MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
COMMANDERS OF THE COMBATANT COMMANDS
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL OF THE DEPARTMENT OF
 DEFENSE
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DIRECTOR, ADMINISTRATION AND MANAGEMENT
DIRECTOR, PROGRAM ANALYSIS AND EVALUATION
DIRECTOR, NET ASSESSMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF DOD FIELD ACTIVITIES

SUBJECT: The Department of Defense Architecture Framework (DoDAF) Version 2.0

The DoD Architecture Framework (DoDAF) Version 2.0 is approved for immediate use. Version 2.0, which supersedes Version 1.5 released 23 April 2007, is the prescribed framework for all Department architectures, and represents a substantial shift in approach. It places emphasis upon a disciplined process of defining the purpose, scope and information requirements of the architecture up-front, followed by collection of data in accordance with a standard vocabulary. Data collected through the architectural process is delivered to the customer in either standard models or "Fit for Purpose" presentations.

DoDAF Version 2.0 accommodates artifacts and viewpoints created under version 1.5 and includes new Viewpoints to meet user requirements. While DODAF is the prescribed means of representing architecture content, the specific models developed are Selected by the user and defined by the processes which they support. DODAF Version 2.0 provides a richer, yet leaner methodology to document essential architectural content. Architectures shall comply with Version 2.0 in their next major release. DODAF version 2.0 is available at https://www.us.army.mil/suite/page/454707.

Version 2.0 consists of three volumes and a Journal:

- Volume 1 (Manager's Guide - Introduction, Overview, and Concepts) introduces DoD architecture concepts and provides general guidance for development, use, and management of DoD architectures.
- Volume 2 (Architect's Guide – Architectural Data and Models) describes the Meta-model data groups, and their associated models from a technical viewpoint.
- Volume 3 (Developer's Guide - DoDAF Meta-model Physical Exchange Specification) relates the Conceptual Data Model structure, Logical Data Model relationships, associations, and business rules to introduce the Physical Exchange Specification which provides the constructs needed to enable exchange of data and derived information among users and Communities of Interest.
- The DoDAF Journal provides a place for submitting future change requests to DoDAF or the DoDAF Meta-model, and provides the examples referenced in the various DoDAF volumes. The DoDAF Journal also contains supplementary "how to" information relating to architecture, architecture best practices, lessons learned, and reference documents.

Our future plans include the development of a "virtual DoDAF", that will allow for incremental changes based upon user feedback and DoDAF Core Management Group adjudication. The release of the "virtual DoDAF" will be announced via the DoDAF website referenced above. My point of contact for the DoDAF is Mr. Michael L. Wayson, (703) 607-0482, michael.wayson@osd.mil.

David M. Wennergren
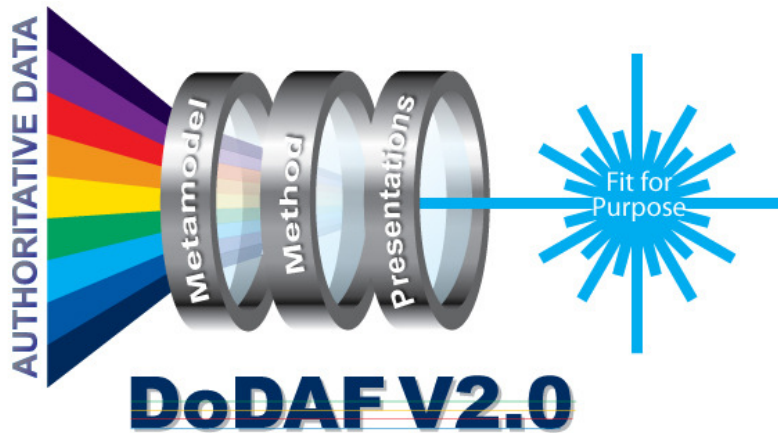Performing the Duties of the
ASD(NII)/DoD CIO

DoD Architecture Framework Version 2.0

Volume 3: DoDAF Meta-model

Physical Exchange Specification

Developer's Guide

28 May 2009

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1. INTRODUCTION

Department of Defense Architecture Framework (DoDAF) Version 2.0 introduces a DoDAF Meta-model (DM2), consisting of a Conceptual Data Model (CDM), Logical Data Model (LDM), and Physical Exchange Specification (PES) as an integral part of the architecture framework. Volume 3 introduces the DM2, which replaces the Core Architecture Data Model (CADM) referenced in previous versions of DoDAF.

