DoD Architecture Framework

Version 2.02, Change 1

Volume II: Architectural Data and Models

Architect's Guide

31 January 2015

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1 INTRODUCTION

a. DoDAF Volume II defines the DoDAF meta-model (DM2) and DoD architectural viewpoints and models.

b. The DoD requires architects to use DoDAF 2.0 for architectural descriptions because the DoDAF provides a standard format for exchanging architectural data. DoDAF concentrates on data; DoDAF does not prescribe architectural methods and techniques. Instead, DoDAF focuses on identifying and describing the data that architecture methods and techniques will create, maintain, and present in architectural descriptions. Architects may choose the methods and techniques they use, but architects must choose their methods and techniques to create, maintain, and present architectural data specified by the DoDAF meta-model.

c. For the convenience of architects and owners of architectural descriptions, we describe some conventional views into the DoDAF meta-model of architectural data. We treat these views as models within the discussion of DoDAF viewpoints. The semantics of these views correspond to the semantics of models that architects may generate using their preferred methods and techniques.

d. Owners of DoD core processes may determine the architectural data they require from architectural descriptions. Process owners may require that certain DoDAF viewpoint models be included in architectural descriptions prepared for them. Process owners may also negotiate fit-for-purpose views with architects and owners of architectural descriptions in lieu of or in addition to DoDAF viewpoint models. However, current guidance from both DoD and Chairman of the Joint Chiefs of Staff (CJCS) levies views and presentation requirements on architectural descriptions. Architects should review this guidance and comply with these requirements for specific models and views.

1.1 How this volume is organized

a. This volume contains information for architects and other technical professionals who develop, use, and maintain architectures. Section 1 is the Introduction to this volume. Section 2 presents the DoDAF meta-model data groups; these data groups are the building blocks of architectural descriptions. These data groups cover performers, resource flows, information and data, rules, capabilities, services, projects, organizational structures, measures, locations, and pedigrees.

b. The discussion of each data group includes:

1) introductory information with an overview of the data group;

2) information about the types and relationships incorporated by the data group; and

3) a DoDAF meta-model diagram that shows these types and relationships.

c. Section 3 describes the viewpoints of the DoD architecture framework. Appropriate models are described for each of these viewpoints.

d. Appendices to this volume provide extracts from the DoDAF Glossary. Appendix B identifies and describes the core terms of the DoDAF model as these terms are used here. Appendix C identifies and describes related terms, such as synonyms for core terms and names for patterns of DoDAF elements. Appendix D discusses the sources that were consulted when constructing definitions for core DoDAF terms.

2 DODAF DATA GROUPS

2.1 How to use the DoDAF meta-model (DM2)

2.1.1 DoDAF glossary and model files

a. The DM2 provides a standard glossary of terms and definitions for architecture work within the Department of Defense. These terms may be used across the six major processes of the DoD.

b. The DM2 itself is available as a Sparx Enterprise Architect model file. You may download a free reader for this model file from the Sparx Systems website. Because the DM2 is based on IDEAS rather than UML, you will also need to download the IDEAS SparxEA profile to see the diagrams correctly. After you have installed the SparxEA reader, download the free profile (a specialized drawing palette for Sparx EA models) add-in from the IDEAS Group website and add it to the SparxEA tool.

2.1.2 DoDAF diagrams and UML as an ontology diagramming notation

a. The IDEAS model is represented using UML notation provided by the SparxEA tool and tailored by the IDEAS add-in. The UML language is not ideally suited to ontology specification in its native form. The IDEAS add-in provides IDEAS stereotypes that are used to create IDEAS-based models. Any SparxEA model elements that are not stereotyped as one of the IDEAS foundation elements by the IDEAS add-in will not be considered part of an IDEAS ontology. The IDEAS Foundation specifies the fundamental types that define the profile stereotypes. The super-subtype structure in IDEAS is quite comprehensive, and showing super-type relationships on some diagrams can result in many crossing lines. In these cases, supertypes of a given type are listed in italic text in the top-right-hand corner of a UML element box.

b. The stereotype of an element in an IDEAS UML model is shorthand for the element being an instance of the type referred to by the stereotype, though the type must be one defined in the root package of the foundation. Hence, the stereotype «Individual» indicates that an element is an instance of an Individual. These stereotyped, color-coded class symbols are used in the model:

1) «Individual» An instance of an Individual - something with spatio-temporal extent [color name: grey(80%), color code: R040 G040 B040]

2) «Type» The specification of a Type [color name: pale blue, color code: R153 G204 B255]

3) «IndividualType» The specification of a Type whose members are Individuals [color name: light orange, color code: R255 G173 B091]

4) «TupleType» The specification of a Type whose members are tuples [color name: light green, color code: R204 G255 B204]

5) «Powertype» The specification of a Type that is the set of all subsets of a given Type [color name: lavender, color code: R204 G153 B255]

6) «Name» The specification of a name, with the exemplar text provided as a tagged value [color name: tan, color code: R255 G254 B153]

7) «NamingScheme» The specification of a Type whose members are names [color name: yellow, color code: R255 G255 B000]

c. The following stereotyped relationships are used in the model:

1) «typeInstance» A relationship between a type and one of its instances (UML dependency) [color name: red, color code: R255 G000 B000]

2) «powertypeInstance» A relationship between a type and its powerset (UML dependency) [color name: red, color code: R255 G000 B000]

3) «nameTypeInstance» A relationship between a name and its NameType (UML dependency) [color name: red, color code: R255 G000 B000]

4) «super-subtype» A relationship between a type and one of its subtypes (UML generalization) [color name: blue, color code: R000 G000 B255]

5) «wholePart» A relationship between an individual and one of its parts (UML aggregation) [color name: green, color code: R000 G147 B000]

6) «namedBy» A relationship between a name and the thing it names [color name: black, color code: R000 G000 B000]

7) «tuple»/«couple» A relationship between a things (UML n-ary relationship diamond) [color name: grey (80%), color code: R040 G040 B040]

d. Figure 2-1 illustrates these conventions.

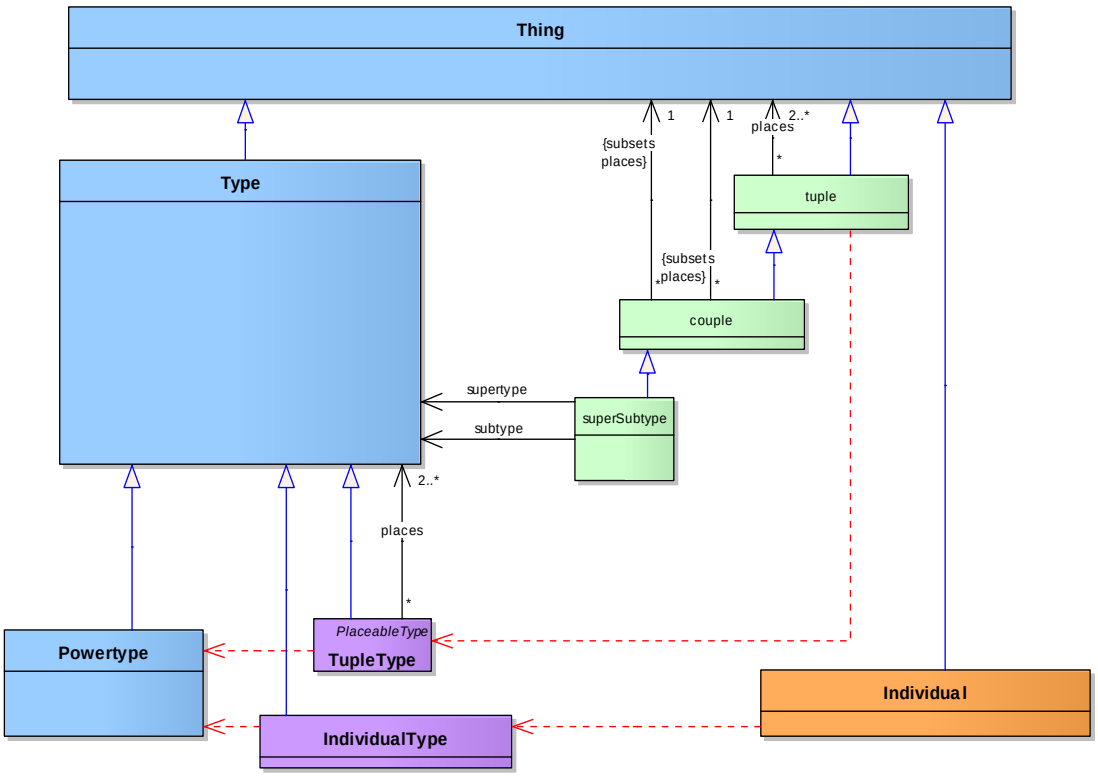


Figure 2-1: An IDEAS diagram with color-coding

e. The DoDAF meta-model follows these naming conventions for types and relationships:

1) Names are formed by concatenating words. The initial letter of each word in a multi-word name is capitalized.

2) Names of types begin with an uppercase letter (i.e., title-case). Names of types are nouns or noun phrases.

3) Names of relationship begin with a lowercase letter (i.e., camel-case). Names of relationships are verbs or verb phrases.

f. The size of graphical elements in DoDAF meta-model diagrams does not signify importance. The sizes or these elements are set to make the diagrams easier to read by reducing the visual clutter of crossing lines and by removing unnecessary bends in connecting lines.

g. The DoDAF Glossary provides ontic terms as they are defined in the DoDAF meta-model. The Glossary also includes a summary of aliases and other synonyms, composite terms and pattern names, and many reference definitions.

h. IDEAS foundational types are generally not shown in data group diagrams. The types not shown include superSubtype, wholePart, temporalWholePart, overlap, typeInstance (memberOf), and beforeAfter patterns.

2.1.3 Support for DoD key processes through DoDAF viewpoints

a. The DODAF groups meta-model concepts that are semantically related. These groups include principle and supporting data groups. Principle data groups are building blocks for describing behavior and structure. Supporting data groups provide properties and attributes for the principle data groups.

b. These DoDAF 2.0 data groups support both DoDAF viewpoints and the DoD key processes: the Joint Capabilities Integration and Development System (JCIDS), the Defense Acquisition System (DAS), the Planning, Programming, Budgeting, and Execution system (PPBE), systems engineering (SE), operations, and portfolio management (both IT portfolio management and capability portfolio management (CPM)). Table 3.3-1 relates DoDAF data groups to DoDAF viewpoints and DoD key processes.

Table 3.3-1: DoDAF data groups related to viewpoints and DoD processes

	viewpoints	DoD processes
meta-model data groups	**AV, CV, DIV, OV, PV, StdV, SvcV, SV**	**JCIDS, DAS, PPBE, SE, OPS, PfM(IT & CPM)**
performer	CV, OV, PV, StdV, SvcV, SV	J, D, P, S, O, C
activity	OV	J, O, C
resource flow	OV, SvcV, SV	J, S, O
data & information	AV, DIV	J, D, P, S, O, C
capability	CV, PV, SvcV, SV	J, D, P, S, O, C
services	CV, StdV, SvcV	J, D, P, S, O, C
project	AV, CV, PV, SvcV, SV	P, S, C
training/skill/education	OV, StdV, SvcV, SV	J, S, O
goals	CV, PV	J, D, P, O, C
rules	OV, StdV, SvcV, SV	J, D, S, O
measures	SvcV, SV	J, D, S, O, C
location	SvcV, SV	P, S, O

c. The principle data groups are:

1) ***Performers.*** Any entity—human things, automated things, and any assemblage of such things—that performs an activity and provides a capability.

2) ***Resource Flows.*** The behavioral and structural representation of the interactions between activities (which are performed by performers) that is both temporal and results in the flow or exchange of things such as information, data, materiel, and performers.

3) ***Information and Data.*** Representations (descriptions) of things of interest and necessary for the conduct of activities. Information is the state of a something of interest that is materialized—in any medium or form—and communicated or received.

4) ***Rules.*** How rules, standards, agreements, constraints, and regulations and are relevant to architectures. A principle or condition that governs behavior; a prescribed guide for conduct or action.

5) ***Capabilities.*** The ability to achieve a desired effect under specified standards of performance and specified conditions through combinations of ways (guidance and rules) and means (resources) to perform a specified set of activities.

6) ***Services.*** A mechanism to enable access to a set of one or more capabilities , where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The mechanism is a Performer. The capabilities accessed are resources, that is, information and data, materiel, performers, and geo-political extents.

7) ***Projects.*** All forms of planned activities that are responsive to visions, goals, and objectives that aim to change the state of some situation. A temporary endeavor undertaken to create resources or desired effects.

8) ***Organizational Structures.*** Representations of the organization types, organizations, and persons in roles that are within the scope of the described architecture.

d. The supporting data groups are:

1) ***Measures.*** All form of measures (metrics) applicable to architectures including needs satisfaction measures, performance measures, interoperability measures, organizational measures, and resource physical measures (e.g., mass). The magnitude of some attribute of an individual.

2) ***Locations.*** A point or extent in space that may be referred to physically or logically.

3) ***Pedigrees.*** The origin and the history of something; broadly, the DoDAF notion of *pedigree* encompasses the background and history of a resource.

2.2 Performers

a. Performers are central to the description of architecture. They are the *who* in architectural descriptions. The *what*—activities—are assigned to performers to produce desired effects. Performers are further subdivided and allocated to organizations, persons in roles, and systems. Locations and measures are then applied to organizations, persons in roles, and systems. Within this assignment and allocation process, there are many major tradeoff opportunities. Automation (mechanization versus people) tradeoffs, analysis for items such as performance and cost/benefit are involved in the process. When these tradeoffs and associated decisions are sufficiently mature, an allocated baseline can be declared and an initial work breakdown structure (WBS) refined.

2.2.1 Data group description

a. Figure 2-2 shows the DoDAF meta-model diagram for the Performers data group.

b. A performer may be:

1) A person in a role such as the roles described by the Amy's military occupational specialties (MOS). A person in a role includes materiel assigned and necessary to carry out the role (for example, see the Army's series of Common Tables of Allowances). A person in a role has temporal whole-parts (states) such as in-garrison or deployed; these temporal parts may have different materiel compositions and other associations.

2) A type of organization or a specific organization that has a mission.

3) A system in the general sense of any assemblage of components—machine and human—that accomplish a function.

4) A service, including software services and business services such as search and rescue.

5) Any combination of the above.

6) The performance of an activity by a performer occurs in physical space and time. That is, at some place and time, the activity is performed. This is referred to as a spatial-temporal overlap, simply meaning that the activity and performer overlap in space and time. There are two ways in which a performer spatial-temporally overlaps an activity:

7) In the act of performing the activity. This sort of overlap may be expressed by saying that a performer is *assigned* to an activity.

8) As part of a larger process (aggregated activities). This sort of overlap may be expressed by saying that a performer is *allocated* to an activity. Allocation forms the initial stages of system or activity decomposition. Allocated performers are assigned to activities in the initial stages of defining performers.

c. A standard, which is a sort of rule, constrains an activity in general and affects how performers carry out activities.

d. A performer may be related to measures that bear on the performance of an activity (e.g., target tracking accuracy.) A performer may also be related to measures that bear on the performer itself (e.g., operational condition).

e. A performer may be *at* a specific location designated by some set of coordinates within a coordinate system. A performer may also be *within* a more general location designated by an area, region, installation, site, or facility. Location type requirements and capabilities of a performer are captured and expressed via the activities that are performed under certain conditions (e.g., must be able to perform maneuver under desert conditions).

f. Activities performed by a system can be called system or service functions (i.e., activities performed by a system). System or service functions are activities that are allocated to hardware, software, firmware, and persons in roles.

g. In typical uses, activities are named by verbs and performers are named by nouns. This distinguishes *what* from *who* at the level of names. In typical specification activities, allocation to performers can take place at different levels of abstraction and at different levels of detail within a level of abstraction.

h. Performers are represented in many places and stages in a detailed architectural description. A pure requirements architectural description would not show allocations to performers; this allocation would come later in the design process.

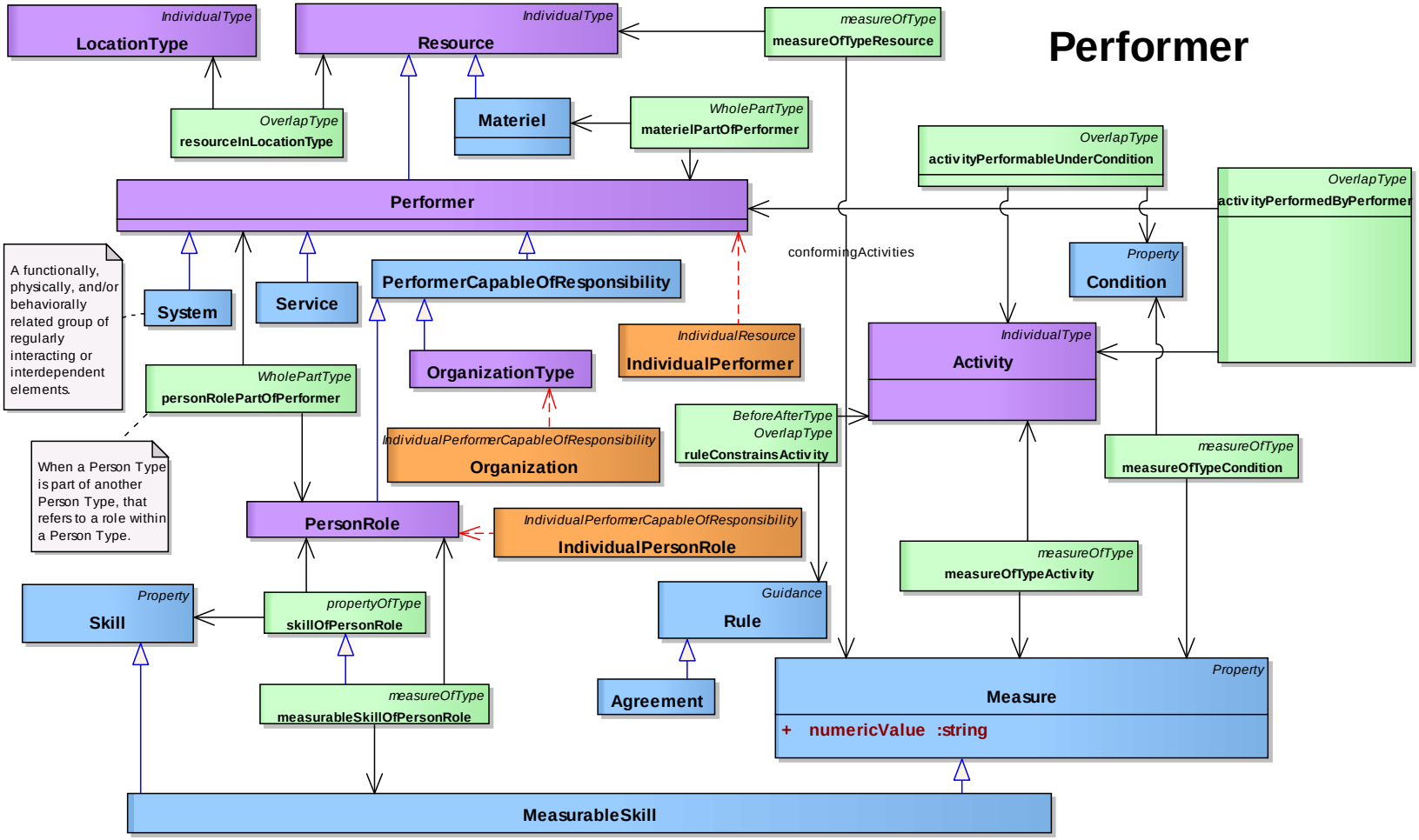


Figure 2-2: DoDAF meta-model diagram for Performers data group

2.2.2 Use in DoD core processes

a. Data for Performers may be used in these ways:

1) JCIDS:

a) Activities carried by persons in roles may correspond to *tactics, techniques, and procedures* (TTP). In this use, *procedures* are sets of activities allocated to performers and *tactics* and *techniques* are guidance for those activities as carried out by those performers.

b) A pure requirements architectural description would not show allocations to performers. This allocation would come later in the design process.

2) PPBE:

a) Programs of record are projects that can contain both material and non-material performers. (See DoD 7045.7-H: FYDP Structure Handbook).

b) Programs of record are linked to the PPBE through the WBS (see DAS) depicting Performers related to cost.

c) The Planning and Programming[1] process analyzes and evaluates capabilities, performers, and properties related to performers.

3) Defense Acquisition System:

a) MIL-STD-881C and DoD 5000.01 provide fundamental guidance for specifications, work breakdown structures, and statements of work within the DAS. Both require the identification of performers and their component parts and types as fundamental elements.

***Planning and Programming**: **Planning** includes the definition and examination of alternative strategies, the analysis of changing conditions and trends, threat, technology, and economic assessments in conjunction with efforts to understand both change and the long-term implications of current choices. Basically, it is a process for determining requirements. **Programming** includes the definition and analysis of alternative force structures, weapon systems, and support systems together with their multi-year resource implications and the evaluation of various tradeoff options. Basically, it is a process for balancing and integrating resources among the various programs according to certain priorities.*

b) The acquisition process generally involves performers through the material acquisition of material systems and the acquisition of activities associated with performers.

c) The acquisition process can acquire services.

4) Systems engineering:

a) Activities are assigned to performers—organizations, persons in roles, and systems. Capabilities, measures, conditions, constraints, and other expressions of requirements are assigned to various performers. Allocation occurs from level-to-level as part of structural design decomposition or design refinement.

b) Allocation is the term used by architects and engineers to denote the organized cross-association (mapping) of elements within the various structures or hierarchies of a user view regardless of modeling convention or standard. The concept of allocation requires flexibility suitable for abstract system specification, rather than a particular constrained method of system or software design. System modelers often associate various elements in abstract, preliminary, and sometimes tentative ways. Allocations can be used early in the design as a precursor to more detailed rigorous specifications and implementations. As definition of requirements gives way to design and as actual components become visible, it becomes important to distinguish between allocated to and assigned to.

c) Some types of performers under configuration control are called system configuration items (CIs). Software configuration items are termed *computer software configuration items* in MIL-STD-881C or simply *software configuration items* (SCIs) in other contexts. Hardware configuration items may follow the MIL-STD-196E taxonomy: central, center, system, subsystem, set, group, and unit.

5) Operations planning:

a) Determines who is going to accomplish the required tasks (activities), where, under what conditions, and to what measures.

6) Capability portfolio management:

a) Performers are the major items in a portfolio to be managed and optimized.

2.3 Resource Flows

a. Resource flows model the flow of resources—materiel, information and data, geo-spatial extents, performers, and any combination thereof. Resource flows are key modeling techniques used to define interfaces and to assure interoperability between activities and their associated

performers (e.g., systems and persons in roles). Resource flow models and associated analysis techniques reveal behavior such as:

1) The connectivity between resources.

2) Resource flow modeling provides an explicit means to describe the behavior of activities, systems, organizations and their composite effects on the overall enterprise.

3) The content of the information flowing between resources (e.g., interface definition).

4) The order or sequential behavior (parallel or serial) of the resources in relation to one another (e.g., project task execution and critical path).

5) The behavior of resource flow between or within organizations (e.g., work flow, information flow).

6) The changes in state during the spatial and/or temporal existence of the resource.

7) The rules that modify the behavior of the resource flow (e.g., business rules, controls, decisions).

8) The measures that define quality, constraints, timing, and other properties of the resource flow (e.g., quality of service (QoS), measures of performance, measures of effectiveness).

9) The flow of control orchestrating the behavior of a resource flow.

2.3.1 Data group description

a. Figure 2-3 shows the DoDAF meta-model diagram for the Resource Flows data group.

b. DoDAF models the consumption and production—the flow—of any sorts of resources, not just flows of information and data exchanges. DoDAF may be used to model:

1) Materiel flows such as ammunition and fuel that are important for modeling the fire rate, logistics, and other aspects of a capability solution so it can be compared with other proposed solutions.

2) Persons in roles such as military occupational specialty (MOS) that allow representation of the training and education pipeline aspects of doctrine, organization, training, material, leadership and education, personnel, and facilities (DOTMLPF).

3) Performers such as organizations, persons in roles, and systems that are produced by a project’s development activities. Among other possibilities, this allows an architect to model an acquisition project.

c. All exchanges and flows are due to producing or consuming activities. Resource flows are activity-based, not performer-based, because a performer cannot produce or consume a resource other than by carrying out an activity. That is, a performer can only give or get a resource by carrying out an activity. For instance, publication and subscription are modeled as an interaction between the publishing activity, the subscribing activity, and the information or data resource. Publication is typically not at the same time as subscription but the subscriber does have to go to the publication place to retrieve the resource. For example, data might be published at 2:00 GMT on a server located at some universal resource locator (URL) and the subscriber may not overlap until 10:00 GMT. In the diagram, the overlap is a *triple* relationship linking the producing activity, the consuming activity, and the resource.

d. The exchange or flow triple may have standards (rules) associated with it such as information assurance and security rules or, for data publication or subscription, data COI and web services standards.

e. Rules and measures are applied to specific activities and their performers. Activities, systems, and persons in roles can be assigned to locations and further can be assigned conditions and constraints.

f. The term flow implies that something (e.g., materiel, information) is moving from point A to point B, hence the use of the foundation concept of “overlap”.

g. The exchange or flow triple may be related to measures such as timeliness, throughput, reliability, or QoS.

h. Information inputs and outputs between resources for some levels of decomposition may be at a higher-level of abstraction than the information characteristics represented in the matrix. This is commonly done to simplify graphical representations of information flow or in the initial definition stages where the characteristics are still unknown. In this case, multiple information exchanges will map to a single resource input or output. Similarly, the information inputs and outputs between resources at a low-level of decomposition may be at a higher-level of detail than the information exchanges in the matrix, and multiple information inputs and outputs may map to a single information exchange. In these cases, to provide the necessary clarity and precision, an ontological or taxonomic structure of information aggregation should be developed for use in each level of decomposition of the resource flow models.

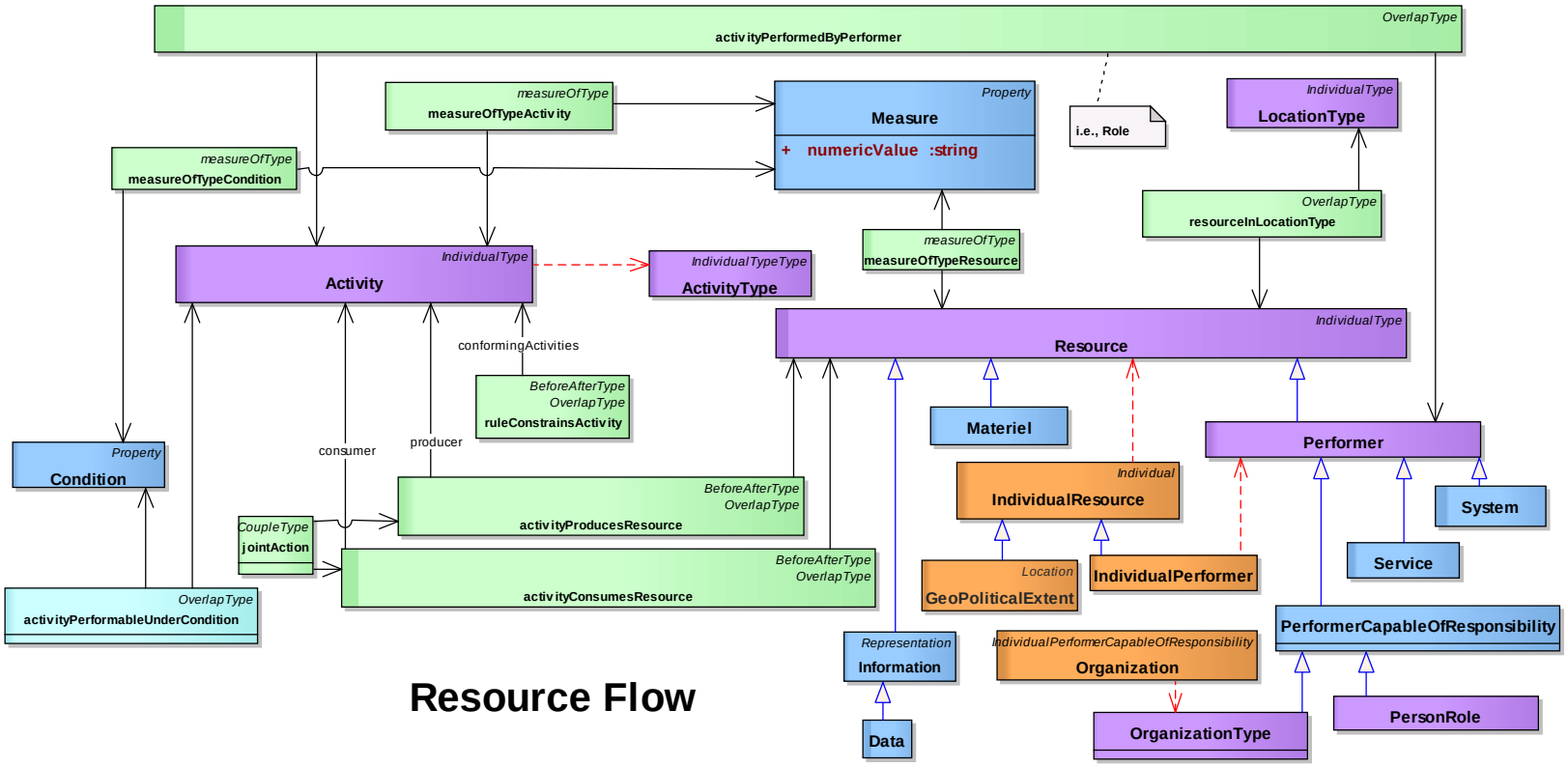


Figure 2-3: DoDAF meta-model diagram for Resource Flows data group

2.3.2 Use in DoD core processes

a. Resource flow modeling is a fundamental engineering based technique used in information technology (IT) architecture, systems engineering, process re-engineering, resource planning, and many other disciplines.

1) JCIDS:

a) Where are activity bottlenecks?

b) Are activities interoperable?

c) Identify new and emerging systems interoperability requirements.

d) Uncover unnecessary or inefficient operational activities and information flows.

e) Evaluate alternative architectures with different connectivity and Resource Flow to maximize capability and minimize automation complexity.

f) Identify critical connectivity needs and interfaces (or key interface profiles) between activities and their performers (organizations and persons in roles).

g) Critical interfaces are generally documented in formal interface documentation signed by the responsible authorities (both information supplier and information consumer) in charge of each end of the interface.

h) Support analysis of alternatives and other systems engineering analyses.

2) DAS:

a) The interface spans organizational boundaries (may be across instances of the same system but used by different organizations).

b) Support the development of test sequences and procedures.

c) The details of resource flow (e.g., of materiel, persons in roles, data) are generally documented in interface control documents (ICDs), interface requirements specifications (IRSs) and interface description documents (IDDs). This data is typically provided to DoD Investment Review Board registry systems for the purpose of milestone reviews and support of acquisition decisions points.

3) PPBE:

a) Ensure FYDP provides flows needed for operations and missions

b) Ensure consumption requirements are met by producers

4) Systems engineering:

a) Identify new system or service, functions (activities), components, and modifications required.

b) Identify new resource flow and system integration requirements.

c) Identification of the need for application of new standards.

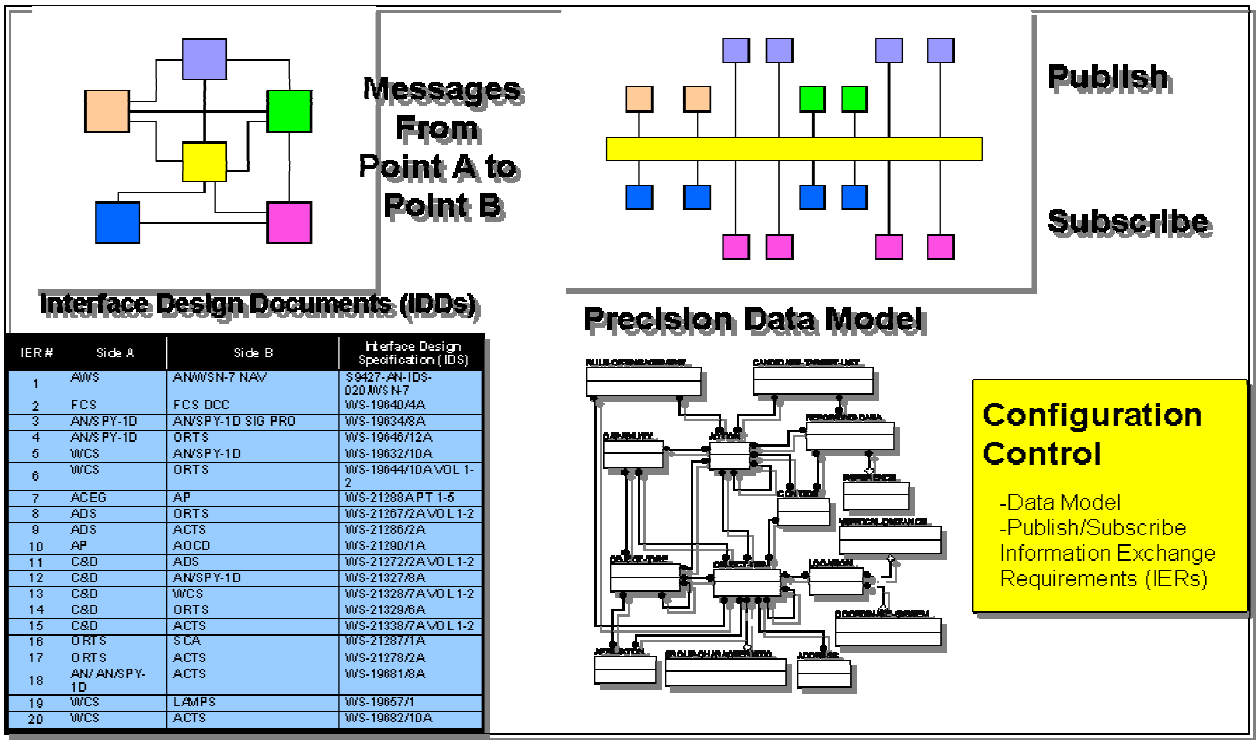
d) Clearly identify the relationship and information flow between systems and system/services in an system of systems (SoS) or between services in a service oriented architecture (SOA) including definition of publish or subscribe requirements

e) Interface identification and definition including interoperability analysis and standardization.

f) Support configuration management of interfaces. Interfaces are generally documented in interface documentation representing the agreements of the responsible parties in charge of each end of the interface (both information supplier and information consumer). This, in no way implies a point-to-point interface. Interfaces implemented with an enterprise service bus, for example, are defined with appropriate publish/subscribe documentation formalized, if necessary, with contractual agreements between information supplier and consumer.

g) Critical interfaces are generally documented in formal interface documentation signed by the responsible authorities (both information supplier and information consumer) in charge of each end of the interface. For legacy point-to-point interfaces this may be in the form of interface control drawings (ICDs), interface requirement documents (IRSs), interface design documents (IDDs), among others. In multiple access or common connectivity (radio communications or bus type connectivity) implementations may be in the form of formal agreements (seen here as consent among parties to the terms and conditions of activities they participate in) detailing the specific set of implementation (e.g., Tactical Digital Information Links) data elements implementation tables or, in the case of a SOA, a publish and subscribe implementation document. These agreements are, in general, managed and controlled by the SoS or system project manager. In new systems, and where possible the interface should be managed and configuration controlled using a common precision data model. Figure 2-4 illustrates the evolution from configuration control of legacy point-to-point interfaces to a net-centric,

distributed processing means of connectivity using carefully managed publish and subscribe agreements and documentation based on formally documented logical and physical data models.



IER #	Side A	Side B	Interface Design Specification (IDS)
1	AWS	AN/WSN-7 NAV	S9427-AN-IDS-020 /WSN-7
2	FCS	FCS DCC	WS-19840/4A
3	AN/SPY-1D	AN/SPY-1D SIG PRO	WS-19834/8A
4	AN/SPY-1D	ORTS	WS-19646/12A
5	WCS	AN/SPY-1D	WS-19632/10A
6	WCS	ORTS	WS-19644/10A VOL 1-2
7	ACEG	AP	WS-21288 APT 1-5
8	ADS	ORTS	WS-21267/2A VOL 1-2
9	ADS	ACTS	WS-21286/2A
10	AP	AOCD	WS-21290/1A
11	C&D	ADS	WS-21272/2A VOL 1-2
12	C&D	AN/SPY-1D	WS-21327/8A
13	C&D	WCS	WS-21328/7A VOL 1-2
14	C&D	ORTS	WS-21329/8A
15	C&D	ACTS	WS-21338/7A VOL 1-2
16	ORTS	SCA	WS-21287/1A
17	ORTS	ACTS	WS-21278/2A
18	AN/ AN/SPY-1D	ACTS	WS-19681/8A
19	WCS	LAMPS	WS-19857/1
20	WCS	ACTS	WS-19682/10A

Figure 2-4: Migrating from legacy to data focused configuration management

5) Operations planning:

a) Operations utilizing information flows should be technology independent. However, operations and their relationships may be influenced by new technologies. There may be some cases in which it is necessary to document the way activities are performed to examine ways in which new systems could facilitate streamlining the activities

b) Mission planning, including simulation and training.

c) Logistics planning.

d) Provide a necessary foundation for depicting information needs and task sequencing to help develop and use procedures, operational plans, and training.

e) Identify critical mission threads and operational resource flow exchanges by annotating which activities are critical (i.e., identify the activities in the DoDAF-described model that are critical, such as a project's critical path).

6) Capability portfolio management:

a) Resource flows can be used to represent the structural and behavioral relationships between the Activities and Performers within the portfolio including interfaces and interdependencies.

2.4 Information and Data

a. Information is the state of a something-of-interest that is materialized, in any medium or form, and communicated or received. DoDAF 2.0 emphasizes the identification and description of the information in a semantic form (what it means) and why it is of interest (who uses it). Although this may entail some formality, such as describing relationships between concepts, its purpose is to convey the interests in a decision-maker's frame of reference.

b. Data is the representation of information in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. Data is concerned with the encoding of information for repeatability, meaning, and use by performers following standard procedures. While information descriptions are useful in understanding requirements (e.g., inter-federate information sharing requirements or intra-federate representation strategies), data descriptions are important in responsive implementations of those requirements and assurances of interoperable data sharing within and between federates.

2.4.1 Data group description

a. Figure 2-5 shows the DoDAF meta-model diagram for the Information and Data data group.

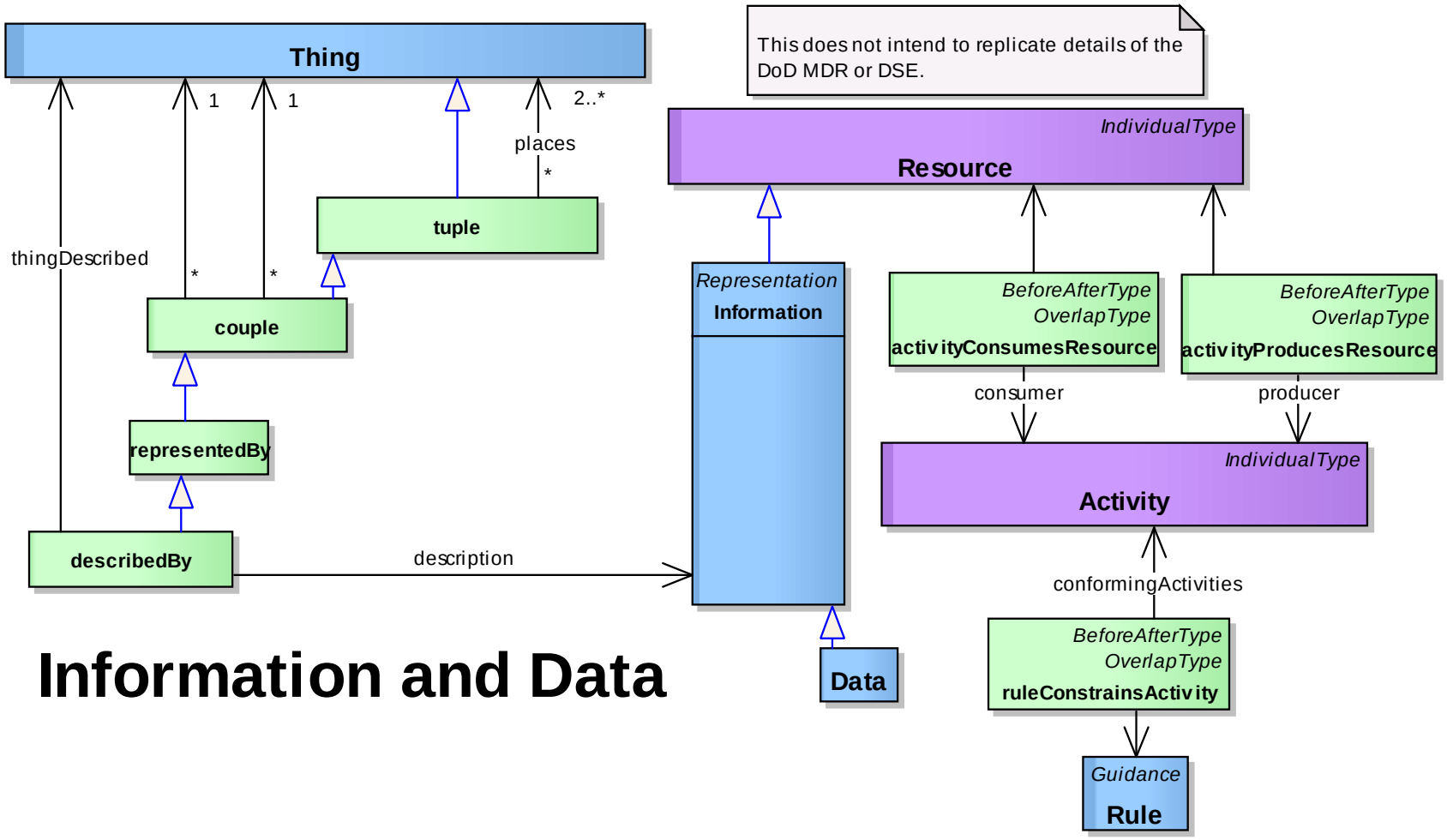


Figure 2-5: DoDAF meta-model diagram for Information and Data data group

b. The key concept in this model is that information describes some real thing: material, temporal, or even abstract, such as a relationship (tuple) or set (type).

c. Since information is a thing, information can describe other information (e.g., metadata).

d. A name is a type of information in that it describes a thing. A name may be short or long—there is no restriction. A textual description can be thought of a just a long name. Information is more general than text strings and could be structured, formalized, or include other manners of description such as diagrams or images.

e. Information, as a sort of resource, inherits whole-part, super-subtype, and before-after relationships.

f. Should humans or machines be able to process some information in a repeatable way, such information is called *proceduralized*. Not all proceduralized information is necessarily computerized; forms are examples of data proceduralized for human repeatable processing.

g. Data to be proceduralized has associations such as parts and types as well as other application specific associations. Therefore, for an entity-relationship model, attributes are associations with entities and entities are related according to verb phrases and cardinalities. In the physical schema, the fields are associated to data types.

h. The representation for data is not intended to cover all the details of, for instance, a meta-model underlying a relational database management system (RDBMS) , but just those aspects necessary to support the decision-making of the core processes.

i. Architectural descriptions describe architectures. An activity model is an example of an architectural description. Two subtypes of architectural description are called out—the AV-1 and the manifest—due to their importance in discovery and exchange, respectively. AV-1 information can also be provided in a structured manner, using the Projects data group to describe the architecture project's goals, timeline, activities, resources, productions, rules, and measures.

j. All methods, even the most philosophical and methodical, involve the ingestion of some record of the enterprise's processes, legacy information-keeping systems, and descriptions of what types of things it thinks it deals with. Upon collection of this raw data, terms within it are then:

1) Identified. This is done by noting recurring or key terms.

2) Understood. Definitions of terms are sought and researched. In most cases, there are multiple authoritative definitions. Definitions selected should be appropriate for the context of use of the term within the enterprise activities.

3) Collated and correlated. This is done by grouping seemingly similar or related terms.

4) Harmonized. In this step, aliases, near-aliases, and composite terms are identified. A consensus definition is formulated from the authoritative source definitions. Often super-subtype and whole-part relationships begin to emerge.

k. The next step is to relate the harmonized terms. Some of the relationships are implicit in the definitions and these definitions may contribute to the relationship description. At this point, the formality can vary. A formal ontological approach will type all relationships to foundational concepts such as whole-part and super-subtype. However, there are many metaphysical challenges with such an approach and it is not necessary for many applications. This constitutes the conceptual-level of modeling, and the defined and related terms are now considered concepts because the definitions and relationships lend a meaning to the terms. The conceptual model should be understandable by anyone knowledgeable about the enterprise. Super-subtype and whole-part relationships can provide cognitive economy. Conceptual models can be done in Entity-Relationship or UML Class model style although any format that documents definitions and relationships is functionally equivalent. The subtype concept in UML generally results in the subclass inheriting properties from the supertype while in Entity-Relationship (E-R) modeling only the identifying keys are inherited directly; the other supertype properties are available after a join operation.

l. At the logical-level, relationships may have cardinalities or other rules added that indicate how many of one instance of something relates to an instance of something else, the necessity of such relations, and so on. The concepts may also be attributed, meaning they will be said to have some other concept (e.g., the concept of eye has the concept of color). Often at the logical-level, the relationships are reified or made concrete or explicit. At the logical-level, this is done in case there is something additional that needs to be stated about the relationship, e.g., the quantity of some part of something or the classification of the related information, which may be different from the classification of the individual elements. There may also be considerations of normalization, meaning that the database structure is modified for general-purpose querying and is free of certain undesirable characteristics during insertion, update, and deletion operations that could lead to a loss of data integrity. The benefits of normalization are to uncover additional business rules that might have been overlooked without the analytical rigor of normalization and ensure the precise capture of business logic. The logical model, though having more parts than the conceptual model, should still be understandable by enterprise experts. At the logical-level, some sort of modeling style is normally used such as entity-relationship data modeling or UML class modeling.

m. At the physical-level, the exact means to exchanged, store, and process data are determined. At this level, we are talking about data. The efficiency, reliability, and assured repeatability of the data use are considered. The data types and the exact formats in which the data is to be stored are determined. The data type needs to accommodate all the data that is permissible to store or exchange yet be efficient and disallow formats that are not permissible. The entities may be de-normalized for efficiency so that join operations do not need to be performed. Logical associations may be replaced with identifiers (e.g., as associative entities or foreign or migrated keys in entity relationship diagrams or explicit identifier attributes or association classes in class models). Keys, identifiers, and other means of lookup are setup. Indexes, hashes, and other mechanisms may be setup to allow data access in accordance with requirements. The physical target may be any of the following:

1) Database – relational, object, or flat file.

2) Message exchange format – document (e.g., XML), binary (e.g., Interface Definition Language).

3) Cybernetic (human – machine), e.g., print or screen formats, such as forms.

2.4.2 Use in DoD core processes

a. Information and Data models may be used in these ways:

1) Commonality and interoperability between core processes:

2) Information models materialize for enterprise participants what things are important to the enterprise and how they are related.

3) Information models can serve as a basis for standardization of terminology and concept inter-relationships for human, machine, and human-machine communications.

4) Information models can provide cognitive compactness by promoting taxonomies and other relationship structures. This can improve clarity, efficiency, accuracy, and interoperability of action.

5) Information models document the scope of things the enterprise is concerned with in a form that allows comparison with other communities of interest to reveal common interests.

6) COI coordination and harmonization.

7) Authoritative sources identification and management.

8) JCIDS and PPBE:

a) Data and information models can be used to determine if a proposed capability will interoperate, be redundant with, or fill gaps in conjunction with other capabilities.

9) Systems engineering and DAS:

a) Data models can be used to generate persistent storage of information such as in databases.

b) Data models can be used to generate formats for exchanging data between machines, humans, and machine-to-human. For example, an XSD is a physical data model that is generally an exchange format. Web services can be used with an RDBMS to generate XML for exchange in the format of the data model implemented in the RDBMS. The underlying data models (the physical data model and the exchange data format) do not have to be the same; a translator or mediator may be invoked to translate during the exchange.

c) Data models can be used to compare whether Performers are compatible for data exchange.

d) Interdependent data or information needs.

e) Data and information models can be used during milestone reviews to verify interoperability, non-redundancy, and sufficiency of the solution.

f) Information models are useful in initial discovery of a service, to know what sorts of information it may provide access to or its accessed capabilities need. An information model is part of a service description.

g) Data models are useful in knowing how to interact with a service and the capabilities it provides and for establishing the service contract. A data model is part of a service description and service contract.

h) Database/sources consolidation and migration.

i) Standards definition and establishment.

j) Mediation and cross-COI sharing.

10) Operations planning:

11) Capability portfolio management:

a) Data and information models can be used to determine if components of a portfolio have:

b) Overlapping data or information production (an indication of potential unwanted redundancy).

c) Data assets management.

2.5 Rules

a. Rules are prescriptive sets of procedures regarding the execution of activities within an enterprise. Rules exist within the enterprise whether or not they are ever written down, talked about, or even part of an organization's consciousness. However, organizations often gather rules in a formal manner for specific purposes.

b. Business rules are a type of rule that govern actions. Business rules are initially discovered as part of a formal requirement-gathering process during the initial stages of a project or during rigorous analysis of activities. In this case, the collecting of the business rules is coincidental to the larger discovery process of determining the workflow of an activity. Projects such as the launching of a new system or service that supports a new or changed business operation might lead to a new body of business rules for an organization that would require employees to conceptualize the purpose of the organization in a new way. This practice of coincidental business rule gathering is vulnerable to the creation of inconsistent or even conflicting business rules within different organizational units, or within the same organizational unit over time.

c. The DoDAF meta-model provides a set of clear, concise data about rules. Such data help architects create and share rules.

d. A rule is not an activity—these two concepts are related but are very different. An *activity* is a transformation that produces new resources from existing resources. In contrast, a *rule* prescribes the ways that an activity may be carried out.

2.5.1 Data group description

a. Figure 2-6 shows the DoDAF meta-model diagram for the Rules data group.

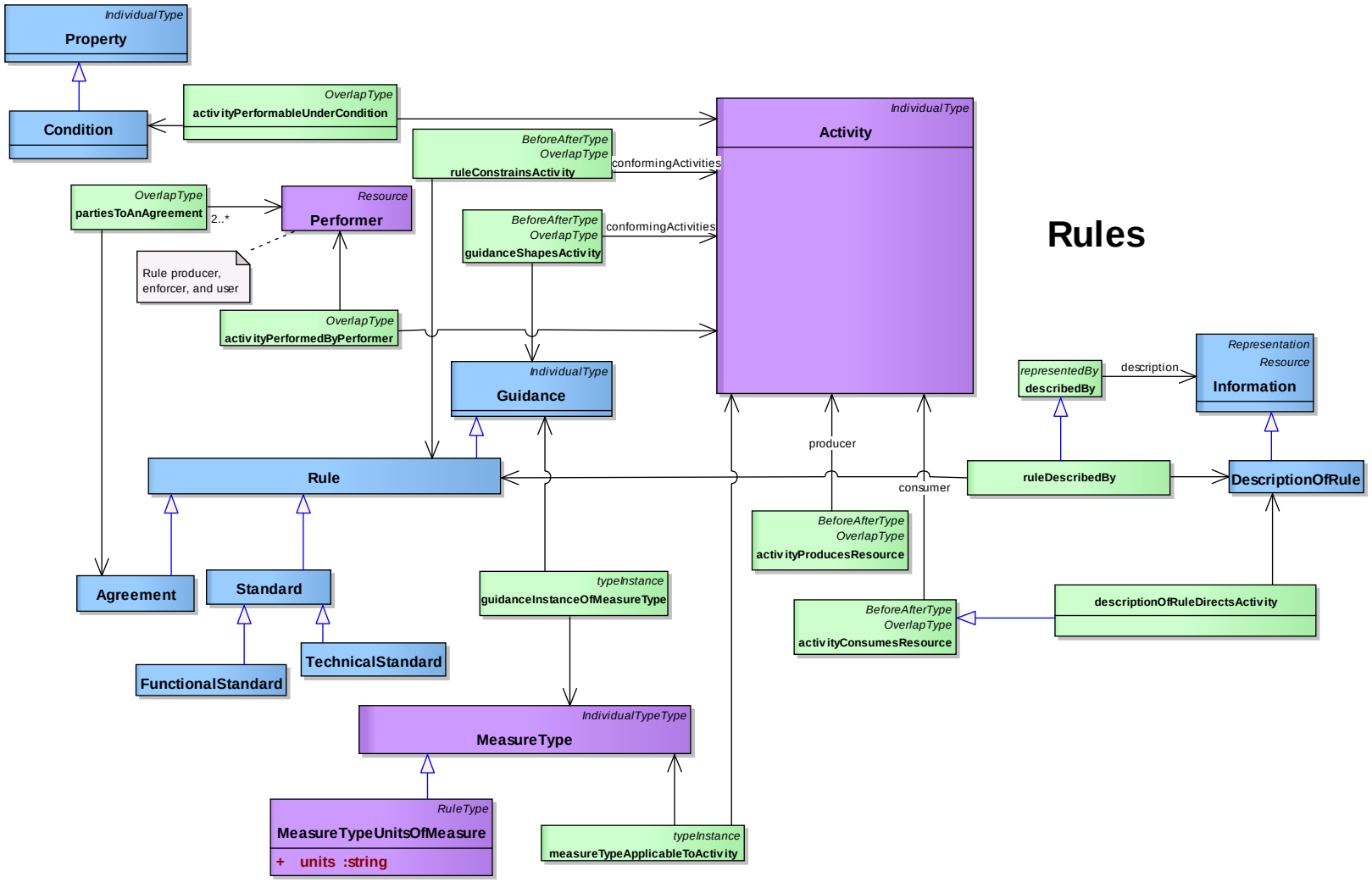


Figure 2-6: DoDAF meta-model diagram for Rules data group

b. A rule constrains activities. For example, a speed limit rule constrains driving activity. Some seemingly static rules have the effect of limiting possible activities. For example, a rule that security fences must be ten feet high constrains the activity of building security fences. This constraint may apply or vary under certain conditions. For example, speed limits can be lower in poor weather conditions.

c. Security classification, security marking, and criteria for release of information are types of guidance. Similarly, a rule is a stronger form of guidance.

d. An important constraint type is a service policy that constrains access to capability performers.

e. By definition, doctrine constrains military action.

2.5.2 Use in DoD core processes

a. Rules data are used to create, document, and share rules of all types that support activities. These data can include:

1) Activities that define transactions where data must be exchanged or passed to execute activities such as PPBE, CPM, JCIDS, and DAS.

2) Rules that define methods of accessing information or services within the net-centric environment, including operations planning, PPBE, CPM, and JCIDS.

3) The order of steps that occur in a series of actions that must be performed in a specific order, such as DAS, systems engineering, PPBE, and CPM.

4) Rules defining analysis of options or future actions, such as operations planning, JCIDS, PPBE, and CPM.

b. Data for Rules may be used in these ways:

1) JCIDS:

a) For materiel facility, installation, and site trade-offs as part of DOTMLPF analyses.

b) For detailing interoperability requirements.

c) In constraining requirements dealing with material and non-material solutions.

d) In relating doctrine and TTP to material and non-material solutions.

2) PPBE:

a) In the planning and programming process, many rules are applied to cost-benefit tradeoffs, cost estimation, program structure, and program constraints.

3) DAS:

a) In both technical and programmatic aspects of the DAS.

b) In specifications, standards, directives, and guidelines.

4) Systems engineering:

a) In the architectural descriptions of systems, describing both structure and behavior.

b) In standards applied throughout the design and development process.

5) Operations planning:

a) Rules are the basic elements contained in doctrine, TTP, and training publications. Rules are used throughout the development and architectural descriptions of operational activities.

6) Capability portfolio management:

a) In describing and governing both the programmatic and technical aspects of the portfolio.

b) In describing the standards and constraints applicable to the portfolio.

2.6 Capabilities

a. The Capabilities data group provides information on the collection and integration of activities that combine to respond to a specific requirement. A capability, as defined here is *"the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks."* This definition is consistent with that contained in the JCIDS Instruction published by the Joint Staff.

2.6.1 Data group description

a. Figure 2-7 shows the DoDAF meta-model diagram for the Capabilities data group.

b. *Ways* are interpreted as guidance, rules, and standards. *Means* are interpreted as resources.

c. Because a *desired effect* is a desired state of a resource (see Goals data group), a capability is about states—the persistence of current states and changes to future states—of resources.

d. *Capabilities* link to *measures* through the *activities* they entail as parts and the *desired effects* sought.

e. *Capabilities* relate to *services* via the realization of the *capability* by a *performer* that is a *service*. In general, a *service* would not provide the *desired effect(s)* but, rather, access to ways and means (*activities* and *resources*) that would.

f. *Desired effects* are *resource states*. This simplification is enabled by the formal ontology on which the model is founded, specifically, 1) because the ontology is four-dimensional, all instances are spatio-temporal extents so a resource has a temporal extent and has possible future extents, and 2) because the ontology is meronymic, resources have wholes and parts so that a resource can be a complex aggregate of all types of things, in principle including Political, Military, Economics, Social, Infrastructure, and Information (PMESII).

g. Desired *resource states* are ontologically synonymous with *goals*, *objectives,* and *outcomes*. Extensive research by the DoDAF working group that developed this model concluded that there was no objective distinction between the concepts because only subjective terms such as “more”, “greater”, “longer term”, “broader”, etc. were used to distinguish them. Since the foundation ontology is spatio-temporally mereologic, this distinction is not necessary.

h. Desired *resource states* can be for *resource states* of adversarial or neutral parties as well as blue force. For example, for a Joint Suppression of Air Defenses (JSEAD) *mission*, the *desired effects* might include that the *resource state* of the target area’s air defenses reaches some desired *measures* of destruction, denial, disruption, degradation, and / or deception (D5). For a humanitarian assistance *mission*, the *desired effects* might include that the *resource state* for the victim population reaches nutrition, shelter, health, and low casualty rates.

i. *Activities*, including *operational activities*, are ontologically synonymous with *Tasks*. The DoDAF capability modeling group could not determine an objective distinction.

j. *Measures* enable modeling of the quantifiable aspects of the *desired effect* as well as the performance of *tasks* and the *conditions* under which they must be performed.

k. In addition to *measures* associated with *task* performance, specified standards also imply conformance with *guidance*, *rules*, etc., shown as a constraint on the performance of the *tasks*.

l. Conditions are modeled in accordance with the UJTL conditions and, therefore, measures are also associated with conditions.

m. A related resource flow model, of which core elements are shown above (*Activity, activityProducesResource, activityConsumesResource, and Resource*) links Activities to produced *resources* (i.e., resource states and typically complex aggregates of resources) so that

the *tasks* to produce the *desired effects* are modeled as resource flows. This enables not only linkage of the *tasks* with the *desired effects* but also modeling of intermediate (e.g., causal) desired effects that can lead to the end-state *desired effect*. Activities and their *performers* are the core of the *ways and means* – *capability configuration*.

n. *Capability configurations* that might provide such a *capability* are modeled as *performers*, which are typically aggregates of air, space, and cyber assets that are located geo-spatially and that have *measures* associated with their overall performance and readiness as well as the individual elements that comprise them, including the personnel.

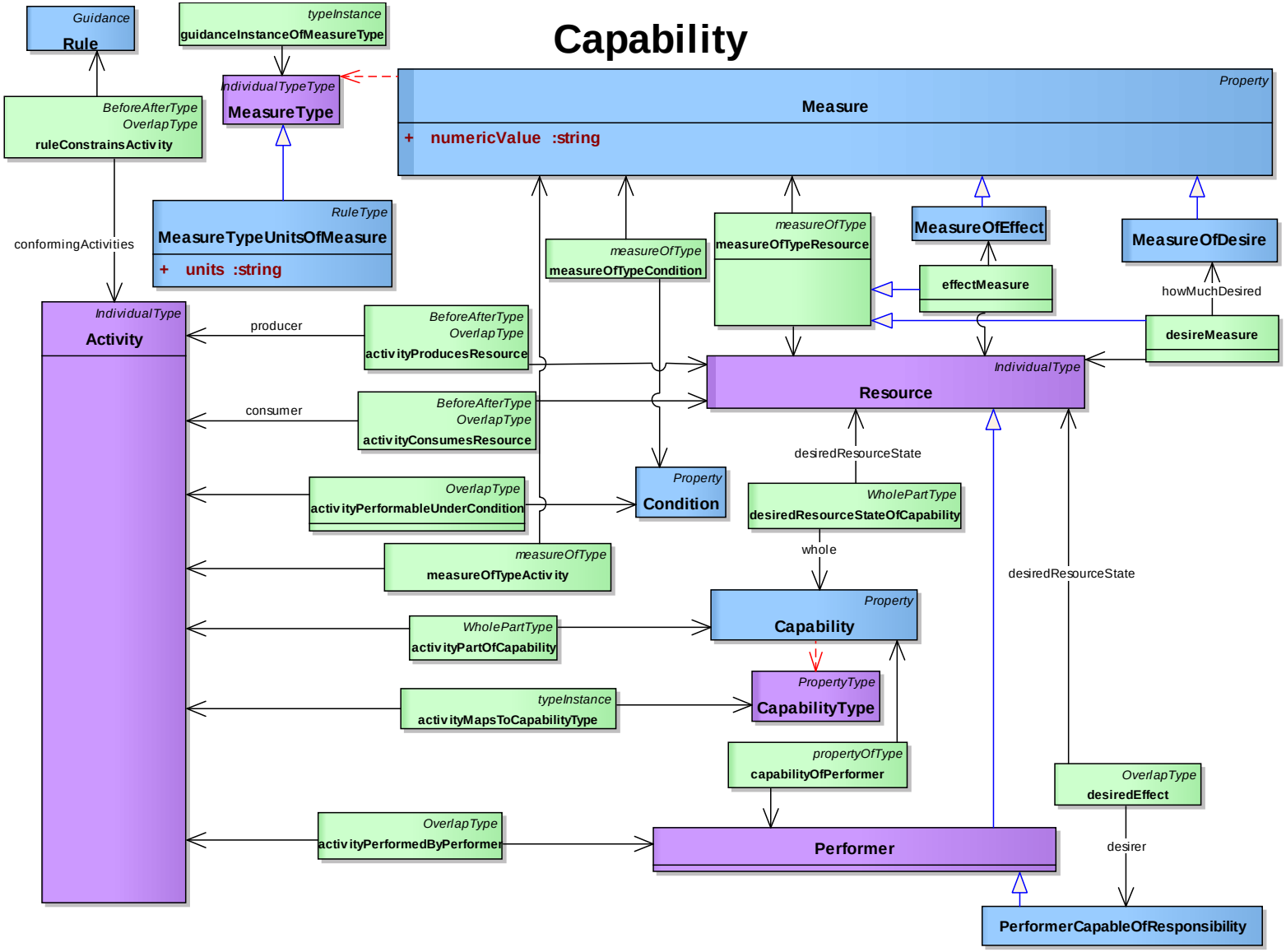


Figure 2-7: DoDAF meta-model diagram for Capabilities data group

2.6.2 Use in DoD core processes

a. The Capabilities data group is used to describe capabilities; define acquisition and development requirements necessary to provide required capabilities; foster understanding of capability execution; develop, update, and improve doctrine and education to support capability execution; and share and reuse data.

