BTA

BUSINESS TRANSFORMATION AGENCY

BEA Architecture Product Guide

March 14, 2008

Version History

Version	Publication Date	Author	Description of Change
1.0	August 15, 2006	Team IBM	Initial baseline BEA 4.0 release
1.1	March 2, 2007	Team IBM	Updated to reflect BEA 4.1 release
1.2	September 28, 2007	Team IBM	Updated to reflect BEA 5.0 release
1.3	March 14, 2008	SAIC Team	Updated to reflect BEA 5.0 final release

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Acronym List

Acronym	Definition
A-0	Context Diagram
APG	Architecture Product Guide
AV	All View (DoDAF) Acquisition Visibility (Business Enterprise Priority) Architecture Verification
AV-1	Overview and Summary
AV-2	Integrated Dictionary
BART	Business Architecture Reporting Tool
BDM	BEA Development Methodology
BEA	Business Enterprise Architecture
BEP	Business Enterprise Priority
BIP	BEA Improvement Proposal
BMA	Business Mission Area
BPD	Business Process Diagram
BPMI	Business Process Management Initiative
BPMN	Business Process Modeling Notation
BRM	Business Reference Model
BTA	Business Transformation Agency
BTG	Business Transformation Guidance
C4ISR	Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance
CADM	Core Architecture Data Model
CBM	Core Business Mission
DISR	DoD IT Standards Registry
DoD	Department of Defense
DoDAF	Department of Defense Architecture Framework
DoDD	Department of Defense Directive
DOORS	Dynamic Object Oriented Requirements System

Acronym	Definition
EA	Enterprise Architecture
ETP	Enterprise Transition Plan
FEA	Federal Enterprise Architecture
FIPS	Federal Information Processing Standard
FM	Financial Management
F&R	Findings and Recommendations
HRM	Human Resource Management
HTML	Hypertext Markup Language
IA	Information Assurance
ICOM	Input, Control, Output, Mechanism
IDEF0	Integrated Definition for Function Modeling
IDEF1X	Integrated Definition for Data Modeling
IE	Information Exchange
ISWG	Information Technology Standards Working Group
IT	Information Technology
LRP	Laws, Regulations and Policies
Multi CBM	Multiple Core Business Missions
MSSM	Materiel Supply and Service Management
MV	Materiel Visibility
OSD	Office of the Secretary of Defense
OV	Operational View
OV-2	Operational Node Connectivity Description
OV-3	Operational Information Exchange Matrix
OV-5	Operational Activity Model
OV-6a	Operational Rules Model
OV-6c	Business Process Model
OV-7	Logical Data Model
PV	Personnel Visibility

Acronym	Definition
RPA	Real Property Accountability
RPILM	Real Property and Installations Lifecycle Management
SA	System Architect (Telelogic)
SDE	System Data Exchange
SFIS	Standard Financial Information Structure
SME	Subject Matter Expert
SV	Systems and Services View
SV-1	Systems Interface Description
SV-5	Operational Activity to System Function Traceability Matrix
SV-6	Systems Data Exchange Matrix
SV-8	Systems Evolution Description
TRM	Technical Reference Model
TV	Technical Standards View
TV-1	Technical Standards Profile
WSLM	Weapon System Lifecycle Management

1. Introduction

The *Architecture Product Guide* (APG) for the Business Enterprise Architecture (BEA) describes the methods and modeling conventions for the development of All View (AV), Operational View (OV), Systems View (SV) and Technical Standards View (TV) products. These products will be used by the Business Transformation Agency (BTA) for the Department of Defense (DoD) Business Mission Area (BMA) in support of the warfighter. The APG supplies the guidance, rules and product descriptions necessary for developing products that comprise the BEA and provides supporting details on how to model relevant architecture products using the BEA Development Methodology (BDM). Guidance regarding development and usage of the BEA in the overall context of DoD business transformation is presented in the Business Transformation Guidance (BTG) document. This document also compiles best practices that have been tried and tested across the BEA lifecycle. In addition to this document, the End-to-End Process provides guidance on specific documentation, approvals and sequencing of BEA development tasks. This document is intended to provide BEA practitioners the guidance and knowledge needed to maintain and extend the BEA.

1.1. Purpose and Scope

For each product and associated elements developed by BTA for the BEA, the APG provides a summary description of the purpose, structure, representation, relationship to other BEA products, applicable modeling standards and conventions used in architecture development and maintenance. The intent is to document applicable rules, and provide modelers/analysts with a user guide that describes how to create and define the products developed in support of the BEA.

The APG is intended for an audience that understands the DoD Architecture Framework (DoDAF) and has Telelogic System Architect (SA) training and/or experience. This document does not address guidelines for the Systems Evolution Description (SV-8), which is a BEA Transition Plan product and is external to SA.

The primary information sources used to develop, revise and update this document are: *DoD Architecture Framework* (DoDAF), *Integrated Definition for Function Modeling* (IDEF0), Federal Information Processing Standard (FIPS), *Integrated Definition for Data Modeling* (IDEF1X) and *Business Process Modeling Notation* (BPMN).

All approved Decision Memorandums through BEA 5.0 have been incorporated into this document.

1.2. Document Organization

The APG consists of the following sections:

Section 1 – Introduction – Describes the purpose and scope of the APG and the document's organization.

Section 2 – Key Concepts – Summarizes the proper structure of DoDAF conformant architectures and how those products should be integrated.

Sections 3 through 14 – Guidelines – Describes, in separate sections, the specific modeling methods and conventions to be followed in developing or maintaining each product built for the BEA. The ordering for these sections directly complies with the ordering of development of architecture products for BEA as documented in the BEA Development Methodology (BDM).

Appendix A – References – Lists the references cited in this document.

Appendix B – Product Checklists – A set of tests to verify conformance to the APG.

Appendix C – Glossary – A list of terms and existing descriptions used in this document.

Appendix D – Business Enterprise Priority (BEP) AV-1 Template – A template used to prepare the AV-1 document.

Appendix E – BEA Improvement Proposal (BIP) Template – A template used to prepare the BEA Improvement Proposal document.

2. Key Concepts

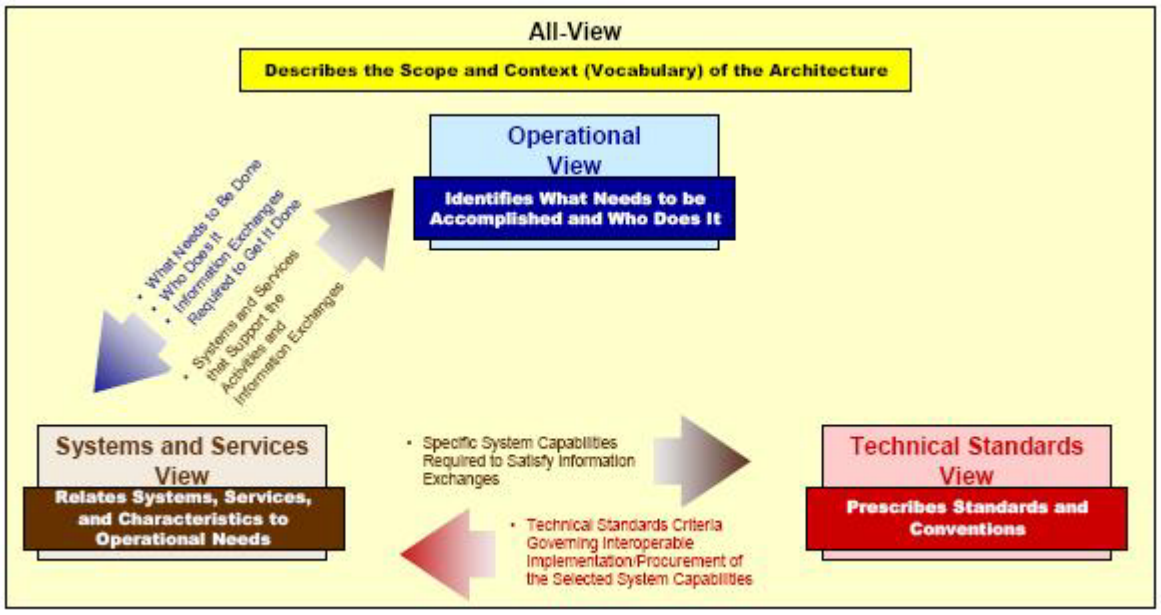
The BEA is the enterprise architecture for DoD's Business Mission Area. The BEA defines the Department's business transformation priorities, the Business Capabilities required to support those priorities and the combinations of systems and initiatives that enable these capabilities. This section describes key concepts required to understand the BEA guidelines for developing a set of integrated DoDAF products, including All View, Operational View, System View and Technical Standards View products.