The DM2 provides a means to collect architecture-related data, organize the data into useful information by architects and architecture Development Teams, store the information for later reuse, and facilitate management analysis of architectural data and information for decision-making purposes, as further described below.

This volume provides links for DoDAF PES files, the role of the PES and its' relationships, and guidance for actions that need to be taken when exchanging architectural data between architectures developed using the same or different versions of DoDAF.

2. PURPOSE

Collection, management, utilization, and reuse of architectural data and information are a complex task. Successful execution of that task requires knowledge of both data structures and the body of knowledge related to the purpose for which an architecture is being created i.e., "Fit-for-Purpose" as described in Section 2 of Volume 1.

If exchanging architectural data, the PES is the specification for the exchange. The PES provides an efficient and standard means to ensure that data sharing can occur in a toolset-agnostic, methodology-agnostic environment. Use of the eXtensible Markup Language (XML) Schema Definitions (XSDs) by architects to document architectural data and information in tools, through spreadsheets, or other means, and deposit that data and organized information into federated repositories is facilitated by the common understanding underlying the use of the PES.

3. DODAF PHYSICAL EXCHANGE SPECIFICATION

The PES is organized as a set of XML Schema Definition (XSD) files and is in the DoDAF Journal. The files are text format and an XML development application, Notepad, etc., will be required to view the files. The XSDs for each DoDAF-described View is listed in **Table 3-1**:

Table 3-1: List of Models and XSDs

Model	Model Name	XSD Filename
AV-1	Overview and Summary Information	AV1.XSD
AV-2	Integrated Dictionary	AV2.XSD
CV-1	Vision	CV1.XSD
CV-2	Capability Taxonomy	CV2.XSD
CV-3	Capability Phasing	CV3.XSD
CV-4	Capability Dependencies	CV4.XSD
CV-5	Capability to Organizational Development Mapping	CV5.XSD
CV-6	Capability to Operational Activities Mapping	CV6.XSD
CV-7	Capability to Services Mapping	CV7.XSD

Table 3-1: List of Models and XSDs

Model	Model Name	XSD Filename
DIV-1	Conceptual Data Model	DIV1.XSD
DIV-2	Logical Data Model	DIV2.XSD
DIV-3	Physical Data Model	DIV3.XSD
OV-1	High Level Operational Concept Graphic	OV1.XSD
OV-2	Operational Resource Flow Description	OV2.XSD
OV-3	Operational Resource Flow Matrix	OV3.XSD
OV-4	Organizational Relationships Chart	OV4.XSD
OV-5a	Operational Activity Decomposition Tree	OV5A.XSD
OV-5b	Operational Activity Model	OV5B.XSD
OV-6a	Operational Rules Model	OV6A.XSD
OV-6b	State Transition Description	OV6B.XSD
OV-6c	Event-Trace Description	OV6C.XSD
PV-1	Project Portfolio Relationships	PV1.XSD
PV-2	Project Timelines	PV2.XSD
PV-3	Project to Capability Mapping	PV3.XSD
StdV-1	Standards Profile	STDV1.XSD
StdV-2	Standards Forecast	STDV2.XSD
SvcV-1	Services Context Description	SVCV1.XSD
SvcV-2	Services Resource Flow Description	SVCV2.XSD
SvcV-3a	Systems-Services Matrix	SVCV3.XSD
SvcV-3b	Services-Services Matrix	SVCV3.XSD
SvcV-4	Services Functionality Description	SVCV4.XSD
SvcV-5	Operational Activity to Services Traceability Matrix	SVCV5.XSD
SvcV-6	Services Resource Flow Matrix	SVCV6.XSD
SvcV-7	Services Measures Matrix	SVCV7.XSD
SvcV-8	Services Evolution Description	SVCV8.XSD
SvcV-9	Services Technology & Skills Forecast	SVCV9.XSD
SvcV-10a	Services Rules Model	SVCV10A.XSD
SvcV-10b	Services State Transition Description	SVCV10B.XSD
SvcV-10c	Services Event-Trace Description	SVCV10C.XSD
SV-1	Systems Interface Description	SV1.XSD
SV-2	Systems Resource Flow Description	SV2.XSD
SV-3	Systems-Systems matrix	SV3.XSD
SV-4	Systems Functionality Description	SV4.XSD
SV-5a	Operational Activity to Systems Function Traceability Matrix	SV5.XSD
SV-5b	Operational Activity to Systems Traceability Matrix	SV5.XSD
SV-6	Systems Resource Flow Matrix	SV6.XSD
SV-7	Systems Measures Matrix	SV7.XSD
SV-8	Systems Evolution Description	SV8.XSD
SV-9	Systems Technology & Skills Forecast	SV9.XSD
SV-10a	Systems Rules Model	SV10A.XSD
SV-10b	Systems State Transition Description	SV10B.XSD
SV-10c	Systems Event-Trace Description	SV10C.XSD