The Capabilities data group has a representation at different levels, from enterprise level to solutions and applies to all DoD core processes. This includes enterprise goals associated with the overall vision, that provide a strategic context for the capabilities described by an architecture, and an accompanying high-level scope, more general than the scenario-based scope defined in an operational concept diagram. At this level, the Capabilities data group enables a high-level description of capabilities in decision-makers contexts that can be used for communicating a strategic vision regarding capability evolution. Factors considered in a capability-based analysis include the DOTMLPF factors: doctrine, organization, training, materiel, leadership and education, personnel, and facilities. The following paragraphs discuss how the Capabilities data group supports analyses of these factors.

b. ***Doctrine***. In Joint Pub 1-02, *Dictionary of Military and Associated Terms*, "doctrine" is defined as "Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

c. The concept of judgment in application concerns decision-making. This cannot be precisely modeled except perhaps as rules affecting the applicability of other rules. The parts of doctrine that can be modeled are included in the Capabilities data group as follows:

1) Principles are modeled as rules.

2) Military forces and elements thereof are modeled as types of performers and assemblies of performers.

3) Actions are modeled as activities.

d. Thus, doctrine is contained in the specification of certain fundamental rules, activities, and performers and the relationships among them. These relationships are:

1) Each performer must be the performer of one or more activities.

2) Each activity must be performed by one or more performers.

3) Each rule may be a constraint on one or more activities.

4) Each activity may be constrained by one or more rules.

e. Thus, since the DM2 contains the entities and relationships listed above it contains the necessary and sufficient set of entities and relationships to permit the modeling of doctrine and a separate data group for doctrine is not required.

f. ***Organization***. An organization is a specific real-world assemblage of people and other resources organized for an ongoing purpose. DM2 models organizations as a type of performer.

g. Defining an organization as an assemblage means that an organization has whole-part relationships. An organization may include other organizations. Each part of one organization may also be a part of other organizations. The following DM2 relationships are involved in the capability-based analysis of organization where each organization is a type of performer:

1) Each capability must be the result of one or more activities.

2) Each activity must be performed by one or more performers, where each performer must be a type of organization; therefore, each capability must be provided by one or more organizations.

3) Each organization must be the performer of one or more activities.

4) Each rule may be a constraint on one or more activities.

5) Each activity may be constrained by one or more rules.

h. ***Training***. Training is defined as an activity or set of activities to increase the capacity of one or more performers to perform one or more activities under specified conditions to specified standards of performance:

1) Each performer may be either an organization or a person in a role.

2) Each performer must be of one or more activities.

3) Each activity must be performed under one or more conditions.

4) Each activity must be completed to meet one or more standards.

5) Each standard must be specified by one or more measures.

i. ***Materiel.*** Materiel is a type of resource. Like organizations, materiel has whole-part relationships. Materiel may be a whole comprised of parts that are themselves materiel, and a materiel may be a part of other materiel.

j. The following DM2 relationships are involved in the capability based analysis of materiel where each Materiel is a part of a Performer:

1) Each performer must be assigned to one or more organizations.

2) Each performer must be used by one or more persons in roles, and each person in a role must be a member of only one organization at any one time.

3) Each capability must be the result of one or more activities.

4) Each activity must be performed by one or more performers, and each performer must be either an organization or a person in a role.

5) Each performer must be the performer of one or more activities.

6) Each rule may be a constraint on one or more activities.

7) Each activity may be constrained by one or more rules.

k. ***Leadership and education***. Joint Pub 1-02 does not define leadership. In the context of the DM2, leadership is defined as the ability to lead. Joint Pub 1-02 defines *military education* as the systematic instruction of individuals in subjects that will enhance their knowledge of the science and art of war. Thus, to a certain extent, leadership is a set of skills that can be taught as part of the science and art of war and a smaller set of skills that can be trained as activities that must be performed under specified conditions to meet specified standards.

l. Leadership is about judgment in application of doctrine. Leadership deals with decision-making, and it cannot be precisely modeled except perhaps as rules affecting the applicability of other rules.

m. ***Personnel.*** Personnel refer to persons in roles. Each person in a role is a type of performer.

n. The following DM2 relationships are involved in the capability based analysis of materiel where each person in a role is a type of performer:

1) Each person in a role must be assigned to only one organization at any one time.

2) Each person in a role may be the user of materiel.

3) Each materiel must be used by one or more persons in a role.

4) Each capability must be the result of one or more activities.

5) Each activity must be by one or more performers, where each performer must be either an organization or a person in a role using a materiel.

6) Each person in a role must be the performer of one or more activities.

7) Each rule may be a constraint on one or more persons in a role.

8) Each activity may be constrained by one or more rules.

o. ***Facilities.*** A facility is a real property entity consisting of underlying land and one or more of the following: a building, a structure (including linear structures), a utility system, or pavement. This definition requires that facilities be firmly sited *on* or *beneath* the surface of the earth. Things such as tents, aircraft, and satellites that are not fixed to a location on or beneath the surface of the earth are a type of materiel. Facilities and their materiel are germane to capability-based analyses through these relationships:

1) Each facility may be the site of one or more performers and any materiel that is part-of the performer(s).

2) Each performer may be at only one facility or within a materiel enclosure at any one time.

3) Because a facility is an individual, it has a spatial and temporal extent.

4) An individual instance of materiel has a spatial and temporal extent in contrast to a type, which does not. Generally, architectural descriptions deal with types of materiel, not with specific individuals such as serial-numbered items of equipment. However, the DM2 does represent a performer at a location and, consequently, any materiel that is part of the performer would also be at the location.

2.7 Services

a. A service, in its broadest sense, is a well-defined way to provide a unit of work, through which a provider provides a useful result to a consumer. Services do not necessarily equate to web-based technology or functions, although their use in the net-centric environment generally involves the use of web-based, or network-based, resources.

b. Functionally, a service is a set of strictly delineated functionalities, restricted to answering the *what-question*, independent of construction or implementation issues. Services form a layer, decoupling operational activities from organizational arrangements of resources, such as people and information systems. Finally, Services form a pool that can be orchestrated in support of operational activities, and the operational activities define the level of quality at which the services are offered.

c. The Services data group provides those data that support the definition and use of services within the net-centric environment. Section 2.7.1 identifies and describes the data within the group; Section 2.7.2 provides an example method for collecting data on services; Section 2.7.3 provides illustrative uses of the data, and Section 2.7.4 provides presentation examples for using the services-related data for presentation to/for management in decision-making.

2.7.1 Data group description

a. Figure 2-8 shows the DoDAF meta-model diagram for the Services data group.

b. Services are activities done by a service provider (performer) to achieve desired results for a service consumer (other performer). A service is a type of performer. This means that a service performs an activity and may thus provide a capability.

c. Capabilities and services are related in two ways. One, the realization or implementation of a capability by a performer (usually a configuration of performers, including locations) may include within the configuration services (or service compositions) access other performers within the overall performer configuration. Conversely, the realization or implementation of a capability by a performer (configuration, including location) may provide the performers that are accessed by a service (or service composition).

d. Services in DoDAF 2.0 include non-business services such as search and rescue services. This is important to keep in mind because much of the SOA literature looks only at information technology services.

e. Although, in principle, anything has a description, the importance of self-description for discovery and use of services merits its call-out as a class. A service description provides whatever information is needed to use the service and no more. As such, it may include visible functionality, QoS, interface descriptions, data descriptions, and references to standards or other rules (service policy). A service description does not examine the inner workings of the service.

f. Since service inherits whole-part, temporal whole-part (and with it before-after), service may refer to an orchestrated or choreographed service, as well as to individual service components.

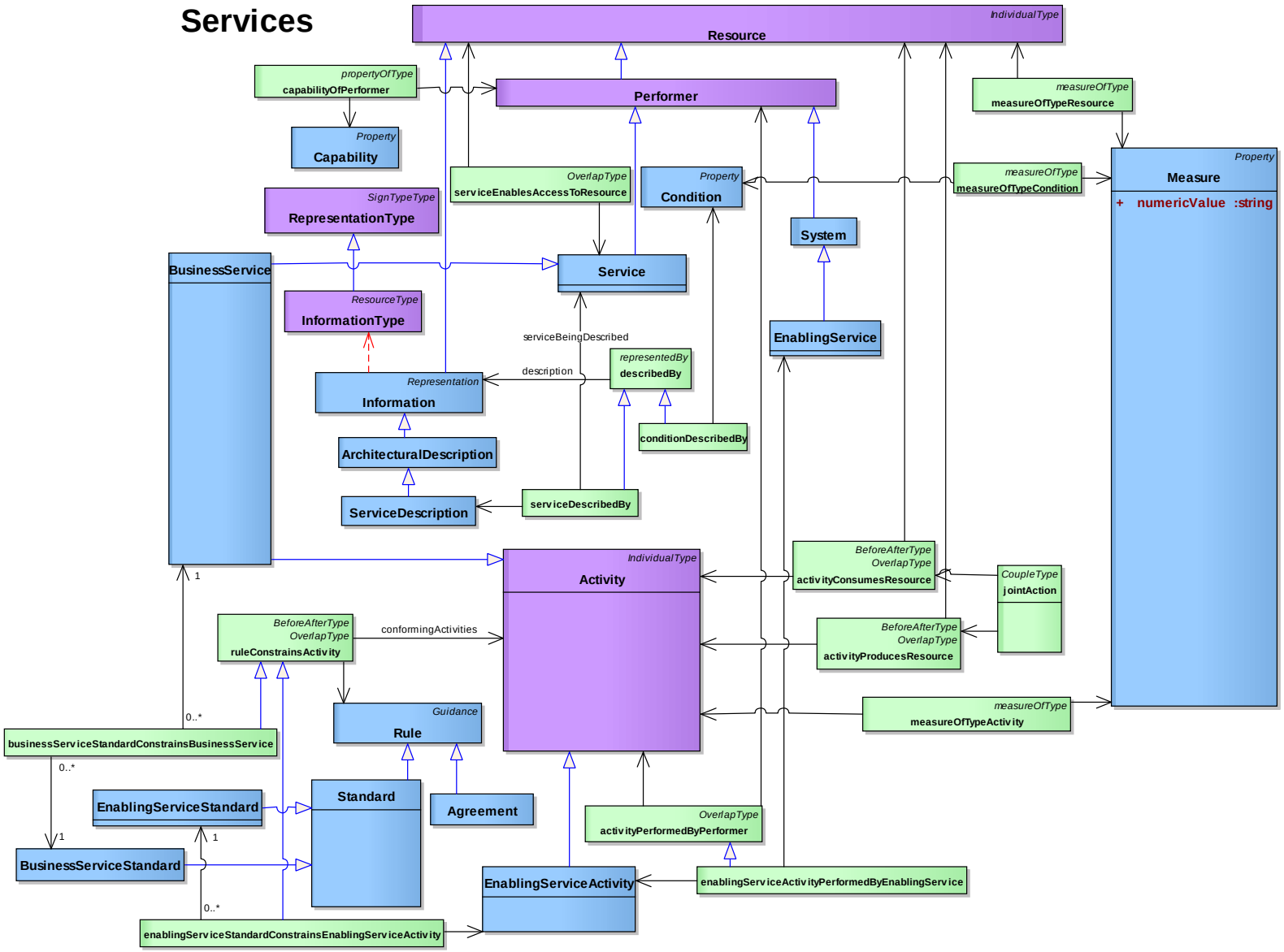


Figure 2-8: DoDAF meta-model diagram for Services data group

2.7.2 Use in DoD core processes

a. The Services data group captures service requirements for capabilities, performers, and operational activities supporting all the core processes. The DM2 data elements describing Services are linkable to architecture artifacts in the Operational, Capability, System, and Project Viewpoints.

b. Data for services may used in these ways:

1) JCIDS, PPBE, DAS, and systems engineering:

a) Services, such as those reified into web or other computer-based software services are considered performers and are used in the same way (See §2.1.2, Performer Use in DoD core processes).

2) Operations planning:

a) Service functions (activities) and resources support operational planning and other activities that foster the exchange of information among performers, aid in decision-making, and support training. TTP documents together with training materials generally describe services used in operations.

b) Business activities (e.g., writing checks, ordering parts) also can be reified as services both manual and automated.

3) Capability portfolio management:

a) Services such as software-as-a-service can be part of a portfolio.

2.8 Projects

a. A project is a temporary endeavor undertaken to create desired states of resources. Projects are relevant to all six core processes. Projects form the major elements of the DAS and are the primary focus of the DoD PPBE system.

b. The primary construct of the PPBE system is the program element (PE). A *program element* is defined as:

> ***program element —****The program element is the basic building block of the Future Years Defense Program. The PE describes the program mission and identifies the organization responsible to perform the mission. A PE may consist of forces, manpower, materiel (both real and personal property), services, and associated costs, as applicable.*

c. The key architectural construct within the program element is the work breakdown structure (WBS) subject to DoD Instruction 5000.2. The WBS is the primary instrument connecting an Architecture description to the DAS and the PPBE processes. A WBS is defined as:

> ***work breakdown structure —*** *A product-oriented family tree composed of hardware, software, services, data, and facilities. The family tree results from systems engineering efforts during the acquisition of a defense materiel item.*

d. MIL-STD-881C provides guidance for constructing the WBS applicable to programs subject to DoD Instruction 5000.2. The WBS is the process necessary for subdividing the major product deliverables and project work into smaller more manageable components and it serves as a valuable framework for the technical objectives, and therefore it is product-oriented. Its elements should represent identifiable work products, whether they are equipment, data, or related service products. A WBS is a product structure, not an organizational structure, providing the complete definition of the work to be performed by all participants and the required interfaces between them.

e. Hardware, software, services, data, and facilities are resources in the DM2. The information captured by project administrative tools and techniques (see, for example, the Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*) provides the basis for resource information in the DM2. The WBS forms the basis of reporting structures used for contracts requiring compliance with ANSI/EIA 748, *Earned Value Management Systems*, and reports placed on contract such as contractor cost data reports, software resource data reports, contract performance reports, and contract funds status reports.

f. MIL-STD-881C states: "*The Program WBS and Contract WBS aid in documenting the work effort necessary to produce and maintain architectural products in a system life cycle. The DoD Architecture Framework (DoDAF) … defines a common approach for DoD architectural description development, presentation, and integration for warfighting operations and business operations and processes*."

g. Just as the system is defined and developed throughout its lifecycle, so is the WBS. In the early Project phases of concept refinement, system architecture, and technology development, the program WBS is usually in an early stage of development. The results of the analysis of material approaches and the analysis of alternatives provide the basis for the evolution of the WBS at all stages of Project evolution. As the architectural design of the project's product or service matures, so should the WBS. The WBS is a primary tool in maintaining efficient and cost effective developments of products and services. Figure 2-9 illustrates the evolution of the WBS during the lifecycle of Project.

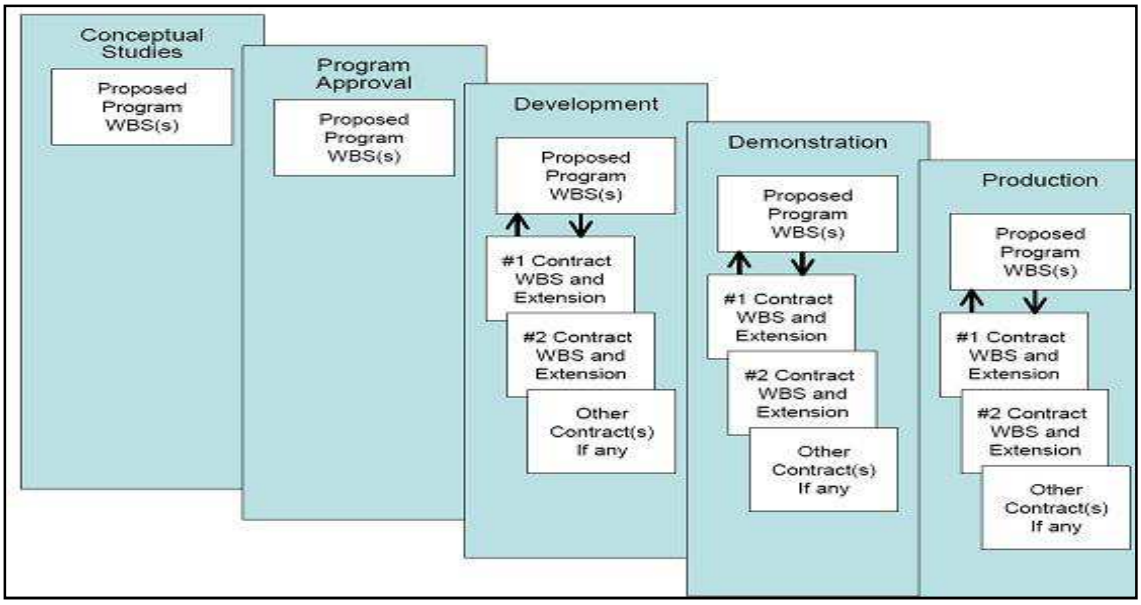


Figure 2-9: Evolution of a project WBS

h. A Project Plan contains the project WBS (including Tasks and responsible Organizations). The Project data group contains the essential data required by DoD 5000.02 to define these parts of a project plan:

1) an acquisition strategy;

2) a technology development strategy; and

3) a systems engineering plan.

i. Activities and performers are the essential elements of a project WBS. The use of both activities and performers focusing on products to be delivered (e.g., system, service) in the WBS is the essential premise of the product-oriented WBS defined in MIL-STD-881C.

j. The project plan also shows plans and initiatives to coordinate transition planning in a documented program baseline, shows critical success factors, milestones, measures, deliverables, and periodic program reviews.

2.8.1 Data group description

a. Figure 2-10 shows the DoDAF meta-model diagram for the Projects data group.

b. Like all concepts in the DM2, projects have whole-part, temporal whole-part, and super-subtype relationships so that major projects can have minor projects within them, projects can have time phases, and projects can be categorized.

c. Because a project involves execution of activities, there is a flow of resources into the project's activities and a flow of products out of them, as described by the Resource Flows data group. So this model can describe a project that results in systems, services, persons in roles (e.g., by training), organizations (e.g., by organizational development), materiel, and locations (e.g., facilities, installations).

d. Many kinds of measures may be associated with a project: measures of needs, of satisfaction, of performance, of interoperability, and of cost.

e. Measures and rules can be assigned at all levels of the project decomposition. Top-level measures and rules (conditions and constraints) could be assigned to the vision, goals, and objectives. Lower-level measures and rules can then be derived and assigned to compliance criteria and to verification criteria. When part of a legal contract, policy, directive, formal agreement, or contractual instrument, rules state requirements for a project.

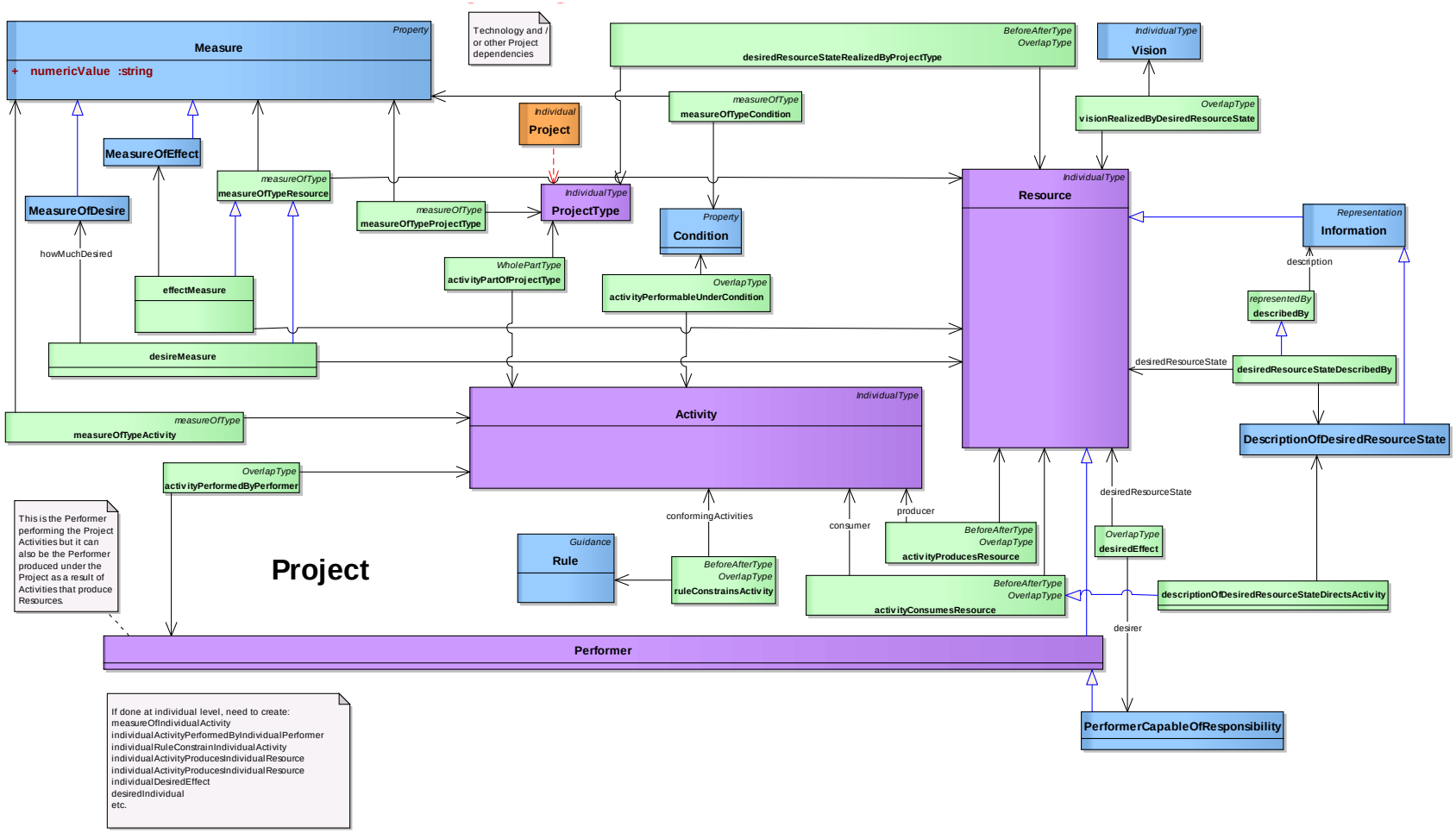


Figure 2-10: DoDAF meta-model diagram for Projects data group

2.8.2 Usage in Core processes

a. JCIDS:

1) Project is the typical outcome of the JCIDS process when material solutions are called for.

2) Non-material solutions may also result in projects.

b. PPBE, DAS, and capability portfolio management:

1) Project is the core element of the PPBE, DAS, and CPM processes. The primary construct of project is the WBS. The WBS is the primary artifact within a project that relates performers and activities to cost and milestones. As stated in MIL-STD-881C, the WBS is a continually evolving instrument from project conception to lifecycle management. This tracks closely with the evolution of the architecture. As key activities are refined into primary activities and assigned to or allocated to performers, the WBS should mature and the project definition can gain additional focus.

2) Early project WBSs may contain high-level activities (tasks, processes, system functions, or service functions). As a project matures, its WBS identifies system components, such as subsystems and SCIs. These SCIs can be software services or individually testable and deliverable packages of software. Depending on the acquisition strategy, all or part of the project WBS may become the contract WBS and form the basic outline of the requirements in a statement of work and the project statement of objectives or specification. Figure 2-11 illustrates this method.

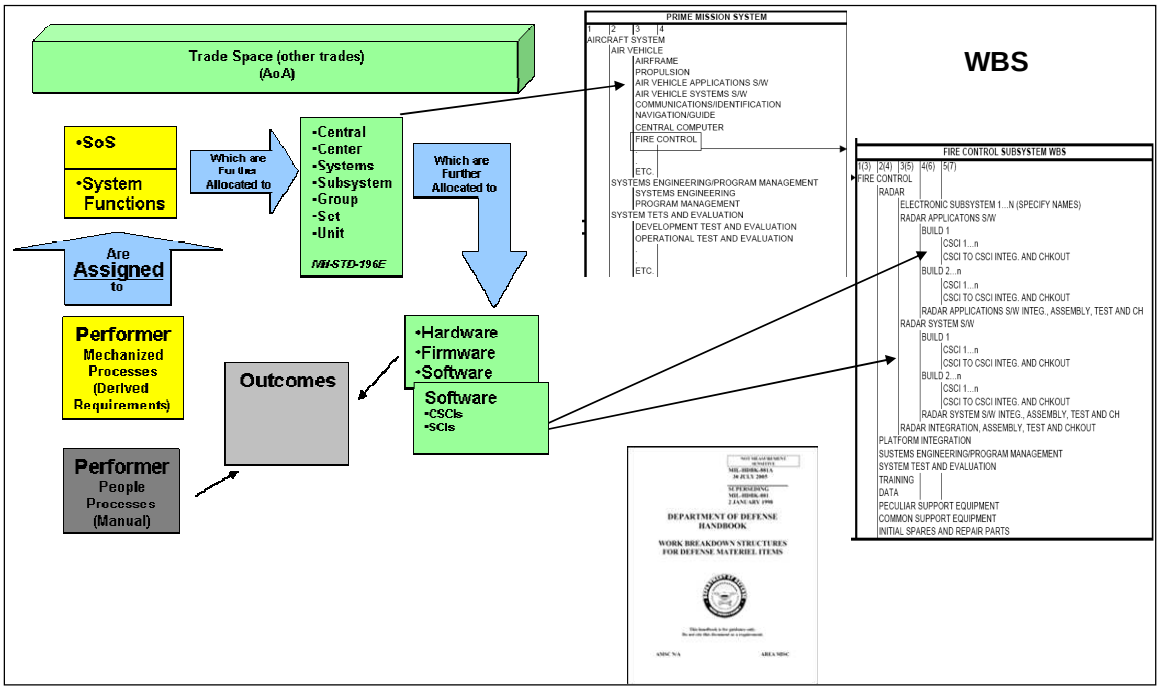


Figure 2-11: Derivation of the materiel portion of a WBS

3) The other, non-materiel portions of the WBS (work packages, tasks and activities) are derived in a similar fashion, that is, activities are assigned to or allocated to performers that are assigned, in turn, to organizations, persons in roles, and facilities.

c. Systems engineering:

1) The data derived from architectural descriptions, derived through the systems engineering process, directly support the definition and structuring of projects. The DoDAF architectural data elements are used in the WBS, in architecture-based and classical specifications, and in the statements of work essential to the systems engineering process. The DoDAF augments classical systems engineering techniques by standardizing the lexicon and relationships. Figure 2-12 illustrates the typical systems engineering process and its relationship to DODAF constructs. The process shows how operational needs, as described in description documents such as a capabilities description document, are translated into structured requirements and associated project constructs. Further, this shows how capabilities and processes are transformed into solutions through automation tradeoffs and analysis of alternatives. Various alternatives are iterated through the architectural descriptions to meet the required performance, cost, and schedule constraints. From here, functional and allocated baselines can be established. As increased detail is added to the architecture, classical systems engineering and design techniques are increasingly applied.

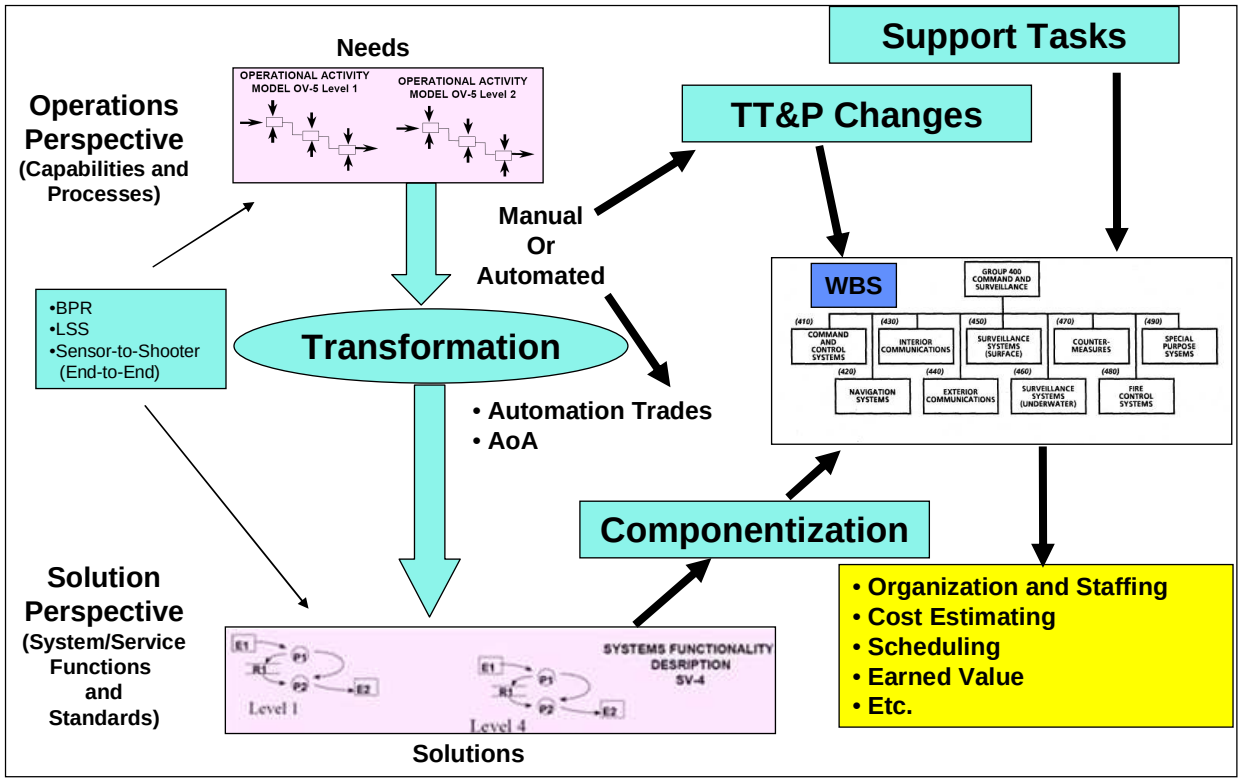


Figure 2-12: Architecture description used to form project structure reified by a WBS

d. Operations planning:

1) Project also is used in operational planning in such areas as developing specific mission plans and procedures. Any effort in the operational community requiring identifiable funding and management can be defined as a project.

2.9 Organizational Structures

2.9.1 Data group description

a. Figure 2-13 shows the DoDAF meta-model diagram for the Organizational Structures data group.

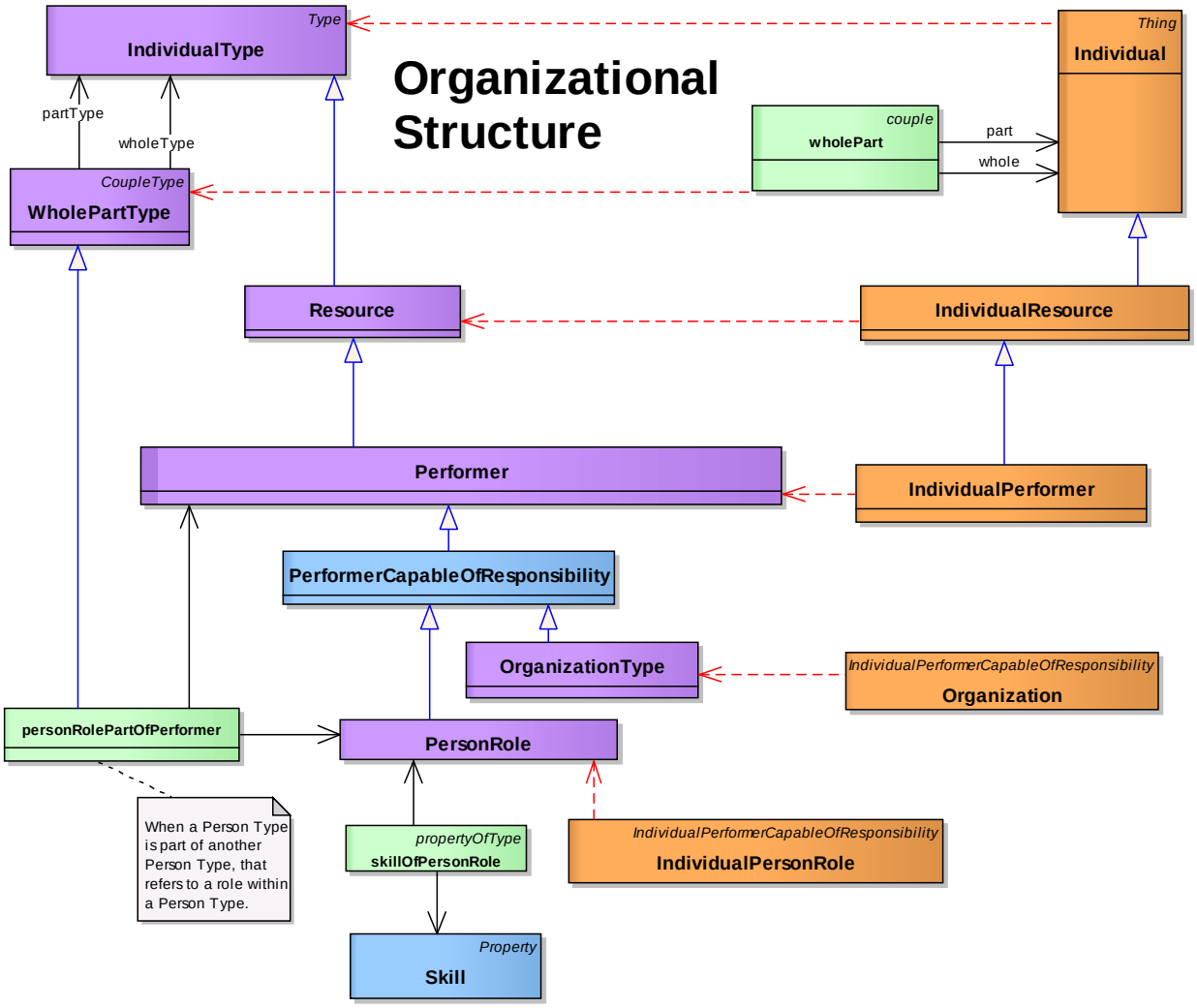


Figure 2-13: DoDAF meta-model diagram for Organizational Structures data group

2.10 Measures

a. A measure is the magnitude of some attribute of an object. Measures provide a way to compare things, including projects, services, systems, activities, and capabilities. The comparisons can be among things at a point in time or among temporal parts of the same thing over time. For example, a capability may have different measures when looking at the current baseline and over increments toward some desired end-state.

b. Many sorts of measures may be applied to architecture elements. The following paragraphs describe some of these types of measures.

2.10.1 Data group description

a. Figure 2-14 shows the DoDAF meta-model diagram for the Measures data group.

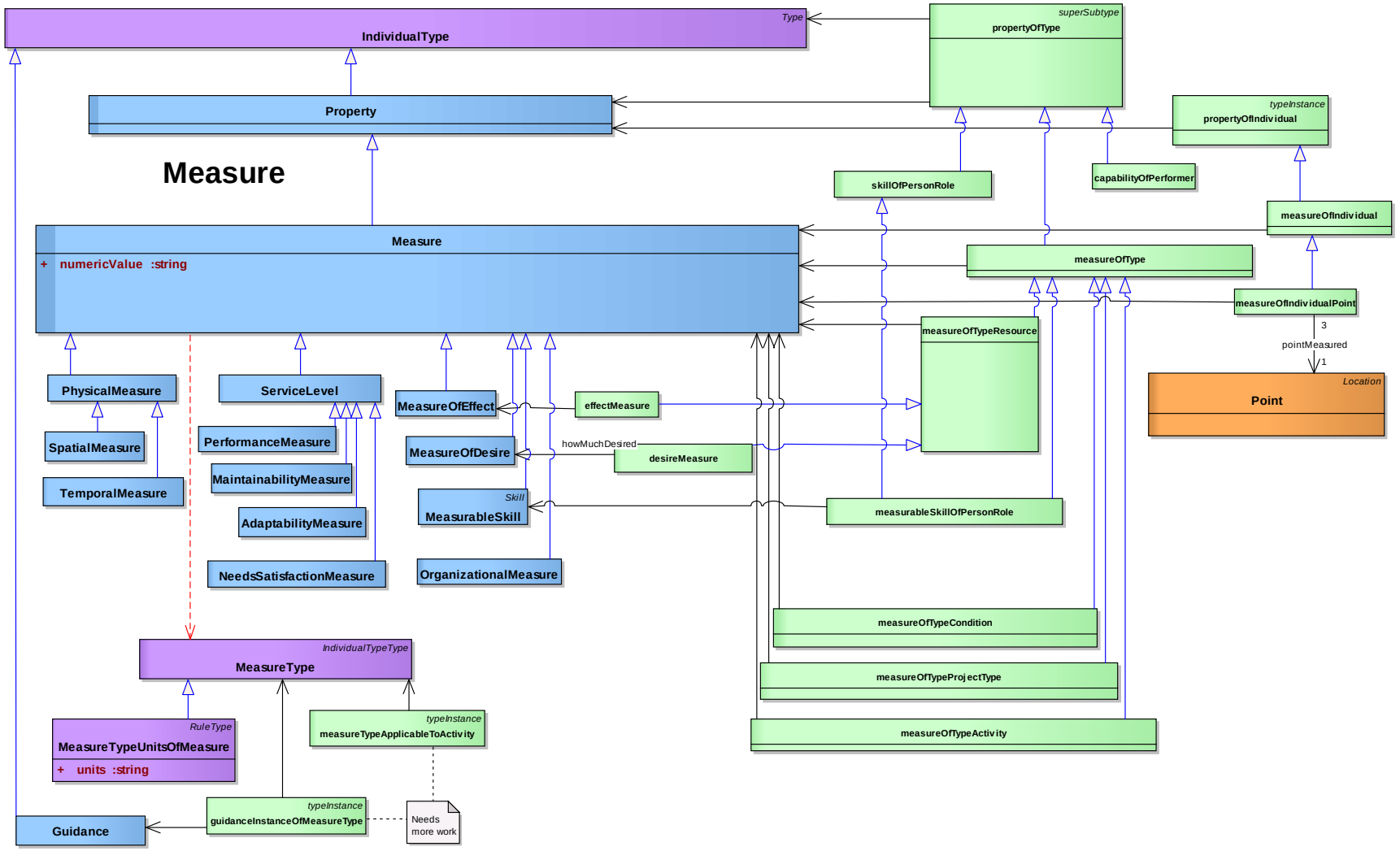


Figure 2-14: DoDAF meta-model diagram for Measures data group

b. The key elements of the Measure data group are measures and types of measures. Measures refer to actual measured values and their units. They relate to a type of measure that describes what is being measured. Table 2.10-1 gives examples of measures and the types of measures that would be related to these measures.

Table 2.10-1: Informative examples of measures and types of measures

Measure	Measure Type
1 year	timeliness
mach 3	rate
99 percent	reliability
56K	BAUD
3 meters	target location error accuracy
1,000 liters	capacity
$1M	cost
Level 3	Capability Maturity Model® Integration maturity level

c. Formally, a measure defines membership criteria for a set or class (e.g., the set of all things that have 2 kg mass). The relationship between measure and type of measure is that any particular measure is an instance of all the possible sets that could be taken for a type of measure.

d. The lower part of Figure 2-14 depicts the upper tiers of a taxonomy or classification scheme for sorts of measures. To specialize such a taxonomy with more specific measures, architects would add detailed subtypes.

e. All types of measures have rules that prescribe their measurement (e.g., units of measurement, calibration of instruments). Rules for spatial measures include rules for selecting, specifying, and using coordinate system. For example, latitude and longitude are understood only by reference to a geodetic coordinate system around the Earth.

f. As a type of measure, cost may be modeled in architectural descriptions.

g. The upper part of Figure 2-14 shows how measures apply to architecture elements. Measures apply to relationships between things as well as to things themselves, that is, measures apply to a performer performing an activity. An activity has a relationship to a type of measure; this relationship says what type of measure applies to an activity. This represents Universal Joint

Task List (UJTL) tasks and their applicable Measure Types, including Conditions, that is, Condition is quantified by a Measure Type. (The whole-part relationship feature of Condition allows it to be singular.) This is accomplished by Condition's typeInstance association, saying an elementary Condition is a member (instance) of a Measure Type class.

2.10.2 Use in DoD core processes

a. Data for Measures may be in these ways:

1) PPBE and JCIDS:

a) Planning – adequacy analysis. From an adequacy point of view, measures that are associated with a capability (including capability increments, since capabilities have whole-part relationships). Capabilities can be compared with measures associated with performers to see if performer solution(s) are adequate. A set of alternative performers as part of an analysis of alternatives could also be evaluated. Goals or desired effects could be compared with measures associated with performers.

b) Programming – overlap analysis. The purpose of an overlap analysis is to determine if there are overlaps, or undesired duplicative capability, in plans for spending, portfolios, capabilities, or acquisitions. Similar abilities are often only an indicator of overlapping capabilities. Often performers with similar abilities operate under different measures, which are not duplicative and do not indicate overlapping capabilities. For example, operational-level situation awareness systems may not be as fast or precise as a tactical-level, but they may handle a larger number of objects over a larger area.

c) Goal Setting. Measures are often part of goals such as goals for production and efficiency.

d) Requirements. Requirements often have measure elements.

e) Capability evolution. Measures are part of capability evolution, showing increments of measurable improvement as the capability evolves and allowing monitoring about when the capability is projected to be achieved or has already been achieved.

2) Systems engineering and DAS:

a) Systems engineering and design. Measures set design envelope goals, sometimes called performance characteristics or attributes. They can also set constraints (e.g., cost constraints).

b) Performance–cost tradeoffs. Measures of performance (e.g., effectiveness) and cost can be compared to evaluate alternative solutions.

c) Benchmarking. Measures can be used to establish baselines for performance, such as for skills required of a person in a role or radar tracking accuracy.

d) Organizational and personnel development. Organizational and personnel goals are often established and monitored using measures.

e) Capacity planning. Measures can be used to plan for needed capacity (e.g., for networks, training programs).

f) QoS description. In SOA, QoS may be expressed as measures (e.g., bit loss rate or jitter). Service descriptions specify such measures, which may be sought during service discovery by users who have service quality requirements.

g) Project constraints. Measures such as cost and risk may constrain projects.

3) Capability portfolio management:

a) Portfolio balancing. Measures may be used to balance a portfolio to achieve an appropriate mix of goals and constraints.

4) Operations planning:

a) Organizational and personnel development. Organizational and personnel goals may be established and monitored using measures.

2.11 Locations

a. A location is a point or extent in space. The need to specify or describe Locations occurs in some Architectural descriptions when it is necessary to support decision-making of a core process. Examples of core process analyzes in which locations might have a bearing on the decisions to be made include the following:

1) Base realignment and closure (systems engineering process).

2) Capability for a new regional command (JCIDS).

3) Communications or logistics planning in a mission area (operations process).

4) System and equipment installation and assignment of person roles to facilities (operations and systems engineering processes).

b. Examples where locations play little, if any, role in the process are:

1) Prioritization of precision engagement programs (PPBE and portfolio management processes).

2) Streamlining of a business process (systems engineering process).

3) Doctrine development (JCIDS and operations processes).

2.11.1 Data group description

a. Figure 2-15 shows the DoDAF meta-model diagram for the Locations data group.

b. Addresses such as URLs, universal resource names (URNs), postal addresses, and data link addresses are considered names for locations. For example, a postal address is a naming system for the location of a building. A universal resource locator is a name for a server that is located somewhere on the web.

c. The naming pattern works by identifying: 1) a name string, 2) the object being named, and 3) the type of name (e.g., postal address). Name here is used in the broadest sense, and a description is considered a long name.

d. The lower left of the diagram is a model of types of location objects. These can be alternatively named using the naming pattern in the upper left and delineated using the Extent pattern in the lower right.

e. Minimal parts of spatial extent (e.g., point, line, surface, solid volume) are detailed to satisfy various requirements within a federation. That is, some members of a federation may need to specialize spatial extents. Some common and simple parts are modeled, such as a line described by two points and a planar surface defined by a line and point.

f. Facilities are types of locations. To describe the functionality of a facility, the activities performed by the performers located at the facility are described.

g. Installation, site, and facility follow Army guidance from the Real Property Inventory Requirements. Similarly, a facility can be a linear structure, such as a road or pipeline.

h. Geofeatures cover constructed control features, geophysical features, and meteorological and oceanographic phenomena.

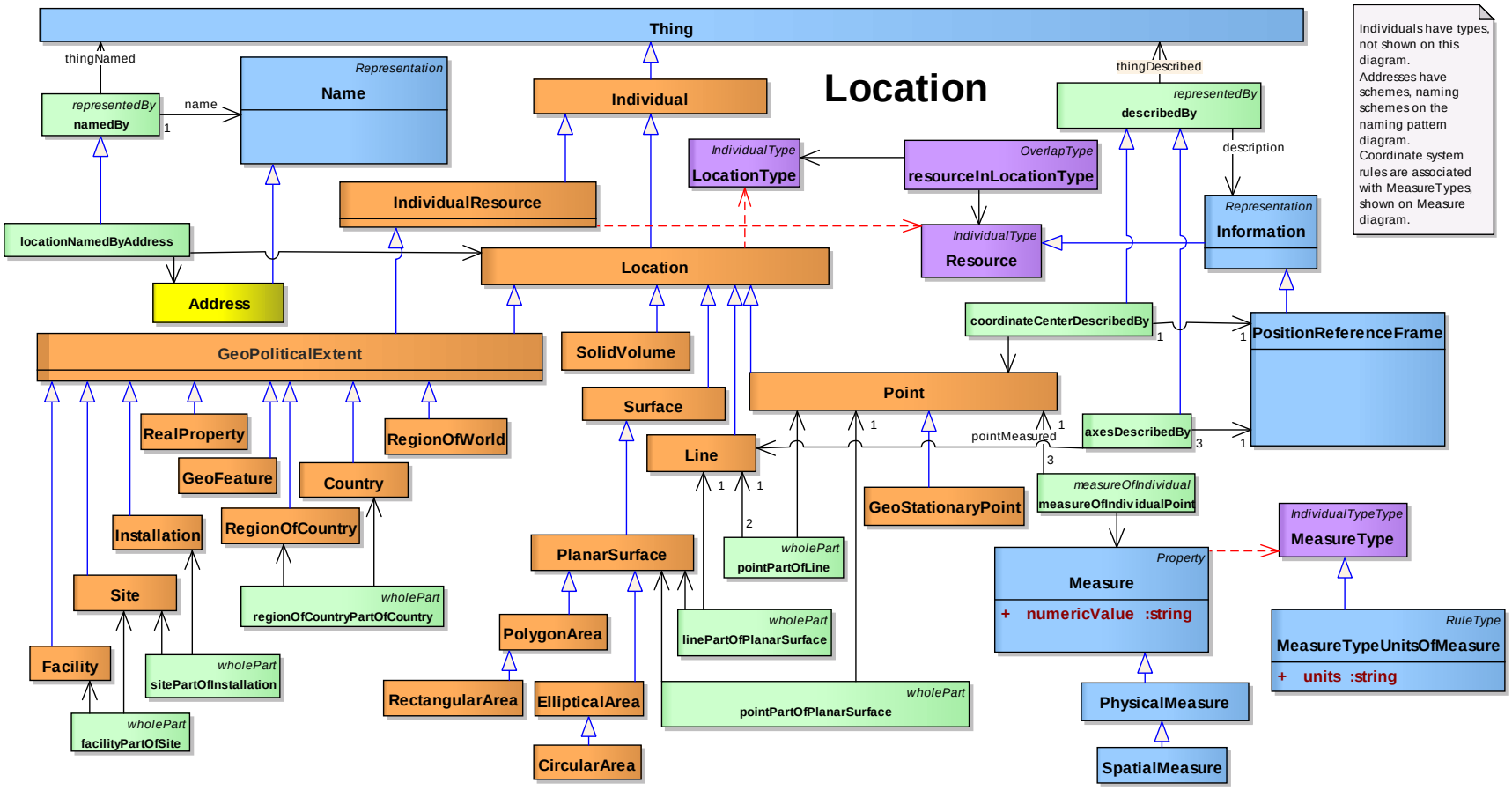


Figure 2-15: DoDAF meta-model diagram for Locations data group

i. For many architecture applications, a locating scheme is some kind of geometric system because many uses (see next paragraph) require geometric calculations.

j. Named locations (e.g., facility, base, installation, region names) can be applicable because names can describe where an activity is performed. In addition, a naming pattern for locations can designate a name as a surrogate for a geometric location; postal addresses demonstrate this pattern.

k. If a geometric system is needed, coordinate systems, reference frames, and units are chosen. Architects may use public standards such as ISO 19136:2007, *Geographic Information—Geography Markup Language (GML)*, to identify and describe coordinate systems and other information needed to specify the locations of resources.

l. The accuracy should be determined. For many uses, locations may not need to be as accurate as some geospatial system can be, since the use calculation may have many approximations, assumptions, and minor influencing variables that are chosen to be ignored.

m. In some cases, there may be need for speed and acceleration ranges. Since these are unusual, they are not part of the core DM2 but would be added as extensions for these kinds of models. The speed could be extended as an attribute or as a trajectory consisting of a set of spatial-temporal points, where the trajectory is a whole and the points are parts.

2.11.2 Use in DoD core processes

a. Data for locations may be used to describe where resources are and where performers act. Examples of locations include:

1) Facility locations allow description that certain systems or organizations are located at a specific facility. The function of a facility is determined by activities performed by performers located at the facility; that is, the facility itself is not a performer.

2) Installation locations allow descriptions of certain organizations that operate or use an installation.

3) Region locations are used to describe what performers and activities are performed in certain regions.

4) A point location can be used to state when a performer is located at a specific point (e.g., latitude and longitude). Regions, countries, and other geometric shapes can be used when a location need not be so specific.

5) Line (set of lines) allows description of performers located on, beside, or within some enclosing lines. A line could be described mathematically to specify an orbit (e.g., that some satellite is located in some orbit).

6) Volume can be used to designate a three-dimensional space. The volume they cover may characterize some systems, such as air defense systems.

7) Addresses (names for locations) allow descriptions of where something is located using the address scheme (e.g., the URL address scheme allows files on a web server to be addressed).

2.12 Pedigrees

a. The Pedigrees data group represents the workflow for a resource. It describes the activities used to produce a resource, in particular, a resource that is information about an architectural description or architectural data. Architectural descriptions are types of information: information describes some thing and architectural descriptions describe architectures. The production of architectural description information is particularly important for architectural descriptions. All aspects of the production workflow are describable with the Pedigrees data group, including:

1) resources consumed to produce a resource;

2) performers who act to produce a resource;

3) rules that constrain a producing activity;

4) measures applied to a producing activity and to resources consumed and produced; and

5) where a producing activity occurred.

b. Architectural descriptions such as activity models are example of architectural descriptions that reified at many level of detail. In a typical development project, the architectural descriptions (contained in plans, specifications and/or “model based” Computer Aided Design Tools (CAD)) provide increasing levels of detail as the project progresses through the normal DoD Milestone process. This is what John Zachman calls “levels of reification”, as shown in **Error! Reference source not found.**

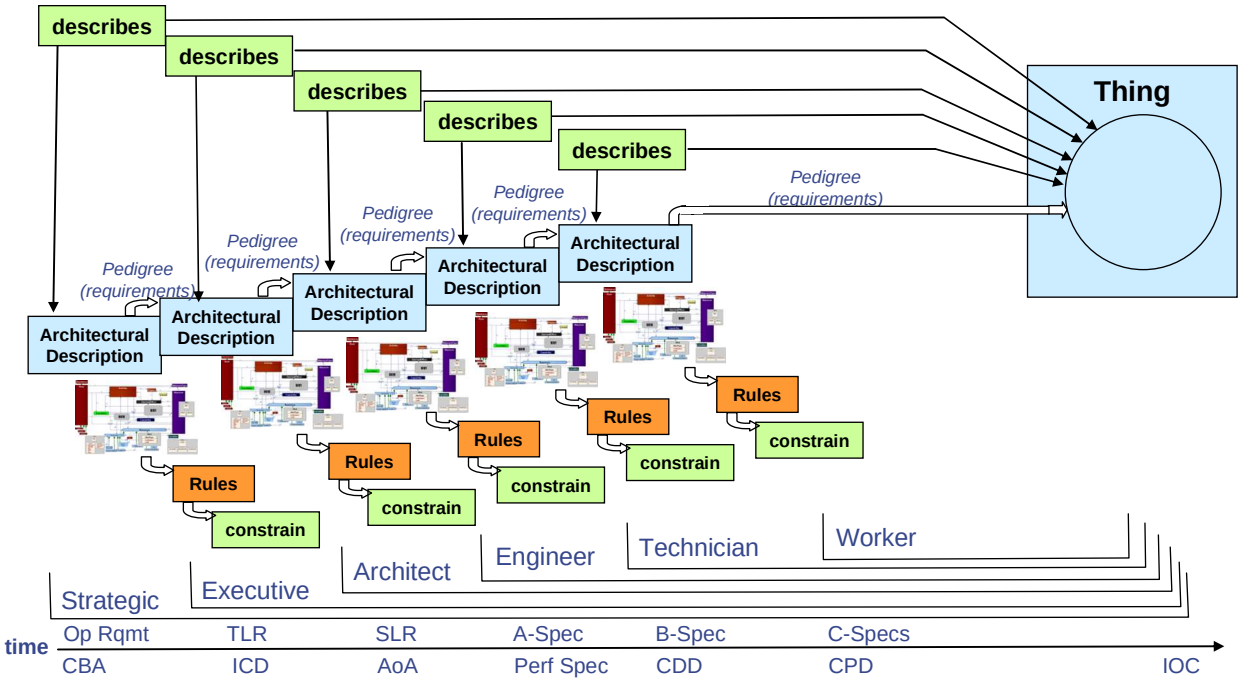


Figure 2-16. Reification of Architectural Descriptions at Varying Levels

2.12.1 Data group description

a. Figure 2-17 shows the DoDAF meta-model diagram for the Pedigrees data group.

2.12.2 Use in DoD core processes

a. Pedigrees are used to demonstrate the rationale for architectural description choices. In many systems engineering and requirements analysis processes, pedigrees maintain traceability of information.

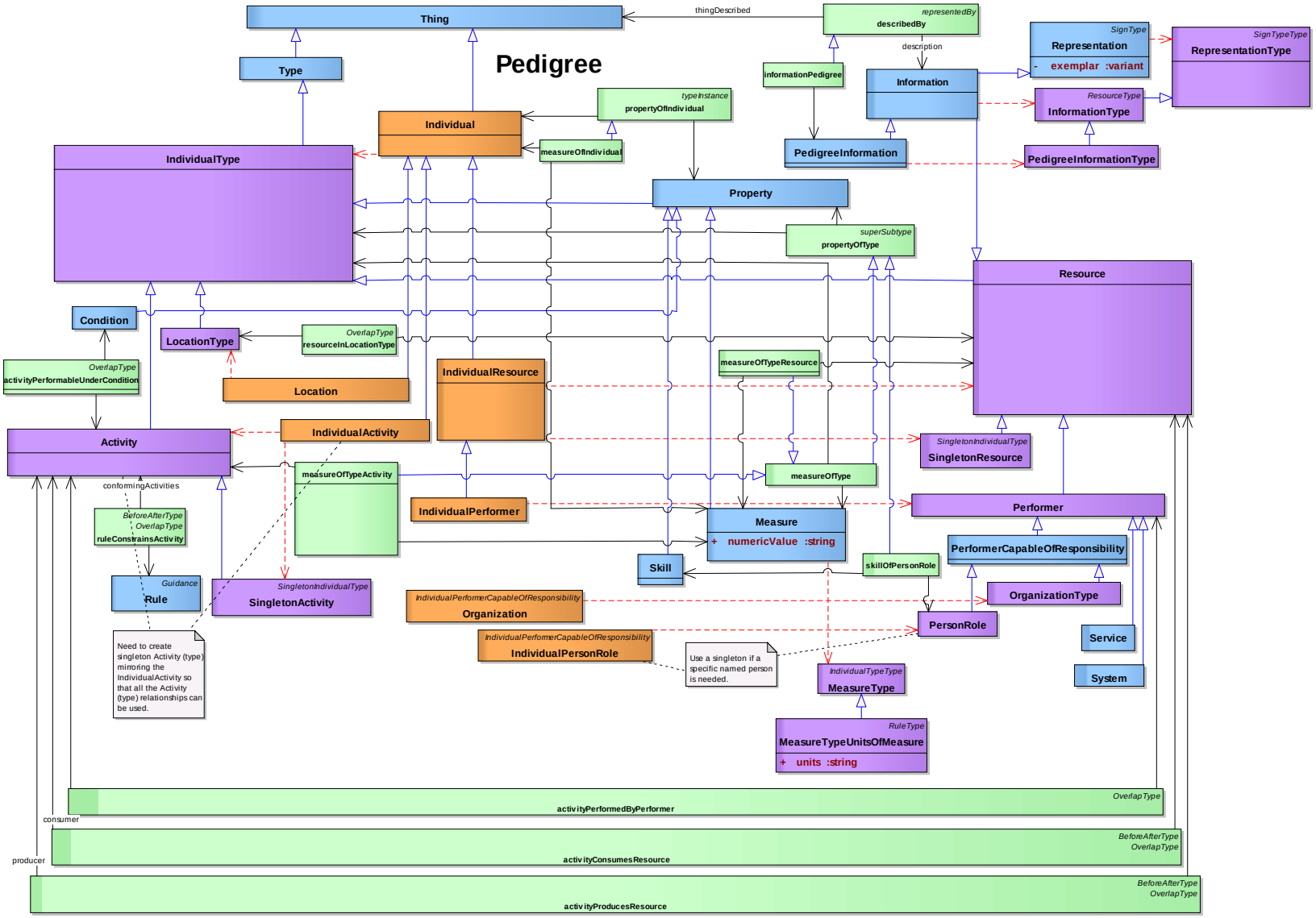


Figure 2-17: DoDAF meta-model diagram for Pedigrees data group

3 DODAF VIEWPOINTS AND MODELS

a. The Department of Defense Architecture Framework (DoDAF) has been designed to meet the specific business and operational needs of the Department of Defense. The DoDAF defines a way of representing an enterprise architecture that enables stakeholders to focus on specific areas of interests in the enterprise while retaining sight of the big picture. To help decision-makers, DoDAF provides ways to abstract essential information from underlying complexity and present this information in ways that maintain coherence and consistency. A principal objective of DoDAF is to present this information in ways that can be understood by many stakeholders who develop, deliver, and sustain capabilities that support missions of the DoD. The DoDAF does this by dividing a problem space into manageable pieces that correspond to stakeholder viewpoints, which are further defined as models.

b. Each viewpoint has its own purpose. Each viewpoint usually presents information in one or more of these categories:

1) information that broadly summarizes the whole enterprise (e.g., high-level operational concepts),

2) information that focuses narrowly on a special concern (e.g., low-level implementation details), and

3) information that shows how elements of an enterprise are connected (e.g., how an activity is supported by some system).

c. However, the DoDAF is fundamentally structured to create a coherent enterprise model that may be effectively used by decision-makers. A DoDAF-based architectural description should not emphasize pretty pictures at the expense of clear, consistent, necessary, and sufficient data, which underlies the architecture.

d. DoDAF organizes models into these viewpoints:

1) The All Viewpoint describes overarching aspects of an architecture context that relate to all viewpoints appropriate for the architecture.

2) The Capability Viewpoint describes capability requirements, delivery timing, and deployed capabilities.

3) The Data and Information Viewpoint describes data relationships and alignment structures in the architecture content for the capability and operational requirements, systems engineering processes, and systems and services.

4) The Operational Viewpoint describes operational scenarios, activities, and requirements that support capabilities.

5) The Project Viewpoint describes relationships between operational and capability requirements and various projects to deliver capabilities. The Project Viewpoint also details dependencies among capability and operational requirements, systems engineering processes, systems design, and services design within the Defense Acquisition System process.

6) The Service Viewpoint describes the performers, activities, services, and resources that provide or support operational, capability, and system functions.

7) The Standards Viewpoint describes applicable policies, standards, guidance, constraints, and forecasts that shape capability and operational requirements, systems engineering processes, systems, and services.

8) The System Viewpoint describes systems, their composition, connections, and contexts that provide or support operational and capability functions.

e. Figure 3-1 illustrates these viewpoints.

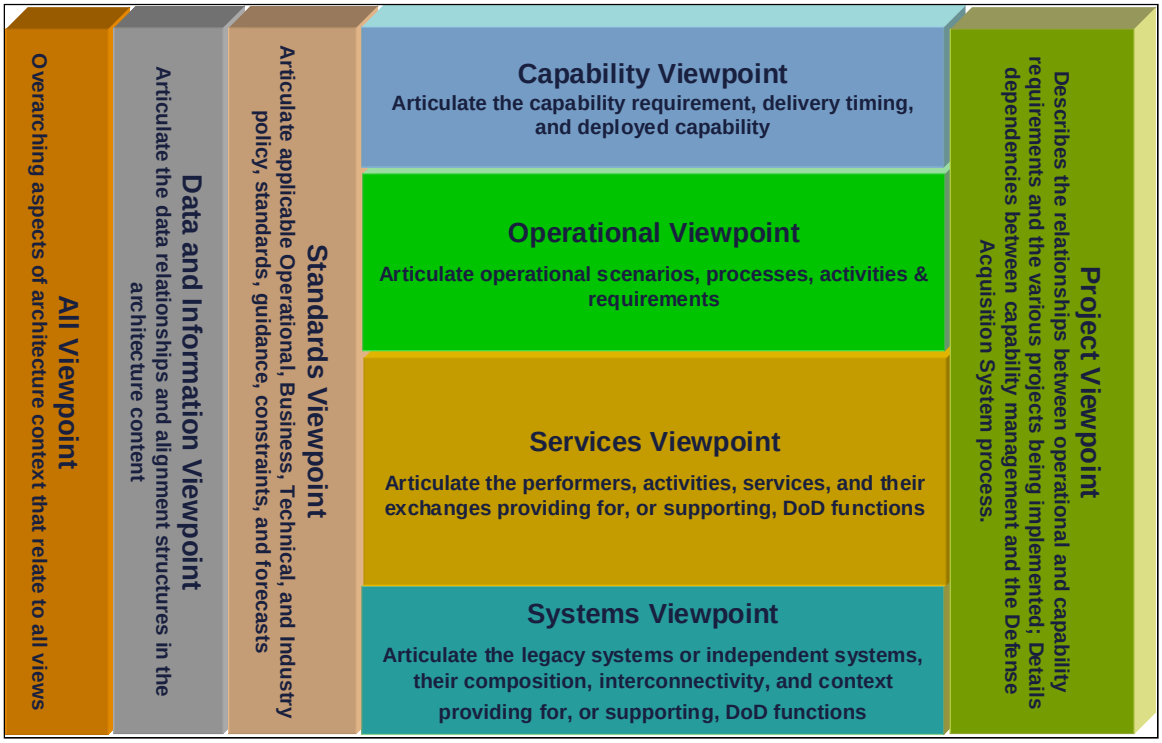


Figure 3-1: DoDAF viewpoints

3.1 Viewpoint and model descriptions

a. The DoDAF viewpoint models may be taken as examples of ways to present architectural data to specific audiences for specific purposes.

b. DoDAF must be used to develop architectural descriptions for the Department of Defense. Owners of specific DoDAF architectures may require viewpoint models for their particular purposes. Only rarely would *all* viewpoint models be required for any complete DoDAF architecture; rather, the DoDAF is *fit-for-purpose*: presentation requirements are to be based on decision-maker needs, not on any set of viewpoint models prescribed by DoDAF fiat. DoDAF does not require architects to use any DoDAF viewpoint models; instead, the DoDAF requires architects to focus on architectural data as the foundation for their architectures.

c. Each section that follows discusses a DoDAF viewpoint and describes models that may be appropriate for that viewpoint.