2.1. DoD Architecture Framework Architecture Conventions

The BEA is an integrated architecture, as defined by DoDAF. There are four architecture views: the All View (AV), the Operational View (OV), Systems View (SV) and Technical Standards View (TV). Each view is composed of sets of architecture products depicted through graphic, tabular, or textual documents. Each of the four views depicts certain architecture attributes. Some attributes integrate multiple products, providing integrity, coherence and consistency to the architecture.

Figure 2-1 shows the relationship of the views to one another, as defined by DoDAF. The OV describes the business in terms of its operational requirements to meet specific objectives (missions), according to a high-level operational concept. In turn, the OV drives the SV to identify systems and associated System Functions. The TV then provides a common set of standards applicable to meeting system requirements defined by the SV. To be internally consistent and integrated, DoDAF requires that the architecture provide explicit linkages among these views. The subsections that follow provide a more detailed description of each of the views and its application to the BEA.

Figure 2-1, OV-SV-TV Relationship



2.1.1. All View

The BEA AV products provide information pertinent to the entire architecture but do not represent a distinct view of the architecture. The BEA AV-1 contains the Overview and Summary Document and the integrated dictionary.

2.1.2. Operational View

The BEA OV is a description of the tasks and activities and related operational information required to accomplish DoD business missions. The OV contains graphical and textual products that describe the operational concept associated with accomplishing the business mission, identifies the Operational Nodes and assigned Activities and the Information Exchanges (IEs) required between Operational Nodes to fulfill the operational concept. It defines the types of information exchanged, which activities are supported by the IEs, which roles support those activities, and the nature of the IEs.

For the BEA, the OV shall be developed to address the following objectives:

- Adoption of Leading Practices for the Business Mission Area (BMA), where appropriate, to optimize business operations.
- Resolution of material weaknesses where applicable.
- Establishment of systems and technology that support Business Processes and Operational Activities.
- Continuous transformation of DoD business operations to support the warfighter.
- Establishment of common business practices across all Components of DoD.
- Establishment of commonly used Data Elements, Entities and Attributes across all Components of DoD.
- Identification of Laws, Regulations and Policies that constrain Operational Activities.

2.1.3. Systems and Services View

The BEA SV is a set of graphical and textual products that describe systems and interfaces and their source and destination functions enabling or supporting DoD activities for the BMA. The SV associates systems capabilities to the OV. These system capabilities support the Operational Activities and facilitate the exchange of information among Operational Nodes.

The BEA SV shall address the following objectives:

- Establishment of System Functions that automate applicable Operational Activities or portions of those Operational Activities.
- Resolution of material weaknesses where applicable.
- Enablement and facilitation of operational tasks and activities through the application of physical resources.
- Evolution of existing systems to meet operational requirements.
- Identification of gaps supporting DoD business operations and transformation

2.1.4. Technical Standards View

The TV products contain the set of standards that govern the arrangement, interaction and interdependence of system parts. The TV ensures that a system adhering to a set of standards can provide the required capabilities to satisfy a specified set of operational requirements. The TV provides the technical systems implementation guidelines for basic engineering specifications and common building blocks. The TV may include a collection of the technical standards implementation conventions, standards options and rules. Furthermore, the TV organizes criteria into profiles that govern systems and system elements for BEA.

2.2. Architecture Product Integration

An integrated architecture has designated, common points of reference linking the OV, SV, TV and AV products. An architecture is defined as integrated when its products and constituent architecture objects are developed such that those architecture objects defined in one view are the same (names, definitions and properties) when referenced in another view.

Each product has a section that describes the relationship to other products within the BEA to show how individual products are integrated and linked across views. The Appendix includes references to BEA products that may not be included in the current BEA release Future updates of the APG will include appropriate guidelines for any additional products and relationships included in later releases of the BEA.

3. AV-1 – Overview and Summary Information

3.1. Summary Description

This section describes the AV-1 architecture product and its relationship to other BEA products and the modeling guidelines used for development of the AV-1.

3.1.1. Product Purpose

The AV-1 Overview and Summary Information document provides executive-level information in a consistent form to identify the Purpose and Viewpoint, Context and Scope of the Business Enterprise Architecture (BEA) for each deliverable.

3.1.2. Product Structure

The BEA AV-1 is a document without diagrams or matrixes.

For BTA, there are two levels of the AV-1 that are developed for each deliverable, the Business Enterprise Priority (BEP) level AV-1 and the BEA level AV-1.

- The BEP AV-1 is developed by each BEP and serves as a planning guide during the initial phases of architecture development for each deliverable, as well as a reporting mechanism for identifying findings and recommendations during the final phases of the development cycle. The BEP AV-1 is used to describe the BEP and to determine the scope of the body of work that the BEP plans to develop during a deliverable. The scope of the BEP AV-1 is detailed in Business Improvement Proposals (BIPs) created by BEPs for each body of work that is planned for a specific release of the BEA. The BIP is the basis for opening Parent and Child Change Requests at the beginning of the development cycle. (Refer to the BEA Development Methodology (BDM) for a more detailed description of BEA procedures during the release cycle.)
- BEP AV-1 Findings and Recommendations (F&Rs) are reported in two parts. Part 1 is a review of the work identified in the BIPs for completeness and specific mappings of BEP Objectives to architecture achievements. Part 2 contains other BEP Findings and Recommendations. New F&Rs are developed, previously documented F&Rs are updated, and a disposition of the F&R is provided on the BEP F&R. Both the initial BEP AV-1 and the F&R (Parts 1 and 2) encompass the final BEP AV-1 document.
- The BEA AV-1 is a summary at the Enterprise level that incorporates the Purpose and Viewpoint, Context, and Scope and Findings and Recommendations for all BEPs. Using the content from all of the BEP AV-1s, the BEA AV-1 is developed, finalized, and delivered by the AV-1 team at the end of the BEA product development cycle. The BEA AV-1 follows the same format as the BEP AV-1.

3.1.3. Relationship to Other BEA Products

The AV-1 document is the high level overview and summary for the BEA. The scope of the development effort for each BEP during each development cycle will determine which BEA products are affected.

- Any AV-1 related term with specialized meaning must be defined, as AV-2 Terms. All acronyms must be defined in the AV-2 Acronym list.
- The BEP and BEA level AV-1 documents are the authoritative source for terms that are also used in the Enterprise Transition Plan (ETP) and the BTG.

3.2. Developing the AV-1

Guidance on developing the BEP AV-1 is found within the *BEP AV-1 Template* in Appendix D. Guidance on developing the Business Improvement Proposal (BIP) is found within the *BIP Template* in Appendix E.

4. AV-2 – Integrated Dictionary

4.1. Summary Description

This section describes the AV-2 Integrated Dictionary architecture product and its relationship to other BEA products, the model development method, and the modeling guidelines used for development of the AV-2.

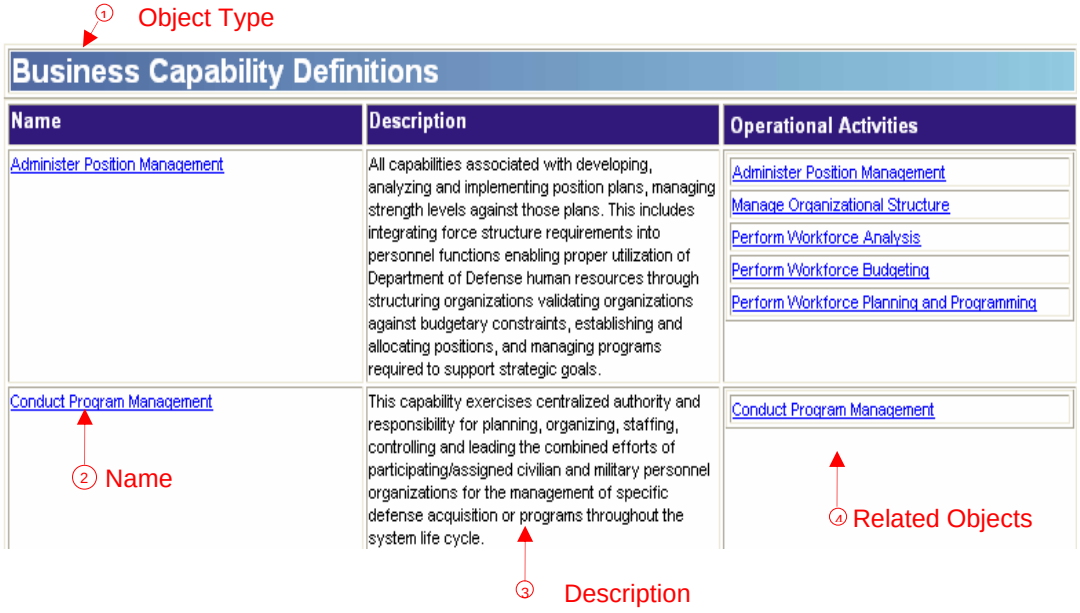
4.1.1. Product Purpose

The AV-2 is the Integrated Dictionary for the BEA. It is a primarily automatically derived product and is the central source for all descriptions that are used in the other BEA products in the SA encyclopedia.