4. EXCHANGE OF DM2 PES XML DOCUMENTS

The DM2 PES XML schema (XSD) provides a neutral format for data exchange between:

- EA databases.

- DoD Authoritative Source Databases (e.g., DoD Information Technology Portfolio Repository [DITPR]).

- Unified Profile for DoDAF and Ministry of Defence Architecture Framework (MODAF) (UPDM) and SysML-based Unified Markup Language (UML) Tools.

- Other Information Technology (IT) and enterprise architecture Tools.

- Modeling and Simulation Tools that are used in EA assessments, e.g., AoA's.

- Reporting Tools, e.g., for Chairman of the Joint Chief of Staff Instruction (CJCSI) or Department of Defense Instruction (DoDI) submission.

- Systems Engineering Tools.

- Other Federal agencies (e.g., Department of Homeland Security (DHS), Department of Justice (DoJ).

- Coalition partners and North Atlantic Treaty Organization (NATO).

- Other organizations with which DoD exchanges Enterprise Architecture (EA) data (e.g., industry, States, National Government Organizations [NGO's]).

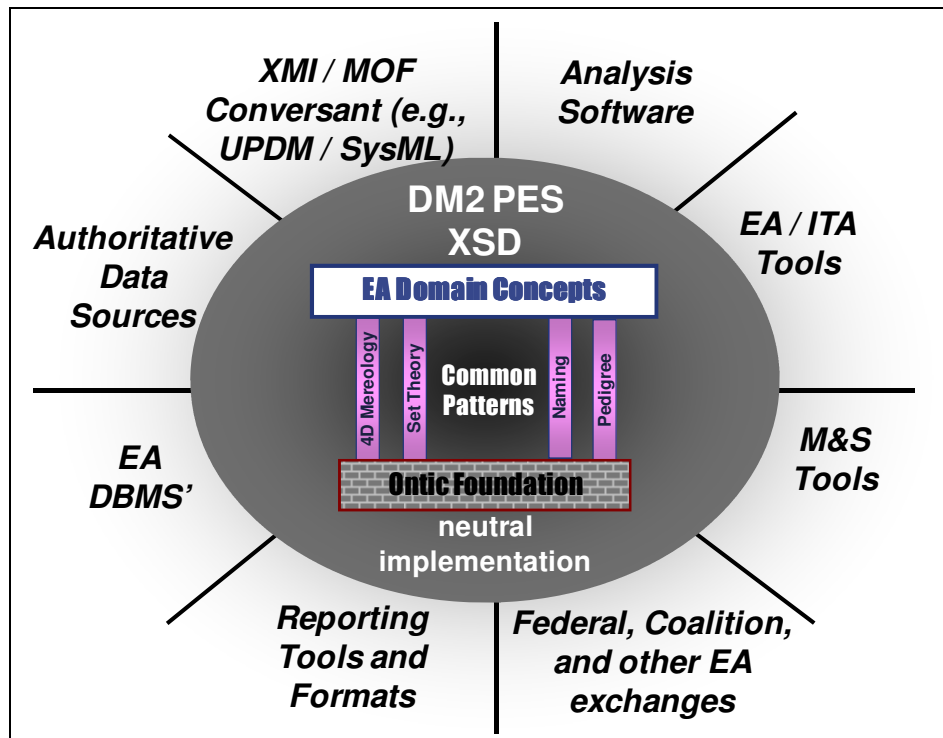This role is illustrated in **Figure 4-1**.