3.2 All Viewpoint (AV)

a. All Viewpoint models capture overarching aspects of an architectural description. These models provide information about the entire architectural description. AV models provide an overview of the architectural effort and may consider such things as the scope, context, rules, constraints, assumptions, and derived vocabulary for an architectural description. These models may document the intent of an architectural description to help preserve its continuity in spite of leadership, organizational, and other changes that often occur during a persistent architecture effort.

b. All Viewpoint models are used to register architectural descriptions with the Defense of Defense Architecture Repository System (DARS).

c. Table 3.2-1 names and describes All Viewpoint models.

Table 3.2-1: All Viewpoint models

Models	Descriptions
AV-1: Executive Summary	Presents the purpose, scope, and subjects of an architecture effort.
AV-2: Dictionary	Presents terms needed to understand an architectural description, their definitions, and their associations.

3.2.1 Executive Summary (AV-1)

a. ***Description***. This model *identifies* an ***architectural description*** and *describes* the *purpose*, *scope*, and *subjects* of an ***architectural description project***.

b. ***Narrative***. An AV-1 model provides executive-level summary information about the described architecture in a consistent form that allows quick reference and comparison between architectural descriptions. At a minimum, AV-1 models should identify the architectural description and describe the purpose, scope, and subjects of an architectural description project. An AV-1 model may include assumptions and constraints that may affect high-level decisions relating to architecture-based projects. An AV-1 model may also put an architectural description into the context of the architecture it describes and the organizations that are significant to the architecture. An AV-1 model may describe the period of time the architectural description covers. Such information should support registration and discovery of architectural descriptions.

c. ***Meta-model***. None.

d. ***Alternative names***: Overview and Summary Information; Architecture Executive Summary.

e. ***Notes***. The DoDAF does not specifically require any content for AV-1 models nor does the DoDAF specifically exclude any content from AV-1 models. However, the DoD Architecture Registry System (DARS) does impose some information and format requirements on an AV-1 model that is submitted to register an architectural description.

3.2.2 Glossary (AV-2)

a. ***Description***. This model *identifies* and *describes* the ***terms*** that are needed to discuss a described ***architecture*** and to understand its ***architecture-description***, as well as describing architecturally significant ***relationships*** among *concepts* signified by these ***terms***.

b. ***Narrative***. Terms are names that signify things within a described architecture. Descriptions are a sort of information about those things; descriptions are statements that represent things in words. In turn, definitions are descriptions that are related to specific names for described things. Several sorts of things are commonly found in architectural descriptions prepared for the Department of Defense; these things include activities, resources, and projects, as well as guidance for and locations of these things. DoDAF provides the terms "activity", "resource", "project", "location", "guidance", "vision", and "property" as basic resources for preparing architectural descriptions. Each of these terms names a primary category of concepts that are required for a sufficient architectural description. Each term heads a taxonomy of further terms that may be refined and specialized to meet the needs of specific architectural descriptions. These terms are organized within these categories by the supertype-subtype relationships and the whole-part relationships that characterize the things that are named by these defined terms.

c. ***Meta-model***. Figure 3-2 shows the DoDAF meta-model for AV-2 models.

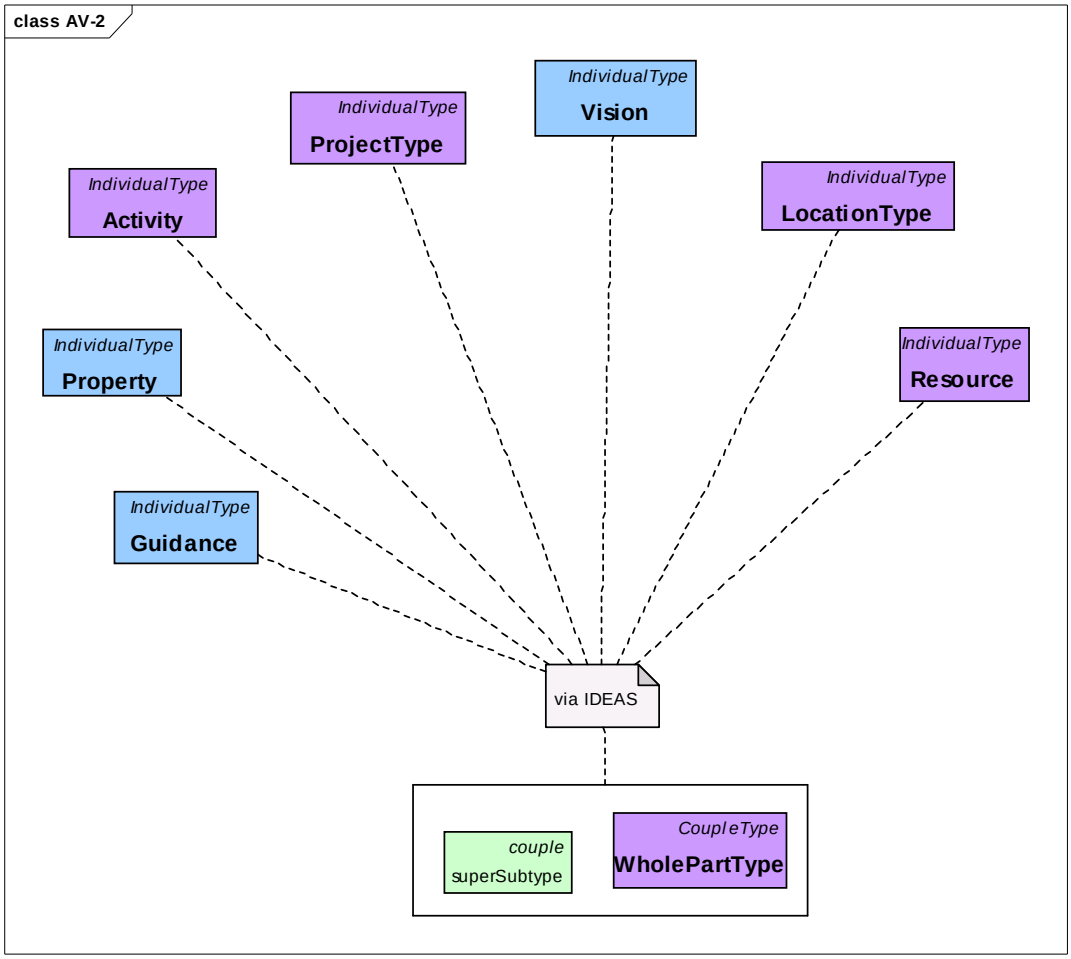


Figure 3-2: DoDAF meta-model diagram for AV-2 models

d. ***Alternative names***: Integrated Dictionary; Architecture Dictionary; Dictionary.

e. ***Notes***. Authoritative sources may be given by the AV-2 model for the meanings of words that are *not* described by the AV-2 model itself. Data elements and their definitions are *not* within the scope of AV-2 models; data element names and definitions are subjects of DIV-3 models.

f. ***Technical note***: DoDAF provides *genus* terms for taxonomical classification of things within the scope of an architectural description. This supports the classical sort of definition called *genus-differentia* definition. In this sort of definition, a definitional statement opens with a statement of the *genus* of a term, that is, the broader concept that incorporates the concept signified by the term. Such a definitional statement then adds a statement of the *differentia* of a term, that is, how the concept signified by the term differs from other concepts within the term's genus. A classic example of genus-differentia definition is "a human being is a featherless biped." In this definitional statement, the genus is "biped" and the differentia is "featherless."

3.3 Capability Viewpoint (CV)

a. The Capability Viewpoint addresses the concerns of capability portfolio managers.

b. A capability is the ability to cause a change in the set of states of some resources. The initial set of states is thought to be less desirable than the set of states that could be brought about (i.e., a desired effect). This difference is desired by a performer who is capable of responsibility (e.g., an organization; a person in a role such as a mission commander) and who has a vision of the resource states to be achieved. Both the less desired set of states and the more desired set of states should be measurable in some way; a measure of effect is a measure of the difference between a measurable less-desired state and a measurable more-desired state. How badly a performer wants such a change in the states of these resources (that is, a measured, desired effect) should also be measurable (e.g., priority; willingness to commit money; risk calculus).

c. Changes in the states of resources are caused by activities; a resource in some desired state can only be produced by specified, trainable activities. Such activities are constrained by appropriate guidance and by rules for carrying out these activities under specified conditions that overlap (co-exist with) them. These conditions may be multifaceted; for example, a condition might be some set of measurements of elevation, humidity, ground cover, available daylight, temperature, air flow, density and distribution of opposing forces, density and distribution of non-combatants, and lethality of weaponry of opposing forces. Different conditions call for different activities carried out by different performers guided by different rules to achieve different resource states.

d. Specific activities are chosen to achieve effects by balancing measures of effect, measures of desire, conditions, rules, and available resources across all desirable effects. This model focuses on understanding the capabilities presented by a described architecture in terms that support strategic choices among possible capabilities.

e. Table 3.3-1 names and describes Capability Viewpoint models.

Table 3.3-1: Capability Viewpoint models

Model	Description
CV-1: Capability Effects	Presents effects caused by capabilities and measures for these effects.
CV-2: Capability Hierarchies	Presents one or more hierarchies of capabilities and the types of hierarchical relationships between these capabilities.
CV-3: Capability Schedules	Presents schedules for the deployment of capabilities in

	terms of timelines.
CV-4: Capability Dependencies	Presents dependencies among effects caused by capabilities.
CV-5: Capability Deployments	Presents schedules for the deployment of capabilities in terms of organizations and locations.
CV-6: Capability Activities	Presents activities that are performed to cause the desired effects of a capability.
CV-7: Capabilities and Services	Presents a mapping of capabilities to services.

3.3.1 Capability Effects (CV-1)

a. ***Description***. This model *identifies* and *describes* ***effects*** caused by ***capabilities*** within a described ***architecture*** and *specifies* ***measures*** for these ***effects***.

b. ***Narrative***. This model emphasizes the desired effects of capabilities provided by a described architecture. A capability comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect, which may be documented by a vision statement. Responsible performers include types of organizations and types of persons in organizational roles. In a CV-1 model, the emphasis is on desired effects, which are articulated by responsible performers, but details of organizations and organization types are not modeled.

d. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

e. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources are available to activities as they are needed; this model may look at the types of these locations.

f. Activities are seen in CV-1 models just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities. In this model, the emphasis is on the relationship between activities and capabilities in the production of desired effects.

g. Capabilities, responsible performers, desired effects, resources, activities, conditions, measures of effects, and measures of desire shall be modeled. Vision statements, types of locations of resources and activities, rules constraining activities, and additional sorts of measures may be modeled. Performers other than responsible performers shall not be modeled.

h. ***Meta-model***. Figure 3-3 shows the DoDAF meta-model for CV-1 models.

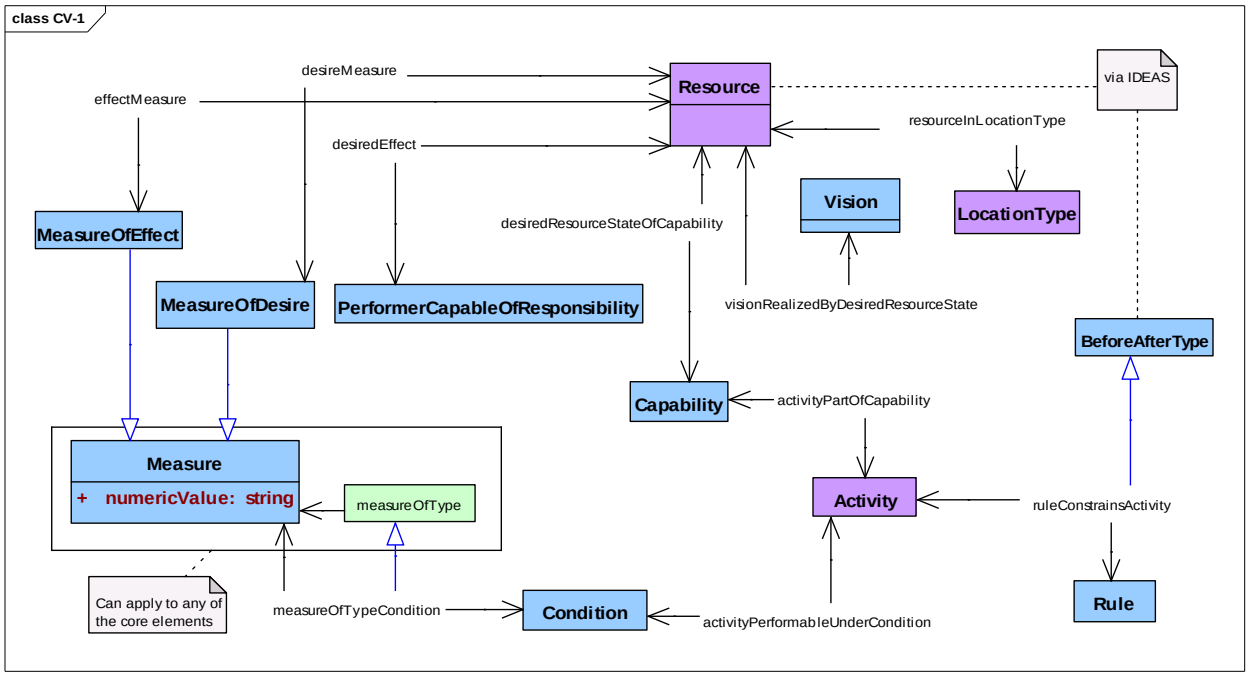


Figure 3-3: DoDAF meta-model diagram for CV-1 models

i. ***Alternative names***: Vision; Capability Desired Effects.

j. ***Notes***. To support risk management and portfolio management, a CV-1 model should examine effects that are *not* desired as well as effects that are desired.

3.3.2 Capability Hierarchies (CV-2)

a. ***Description***. This model *identifies* and *describes* one or more *hierarchies* of ***capabilities*** provided by an ***architecture,*** and it specifies the types of *hierarchical* ***relationships*** between these ***capabilities***.

b. ***Narrative***. This model emphasizes relations among capabilities and among the parts of capabilities. A capability comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect. Responsible performers include types of organizations and types of persons in organizational roles. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

d. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources are available to activities as they are needed; this model may look at the types of these locations.

e. Activities are seen in CV-2 models just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities. Activities are to be measured; collections of measures that are applicable to activities should be grouped as types of measures of activities.

f. A CV-2 model shows (a) the parts that make up a whole capability and (b) the capabilities that are subtypes and subtypes of the capabilities described by an architectural description. A capability may be examined in terms of its parts (e.g., activities and resources; temporal and spatial states) using whole-part relationships. For example, understanding capabilities can be approached by composition and by decomposition of activities and of resources. A capability may also be examined in terms of its similarity and differences with other capabilities using super-subtype relationships. For example, understanding capabilities can be approached by comparing activities, conditions, resources, desired effects, their measures, their locations, and

other sorts of properties shared by different capabilities across their different states. Capabilities should be categorized into types by such analyses.

g. Capabilities, types of capabilities, responsible performers, desired effects, resources, activities, conditions, types of measures that apply to activities, measures of effects, and measures of desire shall be modeled. Types of locations of resources and activities, rules constraining activities, and additional sorts of measures may be modeled. Performers other than responsible performers shall not be modeled.

h. ***Meta-model***. Figure 3-4 shows the DoDAF meta-model for CV-2 models.

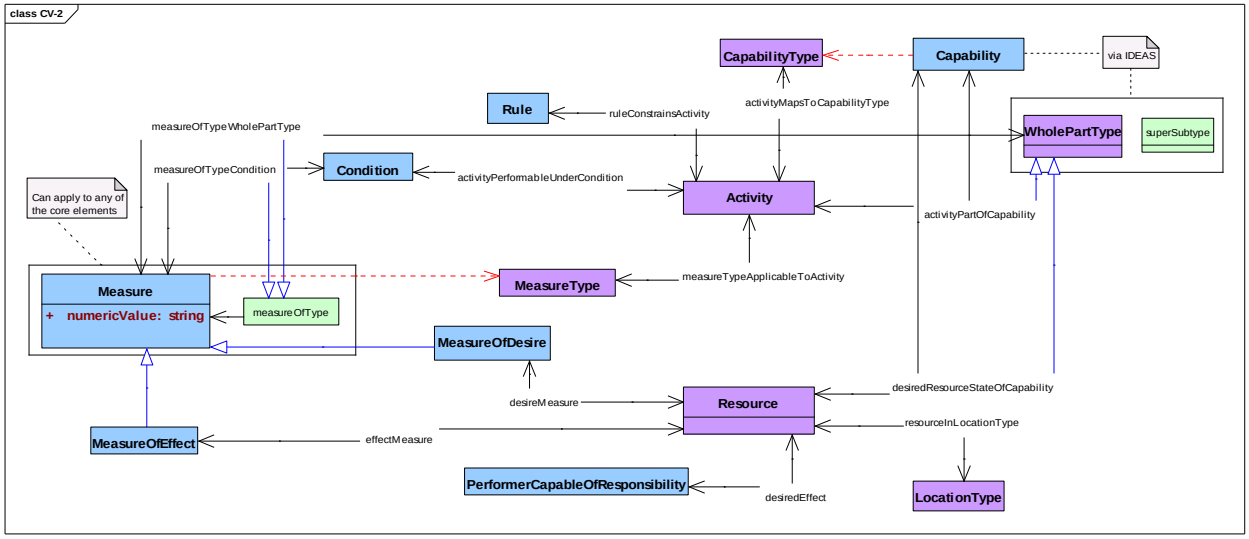


Figure 3-4: DoDAF meta-model diagram for CV-2 models

i. ***Alternative names***: Capability Taxonomy; Capability Hierarchy.

3.3.3 Capability Schedules (CV-3)

a. ***Description***. This model *identifies* and *describes schedules* for the *deployment* of ***resources*** needed to *realize* ***capabilities*** provided by an ***architecture***; these *schedules* are given in terms of *timelines*.

b. ***Narrative***. This model emphasizes the temporal parts of capabilities, specifically the temporal ordering of activities that are parts of projects and temporal measures of the availability of resources. A capability comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired resource state, (b) explicit statements and measures of such desired resource states, and (c)

explicit consideration of conditions under which activities that are part of a capability may be successfully performed.

c. A responsible performer envisions a desired effect, which may be documented by a vision statement. Responsible performers include types of organizations and types of persons in organizational roles. In a CV-3 model, the emphasis may be on particular organizations that desire specified effects and, similarly, particular organizations that may be critical to achieving those effects. Such particular organizations should be organizations of the sort that may have responsibility for those effects.

d. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

e. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources, including performers, are available to activities as they are needed. In a CV-3 model, the emphasis is on the sorts of locations where activities will be carried out to produce desired effects and the sorts of locations where resources involved as desired effects will be found. While a CV-3 model does not require exhaustive enumeration of all possible actual locations for all possible resources constituting a desired effect, specific known locations of more-or-less fixed resources may be modeled.

f. Activities are seen in a CV-3 model just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities.

g. A CV-3 model considers cases where resources, particularly performers, may not be readily available to activities that produce desired effects. Sets of activities may be grouped as projects to ensure that certain resources are available where and when they are needed. In a CV-3 model, the emphasis is on the sorts of projects that will be involved in delivering capabilities. (To examine specific projects within an architectural description, use the Project Viewpoint.)

h. A CV-3 model emphasizes looking at a capability in terms of the ordering of its temporal parts using happensIn and beforeAfter relationships. For example, understanding capabilities can be approached by comparing when things happen in relation to when other things happen: what things come before and what things come after, and what things happen in synchrony or during

the same period of time (e.g., concurrency; serial and parallel execution and existence). In a CV-3 model, the emphasis is on the temporal parts of activities and resources that constitute capabilities—on successive state changes over time—and that lead from some initial resource state to a desired resource state.

i. Capabilities, responsible performers, desired effects, resources, activities, performers, conditions, measures of effects, measures of desire, types of projects, and temporal measures shall be modeled. Types of locations of resources and activities, specific locations of resources and activities, rules constraining activities, types of organizations, specific organizations, and additional sorts of measures may be modeled.

j. ***Meta-model***. Figure 3-5 shows the DoDAF meta-model for CV-3 models.

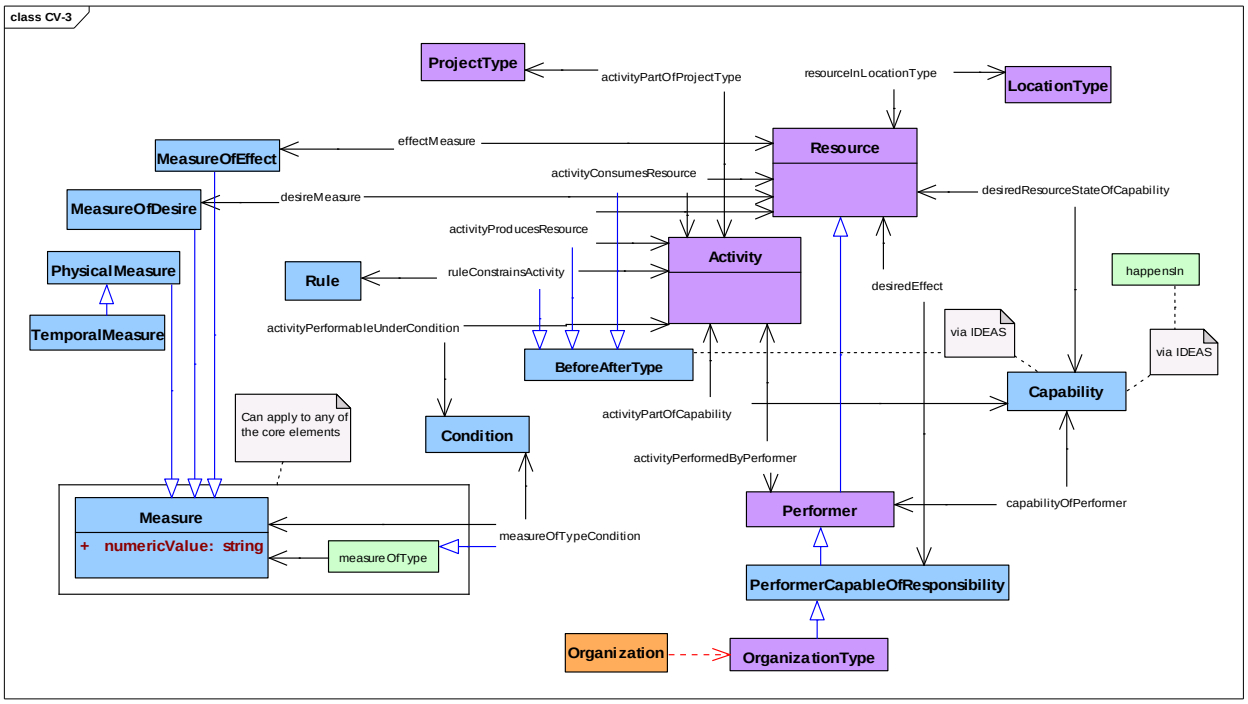


Figure 3-5: DoDAF meta-model diagram for CV-3 models

k. ***Alternative names***: Capability Phasing; Capability Deployment Phasing; Capability Resource Deployment Phasing; Capability Resource Deployment.

3.3.4 Capability Dependencies (CV-4)

a. ***Description***. This model *identifies* and *describes* the *dependencies* among the ***effects*** caused by ***capabilities*** provided by an ***architecture***.

b. ***Narrative***. This model emphasizes spatial and temporal dependencies of activities and resources that constitute capabilities described by an architectural description. A capability

comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect. Responsible performers include types of organizations and types of persons in organizational roles. A VC-4 model may emphasize dependencies among responsible performers

d. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

e. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources are available to activities as they are needed. A CV-4 model may emphasize dependencies among the sorts of locations where activities will be carried out to produce desired effects and the sorts of locations where resources involved as desired effects will be found.

f. Activities are seen in a CV-4 model just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities. Activities are to be measured; collections of measures that may be applicable to activities may be grouped as types of measures of activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

g. A CV-4 model may look at capabilities terms of dependencies among its parts (e.g., activities and resources; temporal and spatial states) using whole-part relationships. For example, understanding capabilities can be approached by composition and by decomposition of activities and of resources across capabilities.

h. A CV-4 model may examine capabilities in terms of the ordering of their temporal parts using happensIn and beforeAfter relationships. For example, understanding capabilities can be approached by comparing when things happen in relation to when other things happen: what things come before and what things come after, and what things happen in synchrony or during

the same period of time (e.g., concurrency; serial and parallel execution and existence). In a CV-4 model, the emphasis may be on the temporal parts of the activities and resources of related capabilities—on successive state changes over time—that flow from initial resource states to desired resource states.

i. Capabilities, responsible performers, desired effects, resources, activities, conditions, measures of effects, measures of desire, and temporal measures shall be modeled. Types of locations of resources and activities, rules constraining activities, happens-in relationships, whole-part relationships, and additional sorts of measures may be modeled. Performers other than responsible performers shall not be modeled.

j. ***Meta-model***. Figure 3-6 shows the DoDAF meta-model for CV-4 models.

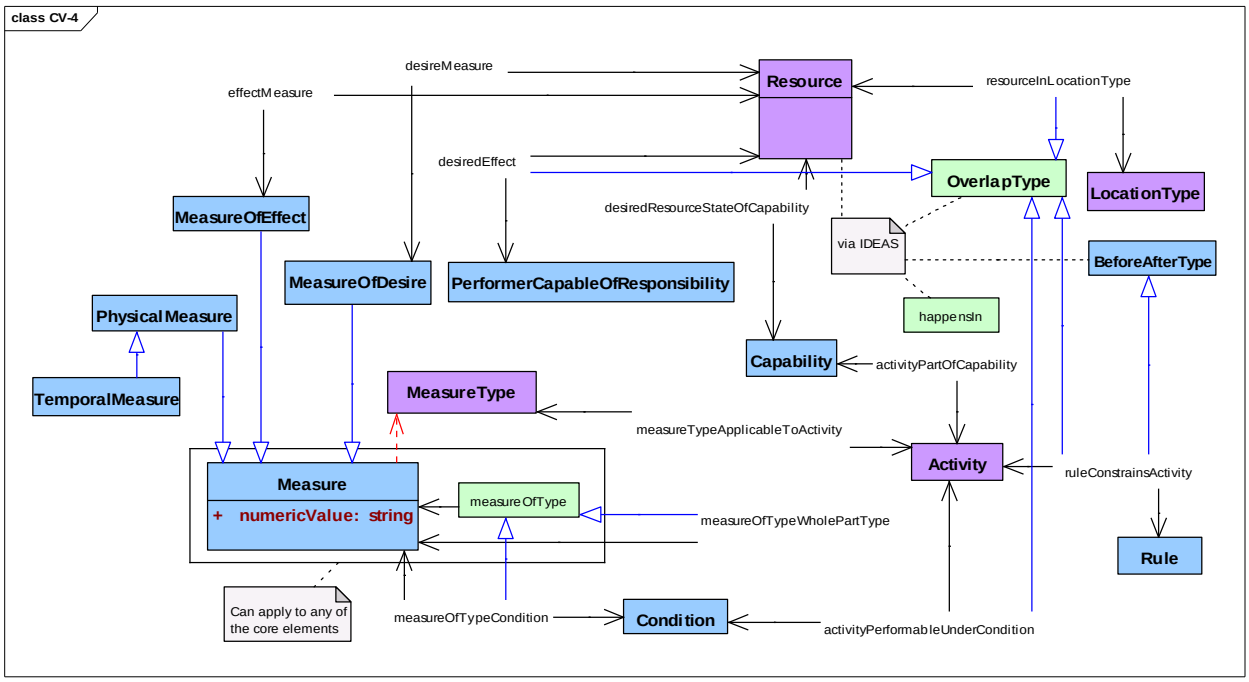


Figure 3-6: DoDAF meta-model diagram for CV-4 models

k. ***Alternative names***.

3.3.5 Capability Deployments (CV-5)

a. ***Description***. This model *identifies* and *describes schedules* for *deployment of* ***resources*** needed to *realize* ***capabilities*** provided by an ***architecture***; these *schedules* are given in terms of ***organizations*** and ***locations***.

b. ***Narrative***. This model emphasizes the deployment of resources produced by project activities so that those resources are available to a responsible performer to achieve a desired effect. A capability comprises activities and resources, which includes resources that are consumed by

activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect. Responsible performers include types of organizations and types of persons in organizational roles. In the Capability Viewpoint, the emphasis may be on particular organizations that desire specified effects and, similarly, particular organizations that may be critical to achieving those effects. Such particular organizations should be organizations of the sort that may have responsibility for those effects.

d. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

e. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources, including performers, are available to activities as they are needed. In a CV-5 model, the emphasis may be on the sorts of locations where activities will be carried out to produce resources needed to achieve desired effects and the sorts of locations where such resources will be delivered or otherwise transported. While a CV_5 model does not require exhaustive enumeration of all possible actual locations for all possible resources constituting a desired effect, specific known locations of more-or-less fixed resources may be modeled.

f. Activities are seen in a CV-5 model just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities. Activities are to be measured; collections of measures that may be applicable to activities may be grouped as types of measures of activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

g. A CV-5 model considers cases where resources, particularly performers, may not be readily available to activities that produce desired effects. Sets of activities may be grouped as projects to ensure that certain resources are available where and when they are needed. In a CV-5 model, the emphasis is on the sorts of projects that might be involved in delivering the resources that are

parts of a capability and on temporal measures appropriate to understanding the delivery of such resources (e.g., schedules; time-lines; budget cycles). (To examine specific projects within an architectural description, use the Project Viewpoint.)

h. A CV-5 model may examine a capability in terms of the ordering of the temporal parts of projects using happens-in and before-after relationships. For example, understanding capabilities can be approached by comparing when things happen in relation to when other things happen: what things come before and what things come after, and what things happen in synchrony or during the same period of time (e.g., activity A of project Y occurs before activity B of project Z; resource M is produced at location N in period Q by project R). In a CV-5 model, the emphasis is on the temporal parts of activities—on successive state changes over time—that produce (a) resources that are consumed to achieve a capability and (b) resources that perform activities to achieve a capability.

i. Capabilities, responsible performers, desired effects, resources, activities, performers, conditions, types of projects, measures of effects, measures of desire, and temporal measures shall be modeled. Types of locations of resources and activities, actual locations of resources and activities, rules constraining activities, types of organizations, specific organizations, happens-in relationships, and additional sorts of measures may be modeled.

j. ***Meta-model***. Figure 3-7 shows the DoDAF meta-model for CV-5 models.

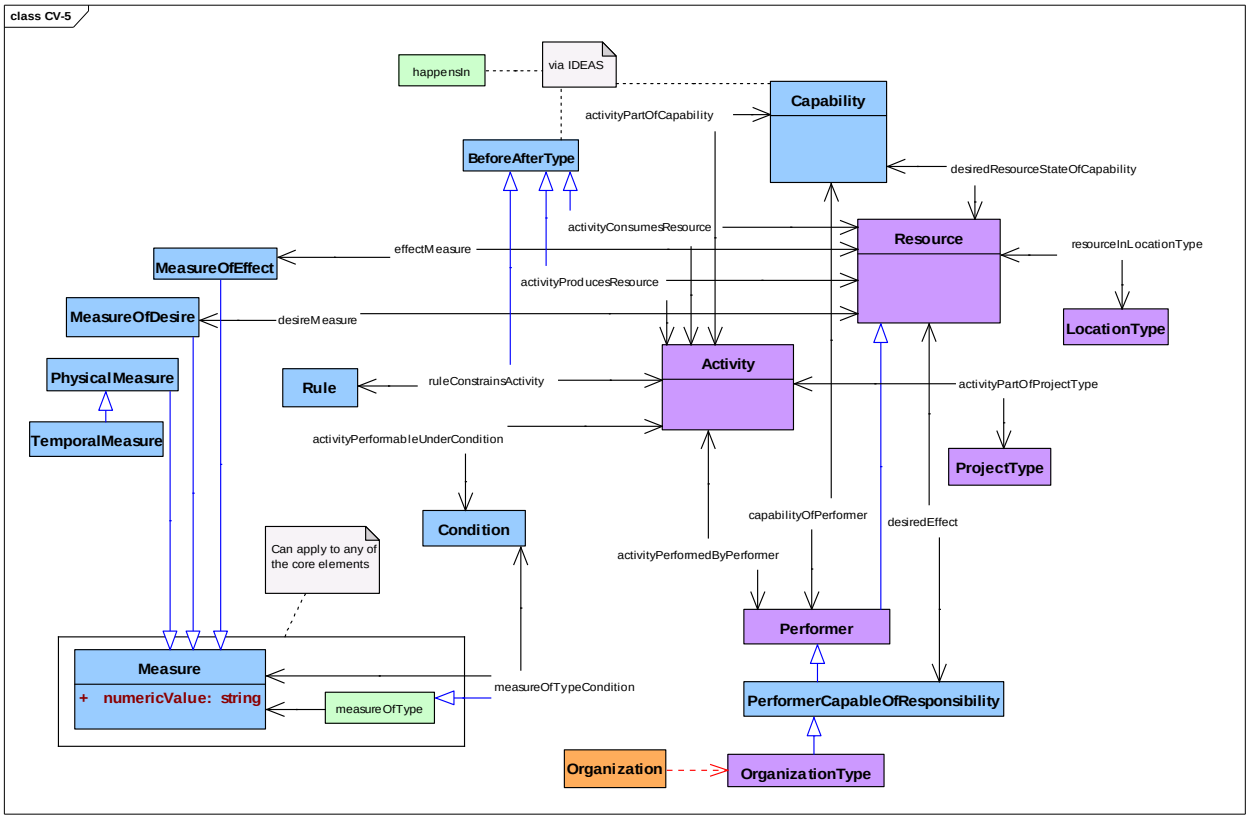


Figure 3-7: DoDAF meta-model diagram for CV-5 models

k. ***Alternative names***: Capability to Organizational Development Mapping; Organizational Deployment of Capabilities; Capability Resource Deployment.

3.3.6 Capability Activities (CV-6)

a. ***Description***. This model *identifies* and *describes* ***activities*** that are *performed* to cause the ***desired-effects*** of a ***capability*** provided by a described ***architecture***.

b. ***Narrative***. This model emphasizes the activities that are parts of capabilities. A capability comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect. Responsible performers include types of organizations and types of persons in organizational roles. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect

incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

d. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources are available to activities as they are needed. In a CV-6 model, the emphasis is on the sorts of locations where activities will be carried out. While CV-6 model does not require exhaustive enumeration of all possible actual locations for all possible activities that are part of a capability, specific known locations of activities may be modeled.

e. Activities are seen in a CV-6 model just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities.

f. A CV-6 model may use whole-part relationships to examine a capability in terms of its parts that are activities. For example, understanding capabilities can be approached by composition and by decomposition of activities. These activities may be related to types of capabilities that include the capabilities described by an architectural description.

g. Capabilities, types of capabilities, responsible performers, desired effects, resources, activities, conditions, measures of effects, and measures of desire shall be modeled. Types of locations of resources and activities, actual known locations of resources and activities, rules constraining activities, and additional sorts of measures may be modeled. Performers other than responsible performers shall not be modeled.

h. ***Meta-model***. Figure 3-8 shows the DoDAF meta-model for CV-6 models.

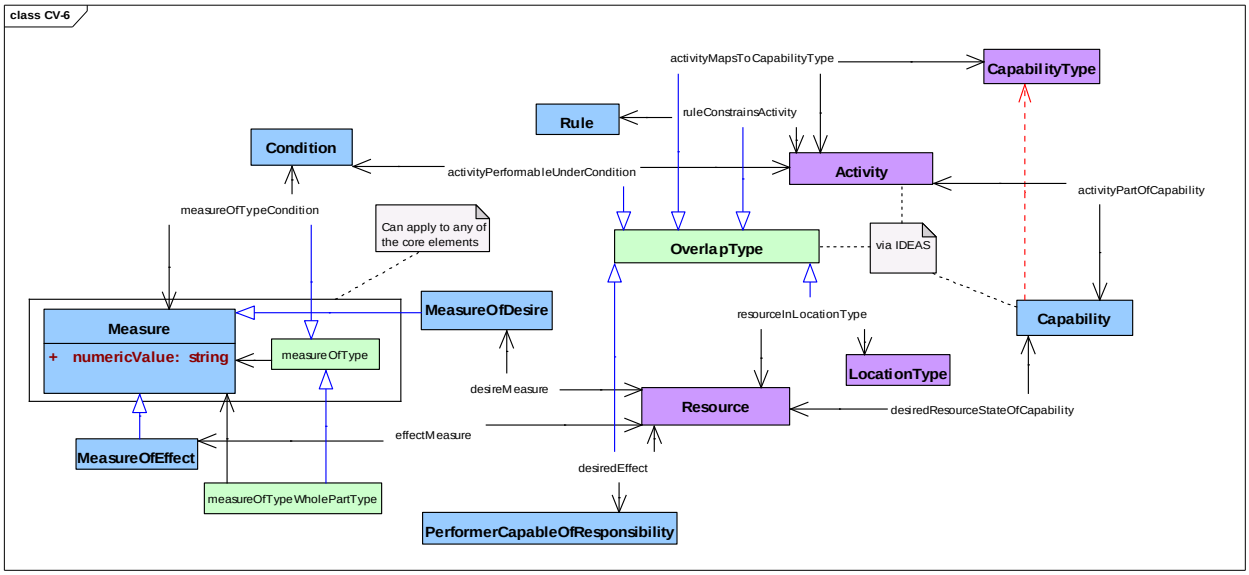


Figure 3-8: DoDAF meta-model diagram for CV-6 models

i. ***Alternative names***: Capability to Operational Activities Mapping.

j. ***Note***. The activities of CV-6 models are a subset of the activities identified by the OV-5b models of a described architecture. All activities that appear in the Capability Viewpoint must appear within the Operational Viewpoint.

3.3.7 Capabilities & Services (CV-7)

a. ***Description***. This model *identifies* and *describes* ***relationships*** among ***services*** and the ***capabilities*** *accessed* via these ***services*** as provided by an ***architecture***.

b. ***Narrative***. This model emphasizes services that enable a responsible performer to access resources needed to achieve a desired effect. A capability comprises activities and resources, which includes resources that are consumed by activities, resources that are produced by activities, and resources, such as services, that perform activities. A capability is distinguished from other collections of activities and resources by (a) the explicit presence of a performer who is capable of responsibility and who envisions a desired effect, (b) explicit statement and measures of such desired effects, (c) and explicit consideration of conditions under which activities entailed by a capability may be successfully carried out.

c. A responsible performer envisions a desired effect. Responsible performers include types of organizations and types of persons in organizational roles. An effect desired by a responsible performer is some desired resource state, that is, some resource state to be achieved by specified changes to some set of resources that are not initially in the desired state. A desired effect incorporates three things: (a) some collection of resources in some initial state, (b) that collection of resources in some desired state, and (c) measures of the differences between resources in their

initial state and their desired state. A capability is also associated with a measure of desire to express how important it is to a responsible performer to achieve a desired effect. (Measures of desire may be expressed in ways as varied as priorities, wagers, and budgets.)

d. A capability plays out over space and time: resources in one state are transformed into resources in another state. The location of activities and resources must be knowable to ensure that resources, including performers, are available to activities as they are needed. In a CV-7 model, the emphasis is on the sorts of locations where activities will be carried out to produce desired effects and the sorts of locations where resources involved as desired effects will be found.

e. Activities are seen in a CV-7 model just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, including services, follow guidance, rules, and standards to carry out activities.

f. Services appear in a CV-7 model as performers, but services are not *responsible* performers. Services are used *by* responsible performers and by other performers to carry out activities. As elsewhere in DoDAF viewpoints, a service enables access to some set of resources and a service is to be described by a service description. Of particular interest in a CV-7 model are services that give responsible performers access to those resources that constitute the responsible performer's desired effects.

g. Capabilities, responsible performers, desired effects, resources, activities, services, service descriptions, conditions, measures of effects, and measures of desire shall be modeled. Types of locations of resources and activities, rules constraining activities, and additional sorts of measures may be modeled. Performers other than responsible performers and services may be modeled.

h. ***Meta-model***. Figure 3-9 shows the DoDAF meta-model for CV-7 models.

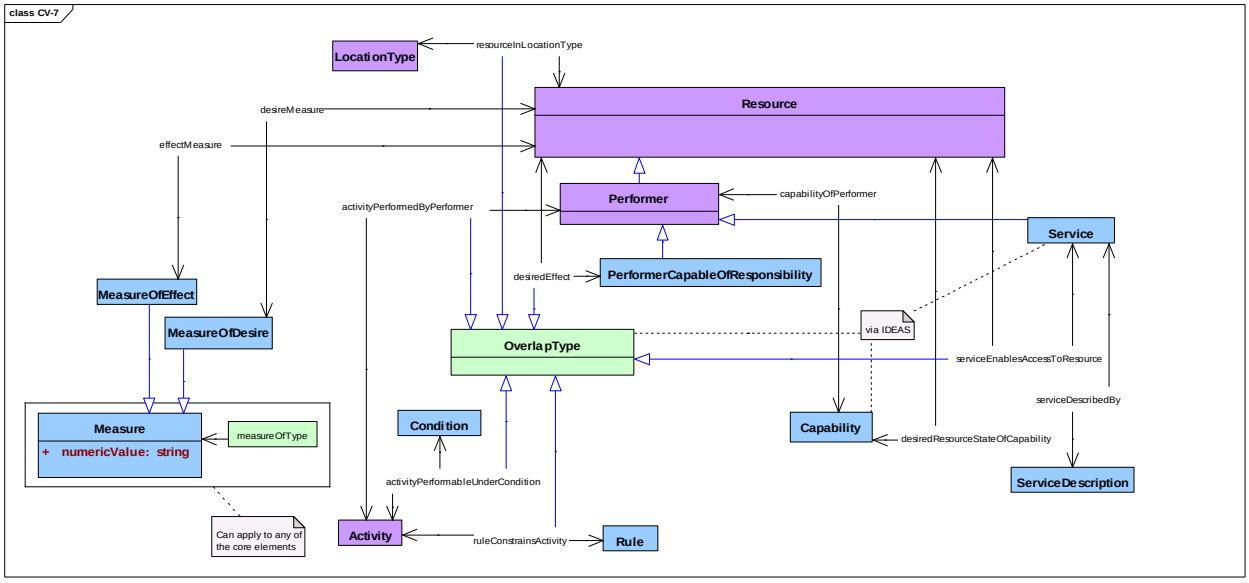


Figure 3-9: DoDAF meta-model diagram for CV-7 models

i. ***Alternative names***: Capability to Services Mapping; Capability Services.

3.4 Data and Information Viewpoint (DIV)

a. Data and Information Viewpoint models portray operational and business information requirements and rules that are managed within and used as constraints on operational and business activities. Experience gained from many enterprise architecture efforts within the DoD led to the identification of several levels of abstraction necessary to accurately communicate the information needs of an organization or enterprise. Audience and purpose determine the levels of abstraction that are appropriate for an architectural description. DIV models provide three levels of abstraction—conceptual information, data requirements, and data implementation—that correspond to the conceptual, logical, and physical models familiar to DoD architects.

b. Table 3.4-1 names and describes Data and Information Viewpoint models.

Table 3.4-1: Data and Information Viewpoint models

Models	Descriptions
DIV-1: Conceptual Information	Presents concepts that must be understood by decision makers to make decisions within the scope of the described architecture.
DIV-2: Data Requirements	Presents data requirements that reify the information concepts identified by corresponding DIV-1 Conceptual Information models

DIV-3: Data Implementation	Presents data-elements and data-structures that reify the data requirements specified by corresponding DIV-2 Data Requirements models.

3.4.1 Meta-model data groups used by Data and Information Viewpoint models

a. The Data and Information Viewpoint models differ from the models of the other viewpoints. Other viewpoints focus on information and data that are largely contained within corresponding meta-model data groups, and each model within a viewpoint examines a somewhat different set of information and data. For example, Capability Viewpoint models are in large part based upon information and data found in the Capabilities meta-model data group, but each Capability Viewpoint model looks at a different set of information and data from that meta-model data group.

b. In contrast, the content of Data and Information Viewpoint models may include information and data from any combination of meta-model data groups. Further, the three sorts of DIV models look at the same, perhaps enterprise-wide, set of information and data, but each DIV model looks at this data at a different level of abstraction. For example, a DIV-1 model might introduce notions of measures of capability effects suitable for use by portfolio managers when selecting candidate performers. A corresponding DIV-2 model might reify this decision-making concept into an information requirement by specifying what exactly will constitute an acceptable measure of an effect (e.g., what will be measured? How will it be measured? Who will measure it? When will it be measured? How accurate must this measure be? How much confidence must we have in this measure?). In turn, a corresponding DIV-3 model might reify this information requirement into an implementation specification (e.g., data element metadata for a data element named ‘MeasureOfEffect’, which is to be stored in a specified column of a specified table in a specified sort of data store; a registry specification of ‘measure of effect’ as an XML tag).

3.4.2 Conceptual Information (DIV-1)

a. ***Description***. This model *identifies* and *describes* the *concepts* that must be understood by *decision makers* within the *scope* of a described ***architecture***.

b. ***Narrative***. This model emphasizes that information and data are resources that guide activities and that are consumed and produced by activities. Resources are things that can be located in space and time and whose state can be described by an architectural description. Performers are resources that carry out activities; decision makers are performers that carry out decision-making activities. Performers as decision makers carry out activities that decide the state and location of resources.

c. The focus of this model is on the needs of performers as decision makers within the scope of a described architecture. Decisions within the scope of a described architecture are decisions about activities, resources that activities consume and produce, resources that perform activities, rules that constrain activities, conditions under which activities are performed, and locations of resources. This model identifies and describes these concepts, the sorts of resources, activities, rules, conditions, and locations about which performers will make decisions. In particular, this model identifies and describes the sorts of measures of resources, activities, locations, and conditions that are need to be known by decision makers and the sorts of measures that rules impose on activities known to decision makers.

d. This model organizes and relates these concepts to each other in at least two ways: first, by identifying and describing their similarities and differences and, second, by identifying and describing the parts that make up whole things. The first way uses super-subtype relationships to show that *this* concept comprises *these* similar but differentiated concepts. In a DIV-1 model, this taxonomic organization of concepts must be rooted by the fundamental DoDAF concepts and terminology of resource, activity, rule, condition, location, and measure. The second way uses whole-part relationships to show that *this* concept is a whole that comprises *these* concepts as its parts. In a DIV-1 model, this mereological organization of concepts considers temporal parts and spatial parts as well as compositional parts.

e. Resources, activities, rules, conditions, locations, and measures shall be modeled using the structure (i.e., relationships and subtyping) and terminology of the DoDAF meta-model. These concepts shall be specialized or otherwise extended as required by decision-making activities within the scope of a described architecture. Properties other than measures may be modeled. Terminology peculiar to audiences of a described architecture may be provided as synonyms for DoDAF terms if and only if the meanings of such synonyms are identical to the meanings of the corresponding DoDAF terms.

f. ***Meta-model***. Figure 3-10 shows the DoDAF meta-model for DIV-1 models.

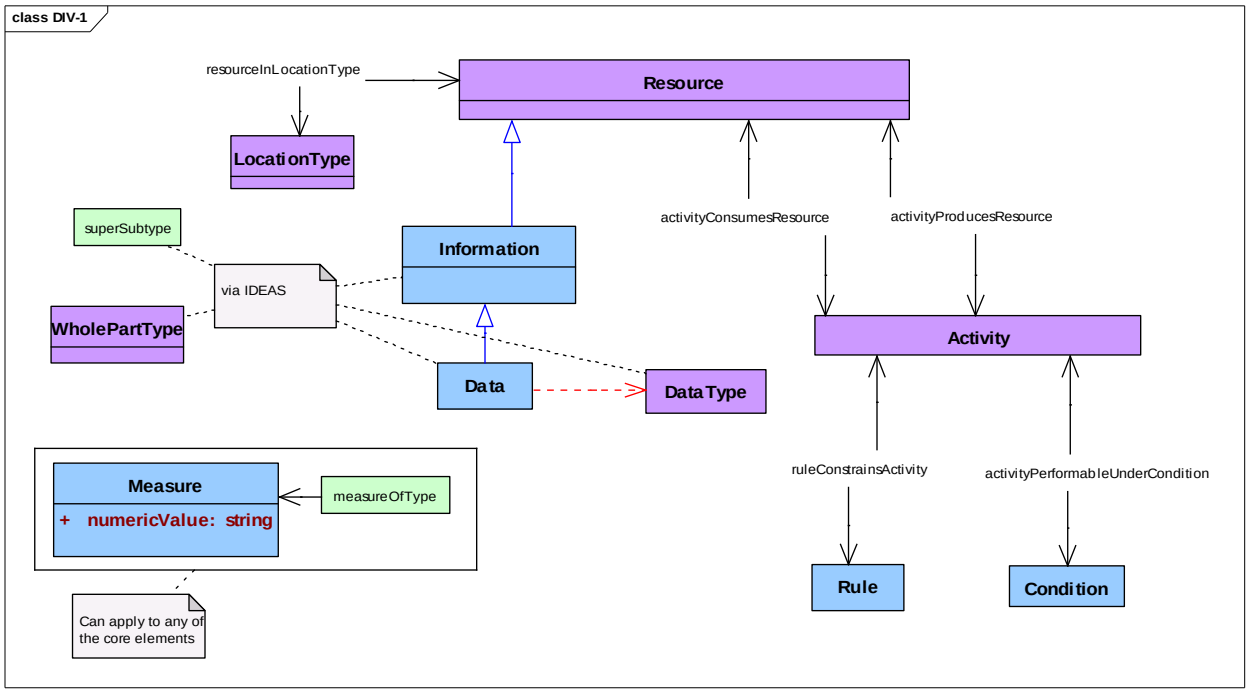


Figure 3-10: DoDAF meta-model diagram for DIV-1 models

g. ***Alternative names***: Conceptual Data Model; Conceptual Information/Data.

3.4.3 Data Requirements (DIV-2)

a. ***Description***. This model *identifies* and *describes* ***data*** *requirements* that ***reify*** the ***information*** *concepts* identified by corresponding DIV-1 Conceptual Information models.

b. ***Narrative***. This model emphasizes information that performers as decision makers need to carry out activities within the scope of a described architecture. While a DIV-1 model focuses on concepts important for decision making within the scope of a described architecture, a DIV-2 model focuses the specific sorts of things that decision makers need to know about those concepts to make specific sorts of decisions. A DIV-2 model identifies and describes information as resources consumed by activities within a described architecture and beyond its boundaries.

c. Decision makers in the act of making a decision require information resources that provide specific data about resources, activities, and other fundamental things, including their states, locations, measures, and properties of other sorts. An information resource may also provide data about its internal structure (e.g., mesodata), data about its relationships with other information resources (e.g., versioning), data to guide the interpretation of data values (e.g., metadata), and data that characterize the integrity of specific data values (e.g., microdata, pedigree).

d. DIV-2 models identify and describe the things that decision makers need to know about and what they need to know about those things. DIV-2 models express these requirements for data to

assure completeness, correctness, and consistency. DIV-2 models identify and describe the data that is necessary and sufficient to support the decisions that must be made within the scope of a described architecture. A DIV-2 model does not imply physical implementation; implementation of data is the subject of DIV-3 models.

e. DIV-2 models should address how information is made available to decision makers. DIV-2 models should show how the right data is made available to the right decision maker at the right time and the right place and in the right way.

f. Resources, activities, rules, conditions, locations, and measures shall be modeled using the structure and terminology established by corresponding DIV-1 models. Properties other than measures may be modeled. Mesodata, metadata, and microdata requirements may be modeled.

g. ***Meta-model***. Figure 3-11 shows the DoDAF meta-model for DIV-2 models.

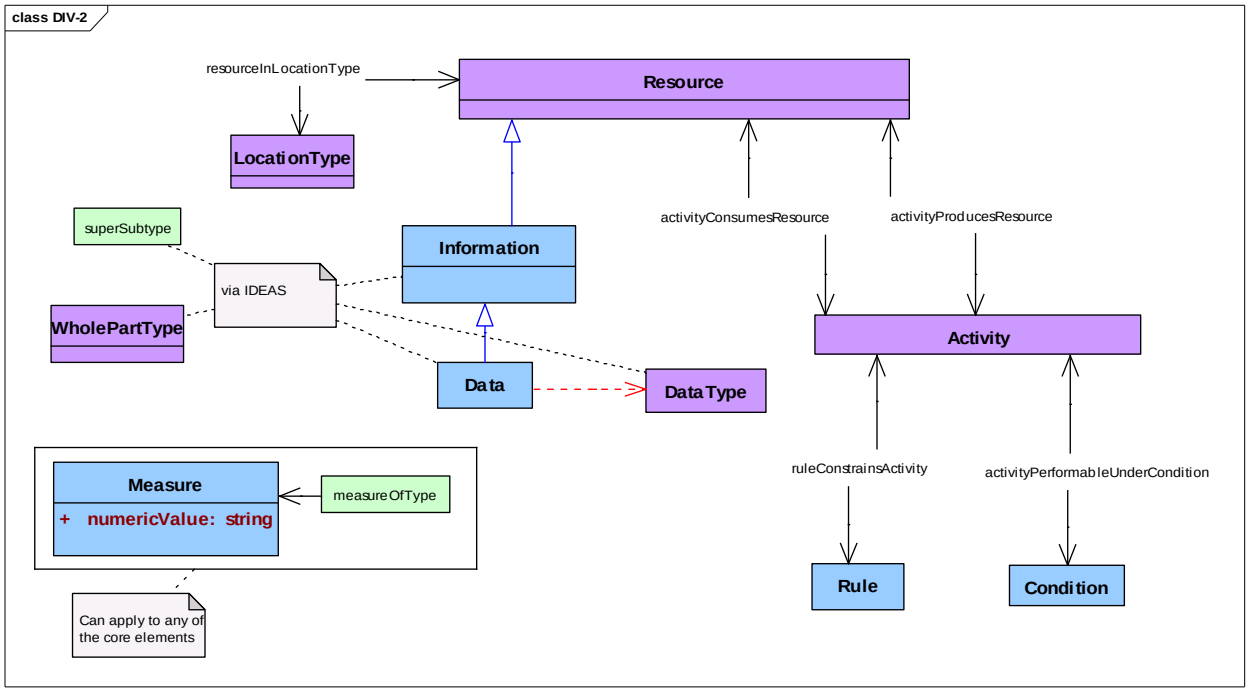


Figure 3-11: DoDAF meta-model diagram for DIV-2 models

h. ***Alternative names***: Logical Data Model; Logical Information/Data; Logical Data; Logical Data Requirements; Data Architecture.

3.4.4 Data Implementation (DIV-3)

a. ***Description***. This model *identifies* and *describes data-structures* and *data-elements* that ***reify*** the ***data*** *requirements* specified by corresponding DIV-2 Data Requirements models.

b. ***Narrative***. This model emphasizes the specification of data structures and data elements that satisfy data requirements given by corresponding DIV-2 models. DIV-3 models specify the physical representation of data in data stores (e.g., database schemas), in data communication (e.g., message formats), in data processing (e.g., class specifications), and in data presentation (e.g., web pages). DIV-3 models should demonstrate how the integrity of data values is preserved throughout the lives of data elements.

c. Each implementation construct (e.g., data element, file, message) in DIV-3 models shall be identified and described to comply with metadata standards established in the Standards Viewpoint for a described architecture. DIV-3 models should specify the rules that are used to preserve the meaning of required data in their physical implementations.

d. DIV-3 models shall show the satisfaction of every data requirement expressed by DIV-2 models for a described architecture. DIV-3 models may not introduce concepts or requirements unrelated to specific implementations.

e. ***Meta-model***. Figure 3-12 shows the DoDAF meta-model for DIV-3 models.

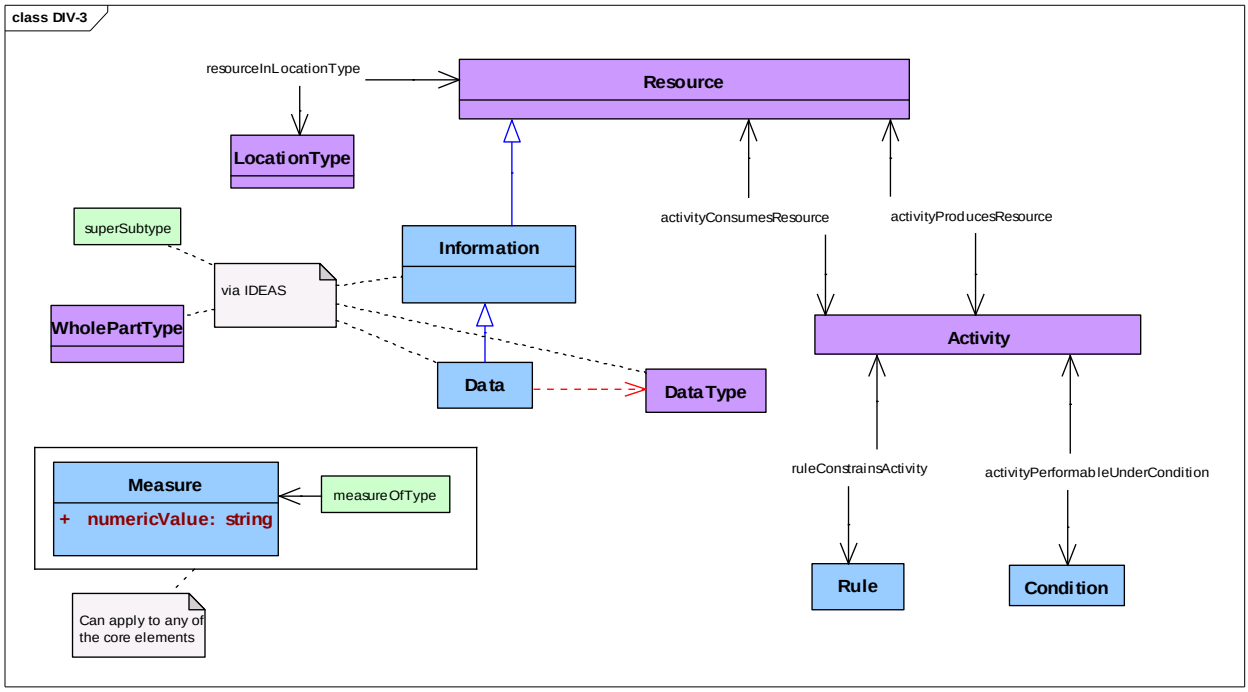


Figure 3-12: DoDAF meta-model diagram for DIV-3 models

f. ***Alternative names***: Physical Data Model; Physical Information/Data; Physical Data; Physical Data Implementation.

3.5 Operational Viewpoint (OV)

a. The Operational Viewpoint looks at activities and resources, especially at resources that are performers who are organizations and how these performers work together to do something. This viewpoint focuses on *who* needs to do *what* rather than on the means that performers might use to carry out their activities.

b. The Operational Viewpoint looks at means—materiel, systems, and services—as constraints. A description of an existing architecture will identify and describe materiel, systems, and services that performers use to carry out activities because an existing architecture is completely constrained by these means. A description of a possible architecture will incorporate materiel, systems, and services only as these means limit possible activities, that is, only insofar as materiel, systems, and services constrain the design of an architecture.

c. Activities are seen in OV models just they are in other DoDAF models. An activity consumes resources to produce resources. Performers, themselves resources, follow guidance, rules, and standards to carry out activities. Activities are carried out under conditions that affect their performance. Activities are to be measured; collections of measures that may be applicable to activities may be grouped as types of measures of activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

d. Activities, resources, and performers who are capable of responsibility—organizations and persons in roles—are represented by OV models. Locations and measures of modeled activities, resources, and performers are also represented by OV models. Rules and conditions are represented by OV models that represent activities. Skills needed by a person in a role may be represented by OV models that represent persons in roles.

e. Table 3.5-1 names and describes Operational Viewpoint models.

Table 3.5-1: Operational Viewpoint models

Model	Description
OV-1: Operational Concept	Presents the concepts of operation of a described architecture.
OV-2: Organizations and Resources	Presents resources that are used by organizational performers.
OV-3: Organizations, Activities, and Resources	Presents resources that are consumed and produced by activities performed by organizational performers.
OV-4: Organizational Relationships	Presents the composition and relationships among organizational performers.
OV-5a: Operational Activity Hierarchy	Presents the hierarchical structure of organizational activities.
OV-5b: Operational Activities	Presents activities performed by organizational performers to consume and produce resources.
OV-6a: Operational Rules	Presents rules that constrain organizational activities.
OV-6b: Operational State Transitions	Presents the states of resources consumed and produced by activities performed by organizational performers.
OV-6c: Operational Activity Sequences	Presents sequences of activities performed by organizational performers.

3.5.1 Operational Concept (OV-1)

a. ***Description***. The OV-1 is a graphical overview of the architecture. There is no prescription of the content of an OV-1, i.e., there is no meta model for the OV-1. An OV-1 may consist of one or more graphics (or video). It must include explanatory text. The OV-1 correlates with the narrative overview in the AV-1.

b. ***Narrative***. The OV-1 can present:

1) a mission, class of mission, or scenario relevant to the architecture,

2) operational concepts and interesting or unique aspects of operations in the architecture,

3) interactions between the architecture and its environment, and between the architected systems and external systems,

4) the concepts of operations,

5) an aggregate illustration of the architecture,

6) an identification of the stakeholders and operations involved,

7) the business or operational activities, functions, organizations, and geographical distribution of assets, and

8) what the architecture is supposed to do, and how it is supposed to do it.

c. The intended usage of the OV-1 includes:

1) Aiding broad-based human communication, i.e., a tool for discussion and presentation,

2) Executive summary presentation to high-level decision-makers, and

3) Putting an operational situation or scenario into context, e.g., in terms of phase, a time period, a mission and/or a location

d. ***Meta-model***. None.

e. ***Alternative names***: High-Level Operational Concept; High-Level Operational Concept Graphic.

f. ***Notes***. DoDAF does not require any specific content for an OV-1 nor does DoDAF specifically exclude any content from an OV-1. An OV-1 should be consistent with the AV-1.

g.

3.5.2 Organizations & Resources (OV-2)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***activities*** *performed* by ***organizational-performers***.

b. ***Narrative***. This model emphasizes the exchange of resources among organizational performers, that is, performers capable of responsibility. These resources include information, materiel, and performers. The dependency between a resource to be consumed by one activity and a resource produced by another activity may be described as the *flow* of resources from

producer to consumer. Activities are modeled in OV-2 models only in detail sufficient to show the relationships between resources produced by the activities of one organizational performer and the resources consumed by the activities of other organizational performers.

c. Activities are seen in OV-2 models much as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in OV-2 models are resources that are capable of responsibility rather than resources that are materiel, systems, or services. Such performers—organizations and persons in roles—follow guidance, rules, and standards to carry out their activities. Performers carry out their activities under conditions that affect their performance.

d. Performers and other resources are related to their locations to ensure that resources to be consumed are available to activities when and where those resources are needed and that performers are there to carry out those activities when those resources are available.

e. Activities and resources may be measured. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

f. Activities and resources shall be modeled. In particular, resources that are information shall be modeled. Types of organizations shall be modeled; specific organizations may be modeled. Persons in roles may be modeled. Types of locations of resources may be modeled, and specific locations may also be modeled. Rules and conditions may be modeled. Measures related to activities, resources, performers, locations, rules, and conditions may be modeled.

g. ***Meta-model***. Figure 3-13 shows the DoDAF meta-model for OV-2 models.