4.1.2. Product Structure

The AV-2 is in a table format. Each description name is classified and located in the AV-2 by its object type; such as, Business Capability, Operational Activity, or System Function. Within each object type, each definition contains the Name and Description. For some Object Types, the definition may also contain a column for related objects. An example from the AV-2 for Business Capabilities is provided in Figure 4-4-1, AV-2 Integrated Dictionary:

Figure 4-4-1, AV-2 Integrated Dictionary



1. **Object Type:** The major classification scheme in the AV-2.
2. **Name**: The specific name of an instance of the Object Type.
3. **Description:** The full description (definition) of the listed Name.
4. **Related Object:** To assist in placing the specific Name in context, some Object Types in the AV-2 are related to other objects based on important relationships in the BEA. In this example, Business Capabilities are related to one or more Operational Activities.

There are cases in the AV-2 where the same description name may be listed separately under more than one object type, but with different descriptions due to its usage and context in the BEA. There are also limited cases of different description names in different object types with the same description, due the development process for that description name.

4.1.3. Relationship to Other BEA Products

The AV-2 relates to all the other BEA products.

- All objects from selected deliverable object types (e.g. Operational Activity, Entity or Business Rule) from other BEA products must be listed and defined in the AV-2.
- Any terms with specialized meaning must be defined as *term descriptions* in the AV-2; these specifically include, but are not limited to, descriptions of all deliverable architectural object types.
- General classes that apply to all architectural products and create a context for the architecture are listed and defined in the AV-2:
  - Acronym Descriptions
  - BEP Descriptions
  - Term Descriptions. Any terms with specialized meaning must be defined as *term descriptions* in the AV-2; these specifically include, but are not limited to, descriptions of all deliverable architectural object types.

4.2. Developing the AV-2

The System Architect SA encyclopedia is the basis of the AV-2. SA automatically generates the AV-2 with all descriptions from the BEA products that are in the SA encyclopedia. In addition, the AV-2 Integrated Dictionary has two manually entered sections that are populated during the encyclopedia deliverable workshops:

Acronyms – Each acronym used in the BEA is listed with its description. When the same acronym is listed in both the BEA and BTG, the acronym descriptions must be the same.

Terms – Terms are selected standard concepts used in the both the BEA. When the same term is listed in both the BEA and the BTG, the term descriptions must be the same.

The BEP and BEA Team that develops a BEA product also develops the initial descriptions for terms used in conjunction with that BEA product. The AV-2 Team may refine the description, subject to approval by the team that developed it, before manually entering it in this section of the AV-2.

As a BEA release is being developed, it is the responsibility of the BEP and BEA Teams to:

- Identify and define necessary terms and descriptions.
- Modify AV-2 entries, if necessary.
- Delete AV-2 entries upon ensuring that the entry is no longer needed, even for historical references.
- Provide key source information and other descriptive information, where deemed helpful.

4.3. AV-2 Problems to Avoid

This section discusses lessons learned from previous AV-2 architecture development and mentions common modeling pitfalls and mistakes to avoid while generating the AV-2 architecture product.

4.3.1. AV-2 Lessons Learned

- Ensure that the AV-2 is generated after all of the BEA products are stabilized.
- Perform regular and early communication with other architecture product teams to assess impact of proposed changes in other products on the AV-2.
- Review BEA descriptions and coordinate with the BTG team to ensure all shared acronyms and terms have the same descriptions.
- Alignment with the BTG can be difficult because the BEA and BTG are not produced and delivered at the same time.

4.3.2. AV-2 Pitfalls

- Failure to ensure that all relevant BEA acronyms are included in the AV-2.

- Failure to ensure that all non-specific architecture product descriptions, such as Acronyms and Terms, are updated and coordinated with BTG team.

5. OV-5 – Operational Activity Model

5.1. Summary Description

This section describes the OV-5 architecture product and its relationship to other BEA products, the model development method, and the modeling guidelines used for development of the OV-5 Operational Activity Model.

5.1.1. Product Purpose

The BEA OV-5 Operational Activity model is the cornerstone architecture product for the BEA. The model describes what DoD does in the BMA, but does not connote how the activities are performed or the sequence of those activities. Other Enterprise Architecture products are built off of and aligned with the Enterprise OV-5 Operational Activity Model. For BEA, there shall be a single Enterprise-level OV-5 Operational Activity Model to represent the DoD Business Mission.

The BEA OV-5 Operational Activity model defines a set of Operational Activities, their relationships, and information requirements needed to optimally perform major DoD business operations. The model incorporates industry and government leading practices, examines doctrine and policy implications, and defines operational requirements.

An OV-5 Activity Model can be used to:

- Clearly delineate lines of responsibility.
- Make decisions to distinguish Core Business Mission (CBM)/BEP-specific Activities.
- Make decisions about streamlining, combining, or omitting Activities.
- Define or flag issues, opportunities, or information dependencies among Activities that need to be scrutinized further.
- Ensure that only pertinent data are managed by the Enterprise.
- Identify the context or framework on how certain aspects of the business will be performed.

5.1.2. Product Structure

The OV-5 product is represented with a single BEA OV-5 Activity Node Tree, or simply Node Tree, and multiple OV-5 Operational Activity Model diagrams as shown in the next two sections.

5.1.2.1. OV-5 Activity Node Tree

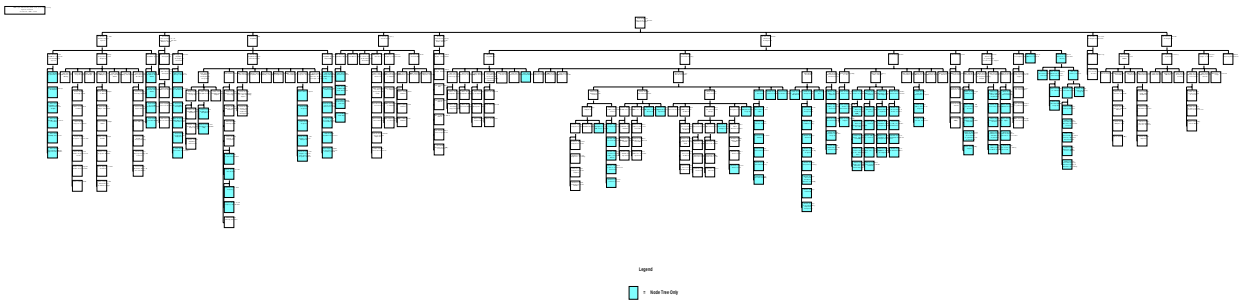
The first diagram constructed is the OV-5 Activity Node Tree, a functional, hierarchical decomposition of Operational Activities for the DoD BMA. The activities on the Node Tree shall be created and defined in accordance with DoD business needs, to include CBM-approved Business Capabilities, in accordance with any DoD initiatives or direction of the "To Be" world, and in alignment with the Federal Enterprise Architecture (FEA) Business Reference Model (BRM), where possible. This Node Tree will constrain the relationships of the activities on the OV-5 diagrams as each branch of Operational Activities on the Node Tree corresponds to an OV-5 Operational Activity Diagram. Additional Activities (indicated in light blue) are included on the Node Tree to capture the full scope of approved DoD Business Capabilities.

The Node Tree will represent Enterprise-level Operational Activities that define business functions covering the full scope of the BMA. The Node Tree is decomposed to a level that identifies the lowest-level activities that are performed at the Enterprise-level to support associated Business Capabilities. While other CBM/BEPs may be identified as stakeholders, meaning the activity is relevant to them, a primary CBM/BEP will always be responsible for defining its basic content. Further decomposition below the Enterprise level is not the province for BTA, but is the responsibility of the Components with a goal toward identifying Federation touchpoints.

Figure 5-1, OV-5 Operational Activity Node Tree Example is a sample Node Tree that illustrates the proper form for an Activity Node Tree Diagram. (It should not be considered representative the current BEA release.) There will be only one Activity Node Tree diagram for any BEA product release. The top box of the Node Tree diagram

shall be a single Operational Activity that is shown on the Context Diagram (A-0) of the Activity Model. All remaining Activities that appear in the OV-5 Activity Model shall then be arranged in their proper Parent-Child relationships beneath the A-0 activity.

Figure 5-1, OV-5 Operational Activity Node Tree Example



When the Node Tree is stabilized and approved, the OV-5 diagrams will be created with Inputs, Controls, Outputs and Mechanisms (ICOMs) identified for each Operational Activity during BEP sponsored workshops. All Operational Activities shall be defined so that they are distinct and are expressed at the correct level of decomposition. The Operational Activity definitions will be updated during future work, such as during workshops, when ICOMs are added to the diagrams and the activity definitions are updated to reflect them.