Figure 4-1: Illustration of DM2 Role in Providing a Neutral Model for Data Exchange

Note that within any particular community above, there may be a data exchange format particular to that community. A particularly important case is the UPDM-SysML XML Metadata Interchange (XMI) format for data exchange of UML models. XMI provides a neutral way to exchange model data, including diagram data, between UML tools. A universal DM2 PES to XMI translation will allow UPDM-SysML tools to interoperate with the other tools and data sources used in DoD EA.

The relationships between PES XSD, PES XML, XMI, UML, and SysML are illustrated in **Figure 4-2**:
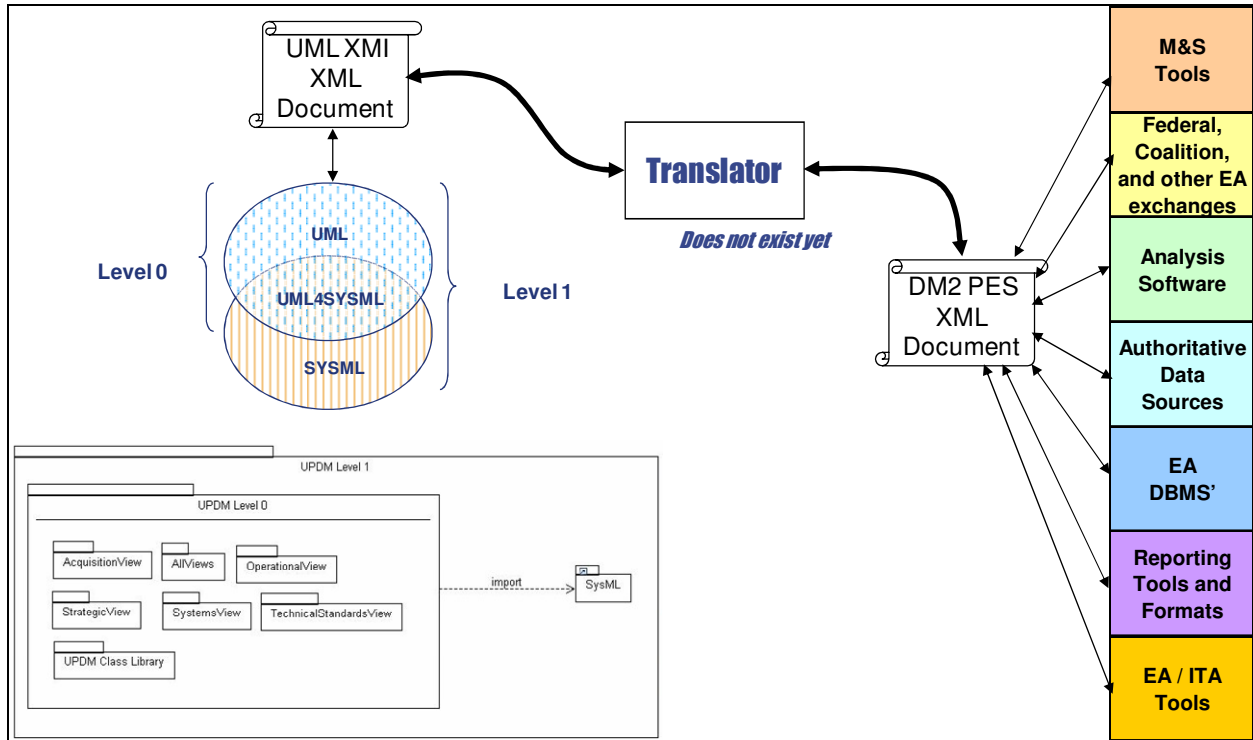