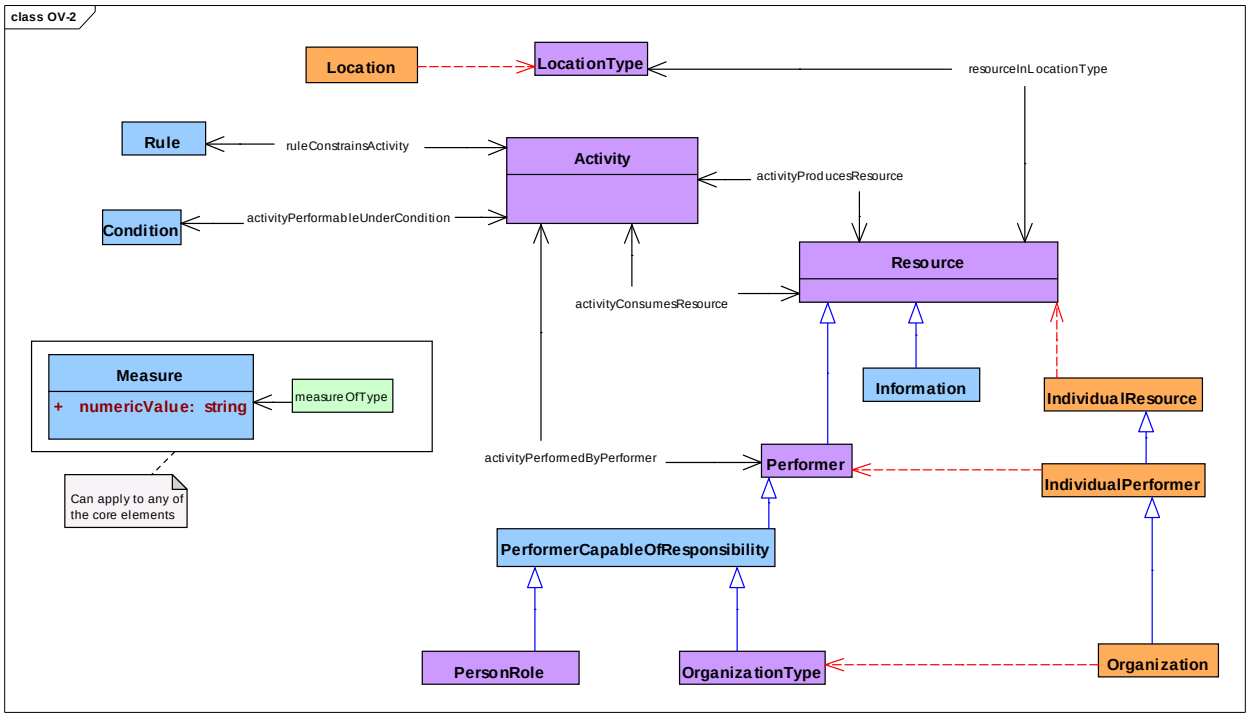


Figure 3-13: DoDAF meta-model diagram for OV-2 models

h. ***Alternate names***: Operational Resource Flow Description; Organizational Resource Flows Identification.

i. ***Notes***. (a) The architectural data of an OV-2 model may be grouped and ordered by organizational-performers who perform activities that produce resources. (b) The architectural data presented by an OV-2 artifact is typically a subset of the architectural data presented by an OV-3 artifact. Activities and measures may be de-emphasized by an OV-2 presentation.

3.5.3 Organizations, Activities, & Resources (OV-3)

j. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***activities*** *performed* by ***organizational-performers***.

k. ***Narrative***. This model emphasizes the exchange of resources among organizational performers, that is, performers capable of responsibility. These resources include information, materiel, and performers. A dependency between a resource to be consumed by one activity and a resource produced by another activity may be described as a *flow* of resources from producer to consumer. Activities are modeled in OV-3 models only in detail sufficient to show the relationships between resources produced by the activities of one organizational performer and the resources consumed by the activities of other organizational performers.

l. Activities are seen in OV-3 models much as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in OV-3 models are resources that are capable of responsibility rather than resources that are materiel, systems, or services. Such performers—organizations and persons in roles—follow guidance, rules, and standards to carry out their activities. Performers carry out their activities under conditions that affect their performance.

m. Performers and other resources may be related to their locations to ensure that resources to be consumed are available to activities when and where those resources are needed and that performers are there to carry out those activities when those resources are available.

n. In contrast to OV-2 models, OV-3 models identify and describe measures that apply to activities and resources. OV-3 models provide physical and temporal measures that are related to resources. OV-3 models also provide measures of performance and of the satisfaction of needs that are related to activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

o. Activities and resources shall be modeled. In particular, resources that are information shall be modeled. Types of organizations shall be modeled; specific organizations may be modeled. Persons in roles may be modeled. Types of locations of resources may be modeled, and specific locations may also be modeled. Rules and conditions may be modeled. Measures related to activities, resources, performers shall be modeled. Measures related to rules, conditions, and locations may be modeled.

p. ***Meta-model***. Figure 3-14 shows the DoDAF meta-model for OV-3 models.

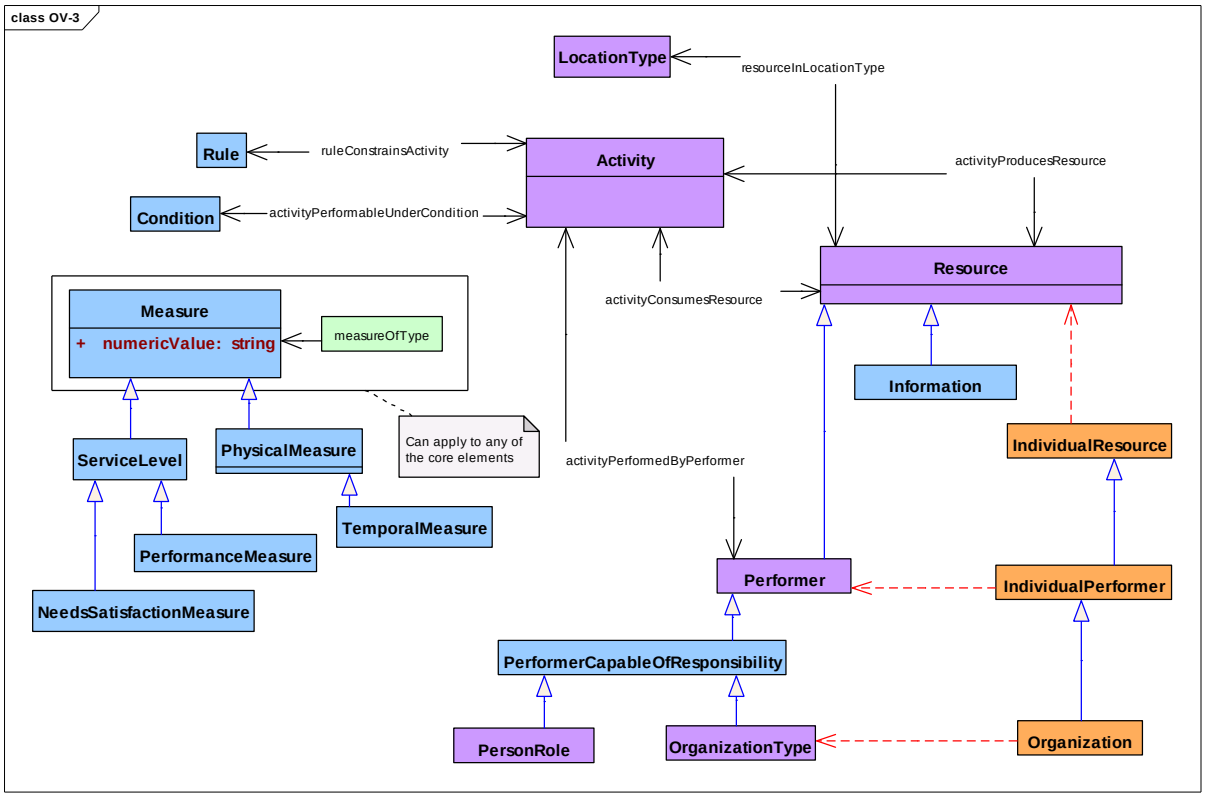


Figure 3-14: DoDAF meta-model diagram for OV-3 models

q. ***Alternate names***: Operational Resource Flow Matrix; Organizational and Activity Resource Flows.

r. ***Notes***. (a) The architectural data of an OV-3 model may be grouped and ordered by organizational-performers who perform activities that produce resources. (b) The architectural data presented by an OV-3 artifact is typically a superset of the architectural data presented by an OV-2 artifact. Measures of activities and resources may be emphasized by an OV-3 presentation.

3.5.4 Organizational Relationships (OV-4)

a. ***Description***. This model *identifies* and *describes* ***relationships*** among ***organizational-performers*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes relationships among organizations as wholes and among the parts of whole organizations. An OV-4 model describes how organizations relate to one another through the resources that they produce and consume. This model focuses on the exchange of resources among organizational performers, that is, performers who are capable of responsibility. Organizational performers include both organizations and persons in roles. Resources exchanged by organizational performers include information, materiel, and performers.

c. The dependency between a resource to be consumed by one activity carried out by one performer and a resource produced by another activity carried out by another performer may be described as the *flow* of resources from producer to consumer. Performers and other resources may be related to locations, that is, flow from a performer who is *here* to another performer who is *there*.

d. Activities themselves are not modeled in OV-4 models.

e. OV-4 models may identify and describe types of measures that apply to performers and other resources. In particular, OV-4 models that include persons in roles may model the skills required by persons in those roles and may model measures of those skills.

f. In OV-4 models, organizational structures may be modeled using whole-part relationships between an organizational whole and its parts. Both types of organizations and specific organizations may be modeled using whole-part relationships.

g. Performers and other resources shall be modeled. Types of organizations shall be modeled; specific organizations may be modeled. The structure of organizations may be modeled using whole-part relationships. Persons in roles may be modeled. Should persons in roles be modeled, skills related to those roles and measures of those skills may also be modeled. Types of locations of resources may be modeled. Measures related to resources and locations may be modeled. Activities shall not be modeled.

h. ***Meta-model***. Figure 3-15 shows the DoDAF meta-model for OV-4 models.

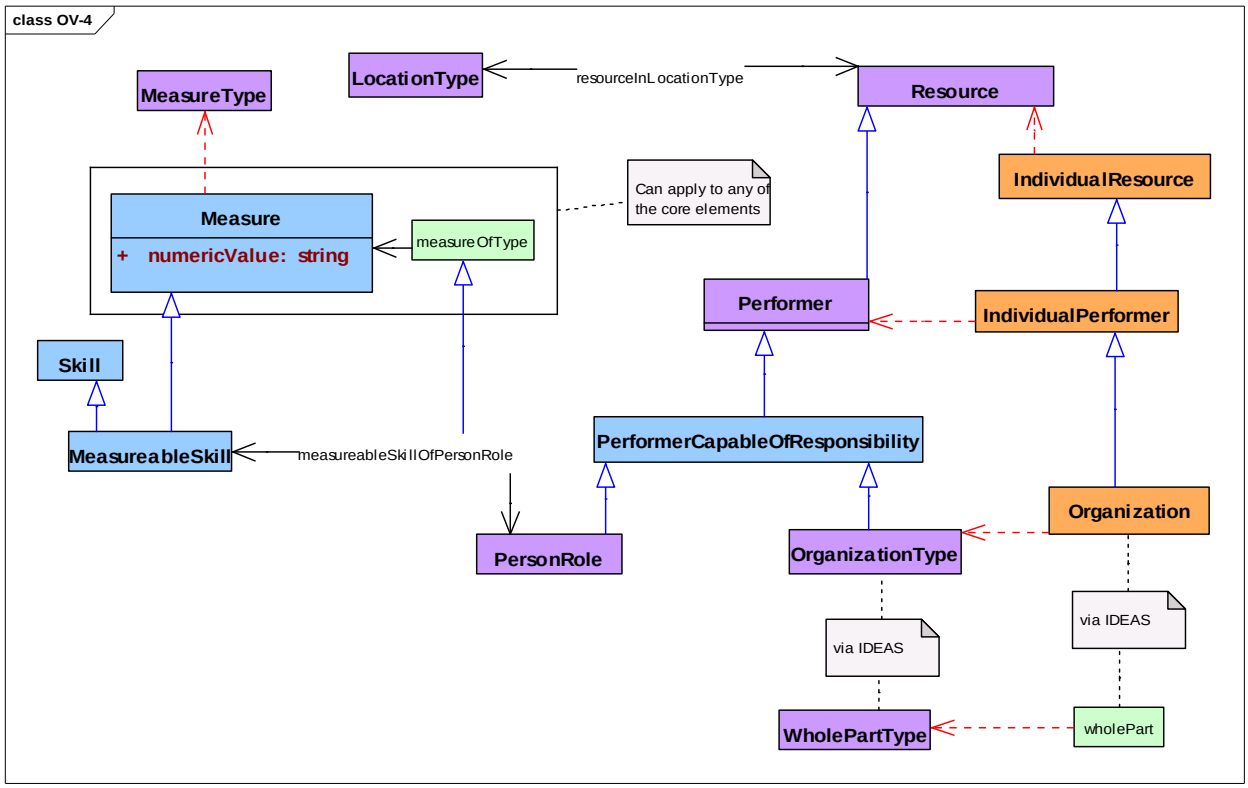


Figure 3-15: DoDAF meta-model diagram for OV-4 models

i. ***Alternative names***: Organizational Relationships Chart.

3.5.5 Operational Activity Hierarchy (OV-5a)

a. ***Description***. This model *describes* the hierarchical *structure* of ***activities*** identified by a corresponding OV-5b Operational Activities model.

b. ***Narrative***. This model emphasizes the activities carried out within the scope of a described architecture. In OV-5a and OV-5b models, any activity comprises other activities. Hierarchical recursive decomposition of activities into activity parts may be modeled using whole-part relationships between activity wholes and their activity parts. Activities may also be related by their similarities and their differences using super-subtype relationships.

c. Activities are seen in OV-5a models much as they are in other DoDAF models. Activities are constrained by guidance, rules, and standards, and activities are carried out under conditions that affect their performance. However, performers, resources, and locations are not included in OV-5a models; in contrast, OV-5b models do include performers, resources, and locations. The information in an OV-5a model is a proper subset of the information in a corresponding OV-5b model. An OV-5a model may not add to nor alter the information in its corresponding OV-5b model.

d. OV-5a models may identify and describe measures that apply to activities, rules, and guidance. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

e. Activities shall be modeled. Rules and conditions may be modeled. The hierarchical structure of activities may be modeled using whole-part relationships. Activities may be categorized using super-subtype relationships. Measures related to activities, rules, and conditions may be modeled.

f. ***Meta-model***. Figure 3-16 shows the DoDAF meta-model for OV-5a models.

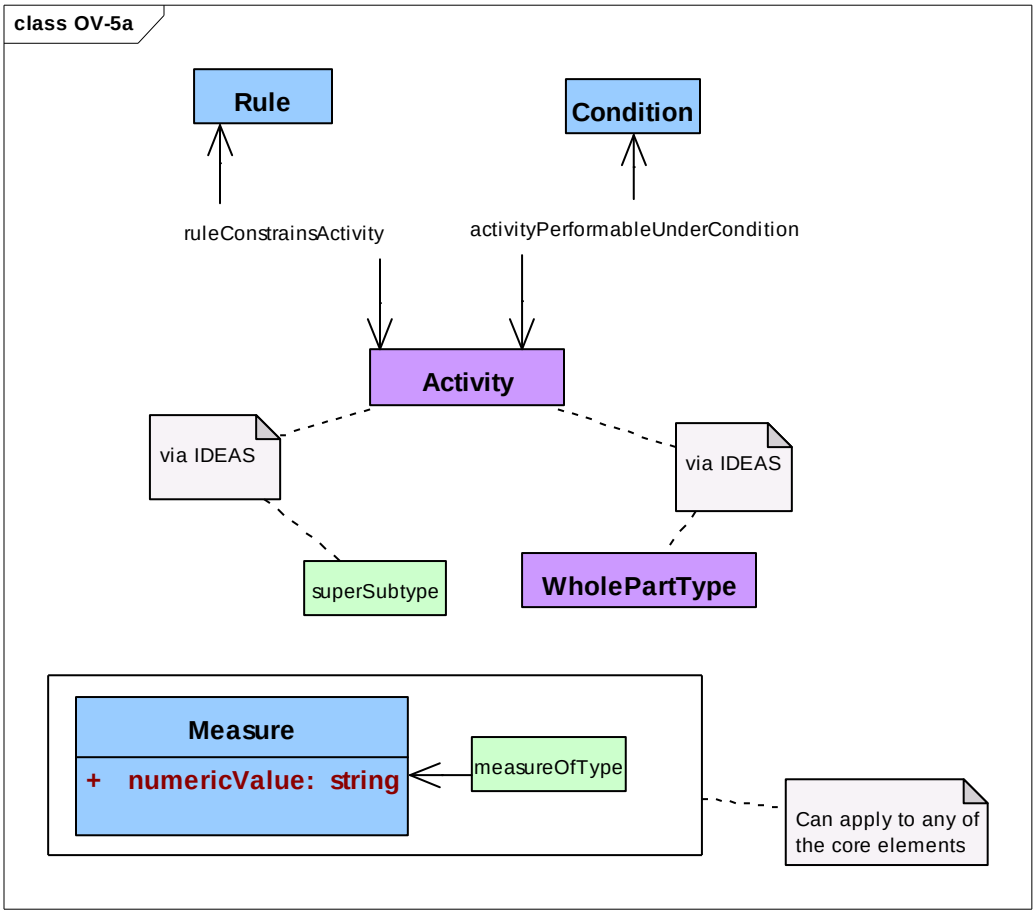


Figure 3-16: DoDAF meta-model diagram for OV-5a models

g. ***Alternative names***: Operational Activity Decomposition Tree; Activity Hierarchy.

3.5.6 Operational Activities (OV-5b)

a. ***Description***. This model *identifies* and *describes* the ***activities*** required by a described ***architecture***.

b. ***Narrative***. This model emphasizes the activities carried out within the scope of a described architecture. In OV-5a and OV-5b models, any activity comprises other activities. Hierarchical recursive decomposition of activities into activity parts may be modeled using whole-part relationships between activity wholes and their activity parts. Activities may also be related by their similarities and their differences using super-subtype relationships.

c. Activities are seen in OV-5b models as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in OV-5b models are resources that are capable of responsibility—organizations and persons in roles—rather than resources that are materiel, systems, or services. Activities are constrained by guidance, rules, and standards, and activities are carried out under conditions that affect their performance.

d. An OV-5b model identifies and describes measures that are related to activities. OV-5b models may also identify and describe measures that apply to rules, conditions, resources, performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

e. Activities, resources, and performers shall be modeled. Rules, conditions, and types of locations may be modeled. The hierarchical structure of activities may be modeled using whole-part relationships. Activities may be categorized using super-subtype relationships. Types of organizations and specific organizations may be modeled, and persons in roles may also be modeled. Measures related to activities shall be modeled. Measures related to rules, conditions, resources, performers, and locations may be modeled.

f. ***Meta-model***. Figure 3-17 shows the DoDAF meta-model for OV-5b models.

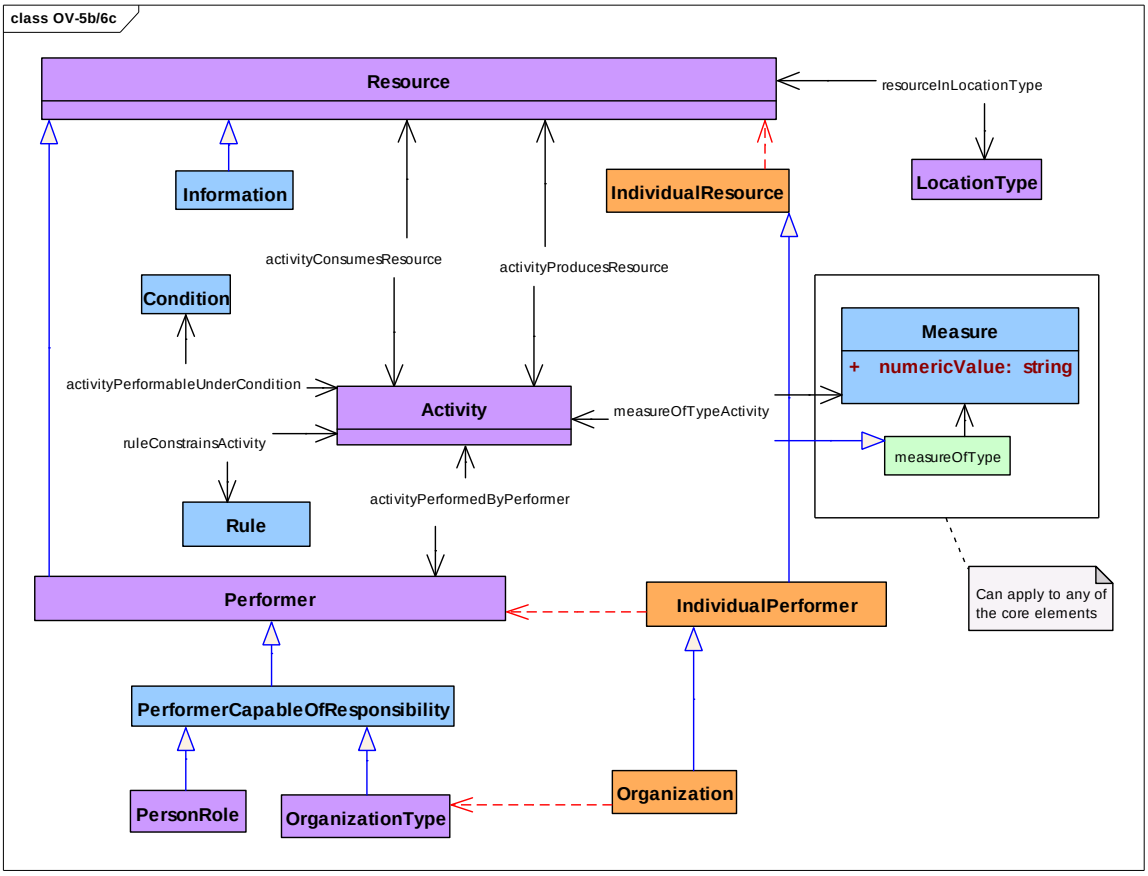


Figure 3-17: DoDAF meta-model diagram for OV-5b models

g. ***Alternative names***: Operational Activity Model; Activity Resource Flows; Process Architecture.

h. ***Notes***. The information in an OV-5b model is a proper superset of the information in a corresponding OV-5a model. An OV-5a model may not add to nor alter the information in a corresponding OV-5b model.

3.5.7 Introduction to OV-6 models

a. OV-5 models examine the *static* relationships of activities. OV-6 models examine the *dynamic behavior* of activities identified and described by OV-5b models. OV-6 models look at the temporal parts of the activities of a described architecture, including the sequencing and duration of these activities.

b. OV-6 models emphasize the behavior through time of a described architecture. OV-6 models help us answer questions such as, “When should we expect a response after sending message X to activity Y at location A?”

c. OV-6 models include:

1) Operational Rules (OV-6a),

2) Operational State Transitions (OV-6b), and

3) Operational Sequences (OV-6c).

d. OV-6 models cover much of the same architectural data, but each model looks at these data from a different perspective. OV-6b and OV-6c models describe timing and sequencing behavior. These OV-6 models describe activities that respond to sequences of resource ***states***. Such *resource* ***states*** may be called ***inputs***, *transactions*, *triggers*, and *events* by different modeling methods and techniques. Resource states include such things as the state of a message being received, the state of a timer whose time has been exhausted, or the state of satisfaction of conditional criteria. When a resource state is detected, an activity to be carried out may be constrained by rules and the activity may need to be performed under certain conditions; such rules and conditions are described by OV-6a models.

3.5.8 Operational Rules (OV-6a)

a. ***Description***. This model identifies and describes the ***rules*** and ***conditions*** that *constrain* ***activities*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes (a) rules and other guidance that constrain activities and (b) conditions under which activities are performed. Rules themselves are not four-dimensional; thus, performers require *descriptions* of applicable rules—such descriptions *do* exist in space and time. Such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

c. Conditions exist within the four-dimensional environment of activities but are not necessarily four-dimensional things within that context. Conditions such as adversary morale and unit cohesion may be real but they are not immediately accessible as architectural data; thus, performers, as with rules, require *descriptions* of applicable conditions—such descriptions are accessible in space and time. As with rules, such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

d. Rules and conditions are considered together in OV-6a models because both impose constraints on the performance of activities. In particular, different rules may apply to an activity under different conditions. Rules may be related to measures; for example, rules that are criteria of UJTL task performance standards are to be related to corresponding measures. Similarly, conditions affecting UJTL task performance are to be related to corresponding measures. Measures related to rules and conditions may include physical and temporal measures.

e. Activities are seen in OV-6a models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance.

f. Rules and conditions for activities may depend upon the location of those activities. Resources are related to their locations and the location of these resources determines the location of activities that consume and produce them.

g. Performers that are capable of responsibility may be related to activities they perform. Systems and services are not to be modeled.

h. Activities, rules, conditions, measures, and resources shall be modeled. In particular, information resources that describe rules shall be modeled and information resources that describe conditions may be modeled. Rules shall be modeled for each activity identified in the corresponding OV-5b models of an architectural description. Performers that are persons in roles, types of organizations, and specific organizations may be modeled. Types of locations may be modeled. Measures for rules and conditions may include physical measures and temporal measures. Measures related to activities, performers, and locations may be modeled. Systems and services shall not be modeled.

i. ***Meta-model***. Figure 3-18 shows the DoDAF meta-model for OV-6a models.

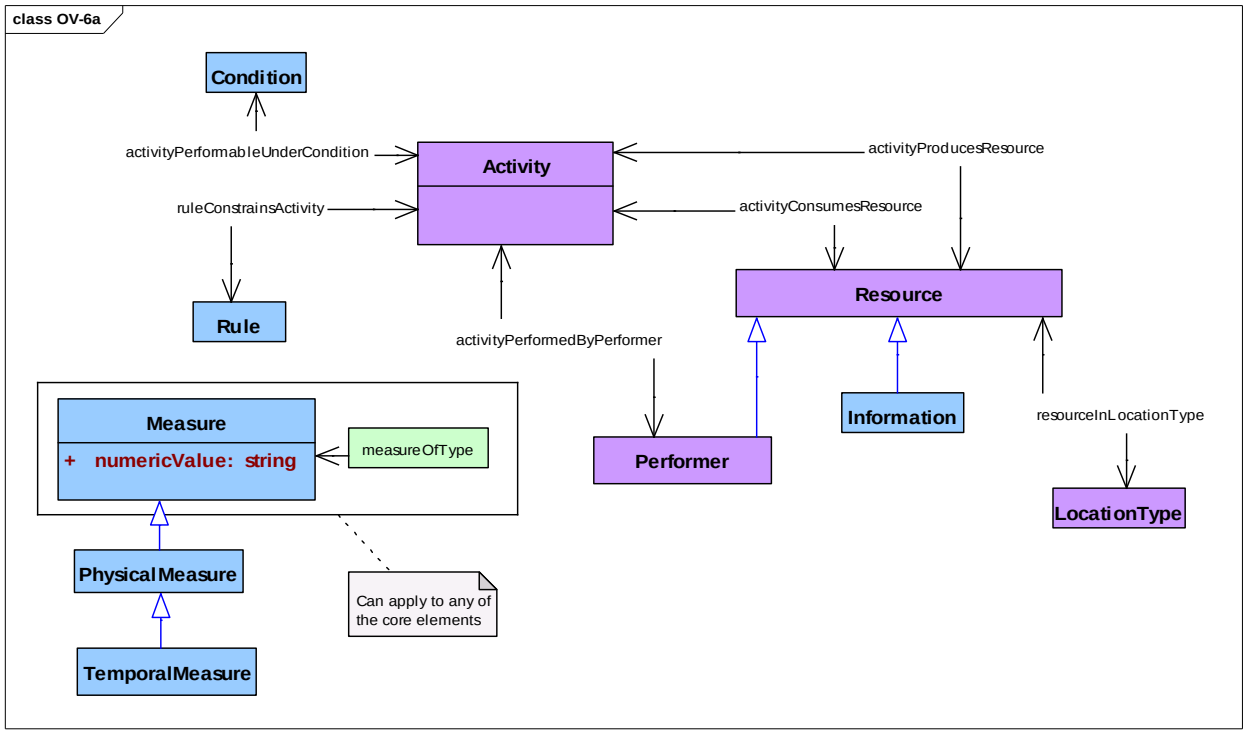


Figure 3-18: DoDAF meta-model diagram for OV-6a models

j. ***Alternative names***: Operational Rules Model; Organizational Rules.

k. ***Note***. Technical and functional standards are the subject of the Standards Viewpoint.

l. The term *standards* is also used when discussing *capabilities*. In the context of capabilities, a *standard* indicates a level of performance that is a taken as the threshold for acceptable performance of an activity by a performer. Such a standard consists of a *measure*—the level of performance— and a *criterion*—the threshold of acceptable performance. In an OV-6a model and in the Capabilities Viewpoint, such a standard is seen as a pairing of a sort of measure that applies to an activity and a rule that expresses a criterion for applying that sort of measure to that activity.

3.5.9 Operational State Transitions (OV-6b)

a. ***Description***. This model *identifies* and *describes* changes in the ***states*** of ***resources*** that are ***consumed*** and ***produced*** by ***activities*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes certain interesting ***temporal parts*** of a resource, specifically those temporal parts that are distinguished by the attainable states of the resource. Each interesting temporal part is related to a property that distinguishes these temporal parts from one another across the whole-life of a resource. These properties are related to activities because an activity transforms an earlier temporal part of a resource with certain properties (***input***) into a later temporal part with altered properties (***output***).

c. A resource with states (i.e., temporal parts observed as resources with properties that may change) generally does not play the role of a ***trigger*** for an activity that changes the state of that resource (see note). Therefore, an OV-6b model may want to identify other resources that *do* play the role of a trigger for activities that change the properties of the resource that is the subject of a model.

d. A ***measure*** is the sort of property that characterizes the state of a resource. In particular, OV-6b models examine ***physical measures*** and ***temporal measures*** to characterize resource states, and they use ***before-after*** relationships to order the changes in these measures, that is, the state transitions of a resource.

e. An OV-6b model focuses on some selected resource whose properties may change in interesting ways. In contrast, an OV-5b model covers all resources within the scope of a specific OV-5b model. Performers are resources that frequently exhibit state transitions that are interesting for OV-6b models because performers in different states can carry out different activities.

f. Activities are seen in OV-6b models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. Rules and conditions are seen in OV-6b models as they are in OV-6a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, OV-6b models may look at changes in rules and conditions by examining the state transitions of their descriptions.

g. Activities, resources, physical measures, and temporal measures shall be modeled. Information resources that describe rules and conditions shall be modeled. Before-after relationships among activities and between resources in sequential states shall be modeled. Types of locations of activities and resources may be modeled. Performers whose state transitions are the subject of an OV-6b model shall be modeled; other performers may be modeled. Measures related to activities, rules, performers, conditions, and locations may be modeled.

h. ***Meta-model***. Figure 3-19 shows the DoDAF meta-model for OV-6b models.

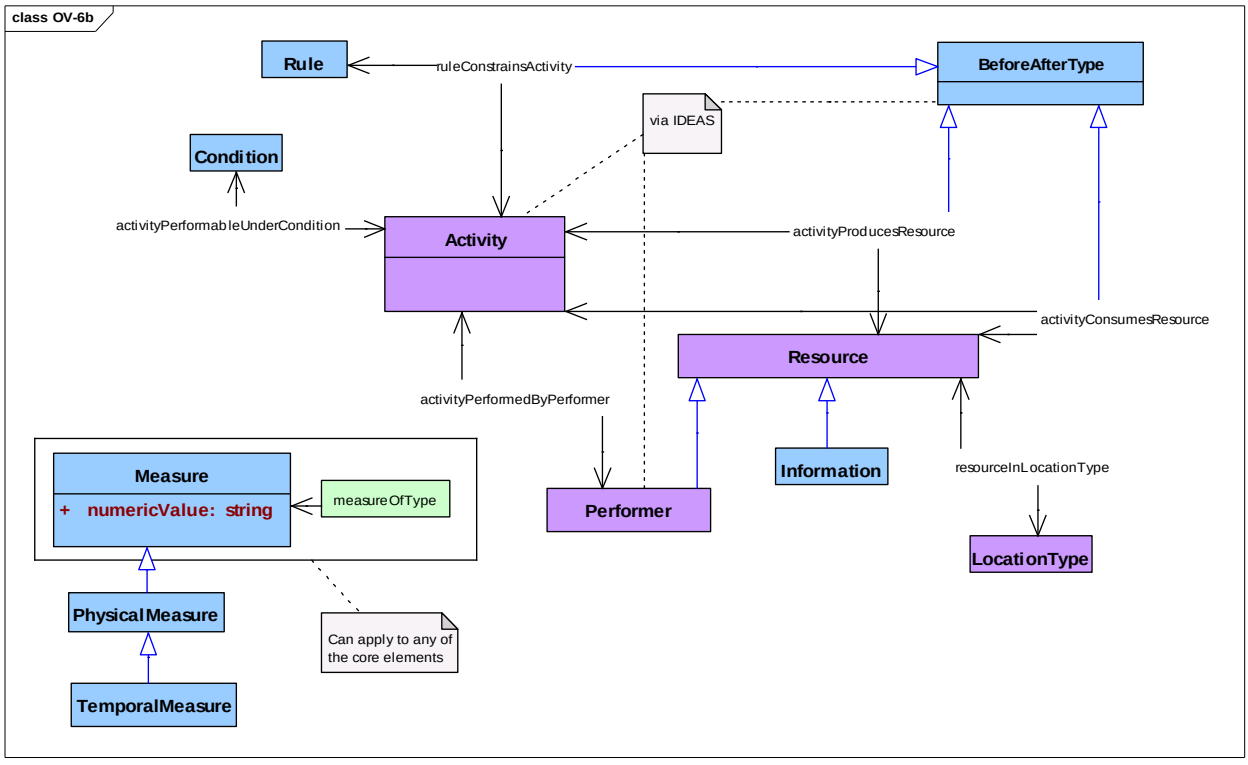


Figure 3-19: DoDAF meta-model diagram for OV-6b models

i. ***Alternative names***: State Transition Description; Organizational State Transitions.

j. ***Note***. Technically, resources may trigger their own state transitions, that is, a resource may be produced by one activity with a property that another activity immediately consumes just because that resource with that property triggers the subsequent consuming activity. Clearly, a resource state that triggers an activity to consume that resource itself does not persist and may, in practice, either (a) be physically not observable or (b) not sufficiently interesting to dwell on. In either case, such an instantaneously transient resource state would be treated as embedded within the black box of an activity that is not further decomposed.

k. The activities and resources examined by an OV-6b model must be a subset of those activities identified by OV-5b models.

3.5.10 Operational Activity Sequences (OV-6c)

a. ***Description***. This model *identifies* and *describes* a *sequence* of ***activities*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes some interesting sequence of activities taken from the set of all activities within an architectural description. The DoDAF meta-model does not prescribe what ought to be interesting. OV-6c models specify sequence using ***before-after*** relationships.

c. Activities are seen in OV-6c models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. Performers in OV-6c models are resources that are capable of responsibility—organizations and persons in roles—rather than resources that are materiel, systems, or services. Rules and conditions are seen in OV-6c models as they are in OV-6a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, OV-6c models may examine the production of rules descriptions and condition descriptions.

d. An OV-6c model identifies and describes measures that are related to activities. OV-6c models may also identify and describe measures that apply to rules, conditions, resources, performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

e. Activities, resources, and performers shall be modeled. Rules, conditions, and types of locations may be modeled. The sequential structure of activities shall be modeled using before-after relationships. Types of organizations and specific organizations may be modeled, and persons in roles may also be modeled. Measures related to activities shall be modeled. Measures related to rules, conditions, resources, performers, and locations may be modeled. Performers other than performers capable of responsibility shall not be modeled.

f. An OV-6c model may consider individual performers and specific organizations.

g. ***Meta-model***. Figure 3-20 shows the DoDAF meta-model for OV-6c models.

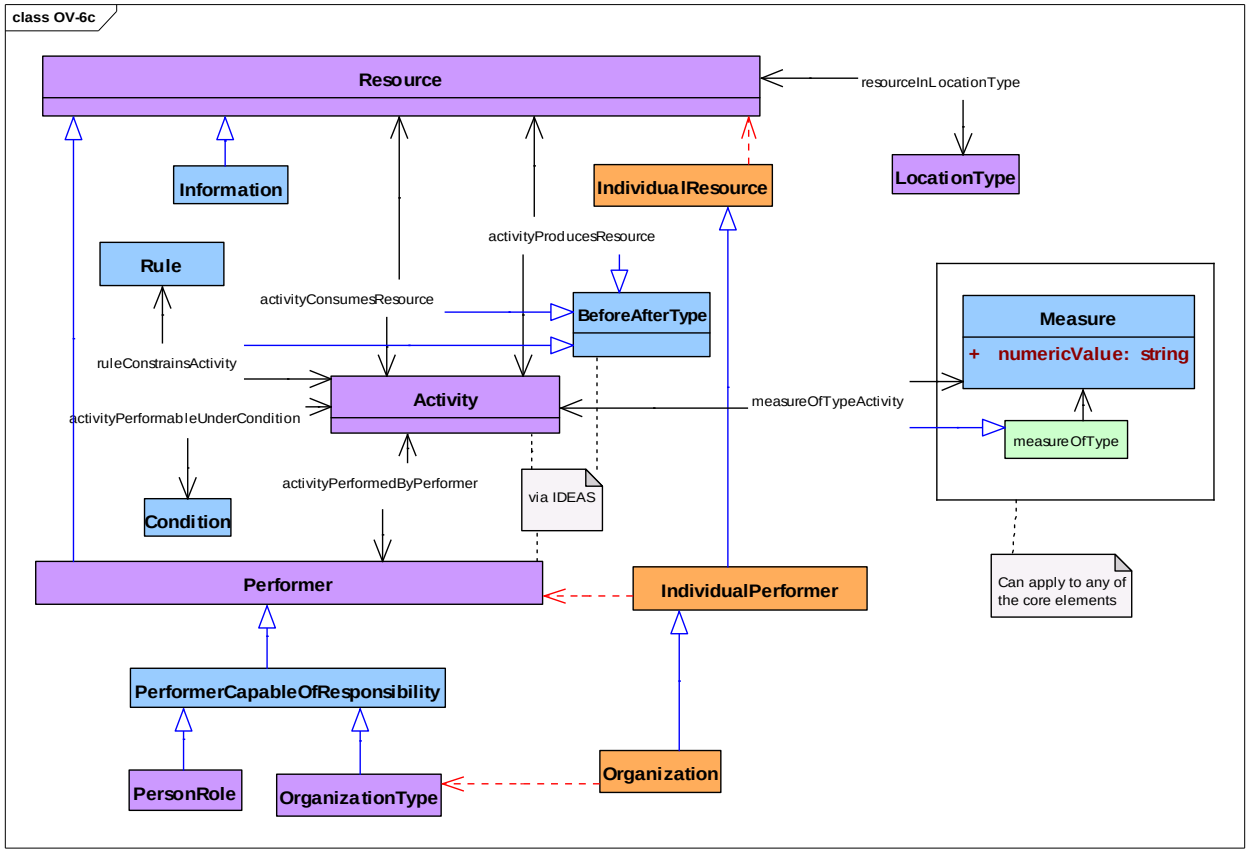


Figure 3-20: DoDAF meta-model diagram for OV-6c models

h. ***Alternative names***: Event-Trace Description; Operational Event-Trace; Sequence Diagram.

i. ***Notes:*** The activities and resources examined by an OV-6c model must be a subset of those activities identified by OV-5b models.

3.6 Project Viewpoint (PV)

a. Project Viewpoint models describe how programs, projects, portfolios, and initiatives deliver capabilities, the organizations contributing to them, and dependencies among them.

b. The integration of project models (organizational and project-oriented) with more traditional architecture models is a characteristic aspect of DoDAF enterprise architectural descriptions. These models expand the use of the DoDAF by including information about programs, projects, portfolios, and initiatives and relating that information to capabilities and other programs, projects, portfolios, and initiatives; this expands DoDAF support to the portfolio management

(PfM) process. For example, different levels of cost data might be captured in an architecture as required by process owners. This data might be presented by a WBS in a Gantt chart.

c. Table 3.6-1 names and describes Project Viewpoint models.

Table 3.6-1: Project Viewpoint models

Models	Descriptions
PV-1: Projects and Organizations	Presents relationships between projects and organizations that perform them.
PV-2: Project Schedules	Presents schedules for projects, project milestones, and schedule dependencies
PV-3: Projects and Capabilities	Presents relationships between projects and capabilities.

3.6.1 Projects & Organizations (PV-1)

a. ***Description***. This model *identifies* and *describes* the *dependencies* among ***organizations***, ***projects***, and *organizational-structures* used to manage projects.

b. ***Narrative***. This model emphasizes relationships between organizations and projects in the production of resources within the scope of a described architecture. A project is an individual activity that produces guidance and resources that are used to perform types of activities. Performers carry out all activities, and individual performers carry out individual projects. The individual performers of interest in PV-1 models are individual organizations.

c. Projects are activities and are seen in PV-1 models much as they are in other DoDAF models. An activity consumes resources to produce other resources. At least one performer carries out an activity. An activity is constrained by guidance, rules, and standards. Performers may carry out activities under conditions that affect its performance. The sorts of locations where resources are produced and consumed by these activities may affect the specification of performers to carry out those activities and measures of performance.

d. Any organization has parts and any organization can be a part of an encompassing organization. Whole-part relationships relate a whole organization to its parts. Similarly, any project has parts, and any project can be a part of an encompassing project. Whole-part relationships relate a whole project to its parts. Thus, PV-1 models may represent hierarchical organizational structures and hierarchical project structures using whole-part relationships.

e. The focus of PV-1 models is to identify individual organizations and their parts that perform individual projects and their parts to produce guidance and resources, including resources that are themselves performers (e.g., systems), that are used to carry out types of activities within the scope of a described architecture.

f. Individual organizations may perform more than one individual project, and individual projects may be performed by more than one individual organization. PV-1 models may emphasize the temporal parts of individual organizations and individual projects.

g. Beyond an existence predicate, the DoDAF does not prescribe nor limit relationships that may be examined by PV-1 models. However, the existence predicate must be true for all pairs of an individual organization and an individual project considered by PV-1 models: the individual organization performs an individual project that produces some guidance or some resource that has been identified by models within other DoDAF viewpoints. PV-1 models may not themselves introduce guidance or resources into the scope of a described architecture.

h. The DoDAF does not prescribe nor limit the details or levels of composition of organizations and projects that PV-1 models may provide.

i. Individual projects and individual organizations shall be modeled. Types of organizations may be modeled. Locations of organizations and projects shall be modeled; types of locations may be modeled. Activities, guidance, and resources may be modeled. Whole-part relationships may be used to model organizations and projects. Measures of projects, organizations, activities, locations, guidance, and resources may be modeled. Rules that constrain projects and conditions under which projects are performed may be modeled; rules and conditions related to activities within the scope of the described architecture shall not be modeled.

j. ***Meta-model***. Figure 3-21 shows the DoDAF meta-model for PV-1 models.

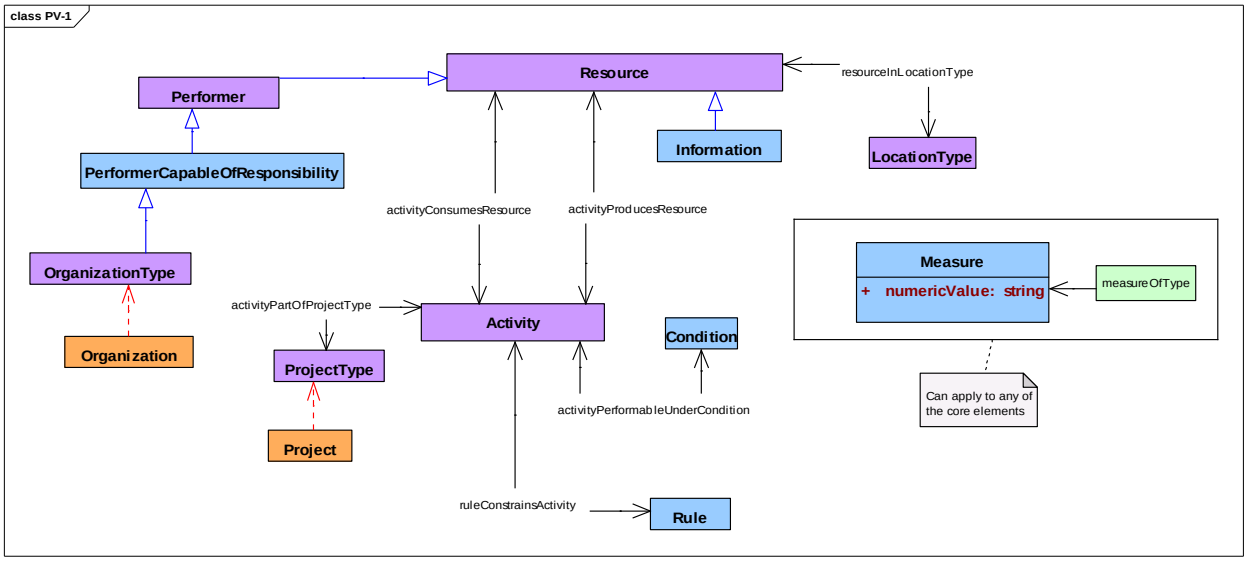


Figure 3-21: DoDAF meta-model diagram for PV-1 models

k. ***Alternative names***: Project Portfolio Relationships; Projects and Portfolios.

l. ***Note***: A work breakdown structure (WBS) is one sort of PV-1 model.

3.6.2 Project Schedules (PV-2)

a. ***Description***. This model *identifies* and *describes* the *schedules* of ***projects***, their ***milestones***, and their schedule *dependencies*.

b. ***Narrative***. This model emphasizes project schedules, that is, the before-after related temporal parts of projects. A project is an individual activity that produces guidance and resources that are used to perform types of activities. Whole projects considered by PV-2 models are those identified by corresponding PV-1 models; PV-2 models may not introduce projects into the Project Viewpoint.

c. Any project has parts, and any project can be a part of an encompassing project. Whole-part relationships relate a whole project to its parts. Thus, while PV-1 models may focus on hierarchical project structures using whole-part relationships. PV-2 models emphasize the temporal parts of these projects using temporal whole-part relationships.

d. Using before-after relationships and overlap relationships, PV-2 models may identify guidance and resources to be produced by one project part and consumed by another project part, including resources that are themselves performers (e.g., systems) of activities within the scope of a described architecture. Using happens-in relationships, such schedule dependencies may be related to interesting temporal periods such as budget years.

e. End boundaries of project temporal parts and start boundaries of project temporal parts may be treated as milestones by PV-2 models, that is, as an overlap between a project temporal boundary and a resource state produced by a project part. At a milestone, the end boundary of one temporal part may overlap the start boundary of another temporal part. PV-2 models examine measures of whole-part composition (i.e., cardinal measures) as well as physical measures of resources related to milestones.

f. The DoDAF does not prescribe nor limit the details or levels of temporal composition of projects that PV-2 models may provide.

g. Organizations and organization structures related to projects and project structures and modeled by PV-1 models may be incorporated by PV-2 models.

h. Projects and their temporal parts shall be modeled. Temporal measures of temporal parts shall be modeled. Resources related to milestones shall be modeled; physical measures and cardinal measures shall be modeled for such resources. Measures of other resources may be modeled. Activities that produce or consume resources related to milestones may be modeled. Locations of projects and their temporal parts shall be modeled; types of locations of projects may be modeled. Before-after relationships and overlap relationships shall be used to model schedules. Organizations and type of organizations may be modeled. Rules that constrain projects and conditions under which projects are performed may be modeled; activities, rules, and conditions related to activities within the scope of the described architecture shall not be modeled.

i. ***Meta-model***. Figure 3-22 shows the DoDAF meta-model for PV-2 models.

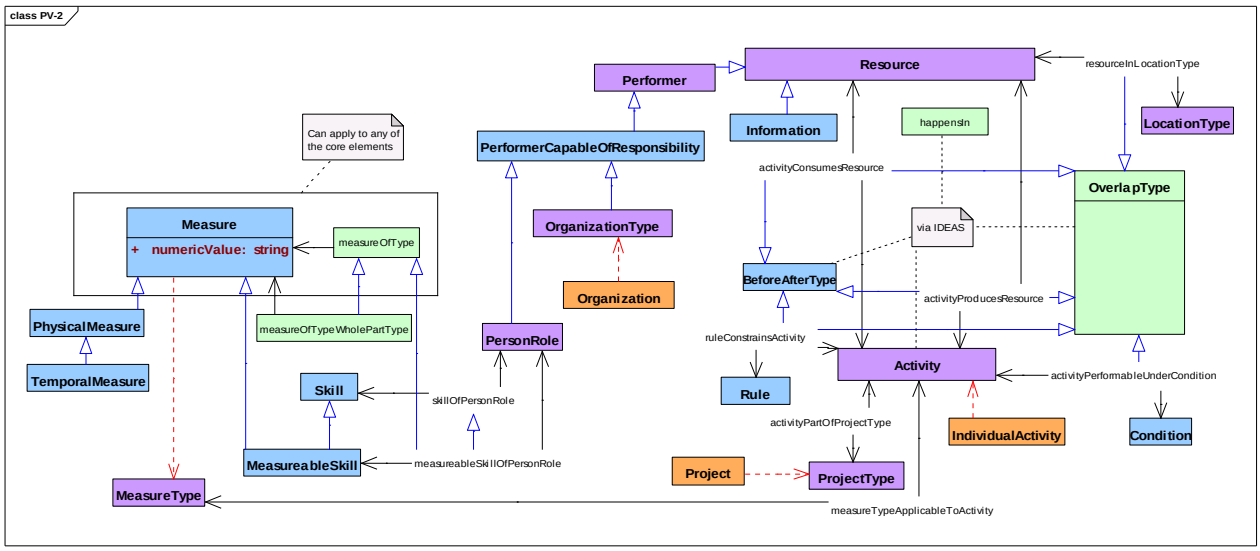


Figure 3-22: DoDAF meta-model diagram for PV-2 models

j. ***Alternative names***: Project Timelines; Project Timelines and Dependencies; Project Schedules and Dependencies.

k. ***Note***: A Gantt Chart is one sort of PV-2 model.

3.6.3 Projects & Capabilities (PV-3)

a. ***Description***. This model *identifies* and *describes* ***relationships*** among ***projects*** and ***capabilities*** to show how specific ***projects*** and ***program*** *elements* help to achieve a ***capability*** provided by an ***architecture***.

b. ***Narrative***.

c. ***Meta-model***. Figure 3-23 shows the DoDAF meta-model for PV-3 models.

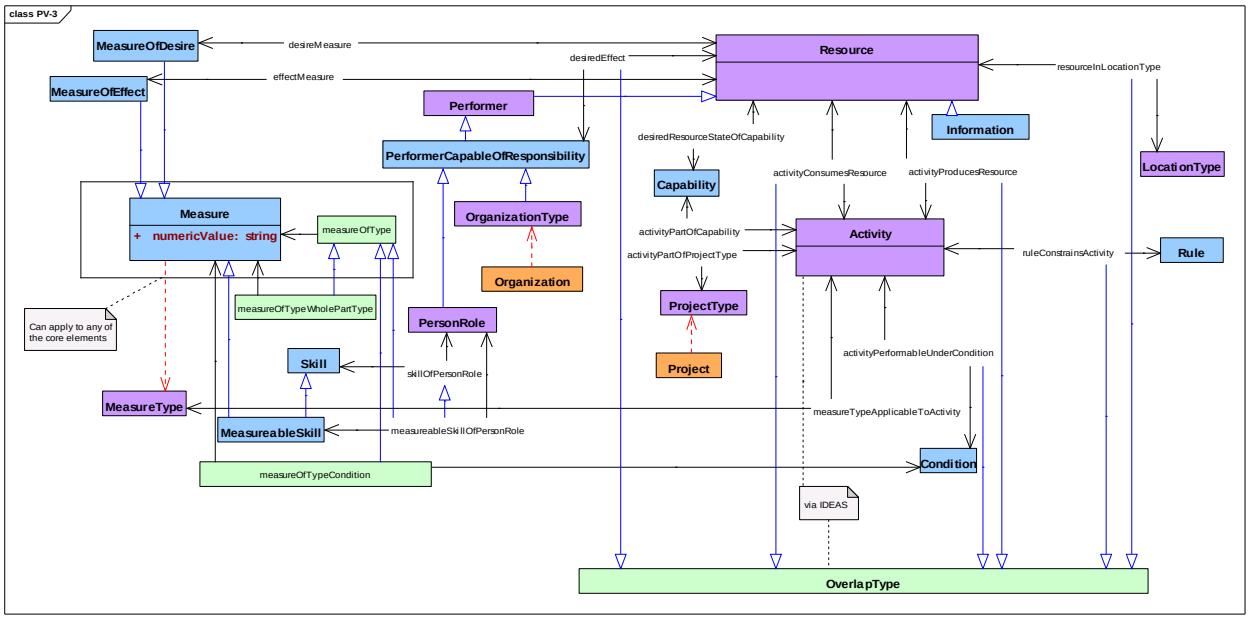


Figure 3-23: DoDAF meta-model diagram for PV-3 models

d. ***Alternative names***: Project to Capability Mapping; Capabilities Achieved by Projects.

3.7 Service Viewpoint (SvcV)

a. Service Viewpoint models describe service composition (parts of services), service resources, interfaces and de systems, interface, technical dependency, and functional dependency relationships, activities performed by services, resources produced and consumed by services, measures associated with services, the time-evolution of services, technologies and skills employed by services, rules applicable to services, state transitions of services, and temporal sequences of services.

b. Services may provide or support both warfighting and business functions.

c. Services are not limited to internal system functions. Services can include human computer interface and graphical user interface functions or functions that consume or produce service data to or from service functions. The external service data providers and consumers can be used to represent the human that interacts with the service. Table 3.7-1 names and describes Service Viewpoint models.

Table 3.7-1: Services Viewpoint models

Models	Descriptions
SvcV-1 Service Composition	Composition and taxonomic structure of services.
SvcV-2 Service Resources	Identification of resource flows between services.
SvcV-3a Services and Systems	Interface relationships between services and systems
SvcV-3b Service Relationships	Interface relationships among services
SvcV-4 Service System Activities	The functions (activities) performed by services and the resource flows among those functions
SvcV-5 Service Operational Activities	A mapping of services activities that support or provide operational activities.
SvcV-6 Service Resources	Details of service resource flows and associated attributes (rules and measures)
SvcV-7 Service Measures	Measures (metrics) of Services Model elements for the appropriate time frame(s)
SvcV-8 Service Evolution	The planned incremental steps toward migrating a suite of services to a more efficient suite or toward evolving current services to a future implementation
SvcV-9 Service Technology & Skills	The emerging technologies, software and hardware products, and skills that are forecast to be available and will affect future service development.
SvcV-10a Service Rules	Rules that constrain services
SvcV-10b Service State Transitions	Responses (changes of state) of services to events
SvcV-10c Service Activity Sequences	Sequences of services and events

3.7.1 Services (SvcV-1)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed and produced* by ***activities*** *performed* by ***services*** within a described ***architecture***; in *presentation*, *architectural-data* are grouped by ***service***.

b. ***Narrative***. This model emphasizes performers that are services and interfaces between these performers, specifically, the ***overlaps*** between services or systems performing activities that produce resources and services or systems performing other activities that consume those resources. The role of a resource with respect to these activities changes from resource *produced* to resource *consumed* at such an interface.

c. Activities are seen in SvcV-1 models much as they are in other DoDAF models. An activity consumes resources to produce other resources. At least one performer carries out an activity. An activity is constrained by guidance, rules, and standards. Performers may carry out activities under conditions that affect its performance. The sorts of locations where resources are produced and consumed by these activities may affect the specification of performers to carry out those activities.

d. Resources produced and resources consumed include information, performers, and materiel. In SvcV-1 models, resources are produced by activities that are performed by services and performers capable of responsibility; these performers include organizations and persons in roles. These produced resources are consumed by other activities similarly carried out by other services or systems and other performers capable of responsibility.

e. As in other models within the Service Viewpoint, an SvcV-1 model relates each service to a description of that service. SvcV-1 models may focus on relationships among services, computational resources, performers capable of responsibility, and resources produced.

f. SvcV-1 models may use whole-part relationships to examine the composition of performers. A service may be considered as a part of encompassing performers, which may be systems or other services. Similarly, a service may be considered as a whole whose parts comprise resources of all sorts, including information, materiel, performers capable of responsibility, systems, and other services. The DoDAF does not prescribe nor limit the details or levels of composition that SvcV-1 models may provide.

g. Services, their descriptions, and the activities that services perform shall be modeled. The resources produced and consumed by these activities as performed by these services shall be modeled. Performers capable of responsibility, including persons in roles and types of organizations as well as specific organizations, may be modeled. The types of locations and the specific locations of resources may be modeled. The composition of services as performers may be modeled; thus, resources that include these services may be modeled, and resources that are

included in the composition of services, such as information, materiel, types of organizations, and persons in roles may be modeled. Measures of services, systems, activities, resources, other performers, materiel, types of locations, rules, and conditions may be modeled. Systems may be modeled by SvcV-1 models.

h. ***Meta-model***. Figure 3-24 shows the DoDAF meta-model for SvcV-1 models.

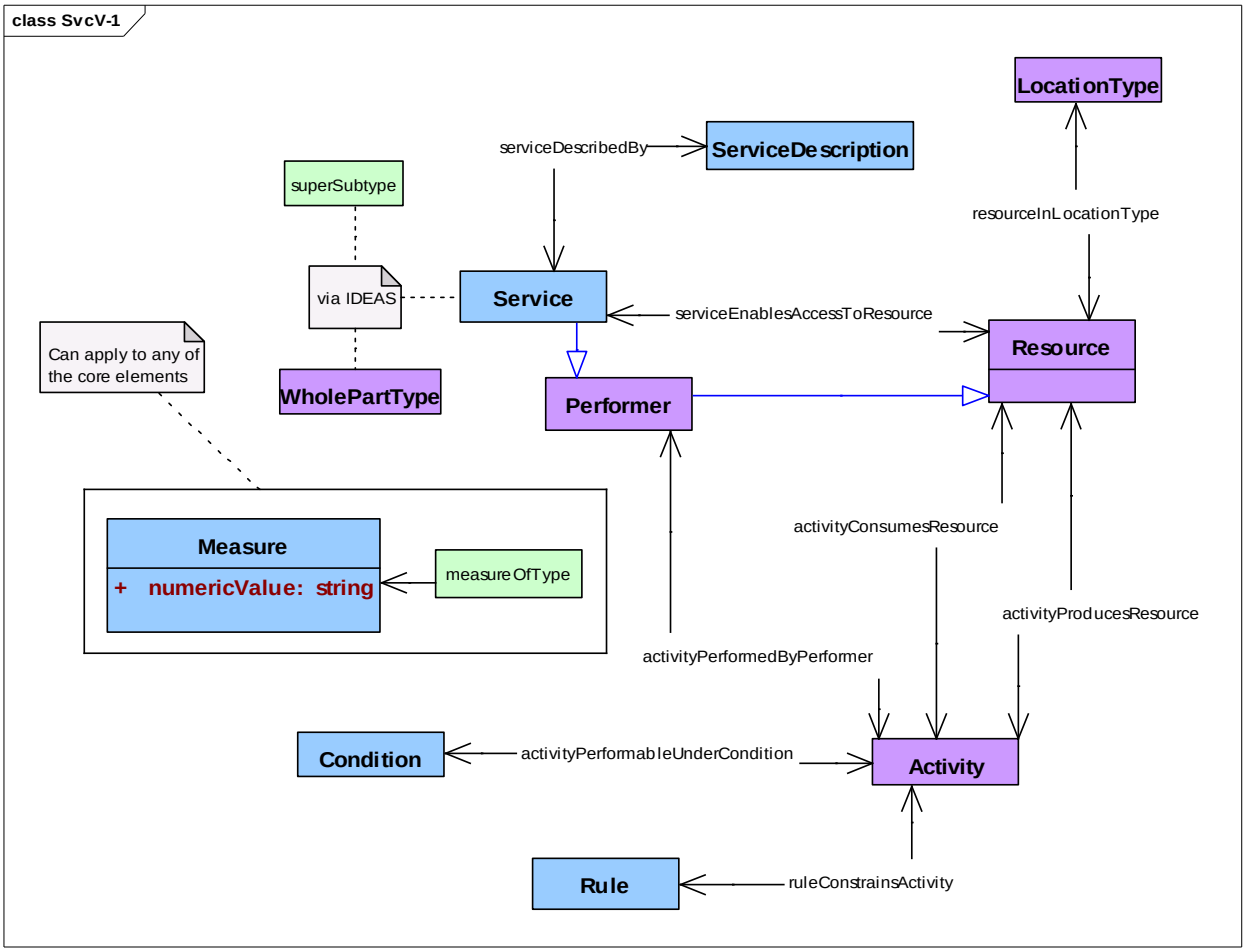


Figure 3-24: DoDAF meta-model diagram for SvcV-1 models

i. ***Alternative names***: Services Context Description; Services Composition Model.

j. ***Notes***. In substance, SvcV-1 models and Svc-2 models examine the same subjects: performers and their interfaces. Some organizations may give less emphasis to performer composition and activity guidance in SvcV-1 models and more emphasis on composition and guidance in SvcV-2 models. The DoDAF does not prescribe these emphases. Similarly, SV-1 models and SvcV-1 models examine the same topic. Some organizations may emphasize performers as systems in SV-1 models while others may emphasize performers as services in SvcV-1 models. The DoDAF does not prescribe these emphases.

3.7.2 Service Interfaces (SvcV-2)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***services*** within a described ***architecture***; in *presentation*, *architectural-data* are grouped by ***service*** and, within ***service***, by ***service*** *parts*.

b. ***Narrative***. This model emphasizes performers that are services and interfaces between these performers, specifically, the overlaps between services performing activities that produce resources and services performing other activities that consume those resources. The role of a resource with respect to these activities changes from resource *produced* to resource *consumed* at such an interface.

c. SvcV-2 models consider services and activities introduced by corresponding SvcV-1 models. SvcV-2 models may not introduce services or activities that have not already been identified and described by corresponding SvcV-1 models. However, SvcV-2 models may look more closely at the parts of these services or activities.

d. Activities are seen in SvcV-2 models much as they are in other DoDAF models. An activity consumes resources to produce other resources. At least one performer carries out an activity. An activity is constrained by guidance, rules, and standards; SvcV-2 models may pay particular attention to guidance. Performers may carry out activities under conditions that affect their performance. The sorts of locations where resources are produced and consumed by these activities may affect the specification of performers to carry out those activities.

e. Resources produced and resources consumed include information, performers, and materiel. In SvcV-2 models, resources are produced by activities that are performed by services and performers capable of responsibility; these performers include organizations and persons in roles. These produced resources are consumed by other activities similarly carried out by other services, systems, and other performers capable of responsibility.

f. SvcV-2 models may use whole-part relationships to examine the composition of performers; SvcV-2 models may pay particular attention to service parts that constitute overlaps and to rules that constrain the activities performed by these service parts. A service may be considered as a part of encompassing performers. Similarly, a service may be considered as a whole whose parts comprise resources of all sorts, including information, materiel, performers capable of responsibility, systems, and other services. The DoDAF does not prescribe nor limit the details or levels of composition that SvcV-2 models may provide.

g. Services and the activities they perform shall be modeled. The resources produced and consumed by these activities as performed by these services shall be modeled. Performers capable of responsibility, including persons in roles and types of organizations, may be modeled. Guidance for activities carried out by services as performers and conditions that affect the

performance of these activities may be modeled. The types of locations of resources may be modeled. The composition of services as performers may be modeled; thus, resources that include these interfacing services may be modeled, and resources that are included in the composition of interfacing services, such as information, materiel, types of organizations, and persons in roles, may be modeled. Measures of services, activities, resources, other performers, materiel, types of locations, rules, and conditions may be modeled. Systems may be modeled by SV-2 models.

h. ***Meta-model***. Figure 3-25 shows the DoDAF meta-model for SvcV-2 models.