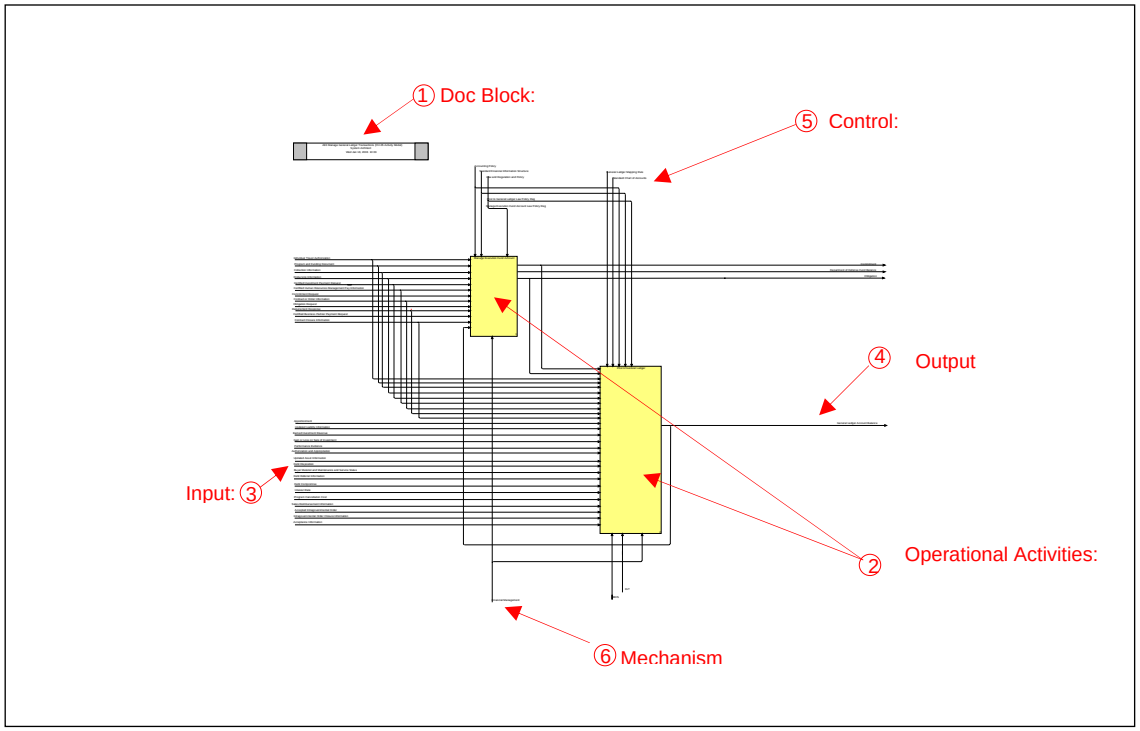
5.1.2.2. OV-5 Operational Activity Model Diagram

The OV-5 Operational Activity Model Diagram represents the Operational Activities and their information dependencies between Activities within the DoD BMA and external to the DoD BMA.

Associated with each Operational Activity, at any level of decomposition, is a description of the Activity, required information Inputs and Outputs of the Activity, Controls or Data Initiatives that direct or constrain the Activity, and Mechanisms that identify CBM(s) and the System(s)/Initiative(s) that perform the activity.

Figure 5-2 is an example of an Activity model for Manage General Ledger supporting the Financial Management CBM. (It should not be considered representative of the current BEA.)

Figure 5-2, Example OV-5 Model for Manage General Ledger Transactions



The objects used to represent the OV-5 Activity model are numbered as shown in Figure 5-2. The main features of this diagram are:

- **(1) Doc (title) block** is located in the upper left corner of the diagram. The title block contains the diagram name and type in the format "A83 Manage General Ledger Transactions (OV-5 Activity Model)", as well as the last modification date. The double gray bars show that it's a decomposition of a parent activity.
- **(2) Operational Activities** are the yellow rectangular shapes in the diagram. Figure 5-2 shows two Operational Activities, "Manage Execution Fund Account" and "'Post to General Ledger," which support Manage General Ledger Transactions. Operational Activities create or transform Outputs based on the Controls and Inputs
- **ICOMs** are the arrows representing Inputs, Controls, Outputs and Mechanisms.

  (3) Inputs – Information that is transformed or consumed by the Activity.

  (4) Outputs – Information that is produced by the Activity.

  (5) Controls – Identifies what Laws, Regulations and Policies and Data Initiatives constrain the Activity.

  (6) Mechanisms – Identifies which CBM and System, if identified, performs the Activity as well as any Initiative that will become a System in the future.

The BEA OV-5 Operational Activity models are developed in accordance with the specifications contained in this document, which are derived from DoDAF and IDEF0 modeling techniques. Exceptions to these standards that are required to develop this model shall be accommodated with appropriate approved authority and shall be incorporated within this document after each deliverable. The Enterprise OV-5 Activity Model will be used as a guide to restructure and update other OV and SV products as development continues in future releases of the BEA. This will ensure a complete, integrated and consistent architecture.

5.1.3. Relationship to Other BEA Products

5.1.3.1. OV-5 Activity Node Tree

The Node Tree is the basis for the integrated Enterprise OV-5 Activity Model. Every Operational Activity shown in the OV-5 Activity Model is represented in its proper hierarchy in the Operational Activity Node Tree. The Node Tree provides a navigation map for the OV-5 diagrams and a way to locate particular Operational Activities performed within the Enterprise.

5.1.3.2. OV-5 Activity Model

When the Activity Node Tree is stabilized and approved, Enterprise OV-5 Operational Activity Model diagrams are created for each level of the Node Tree.

The OV-5 Activity Model is related to other BEA products as follows:

AV-2 All OV-5 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

All OV-5 objects from these deliverable object types must be listed and defined in the AV-2 Terms:

- Business Capability Definitions
- ICOM Arrow Definitions
- Operational Activity Definitions

All acronyms must be listed and spelled out in the AV-2 Acronyms.

OV-2 Operational Nodes in the OV-2 represent logical groupings of leaf-level Operational Activities from the OV-5. The Activities are assigned to the Operational Nodes in the OV-2, and related leaf-level Inputs, and Outputs from the OV-5 are then translated to IEs that depict the required information flow represented on the OV-2 as Need Lines between Operational Nodes. The Operational Nodes are CBM(s) and are represented as Mechanisms on the OV-5 diagrams.

OV-3 Each leaf-level Input and Output ICOM Arrow on the OV-5 diagram connecting Operational Activities in Operation Nodes is represented as one occurrence of an IE in the OV-3. Several IEs can be linked to a leaf-level Input and Output ICOM Arrow.

OV-6a A Business Rule from the Operational Rules Model (OV-6a) may define conditions that constrain the execution of an Operational Activity in a specific way. A macro has been created to automatically generate External Control definitions, those that decompose from the Control *Laws, Regulations and Policies* (LRP), based on LRP mappings from DOORS to OV-6c Process Steps (through LRP IDs mapped to Business Rules in SA), which are in turn mapped to Operational Activities.

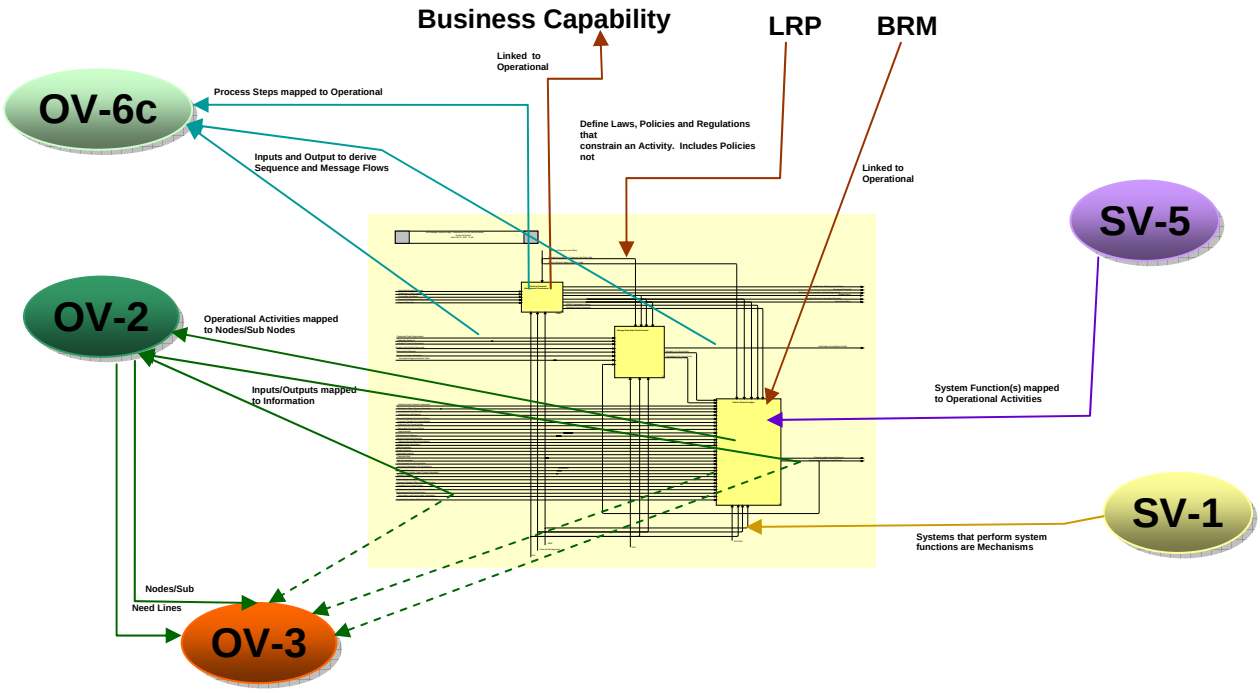
Note: The decision was made that Business Rules will not be linked to the OV-5. Business Rules shall only be linked to the OV-6c Process Steps.