Figure 4-2: PES XSD, PES XML, XMI, UML, and SysML Relationships

Figure 4-2 shows on the left side is that UML and SYSML tools, when used in conjunction with UML4SYSML[1] can export and import XMI XML files (documents). XMI files are relatively complex because they contain all the information to exchange complete UML models between UML tools, including diagram layout and implementation details. So a translator needs to be developed that will translate those XMI XML documents to and from DM2 PES XML documents that the non-XMI tools and databases can import and export. The non-XMI tools and databases categories are shown on the right side of the diagram. The reasoning for this approach is that one XMI-PES translator will serve for <u>all</u> the UPDM/SYSML tools and for non-XMI tools and databases the simple and tool-agnostic DM2 PES format will be used as the exchange standard.

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[1] The underlying metamodel for SysML is called UML4SysML and is based on UML—an existing modeling language. UML4SysML contains the subset of UML concepts that are needed for systems modeling. SysML defines a graphical notation, based on UML, to represent the concepts in the metamodel.

5. DODAF V1.5 AND DODAF V2.0

As mentioned in Volume 2, architectural data will need to be exchanged between Architecture tools. Architectures developed in accordance with DoDAF V1.0 or V1.5 may need to exchange data with Architectures developed in accordance with DoDAF V1.0, V1.5, and V2.0.

DoDAF V1.0 and V1.0 architectures that use the Node concept will need to update the architecture to express the concrete concepts in place of the abstract concept that Node represents. When pre-DoDAF V2.0 architecture is compared with DoDAF V2.0 architecture, the concrete concepts that Node represents must be defined for the newer architecture.

Table 5-1 clarifies actions to be performed when exchanging information between Architectures developed on same or different versions of DoDAF.

Table 5-2: Exchange Actions betweens Architectures

Architecture Source	Architecture Target	Actions
DoDAF V1.0 or V1.5	DoDAF V1.0 or V1.5	Use CADM as the exchange basis.
DoDAF V1.0 or V1.5	DoDAF V2.0	Determine the DoDAF V2.0 concepts of the Nodes in DoDAF V1.0 or V1.5 Architecture. Export the DoDAF V1.0 or V1.5 architectural data. As a step of the export, transform the DoDAF V1.0 or V1.0 Node concept into the appropriate DoDAF V2.0 concepts using DoDAF PES Import the architectural data in accordance to the PES into DoDAF V2.0 Architecture.
DoDAF V2.0	DoDAF V1.0 or V1.5	Determine the DoDAF V2.0 concepts of the Nodes in DoDAF V1.0 or V1.5 Architecture Export the DoDAF V2.0 architectural data. As a step of the export, transform the appropriate DoDAF V2.0 concepts into the appropriate DoDAF V1.0 or V1.0 Node concept. Import the architectural data in PES format into DoDAF V1.0 or V1.5 Architecture. Transformation into CADM format may be required.
DoDAF V2.0	DoDAF V2.0	Use PES as the exchange basis.

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APPENDIX A
ACRONYMS

Acronym	Definition
CADM	Core Architecture Data Model
CDM	Conceptual Data Model
CJCSI	Chairman of the Joint Chief of Staff Instruction
DHS	Department of Homeland Security
DITPR	DoD Information Technology Portfolio Repository
DM2	DoDAF Meta-model
DoDAF	Department of Defense Architecture Framework
DoDI	Department of Defense Instruction
EA	Enterprise Architecture
IT	Information Technology
LDM	Logical Data Model
MODAF	Ministry of Defence Architecture Framework
NATO	North Atlantic Treaty Organization
NGO	National Government Organizations
PES	Physical Exchange Specification
UML	Unified Markup Language
UPDM	Unified Profile for DoDAF and MODAF
XMI	XML Metadata Interchange
XML	eXtensible Markup Language
XSD	XML Schema Definition