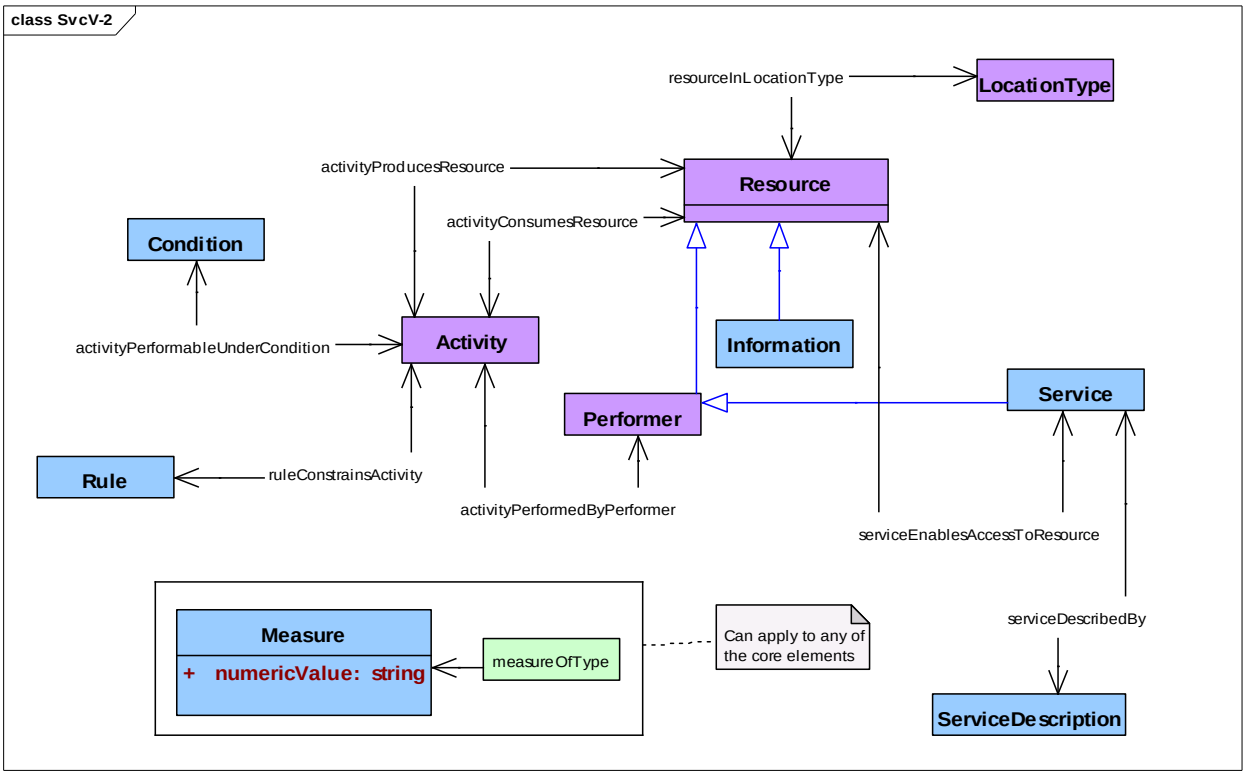


Figure 3-25: DoDAF meta-model diagram for SvcV-2 models

i. ***Alternative names***: Services Resource Flow; Services Resource Flow Description.

j. ***Notes***. In substance, SvcV-1 models and Svc-2 models examine the same subjects: performers and their interfaces. Some organizations may give less emphasis to performer composition and activity guidance in SvcV-1 models and more emphasis on composition and guidance in SvcV-2 models. The DoDAF does not prescribe these emphases. Similarly, SV-2 models and SvcV-2 models examine the same topic. Some organizations may emphasize performers as systems in SV-2 models while others may emphasize performers as services in SvcV-2 models. The DoDAF does not prescribe these emphases.

3.7.3 Services & Systems (SvcV-3a)

a. ***Description***. This model *identifies* and *describes* ***relationships*** between ***services*** and ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes relationships between systems and services that are the subject of SvcV-1 models and SV-1 models. The DoDAF does not prescribe service-to-system relationships that must be examined by SvcV-3a models. However, relationships considered by SvcV-3a models must be established by other models within the Service Viewpoint; SvcV-3a models may not themselves introduce service-to-system relationships.

c. Services and systems shall be modeled. Service-to-system relationships shall be modeled. Composition of services and systems may be modeled and interfaces between services and systems may be modeled. Activities, rules, conditions, resources, and types of locations may be modeled. Measures of services, systems, activities, rules, conditions, resources, and types of location may be modeled.

d. ***Meta-model***. Figure 3-26 shows the DoDAF meta-model for SvcV-3a models.

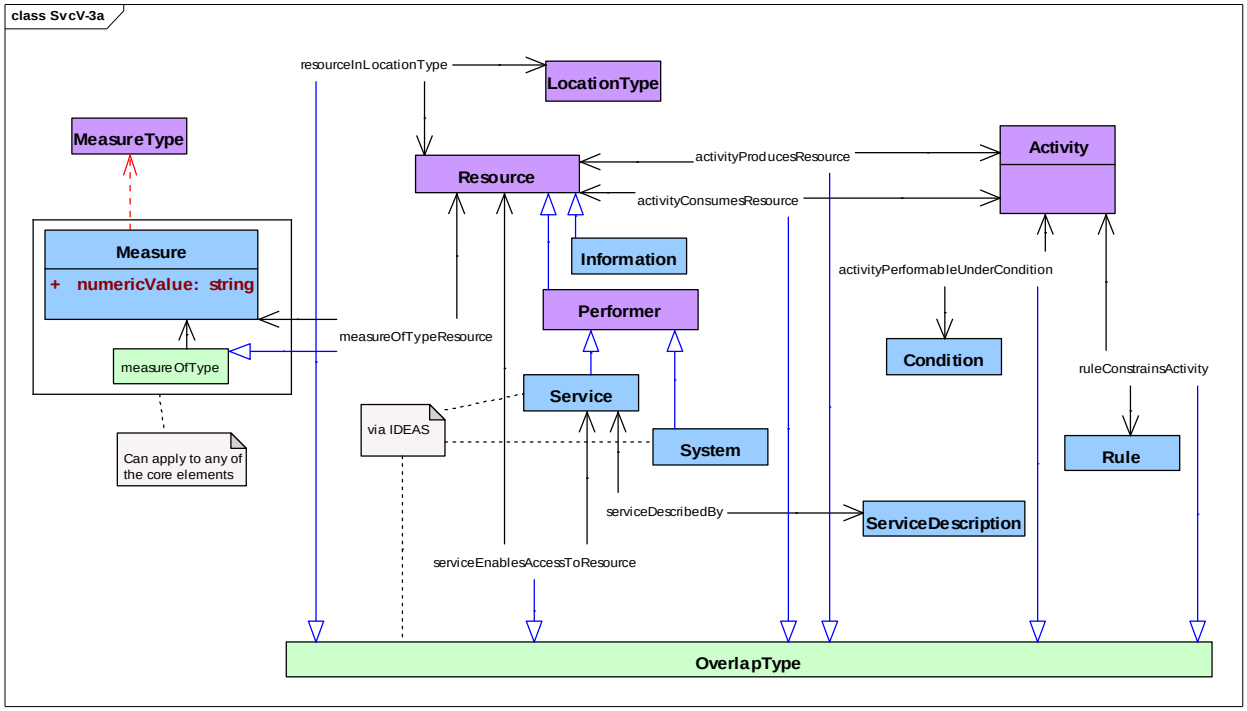


Figure 3-26: DoDAF meta-model diagram for SvcV-3a models

e. ***Alternative names***: Systems-Services Matrix.

f. ***Note***. An SvcV-3a model may be considered simply as a report that presents interesting system-to-service relationships that have been captured as architectural data by other Service Viewpoint models within an architectural description.

3.7.4 Service Relationships (SvcV-3b)

a. ***Description***. This model *identifies* and *describes* ***relationships*** among ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes relationships among services that are the subject of SvcV-1 models. The DoDAF does not prescribe service-to-service relationships that must be examined by SvcV-3b models. However, relationships considered by SvcV-3b models must be established by other models within the Service Viewpoint; SvcV-3b models may not themselves introduce service-to-service relationships.

c. Services shall be modeled. Service-to-service relationships shall be modeled. Composition of services may be modeled and interfaces between services may be modeled. Activities, rules, conditions, resources, and types of locations may be modeled. Measures of systems, activities, rules, conditions, resources, and types of location may be modeled. Systems shall not be modeled.

d. ***Meta-model***. Figure 3-27 shows the DoDAF meta-model for SvcV-3b models.

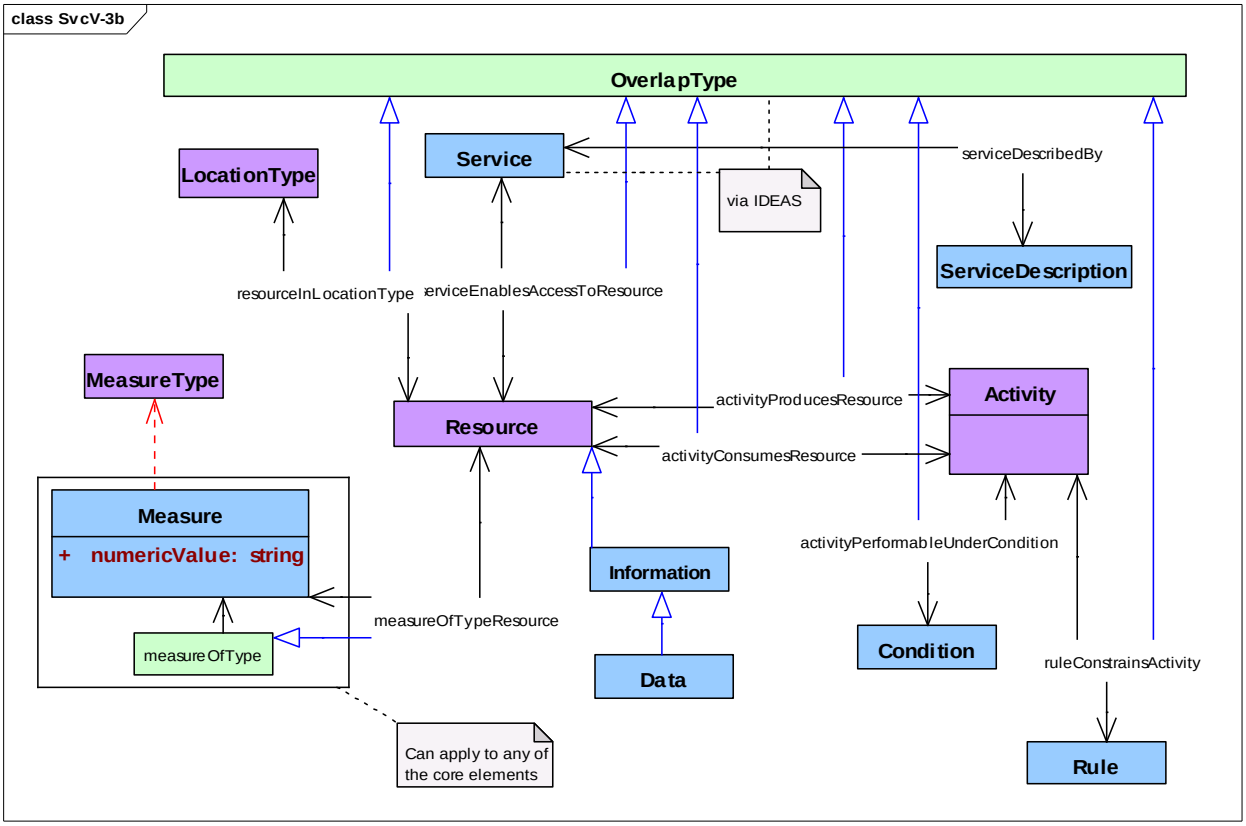


Figure 3-27: DoDAF meta-model diagram for SvcV-3b models

e. ***Alternative names***: Services-Services Matrix.

f. ***Note***. An SvcV-3b model may be considered simply as a report that presents interesting service-to-service relationships that have been captured as architectural data by other Service Viewpoint models within an architectural description.

3.7.5 Service Functions (SvcV-4)

a. ***Description***. This model *identifies* and *describes* ***activities*** performed by ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes the activities carried out by services as performers within the scope of a described architecture. Any activity comprises other activities. Hierarchical recursive decomposition of activities into activity parts may be modeled using whole-part relationships between activity wholes and their activity parts. Activities may also be related by their similarities and their differences using super-subtype relationships.

c. Activities are seen in SvcV-4 models as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in SvcV-4 models are services; these services may have parts that are resources that are capable of responsibility—organizations and

persons in roles—as well as materiel, systems, and other services. Activities are constrained by guidance, rules, and standards, and activities are carried out under conditions that affect their performance.

d. SvcV-4 models examine information and data as resources that are consumed and produced by activities performed by services.

e. An SvcV-4 model identifies and describes measures that are related to activities; in particular, an SvcV-4 model may examine measures that relate services to the performance of activities carried out by those services. SvcV-4 models may also identify and describe measures that apply to rules, conditions, resources, performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

f. Services, their descriptions, and other performers that are parts of services shall be modeled. Activities performed by services shall be modeled. Resources, especially data and other information consumed and produced by activities performed by services within an SvcV-4 model, shall be modeled. Rules, conditions, and types of locations may be modeled. The hierarchical structure of activities and the hierarchical structure of services may be modeled using whole-part relationships. Activities and services may be categorized using super-subtype relationships. Types of organizations and specific organizations may be modeled, and persons in roles may also be modeled. Measures related to services, activities, rules, conditions, resources, constituent performers, and locations may be modeled. Systems may not be modeled except as parts of services.

g. ***Meta-model***. Figure 3-28 shows the DoDAF meta-model for SvcV-4 models.

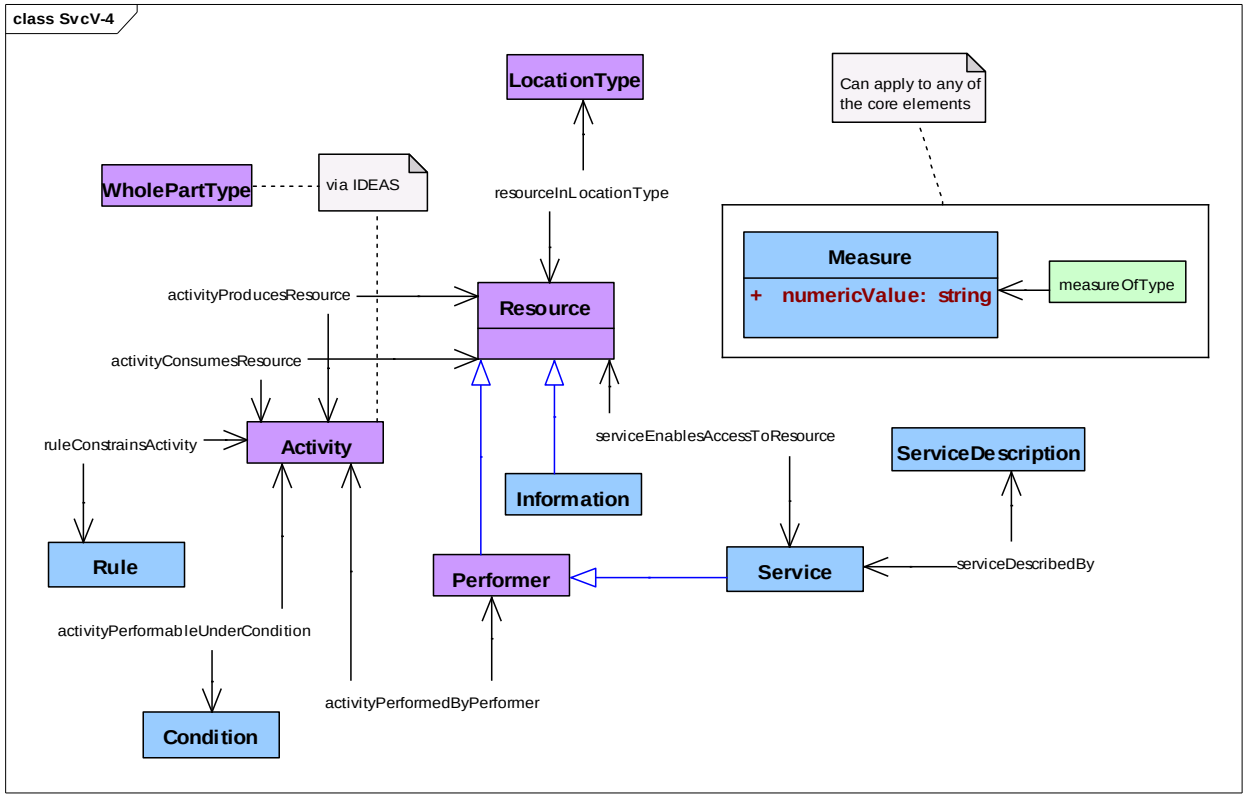


Figure 3-28: DoDAF meta-model diagram for SvcV-4 models

h. ***Alternative names***: Services Functionality Description.

3.7.6 Services & Operational Activities (SvcV-5)

a. ***Description***. This model *identifies* and *describes* ***relationships*** between ***services*** and ***operational activities*** within a described ***architecture***.

a. ***Narrative***. This model focuses on relationships between services identified by SvcV-1 models and operational activities identified by OV-5b models. Services perform ***service functions*** and service functions ***overlap*** operational activities.

b. Operational activities considered by SvcV-5 models must be identified by OV-5b models; SvcV-5 models may not introduce operational activities into an architectural description. Service functions considered by SvcV-5 models must be identified by corresponding SvcV-4 models; SvcV-5 models may not introduce activities performed by services into an architectural description. Operational activities considered by SvcV-5 models must overlap service functions identified by corresponding SvcV-4 models.

c. Services considered by SvcV-5 models must be identified by SvcV-1 models; SvcV-5 models may not introduce services into an architectural description. All services identified by SvcV-1

models are to be related by SvcV-5 models to operational activities identified by corresponding OV-5b models. However, the converse does not necessarily hold: there may be activities identified by OV-5b models that have no part that is performed by a service. Further, a service may perform a service function that overlaps with more than one operational activity within a described architecture, and an operational activity may overlap with service functions that are performed by more than one service within a described architecture.

d. Beyond an existence predicate, the DoDAF does not prescribe relationships that must be examined by SvcV-5 models. However, the existence predicate must be true for all pairs of an operational activity and a service considered by SvcV-5 models: the service performs a service function that overlaps the operational activity.

e. Services, their descriptions, and activities shall be modeled. Relationships between services and activities shall be modeled. Composition of services, composition of activities, and overlap of activities may be modeled. Rules, conditions, resources, and types of locations may be modeled. Measures of services, activities, rules, conditions, resources, and types of location may be modeled. Systems may also be modeled.

f. ***Meta-model***. Figure 3-29 shows the DoDAF meta-model for SvcV-5 models.

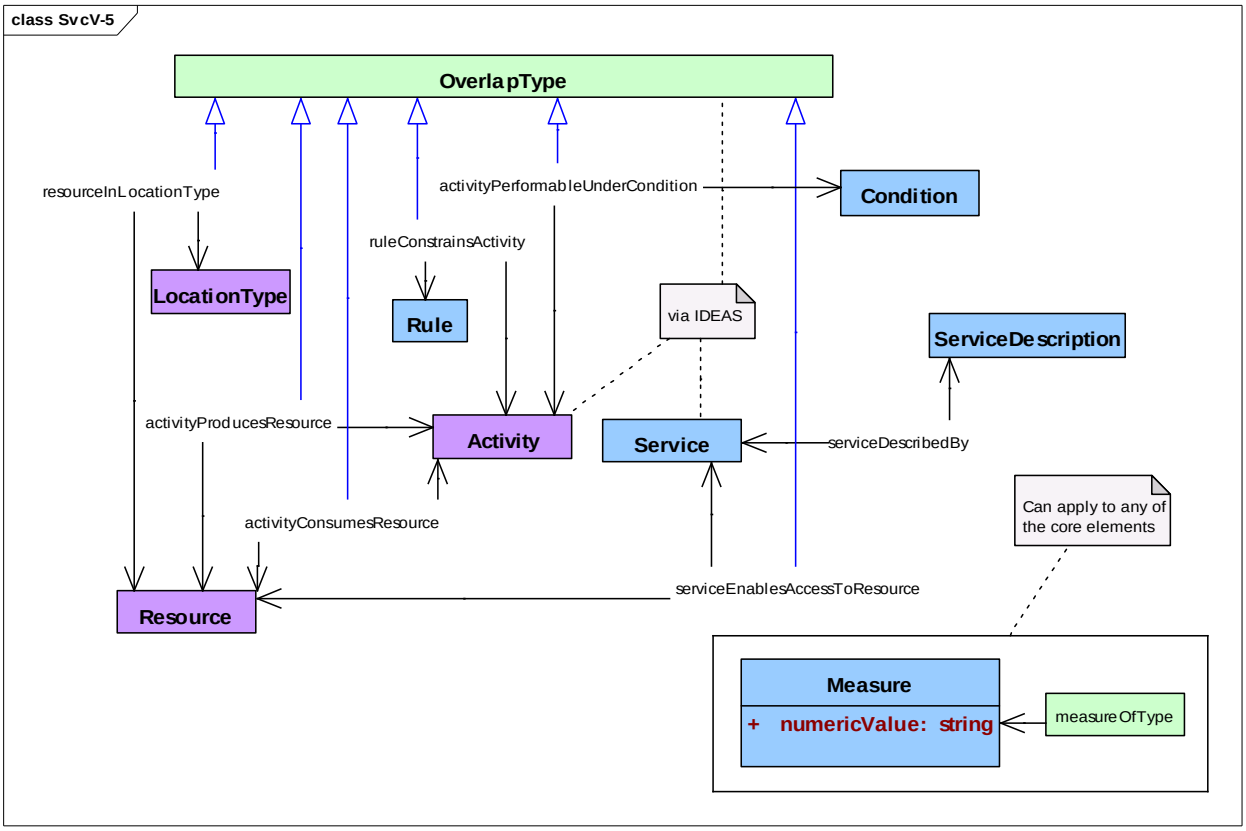


Figure 3-29: DoDAF meta-model diagram for SvcV-5 models

g. ***Alternative names***: Operational Activity to Services Traceability Matrix.

3.7.7 Services, Activities, & Resources (SvcV-6)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes the exchange of resources among services; in particular, these resources include data. A dependency between a resource to be consumed by one activity and a resource produced by another activity may be described as a *flow* of resources from producer to consumer. Activities are modeled in SvcV-6 models only in detail sufficient to show the relationships between resources produced by activities performed by one service and the resources consumed by activities performed by other services.

c. Activities are seen in SvcV-6 models much as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in SvcV-6 models are services. Services follow guidance, rules, and standards to carry out their activities, and services carry out their activities under conditions that affect their performance.

d. Services and other resources may be related to their locations to ensure that resources to be consumed are available to activities when and where those resources are needed and that services are there to carry out those activities when those resources are available.

e. In contrast to SvcV-4 models, SvcV-6 models identify and describe measures that apply to activities and resources. SvcV-6 models provide physical and temporal measures that are related to resources. SvcV-6 models also provide measures of performance and of the satisfaction of needs that are related to activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

f. Services, activities, and resources shall be modeled. In particular, resources that are data shall be modeled. Types of organizations shall be modeled; specific organizations may be modeled. Persons in roles may be modeled as parts of services. Types of locations of resources and services may be modeled, and specific locations may also be modeled. Rules and conditions may be modeled. Measures related to services, activities, resources shall be modeled; these measures shall include physical measures, temporal measures, performance measures, and measures of need satisfaction. Measures related to rules, conditions, and locations may be modeled. Systems may be modeled.

g. ***Meta-model***. Figure 3-30 shows the DoDAF meta-model for SvcV-6 models.

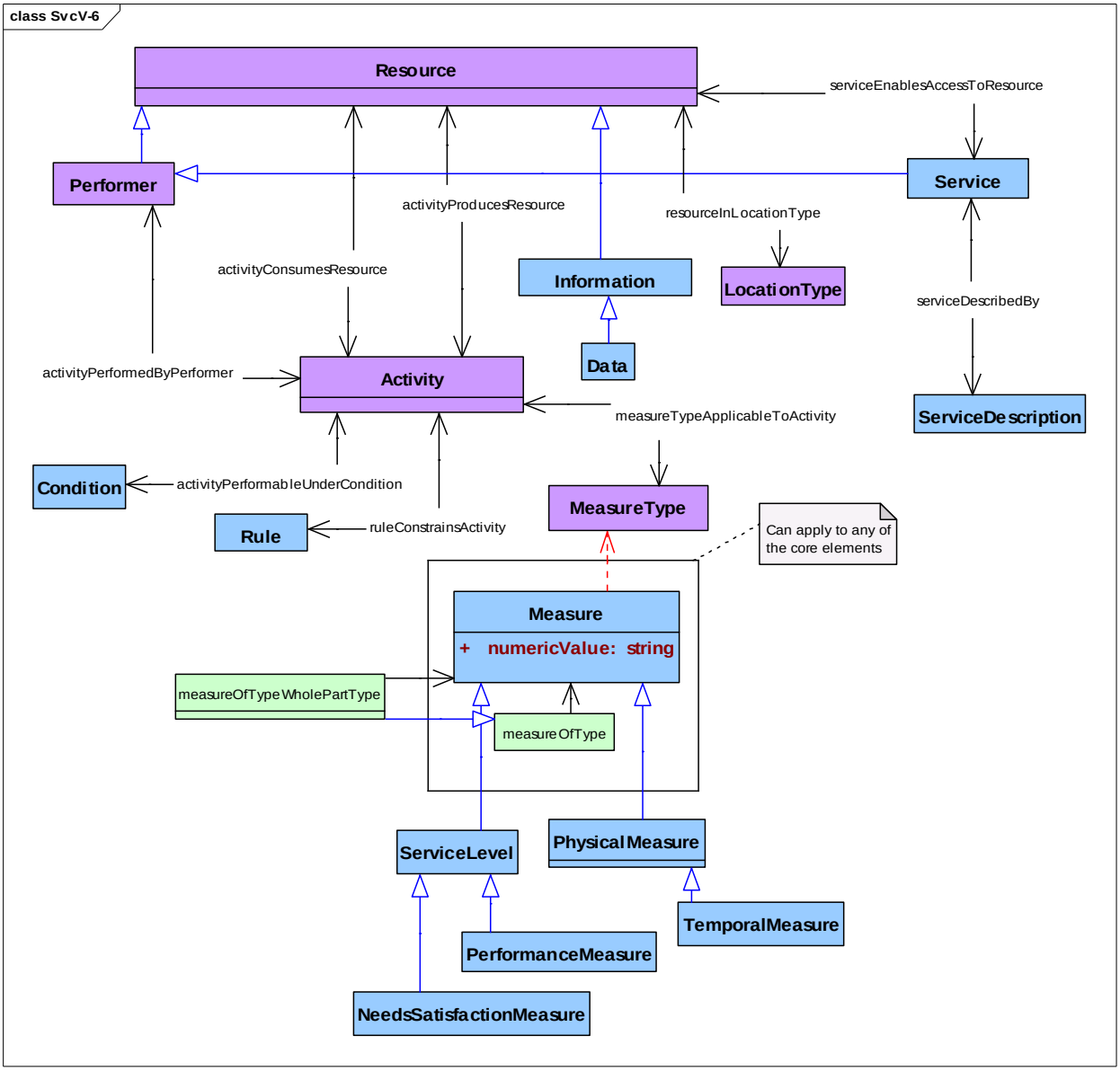


Figure 3-30: DoDAF meta-model diagram for SvcV-6 models

h. ***Alternative names***: Services Resource Flow Matrix.

3.7.8 Service Measures (SvcV-7)

a. ***Description***. This model *identifies* and *describes* ***measures*** for *specifying and evaluating* ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes measures and focuses on measures applicable to services that enable access to resources used by activities. A ***measure*** is the sort of property that characterizes the state of a resource. In particular, SvcV-7 models examine ***performance measures*** and ***maintainability measures*** to characterize changes in service states.

c. As in other models within the Service Viewpoint, an SvcV-7 model relates a service description to each service.

d. SvcV-7 models may examine both static properties of services and their parts and dynamic properties of services and their parts. SV-7 models may quantitatively examine the composition of measured resources using whole-part relationships. In particular, SV-7 models may examine the measurable skills of persons in roles in performing services. SV-7 models may examine a service and its parts as resources—things produced or consumed—and SV-7 models may examine a service and its parts as performers performing an activity that consumes and produces other resources.

e. An SvcV-7 model may focus on some selected resource whose properties may change in interesting ways. Performers that are services are resources that frequently exhibit state transitions that are interesting for SvcV-7 models because services in different states can do different things.

f. Activities are seen in SvcV-7 models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. In addition, SV-7 models look at sorts of measures that are applicable to activities and specify those sorts of measures that are appropriate for activities within the scope of the described architecture.

g. Services, their descriptions, persons in roles, activities, skills, performance measures, maintainability measures, and types of measures for activities shall be modeled. Other measures of services, their descriptions, persons in roles, activities, and skills may be modeled. Measures related to activities, rules, performers, conditions, and locations may be modeled. Types of locations of activities, services, persons in roles, and other resources may be modeled. Performers that are systems, organizations, or types of organizations shall not be modeled as performers in SvcV-7 models.

h. ***Meta-model***. Figure 3-31 shows the DoDAF meta-model for SvcV-7 models.

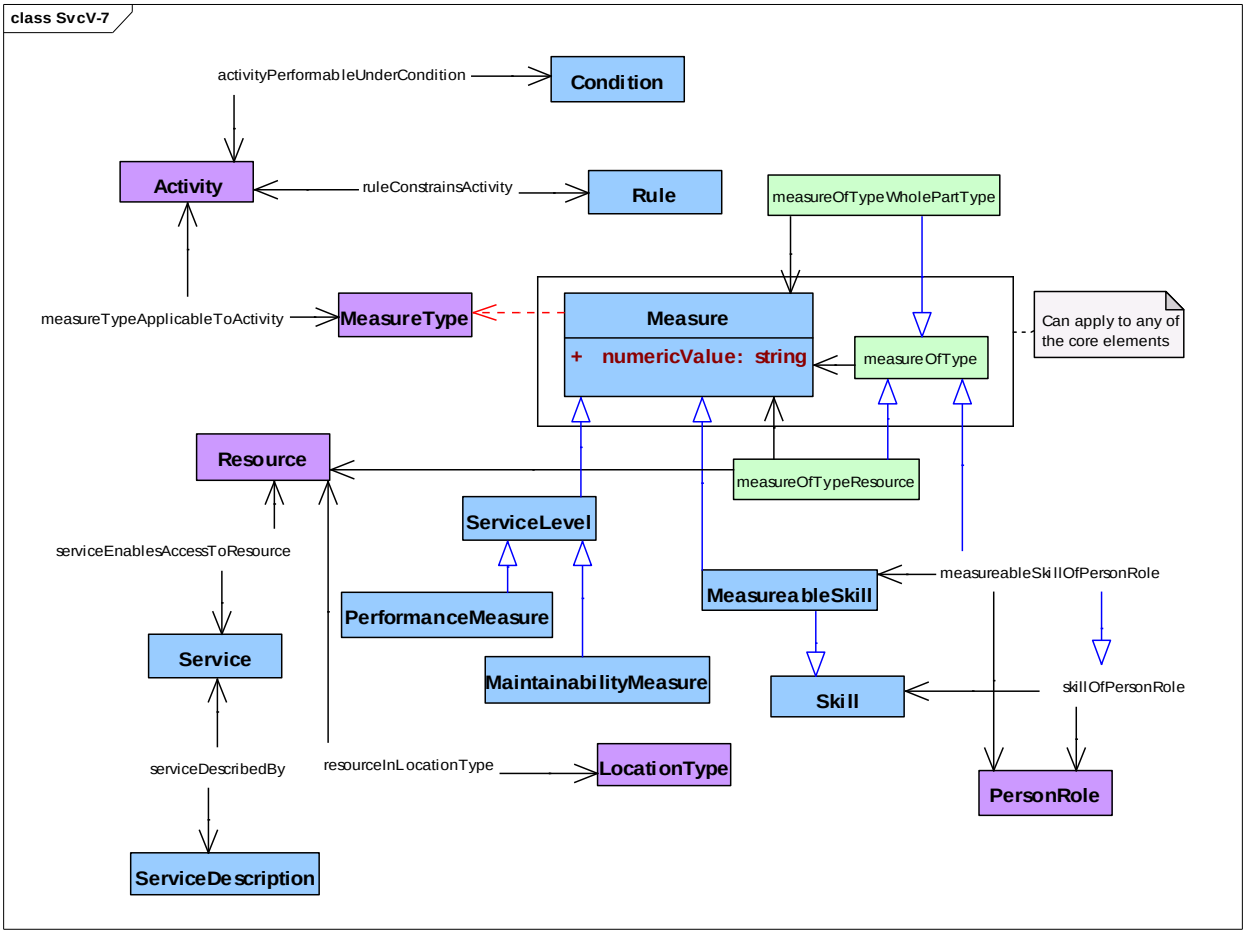


Figure 3-31: DoDAF meta-model diagram for SvcV-7 models

i. ***Alternative names***: Services Measures Matrix.

j. ***Note:*** An SvcV-7 model differs from an SV-7 model in these ways: first, services along with their descriptions are modeled by SvcV-7 models while SV-7 models look instead at systems and, second, SvcV-7 models must include maintainability measures within the measures that are modeled.

3.7.9 Service Evolution (SvcV-8)

a. ***Description***. This model *identifies* and *describes* the *temporal-states* of ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes the changes in the states of services and focuses those changes taking place with variations in the sequence of time (temporal state changes).

c. Temporal state changes are identified to be of or relating to the sequence of or relating to variations in time or to a particular time

d. The service is mechanism to enable access to a set of one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The capabilities accessed are resources, that is, information and data, materiel, performers, and geo-political extents.

e. As in other models within the Service Viewpoint, a SvcV-8 model relates a service description to each service.

f. SvcV-8 models examine the changing of resources, mapping the temporal state changes to allow comparison and examination of the resource and resource alternatives over time.

g. SvcV-8 models allow comparison between historical (legacy), current (as-is), and future (to-be) capabilities to permit evaluation of change and the measure of the impact will have on the current service. This comparison is to be in the observation of service over a unit of time that will allow compare and contrast of other services during the same period. The model shows the structure of each resource, using similar modeling elements as those used in SvcV-1.

h. The SvcV-8, when linked together with other evolution models, such as CV-2, CV-3, and StdV-2 models, provides a rich definition of how the enterprise and its capabilities are expected to evolve over time.

i. ***Meta-model***. Figure 3-32 shows the DoDAF meta-model for SvcV-8 models.

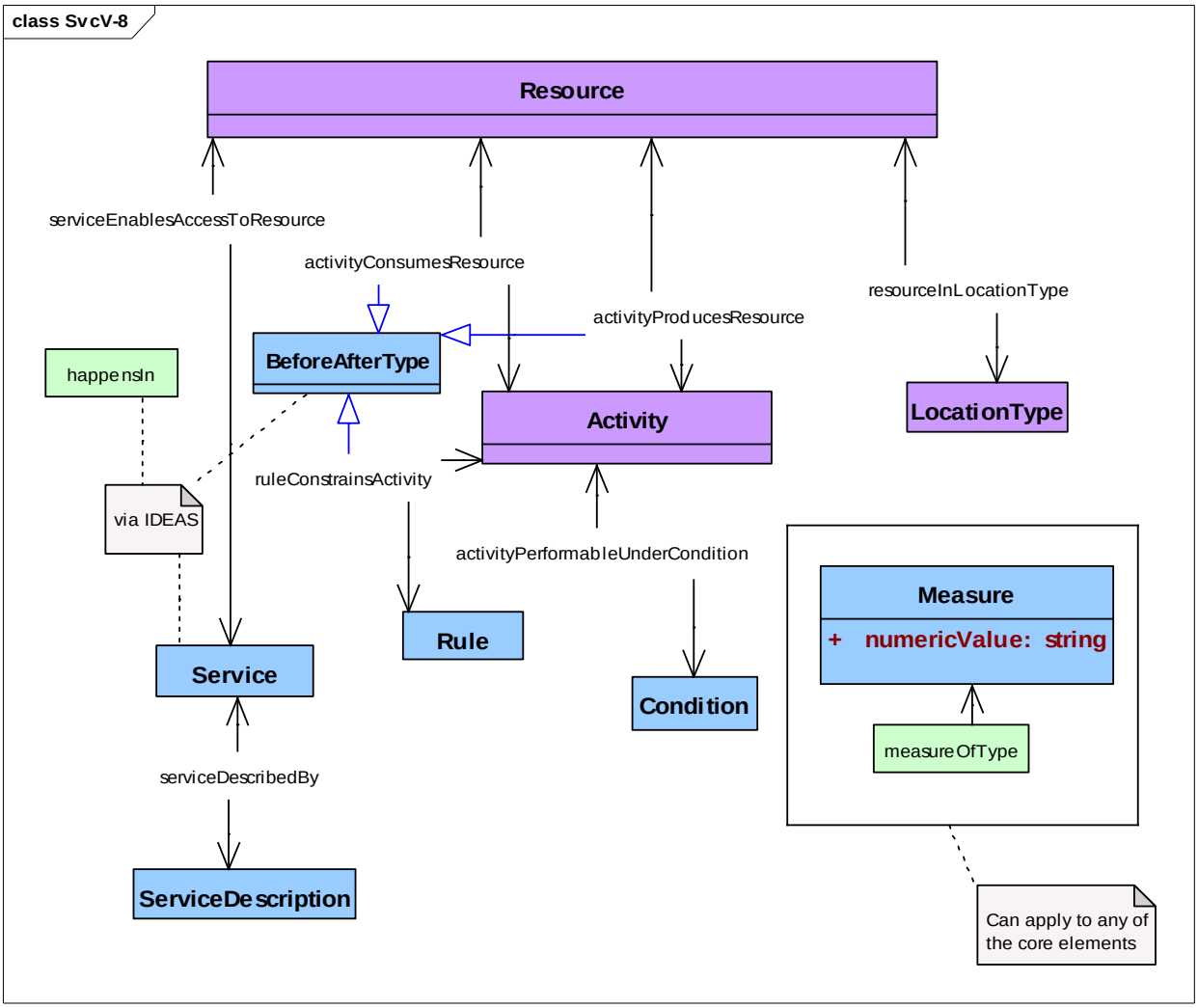


Figure 3-32: DoDAF meta-model diagram for SvcV-8 models

j. ***Alternative names***: Services Evolution Description, SoA Roadmap, Plan of Action and Milestones (POA&M), Integrated Master Plan (IMP), Services Deployment Plan, Services Lifecycle Management Plan, Enterprise Transition Plan.

3.7.10 Service Technologies & Skills (SvcV-9)

a. ***Description***. This model *identifies* and *describes* the *precursors* of *temporal-states* of ***services*** within a described ***architecture***.

b. ***Narrative***. The service is mechanism to enable access to a set of one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The capabilities accessed are resources, that is, information and data, materiel, performers, and geo-political extents.

c. As in other models within the Service Viewpoint, an SvcV-9 model relates a service description to each service.

d. SvcV-9 includes the precursors that record the services that are active in the architecture prior (legacy), currently (as-is), and future (to-be) to allow examination of the compare and contrast between them.

e. SvcV-9 defines the underlying current and expected supporting resources (technologies and skills) are those that can be reasonably forecast given the current state of technology and skills, and expected improvements or trends. New technologies and skills are tied to specific periods, which can be correlated with SvcV-8 models and CV-3 models. Additionally, the technologies and skills can also be coordinated with the StdV-2 models.

f. SvcV-9 models may focus on selected temporal time states in which a resource or a selection of resources will have their properties change in a particular way that will provide interesting variations for possible implementations.

g. Alternatively, the SvcV-9 may relate forecasts to Service Model elements (e.g., Services) where applicable. The list of resources potentially impacted by the forecasts can also be summarized as additional information in SvcV-9.

h. ***Meta-model***. Figure 3-33 shows the DoDAF meta-model for SvcV-9 models.

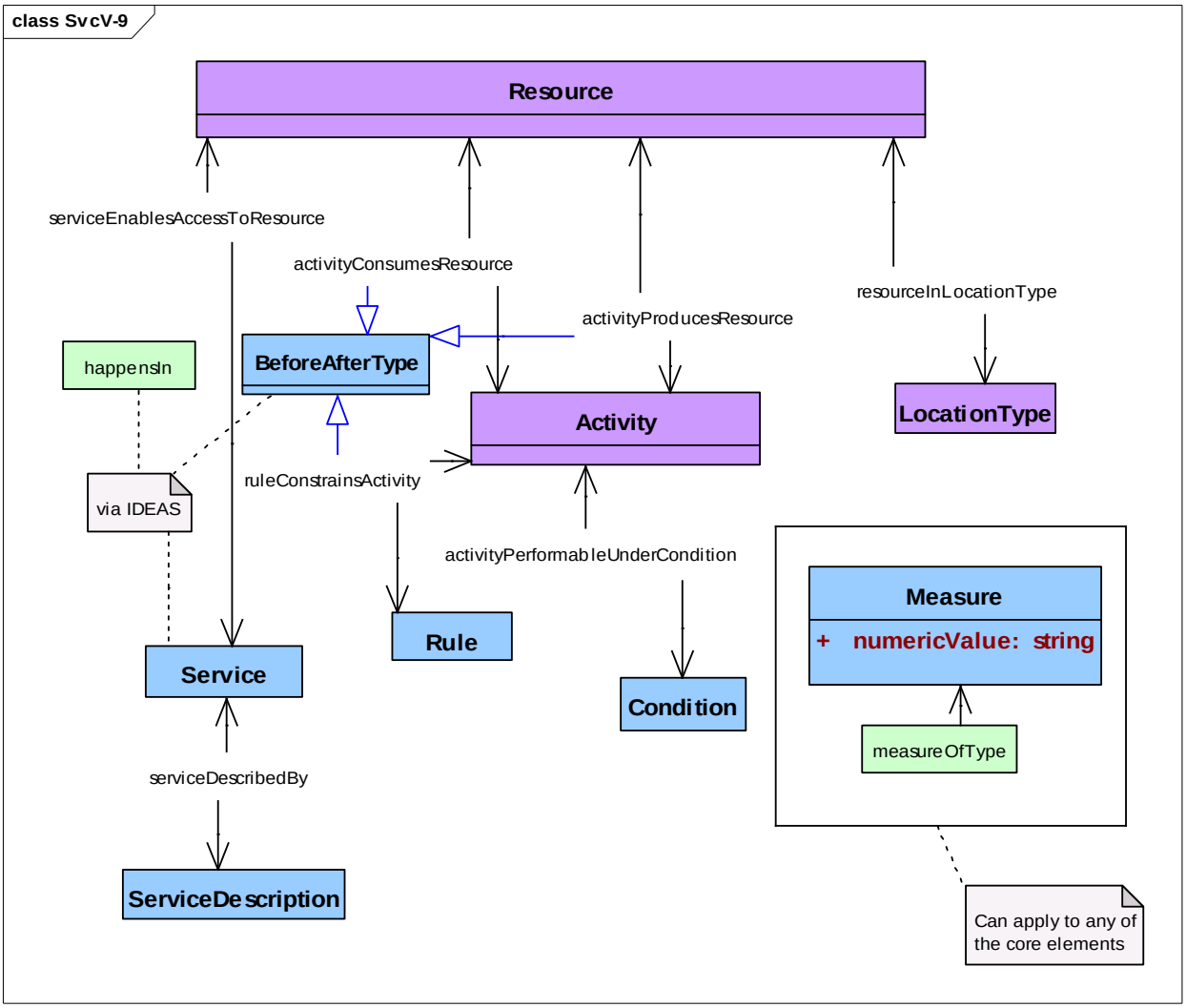


Figure 3-33: DoDAF meta-model diagram for SvcV-9 models

i. ***Alternative names***: Services Technology & Skills Forecast, S&T Roadmap S&T Master Plan.

3.7.11 Introduction to SvcV-10 models

a. Many of the critical characteristics of an architecture are only discovered when an architecture's dynamic behaviors are defined and described. These dynamic behaviors concern the timing and sequencing of events that capture resource performance characteristics (e.g., a performer executing service functions described by an SvcV-4 Service System Activities model).

b. Behavioral modeling and documentation are key parts of a successful architectural description because we should understand how a described architecture behaves. Although knowledge of the functions and interfaces is also crucial, knowing whether, for example, a response should be expected after sending message X to service Y can be crucial to successful operations.

c. The SvcV-10 models support net-centric (service-oriented) implementation of services as orchestrations of services. The SvcV-3 Service Relationships model can provide input for the SvcV-10 models. Three types of models may be used to describe the dynamic behavior and performance characteristics of services. These three models are:

1) Service Rules (SvcV-10a),

2) Service State Transitions (SvcV-10b), and

3) Service Sequences (SvcV-10c).

d. SvcV-10b and SvcV-10c models may be used separately or together to describe timing and sequencing behavior.

e. Both SvcV-10b and SvcV-10c models describe functional responses to sequences of events. Events may also be referred to as ***inputs***, *transactions*, or *triggers*. When an event occurs, the action to be taken may be subject to a rule or set of rules described in an SvcV-10a model.

3.7.12 Service Rules (SvcV-10a)

a. ***Description***. This model *identifies* and *describes* the ***rules*** that guide ***activities*** performed by ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes (a) rules and other guidance that constrain activities and (b) conditions under which activities are performed. Rules themselves are not four-dimensional; thus, performers require *descriptions* of applicable rules—such descriptions *do* exist in space and time. Such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

c. Conditions exist within the four-dimensional environment of activities but are not necessarily four-dimensional things within that context. Conditions such as adversary morale and unit cohesion may be real but they are not immediately accessible as architectural data; thus, performers, as with rules, require *descriptions* of applicable conditions—such descriptions are accessible in space and time. As with rules, such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

d. Rules and conditions are considered together in SvcV-10a models because both impose constraints on the performance of activities. In particular, different rules may apply to an activity under different conditions. Rules may be related to measures; for example, rules that are criteria of UJTL task performance standards are to be related to corresponding measures. Similarly, conditions affecting UJTL task performance are to be related to corresponding measures. Measures related to rules and conditions may include physical and temporal measures.

e. Activities are seen in SvcV-10a models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance.

f. Rules and conditions for activities may depend upon the location of those activities. Resources are related to their locations and the location of these resources determines the location of activities that consume and produce them.

g. In contrast to OV-6a models and SV-10a models, services are to be related to activities that these services perform following these rules and under these conditions. In addition to services, other performers, including performers capable of responsibility and systems, may be addressed by SvcV-10a models. Services may be related to resources produced by activities as well as related to those resources through the activities that produce them.

h. In SvcV-10a models, each service is described by a service description; a service description is a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

i. Services, service descriptions, activities, rules, conditions, measures, and resources shall be modeled. In particular, information resources that describe rules shall be modeled and information resources that describe conditions may be modeled. In addition, a service description shall be modeled for each modeled service. Rules shall be modeled for each activity identified in the corresponding SvcV-4 models of an architectural description that a service performs. Performers that are services shall be modeled. Other performers, including performers that are systems, may be modeled. Types of locations may be modeled. Measures for rules and conditions may include physical measures and temporal measures. Measures related to activities, performers, and locations may be modeled.

j. ***Meta-model***. Figure 3-34 shows the DoDAF meta-model for SvcV-10a models.

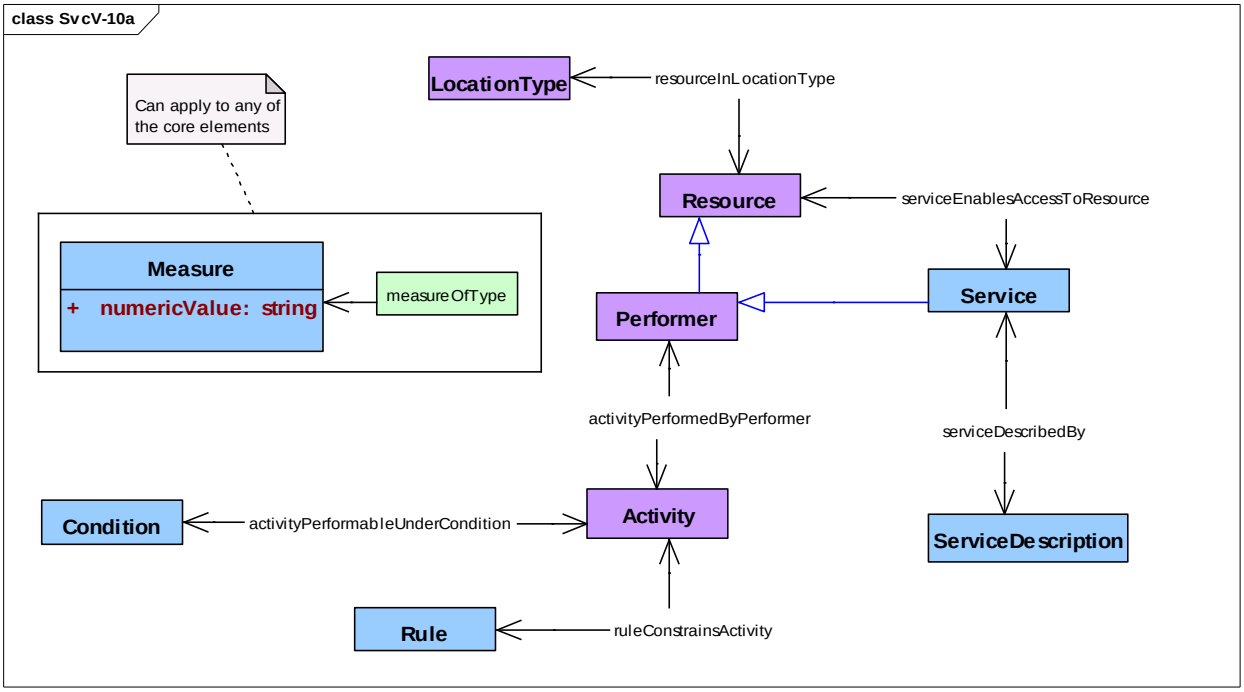


Figure 3-34: DoDAF meta-model diagram for SvcV-10a models

k. ***Alternative names***: Services Rules Model, SoA Framework, SoA Standards, SoA Business Rules.

3.7.13 Service State Transitions (SvcV-10b)

a. ***Description***. This model *identifies* and *describes* changes in the *states* of ***resources*** that are *consumed* and *produced* by ***activities*** *performed* by ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes certain interesting ***temporal parts*** of a resource, specifically those temporal parts that are distinguished by the attainable states of the resource. Each interesting temporal part is related to a property that distinguishes these temporal parts from one another across the whole-life of a resource. These properties are related to activities because an activity transforms an earlier temporal part of a resource with certain properties (***input***) into a later temporal part with altered properties (***output***).

c. A resource with states (i.e., temporal parts observed as resources with properties that may change) generally does not play the role of a ***trigger*** for an activity that changes the state of that resource (see note for OV-6b). Therefore, an SvcV-10b model may want to identify other resources that *do* play the role of a trigger for activities that change the properties of the resource that is the subject of a model.

d. A ***measure*** is the sort of property that characterizes the state of a resource. In particular, SvcV-10b models may examine ***physical measures*** and ***temporal measures*** to characterize

resource states, and they use ***before-after*** relationships to order the changes in these measures, that is, the state transitions of a resource.

e. An SvcV-10b model focuses on some selected resource whose properties may change in interesting ways. In contrast, an SV-4 model covers all resources within the scope of a specific SV-4 model. Performers that are services are resources that frequently exhibit state transitions that are interesting for SvcV-10b models because services in different states could perform different activities or access different resources through different activities. SvcV10-b models relate each service to a description of that service. Services may be analyzed

f. Activities are seen in SvcV-10b models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. Rules and conditions are seen in SvcV-10b models as they are in SvcV-10a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, SvcV-10b models may look at changes in rules and conditions by examining the state transitions of their descriptions.

g. Services, service descriptions, activities, and resources shall be modeled. Physical measures and temporal measures shall be modeled. Information resources that describe rules shall be modeled and information resources that describe conditions may be modeled. Before-after relationships among activities and between resources in sequential states shall be modeled. Types of locations of activities and resources may be modeled. Services that are performers whose state transitions are the subject of an SvcV-10b model shall be modeled. Performers that are capable of responsibility may be modeled. Performers that are systems may be modeled as performers in SvcV-10b models. Measures related to activities, rules, performers, conditions, and locations may be modeled.

h. ***Meta-model***. Figure 3-35 shows the DoDAF meta-model for SvcV-10b models.

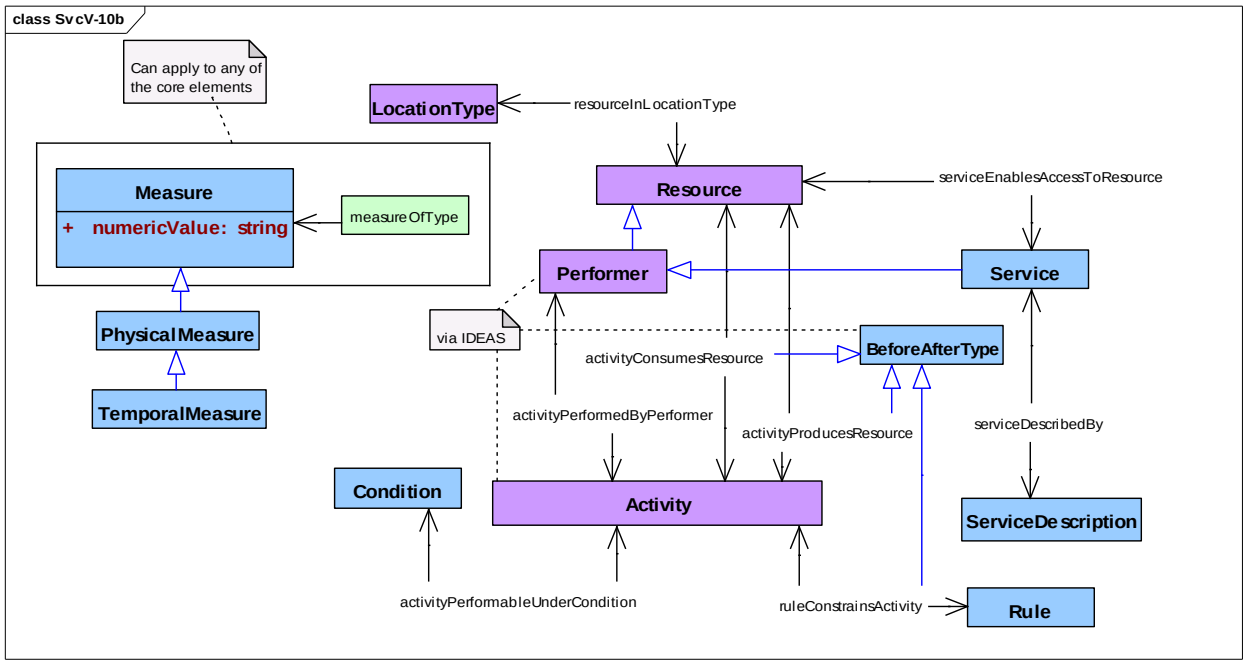


Figure 3-35: DoDAF meta-model diagram for SvcV-10b models

i. ***Alternative names***: Services State Transition Description.

3.7.14 Service Activity Sequences (SvcV-10c)

a. ***Description***. This model *identifies* and *describes sequences* of ***activities*** *performed* by ***services*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes some interesting sequence of activities taken from the set of all activities within an architectural description. The DoDAF meta-model does not prescribe what ought to be interesting. SvcV-10c models specify sequence using ***before-after*** relationships. Thus, SvcV-10c models are concerned with ***temporal measures*** related to the succession of activities and with ***physical measures*** related to changes in the states of resources. The focus of SvcV-10c models is on activities performed by services.

c. Activities are seen in SvcV-10c models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. Performers in SvcV-10c models are services, systems, and performers capable of responsibility. Rules and conditions are seen in SvcV-10c models as they are in SvcV-10a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, SvcV-10c models may examine the production of rules descriptions and condition descriptions.

d. An SvcV-10c model identifies and describes measures that are related to services and activities. SvcV-10c models may also identify and describe measures that apply to rules, conditions, resources, other performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

e. Services, service descriptions, activities, and resources shall be modeled. Rules, conditions, and types of locations may be modeled. The sequential structure of activities shall be modeled using before-after relationships. Systems and performers capable of responsibility may be modeled. Specific organizations may be modeled. Measures related to services, activities, rules, conditions, resources, other performers, and locations may be modeled.

f. ***Meta-model***. Figure 3-36 shows the DoDAF meta-model for SvcV-10c models.

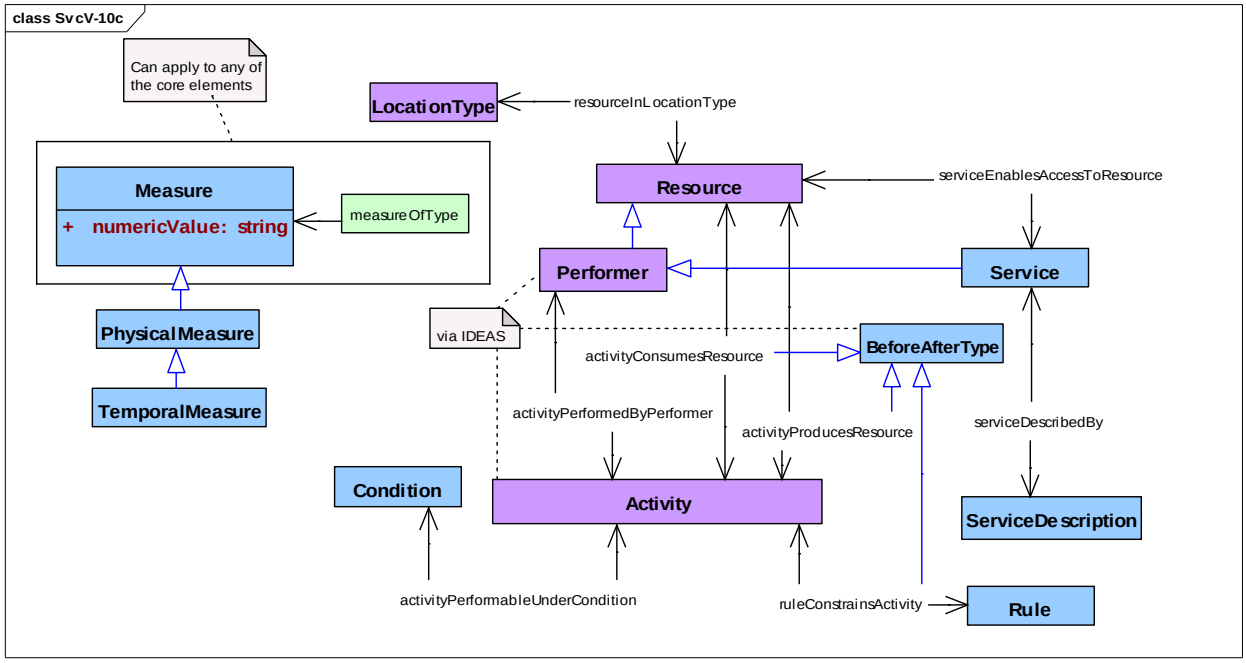


Figure 3-36: DoDAF meta-model diagram for SvcV-10c models

g. ***Alternative names***: Services Event-Trace Description.

3.8 Standards Viewpoint (StdV)

a. The Standards Viewpoint looks at the sets of rules governing the arrangement, interaction, and interdependence of parts or elements of a described architecture. These sets of rules can be captured at the organizational level and applied to each solution, while each solution's architectural description shows just those rules pertinent to the described architecture. Its purpose is to ensure that a solution satisfies a specified set of operational or capability requirements. Standards Viewpoint models shows the doctrinal, operational, business, technical, and industry

guidelines upon which engineering specifications are based, common building blocks are established, and solutions are developed. It includes a collection of the doctrinal, operational, business, technical, or industry standards, implementation conventions, standards options, rules, and criteria that can be organized into profiles that govern solution elements for a given architecture. Current DoD guidance requires the technical standards portions of models be produced from the DoD Information Technology Standards and Profile Registry (DISR) to determine the minimum set of standards and guidelines for the acquisition of all DoD systems that produce, use, and exchange information.

b. Table 3.8-1 names and describes Standards Viewpoint models.

Table 3.8-1: Standards Viewpoint models

Models	Descriptions
StdV-1 Standards Profile	Presents rules that constrain activities and their performers.
StdV-2 Standards Forecast	Presents rules that will constrain activities and their performers in the future.

3.8.1 Standards Profile (StdV-1)

a. ***Description***. This model *identifies* and *describes* the ***rules*** that *constrain* ***activities*** and their ***performers*** within a described ***architecture***.

b. ***Narrative***. Activities are guided and constrained by rules. Such rules include standards of many kinds, including technical standards. Standards and other rules affect performers of activities; these performers must abide by the rules that apply to specific activities. Conditions under which specific rules apply to an activity may be modeled. Measures may be related to modeled activities; performers; rules, standards, and technical standards; and conditions. This model focuses on rules that *currently* (at some specified time) apply to activities within a described architecture.

c. ***Meta-model***. Figure 3-37 shows the DoDAF meta-model for StdV-1 models.

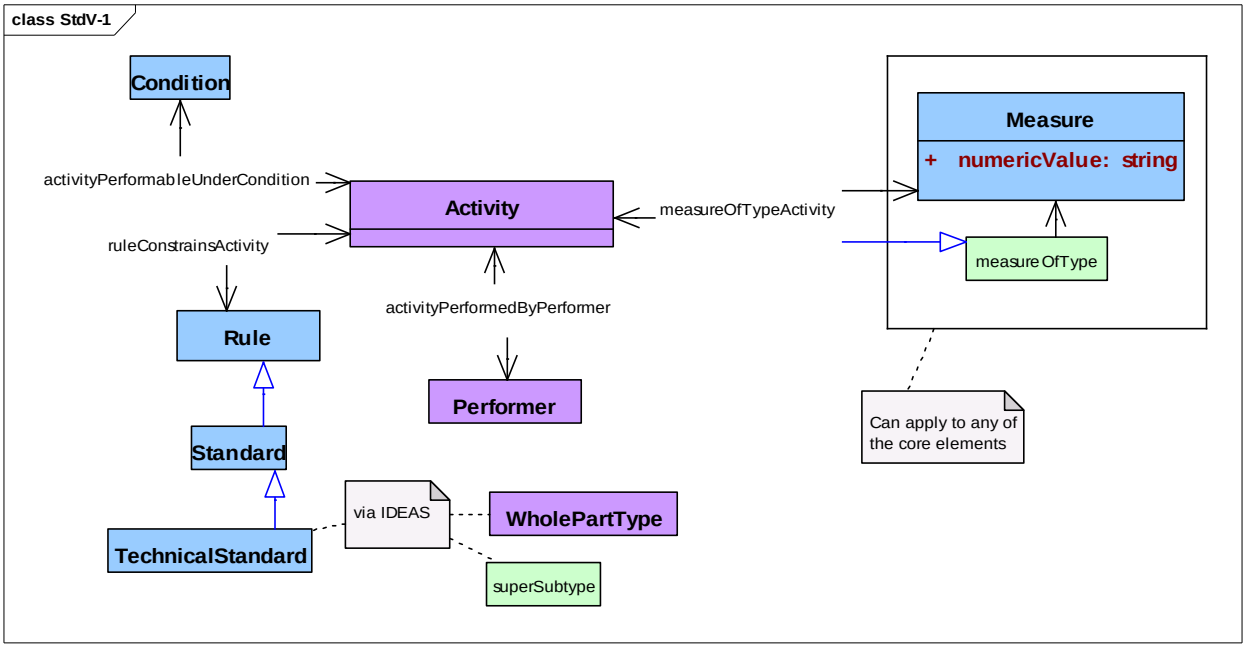


Figure 3-37: DoDAF meta-model diagram for StdV-1 models

d. ***Alternative names***: Technical View; Technical Standards.

e. ***Notes.*** In the Standards Viewpoint, standards are called into play by the activities to be performed and they apply to performers only in virtue of the roles performers enact when they perform a given activity. The same performer in different roles with respect to different activities may be governed by different standards for these different activities. Conversely, the same standards may apply to different performers of a given activity. Therefore, rules are directly related to activities with their conditions, and performers are related to rules through the activities that performers carry out.