OV-6c Process Steps in the Business Process Model (OV-6c) are derived from and link to Operational Activities in the OV-5. Data Objects in the OV-6c are related one to one to OV-3 Information Exchanges, which are mapped to the Inputs and Outputs of Operational Activities in the OV-5 Activity Model.

OV-7 Entities or Attributes within Entities in the OV-7 are derived from and linked to Inputs and Outputs on the OV-5 via the Information Exchanges in the OV-3.

SV-5 Operational Activities from the OV-5 are mapped to System Functions in the SV-5. BTA has created a modified SV-5 that shows Operational Activities mapped from Business Capabilities and to System Functions with the identified Enterprise System, if available, in the intersection.

Figure 5-3, Relationships between OV-5 and Other BEA Products



5.1.4. OV-5 Definitions

5.1.4.1. Operational Activity Node Tree Definitions

Operational Activities shall be defined using validated source information from existing/approved BEA Operational Activities, BRM definitions and CBM/BEP representatives. The definitions shall reflect the transformation, creation and/or consumption of information. The definitions should use standard terms from recognized DoD and commercial sources to the maximum degree practical. The following are definitions of the key elements contained in the Operational Activity Node Tree:

- **Parent Activity:** An Operational Activity that is decomposed into two to nine Operational Activities, or child activities. The definition of the Parent Operational Activity is the sum of the child Operational Activities and serves to set the scope of its decomposition.
- **Child Activity:** An Operational Activity that is a decomposition of a parent Operational Activity. It represents a functional aspect of its Operational Activity.
- **Hierarchy Chart Connectors:** These lines connect a Parent activity to its Child Activities and show the relationships between activities.

5.1.4.2. Operational Activity Model Definitions

The following are definitions of the key elements contained in Operational Activity Models:

- **Operational Activity:** An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence (for example, 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).
- **ICOM Arrows:** Represent the Inputs, Controls, Outputs and Mechanisms that define information relationships in an Activity Model.
  - **Inputs:** Information received from another Operational Activity, either internal or external to the model, which is needed for the given Operational Activity to be carried out.
  - **Controls:** Information that guides or constrains the way an activity is performed.

    In the BEA, there are two types of Controls - External and Internal.

- External Controls are decomposed from the *Laws, Regulations and Policies* parent Control and the definition of an External Control is generated based upon mappings of LRPs to process steps as maintained in the LRP Repository. External Initiatives are decomposed to the appropriate activity from this parent Control if they are not generated by a BEA activity.
- Internal Controls are Initiatives that are created as Outputs from other Operational Activities within the BEA OV-5 Activity Model. Internal Controls, while Outputs from other BEA Operational Activities, are not depicted as IEs in the OV-2 or OV-3 products.

  Initiatives, both External and Internal, can be one of the following:

  - **Data Initiatives**
  - **Policy Initiatives**
  - **Process Improvement Initiatives**

- **Outputs:** Information that has been transformed or created by the Operational Activity and sent to another internal Operational Activity or to an external activity (one outside the scope of the BEA BMA model/viewpoint).
- **Mechanisms:** Resources used to perform the activity. Mechanisms will be CBMs and those Systems or Initiatives as defined by the BEP Executives.

  - **Existing Systems Initiatives (Milestone B and beyond):** shown as Mechanisms on the OV-5 and as systems on the SV products.
  - **Future Systems Initiatives (pre-Milestone B):** shown as Mechanisms on the OV-5 and not shown as systems on the SV products.

5.2. Developing OV-5 Models

This section describes the approach to develop, extend and maintain the OV-5 Operational Activity Model. In accordance with DoDAF, BTA requires a single, integrated Operational Activity Model that covers the scope of the DoD BMA, incorporates results from Subject-Matter Expert (SME) attended workshops, and aligns Operational Activities with the FEA BRM. Such a single, integrated, Enterprise Activity Model provides the context for linking and grouping supporting Operational Activities within the DoD BMA, and provides a starting point for the development of more detailed activity models built by the CBMs for the BEPs.

The Enterprise-level OV-5 Activity Model defines the "To Be" activities and business information requirements to optimize DoD business operations in support of the warfighter. Specifically, the Enterprise OV-5 will be an integrated architecture product used to identify business information, Systems/Initiatives, constraints and activities as a basis for the rest of the enterprise architecture.

To build the content of this Activity Model for the "To Be" architecture, the following shall be used:

- Industry and government leading practices
- Doctrine and policy
- Defined operational requirements.

Using a spiral development approach through facilitated workshops, Business Analysts, Modelers and Architects provide functional and technical subject-matter expertise to perform tasks in every step of development of the OV-5 model.

The OV-5 Node Tree is the initial product to be constructed; it is a functional hierarchical decomposition of DoD Enterprise Activities that bounds what DoD does across the BMA. These Enterprise Activities are reconciled

against DoD business needs and with any existing OV-5 Operational Activity Models. FEA BRM functions also are analyzed during construction of the Node Tree and any necessary adjustments are made to the alignment or the content of the Node Tree. During this work, gaps and additional work are identified in the Enterprise Operational Activities. The Gap Analysis is performed in conjunction with the Planned Capability Improvements identified in the BEP AV-1 and the related BEA Improvement Proposal (BIP) created for each proposed body of work to improve the BEA. These activities form the basis for selection of the parent Change Request (CR) and the child CR for each architecture product. Identified gaps are addressed during a deliverable or noted for future work. Identified gaps in the FEA BRM are noted and passed to BTA Management.

When the Node Tree is defined, stabilized and approved, Enterprise-level OV-5 Operational Activity Model diagrams are created for each level of the Node Tree. ICOMs are added to the diagrams during workshops. The diagrams show the information dependencies between Operational Activities as ICOMs. ICOMs are based on approved sources, to include existing Operational Activity Models and other industry reference materials or Government-Furnished Information (GFI).

5.2.1. Pre-Analysis Tasks

Prior to the start of OV-5 development and/or maintenance:

- Review the BEP's AV-1 and BIP to understand the impact of the planned body of work on the OV-5 Activity Model.
- Identify Subject Matter Experts (SMEs) for content contribution and product validation.
- Identify products that could potentially be affected by OV-5 changes and begin coordination with impacted BEA Product Leads.

A thorough analysis of the existing Telelogic SA USRPROP.txt file should be performed prior to the start of any extension or maintenance activities. The SA tool uses this file to add, delete and modify properties associated with architecture products and objects, such as Operational Activities and ICOMs. The USRPROP.txt file also allows the specification of linkages to other architecture definitions, such as FEA BRM Sub-functions as well as the OV-6c. This analysis provides a list of current tool configuration modifications contained in the USRPROP.txt file. The list will be assessed to:

- Identify modifications no longer needed to support the BEA.
- Identify modifications that will be needed to support extensions and/or modifications to the BEA.
- As necessary, changes to the USRPROP.txt file are proposed and approved through a configuration management process. The BEA Build Team implements these changes.

5.2.2. Development Tasks

Operational Activity model development work is accomplished in facilitated workshops that include Government SME participation to address activity model content and provide preliminary validation of results. The following subsections describe the approach used to develop the Enterprise OV-5 Operational Activity Model for the BEA. Each subsection represents a step in the approach and outlines specific tasks that must be accomplished to complete the given step. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

5.2.3. Creating/Modifying Diagrams

This section describes the approach to develop the OV-5 Operational Activity Model.