3.8.2 Standards Forecast (StdV-2)

a. ***Description***. This model *identifies* and *describes* the ***rules*** that will *constrain* ***activities*** and their ***performers*** within a described ***architecture*** in the future.

b. ***Narrative***. Activities are guided and constrained by rules. Such rules include standards of many kinds, including technical standards. Standards and other rules affect performers of activities; these performers must abide by the rules that apply to specific activities. Conditions under which specific rules apply to an activity may be modeled. Measures may be related to modeled activities; performers; rules, standards, and technical standards; and conditions. An StdV-2 model differs from an StdV-1 model by modeling foreseeable successions of standards that might apply to modeled activities in the future, that is, *after* the time specified by a corresponding StdV-1 model.

c. ***Meta-model***. Figure 3-38 shows the DoDAF meta-model for StdV-2 models.

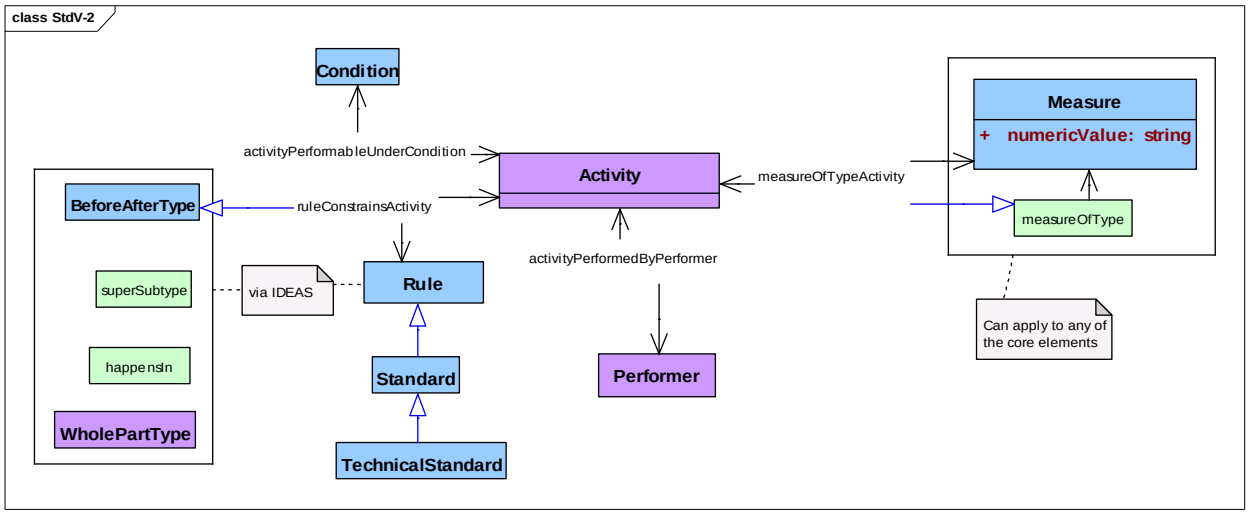


Figure 3-38: DoDAF meta-model diagram for StdV-2 models

d. ***Alternative names***: *none*.

e. ***Notes***. See Notes for StdV-1. In principle, an StdV-2 model can look at historical successions of standards as well as anticipated future successions of standards.

3.9 System Viewpoint (SV)

a. System Viewpoint models identify and describe system resource flows, the means by which they occur, and rules and metrics associated with those resource flow, describe the composition (parts) of systems, the technical dependency, interface relationships among systems, the hierarchical structure of system activities (system functions) and their resource flows, organizational activities performed or supported by system functions, the mapping of systems to capabilities whose achievement they contribute toward, activities supported by a system, the measures (metrics) associated with systems, the system evolution plan, the emerging technologies, software and hardware products, and skills that are expected to be available in a given set of time frames and that will affect future system development, rules that constrain systems, the states systems transition to in response to events, and the sequences of triggering events.

b. Systems provide or support both warfighting and business functions.

c.

d. Table 3.9-1 names and describes System Viewpoint models.

Table 3.9-1: Systems Viewpoint models

Models	Descriptions
SV-1 Systems Composition and Interface Identification	The identification of system resource flows and their composition
SV-2 Systems Interface Means	The means by which resource flows between systems occur
SV-3 Systems-Systems Matrix	The interface relationships among systems
SV-4 Systems and Services Functionality Description	The hierarchical structure of system activities and their resource flows
SV-5a Organizational Activities Supported by System and Service Functions	Organizational activities performed or supported by system functions
SV-5b Organizational Activities Supported by Systems and Services	A mapping of systems to capabilities whose achievement they contribute toward or activities supported by the system.
SV-6 Systems and Services Resource Flows	The details of resource flows among systems; the activities performed; the resources exchanged; and the attributes (rules and measures) associated with these exchanges
SV-7 Systems Measures Matrix	The measures (metrics) of systems
SV-8 Systems Evolution Description	The planned incremental steps toward migrating a suite of systems to a more efficient suite, or toward evolving a current system to a future implementation
SV-9 Systems Technology & Skills Forecast	The emerging technologies, software/hardware products, and skills that are expected to be available in a given set of time frames and that will affect future system development
SV-10a System and Service Rules	Rules that constrain systems and the activities they perform
SV-10b System and Service State Transition	The states systems transition to in response to events
SV-10c Systems and Services Event-Trace	A sequence of triggering events associated with resource flows and systems

3.9.1 Systems Composition and Interface Identification (SV-1)

a. ***Description***. This model identifies ***system resource*** flows and describes the composition (parts) of systems.

b. ***Narrative***. This model emphasizes performers that are systems and interfaces between these performers, specifically, the overlaps between systems performing activities that produce resources and systems performing other activities that consume those resources. The role of a resource with respect to these activities changes from resource *produced* to resource *consumed* at such an interface.

c. Activities are seen in SV-1 models as they are in other DoDAF models. An activity consumes resources to produce other resources. At least one performer carries out an activity. An activity is constrained by guidance, rules, and standards. Performers may carry out activities under conditions that affect its performance. The sorts of locations where resources are produced and consumed by these activities may affect the specification of performers to carry out those activities.

d. Resources produced and resources consumed include information, performers, and materiel. In SV-1 models, resources are produced by activities that are performed by systems and performers capable of responsibility; these performers include organizations and persons in roles. These produced resources are consumed by other activities similarly carried out by other systems and other performers capable of responsibility.

e. SV-1 models may use whole-part relationships to examine the composition of performers. A system may be considered as a part of encompassing performers. Similarly, a system may be considered as a whole whose parts comprise resources of all sorts, including information, materiel, performers capable of responsibility, and other systems. The DoDAF does not prescribe nor limit the details or levels of composition that SV-1 models may provide.

f. Interfacing systems and the activities they perform shall be modeled. The resources produced and consumed by these activities as performed by these interfacing systems shall be modeled. Performers capable of responsibility, including persons in roles and types of organizations, may be modeled. Guidance for activities carried out by systems as performers and conditions that affect the performance of these activities may be modeled. The types of locations of resources may be modeled. The composition of systems as performers may be modeled; thus, resources that include these interfacing systems may be modeled, and resources that are included in the composition of interfacing systems, such as information, materiel, types of organizations, and persons in roles, may be modeled. Measures of systems, activities, resources, other performers, materiel, types of locations, rules, and conditions may be modeled. Services shall not be modeled by SV-1 models.

g. ***Meta-model***. Figure 3-39 shows the DoDAF meta-model for SV-1 models.

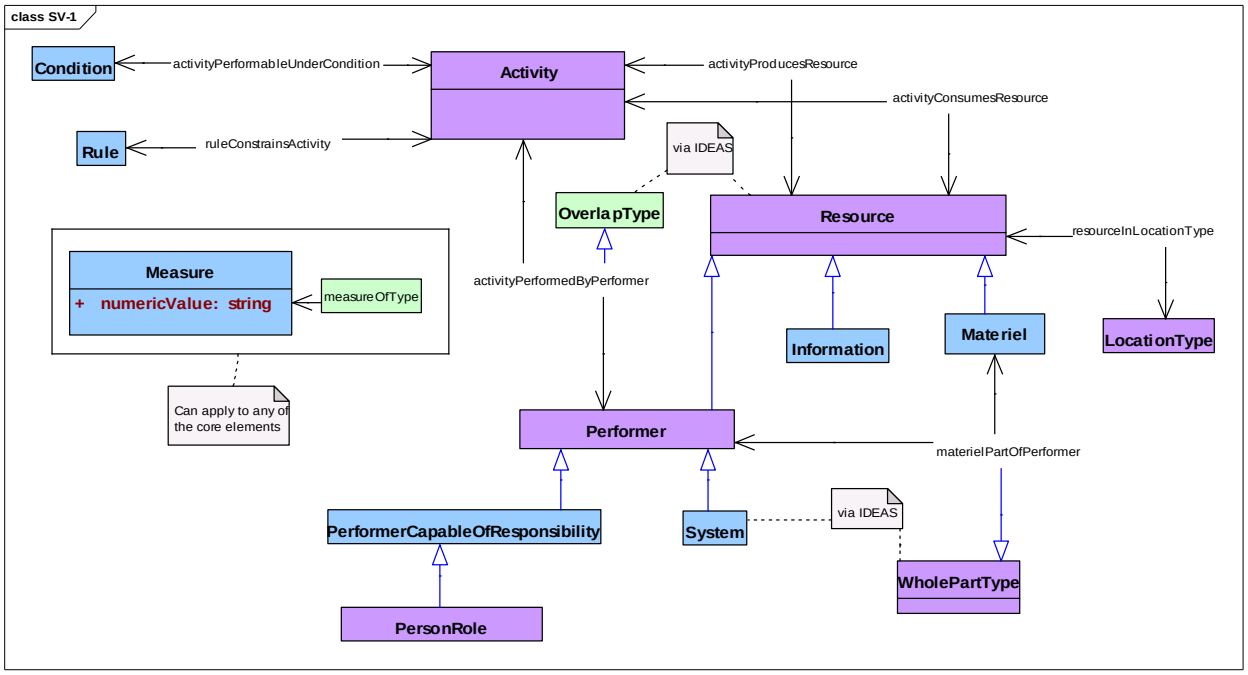


Figure 3-39: DoDAF meta-model diagram for SV-1 models

h. ***Alternative names***: Systems Interface Description; Systems and Services Composition and Interface Identification; Service Composition, System Block Diagram.

i. ***Notes***. In substance, SV-1 models and SV-2 models examine the same subjects: performers and their interfaces. Some organizations may give less emphasis to performer composition and activity guidance in SV-1 models and more emphasis on composition and guidance in SV-2 models. The DoDAF does not prescribe these emphases. Similarly, SV-1 models and SvcV-1 models examine the same topic. Some organizations may emphasize performers as systems in SV-1 models while others may emphasize performers as services in SvcV-1 models. The DoDAF does not prescribe these emphases.

3.9.2 System Interface Means (SV-2)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed and produced* by *activities performed* by ***systems*** within a described ***architecture***; in *presentation*, *architectural-data* are grouped by ***system*** and, within ***system***, by ***system*** *parts*.

b. ***Narrative***. This model emphasizes performers that are systems and interfaces between performers, specifically, the overlaps between systems performing activities that produce resources and systems performing other activities that consume those resources. The role of a resource with respect to these activities changes from resource *produced* to resource *consumed* at such an interface.

c. SV-2 models may consider any systems introduced by corresponding SV-1 models. SV-2 models may not introduce systems or activities that have not already been identified and described by corresponding SV-1 models. However, SV-2 models may look more closely at the parts of these services or activities.

d. Activities are seen in SV-2 models much as they are in other DoDAF models. An activity consumes resources to produce other resources. At least one performer carries out an activity. An activity is constrained by guidance, rules, and standards; SV-2 models may pay particular attention to guidance. Performers may carry out activities under conditions that affect their performance; however. The sorts of locations where resources are produced and consumed by these activities may affect the specification of performers to carry out those activities.

e. Resources produced and resources consumed include information, performers, and materiel. In SV-2 models, resources are produced by activities that are performed by systems and performers capable of responsibility; these performers include organizations and persons in roles. These produced resources are consumed by other activities similarly carried out by other systems and other performers capable of responsibility.

f. SV-2 models may use whole-part relationships to examine the composition of performers; SV-2 models may pay particular attention to system parts that constitute overlaps and to rules that constrain the activities performed by these system parts. A system may be considered as a part of encompassing performers. Similarly, a system may be considered as a whole whose parts comprise resources of all sorts, including information, materiel, performers capable of responsibility, and other systems. The DoDAF does not prescribe nor limit the details or levels of composition that SV-2 models may provide.

g. Systems and the activities they perform shall be modeled. The resources produced and consumed by these activities as performed by these systems shall be modeled. Performers capable of responsibility, including persons in roles and types of organizations, may be modeled. Guidance for activities carried out by systems as performers and conditions that affect the performance of these activities may be modeled. The types of locations of resources may be modeled. The composition of systems as performers may be modeled; thus, resources that include these systems may be modeled, and resources that are included in the composition of systems, such as information, materiel, types of organizations, and persons in roles, may be modeled. Measures of systems, activities, resources, other performers, materiel, types of locations, rules, and conditions may be modeled. Services shall not be modeled by SV-2 models.

h. ***Meta-model***. Figure 3-40 shows the DoDAF meta-model for SV-2 models.

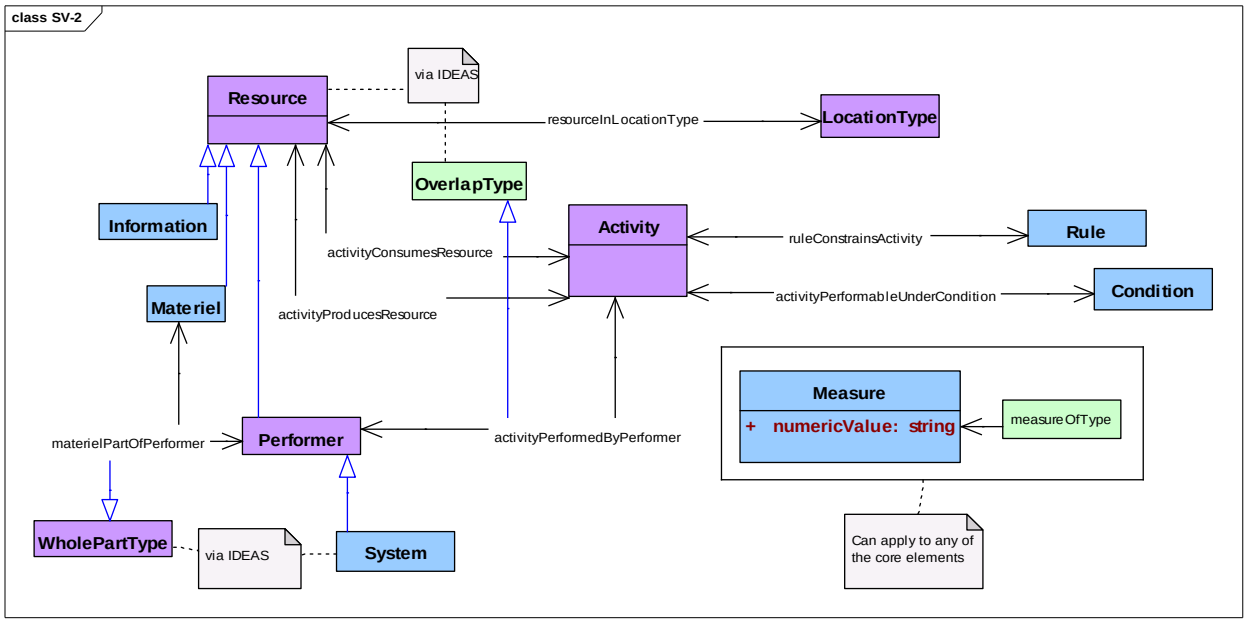


Figure 3-40 DoDAF meta-model diagram for SV-2 models

i. ***Alternative names***: Systems Resource Flow Description; Systems and Services Interface Means, Network Diagram, System Communications Diagram.

j. ***Notes***. In substance, SV-1 models and SV-2 models examine the same subjects: performers and their interfaces. Some organizations may give less emphasis to performer composition and activity guidance in SV-1 models and more emphasis on composition and guidance in SV-2 models. The DoDAF does not prescribe these emphases. Similarly, SV-2 models and SvcV-2 models examine the same topic. Some organizations may emphasize performers as systems in SV-2 models while others may emphasize performers as services in SvcV-2 models. The DoDAF does not prescribe these emphases.

3.9.3 System Relationships (SV-3)

a. ***Description***. This model *identifies* and *describes* ***relationships*** among ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes relationships among systems that are the subject of SV-1 models. The DoDAF does not prescribe system-to-system relationships that must be examined by SV-3 models. However, relationships considered by SV-3 models must be established by other models within the Service Viewpoint; SV-3 models may not themselves introduce system-to-system relationships.

c. Systems shall be modeled. System-to-system relationships shall be modeled. Composition of systems may be modeled and interfaces between systems may be modeled. Activities, rules,

conditions, resources, and types of locations may be modeled. Measures of systems, activities, rules, conditions, resources, and types of location may be modeled. Services shall not be modeled.

d. ***Meta-model***. Figure 3-41 shows the DoDAF meta-model for SV-3 models.

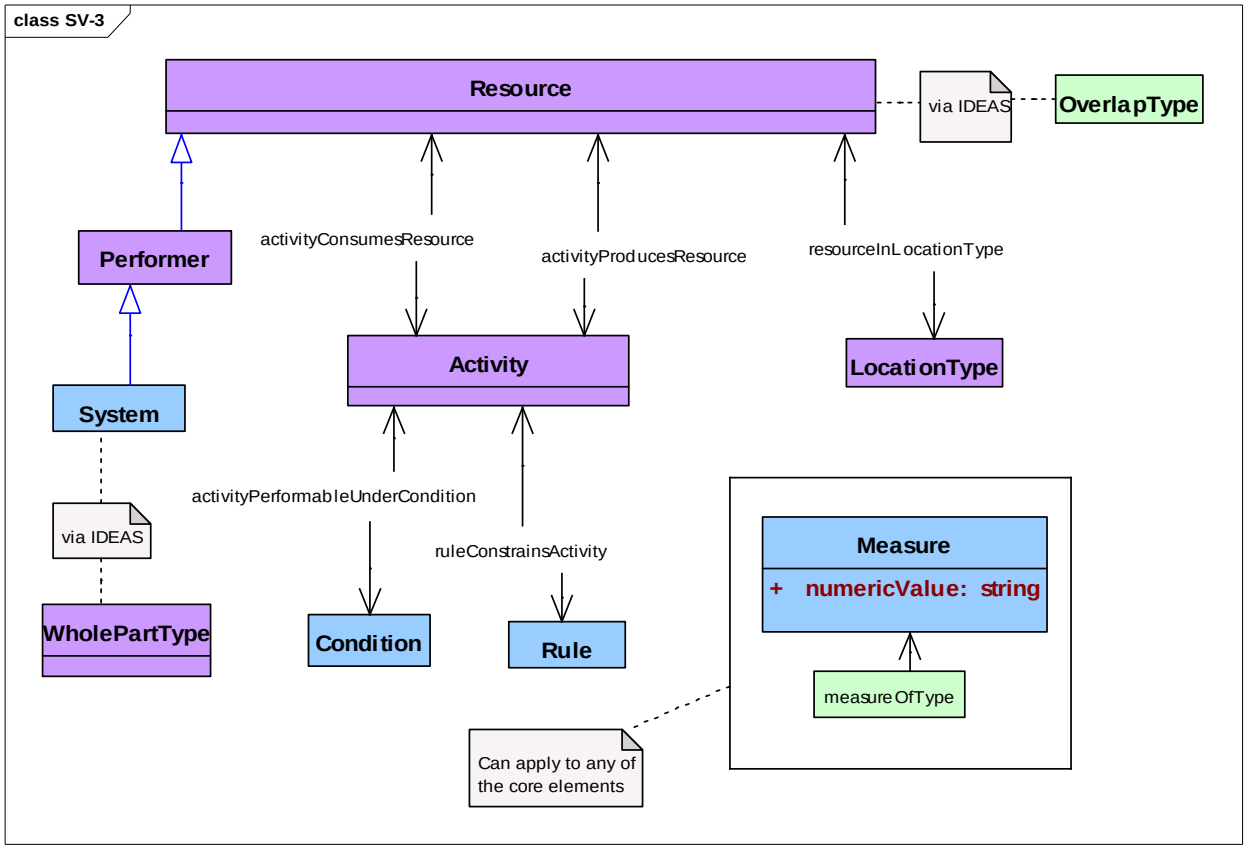


Figure 3-41: DoDAF meta-model diagram for SV-3 models

e. ***Alternative names***: Systems-Systems Matrix.

f. ***Note***. An SV-3 model may be considered simply as a report that presents interesting system-to-system relationships that have been captured as architectural data by other Service Viewpoint models within an architectural description.

3.9.4 System Functions (SV-4)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***activities*** *performed* by ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes the activities carried out by systems as performers within the scope of a described architecture. Any activity comprises other activities. Hierarchical recursive decomposition of activities into activity parts may be modeled using whole-part

relationships between activity wholes and their activity parts. Activities may also be related by their similarities and their differences using super-subtype relationships.

c. Activities are seen in SV-4 models as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in SV-4 models are systems; these systems may have parts that are resources that are capable of responsibility—organizations and persons in roles—as well as materiel, systems, and services. Activities are constrained by guidance, rules, and standards, and activities are carried out under conditions that affect their performance.

d. SV-4 models examine information and data as resources that are consumed and produced by activities performed by systems.

e. An SV-4 model identifies and describes measures that are related to activities; in particular, an SV-4 model may examine measures that relate systems to the performance of activities carried out by those systems. SV-4 models may also identify and describe measures that apply to rules, conditions, resources, performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

f. Systems and other performers that are parts of systems shall be modeled. Activities performed by systems shall be modeled. Resources, especially data and other information consumed and produced by activities performed by systems within an SV-4 model, shall be modeled. Rules, conditions, and types of locations may be modeled. The hierarchical structure of activities and the hierarchical structure of systems may be modeled using whole-part relationships. Activities and systems may be categorized using super-subtype relationships. Types of organizations and specific organizations may be modeled, and persons in roles may also be modeled. Measures related to systems, activities, rules, conditions, resources, constituent performers, and locations may be modeled. Services may not be modeled except as parts of systems.

g. ***Meta-model***. Figure 3-42 shows the DoDAF meta-model for SV-4 models.

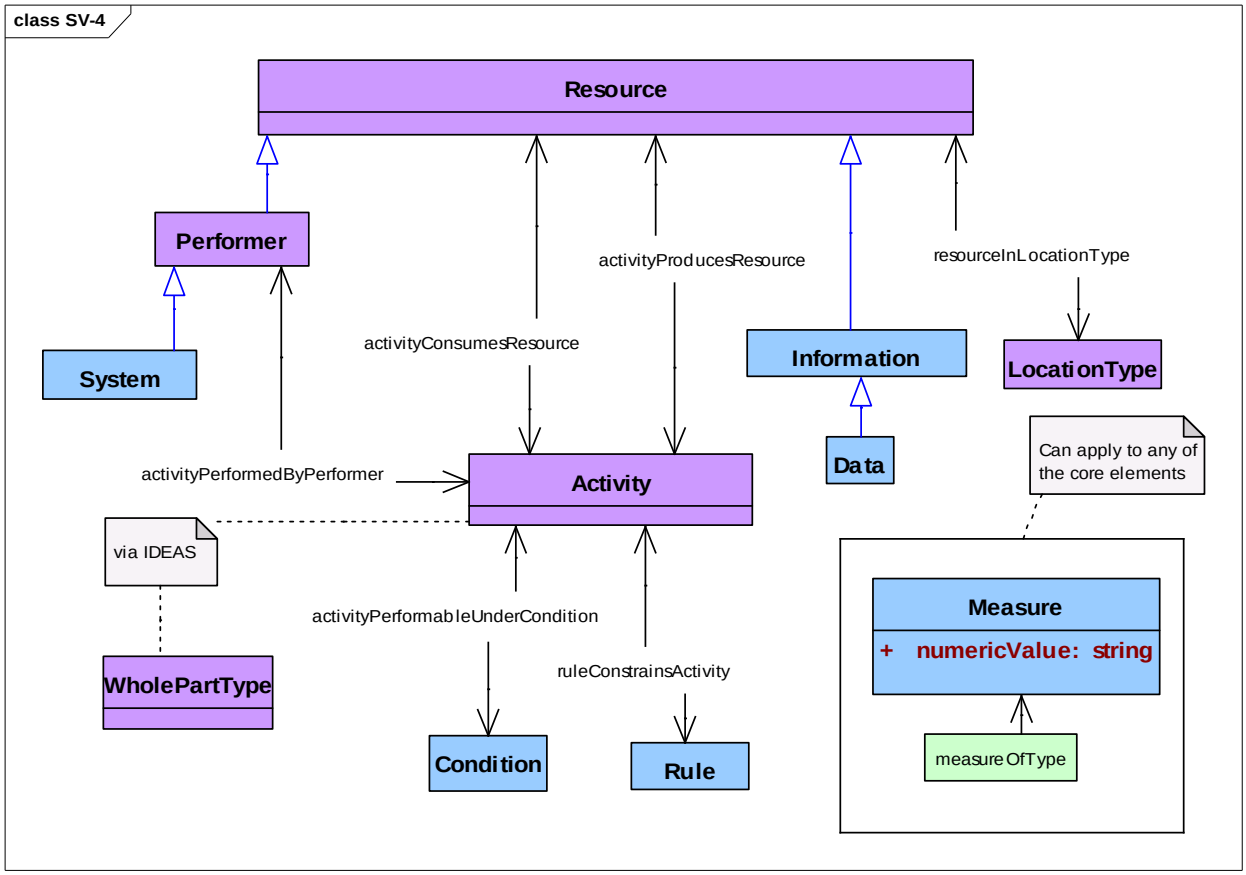


Figure 3-42: DoDAF meta-model diagram for SV-4 models

h. ***Alternative names***: Systems Functionality Description; Systems and Services Functionality Description, Data Flow Diagram, Functional Flow Diagram, Functional Flow and Data Diagram, Data Flow Diagram.

3.9.5 Systems & Operational Activities (SV-5a)

i. ***Description***. This model *identifies* and *describes* ***relationships*** between ***system functions*** and ***operational activities*** within a described ***architecture***.

j. ***Narrative***. This model focuses on relationships between systems identified by SV-1 models and their ***system functions*** and operational activities identified by OV-5b models or, equivalently, between ***system functions*** identified by SV-4 models and operational activities identified by OV-5b models. Systems perform ***system functions*** and system functions ***overlap*** operational activities.

k. Operational activities considered by SV-5a models must be identified by OV-5b models; SV-5a models may not introduce operational activities into an architectural description. System functions considered by SV-5a models must be identified by corresponding SV-4 models; SV-5a

models may not introduce activities performed by systems into an architectural description. Operational activities considered by SV-5a models must overlap system functions identified by corresponding SV-4 models.

l. Systems considered by SV-5a models must be identified by SV-1 models; SV-5a models may not introduce systems into an architectural description. All systems identified by SV-1 models are to be related by SV-5a models to operational activities identified by corresponding OV-5b models. However, the converse does not necessarily hold: there may be activities identified by OV-5b models that have no part that is performed by a system. Further, a system may perform a system function that overlaps with more than one operational activity within a described architecture, and an operational activity may overlap with system functions that are performed by more than one system within a described architecture.

m. Beyond an existence predicate, the DoDAF does not prescribe relationships that must be examined by SV-5a models. However, the existence predicate must be true for all pairs of an operational activity and a system considered by SV-5a models: the system performs a system function that overlaps the operational activity.

n. Systems and activities shall be modeled. Relationships between systems and activities shall be modeled. Composition of systems, composition of activities, and overlap of activities may be modeled. Rules, conditions, resources, and types of locations may be modeled. Measures of systems, activities, rules, conditions, resources, and types of location may be modeled. Services shall not be modeled.

o. ***Meta-model***. Figure 3-43 shows the DoDAF meta-model for SV-5a models.

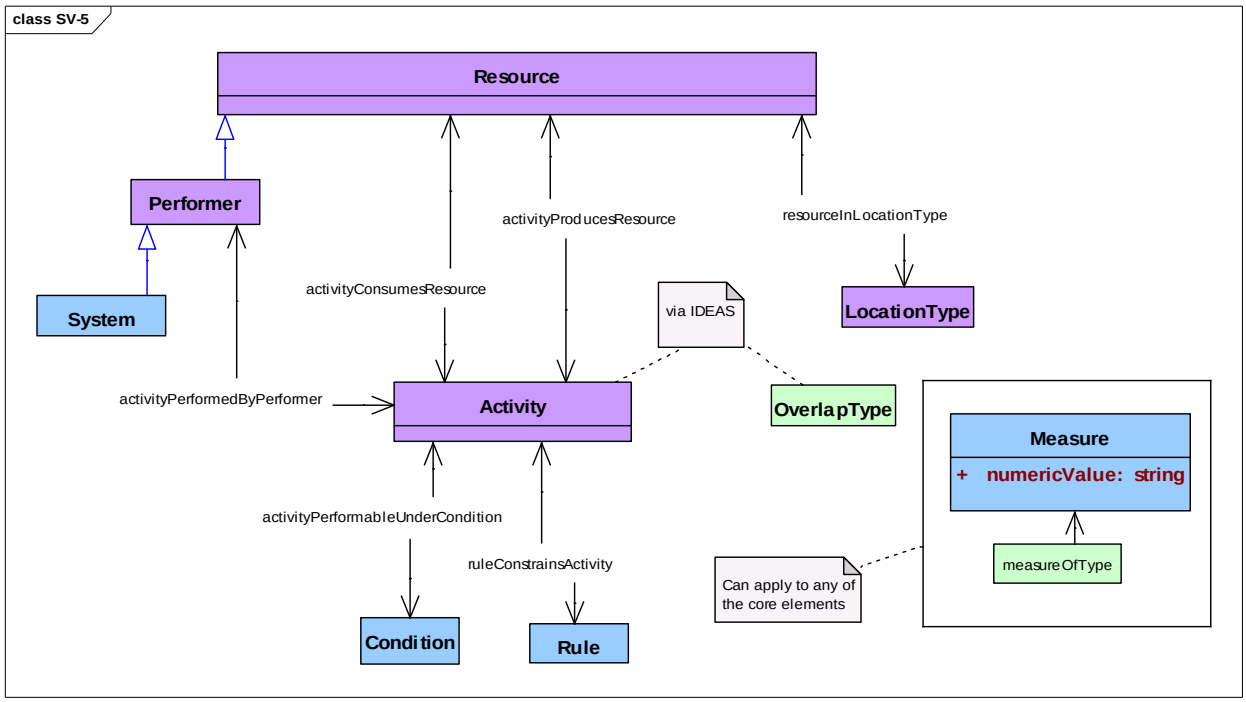


Figure 3-43: DoDAF meta-model diagram for SV-5a models

p. ***Alternative names***: Operational Activity to Systems Function Traceability Matrix; Organizational Activities Supported by System and Service Functions.

3.9.6 Systems & Capabilities (SV-5b)

a. ***Description***. This model *identifies* and *describes* ***relationships*** between ***systems*** and ***capabilities*** within a described ***architecture***.

b. ***Narrative***. This model focuses on relationships between systems identified by SV-1 models and capabilities identified by CV-1 models. Systems perform ***system functions***, system functions ***overlap*** operational activities, and ***operational activities*** produce those ***resources*** that constitute ***desired effects***.

c. Capabilities considered by SV-5b models must be identified by CV-1 models; SV-5b models may not introduce capabilities into an architectural description. The operational activities that produce the resources that constitute the desired effects of these capabilities are identified by CV-6 models.

d. Operational activities considered by SV-5b models must be identified by CV-6 models; SV-5b models may not introduce operational activities into an architectural description. System functions considered by SV-5b models must be identified by corresponding SV-4 models; SV-5b models may not introduce activities performed by systems into an architectural description.

Operational activities considered by SV-5b models must overlap system functions identified by corresponding SV-4 models.

e. Systems considered by SV-5b models must be identified by SV-1 models; SV-5b models may not introduce systems into an architectural description. All systems identified by SV-1 models are to be related by SV-5b models to operational activities identified by corresponding CV-6 models. However, the converse does not necessarily hold: there may be activities identified by CV-6 models that have no part that is performed by a system. Further, a system may perform a system function that overlaps with more than one operational activity within a described architecture, and an operational activity may overlap with system functions that are performed by more than one system within a described architecture.

f. Beyond an existence predicate, the DoDAF does not prescribe relationships that must be examined by SV-5b models. However, the existence predicate must be true for all pairs of a capability and a system considered by SV-5b models: the system identified by a SV-1 model performs a system function that overlaps an operational activity that produces a resource that is a constituent of a desired effect identified by a CV-1 model.

g. Systems and capabilities shall be modeled. Relationships between systems and capabilities shall be modeled. Composition of systems, composition of activities, and overlap of activities may be modeled. Resources that constitute desired effects may be modeled. Rules, conditions, other resources, and types of locations may be modeled. Measures of systems, capabilities, activities, rules, conditions, resources, and types of location may be modeled. Services shall not be modeled.

h. ***Meta-model***. Figure 3-44 shows the DoDAF meta-model for SV-5b models.

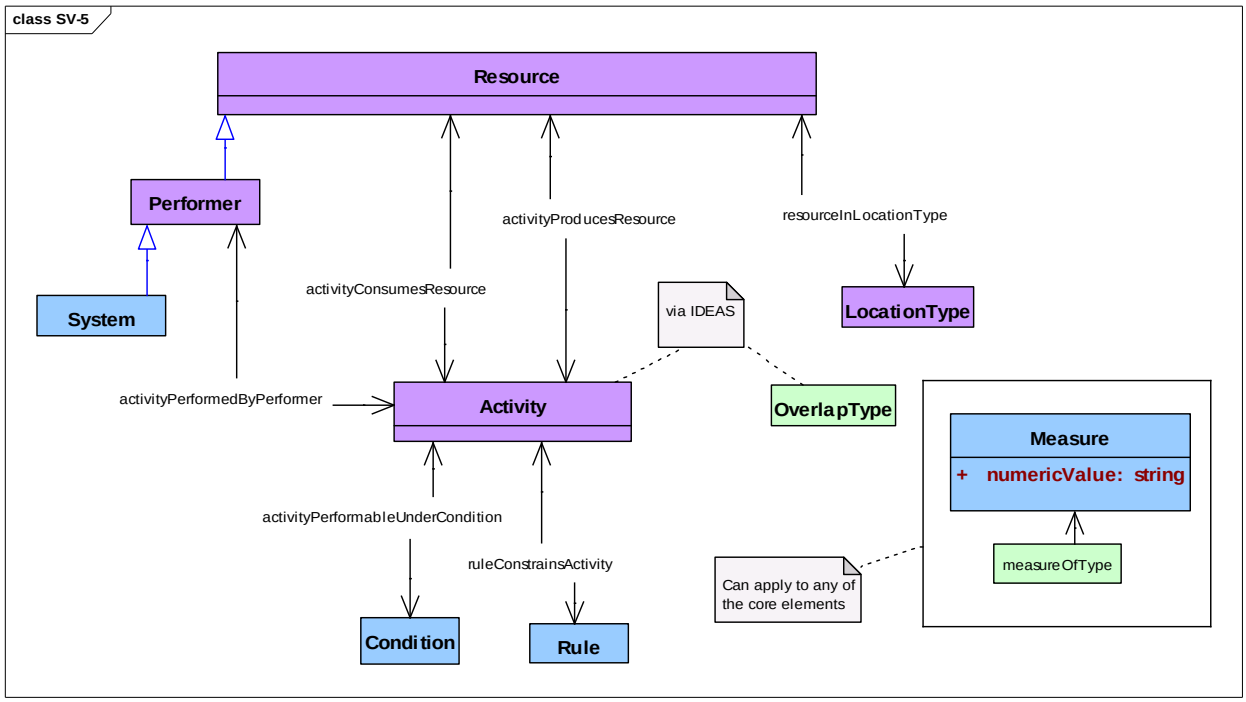


Figure 3-44: DoDAF meta-model diagram for SV-5b models

i. ***Alternative names***: Operational Activity to Systems Traceability Matrix; Organizational Activities Supported by Systems and Services.

j. ***Note***. The activities identified by CV-6 models are a proper subset of the activities identified by OV-5b models.

3.9.7 Systems, Activities, & Resources (SV-6)

a. ***Description***. This model *identifies* and *describes* ***resources*** *consumed* and *produced* by ***activities*** *performed* by ***systems*** within a described ***architecture.***

b. ***Narrative***. This model emphasizes the exchange of resources among systems. These resources include information, materiel, and performers. A dependency between a resource to be consumed by one activity and a resource produced by another activity may be described as a *flow* of resources from producer to consumer. Activities are modeled in SV-6 models only in detail sufficient to show the relationships between resources produced by activities performed by one system and the resources consumed by activities performed by other systems.

c. Activities are seen in SV-6 models much as they are in other DoDAF models. An activity consumes resources to produce resources. Performers in SV-6 models are systems. Systems follow guidance, rules, and standards to carry out their activities, and systems carry out their activities under conditions that affect their performance.

d. Systems and other resources may be related to their locations to ensure that resources to be consumed are available to activities when and where those resources are needed and that systems are there to carry out those activities when those resources are available.

e. In contrast to SV-4 models, SV-6 models identify and describe measures that apply to activities and resources. SV-6 models provide physical and temporal measures that are related to resources. SV-6 models also provide measures of performance and of the satisfaction of needs that are related to activities. Guidance of various sorts may refer to types of applicable measures, and specific measures for specific activities may be drawn from such guidance.

f. Systems, activities, and resources shall be modeled. In particular, resources that are data shall be modeled. Types of organizations shall be modeled; specific organizations may be modeled. Persons in roles may be modeled as parts of systems. Types of locations of resources and systems may be modeled, and specific locations may also be modeled. Rules and conditions may be modeled. Measures related to systems, activities, resources shall be modeled; these measures shall include physical measures, temporal measures, performance measures, and measures of need satisfaction. Measures related to rules, conditions, and locations may be modeled. Services shall not be modeled.

g. ***Meta-model***. Figure 3-45 shows the DoDAF meta-model for SV-6 models.

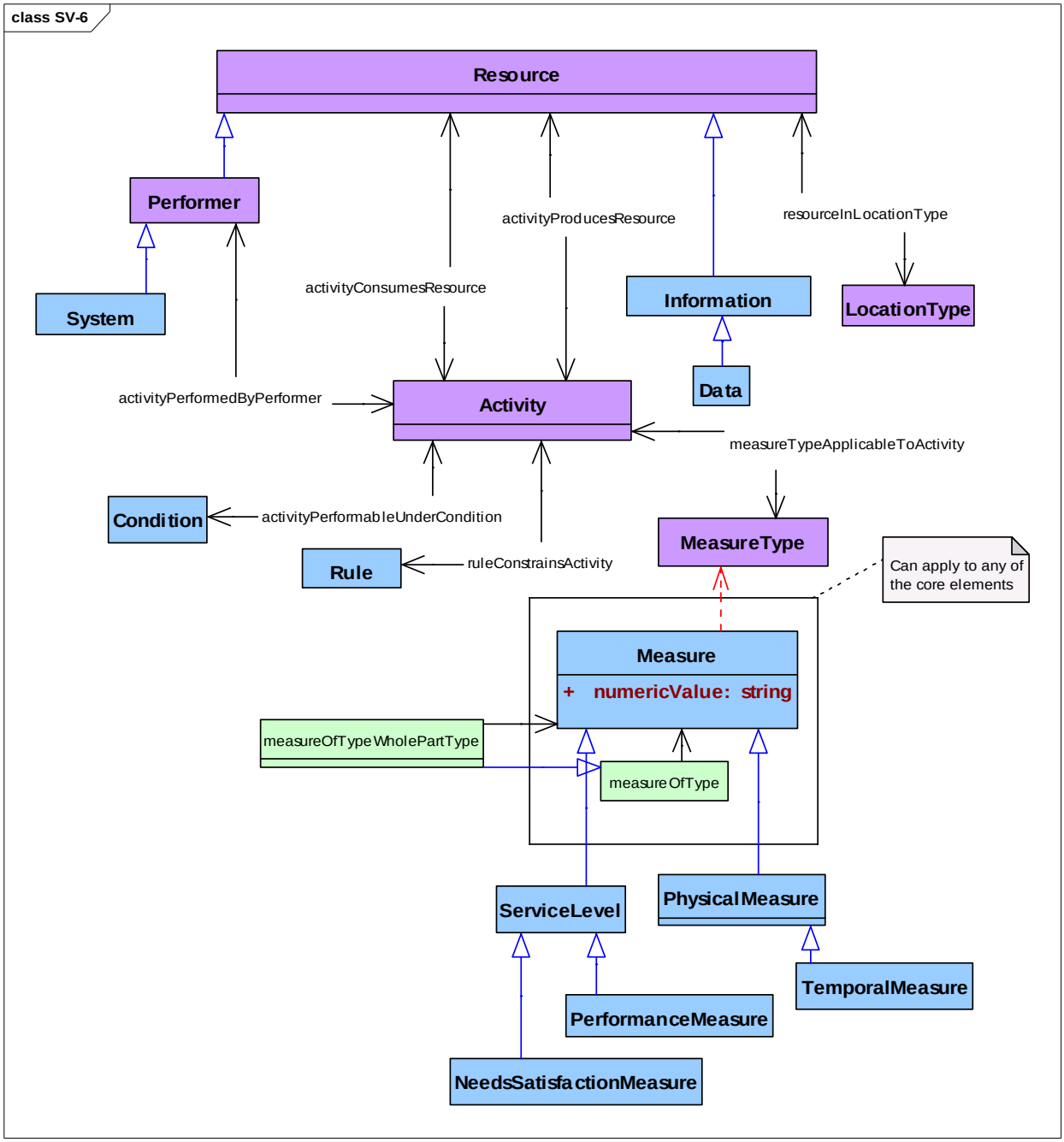


Figure 3-45: DoDAF meta-model diagram for SV-6 models

h. ***Alternative names***: Systems Resource Flow Matrix; Systems and Services Resource Flows.

3.9.8 System Measures (SV-7)

a. ***Description***. This model *identifies* and *describes* ***measures*** for *evaluating* ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes measures and focuses on measures applicable to systems that perform activities. A ***measure*** is the sort of property that characterizes the state of a resource. In particular, SV-7 models examine ***performance measures*** to characterize changes in system states.

c. SV-7 models may examine both static properties of systems and their parts and dynamic properties of systems and their parts. SV-7 models may quantitatively examine the composition of measured resources using whole-part relationships. In particular, SV-7 models may examine the measurable skills of persons in roles in performing systems. SV-7 models may examine a system and its parts as resources—things produced or consumed—and SV-7 models may examine a system and its parts as performers performing an activity that consumes and produces other resources.

d. An SV-7 model may focus on some selected resource whose properties may change in interesting ways. Performers that are systems are resources that frequently exhibit state transitions that are interesting for SV-7 models because systems in different states can perform different activities.

e. Activities are seen in SV-7 models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. In addition, SV-7 models look at sorts of measures that are applicable to activities and specify those sorts of measures that are appropriate for activities within the scope of the described architecture.

f. Systems, persons in roles, activities, skills, performance measures, and types of measures for activities shall be modeled. Other measures of systems, persons in roles, activities, and skills may be modeled. Measures related to activities, rules, performers, conditions, and locations may be modeled. Types of locations of activities, systems, persons in roles, and other resources may be modeled. Performers that are services, organizations, or types of organizations may not be modeled as performers in SV-7 models.

g. ***Meta-model***. Figure 3-46 shows the DoDAF meta-model for SV-7 models.

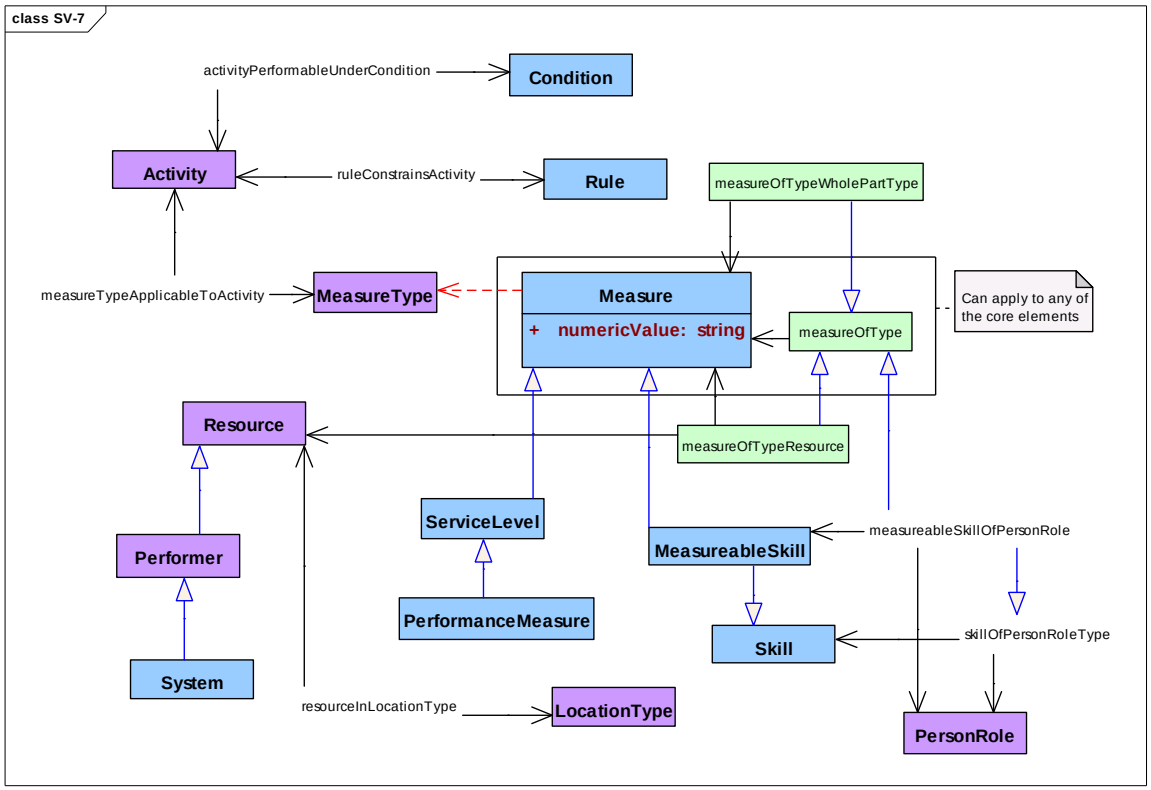


Figure 3-46: DoDAF meta-model diagram for SV-7 models

h. ***Alternative names***: Systems Measures Matrix.

i. ***Note:*** An SvcV-7 model differs from an SV-7 model in these ways: first, services along with their descriptions are modeled by SvcV-7 models while SV-7 models look instead at systems and, second, SvcV-7 models must include maintainability measures within the measures that are modeled while SV-7 models do not have this requirement.

3.9.9 System Evolution (SV-8)

a. ***Description***. This model *identifies* and *describes* the *temporal-states* of ***systems*** within a described ***architecture***.

b. ***Narrative***. The system is a functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements.

c. SV-8 models examine the changing of resources, mapping the temporal state changes to allow comparison and examination of the resource and resource alternatives over time.

d. SV-8 models allow comparison between historical (legacy), current (as-is), and future (to-be) capabilities to permit evaluation of change and the measure of the impact will have on the current system. This comparison is to be in the observation of system over a unit of time that will

allow compare and contrast of other systems during the same period. The model shows the structure of each resource, using similar modeling elements as those used in SV-1.

e. SV-8 models, when linked together with other evolution models, such as CV-2, CV-3, and StdV-2 models, provides a rich definition of how the enterprise and its capabilities are expected to evolve over time.

f. Changes depicted in SV-8 models are derived from schedules shown by PV-2 models.

g. An SV-8 model can describe historical (legacy), current, and future capabilities against a schedule. An SV-8 model shows the structure of each resource, using similar modeling elements as those used in SV-1 models. Interactions that take place within the resource may also be shown.

h. The changes depicted in an SV-8 model are derived from the schedules of PV-2 models.

i. SHALLs & MAYs

j. ***Meta-model***. Figure 3-47 shows the DoDAF meta-model for SV-8 models.

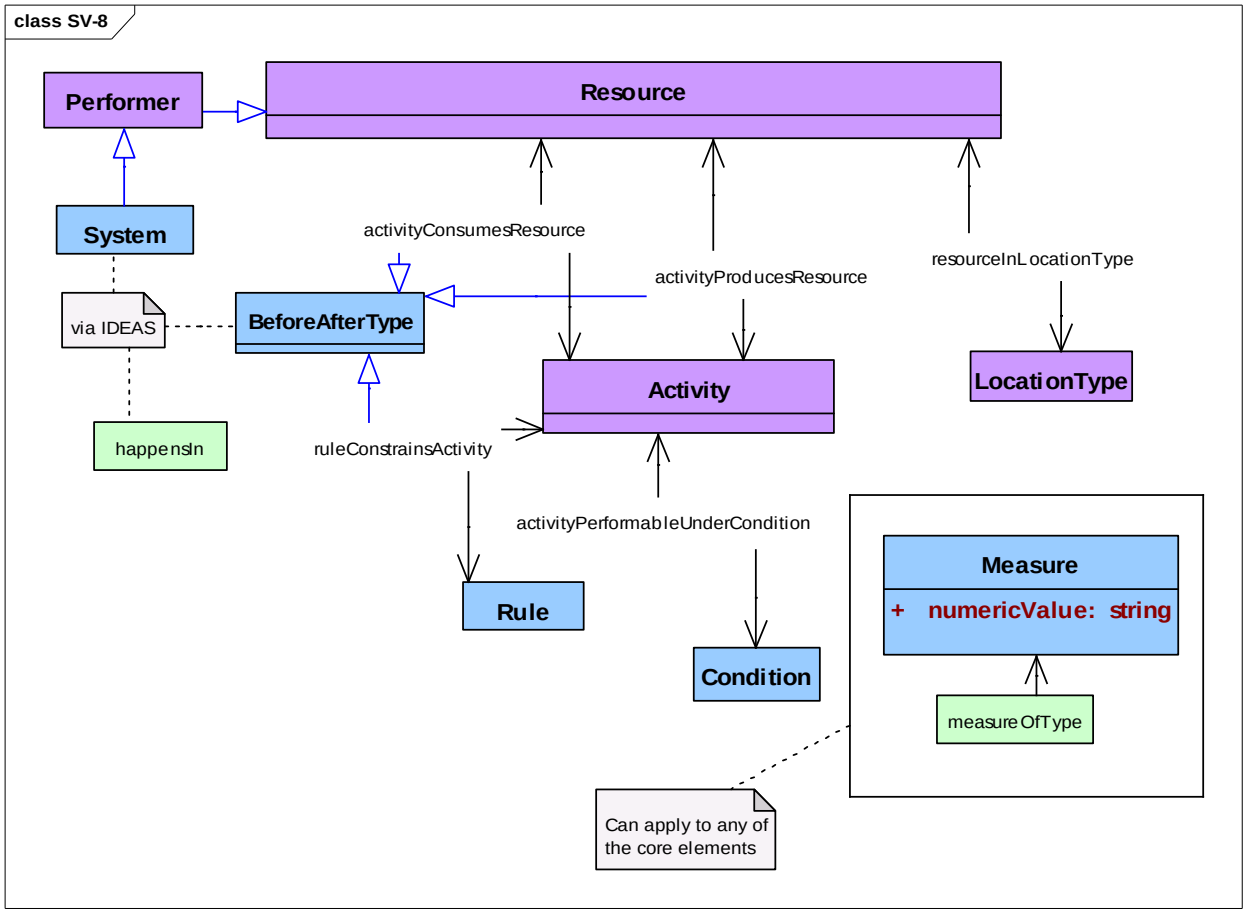


Figure 3-47: DoDAF meta-model diagram for SV-8 models

k. ***Alternative names***: Systems Evolution Description, System of Systems Roadmap, Plan of Action and Milestones (POA&M), Integrated Master Plan (IMP), System Deployment Plan, Services Lifecycle Management Plan, Enterprise Transition Plan.

3.9.10 System Technologies & Skills (SV-9)

a. ***Description***. This model *identifies* and *describes* the *precursors* of *temporal-states* of ***systems*** within a described ***architecture***.

b. ***Narrative***. The system is a functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements. The capabilities accessed are resources, that is, information and data, materiel, performers, and geo-political extents.

c. As in other models within the System Viewpoint, a SV-9 model relates a system description to each system.

d. SV-9 includes the precursors that record the systems that are active in the architecture prior (legacy), currently (as-is), and future (to-be) to allow examination of the compare and contrast between them.

e. SV-9 defines the underlying current and expected supporting resources (technologies and skills) are those that can be reasonably forecast given the current state of technology and skills, and expected improvements or trends. New technologies and skills are tied to specific time periods, which can be correlated against the periods used in SV-8 models and linked to CV-3 models. Additionally, the technologies and skills can also be coordinated with StdV-2 models that examine expected changes in technology the model will allow looking at historical successions of standards as well as anticipated future successions of standards.

f. A SV-9 model summarizes predictions about trends in technology and personnel. Architects may produce separate SV-9 models for technology and human resources. The forecast includes potential impacts on current architectures and thus influences the development of transition and target architectures. The forecast is focused on technology and human resource areas that are related to the purpose of a described architecture and on issues that may affect that architecture.

g. An SV-9 model may focus on a selected period in which the states of resources will change in interesting ways.

h. SHALLs & MAYs

i. ***Meta-model***. Figure 3-48 shows the DoDAF meta-model for SV-9 models.

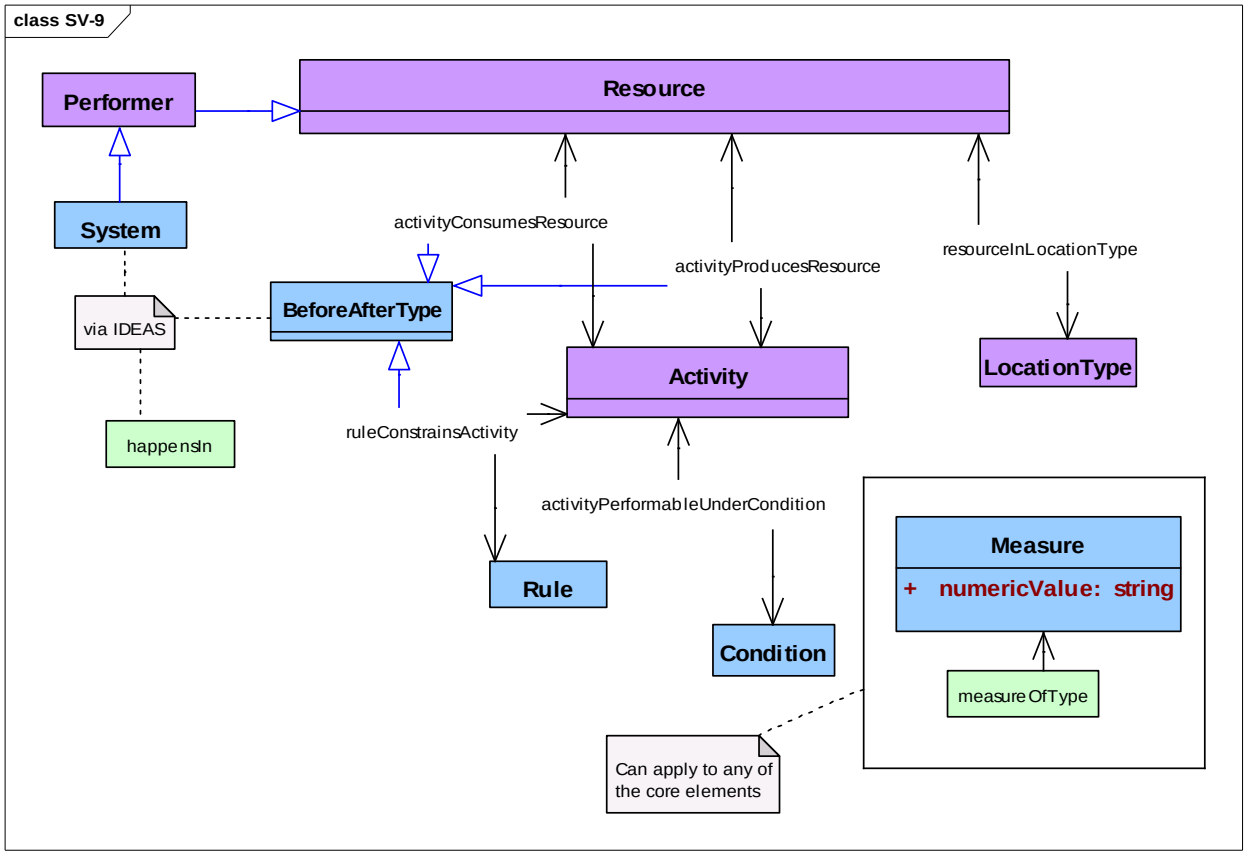


Figure 3-48: DoDAF meta-model diagram for SV-9 models

j. ***Alternative names***.

3.9.11 Introduction to SV-10 models

a. Many of the critical characteristics of an architecture are only discovered when an architecture's dynamic behaviors are defined and described. These dynamic behaviors concern the timing and sequencing of events that capture resource performance characteristics (e.g., a performer executing the system activities described in SV-4 models).

b. Behavioral modeling and documentation are key parts of a successful architectural description because we should understand how a described architecture behaves. Although knowledge of the functions and interfaces is also crucial, knowing whether, for example, a response should be expected after sending message X to system activity Y can be crucial to successful overall operations.

c. The SV-10 models are useful in support of net-centric (service-oriented) implementation of services as orchestrations of services. SV-3 models can provide input for SV-10 models. Three types of models may be used to describe the dynamic behavior and performance of systems. These three models are:

1) System Rules (SV-10a),

2) Systems State Transitions (SV-10b), and

3) System Sequences (SV-10c).

d. SV-10b and SV-10c models may be used separately or together, as necessary, to describe critical timing and sequencing behavior.

e. Both SV-10b and SV-10c models describe functional responses to sequences of events. Events may also be referred to as ***inputs***, *transactions*, or *triggers*. When an event occurs, the action to be taken may be subject to a rule or set of rules as described in SV-10a models.

3.9.12 System Rules (SV-10a)

a. ***Description***. This model *identifies* and *describes* the ***rules*** that *guide* ***activities*** *performed* by ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes (a) rules and other guidance that constrain activities and (b) conditions under which activities are performed. Rules themselves are not four-dimensional; thus, performers require *descriptions* of applicable rules—such descriptions *do* exist in space and time. Such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

c. Conditions exist within the four-dimensional environment of activities but are not necessarily four-dimensional things within that context. Conditions such as adversary morale and unit cohesion may be real but they are not immediately accessible as architectural data; thus, performers, as with rules, require *descriptions* of applicable conditions—such descriptions are accessible in space and time. As with rules, such descriptions are a sort of information, which is a sort of resource that may be consumed and produced by real activities for real performers.

d. Rules and conditions are considered together in SV-10a models because both impose constraints on the performance of activities. In particular, different rules may apply to an activity under different conditions. Rules may be related to measures; for example, rules that are criteria of UJTL task performance standards are to be related to corresponding measures. Similarly, conditions affecting UJTL task performance are to be related to corresponding measures. Measures related to rules and conditions may include physical and temporal measures.

e. Activities are seen in SV-10a models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance.

f. Rules and conditions for activities may depend upon the location of those activities. Resources are related to their locations and the location of these resources determines the location of activities that consume and produce them.

g. In contrast to OV-6a models and SvcV-10a models, systems are to be related to activities that these systems perform following these rules and under these conditions. Performers that are persons in roles may be included in OV-10a models, but neither types of organizations nor specific organizations are to be included. Services are not addressed by SV-10a models.

h. Systems, activities, rules, conditions, measures, and resources shall be modeled. In particular, information resources that describe rules shall be modeled and information resources that describe conditions may be modeled. Rules shall be modeled for each activity identified in the corresponding SV-4 models of an architectural description that a system performs. Performers that are systems shall be modeled. Performers that are persons in roles may be modeled. Performers that are organizations, types of organizations, or services shall not be modeled. Types of locations may be modeled. Measures for rules and conditions may include physical measures and temporal measures. Measures related to activities, performers, and locations may be modeled.

i. ***Meta-model***. Figure 3-49 shows the DoDAF meta-model for SV-10a models.

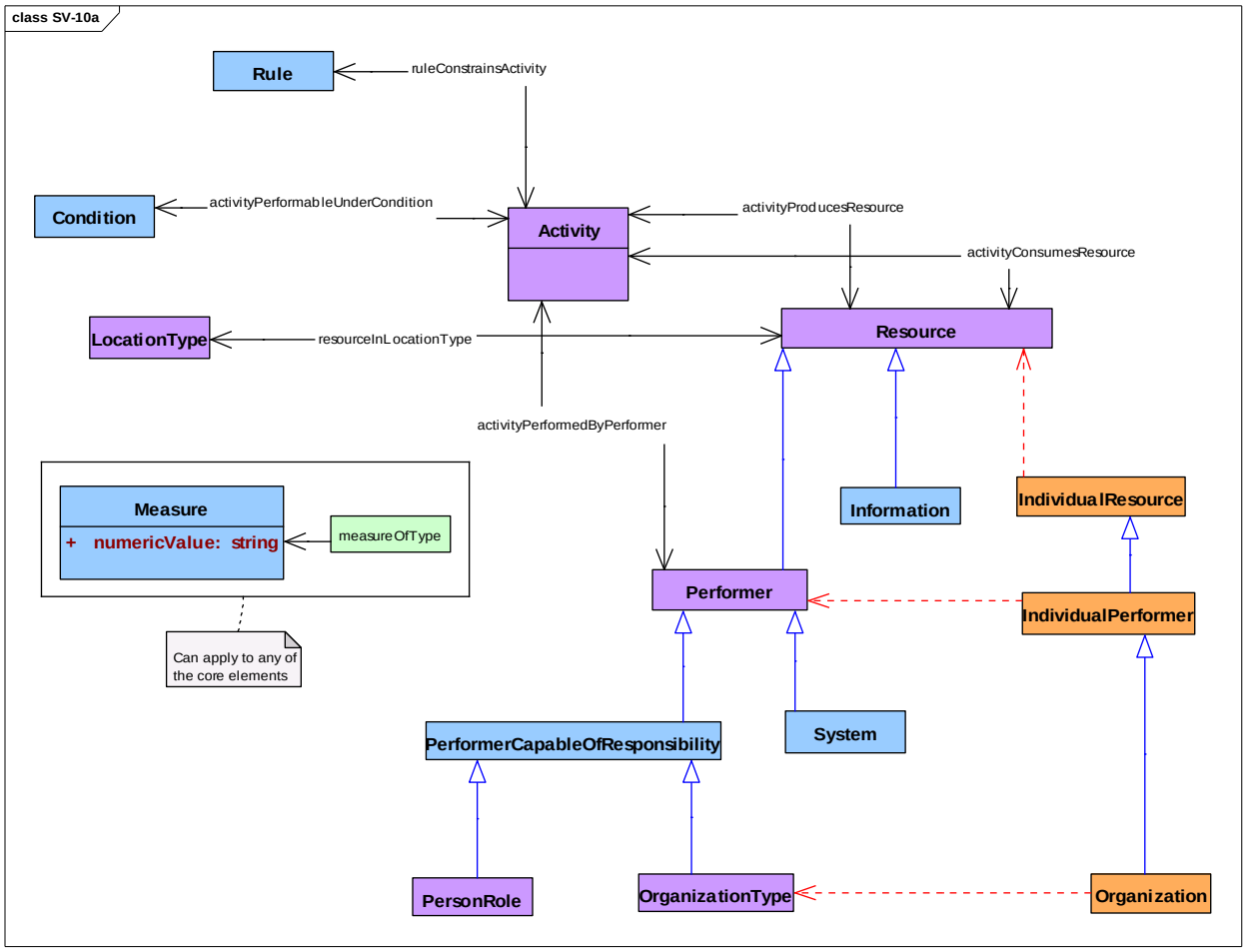


Figure 3-49: DoDAF meta-model diagram for SV-10a models

j. ***Alternative names***: Systems Rules Model; System and Service Rules.

3.9.13 System State Transitions (SV-10b)

a. ***Description***. This model *identifies* and *describes* changes in the *states* of ***resources*** that are *consumed* and *produced* by ***activities*** *performed* by ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes certain interesting ***temporal parts*** of a resource, specifically those temporal parts that are distinguished by the attainable states of the resource. Each interesting temporal part is related to a property that distinguishes these temporal parts from one another across the whole-life of a resource. These properties are related to activities because an activity transforms an earlier temporal part of a resource with certain properties (***input***) into a later temporal part with altered properties (***output***).

c. A resource with states (i.e., temporal parts observed as resources with properties that may change) generally does not play the role of a ***trigger*** for an activity that changes the state of that resource (see note for OV-6b). Therefore, an SV-10b model may want to identify other resources

that *do* play the role of a trigger for activities that change the properties of the resource that is the subject of a model.

d. A ***measure*** is the sort of property that characterizes the state of a resource. In particular, SV-10b models may examine ***physical measures*** and ***temporal measures*** to characterize resource states, and they use ***before-after*** relationships to order the changes in these measures, that is, the state transitions of a resource.

e. An SV-10b model focuses on some selected resource whose properties may change in interesting ways. In contrast, an SV-4 model covers all resources within the scope of a specific SV-4 model. Performers that are systems are resources that frequently exhibit state transitions that are interesting for SV-10b models because systems in different states can perform different activities.

f. Activities are seen in SV-10b models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance. Rules and conditions are seen in SV-10b models as they are in SV-10a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, SV-10b models may look at changes in rules and conditions by examining the state transitions of their descriptions.

g. Systems, activities, and resources shall be modeled. Physical measures and temporal measures may be modeled. Information resources that describe rules shall be modeled and information resources that describe conditions may be modeled. Before-after relationships among activities and between resources in sequential states shall be modeled. Types of locations of activities and resources may be modeled. Systems that are performers whose state transitions are the subject of an SV-10b model shall be modeled. Performers that are persons in roles may be modeled. Performers that are services, organizations, or types of organizations may not be modeled as performers in SV-10b models. Measures related to activities, rules, performers, conditions, and locations may be modeled.

h. ***Meta-model***. Figure 3-50 shows the DoDAF meta-model for SV-10b models.

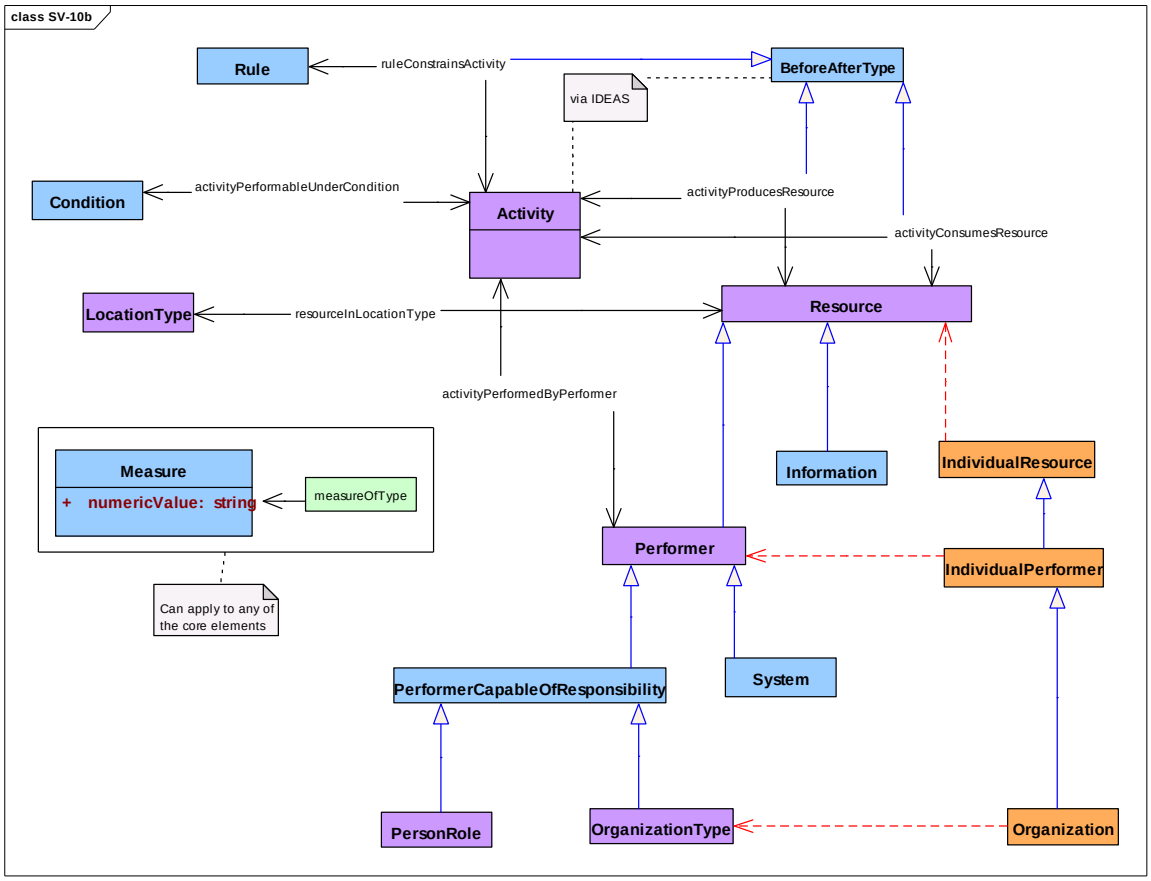


Figure 3-50: DoDAF meta-model diagram for SV-10b models

i. ***Alternative names***: Systems State Transition Description; System and Service State Transition.

3.9.14 System Activity Sequences (SV-10c)

a. ***Description***. This model *identifies* and *describes sequences* of ***activities*** *performed* by ***systems*** within a described ***architecture***.

b. ***Narrative***. This model emphasizes some interesting sequence of activities taken from the set of all activities within an architectural description. The DoDAF meta-model does not prescribe what ought to be interesting. SV-10c models specify sequence using ***before-after*** relationships. Thus, SV-10c models are concerned with ***temporal measures*** related to the succession of activities and with ***physical measures*** related to changes in the states of resources. The focus of SV-10c models is on activities performed by systems.

c. Activities are seen in SV-10c models as they are in other DoDAF models. An activity consumes resources to produce resources. An activity is constrained by guidance, rules, and standards, and performers carry out an activity under conditions that affect its performance.

Performers in SV-10c models are systems and persons in roles. Rules and conditions are seen in SV-10c models as they are in SV-10a models. Descriptions of rules and conditions are sorts of information, and information is a sort of resource that may be consumed and produced by real activities for real performers. Thus, SV-10c models may examine the production of rules descriptions and condition descriptions.

d. An SV-10c model identifies and describes measures that are related to systems and activities. SV-10c models may also identify and describe measures that apply to rules, conditions, resources, other performers, and locations. Guidance of various sorts may refer to measures applicable to activities, and specific measures for activities may be drawn from such guidance.

e. Systems, activities, resources, and performers shall be modeled. Rules, conditions, and types of locations may be modeled. The sequential structure of activities shall be modeled using before-after relationships. Services, types of organizations, and specific organizations shall not be modeled, but persons in roles may be modeled. Measures related to systems, activities, rules, conditions, resources, other performers, and locations may be modeled. Performers that are services or types of organizations shall not be modeled; specific organization shall not be modeled.

f. ***Meta-model***. Figure 3-51 shows the DoDAF meta-model for SV-10c models.

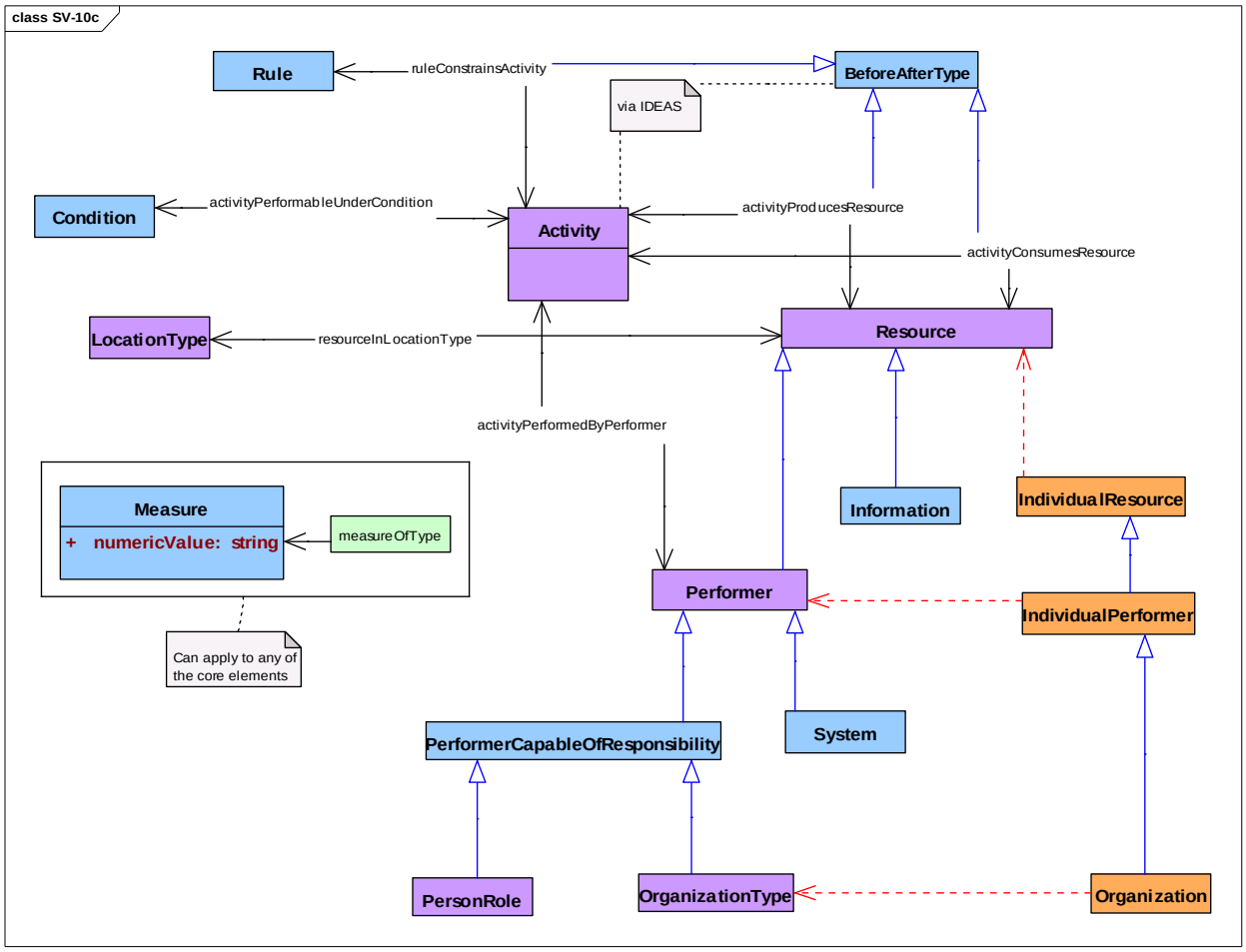


Figure 3-51: DoDAF meta-model diagram for SV-10c models

g. ***Alternative names***: Systems Event-Trace Description; Systems and Services Event-Trace, Operational Sequence Diagram.

APPENDIX A ACRONYMS & ABBREVIATIONS

Acronym	Definition
AV	All Viewpoint
BEA	Business Enterprise Architecture
BMA	Business Mission Area
BPMN	Business Process Modeling Notation
C2	Command and Control
CA	Common Approach
CDM	Conceptual Data Model
CI	Configuration Item
CM	Configuration Management
COI	Community of Interest
COMMPLAN	Communications Plan
CDD	Capability Development Document
CPD	Capability Production Document
CPM	Capability Portfolio Management
CV	Capability Viewpoint
DAS	Defense Acquisition System
DDMS	Department of Defense Discovery Metadata Specification
DISR	DoD Information Standards Registry
DIV	Data and Information Viewpoint
DM2	DoDAF meta-model
DNDAF	Department of National Defense Architecture Framework
DOTMLPF	Doctrine, Organization, Training, Material, Leadership and education, Personnel, and Facilities
E-R	Entity-Relationship
EA	Enterprise Architecture
EEI	Essential Element of Information

Acronym	Definition
FEA	Federal Enterprise Architecture
FFP	Fit For Purpose
FOC	Full Operational Capability
IC	Intelligence Community
IC-ISM	Intelligence Community – Intelligence Standard Markings
ICD	Initial Capabilities Document
IDEAS	International Defence Enterprise Architecture Specification
IEA	Information Environment Architecture
IER	Information Exchange Requirement
IMA	Information Mission Area
IPB	Intelligence Preparation of the Battlefield
IPOE	Intelligence Preparation of the Operational Environment
IOC	Initial Operational Capability
ISO	International Standards Organization
ISP	Interoperability Support Plan
ISR	Intelligence, Surveillance and Reconnaissance
IT	Information Technology
JCA	Joint Capability Areas
JCIDS	Joint Capabilities Integration and Development System
LDM	Logical Data Model
OMB	office of Management and Budget
OPLAN	Operation Plan
OV	Operational Viewpoint
MODAF	Ministry of Defence Architecture Framework
MOE	Measure of Effectiveness
MOP	Measure of Performance
NIEM	National Information Exchange Model

Acronym	Definition
NSS	National Security System
PE	Program Element
PES	Physical Exchange Specification
PIR	Priority Intelligence Requirement
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting, and Execution
PV	Project Viewpoint
QoS	Quality of Service
RA	Reference Architecture
RDBMS	Relational Database Management System
SA	Solution Architecture
SCI	Software Configuration Item
SE	Systems Engineering
SETR	System Engineering Technical Review
SOA	Service Oriented Architecture
SoS	System of Systems
SoSE	System of Systems Engineering
SV	Systems Viewpoint
SvcV	Services Viewpoint
StdV	Standards Viewpoint
TADIL	Tactical Data and Information Link
TEMP	Test and Evaluation Master Plan
TOGAF	The Open Group Architecture Framework
TTP	Tactics, Techniques, and Procedures
UJTL	Universal Joint Task List
UML	Unified Modeling Language
URL	Universal Resource Locator

Acronym	Definition
WBS	Work Breakdown Structure
WMA	Warfighting Mission Area
XML	Extensible Markup Language
XSD	XML Schema Definition

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APPENDIX B GLOSSARY.

The DoDAF glossary consists of DoDAF Meta Model (DM2) terms and their aliases:

a. Section B.1 provides the DoDAF definition, a list of alias terms, and the source definitions related to and used to derive the DoDAF definition.

b. Section B.2 provides a list of all aliases used in DoDAF along with their relationship to DM2 terms and their source definitions.

c. Section B.3 provides definitions of DoDAF relationships between terms along with any aliases and source definitions.

B.1 DM2 Terms.

Activity -- Work, not specific to a single organization, weapon system or individual that transforms inputs (Resources) into outputs (Resources) or changes their state.

Aliases -- Action, Process Operational Activity, Processes, Function, System Function, Operation, Task, Plan, Project.

Source Definitions -- (DoDAF): An action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the OV-5). It is used to portray operational actions not hardware/software system functions. (DoDAF/CADM): (ProcessActivity, catCode=5) The representation of a means by which a process acts on some input to produce a specific output. (DDDS Counter (4204/3)(A)) (MODAF): An action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy). It is used to portray operational actions not hardware/software system functions. Operational Activity may include either military operations or business processes. (NAF): A logical process, specified independently of how the process is carried out. Note: an <Operational Activity>> may only be carried out by a logical <<Node>>. (MM) (JCS 1-02): Activity: 1. A unit, organization, or installation performing a function or mission, e.g., reception center, redistribution center, naval station, naval shipyard. 2. A function, mission, action, or collection of actions. Also called ACT. See also establishment. (Zachman): Activity: A general term to describe something that is done. It is used when a more specific definition is not available. An ACTIVITY must be either a FUNCTION or a PROCESS. (American Heritage Dictionary): Activity: 1. The state or quality of being active. 2. A specific deed, action, function, or sphere of action. 3. Any specific behavior. 4. The state of being active. (Webster's): Activity: 1. A specific function being performed by an organizational unit or system. 2. A pursuit in which a person or system is active.

Adaptability Measure -- A measure of the ease with which Performers satisfy differing Constraints and Capability and Service needs.

Source Definitions -- (SEI): the ease with which software satisfies differing system constraints and user needs [Evans 87].

Address -- The name of a location along with the location-finding scheme that allows a location to be found from the name.

Source Definitions -- (Dictionary.com): The place or the name of the place where a person, organization, or the like is located or may be reached: What is your address when you're in Des Moines? (WordNet): 1. (computer science) the code that identifies where a piece of information is stored 2. the place where a person or organization can be found or communicated with.

Agreement -- A consent among parties regarding the terms and conditions of activities that said parties participate in.

Source Definitions -- (DoDAF/CADM): An arrangement between parties. (DDDS Counter (332/1)(A)) (Webster's): 1. Harmony of opinion; accord. 2. An arrangement between parties regarding a course of action; a covenant.

Architectural Description -- Information describing an architecture such as an OV-5 Activity Model document.

Source Definitions -- (DoDAF-DoDAF WG): Information describing an architecture such as an OV-5 Activity Model document.

Business Service -- The class representing a Business Service and subtype of Service and Activity.

Source Definitions -- (DoDAF-DoDAF WG): The class representing a Business Service and subtype of Service and Activity.

Business Service Standard -- The class representing a Business Service Standard and subtype of Standard.

Source Definitions -- (DoDAF-DoDAF WG): The class representing a Business Service Standard and subtype of Standard.

Capability -- The ability to achieve a Desired Effect under specified [performance] standards and conditions through combinations of ways and means [rules, activities, and resources] to perform a set of activities.

Source Definitions -- (JCIDS): The ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. (DoDAF/CADM): An ability to achieve an objective. (DDDS Counter (333/1)(A)) (JC3IEDM): The potential ability to do work, perform a function or mission, achieve an objective, or provide a service. (MODAF): Capabilities in the MODAF sense are specifically not about equipment but are a high level specification of the enterprise's ability. A capability is a classification of some ability – and can be specified regardless of whether the enterprise is currently able to achieve it. For example, one could define a capability Manned Interplanetary Travel which no-one can currently achieve, but which may be planned or aspired to. Capabilities in MODAF are not time-dependent – once defined they are persistent. It is only the Capability Requirement that changes. (NAF): The ability of one or more resources to deliver a specified type of effect or a specified course of action. (GEN TERM) (NAF): A high level specification of the enterprise's ability. (MM) (JP 1-02): The ability to execute a specified course of action. (A capability may or may not be accompanied by an intention.) (Webster's): 1. The quality of being capable; ability. 2. A talent or ability that has potential for development or use. 3. The capacity to be used, treated, or developed for a specific purpose. (Merriam-Webster's Eleventh Collegiate Dictionary): A feature or factor capable of development: POTENTIALITY. 3. The facility or potential for an indicated use or deployment. (Dictionary.com): The quality of being capable; capacity; ability: His capability was unquestionable. The ability to undergo or be affected by a given treatment or action: the capability of glass in resisting heat. Usually, capabilities. qualities,

abilities, features, etc., that can be used or developed; potential: Though dilapidated, the house has great capabilities (Wiktionary): The power or ability to generate an outcome (www.staffordshireprepared.gov.uk/glossary/): Originally a military term which includes the aspects of personnel, equipment, training, planning and operational doctrine. Now used to mean a demonstrable capacity or ability to respond to and recover from a particular threat or hazard. (SoAML UPMS, beta 2): A Capability is the ability to act and produce an outcome that achieves a result. It can. Specify a general capability of a participant as well as the specific ability to provide a service.

Capability Type -- Category or type of capability.

Source Definitions -- (DoDAF WG): Category or type of capability.

Circular Area -- The space enclosed by a circle.

Source Definitions -- (IDEAS): The space enclosed by a circle.

Circular Area Type -- Power type of Circular Area.

Source Definitions -- (DoDAF WG): Power type of Circular Area.

Condition -- The state of an environment or situation in which a Performer performs or is disposed to perform.

Source Definitions -- (The American Heritage Dictionary): the particular mode or being of a person or thing (Dictionary.com): a circumstance indispensable to some result; prerequisite; that on which something else is contingent (UJTL) Those variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance. Some conditions are designed to help describe the theater of operations (e.g., host-nation support); others describe the immediate joint operations area (e.g., maritime superiority), while still others describe the battlefield conditions (e.g., littoral composition). Not to be confused with condition as it applies to triggers, e.g., in state transition models (WordNet) A state at a particular time.

Country -- A political state or nation or its territory.

Source Definitions -- (IDEAS): A political state or nation or its territory.

Country Type -- Power type of Country.

Source Definitions -- (DoDAF WG): Power type of Country.

Data -- Representation of information in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means.

Source Definitions -- (NAF): A reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing. Note: Data can be processed by humans or by automatic means (GEN TERM) (JCS 1-02 / NECC): Representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. Any representations such as characters or analog quantities to which meaning is or might be

assigned. (Zachman): The column in the Architecture Framework that is concerned with what things are significant enough to an enterprise that they require holding information about them. (American Heritage Dictionary.): Factual information, especially information organized for analysis or used to reason or make decisions. (Webster's): Factual information (as measurements or statistics) used as a basis for reasoning, discussion, or calculation (DoD Net-Centric Data Strategy, App. A (Terminology), May 2003): Data asset refers to any entity that is composed of data. For example, a database is a data asset that comprises data records. In this document, data asset means system or application output files, databases, documents, or web pages. Data asset also includes services that may be provided to access data from an application. For example, a service that returns individual records from a database would be a data asset. Similarly, a website that returns data in response to specific queries (e.g., weather.com) would be a data asset. The core of the net-centric environment is the data that enables effective decisions. In this context, data implies all data assets such as system files, databases, documents, official electronic records, images, audio files, web sites, and data access services.

Description of Desired Resource State -- The description of the desired Resource State.

Source Definitions -- (DoDAF WG): The description of the desired Resource State.

Description of Rule -- The description of the Rule.

Source Definitions -- (DoDAF WG): The description of the Rule.

Description Scheme -- A Representation Scheme and Description Type whose members are intentionally descriptions.

Source Definitions -- (DoDAF WG): A Representation Scheme and Description Type whose members are intentionally descriptions.

Domain Information -- Types of information within the scope or domain of the architecture.

Source Definitions -- (DoDAF WG): Types of information within the scope or domain of the architecture.

Duration -- A Period Type that is an arbitrary period of time Examples: 20 Minutes - the set of all 20 minute periods 3.345 Nanoseconds- the set of all 3.345 Nanosecond periods 7000 Years- the set of all 7000 Year periods.

Source Definitions -- (IDEAS:) A Period Type that is an arbitrary period of time Examples: 20 Minutes - the set of all 20 minute periods 3.345 Nanoseconds- the set of all 3.345 Nanosecond periods 7000 Years- the set of all 7000 Year periods.

Elliptical Area -- The space enclosed by an ellipse.

Source Definitions -- (Answers.com): The space enclosed by an ellipse.

Elliptical Area Type -- Power type of Elliptical Area.

Source Definitions -- (DoDAF WG): Power type of Elliptical Area.

Enabling Service -- The class that represents an Enabling Service and a subtype of System.

Source Definitions -- (DoDAF WG): The class that represents an Enabling Service and a subtype of System.

Enabling Service Activity -- The class representing an Enabling Service Activity that is a subtype of Activity.

Source Definitions -- (DoDAF WG): The class representing an Enabling Service Activity that is a subtype of Activity.

Enabling Service Standard -- The class representing and Enabling Service Standard and subtype of Standard.

Source Definitions -- (DoDAF WG): The class representing and Enabling Service Standard and subtype of Standard.

Facility -- A real property entity consisting of underlying land and one or more of the following: a building, a structure (including linear structures), a utility system, or pavement.

Source Definitions -- (DoDAF/CADM): Real property, having a specified use, that is built or maintained by people. (DDDS Counter (334/1)(A)). (JC3IEDM): An Object Item that is built installed or established to serve some particular purpose and is identified by the service it provides rather than by its content. (NAF): Physical Asset: A <<Resource>> that can host systems and/or people. Note 1: synonyms for <<Physical Asset>>; would be platform, facility, or host. This is the original intent for the Systems Node concept in DoDAF. (MM) (JP 1-02): A real property entity consisting of one or more of the following: a building, a structure, a utility system, pavement, and underlying land. See also air facility. (Webster's): 1. Something designed, built, installed, etc., to serve a specific function affording a convenience or service. 2. Something that permits the easier performance of an action, course of conduct, etc. (DoDI 4165.14): A building, structure, or linear structure out to an imaginary line surrounding a facility at a distance of five feet from the foundation that, barring specific direction to the contrary such as a utility privatization agreement, denotes what is included in the basic record for the facility (e.g., landscaping, sidewalks, utility connections). This imaginary line is what is commonly referred to as the five-foot line.

Facility Type -- Power type of Facility.

Source Definitions -- (DoDAF WG): Power type of Facility.

Functional Standard -- Functional standards set forth rules, conditions, guidelines, and characteristics.

Source Definitions -- (ISE FS 200, adapted from): Functional standards set forth rules, conditions, guidelines, and characteristics.

Geofeature -- An object that encompasses meteorological, geographic, and control features mission significance**.**

Source Definitions -- (DoDAF/CADM): A set of characteristics, structures or other entities that are of military significance. (DDDS Counter (4134/2)(A)). (JC3IEDM): An OBJECT-

ITEM that encompasses meteorological, geographic, and control features of military significance. (Webster's): 1. A prominent or conspicuous part or characteristic. 2. Outward appearance; form or shape.

Geofeature Type -- Power type of Geofeature.

Source Definitions -- (DoDAF WG): Power type of Geofeature.

Geopolitical Extent -- A geospatial extent whose boundaries are by declaration or agreement by political parties.

Source Definitions -- (IDEAS): A geospatial extent whose boundaries are by declaration or agreement by political parties.

Geopolitical Extent Type -- Power type of Geopolitical Extent.

Source Definitions -- (DoDAF WG): Power type of Geopolitical Extent.

GeoStationary Point -- Unidimensional Individual (dimensionless in space, existant over all time).

Source Definitions -- (IDEAS): Unidimensional Individual (dimensionless in space, existant over all time).

GeoStationary Point Type -- Power type of Geostationary Point.

Source Definitions -- (DoDAF WG): Power type of Geostationary Point.

Guidance -- An authoritative statement intended to lead or steer the execution of actions.

Source Definitions -- (DoDAF/CADM): A statement of direction received from a higher echelon. (DDDS Counter (336/4)(A)) (Zachman): A kind of DIRECTION from a DIRECTIVE describing an overall supervision of a BUSINESS PROCESS. (Webster's): The act or function of guiding; leadership; direction. Synonyms: management, conduct, supervision, control, government.

Individual Activity -- Activities that are Individuals, i.e., that occur in space and time.

Source Definitions -- (DoDAF WG): Activities that are Individuals, i.e., that occur in space and time.

Individual Performer -- A specific thing that can perform an action.

Source Definitions -- (DoDAF WG): A specific thing that can perform an action.

Individual Performer Capable of Responsibility -- An individual performer answerable or accountable for the action it performs.

Source Definitions -- (DoDAF WG): An individual performer answerable or accountable for the action it performs.

Individual Person Role -- Person roles defined by the role or roles they share that are relevant to an architecture. Includes assigned materiel.

Source Definitions -- (DoDAF WG): An individual person.

Individual Resource -- Any specific physical or virtual entity of limited availability.

Source Definitions -- (DoDAF WG): Any specific physical or virtual entity of limited availability.

Information -- Information is the state of a something of interest that is materialized -- in any medium or form -- and communicated or received.

Source Definitions -- (DoDAF/CADM): Information Element: A formalized representation of data subject to a functional process.(DDDS Counter (4199/2)(A)) (NAF): The knowledge concerning objects, such as facts, events, things, processes or ideas including concepts that within a certain context have a particular meaning. (GEN TERM) (JP 1-02): 1. Facts, data, or instructions in any medium or form. 2. The meaning that a human assigns to data by means of the known conventions used in their representation. (JP 3-13.1) (IDEAS): For Individuals, an instance of a piece of information - e.g. an utterance, and electronic message, a particular instance of a written document, or a particular instance of an electronic file. (American Heritage Dictionary.): 1. Knowledge communicated or received concerning a particular fact or circumstance. 2. Factual data. (Webster's): 1. The communication or reception of knowledge or intelligence. 2. Knowledge obtained from investigation, study, or instruction. (Wikipedia): Information is the state of a system of interest. Message is the information materialized. Even though information and data are often used interchangeably, they are actually very different. Data is a set of unrelated information, and as such is of no use until it is properly evaluated. Upon evaluation, once there is some significant relation between data, and they show some relevance, then they are converted into information. Now this same data can be used for different purposes. Thus, till the data convey some information, they are not useful. Gregory Bateson: Information is a difference that makes a difference.

Installation -- A base, camp, post, station, yard, center, or other activity, including leased facilities, without regard to the duration of operational control. An installation may include one or more sites.

Source Definitions -- (DODI 4165.14): A base, camp, post, station, yard, center, or other activity, including leased facilities, under the jurisdiction, custody, or control of the Secretary of Defense or the Secretary of a Military Department or, in the case of an activity in a foreign country, under the operational control of the Secretary of Defense or the Secretary of a Military Department, without regard to the duration of operational control. An installation may include one or more sites.

Installation Type -- Power type of Installation.

Source Definitions -- (DoDAF WG): Power type of Installation.

Instant -- A Period or Instant whose temporal extent tends towards zero.

Source Definitions -- (IDEAS): A Period or Instant whose temporal extent tends towards zero.

Line -- A geometric figure formed by a point moving along a fixed direction and the reverse direction.

Source Definitions -- (IDEAS): A geometric figure formed by a point moving along a fixed direction and the reverse direction.

Line Type -- Power type of Line.

Source Definitions -- (DoDAF WG): Power type of Line.

Location -- A point or extent in space that may be referred to physically or logically.

Source Definitions -- (JC3IEDM) A specification of position and geometry with respect to a specified horizontal frame of reference and a vertical distance measured from a specified datum. (UCORE) A position on the earth's surface or in geographic space definable by coordinates or some other referencing system, such as a street address or space indexing system. (WordNet) A point or extent in space.

Location Type -- The power type of Location.

Source Definitions -- (DoDAF WG): The power type of Location.

Maintainability Measure -- A category of measures of the amount of time a Performer is able to conduct Activities over some time interval.

Source Definitions -- (Answers.com): A category of measures of the amount of time a Performer is able to conduct Activities over some time interval.

Materiel -- Equipment, apparatus or supplies that are of interest, without distinction as to its application for administrative or combat purposes.

Source Definitions -- (DoDAF/CADM): An object of interest that is non-human, mobile and physical. (DDDS Counter (337/1)(A)) (JC3IEDM): An Object Item that is equipment, apparatus or supplies, that is of military interest, without distinction as to its application for administrative or combat purposes. (JP 1-02): All items (including ships, tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes. See also equipment; personal property. (Webster's): That in a complex system which constitutes the materials, or instruments employed, in distinction from the personnel, or men; as, the baggage, munitions, provisions, etc., of an army.

Measurable Skill -- A Skill that can be measured numerically.

Source Definitions -- (DoDAF WG): A Skill that can be measured numerically.

Measure -- The magnitude of some attribute of an individual.

Source Definitions -- (DoDAF/CADM): N/A (JC3IEDM): Object Item Capability Norm: The standard of a specific Capability of an Object Type. (Webster's): the extent, dimensions, quantity, etc., of something (Wikipedia, Measurement): the estimation of the magnitude of some attribute of an object (Software Engineering Institute (SEI)): Need Satisfaction (QM.1) How well does the system meet the user's needs and requirements? Performance (QM.2) How well does the system function? Maintenance (QM.3) How easily can the system be repaired or changed? Adaptive (QM.4) How easily can the system evolve or migrate? Organizational (QM.5) none specifically, usually indirect (IDEAS): An Property whose members are Individuals that all share a common, measurable property, or whose properties lie within a Measure Range.

Measure of Desire – Desired Effect is a member of Measure.

Source Definitions -- (DoDAF WG): Desired Effect is a member of Measure.

Measure of Effect -- Category of measures on Effect Objects.

Source Definitions -- (Answers.com): Category of measures on Effect Objects.

Measure Point -- A Measure whose members are Individuals that all share a common property that can be measured. Examples: 2kg 4 weeks 2km.

Source Definitions -- (IDEAS): A Measure whose members are Individuals that all share a common property that can be measured. Examples: 2kg 4 weeks 2km.

Measure Range -- A Measure that is characterised by two Measure Points that define its upper and lower bounds.

Source Definitions --.

Measure Type -- A category of Measures.

Source Definitions -- (DoDAF WG): A category of Measures.

Measure Type Units of Measure -- The subtype of Measure Type that has units.

Source Definitions -- (DoDAF WG): The subtype of Measure Type that has units.

Name Type -- A Representation Type that is the Power type of Name.

Source Definitions -- (DoDAF WG): A Representation Type that is the Power type of Name.

Needs Satisfaction Measure -- A category of quality measures that address how well a system meets the user's needs and requirements.

Source Definitions -- (SEI): a category of quality measures that address how well a system meets the user's needs and requirements.

Organization -- A specific real-world assemblage of people and other resources organized for an on-going purpose.

Aliases -- Department, Agency, Enterprise.

Source Definitions -- (DoDAF/CADM): An administrative structure with a mission. (DDDS Counter (345/1)(A)) (JC3IEDM): An Object Item that is an administrative or functional structure. (NAF): Actual Organization: An actual specific organisation, an instance of an organisation class - e.g. The US Department of Defense (MM) (Zachman): A collection of people brought together for a specific purpose and generally recognized as such. (IDEAS): No definition yet, possibilities are: (1) An agreement amongst parties to act as a whole; (2) A structure for arranging and classifying; (3) the process of obscuring information to make it unreadable without special knowledge. (Webster's): 1. A group of persons organized for some end or work; association. 2. Something that has been organized or made into an ordered whole. 3. The administrative personnel or apparatus of a business.

Organizational Measure -- A category of quality measures that address how costly a Performer is to operate and maintain.

Source Definitions -- (SEI): a category of quality measures that address how costly a system is to operate and maintain.

Organization Type -- A type of Organization.

Source Definitions -- (DoDAF WG): A type of Organization.

Pedigree Information -- Information describing pedigree.

Source Definitions -- (DoDAF WG): Information describing pedigree.

Performance Measure -- A category of quality measures that address how well a Performer meets Capability needs.

Source Definitions -- (SEI): a category of quality measures that address how well a system functions.

Performer -- Any entity - human, automated, or any aggregation of human and/or automated - that performs an activity and provides a capability.

Aliases -- Actor, Agent, Capability Configuration (MODAF).

Source Definitions -- (SUMO): Something or someone that can act on its own and produce changes in the world. (SUMO).

Performer Capable of Responsibility -- A performer answerable or accountable for the action it performs.

Source Definitions -- (DoDAF WG): A performer answerable or accountable for the action it performs.

Period -- A Period or Instant whose temporal extent is greater than zero.

Source Definitions -- (IDEAS): A Period or Instant whose temporal extent is greater than zero.

Period Or Instant -- An Individual whose spatial extent is infinite, but whose temporal extent is finite or zero.

Source Definitions -- (IDEAS): An Individual whose spatial extent is infinite, but whose temporal extent is finite or zero.

Person Role -- A category of person roles defined by the role or roles they share that are relevant to an architecture. Includes assigned materiel.

Aliases -- Role.

Source Definitions -- (DoDAF/CADM): A class of persons. (DDDS Counter (897/2)(A)) (JC3IEDM): An Object Item that represents human beings about whom information is to be held. (JP 1-02): Personnel: Those individuals required in either a military or civilian capacity to accomplish the assigned mission. (Zachman): A human individual. (IDEAS): An individual human being. (Webster's): Personnel: The body of persons employed by or active in an organization, business, or service.

Physical Measure -- A category of measures of spatio-temporal extent of an Individual such as length, mass, energy, velocity, ….

Source Definitions -- (Answers.com): A category of measures of spatio-temporal extent of an Individual such as length, mass, energy, velocity, ….

Planar Surface -- A two-dimensional portion of space.

Source Definitions -- (IDEAS): A two-dimensional portion of space.

Planar Surface Type -- Power type of Planar Surface.

Source Definitions -- (DoDAF WG): Power type of Planar Surface.

Point -- Unidimensional Individual (dimensionless in space, existant over all time).

Source Definitions -- (IDEAS): Unidimensional Individual (dimensionless in space, existant over all time).

Point Type -- Power type of Point.

Source Definitions -- (DoDAF WG): Power type of Point.

Polygon Area -- The space enclosed by a polygon.

Source Definitions -- (IDEAS): The space enclosed by a polygon.

Polygon Area Type -- Power type of Polygon Area.

Source Definitions -- (DoDAF WG): Power type of Polygon Area.

Position Reference Frame -- An arbitrary set of axes with reference to which the position or motion of something is described or physical laws are formulated.

Source Definitions -- (IDEAS): An arbitrary set of axes with reference to which the position or motion of something is described or physical laws are formulated.

Project -- A temporary endeavor undertaken to create Resources or Desired Effects.

Aliases -- Plan, Tactic, Strategy, Activity.

Source Definitions -- (Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK), 3rd edition 2004): A Project is a temporary endeavor undertaken to create a unique product, service, or result. (DoDAF/CADM): A planned action that represents a set of activities organized and managed to produce a specified product in a specified period of time with specified resources. (DDDS Counter (19607/1)(A)) (NAF): A time-limited endeavour to create a specific set of products or services. (MM). (Webster's): 1. Something that is contemplated, devised, or planned; plan; scheme. 2. A large or major undertaking, esp. one involving considerable money, personnel, and equipment.

Project Type -- The power type of Project.

Source Definitions -- (DoDAF WG): The power type of Project.

Property -- An Individual Type whose members all exhibit a common trait or feature. often the Individuals are states having a property (the state of being 18 degrees centigrade), where this property can be a Categorical Property (qv.) or a Dispositional Property (qv.).

Source Definitions -- (DoDAF WG): An Individual Type whose members all exhibit a common trait or feature. often the Individuals are states having a property (the state of being 18 degrees centigrade), where this property can be a Categorical Property (qv.) or a Dispositional Property (qv.).

Real Property -- Land and improvements to land (i.e., facilities).

Source Definitions -- (DODI 4165.14): Land and improvements to land (i.e., facilities), equipment affixed and built into the facility as an integral part of the facility heating systems), but not movable equipment (e.g., plant equipment, industrial buoys). In many instances this term is synonymous with real estate.

Real Property Type -- Power type of Real Property.

Source Definitions -- (DoDAF WG): Power type of Real Property.

Rectangular Area -- The space enclosed by a rectangle.

Source Definitions -- (IDEAS): The space enclosed by a rectangle.

Rectangular Area Type -- Power type of Rectangular Area.

Source Definitions -- (DoDAF WG): Power type of Rectangular Area.

Region of Country -- A large, usually continuous segment of a political state or nation or its territory.

Source Definitions -- (IDEAS): A large, usually continuous segment of a political state or nation or its territory.

Region of Country Type -- Power type of Region of Country.

Source Definitions -- (DoDAF WG): Power type of Region of Country.

Region of World -- A large, usually continuous segment of a surface or space; area.

Source Definitions -- (IDEAS): A large, usually continuous segment of a surface or space; area.

Region of World Type -- Power type of Region of World.

Source Definitions -- (DoDAF WG): Power type of Region of World.

Representation -- A Sign Type where all the individual Signs are intended to signify the same Thing.

Source Definitions -- (DoDAF WG): A Sign Type where all the individual Signs are intended to signify the same Thing.

Representation Scheme -- A Representation Type that is a collection of Representations that are intended to be the preferred Representations in certain contexts.

Source Definitions -- (DoDAF WG): A Representation Type that is a collection of Representations that are intended to be the preferred Representations in certain contexts.

Resource -- Data, Information, Performers, Materiel, or Personnel Types that are produced or consumed.

Source Definitions -- (JP 1-02) The forces, materiel, and other assets or capabilities apportioned or allocated to the commander of a unified or specified command. (Wikipedia) A resource is any physical or virtual entity of limited availability that needs to be consumed to obtain a benefit from it. (dictionary.com) A source of supply, support, or aid, especially one that can be readily drawn upon when needed. (merriam-webster.com) a source of supply or support: an available means —usually used in plural (Survey of Social Science, Economics Series, volume 5) Resources are the factors of production that are normally derived from the natural environment and are used to produce goods and services. (Survey of Social Science, Economics Series, volume 5) A resource is basically an anthropomorphic concept that involves the use of material and nonmaterial stuff for human purposes.

Rule -- A principle or condition that governs behavior; a prescribed guide for conduct or action.

Source Definitions -- (BMM Concept Catalog): Business Rules provide specific, actionable guidance to implement Business Policies. Some Business Rules could be automated in software; some are actionable only by people. 'Business Rule' participates in the following associations: • is derived from Business Policy • may guide Business Processes • may have an enforcement level effected by a Tactic. 'Business Rule' in version 1.2 of the BMM is

adopted from SBVR. (dictionary.com): a principle or regulation governing conduct, action, procedure, arrangement, etc.; the customary or normal circumstance, occurrence, manner, practice, quality, etc.: (WordNet): a principle or condition that customarily governs behavior; prescribed guide for conduct or action (Wikipedia): Business rules or business rulesets describe the operations, definitions and constraints that apply to an organization in achieving its goals.

Security Attributes Group -- The group of Information Security Marking attributes in which the use of attributes 'classification' and 'owner Producer' is required. This group is to be contrasted with group 'Security Attributes Option Group' in which use of those attributes is optional.

Source Definitions -- (UCORE 1.1): The group of Information Security Marking attributes in which the use of attributes 'classification' and 'owner Producer' is required. This group is to be contrasted with group 'Security Attributes Option Group' in which use of those attributes is optional.

Service -- A mechanism to enable access to a set of one or more capabilities , where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The mechanism is a Performer. The capabilities accessed are Resources -- Information, Data, Materiel, Performers, and Geo-political Extents.

Source Definitions -- (Net-Centric Services Strategy, 3/2007): a mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. (OASIS SOA RM): A mechanism to enable access to a set of one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. (WordNet): Work done by one person or group that benefits another; budget separately for goods and services (SoAML): A Service represents a feature of a Participant that is the offer of a service by one participant to others using well defined terms, conditions and interfaces. A Service designates a Port that defines the connection point through which a Participant offers its capabilities and provides a service to clients (Mark Lankhorst, et. al., Archimate Language Primer, Telematica Institut, the Netherlands, p 4.): A service is defined as a unit of functionality that some entity (e.g., a system, organization or department) makes available to its environment and which has some value to certain entities in the environment. (The Free On-line Dictionary of Computing): Work performed (or offered) by a server. This may mean simply serving simple requests for data to be sent or stored (as with file servers, gopher or http servers, e-mail servers, finger servers, SQL servers, etc.); or it may be more complex work, such as that of IRC servers, print servers, X Windows servers, or process servers. E.g. Access to the finger service is restricted to the local subnet, for security reasons. (http://www.ibm.com/developerworks/xml/library/ws-support-soa/): Service-Oriented Architecture (SOA) introduces a highly distributed architecture which assumes multiple consumers executing the same service. In such systems, different consumers can have different quality of service (QoS) requirements for the invocation of the same service. Additionally, new versions of services can be introduced over time, which might require correct routing of requests from different consumers to particular service versions. All of

these requirements can be collectively described as service invocation policies. These policies can be either managed separately or incorporated into the service's definitions.

Service Description -- Information necessary to interact with the service in such terms as the service inputs, outputs, and associated semantics. The service description also conveys what is accomplished when the service is invoked and the conditions for using the service.

Aliases -- Service Interface Description (UPDM).

Source Definitions -- (DoDAF): The set of descriptive metadata that provides a consistent way to describe the use, composition, and implementation of a service to service providers, users, developers, and managers. a specification for metadata about a service (OASIS SOA RM): Contains the information necessary to interact with the service and describes this in such terms as the service inputs, outputs, and associated semantics. The service description also conveys what is accomplished when the service is invoked and the conditions for using the service. (OASIS SOA Ref Arch): A service description is an artifact, usually document-based, that defines or references the information needed to use, deploy, manage and otherwise control a service. This includes not only the information and behavior models associated with a service to define the service interface but also includes information needed to decide whether the service is appropriate for the current needs of the service consumer. Thus, the service description will also include information such as service reachability, service functionality, and the policies and contracts associated with a service.

Service Level -- A measurement of the performance of a system or service.

Source Definitions -- (Answers.com): A measurement of the performance of a system or service.

Set of Site Type And Facility Type -- The set of Site Types and Facility Types.

Source Definitions -- (DoDAF WG): The set of Site Types and Facility Types.

Sign -- An Individual that signifies a Thing.

Source Definitions -- (DoDAF WG): An Individual that signifies a Thing. Example: 'BOSTON' signifies BOSTON.

Sign Type -- An Individual Type that is the Power type of Sign.

Source Definitions -- (DoDAF WG): An Individual Type that is the Power type of Sign.

Singleton Activity -- A set of activities containing only one activity.

Source Definitions -- (DoDAF WG): A set of activities containing only one activity.

Singleton Resource -- A set of resources containing only one resource.

Source Definitions -- (DoDAF WG): A set of resources containing only one resource.

Site -- Physical (geographic) location that is or was owned by, leased to, or otherwise possessed. Each site is assigned to a single installation. A site may exist in one of three forms: (1) Land only, where there are no facilities present and where the land consists of either a single land

parcel or two or more contiguous land parcels. (2) Facility or facilities only, where the underlying land is neither owned nor controlled by the government. A stand-alone facility can be a site. If a facility is not a stand-alone facility, it must be assigned to a site. (3). Land and all the facilities thereon, where the land consists of either a single land parcel or two or more contiguous land parcels.

Source Definitions -- (DODI 4165.14): Physical (geographic) location that is or was owned by, leased to, or otherwise possessed by a DoD Component. Each site is assigned to a single installation. A site may exist in one of three forms: (1) Land only, where there are no facilities present and where the land consists of either a single land parcel or two or more contiguous land parcels. (2) Facility or facilities only, where the underlying land is neither owned nor controlled by the government. A stand-alone facility can be a site. If a facility is not a stand-alone facility, it must be assigned to a site. (3). Land and all the facilities thereon, where the land consists of either a single land parcel or two or more contiguous land parcels.

Site Type -- Power type of Site.

Source Definitions -- (DoDAF WG): Power type of Site.

Skill -- The ability, coming from one's knowledge, practice, aptitude, etc., to do something well.

Aliases -- Training, Knowledge, Ability.

Source Definitions -- (DoDAF/CADM): Skill: An ability. (DDDS Counter (2226/1)(A)) (NAF): Competence: A specific set of abilities defined by knowledge, skills and attitude. (MM) (Webster's): 1. The ability, coming from one's knowledge, practice, aptitude, etc., to do something well. 2. Competent excellence in performance; expertness.

Solid Volume -- The amount of space occupied by a three-dimensional object of definite shape; not liquid or gaseous.

Source Definitions -- (IDEAS): The amount of space occupied by a three-dimensional object of definite shape; not liquid or gaseous.

Solid Volume Type -- Power type of Solid Volume.

Source Definitions -- (DoDAF WG): Power type of Solid Volume.

Spatial Measure -- A category of measures of the spatio-temporal location of an Individual.

Source Definitions -- (IDEAS): A category of measures of the spatio-temporal location of an Individual.

Standard -- A formal agreement documenting generally accepted specifications or criteria for products, processes, procedures, policies, systems, and/or personnel.

Source Definitions -- (DoDAF/CADM): Information Technology Standard: An Agreement for a procedure, product or relationship for the acquisition, storage, manipulation, management, movement, control, switching, interchange, transmission or reception or data. (see Metrics) (FEA): A set of criteria (some of which may be mandatory), voluntary guidelines, and best practices. Examples include: • Application development • Project management • Vendor management • Production operation • User support • Asset

management • Technology evaluation • Architecture governance • Configuration management • Problem resolution. (NAF): A ratified and peer-reviewed specification that is used to guide or constrain the architecture. A <<Standard>> may be applied to any element in the architecture via the [constrained Item] property of UML::Constraint. (MM) (Webster's): 1. Something considered by an authority or by general consent as a basis of comparison; an approved model. 2. A rule or principle that is used as a basis for judgment. 3. An average or normal requirement, quality, quantity, level, grade, etc. 4. An authoritative principle or rule that usually implies a model or pattern for guidance, by comparison with which the quantity, excellence, correctness, etc., of other things may be determined. Synonyms: gauge, basis, pattern, guide. Standard, criterion refer to the basis for making a judgment. A criterion is a rule or principle used to judge the value, suitability, probability, etc., of something, without necessarily implying any comparison. (American Heritage Dictionary): an acknowledged measure of comparison for quantitative or qualitative value; criterion. (ISE-FS-200): A specific technical methodology and practice. (ANSI): A formal agreement documenting generally accepted specifications or criteria for products, processes, procedures, policies, systems, and/or personnel. (ISO): An ISO standard is a documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose. It is a living agreement that can have a profound influence on things that deserve to be taken seriously - such as the safety, reliability and efficiency of machinery and tools, means of transport, toys, medical devices, and so on.

Surface -- A portion of space having length and breadth but no thickness or regards to time.

Source Definitions -- (IDEAS): Note: as opposed to spatio-temporal area.

Surface Type -- Power type of Surface.

Source Definitions -- (DoDAF WG): Power type of Surface.

System -- A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements.

Source Definitions -- (DoDAF): Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions. (DoDAF/CADM): An organized assembly of interactive components and procedures forming a unit.(DDDS Counter (19607/1)(A)) (MODAF): Any organised assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions. (IEEE): A collection of components organized to accomplish a specific function or set of functions. (BEA): Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions. (NAF): A collection of components organized to accomplish a specific function or set of functions. (GEN TERM) (NAF): A coherent combination of physical artifacts, energy and information, assembled for a purpose. (MM) (JP 1-02): A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements; that group of elements forming a unified whole. (JP 3-0) (Zachman): A MECHANISM TYPE that consists of one of more linked computers, along with associated software. (Webster's): 1. An assemblage or combination of things or parts forming a complex or unitary whole. 2. Any assemblage or set of correlated members.

3. An ordered and comprehensive assemblage of facts, principles, doctrines, or the like in a particular field of knowledge or thought. 4. A coordinated body of methods or a scheme or plan of procedure; organizational scheme. 5. Any formulated, regular, or special method or plan of procedure or organizational scheme. 5. Any formulated, regular, or special method or plan of procedure (INCOSE) A system is a construct or collection of different elements that together produce results not obtainable by the elements alone. The elements, or parts, can include people, hardware, software, facilities, policies, and documents; that is, all things required to produce systems-level results. The results include system level qualities, properties, characteristics, functions, behavior and performance. The value added by the system as a whole, beyond that contributed independently by the parts, is primarily created by the relationship among the parts; that is, how they are interconnected (Rechtin, 2000). (WordNet): (Gene Bellinger): A system is an entity that maintains its existence through the mutual interaction of its parts.

Technical Standard -- Technical standards document specific technical methodologies and practices to design and implement.

Source Definitions -- (ISE FS 200, adapted from): Technical standards document specific technical methodologies and practices to design and implement.

Temporal Measure -- A type of measure of time.

Source Definitions -- (DoDAF WG): A type of measure of time.

Time -- A Measure Instance whose members are Individuals that have a particular temporal dimension of the same length. Examples: 22 seconds 14 weeks The time taken for light to travel 2km in a vacuum.

Source Definitions -- (DoDAF WG): A Measure Instance whose members are Individuals that have a particular temporal dimension of the same length. Examples: 22 seconds 14 weeks The time taken for light to travel 2km in a vacuum.

Vision -- An end that describes the future state of the enterprise, without regard to how it is to be achieved; a mental image of what the future will or could be like.

Source Definitions -- (BMM Concept Catalog): A Vision is an overall image of what the organization wants to be or become. An enterprise can use the Business Motivation Model without defining a Vision explicitly. An end that is about the future state of the enterprise, without regard to how it is to be achieved. Dictionary Basis: a mental image of what the future will or could be like [NODE 'vision' (2), bullet 1] (DoDAF WG): the notion of capabilities intended by Joint terms such as capabilities-based: intent & doctrinal foundation.

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B.2 Aliases.

Ability -- The quality of being able to perform.

Related Terms – Skill, measure of Individual and measure of Type applied to Individual Performer and Performer (a type).

Source Definitions -- (WordNet): The quality of being able to perform; a quality that permits or facilitates achievement or accomplishment (The American Heritage® Dictionary of the English Language, Fourth Edition): The quality of being suitable for or receptive to a specified treatment; capacity: the ability of a computer to be configured for use as a file server.

Accuracy Precision -- The nearness of a functional goal to the true value.

Related Terms -- Performance Measure.

Source Definitions -- (SEI): a quantitative measure of the magnitude of error [IEEE 90]. (Wikipedia, accuracy): accuracy is the degree of conformity of a measured or calculated quantity to its actual (true) value (Wikipedia, precision): Accuracy is closely related to precision, also called reproducibility or repeatability, the degree to which further measurements or calculations show the same or similar results. (WordNet, accuracy): the quality of being near to the true value.

Action -- An activity, or the occurrence of an activity, that may utilise resources and may be focused against an objective.

Related Terms -- Activity?.

Source Definitions -- (JC3IEDM) An activity, or the occurrence of an activity, that may utilise resources and may be focused against an objective.

Actor -- A performer that is external to and invokes the performer to be architected.

Related Terms -- Performer.

Source Definitions -- (DoDAF): A coherent set of roles that users of use cases play when interacting with these use cases. An actor has one role for each use case with which it communicates. (NAF): An actor is an implementation independent unit of responsibility that performs a certain role. (ARCH ELEM) (Webster's): 1. One who takes part; a participant. 2. A person who does something (OASIS SoA RAF): An actor is an entity, human, non-human or organization of entities, that is capable of action. The concept of actor encompasses many kinds of entities, human and corporate participants, even semi-autonomous computational agents. Two important kinds of actor are participants and delegates.

Agent --.

Related Terms -- Perfomer or Service.

Source Definitions -- (SoAML): An Agent is a classification of autonomous entities that can adapt to and interact with their environment. It describes a set of agent instances that have features, constraints, and semantics in common. Agents in SoAML are also participants, providing and using services. something that produces or is capable of producing an effect :

an active or efficient cause (www.merriam-webster.com): 2 a : something that produces or is capable of producing an effect : an active or efficient cause.

Architecture -- The fundamental underlying design of something.

Related Terms -- A collection of associations of the components of the underlying design to the something.

Source Definitions -- (DoDAF v 1 and v 1.5): Architecture: the structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. (DoD Integrated Architecture Panel, 1995, based on IEEE STD 610.12) (Dictionary.com): architecture 1. the profession of designing buildings, open areas, communities, and other artificial constructions and environments, usually with some regard to aesthetic effect. Architecture often includes design or selection of furnishings and decorations, supervision of construction work, and the examination, restoration, or remodeling of existing buildings. 2. the character or style of building: the architecture of Paris; Romanesque architecture. 3. the action or process of building; construction. 4. the result or product of architectural work, as a building. 5. buildings collectively. 6. a fundamental underlying design of computer hardware, software, or both. 7. the structure of anything: the architecture of a novel. (American Heritage Dictionary): Architecture: 1. The art and science of designing and erecting buildings. 2. Buildings and other large structures: the low, brick-and-adobe architecture of the Southwest. 3. A style and method of design and construction: byzantine architecture. 4. Orderly arrangement of parts; structure: the architecture of the federal bureaucracy; the architecture of a novel. 5. Computer Science The overall design or structure of a computer system, including the hardware and the software required to run it, especially the internal structure of the microprocessor. (WordNet 3.0): Architecture 1. an architectural product or work 2. the discipline dealing with the principles of design and construction and ornamentation of fine buildings; architecture and eloquence are mixed arts whose end is sometimes beauty and sometimes use 3. the profession of designing buildings and environments with consideration for their esthetic effect 4. (computer science) the structure and organization of a computer's hardware or system software; the architecture of a computer's system software [syn: computer architecture].

Architecture Description -- (DoDAF v 1.5): The Framework products portray the basic architecture data elements and relationships that constitute an architecture description, therefore architecture description: architecture data elements and relationships that make up an architecture model or product. Hence, and architecture description is an architecture model or product.

Related Terms -- A type of Information.

Source Definitions -- (DoDAF v 1.5): The Framework products portray the basic architecture data elements and relationships that constitute an architecture description, therefore architecture description: architecture data elements and relationships that make up an architecture model or product. Hence, and architecture description is an architecture model or product.

Behavior -- The manner in which an individual, group or machine functions, operates or reacts/responds to stimuli.

Related Terms -- Composite of Performer and its Activities and the Events that Trigger them and the Performer State changes and/or Activities and outputs (Exchange Objects) or trigger Events resulting from those Activities.

Source Definitions -- (DoDAF): The way machines or systems operate or interact. (American Heritage Dictionary): 1. The aggregate of responses to internal and external stimuli. 2. The action or reaction of any material under given circumstances. 3. The manner in which something functions or operates. 4. The manner in which a physical system acts or functions, especially under specified conditions. (Webster's): 1. The manner of conducting oneself. 2. Anything that an organism does involving action and response to stimulation. 3. The response of an individual, group, or species to its environment. 4. The way in which someone behaves. 5. The way in which something functions or operates.

Business Process -- A functionally or temporally linked collection of structured activities/ tasks aimed at producing specific services and products for an end-user.

Related Terms -- Activity, Process, Function, Job, Chore, Assignment.

Source Definitions -- Business Processes realize Courses of Action. They provide processing steps, sequences, (including cycles branches and synchronization), structure (decomposition and reuse), interactions, and connection to events that trigger the processes. Courses of Action are governed by Business Policies. Business Processes are also governed by Business Policies. 'Business Process' participates in the following associations: • realizes Courses of Action • is governed by Business Policies • may be guided by Business Rules • is the responsibility of one or more Organization Units (BMM Concept Catalog): 'Business Process' in version 1.2 of the Business Motivation Model is a definition, taken from the August 2004 of BDPM and anticipating a definition to be adopted from BDPM when it is further developed. (Wikipedia): 1. Management processes, the processes that govern the operation of a system. Typical management processes include Corporate Governance and Strategic Management. 2. Operational processes, processes that constitute the core business and create the primary value stream. Typical operational processes are Purchasing, Manufacturing, Marketing, and Sales. 3. Supporting processes, which support the core processes. Examples include Accounting, Recruitment, IT-support.

Capability Configuration -- A combination of organizational aspects (with their competencies) and equipment that combine to provide a capability.

Related Terms -- aggregated Performer.

Source Definitions -- (DoDAF/CADM): Capability Association: The association of one Capability to another Capability (DDDS Counter (20846/1)(A)) (NAF): A combination of organizational aspects (with their competencies) and equipment that combine to provide a capability. A <<Capability Configuration>> is a physical asset or organization configured to provide a capability, and must be guided by [doctrine] which may take the form of <<Standard>> or <<Operational Constraint>> stereotypes. (MM) (MODAF 1.2): A composite structure representing the physical and human resources (and their interactions) in an enterprise. A Capability Configuration is a set of artefacts or an organisation configured to

provide a capability, and should be guided by [doctrine] which may take the form of Standard or Operational Constraint stereotypes.

Capability Increment -- A capability that can be effectively developed, produced, acquired, deployed and sustained.

Related Terms -- composite of Capability temporal part (with time period) - Performer (and its time period).

Source Definitions -- (Defense Acquisition Acronyms & Terms, Defense Acquisition University (DAU)) In the context of Joint Capabilities Integration and Development System (JCIDS), a militarily useful and supportable operational capability that can be effectively developed, produced, acquired, deployed and sustained. Each increment of capability will have its own set of threshold and objective values.

Capability Phase -- A temporal part of a whole capability that relates to temporal parts of the desired effect resource states of the whole capability.

Related Terms -- Capability, desired Effect resource state.

Source Definitions -- (DoDAF WG): A temporal part of a whole capability that relates to temporal parts of the desired effect resource states of the whole capability.

Capacity -- The amount a Performer can hold, receive, or absorb.

Related Terms -- Performance Measure.

Source Definitions -- (Wikipedia): Capacity is the ability to hold, receive or absorb, or a measure thereof, similar to the concept of volume. (SEI): a measure of the amount of work a system can perform [Barbacci 95].

Concept of Operations -- A general idea derived or inferred from specific instances or occurrences of major planning and operating functions.

Related Terms -- Activity.

Source Definitions -- (JP 5-0): A verbal or graphic statement that clearly and concisely expresses what the joint force commander intends to accomplish and how it will be done using available resources. The concept is designed to give an overall picture of the operation. Also called commander's concept or CONOPS.

Constraint -- The range of permissible states for an object.

Related Terms -- Business Rule, Rule, Restraint, Operational Limitation, Guidance.

Source Definitions -- (DoDAF/CADM): Directed Constraint: An instance of Guidance that represents a specific limitation (DDDS Counter (19597/1)(A)); (Operational Rule) An instance of Guidance that specifies a set of procedures to achieve an objective; (Operational Condition) A variable of the operational environment or situation in which a unit, system or individual is expected to operate that may affect performance. (DDDS Counter (19589/1)(A)) (NAF): Operation Constrain: A rule governing an operational behavior or property. (MM) (NAF): Resource Constraint: A rule governing the structural or functional aspects of an implementation - this may also include constraints on <<Organisational Resource>>s that are part of an implementation. (MM) (JP 1-02): In the context of joint operation planning, a

requirement placed on the command by a higher command that dictates an action, thus restricting freedom of action. See also operational limitation; restraint. (JP 5-0) (Zachman): A business rule that constrains behavior in some way, or constrains what data may or may not be updated. (Webster's): The state of being restricted or confined within prescribed bounds.