5.2.3.1. Establish Activity Node Tree

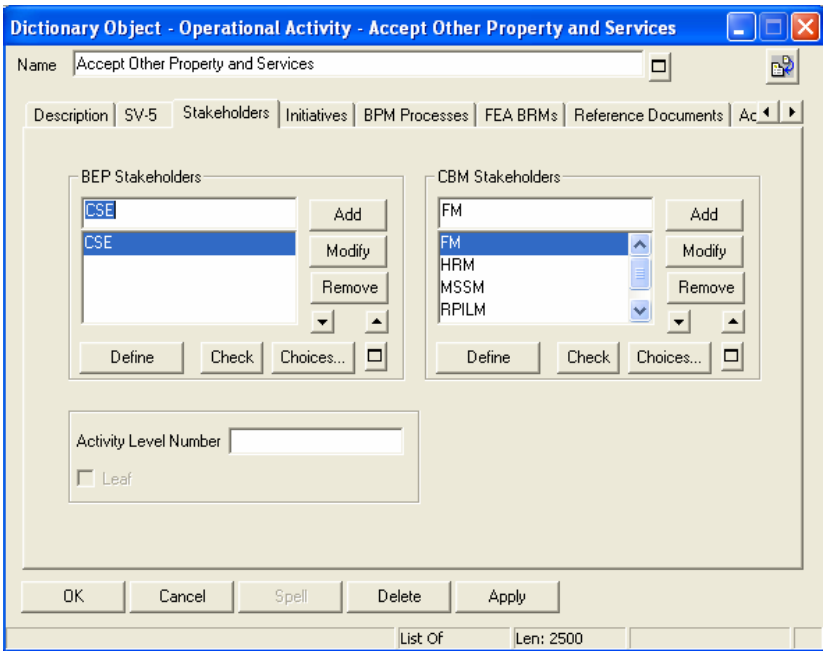
The development of the Node Tree is the first modeling step in developing the Enterprise-level Operational Activity Model. The Node Tree shows in a hierarchical fashion the proper grouping and decomposition of activities. It provides a navigation map for the OV-5 Operational Activity Model diagrams.

The Node Tree is decomposed to a level that identifies the lowest-level activities that are performed at the Enterprise level to support associated Business Capabilities.

The leaf-level Operational Activities within each branch of the Node Tree are linked to Business Capabilities and to Sub-functions of the FEA BRM. These linkages are maintained in the BEA, and are further described in Section 6. The Node Tree is built in workshops as a cooperative effort between Government SMEs and appropriate BTA members (both technical and functional).

During development of the Node Tree, stakeholders shall be identified and filled in on the appropriate tab in the Operational Activity definition, as shown on Figure 5-4. Process Steps and System Functions will be mapped to the correct Operational Activity later in the process.

Figure 5-4, SA Utility for Assigning Stakeholders to OV-5 Operational Activity



Use the procedure below to maintain the Node Tree:

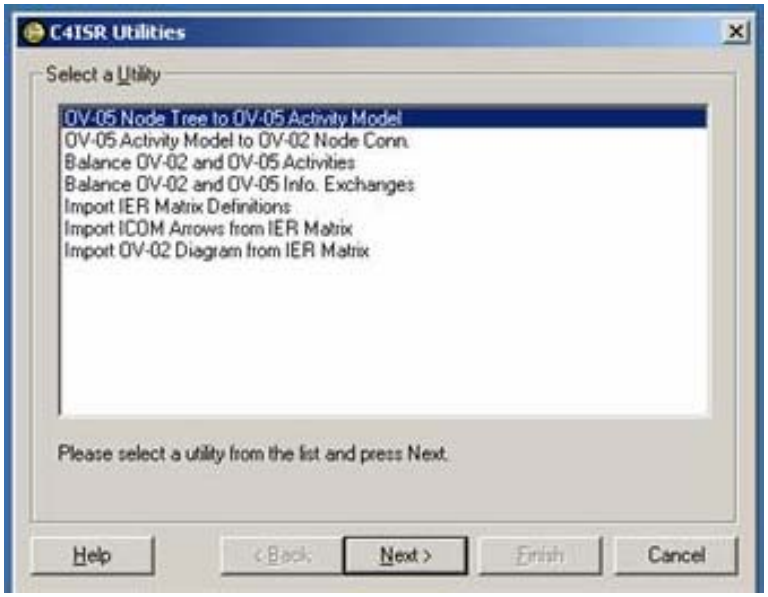
- Using approved sources, SMEs create and define Operational Activities during BEP Workshops that cover the scope areas as defined in the BIPs. Approved sources include existing approved OV-5 Operational Activity Models; CBM/BEP SMEs; and FEA BRM Lines of Business and Sub-function definitions.
- Begin with approved OV-5 Operational Activity Models. Form logical groups of activities and normalize by eliminating overlapping and redundant activities. The top level of the Node Tree shall have one Operational Activity that will serve as the scoping activity for the OV-5s. Subsequent Operational Activities shall be decomposed and arranged, where appropriate, into two to nine Operational Activities.
- Identify Lines of Business and/or Sub-functions in the current FEA BRM that should be reflected in the OV-5. Develop Operational Activities to account for these gaps or note that they should be addressed in future deliverables.
- With SMEs, review artifacts from prior approved versions of the BEA that are pertinent to current or new OV-5 development. Create or refine existing definitions of Operational Activities based on this review.
- Validate the resulting Operational Activity definitions.

5.2.3.2. Generate OV-5 Activity Model Diagrams

As shown in Figure 5-5, the Telelogic SA tool has a capability that can automatically generate OV-5 Operational Activity Model diagrams from a Node Tree. If there are changes after initial generation of the OV-5 diagrams,

changed diagrams must be created manually, since SA cannot automatically generate updated activity model diagrams from changes made in a Node Tree. (Each time the utility is run it generates a completely new set of activity model diagrams.)

Figure 5-5, Telelogic SA Utility for Auto-Generation of OV-5



The following diagrams comprise the OV-5 Operational Activity Model:

- The A-0 diagram is the top-level Operational Activity Model diagram created when developing the OV-5 Activity Model. The A-0 is called the Context Diagram and is composed of a single activity box with a name that encompasses the entire scope of the Enterprise being described. The A-0 uses ICOM Arrows entering and leaving this box to represent interfaces of the Enterprise to its external environment, and those ICOMs are then carried down to subsequent child diagrams. A text box shall be added detailing the Purpose and Viewpoint of the Model.

- The next diagram in the Operational Activity Model is the A0 diagram, which is a child diagram of A-0, and decomposes the single upper-level context activity into two to nine child activities. (While IDEF0 conventions suggest that no less than three or more than six activities should comprise a given Activity Model diagram, BEA requirements have established a need for a modified standard of two to nine activities.) The A0 diagram is recognized as the primary diagram of an OV-5 model, clearly showing the high-level DoD activities.

- The next level of Activity Model decomposition is the A1 set of diagrams, which are children of the A0 and decompose each of the A0's Operational Activities into two to nine sub-activities. The OV-5 Operational Activity Models, and the Operational Activities contained within must be decomposed to a level that supports the BEP, necessary to answer questions (required outcomes). If the level of decomposition does not clearly show how it supports a particular BEP capability, then the Operational Activity must be decomposed to expose the capability. The ICOMs attached to the activities must be at the level of detail reflecting the level of Operational Activity to which it is attached.

- At the leaf-level, definitions for Control ICOMs related to Laws, Regulations and Policies (LRP) are generated through a LRP Repository macro based on mappings of LRP to OV-6c Process Steps,

which are in turn linked to the leaf-level Operational Activities corresponding too these Process Steps. This macro generation applies only to external Controls that are stored in the LRP Repository. Other Controls, including Data Initiatives are defined during workshops and are shown as Outputs of one activity and Controls on others. This generation occurs towards the end of the development cycle when products are stabilized. External Controls are added to the OV-5 diagrams as placeholders during workshops so that the definitions can be added after the products are stabilized to reduce impact to the diagrams.

- Create viewpoint and purpose statements for the Enterprise-level OV-5 model. These statements will then be placed in a text box on the A-0 diagram.
- For each Diagram in the OV-5 Operational Activity Model, a diagram description shall be written to provide a clear understandable narrative description of what the Diagram portrays. The narrative shall describe the activities present and their interactions, the main themes of the diagram by following the critical ICOM interactions, as well as the minor themes by following other ICOM interactions. Specific ICOMs should not be named, but the general types of information contained within the ICOMs or the LRP or Systems they represent should be included in the Diagram description.