Cost -- 1. Cost - financial: The price paid to acquire, produce, accomplish, or maintain anything. 2. Cost – general: The expenditure of something, such as time or labor, necessary for the attainment of a goal.

Related Terms -- Organizational Measure.

Source Definitions -- (DoDAF/CADM): (Architecture Project, cost Amount): The amount that represents the best estimate of cost for a specific Architecture Project. (DDDS Counter (19607/1)(A)) (SEI): Cost estimation -- the process of estimating the costs associated with software development projects, to include the effort, time, and labor required. Cost of maintenance -- the overall cost of maintaining a computer system to include the costs associated with personnel, training, maintenance control, hardware and software maintenance, and requirements growth. Cost of operation -- the overall cost of operating a computer system to include the costs associated with personnel, training, and system operations. Cost of ownership -- the overall cost of a computer system to an organization to include the costs associated with operating and maintaining the system, and the lifetime of operational use of the system. (Webster's): 1. The price paid to acquire, produce, accomplish, or maintain anything. 2. An outlay or expenditure of money, time, labor, trouble, etc. (American Heritage Dictionary): The expenditure of something, such as time or labor, necessary for the attainment of a goal.

Course of Action -- A path towards a goal.

Related Terms -- Mission, strategy, plan.

Source Definitions -- (BMM Concept Catalog): Courses of Action are what the enterprise has decided to do. A Course of Action is more than simply a resource, skill, or competency that the enterprise can call upon. A Course of Action is a way of configuring some aspect of the enterprise (things, processes, locations, people, time) to channel efforts towards Desired Results - the result of a decision by the enterprise about the best way to use its resources, skills, and competencies. A Course of Action defines what has to be done, not how well it has to be done. Measures of Performance are defined in Objectives that are supported by the Courses of Action. Definition: means that is an approach or plan for configuring some aspect of the enterprise involving things, processes, locations, people, timing, or motivation undertaken to achieve ends Note: Categories of course of action include: strategy, tactic. Dictionary Basis: a mode of action; if you persist in that course you will surely fail; once a nation is embarked on a course of action it becomes extremely difficult for any retraction to take place [www.dictionary.com - Source: WordNet® 2.0 'course of action']. Dictionary Basis: a chosen manner of conducting oneself: way of acting our wisest course is to retreat [MWCD 'course' (3b)]. In the Business Motivation Model, Courses of Action are categorized as Strategies and Tactics. The model does not make a hard distinction between the two. Enterprises define their own criteria.

Data Dependency -- Resource consumed by Performer.

Related Terms -- 1. Resource consumed by Performer 2. Data Association.

Source Definitions -- (DISA TBD): Data is, somewhat artificially, divided into two types: Operations, Administration, Maintenance, and Provisioning (OAM&P) data and service/application-specific content data. OAM&P data includes user identity/authorization data, service description data, performance data, etc. The DEERS personnel data used by the PKI program is an example of OAM&P data. Service/application-specific content data is data that is processed by a consumer. The consumer may be human or machine. Examples include map data, email, weather data, etc. (Entity-Relationship TBD): The values for one data element depend on some other data element.

Definition -- A statement conveying fundamental character.

Related Terms -- Information.

Source Definitions -- (Answers.com): A statement conveying fundamental character WordNet: a concise explanation of the meaning of a word or phrase or symbol [2011 Nov 01].

Desired Result -- The wished for result, outcome, or consequence of an action. A desired result may be either a goal or an objective.

Related Terms -- desired effect, desired outcome, desired consequence.

Source Definitions -- Desired Results are categorized as Goals and Objectives. (BMM Concept Catalog): An end that is a state or target that the enterprise intends to maintain or sustain Dictionary Basis: A favorable outcome of an undertaking or contest [ODE 'result' (bullet 1)] Note: Categories of desired result include: goal, objective.

Directive -- An authoritative statement intended to impel actions and the achievement of goals.

Related Terms -- Guidance, Agreement.

Source Definitions -- In the Business Motivation Model, Directives are categorized as Business Policies and Business Rules. In general, Business Policies exist to govern – that is, control, guide, and shape – the Strategies and Tactics. Business Policies define what can be done and what must not be done, and may indicate how or set limits on how it should be done. Compared to a Business Rule, a Business Policy tends to be less formally-structured; and may not be atomic - i.e. not focused on a single aspect of governance or guidance - and may be less formally articulated. Business policies are not directly actionable. Business Rules are actionable Directives. They need to be defined as actionable Directives and managed for consistency and completeness. Business Rules are derived from Business Policies. Apart from its role in the structure, 'Business Rule' is outside the scope of the Business Motivation Model. Its place in the structure provides a hook to another model, where 'Business Rule' is defined and associated with other concepts. (BMM Concept Catalog): Definition: means that defines or constrains some aspect of an enterprise Note: A directive is intended to assert business structure or to control or influence the behavior of the enterprise. Note: Categories of directive include: business policy, business rule. Dictionary Basis: an official or authoritative instruction [ODE 'directive'].

Doctrine -- The body of principles by which an enterprise seeks to guide its activities.

Related Terms -- Composite of Activities and their structure, sequencing, state transitions, their assignment to Organizations, Organization structure, and Rules.

Source Definitions -- (DoDAF/CADM): (Guidance, catCode=1): A statement of direction received from a higher echelon. (DDDS Counter (336/4)(A)) (JP 1-02): Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application. See also multinational doctrine; joint doctrine; multi-Service doctrine. (Webster's): 1. Something that is taught; teachings collectively. 2. A body or system of teachings relating to a particular subject. 3. A rule or principle of law, especially when established by precedent. 4. A statement of official government policy, especially in foreign affairs and military strategy.

Effect -- The result, outcome, or consequence of an action.

Related Terms -- A change in the state of a Resource as a result of some Activity. Goal, Objective, Desired Result, Outcome, Consequence, Effect Object.

Source Definitions -- (DoDAF/CADM): N/A. (JC3IEDM): A perceived effectiveness of a specific Action against a specific battle space object or its class. (JP 1-02): 1. The physical or behavioral state of a system that results from an action, a set of actions, or another effect. 2. The result, outcome, or consequence of an action. 3. A change to a condition, behavior, or degree of freedom. (JP 3-0). (Webster's): 1. Something brought about by a cause or agent; a result. 2. The power to produce an outcome or achieve a result; influence. 4. A scientific law, hypothesis, or phenomenon. (UJTL): A change to a condition, behavior, or degree of freedom.

End -- an outcome worked toward especially with forethought, deliberate planning, and organized effort.

Related Terms -- effect, outcome, result.

Source Definitions -- Ends are about what an enterprise wants to be. Ends can be about changing what the enterprise is - e.g. developing new lines of business, moving into new markets - or about maintaining its current position relative its market and competition. The definition of an end does not say how it will be achieved. (BMM Concept Catalog): General Concept: motivation element. Definition: Something that is to be accomplished. Dictionary Basis: an outcome worked toward especially with forethought, deliberate planning, and organized effort [MWUD 'end' (4a)] In the Business Motivation Model, Ends are categorized as Vision and Desired Results.

Enduring Task -- A continuing function to be performed.

Related Terms -- Activity.

Source Definitions -- (MODAF) TBS Dandashi.

Enterprise -- An umbrella term for the management systems, information systems and computer systems within an organization.

Related Terms -- System.

Source Definitions -- (Answers.com): An umbrella term for the management systems, information systems and computer systems within an organization. (MODAF 1.2): Enterprise Phase: A current or future state of the whole life enterprise or enterprise phase; Whole-Life Enterprise: An enterprise phase that is the whole of the enterprise. (UDEF): Any data or information about any definable boundary collection of human and asset resources used to perform a collection of processes to create one or more products which are intended for use or consumption by outside entities.

Enterprise Phase -- A current or future state of the whole life enterprise or enterprise phase.

Related Terms -- Capability Phase.

Source Definitions -- (MODAF 1.2): A current or future state of the whole life enterprise or enterprise phase. (Bailey email 2010-06-02): An EP is just a phase of the enterprise you're modelling – in IDEAS/DM2 terms that would be an individual with the spatial extent of the enterprise, and a finite temporal extent defined by the start and the end of the phase. Projects deliver capability, and they also have phases, the starts/ends of which are shown as project milestones in MODAF. It's imperative to keep this separate from the enterprise phase, because project are about delivery and enterprise phases are about strategic intent. If someone states a capability for a future enterprise phase, that is a statement of requirement – e.g. we need bad weather ISTAR by 2015. The project that delivers that capability may well intend to deliver on time, but may slip. by keeping these two aspects separate, we can see how reality matches the requirement.

Event -- Something that happens at an instant in the world, i.e., a near-zero-duration process (Activity).

Related Terms -- Milestone, Trigger, Activity.

Source Definitions -- (DoDAF/CADM): A significant occurrence. (DDDS Counter (19589/1)(A)) (JC3IEDM): An Action that is an incident, phenomenon or occasion that is of military significance which has occurred or is occurring but for which planning is not known. (Zachman): Something that happens at an instant in the world that causes a process to be launched. (Webster's): 1. Something that happens or is regarded as happening; an occurrence, esp. one of some importance. 2. The outcome, issue, or result of anything. 3. Something that occurs in a certain place during a particular interval of time. Synonyms: happening, affair, case, circumstance. (BPMN v1.1) :An Event is something that happens during the course of a business process. These Events affect the flow of the Process and usually have a cause or an impact. The term event is general enough to cover many things in a business process. The start of an activity, the end of an activity, the change of state of a document, a message that arrives, etc., all could be considered events. However, BPMN has restricted the use of events to include only those types of events that will affect the sequence or timing of activities of a process. BPMN further categorizes Events into three main types: Start, Intermediate, and End. Start and most Intermediate Events have Triggers that define the cause for the event. There are multiple ways that these events can be triggered (Start Event Triggers on page 38 and Intermediate Event Triggers on page 45). End Events may define a Result that is a consequence of a Sequence Flow ending. There are multiple types of Results that can be defined (End Event Results on page 41). Start As the name implies, the Start Event indicates where a particular Process will start. In terms of Sequence Flow, the

Start Event starts the flow of the Process, and thus, will not have any incoming Sequence Flow—no Sequence Flow can connect to a Start Event. Start Event Triggers There are many ways that business process can be started (instantiated). The Trigger for a Start Event is designed to show the general mechanism that will instantiate that particular Process. There are six (6) types of Start Events in BPMN: None, Message, Timer, Conditional Signal, and Multiple. End As the name implies, the End Event indicates where a process will end. In terms of Sequence Flow, the End Event ends the flow of the Process, and thus, will not have any outgoing Sequence Flow—no Sequence Flow can connect from an End Event. End Event Results There are eight (8) types of End Events in BPMN: None, Message, Error, Cancel, Compensation, Signal, Terminate, and Multiple. These types define the consequence of reaching an End Event. This will be referred to as the End Event Result. Intermediate As the name implies, the Intermediate Event indicates where something happens (an Event) somewhere between the Start and End of a Process. It will affect the flow of the Process, but will not start or (directly) terminate the Process. Intermediate Event Triggers There are 10 types of Intermediate Events in BPMN: None, Message, Timer, Error, Cancel, Compensation, Conditional, Link, Signal, and Multiple. Each type of Intermediate Event will have a different icon placed in the center of the Intermediate Event shape to distinguish one from another. (UDEF): Any natural or man-made event of interest to the enterprise.

Federation -- A union comprising a number of partially self-governing states or regions united by a central (federal) government.

Related Terms -- A type of Performer interaction (overlap of their Activities).

Source Definitions -- (Answers.com): A union comprising a number of partially self-governing states or regions united by a central (federal) government.

FoS -- A set of systems that provide similar capabilities through different approaches to achieve similar or complementary effects. For instance, the warfighter may need the capability to track moving targets. The FoS that provides this capability could include unmanned or manned aerial vehicles with appropriate sensors, a space-based sensor platform, or a special operations capability. Each can provide the ability to track moving targets but with differing characteristics of persistence, accuracy, timeliness, etc.

Related Terms -- Systems with similar Capability overlaps.

Source Definitions -- (CJCSI 3170.01F): A set of systems that provide similar capabilities through different approaches to achieve similar or complementary effects. For instance, the warfighter may need the capability to track moving targets. The FoS that provides this capability could include unmanned or manned aerial vehicles with appropriate sensors, a space-based sensor platform, or a special operations capability. Each can provide the ability to track moving targets but with differing characteristics of persistence, accuracy, timeliness, etc.

Function -- The action for which a person or thing is specially designed, fitted, used or intended to accomplish or execute.

Related Terms -- Activity, Process, Job, Chore, Assignment.

Source Definitions -- (DoDAF/CADM): (Process Activity, catCode=2): The representation of a means by which a process acts on some input to produce a specific output. (DDDS

Counter (4204/3)(A)) (NAF): An activity which is specified in context of the resource (human or machine) that performs it. Note1: Contrast with <<Operational Activity>>, where the actor performing the activity is not known (i.e. it is just a logical node). A <<Function>> is implementation-specific. Note2: Should the <<Function>> be specific to one usage of a type of system, then the usage Context is specified by a reference to the composite structure property <<Resource Composition>> typed by the system. (MM) (Zachman): A type of activity to carry out a mission, goal or objective of the enterprise. It is described solely in terms of what it is intended to accomplish, without regard to the technology used to carry it out or who is to perform it. This is also described without reference to time. (American Heritage Dictionary): 1. The kind of action or activity proper to a person, thing, or institution; the purpose for which something is designed or exists; role. 2. A factor related to or dependent upon other factors. 3. What something is used for. (Webster's): 1. The action for which a person or thing is specially fitted or used or for which a thing. exists. 2. Any of a group of related actions contributing to a larger action.

Functional Dependency -- A constraint on, or dependence of, a function on one or more outside influences, conditions, functions, triggers or events.

Related Terms -- Composite of Activity with Constraint or dependence on one or more Conditions, Activities, triggers (composite of Activity and Event), Events.

Source Definitions -- (DoDAF/CADM): (multiple entities) (Zachman): Functional Verifier: If it is an integrity constraint (Condition indicator = False), it requires an object to assume a function relative to the constrained object. For example, the value of an attribute may be required to be unique within an entity class. If this is a condition (Condition indicator = True), it tests to see if this is so. This is an example of an OTHER SYSTEM CONSTRAINT TYPE. (American Heritage Dictionary): Dependency: Something dependent or subordinate; appurtenance. (UNK - TBD): Functional dependencies ties two distinct capabilities together. For example, NECC uses PKI to provide authentication, authorization, and non-repudiation of users.

Geolocation -- A place or site that is either occupied or available for occupancy and is marked by some distinguishing feature.

Related Terms -- Geofeature Geopolitical Extent.

Source Definitions -- (DoDAF/CADM): A specific place.(DDDS Counter (343/2)(A)) (JC3IEDM): A specification of position and geometry with respect to specified horizontal frame of reference and a vertical distance measured from a specified datum. (NAF): Actual Location: A location anywhere on the earth. The means of describing the location is a string (location Description). The information contained in that string is governed by the taxonomy reference - e.g. if the <<Actual Location>> is a GPS reference, the string will contain the GPS coordinates. (MM) (Zachman): The column in the Architecture Framework that describes the places where the enterprise does business and how these places are connected. (Webster's): 1. A place of settlement, activity, or residence. 2. A place or situation occupied. 3. A place where something is or could be located; a site.

Goal -- A desired state of a Resource.

Related Terms -- Desired Result, Effect, Outcome, Consequence.

Source Definitions -- Desired Results – Goals and Objectives - are more specific. A Goal tends to be longer term, and defined qualitatively rather than quantitatively. It should be narrow - focused enough that Objectives can be defined for it. (BMM Concept Catalog): An end that is a state or condition of the enterprise to be brought about or sustained through appropriate means (Dictionary Basis): the end toward which effort or ambition is directed [MWUD 'goal' (2)] (Dictionary Basis): the object of a person's ambition or effort; an aim or desired result [ODE 'goal' (2)] Note: Compared to an objective, a goal tends to be: ongoing; qualitative (rather than quantitative).; general (rather than specific); longer term.

Instruction -- An imparted or acquired item of knowledge.

Related Terms -- Skill.

Source Definitions -- (Answers.com): An imparted or acquired item of knowledge.

Interface -- An overlap between Performers for the purpose of producing a Resource by one Performer that is consumed by the other Performer.

Related Terms -- Performers (2), APBP (2), Activities (2), APR, ACR, Resource.

Source Definitions --.

Interoperability -- A category of measures of the ability of two or more Performers to exchange Resources and to use the Resources that have been exchanged.

Related Terms -- Adaptability Measure.

Source Definitions -- (SEI): the ability of two or more systems or components to exchange information and to use the information that has been exchanged [IEEE 90].

Joint Capability Area --.

Related Terms -- Capability Type.

Source Definitions --.

Manual -- A small reference book, especially one giving instructions.

Related Terms -- Information.

Source Definitions -- (Answers.com): A small reference book, especially one giving instructions.

Means -- An action or system by which a result is brought about; a method.

Related Terms -- Tactics, Strategy, Project. A type of Resource or System. APBP, APR, APC.

Source Definitions -- (BMM Concept Catalog): Means are about what an enterprise has decided to do in order to become what it wants to be. A Means is some device, capability, regime, technique, restriction, agency, instrument, or method that may be called upon, activated, or enforced to achieve Ends. A Means does not include either the tasks (business processes and workflow) necessary to exploit it, nor responsibility for such tasks. In the Business Motivation Model, Means are organized into Mission, Courses of Action and Directives. A Mission indicates the ongoing operational activity of the enterprise. Its

definition should be broad enough to cover all Strategies and the complete area of operations. An enterprise can use the Business Motivation Model without defining a Mission explicitly. General Concept: motivation element Definition: device, capability, regime, technique, restriction, agency, instrument, or method that may be called upon, activated, or enforced to achieve ends Dictionary Basis: an action or system by which a result is brought about; a method [ODE 'means' (1)] Note Categories of means include: mission; course of action; directive. (Dictionary.com): 1. Usually, means. (used with a singular or plural verb) an agency, instrument, or method used to attain an end: The telephone is a means of communication. There are several means of solving the problem. 2. means, a. available resources, esp. money: They lived beyond their means. b. considerable financial resources; riches: a man of means. (David Hay): Any capability that may be called upon, activated, or enforced to achieve an organization's objectives. (dictionary.cambridge.org): a method or way of doing something. money, for example from an income, that allows you to buy things (Wordcentral.com Merriam-Webster): 3 plural : something by which a desired result is achieved or furthered <means of production> <use any means you can> 4 plural : WEALTH 1 <a person of means> - by all means : without fail : CERTAINLY - by means of : through the use of.

Mechanism -- An instrument or a process, physical or mental, by which something is done or comes into being.

Related Terms -- Performer.

Source Definitions -- (Answers.com): An instrument or a process, physical or mental, by which something is done or comes into being.

Metadata -- Information about information.

Related Terms -- Thing described by Information where the Thing is Information.

Source Definitions -- (WordNet): Data about data.

Milestone -- Something that happens at an instant in the world, i.e., a zero-duration process (Activity).

Related Terms -- Activity, possibly Event.

Source Definitions -- (DoDAF): A decision point that separates the phases of a directed, funded effort that is designed to provide a new or improved material capability in response to a validated need. (NAF): Project Milestone: An event in a <<Project>> by which progress is measured – modeled as a <<Project>> of zero duration. Note: in the case of an acquisition project, there are two key types of milestone which shall be represented using subtypes - <<Capability Increment>> and <<Out of Service>>. (MM) (Webster's): A significant event or stage in the life, progress, development, or the like of a person, nation, etc.

Mission -- The task, together with the purpose [Desired Effect], that clearly indicates the action [Activity] to be taken and the reason [Desired Effect]; a duty [Activity] assigned to an individual [Personnel Type] or unit [Organization].

Related Terms -- Task (=Activity) and Desired Effect associated with it (them); Activity and Activity Performer Overlap where Performer = Person Type or Organization.

Source Definitions -- (DoDAF/CADM): The task, together with the purpose that clearly indicates the action to be taken.(DDDS Counter (1/3)(A))(NAF) A clear, concise statement of the task of the command and its purpose. Notes: Also, the execution of that task. A purpose to which a person, organisation or autonomous system is tasked. (GEN TERM) (NAF): A purpose to which a person, organisation or autonomous system is tasked. (MM) (JP 1-02): 1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task. (Zachman): An overall method for the ongoing operation of the enterprise (what the business is or will be doing on a day-to-day basis). (Webster's): 1. An operational task, usually assigned by a higher headquarters. 2. A sending or being sent for some duty or purpose. 3. A special assignment given to a person or group. 4. A combat operation assigned to a person or military unit.

Needline -- An information technology requirement that is the logical expression of the need to transfer information among performers.

Related Terms -- activity Consumes Resource/activity Produces Resource and activity Performed by Performers.

Source Definitions -- (DoDAF/CADM): Exchange Needline Requirement: An Information Technology Requirement that is the logical expression of the need to transfer information among nodes. (DDDS Counter (19607/1)(A)) (MODAF): A requirement that is the logical expression of the need to transfer information between nodes. (NAF): A relationship specifying the need to exchange information between nodes, uniquely identified in context of the product by its needline Number. Note: The needline does not indicate how the transfer is implemented. (MM).

Network -- An interconnected or interrelated chain, group, or system.

Related Terms -- System, group of systems, chain of systems.

Source Definitions -- (DoDAF/CADM): The specification of the joining of two or more nodes for a specific purpose. (DDDS Counter (10972/1)(A)) (JC3IEDM): A Facility that provides bearer services for communications and information services and is composed of one or more links and nodes. (NAF): A network is a specialisation of system and is used for communication networks that have a geographical extension. (MM) (Webster's): 1. An openwork fabric or structure in which cords, threads, or wires cross at regular intervals. 2. A system of lines or channels that cross or interconnect. 3. A complex, interconnected group or system. 4. A group or system of electric components and connecting circuitry designed to function in a specific manner. 5. A system of computers interconnected by telephone wires or other means in order to share information.

Objective -- A clearly defined, decisive, and attainable end toward which every operation is directed. An objective is a specific, time-targeted, measurable, and attainable target that an enterprise seeks to meet in order to achieve its goals.

Related Terms -- Desired Result, Effect, Outcome, Consequence.

Source Definitions -- (See above) (BMM Concept Catalog): An end that is a specific time-targeted, measurable, attainable target that an enterprise seeks to meet in order to achieve its

goals. Dictionary Basis: something toward which effort is directed: an aim or end of action [MWUD 'objective' (1)] Note: Compared to a goal, an objective is: short-term; not continuing beyond its time frame (although such time frames can be cyclical – monthly, quarterly, etc.). objective quantifies goal Definition: objectives provide the basis for measures to determine that progress is being made towards a goal.

Occupational Training -- To make proficient by instruction and practice in particular knowledge or skills.

Related Terms -- Skill.

Source Definitions -- (DoDAF/CADM): Occupation: A field of work.(DDDS Counter (2009/1)(A)); (See also attributes in Architecture Finding Requirement Domain for DOTMLPF) (American Heritage Dictionary): Occupation: 1. a person's usual or principal work or business, esp. as a means of earning a living; vocation. 2. Any activity in which a person is engaged. Education: 1. The act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life. 2. The act or process of imparting or acquiring particular knowledge or skills. 3. The result produced by instruction, training, or study. Training: 1. To make proficient by instruction and practice, as in some art, profession, or work. 2. To discipline and instruct, as in the performance of tasks. 3. To give the discipline and instruction, drill, practice, etc., designed to impart proficiency or efficiency.

Operational Activity -- An activity is an action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model). It is used to portray operational actions not hardware/software system functions.

Related Terms -- Activity.

Source Definitions -- An activity is an action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model). It is used to portray operational actions not hardware/software system functions. (DoDAF).

Operational Condition -- A statement of the values or states needed for the execution of actions within the processes and transactions of an enterprise.

Related Terms -- Condition.

Source Definitions -- (DoDAF/CADM): A variable of the operational environment or situation in which a unit, system or individual is expected to operate that may affect performance. (DDDS Counter (19589/1)(A)) (NAF): Operational Constraint: A rule governing an operational behaviour or property. (MM) (JP 1-02): Condition: Those variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance. See also joint mission essential tasks.

Organizational Performer -- Performers capable of responsibility, i.e., organizations, types of organizations, and person roles.

Related Terms -- Organization, Organization Type, Person Role.

Source Definitions --.

Outcome -- An end result; a consequence.

Related Terms -- desired effect, desired outcome, desired consequence.

Source Definitions -- (Answers.com): An end result; a consequence.

Performer Role -- Any entity - human, automated, or any aggregation of human and/or automated - that performs a function, activity, or role, or provides a capability.

Related Terms -- 1. Composite of Performer (and its parts in the case of an aggregate), the Activities it performs, the processes (Activities) it is within (overlaps), and the Capabilities in provides. 2. Alias with function (Activity).

Source Definitions -- (NAF): Role: An aspect of a person or organisation that enables them to fulfill a particular function. (MM) (NAF): Actor: An actor is an implementation independent unit of responsibility that performs a certain role. (ARCH ELEM) (Zachman): Party: A PERSON or an ORGANIZATION of interest to the enterprise. This includes PARTIES who are playing roles of Vendor, Customer, and Employee, among others. (American Heritage Dictionary): A function or position. See Synonyms at function. (WordNet): What something is used for; the function of an auger is to bore holes; ballet is beautiful but what use is it? [syn: function] (Kernerman English Multilingual Dictionary): The actions or functions of a person in some activity (OMG): A Performer Role is a Part Group that takes responsibility of performing activities in the process. Being an Interactive Part, a Performer Role also has responsibilities to fulfill Interactions that it is involved with other Performer Roles or with Interaction Roles at the boundary of the Process. A Performer Role is a Typed Part for specifying Actor that can play the role at process enactment. A Performer Role can be decomposed into sub Performer Role to delegate responsibility for a subset of its activities or interactions. A Performer Role may have a realization as defined by a Role Realization that further specifies how the Performer Role will meet its responsibilities.

Performer Supporting Activity -- A type of Activity - Performer overlap between a Performer and those Activities which may not necessarily be carried out by the Performer but which are necessary for the performance of the Activity.

Related Terms -- Activity Performer Overlap of the Activities actually performed by the Performer and then Activity overlaps between them and the supported Activity.

Source Definitions -- (DoDAF WG): A type of Activity - Performer overlap between a Performer and those Activities which may not necessarily be carried out by the Performer but which are necessary for the performance of the Activity.

Phasing/Evolution/Forecast -- Phase: A stage in a process of change or development. Evolution: Any process of formation or growth; development. Forecast: To predict a future condition or occurrence.

Related Terms -- before after relationships, temporal state, time period.

Source Definitions -- (DoDAF/CADM): (multiple entities) (NAF): Forecast: A statement about the future state of one or more types of system or standard. (MM) (Webster's): Phasing: 1. Any of the major appearances or aspects in which a thing of varying modes or conditions manifests itself to the eye or mind. 2. A stage in a process of change or development. Evolution: 1. Any process of formation or growth; development. 2. A product of such development; something evolved. Forecast: 1. To predict (a future condition or occurrence); calculate in advance. 2. To serve as a prediction of; foreshadow. 3. To contrive or plan beforehand; prearrange. 4. To conjecture beforehand; make a prediction. 5. To plan or arrange beforehand. 6. A prediction. Synonyms: foretell, anticipate, project, estimate, forethought, prescience.

Physical Asset -- Covered by the Real Property and Materiel concepts.

Related Terms -- Real Property, Materiel.

Source Definitions -- (NAF): Physical Asset: A <<Resource>> that can host systems and/or people. Note 1: synonyms for <<Physical Asset>>; would be platform, facility, or host. This is the original intent for the Systems Node concept in DoDAF. Note 2: A <<Physical Asset>> can contribute to a <<Capability Configuration>>, and is usually configured for that purpose. It may be that a given platform can be configured and manned in many different ways to achieve different capabilities. In these cases, a class should be created for the <<Physical Asset>> in general, and this should be abstract. The variants of the asset should be created as concrete classes, specializing from the abstract class. (MM) (Webster's): Asset: 1. A useful or valuable quality, person, or thing; an advantage or resource. 2. A valuable item that is owned.

Plan -- A set of Activities that result in a Goal, Desired Effect, outcome, or objective.

Related Terms -- Course of Action, Activity aggregate (temporal or otherwise).

Source Definitions -- (BMM Concept Catalog): Courses of Action are what the enterprise has decided to do. A Course of Action is more than simply a resource, skill, or competency that the enterprise can call upon. A Course of Action is a way of configuring some aspect of the enterprise (things, processes, locations, people, time) to channel efforts towards Desired Results - the result of a decision by the enterprise about the best way to use its resources, skills, and competencies. A Course of Action defines what has to be done, not how well it has to be done. Measures of Performance are defined in Objectives that are supported by the Courses of Action.

Platform -- A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

Related Terms -- System.

Source Definitions -- UML Profile and Metamodel for Services (UPMS) RFP OMG Document: SoA/2006-09-09: A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

Policy -- A course of action, guiding principle, or procedure considered expedient, prudent, or advantageous.

Related Terms -- Rule.

Source Definitions -- (Answers.com): A course of action, guiding principle, or procedure considered expedient, prudent, or advantageous.

Port -- An interface (performer) provided by a Performer that is disposed to perform production or consumption of resources external to the Performer.

Related Terms -- part of a Performer.

Source Definitions -- (DoDAF/CADM): Node Port: The specification of a physical interface point for a specific Node. (DDDS Counter (19607/1)(A)) (NAF): System Port: An interface (logical or physical) provided by a <<System>>. A <<System Port>> may implement a <<Port Type>>, though there is no requirement for <<System Port>>s to be typed. (MM). (Webster's): 1. A data connection in a computer to which a peripheral device or a transmission line from a remote terminal can be attached. 2. An entrance to or exit from a data network. 3. A connection point for a peripheral device.

Process -- A logical, systematic sequence of activities, triggered by an event, producing a meaningful output.

Related Terms -- Activity, Process, Function, Job, Chore, Assignment.

Source Definitions -- (DoDAF): A group of logically related activities required to execute a specific task or group of tasks. (Army Systems Architecture Framework) Note: Multiple activities make up a process. (SPAWAR) (DoDAF/CADM): (see Function above) (NAF): A predetermined course of events defined by its purpose or by its effect, achieved under given conditions. (GEN TERM) (NAF): Operational Process: An Operational Process is a logical sequence of activities that is triggered by an event and transforms a specific input into a meaningful output. (ARCH ELEM) (Zachman): A kind of ACTIVITY performed by the enterprise to produce a specific output or achieve a goal. It may or may not be described in terms of the MECHANISMS or the PARTIES performing it. A set of PROCESSES is usually described in sequence. (American Heritage Dictionary): 1. A systematic series of actions directed to some end. 2. A continuous action, operation, or series of changes taking place in a definite manner. 3. The action of going forward or on. 4. The condition of being carried on. (Webster's): 1. A natural phenomenon marked by gradual changes that lead toward a particular result. 2. A continuing activity or function. 3. A series of actions or operations conducing to an end. (UDEF): Any data or information about a definable course of events distinguishable by its purpose or by its effect, whether natural, manual, automated or machine supported and which is relevant to the enterprise.

Program -- A directed funded effort that provides a new, improved, or continuing materiel, weapon or information system or service capability in response to an approved need.

Related Terms -- Project.

Source Definitions -- (AR 70-1): A directed funded effort that provides a new, improved, or continuing materiel, weapon or information system or service capability in response to an approved need.

Quality of Services -- The ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow.

Related Terms -- activity Performer Overlap Type Instance of Measure activity Resource Overlap Type Instance of Measure.

Source Definitions -- (Answers.com): The ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow.

Rate Throughput -- The ratio of the effective or useful output to the total input in any system.

Related Terms -- Performance Measure.

Source Definitions -- (SEI): the amount of work that can be performed by a computer system or component in a given period of time [IEEE 90]. (WordNet, throughput): output relative to input; the amount passing through a system from input to output (American Heritage, efficiency): The ratio of the effective or useful output to the total input in any system. (Wikipedia, business throughput): In the business management Theory of Constraints, throughput is the rate at which a system produces money.

Relationship -- A connection, association, or involvement.

Related Terms -- Tuple, Tuple Type.

Source Definitions -- (dictionary.com): a connection, association, or involvement. WordNet: relation: an abstraction belonging to or characteristic of two entities or parts together [2011 Nov 01].

Reliability -- A category of measures of the ability of a Performer to perform its required Activities under stated conditions for a specified period of time.

Related Terms – measure of Individual and measure of Type applied to Individual Performer and Performer (a type).

Source Definitions -- (SEI): the ability of a system or component to perform its required functions under stated conditions for a specified period of time [IEEE 90].

Requirement -- A singular documented need of what a particular product or service should be or do.

Related Terms -- Rule.

Source Definitions -- (WordNet): require -- consider obligatory; request and expect (Wikipedia): In engineering, a requirement is a singular documented need of what a particular product or service should be or do. It is most commonly used in a formal sense in

systems engineering or software engineering. It is a statement that identifies a necessary attribute, capability, characteristic, or quality of a system in order for it to have value and utility to a user.[Young, Ralph R. Effective Requirements Practices. Boston: Addison-Wesley, 2001. See also RalphYoung.net, a website devoted to requirements-related topics.] In the classical engineering approach, sets of requirements are used as inputs into the design stages of product development. Requirements show what elements and function are necessary for the particular project. In systems engineering, a requirement can be a description of what a system must do, referred to as a Functional Requirement. This type of requirement specifies something that the delivered system must be able to do. Another type of requirement specifies something about the system itself, and how well it performs its functions. Such requirements are often called Non-functional requirements, or 'performance requirements' or 'quality of service requirements.' Examples of such requirements include availability, testability, maintainability, and ease-of-use. (Dictionary.com): require -- to call for or exact as obligatory; ordain, to place under an obligation or necessity.

Resource Flow --.

Related Terms – resource Consumed by Activity, resource Produced by Activity.

Source Definitions -- (DoDAF 2.0): The behavioral and structural representation of the interactions between activities (which are performed by performers) that is both temporal and results in the flow or exchange of things such as information, data, materiel, and performers.

Responsibility -- Answerable or accountable, as for something within one's power, control, or management.

Related Terms -- Association between a Performer and an Activity by or under an Agreement between an authority Performer and a performing Performer that performing Performer perform Activities in accordance with certain Metrics, Rules, Conditions, and Locations.

Source Definitions -- (Dictionary.com): 1. answerable or accountable, as for something within one's power, control, or management (often fol. by to or for): He is responsible to the president for his decisions. 2. involving accountability or responsibility: a responsible position. 3. chargeable with being the author, cause, or occasion of something (usually fol. by for): Termites were responsible for the damage. 4. having a capacity for moral decisions and therefore accountable; capable of rational thought or action: The defendant is not responsible for his actions. 5. able to discharge obligations or pay debts. 6. reliable or dependable, as in meeting debts, conducting business dealings, etc. 7. (of a government, member of a government, government agency, or the like) answerable to or serving at the discretion of an elected legislature or the electorate.

Restraint -- to moderate or limit the force, effect, development, or full exercise of.

Related Terms -- Rule.

Source Definitions -- (Webster's) to moderate or limit the force, effect, development, or full exercise of.

Role -- A set of similar or otherwise logically related activities, implying a set of skills or capabilities, to which a performer may be assigned.

Related Terms -- Performer, Activity, and their overlap.

Source Definitions -- (DoDAF): A function or position. (Webster's) (DoDAF/CADM): Operational Role: The specification of a set of abilities required for performing assigned activities and achieving an objective. (DDDS Counter (19607/1)(A)) (MODAF): A function or position filled by a person or organisation. (NAF): An aspect of a person or organisation that enables them to fulfill a particular function. (MM) (IDEAS): An Agent Role is an Agent State where the agent is conducting processes. (Webster's): 1. A function or position. 2. The actions and activities assigned to or required or expected of a person or group. (WordNet): What something is used for; the function of an auger is to bore holes; ballet is beautiful but what use is it? [synonym: function] (OASIS EA file): A role is an identified relationship between a participant and a social structure that defines the rights, responsibilities, qualifications, and authorities of that participant within the context of the social structure.

Schedule Dependency -- Schedule dependencies deal with Resources that an Activity requires in order to proceed.

Related Terms -- Before after relationships between Activities and Resources.

Source Definitions -- (DISA doc TBS): Schedule dependencies include capabilities that a program is relying upon to meet life-cycle events. For example, program Alpha needs functionality from Program Bravo in order to meet milestone B.

Security Measure -- A measure of the ability of a Performer to manage, protect, and distribute sensitive information.

Related Terms -- Performance Measure.

Source Definitions -- (SEI): the ability of a system to manage, protect, and distribute sensitive information.

Service Level Agreement -- Part of a service contract where the level of service is formally defined.

Related Terms -- Agreement, Constraint.

Source Definitions -- (Answers.com): Part of a service contract where the level of service is formally defined.

Service Function -- White box implementation of the Activities of the Service.

Related Terms -- Activity known to be a Service Function when it is performed by a Service.

Source Definitions -- (MODAF): White box description of the Activities of the Service. OASIS SOA RA: Action is the application of intent by a participant (or agent) to achieve a real world effect.

Service Policy -- An agreement governing one or more Services.

Related Terms -- Agreement, Constraint.

Source Definitions -- OASIS SOA RA: As described in the Reference Model, a policy is the representation of a constraint or condition on the use, deployment, or description of an owned entity as defined by any participant. A contract is a representation of an agreement between two or more participants. Technically, the only difference between a policy and a contract is the agreement between two or more parties to a contract and the enforceability of a policy by one party on other parties.

SoA Service -- A distinct part of the functionality that is provided by a technical system on one side of an interface to a general system on the other side of the interface (Derived from IEEE 1003.0). Characterized by transparency, autonomy, loose coupling, and discovery.

Related Terms -- composite term.

Source Definitions -- (DoDAF): Service Oriented Architecture is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. It provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable (DoDAF/CADM): A business or computational resource available within an enterprise that can be linked on demand to achieve a desired result. (NAF): Service: A type of delivered functionality, specified independently of the capabilities that provide it. Note: A service may or may not have a physical effect on its environment. (MM). (Wikipedia): An architectural style that guides all aspects of creating and using business processes, packaged as services, throughout their lifecycle, as well as defining and provisioning the IT infrastructure that allows different applications to exchange data and participate in business processes loosely coupled from the operating systems and programming languages underlying those applications.

System of Systems -- A set or arrangement of interdependent systems that are related or connected to provide a given capability. The loss of any part of the system could significantly degrade the performance or capabilities of the whole. The development of an SoS solution will involve trade space between the systems as well as within an individual system performance.

Related Terms -- Systems that have interface overlaps necessary to achieve Capabilities.

Source Definitions -- (CJCSI 3170.01F): A set or arrangement of interdependent systems that are related or connected to provide a given capability. The loss of any part of the system could significantly degrade the performance or capabilities of the whole. The development of an SoS solution will involve trade space between the systems as well as within an individual system performance.

Source -- One, such as a person or document, that supplies information.

Related Terms -- pedigree model.

Source Definitions -- (Answers.com): One, such as a person or document, that supplies information.

Strategy -- A long-term plan to achieve pre-set goals.

Related Terms -- Plan, project.

Source Definitions -- In the Business Motivation Model, Courses of Action are categorized as Strategies and Tactics. The model does not make a hard distinction between the two.

Enterprises define their own criteria. Strategies tend to be long term and fairly broad in scope. Each Strategy is implemented by Tactics, which tend to be shorter term and narrower in scope. A Tactic may contribute to the implementation of more than one Strategy. (BMM Concept Catalog): Definition: a course of action that is an element of a plan devised through the science and art of business leadership exercised to ensure the most advantageous conditions Dictionary Basis: the science and art of military command exercised to meet the enemy in combat under advantageous conditions [MWUD 'strategy' (1a2)] Dictionary Basis: a careful plan or method or a clever stratagem [MWUD 'strategy' (2a)] Note Compared to a tactic, a strategy tends to be: longer term; broader in scope.

System Function -- A function that is performed by a system. Although commonly used to refer to the automation of activities, data transformation or information exchanges within IT systems, it also refers to the delivery of military capabilities.

Related Terms -- Activity, Process, Function, Job, Chore, Assignment.

Source Definitions -- (DoDAF): A data transform that supports the automation of activities or information elements exchange. (DoDAF/CADM): (Process Activity, catCode=2) the representation of a means by which a process acts on some input to produce a specific output. (DDDS Counter (4204/3)(A)) (MODAF): A function that is performed by a system. Although commonly used to refer to data transformation within IT systems it may also refer to the delivery of military capabilities such a ground manoeuvre or deep strike. (NAF): Function: An activity which is specified in context of the resource (human or machine) that performs it. Note1: Contrast with <<Operational Activity>>, where the actor performing the activity is not known (i.e., it is just a logical node). A <<Function>> is implementation-specific. Note2: Should the <<Function>> be specific to one usage of a type of system, then the usage Context is specified by a reference to the composite structure property <<Resource Composition>> typed by the system. (MM) (Zachman): Function: A type of ACTIVITY to carry out a MISSION, GOAL or OBJECTIVE of the enterprise. It is described solely in terms of what it is intended to accomplish, without regard to the technology used to carry it out or who is to perform it. This is also described without reference to time.

Tactic -- A short-term action used to accomplish a strategy.

Related Terms -- Plan, project.

Source Definitions -- (BMM Concept Catalog): Definition: a course of action that is a device or expedient to be employed as part of a strategy Note: Compared to a strategy, a tactic tends to be: shorter term and narrower in scope. Dictionary Basis: a device or expedient for accomplishing an end [MWUD 'tactics' (2b)] Dictionary Basis: a plan scheme or trick with a particular aim [ODE 'device' (2)] There is a de-facto correspondence between Course of Action and Desired Results. Generally, Strategies are selected to move the enterprise towards its Goals, and Tactics to ensure that it meets its Objectives. But this is not hard-wired into the model; enterprises can make the correspondences they need. Courses of Action do not necessarily have to support Desired Results directly; some are selected to enable other Courses of Action.

Tactics, Techniques, and Procedures -- The actions and methods that implement doctrine and describe how forces will be employed in operations.

Related Terms -- Activity, Rule, Organization and their inter-relationships.

Source Definitions -- (DOD) The actions and methods which implement joint doctrine and describe how forces will be employed in joint operations. They will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff.

Task -- A action, activity or undertaking enabling missions, activities or functions to be performed or accomplished.

Related Terms -- Activity, Process, Function, Job, Chore, Assignment.

Source Definitions -- (DoDAF): An action or activity (derived from an analysis of the mission and concept of operations) assigned to an individual or organization to provide a capability. (UJTL, CJCSM 3500.04D, 2005) (DoDAF/CADM): A directed activity.(DDDS Counter (290/2)(A)) (MODAF): A discrete unit of work, not specific to a single organisation, weapon system or individual, that enables missions or functions to be accomplished. (NAF): Enduring Task: A type of behavior recognized by an enterprise as being essential to achieving its goals – i.e., a strategic specification of what the enterprise does. (MM) (American Heritage Dictionary): 1. A function to be performed. 2. A definite piece of work assigned to, falling to, or expected of a person; duty. 3. Any piece of work. Potential *Related Terms*: function, activity, process activity. (Webster's): 1. A usually assigned piece of work often to be finished within a certain time. Potential *Related Terms*: (WordNet): 1. Any piece of work that is undertaken or attempted. 2. A specific piece of work required to be done as a duty. 3. A well-defined responsibility that is usually imposed by another.

Technical Dependency -- A Constraint on an Activity related to Performer(s) or Resource(s) needed.

Related Terms -- Rule to Performer Resource - Performer overlap Resource consumed by Performer.

Source Definitions -- (TBS): Technical dependencies include technical specifications (e.g. HTTP, FTP, etc.), network infrastructures (e.g. AirNet), and hosting environments (e.g. DISA's Denver, CO DECC).

Technology -- The application of science to meet one or more objectives.

Related Terms -- type of Project or Performer?.

Source Definitions -- (DoDAF/CADM): The application of science to meet one or more objectives.(DDDS Counter (19607/1)(A)) (American Heritage Dictionary): 1. The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science. 2. The terminology of an art, science, etc.; technical nomenclature. 3. A technological process, invention, method, or the like. 4. The sum of the ways in which social groups provide themselves with the material objects of their civilization. 5. The application of science, especially to industrial or commercial objectives.

6. The scientific method and material used to achieve a commercial or industrial objective. (Webster's): 1. The practical application of knowledge especially in a particular area. 2. A capability given by the practical application of knowledge. 3. A manner of accomplishing a task especially using technical processes, methods, or knowledge. 4. The specialized aspects of a particular field of endeavor.

Term -- A word or group of words having a particular meaning.

Related Terms -- Name.

Source Definitions -- (Answers.com): A word or group of words having a particular meaning WordNet: a word or expression used for some particular thing [2011 Nov 01].

Timeliness -- The time from the occurrence of an event to the time required action occurs.

Related Terms -- Performance Measure.

Source Definitions -- (DoDAF): Required maximum time from node to node expressed in seconds (CADM, timeliness code): The code that represents how quickly information should be transmitted using a specific Information Technology Requirement.

Trigger -- Something that happens at an instant in the world, i.e., a zero-duration process (Activity).

Related Terms -- Event or composite of Event and the Activity it triggers.

Source Definitions -- (DoDAF): Specifies the event that fires a transition. There can be at most one trigger per transition. (A Transition is defined in DoDAF as A relationship between two states indicating that an object in the first state will perform certain specified actions and enter the second state when a specified Event occurs and specified conditions are satisfied. On such a change of state, the transition is said to fire.) (DoDAF/CADM): (Events trigger Operational Mission Threads) (Webster's): Anything, as an act or event that serves as a stimulus and initiates or precipitates a reaction or series of reactions.

Trustworthiness -- A category of measures of the degree to which a Performer avoids compromising, corrupting, or delaying sensitive information.

Related Terms -- Performance Measure.

Source Definitions -- (SEI): the degree to which a system or component avoids compromising, corrupting, or delaying sensitive information.

Unit -- Any military element whose structure is prescribed by competent authority, such as a table of organization and equipment; specifically, part of an organization.

Related Terms -- Organization.

Source Definitions -- (JP 1-02): 1. Any military element whose structure is prescribed by competent authority, such as a table of organization and equipment; specifically, part of an organization. 2. An organization title of a subdivision of a group in a task force. 3. A standard or basic quantity into which an item of supply is divided, issued, or used. In this meaning, also called unit of issue. 4. With regard to Reserve Components of the Armed Forces, denotes a Selected Reserve unit organized, equipped, and trained for mobilization to serve on active duty as a unit or to augment or be augmented by another unit. Headquarters

and support functions without wartime missions are not considered units. (JC3IEDM): A military ORGANISATION whose structure is prescribed by competent authority. (Dictionary.com): an organized body of soldiers, varying in size and constituting a subdivision of a larger body. (WordNet): an organization regarded as part of a larger social group.

Used In -- Put into service.

Related Terms -- Description whole part.

Source Definitions -- (Answers.com): Put into service.

User -- Any actor (as defined above) that invokes an automated performer.

Related Terms -- Actor.

Source Definitions -- (DoDAF): Humans or machines who must exchange information in pursuit of their shared goals, interests, missions, or business processes and who therefore must have shared vocabulary for the information they exchange. (Webster's): A person who makes use of a thing; someone who uses or employs something.

Ways -- Doctrine, tactics, techniques, procedures, competency requirements, and organizing concepts.

Related Terms -- Rules, Guidance.

Source Definitions -- (BMM) TBD Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment, 9 April 2007: Doctrine, tactics, techniques, and procedures, competencies, and concepts.

Whole Life Enterprise --.

Related Terms -- Organization.

Source Definitions -- (MODAF 1.2): An Enterprise Phase that represents the whole existance of an enterprise. (Bailey email 2010-06-02): WLEP is also a phase, it's just that it lasts the whole life of the enterprise (hence it is a special case of an enterprise phase, and therefore a subtype).

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B.3 Relationship Terms.

activity Consumes Resource -- Represents that an activity consumes a resource.

Source Definitions -- (DoDAF-DoDAF WG): Represents that an activity consumes a resource.

activity Maps To Capability Type -- Represents that an activity was / is / can-be/ must-be conducted under certain conditions with a spatiotemporal overlap of the activity with the condition.

Source Definitions -- (DoDAF-DoDAF WG): Represents that an activity was / is / can-be/ must-be conducted under certain conditions with a spatiotemporal overlap of the activity with the condition.

activity Part of Capability -- A disposition to manifest an Activity. An Activity to be performed to achieve a desired effect under specified [performance] standards and conditions through combinations of ways and means.

Source Definitions -- (DoDAF-DoDAF WG): A disposition to manifest an Activity. An Activity to be performed to achieve a desired effect under specified [performance] standards and conditions through combinations of ways and means.

activity Part of Project Type -- A whole Part relationship between a Project and an Activity (Task) that is part of the Project.

Source Definitions -- (DoDAF-DoDAF WG): A whole Part relationship between a Project and an Activity (Task) that is part of the Project.

activity Performable Under Condition -- Represents that an activity was / is / can-be/ must-be conducted under certain conditions with a spatiotemporal overlap of the activity with the condition.

Source Definitions -- (DoDAF-DoDAF WG): Represents that an activity was / is / can-be conducted under certain conditions with a spatio-temporal overlap of the activity with the condition.

activity Performed by Performer -- An overlap between a Performer and an Activity that is non-specific as to whether:

1. the Activity is solely performed by the Performer.
2. the Activity is performed by several Performers.
3. the Performer performs only this Activity.
4. the Performer performs other Activities.

Source Definitions -- (DoDAF-DoDAF WG): An overlap of an Activity with a Resource, in particular a consuming or producing Activity that expresses an input, output, consumption, or production Activity of the Resource.

activity Produces Resource -- Represents that an activity produces a resource.

Source Definitions -- (DoDAF-DoDAF WG): Represents that an activity produces a resource.

axes Described by -- A relationship describing the straight lines about which bodies rotate.

Source Definitions -- (DoDAF-DoDAF WG): A relationship describing the straight lines about which bodies rotate.

before After -- A couple that represents that the temporal extent end time for the individual in place 1 is less than temporal extent start time for the individual in place 2.

Aliases -- proceeds, succeeds.

Source Definitions -- (IDEAS): A couple that represents that the temporal extent end time for the individual in place 1 is less than temporal extent start time for the individual in place 2.

Before After Type -- An association between two Individual Types signifying that the temporal end of all the Individuals of one Individual Type is before the temporal start of all the Individuals of the other Individual Type.

Source Definitions -- (IDEAS): An association between two Individual Types signifying that the temporal end of all the Individuals of one Individual Type is before the temporal start of all the Individuals of the other Individual Type.

business Service Standard Constrains Business Service -- The relationship between a Business Service and a Business Service Standard.

Source Definitions -- (DoDAF WG): The relationship between a Business Service and a Business Service Standard.

capability of Performer -- A couple that represents the capability that a performer manifests.

Source Definitions -- (DoDAF WG): A couple that represents the capability that a performer manifests.

condition Described by -- A tuple that asserts Information describes a Condition.

Source Definitions -- (DoDAF WG): A tuple that asserts Information describes a Condition.

coordinate Center Described by -- A relationship describing the midpoint of a position reference frame.

Source Definitions -- (DoDAF WG): A relationship describing the midpoint of a position reference frame.

described by -- A tuple that asserts that Information describes a Thing.

Source Definitions -- (DoDAF WG): A tuple that asserts that Information describes a Thing.

description of Desired Resource State Directs Activity -- The couple that represents how the description of Desired Resource State directs an Activity.

Source Definitions -- (DoDAF WG): The couple that represents how a desired effect directs an activity.

description of Rule Directs Activity -- The couple that represents how the description of Desired Resource State directs an Activity.

Source Definitions -- (DoDAF WG): The couple that represents how the description of Desired Resource State directs an Activity.

description Scheme Instance -- A representation Scheme Instance that asserts a Description is a member of a Description Scheme.

Source Definitions -- (DoDAF WG): A representation Scheme Instance that asserts a Description is a member of a Description Scheme.

desired Effect -- A desired state of a Resource.

Source Definitions -- (JP 1-02) Effect: (n) The result, outcome, or consequence of an action [activity].

desired Resource State Described by -- A tuple that asserts that Information describes a desired Resource State (Resource).

Source Definitions -- (DoDAF WG): A tuple that asserts that Information describes a desired Resource State (Resource).

desired Resource State of Capability -- A couple that represents the whole part relationship between a desired Resource State (Resource) and a Capability.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between a desired effect and a capability.

desired Resource State Realized by Project Type -- The couple that represents how a desired Resource State is realized by a Project Type.

Source Definitions -- (DoDAF WG): The couple that represents how a desired effect is realized by a project type.

desire Measure -- A measure of Type that relates a desired Resource State (Resource) to a Measure of Desire.

Source Definitions -- (DoDAF WG): A measure of Type that relates a desired Resource State (Resource) to a Measure of Desire.

effect Measure -- A measure of Type that relates a desired Resource State (Resource) to a Measure of Effect.

Source Definitions -- (DoDAF WG): A measure of Type that relates a desired Resource State (Resource) to a Measure of Effect.

enabling Service Activity Performed by Enabling Service -- The relationship between an Enabling Service Activity and an Enabling Service.

Source Definitions -- (DoDAF WG): The relationship between an Enabling Service Activity and an Enabling Service.

enabling Service Standard Constrains Enabling Service Activity -- The relationships between an Enabling Service Standard and an Enabling Service Activity.

Source Definitions -- (DoDAF WG): The relationships between an Enabling Service Standard and an Enabling Service Activity.

end Boundary -- A temporal whole part couple that relates the temporal boundary to the whole.

Source Definitions -- (IDEAS): The maximum time value of a temporal extent.

End Boundary Type -- A temporal whole part couple that relates the temporal boundary to the whole taken over a Type.

Source Definitions -- (IDEAS): The maximum value of a temporal extent taken over a Type, i.e., the maximum time value taken over all its members.

facility Part of Site -- A whole part association between a Facility (part) and the Site (whole) in which it resides.

Aliases -- project goals, objectives, desired outcomes.

Source Definitions -- (DoDAF WG): A whole part association between a Facility (part) and the Site (whole) in which it resides.

guidance Instance of Measure Type -- A couple that represents the relationship between types of measures and guidance.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between types of measures and rules.

guidance Shapes Activity -- Overlap between Guidance and Activity.

Source Definitions -- (DoDAF WG): Overlap between Guidance and Activity.

joint Action -- Relating two parts of a joint action.

Source Definitions -- (DoDAF WG): Relating two parts of a joint action.

line Part of Planar Surface -- A couple that represents the whole part relationship between Line and Planar Surface.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between Line and Planar Surface.

location Named by Address -- A relationship that represents a location being named by an address.

Source Definitions -- (DoDAF WG): A relationship that represents a location being named by an address.

materiel Part of Performer -- A whole-part association between a Performer (whole) and the Materiel parts of the Performer. (A Performer can have Personnel Type, System, Service, and Organizational components.).

Source Definitions -- (IDEAS): A whole-part association between a System (whole) and the Materiel parts of the System. (A System can have Personnel Type and Organizational components.).

measurable Skill of Person Role -- skill Part of Person Role is a member of Measure.

Source Definitions -- (DoDAF WG): skill Part of Person is a member of Measure.

measure of Individual -- A property of Individual that asserts an Individual is an instance of a Measure - i.e. the Individual has a property corresponding to the Measure.

Source Definitions -- (DoDAF WG): A property of Individual that asserts an Individual is an instance of a Measure - i.e. the Individual has a property corresponding to the Measure.

Examples:

A laptop weighing 2.2kg.

A car travelling between 40 and 50 km/h.

measure of Individual Point -- Point is a member of Measure.

Source Definitions -- (DoDAF WG): Point is a member of Measure.

measure of Type -- A property of Type that asserts an Individual Type is a subtype of a Measure - i.e. it asserts all members of the Individual type have a property corresponding to the Measure.

Source Definitions -- (DoDAF WG): A property of Type that asserts an Individual Type is a subtype of a Measure - i.e. it asserts all members of the Individual type have a property corresponding to the Measure.

Examples:

All Porsche 911 2.2S have a mass between 900 and 960 kg.

All atoms of mercury have an atomic weight of 200.59.

measure of Type Activity -- A measure of Type that relates an Activity to a Measure.

Source Definitions -- (DoDAF WG): A measure of Type that relates an Activity to a Measure.

measure of Type Condition -- Condition is a member of Measure.

Source Definitions -- (DoDAF WG): Condition is a member of Measure.

measure of Type Project Type -- Project Type is a member of Measure.

Source Definitions -- (DoDAF WG): Project Type is a member of Measure.

measure of Type Resource -- Resource Type is a member of Measure.

Source Definitions -- (DoDAF WG): Resource Type is a member of Measure.

measure of Whole Part Type -- whole Part is a member of Measure.

Source Definitions -- (DoDAF WG): whole Part is a member of Measure.

measure Type Applicable To Activity -- Type instance relationship between Activity and Measure Type.

Source Definitions -- (DoDAF WG): activity Type is a member of Measure Type.

named by -- A couple that asserts that a Name describes a Thing.

Source Definitions -- (IDEAS): A couple that asserts that a Name describes a Thing.

naming Scheme Instance -- A representation Scheme Instance that asserts a Name is a member of a Naming Scheme.

Source Definitions -- (DoDAF WG): A representation Scheme Instance that asserts a Name is a member of a Naming Scheme.

organization Type Part of Service -- Relationship describing an Organization Type being part of a Service.

Source Definitions -- (DoDAF WG): Relationship describing an Organization Type being part of a Service.

organization Type Part of System -- Relationship describing an Organization Type being part of a System.

Source Definitions -- (DoDAF WG): Relationship describing an Organization Type being part of a System.

overlap -- A couple of whole Part couples where the part in each couple is the same.

Source Definitions -- (IDEAS): A couple of whole Part couples where the part in each couple is the same.

Overlap Type -- An overlap in which the places are taken by Types only.

Source Definitions -- (IDEAS): An overlap in which the places are taken by Types only.

parties To An Agreement -- The two parties involved in an agreement.

Source Definitions -- (DoDAF WG): The two parties involved in an agreement.

person Role Part of Performer -- A whole Part between a Person Role and a Performer in which it performs.

Source Definitions -- (DoDAF WG): A whole Part between a Person Role and a Performer in which it performs.

point Part of Line -- A couple that represents the whole part relationship between a line and a point.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between a line and a point.

point Part of Planar Surface -- A couple that represents the whole part relationship between a planar surface and a point.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between a planar surface and a point.

property of Individual -- A type Instance that asserts an Individual is an instance of a Property - i.e. the Individual has a property.

Source Definitions -- (DoDAF WG): A type Instance that asserts an Individual is an instance of a Property - i.e. the Individual has a property.

Examples:

A product being expensive.

A laptop weighing 2.2kg.

A car travelling between 40 and 50 km/h.

property of Type -- A super Subtype that asserts an Individual Type is a subtype of a Property - i.e. it asserts all members of the Individual type have a property.

Source Definitions -- (DoDAF WG): A super Subtype that asserts an Individual Type is a subtype of a Property - i.e. it asserts all members of the Individual type have a property.

Examples:

All London Buses are red.

All Porsche 911 2.2S have a mass between 900 and 960 kg.

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real Property Type Facility Type Partition -- Partition between Real Property Type and Facility Type.

Source Definitions -- (DoDAF WG): Partition between Real Property Type and Facility Type.

Real Property Type Site Type Facility Type Partition Type -- The partition between the classes that are Real Property Types and those that are Facility Types or Site Types.

Source Definitions -- (DoDAF WG): The partition between the classes that are Real Property Types and those that are Facility Types or Site Types.

real Property Type Site Type Partition -- Partition between Real Property Type and Site Type.

Source Definitions -- (DoDAF WG): Partition between Real Property Type and Site Type.

region of Country Part of Country -- A couple that represents the whole part relationship between a country and a region within it.

Source Definitions -- (DoDAF WG): A couple that represents the whole part relationship between a country and a region within it.

representation Scheme Instance -- A type Instance that asserts a Representation is a member of a Representation Scheme.

Source Definitions -- (DoDAF WG): A type Instance that asserts a Representation is a member of a Representation Scheme.

represented by -- A couple that asserts that a Representation represents a Thing.

Source Definitions -- (DoDAF WG): A couple that asserts that a Representation represents a Thing.

resource In Location Type -- The relationship that describes the location of a performer or type of performer.

Source Definitions -- (DoDAF WG): The relationship that describes the location of a performer or type of performer.

rule Constrains Activity -- An overlap between a Rule and the Activities it allows.

Source Definitions -- (DoDAF WG): An overlap between a Rule and the Activities it allows.

rule Described by -- A tuple that asserts that Information describes a Rule.

Source Definitions -- (DoDAF WG): A tuple that asserts that Information describes a Rule.

service Described by -- A tuple that asserts that a Service Description describes a Service.

Source Definitions -- (DoDAF WG): A tuple that asserts that Information describes a Thing.

service Enables Access To Resource -- An overlap between the Service (i.e., mechanism) and the Resources (i.e., capabilities) to which it provides access.

Source Definitions -- (IDEAS): An overlap between the Service mechanism and the Performer capabilities it provides access to.

service Part of Organization Type -- Relationship describing a Service being part of an Organization Type.

Source Definitions -- (DoDAF WG): Relationship describing a Service being part of an Organization Type.

service Part of System -- Relationship describing a Service being part of a System.

Source Definitions -- (DoDAF WG): Relationship describing a Service being part of a System.

site Part of Installation -- A whole-part association representing that a Site (the part) is spatio-temporally contained within an Installation (the whole).

Source Definitions -- (DoDAF WG): A whole-part association representing that a Site (the part) is spatio-temporally contained within an Installation (the whole).

skill of Person Role -- A type property between a Person Role and the Skills it entails.

Source Definitions -- (DoDAF WG): A type property between a Person Role and the Skills it entails.

start Boundary -- The beginning of a temporal Boundary.

Source Definitions -- (IDEAS): The beginning of a temporal Boundary.

Start Boundary Type -- The beginning of a temporal Boundary Type.

Source Definitions -- (IDEAS): The beginning of a temporal Boundary Type.

system Part of Organization Type -- Relationship describing a System being part of an Organization Type.

Source Definitions -- (DoDAF WG): Relationship describing a System being part of an Organization Type.

system Part of Service -- Relationship describing a System being part of a Service.

Source Definitions -- (DoDAF WG): Relationship describing a System being part of a Service.

temporal Boundary -- The start and end times for the spatio-temporal extent of an Individual.

Source Definitions -- (IDEAS): A relationship between two or more things. Note: Tuples are identified by their places (i.e. the ends of the relationship).

Temporal Boundary Type -- The start and end times for the Individual members of a Type.

Source Definitions -- (IDEAS): A relationship between two or more things. Note: Tuples are identified by their places (i.e. the ends of the relationship).

temporal Whole Part -- A whole Part that asserts the spatial extent of the (whole) individual is co-extensive with the spatial extent of the (part) individual for a particular period of time.

Source Definitions -- (IDEAS): A whole Part that asserts the spatial extent of the (whole) individual is co-extensive with the spatial extent of the (part) individual for a particular period of time.

Temporal Whole Part Type -- A couple between two Individual Types where for each member of the whole set, there is a corresponding member of the part set for which a whole Part relationship exists, and conversely.

Source Definitions -- (IDEAS): A couple between two Individual Types where for each member of the whole set, there is a corresponding member of the part set for which a whole Part relationship exists, and conversely.

vision Realized by Desired Resource State -- The relationship that exists between a Vision and the specific desired Resource State (Resource) that realised it.

Source Definitions -- (DoDAF WG): The relationship that exists between a vision and the specific desired effect that realised it.