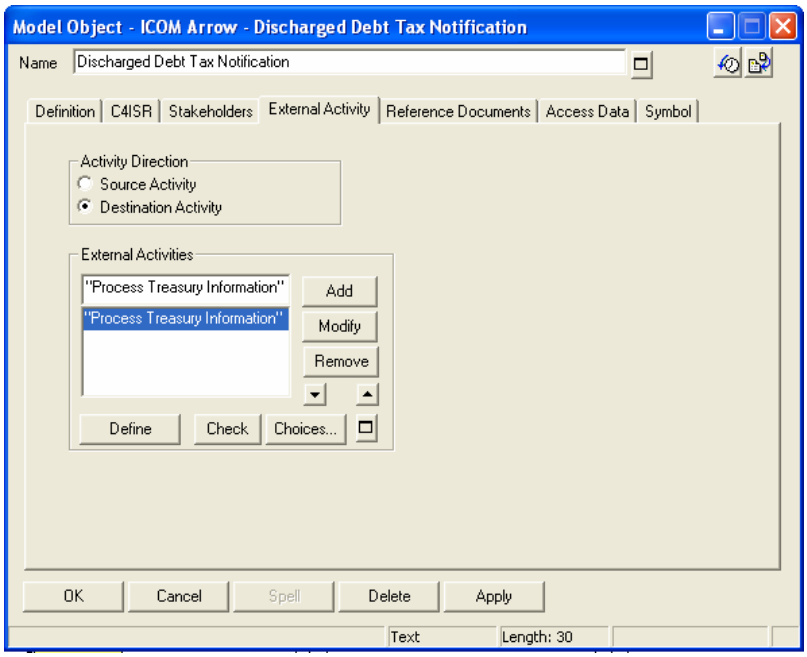
ICOMs

The ICOMs are the means by which information and relationships between Operational Activities are represented on the OV-5 Operational Activity Model diagram(s). Many other architecture products use or refer to these ICOMs. Therefore, it is imperative that ICOM names be as discrete and as representative as possible of the business information they represent.

To identify and define ICOMs for the BEA OV-5 Operational Activity Model:

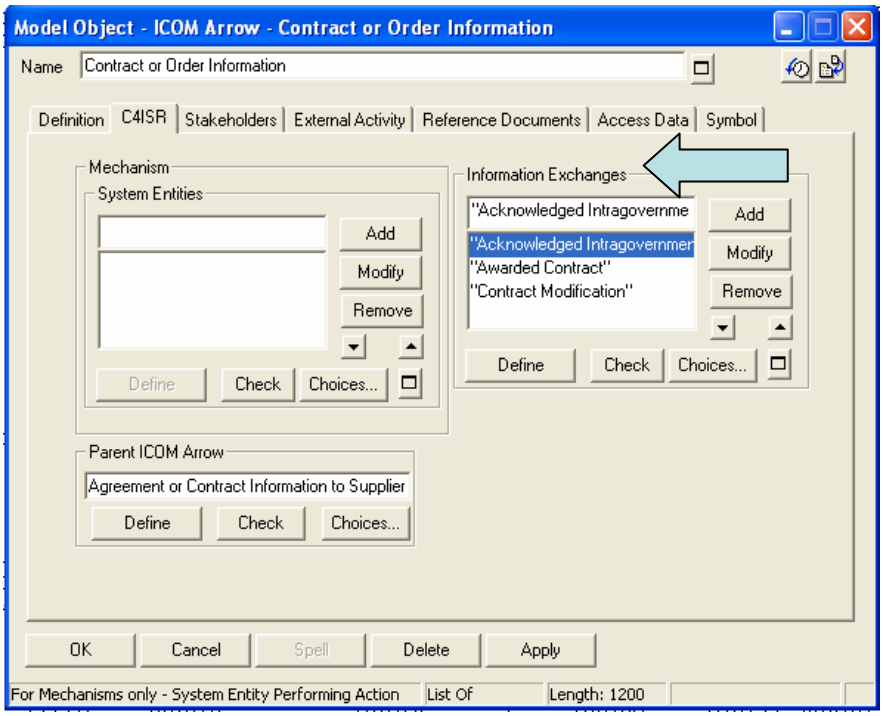
- Place the Inputs and Outputs on the appropriate OV-5 diagrams.
- For Inputs and Outputs that originate from or go to Entities that are external to the BEA, develop generic external activities such as "Process Treasury Information" and populate the checkbox identifying the activity as external in SA. This activity will then be assigned as a source or destination to the appropriate ICOM.

Figure 5-6, SA Utility for Assigning External Activities to an ICOM



- Definitions for Inputs and Outputs should include a consumable-oriented noun.
- Internal Controls, or those Controls generated by an activity within the BEA OV-5 Activity Model, will follow the same naming conventions as Inputs and Outputs, not the external LRP Control.
- External Controls originate outside the BEA and will be decomposed from the *Laws, Regulations and Policies* parent Control.
    - External Control definitions related to LRPs are generated by a macro through the mapping of LRP to Process Steps in the LRP Repository, which are then mapped to Operational Activities. The macro creates the ICOM definition with a naming convention of {*Operational Activity Name*} *Law Policy Reg*. The OV-5 Architect will then add the Control to the diagram going into the appropriate activity.
    - External Initiatives are decomposed from the Laws, Regulations and Policies Control. For the definition of these external initiatives, the definition should use control-oriented nouns, i.e. words that indicate elements of control and not performance or consumption.
- In conjunction with SMEs, identify and link Mechanisms to Operational Activities in the OV-5 in accordance with which CBM and the System or Initiative, if possible, that would perform the assigned Operational Activity. As defined in section 5.1.3, Mechanisms are the Systems or CBMs that actually perform some part of the Operational Activity and not just send or receive information to/from the activity.
- IEs are created from Input and Output ICOMs, associated to leaf-level Operational Activities, but not Internal Controls. The ICOM Arrow shall be linked to the created IE in the Telelogic SA tool.

Figure 5-7, SA Utility for Linking IEs to an ICOM



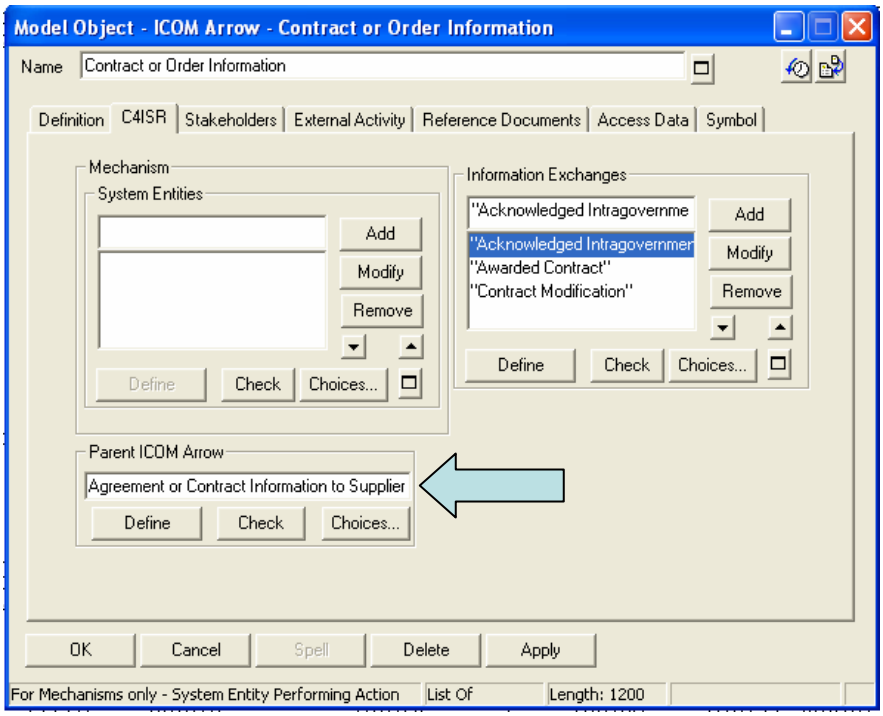
- General rules for adding ICOMs to diagrams:
  - Each Operational Activity will have one or more Inputs.
  - Each Operational Activity will have one or more Controls.
  - Each Operational Activity will have one or more Mechanisms.
  - Each Operational Activity will have one or more Outputs.

ICOM Bundling

To Bundle ICOMs for the BEA OV-5 Operational Activity Model:

- Identify A0 Level ICOMs that come from the same external node or go to the same external node that may be bundled. The A0 Level parent ICOM shall be decomposed in one or more intermediate level parent ICOMs, determined by the destination activities on each intermediate level of the Operational Activity model. For all other ICOMs (used by a BEP or between BEP), BEPs will create a single ICOM to bundle multiple ICOMs with the same source and destination Operational Activity. A meaningful name for the ICOM bundle and a meaningful description of the bundled ICOM must be provided.
- If the types of ICOMs between two Operational Activities are very disparate, or functional understanding of the diagram is increased, two or more bundles may be defined between the source and destination Operational Activities.
- No changes will be made to the leaf-level diagrams except to add parent ICOMs with appropriate ICOM Arrow forks and joins to connect the leaf-level ICOMs to their parent. Parent ICOMs are not shown if they were decomposed at a higher intermediate level of the activity model. Assign child ICOM to the parent ICOM.

Figure 5-8, SA Utility for Linking Parent ICOM to an ICOM



5.2.3.3. Diagram/Model Coordination with the BEP and Other BEA Products

The business analysts will closely review any changes made to any other BEA products and assess the impact of such changes on the OV-5. Products of particular concern, because of their close alignment with the OV-5 are the OV-6c and the SV product System Functionality Descriptions, specifically the SV-5. Changes to the OV-6c Process Steps may require definition modifications in Operational Activities or remapping of Process Steps. Changes to System Functions may require corresponding changes to Operational Activities or definitions since Systems are Mechanisms and are represented in the SV-1 and SV-5, while changes to the Data Objects or System Data Exchanges (SDEs) may require changes to ICOMs. The OV-5s are linked to other products and those linkages are listed in Section 5.1.3, Relationship to Other BEA Products.

Changes to the FEA Business Reference Model (BRM) could also result in changes to the OV-5. The business analysts will do periodic reviews of the FEA BRM to determine what changes have been implemented. Changes to Lines of Business and Sub-functions in the FEA BRM are assessed for the need to make corresponding changes to Operational Activities in the OV-5. At the very least, each such change to the FEA BRM requires changes to definitions of Lines of Business or Sub-functions maintained in Telelogic SA and to existing linkages between these definitions and Operational Activities.

To ensure proper integration across products, a thorough analysis must be conducted with all products and definitions that impact the OV-5. Mappings from or to OV-5 Operational Activities must be validated.

The following subsections describe specific linkages that must be established for the BEA, and how those linkages are implemented using the SA tool.

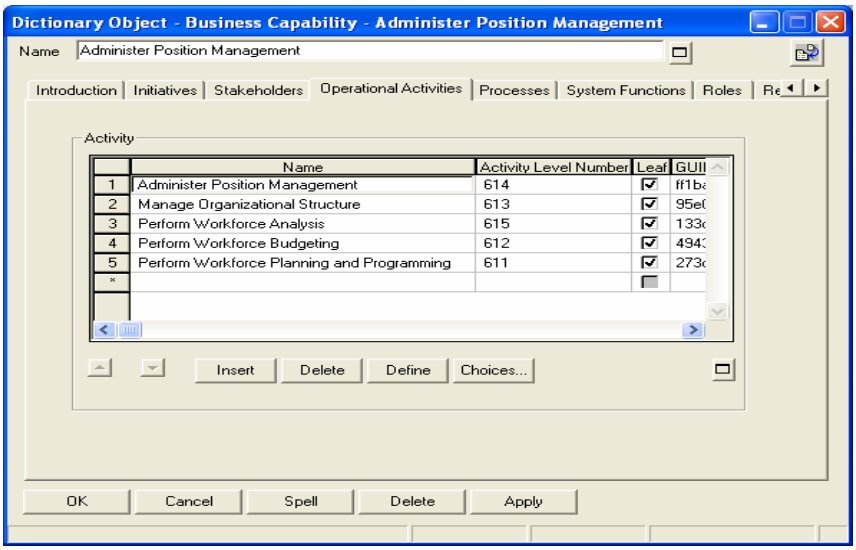
Linking Operational Activities to Business Capabilities

Each CBM will identify a set of Business Capabilities. A Business Capability is defined as a realistic, tangible, measurable, and performance dependent outcome of one or more collaborations among people, processes and activities through utilization of technologies to maximize the effectiveness and efficiency of the warfighter.

BEP representative will review the definitions of designated Business Capabilities along with definitions of Operational Activities to determine if the Activities address it. As shown in 9, this task uses a Telelogic SA utility to map Operational Activities to Business Capabilities.

Multiple leaf-level Operational Activities can be mapped to the same Business Capability. Leaf-level Operational Activities should not be mapped to multiple Business Capabilities.

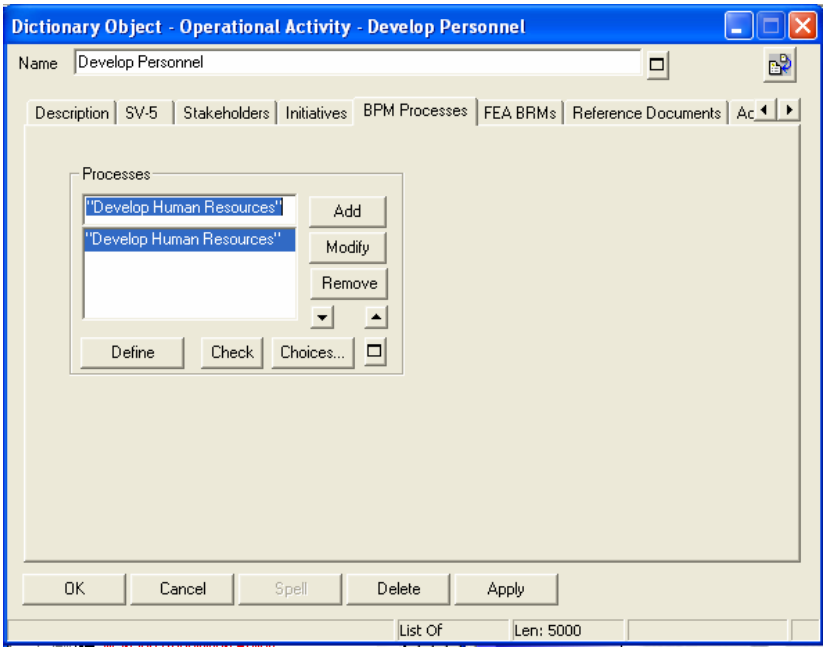
Figure 5-9, Telelogic SA Utility for Linking Operational Activities to Business Capabilities Business



Link OV-6c Process Steps to Activities

As shown in Figure 5-10, this task uses a Telelogic SA utility to map BPM Processes to Operational Activities. These linkages will be identified during OV-6c workshops with the appropriate SMEs in attendance. Once the correct mappings are identified, the tab on the Operational Activity definition will be filled in.

Figure 5-10, Telelogic SA Utility for Linking OV-6c Process Steps to OV-5 Operational Activities

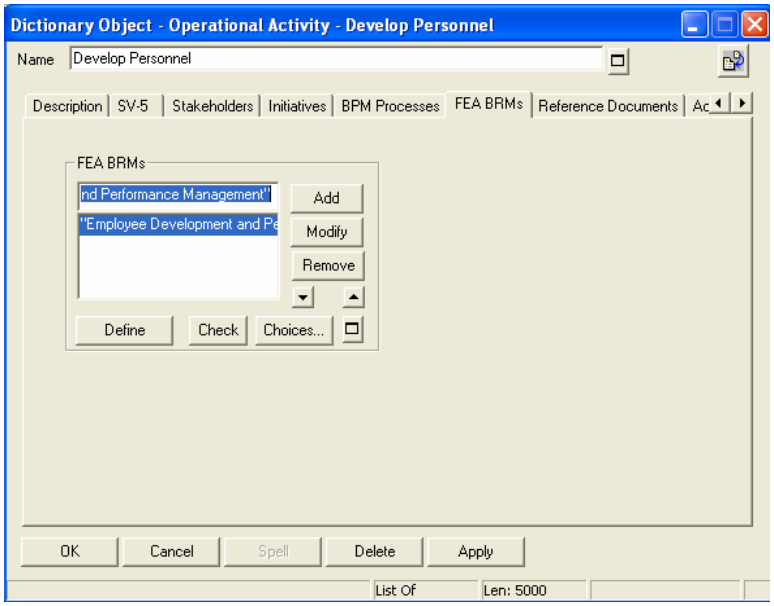


Link FEA BRM Sub-functions to Operational Activities

As shown in Figure 5-11, this task uses the Telelogic SA utility to map FEA BRM Sub-functions to Operational Activities, as follows:

- Assign new FEA BRM Sub-functions to Operational Activities, in collaboration with appropriate SMEs.
- Assign new Operational Activities to existing FEA BRM Sub-functions
- Reassign Operational Activities to deleted FEA BRM Sub-functions.

Figure 5-11, SA Utility for Linking FEA/BRM Objects to OV-5 Operational Activities



5.2.3.4. Diagram Model Cleanup

This activity is used to provide analysis/review support to the final delivery of OV-5 models and modeling objects. The products are assessed via numerous tools and checklists to uncover discrepancies.

Operational Activity Node Tree

Architecture validation reviews are conducted to validate the Node Tree against the:

- BEP AV-1
- BIP
- CR Content Summary
- Product Checklists
- Relevant Business Architecture Reporting Tool (BART) reports
- Encyclopedia Compare Reports
- Threads Tool Report

Operational Activity Model

Architecture validation reviews are conducted to validate the OV-5 Operational Activity Model against the:

- BEP AV-1
- BIP

- CR Content Summary
- Product Checklists
- Relevant BART reports
- Encyclopedia Compare Reports
- Threads Tool Report

5.2.4. Post-Analysis Tasks

These tasks are done after the work has been approved by the BEP representatives:

1) Integrate the work products into the BEA Architecture.
2) Incorporate additional updates to the OV-5 based upon subsequent BEP work sessions.
3) Incorporate quality control and architecture verification (AV) changes into the BEA.

5.3. Modeling OV-5 Using SA

5.3.1. Modeling Conventions

The following modeling conventions shall be used to create an efficient and effective OV-5:

5.3.1.1. Use of Color, Size and Lines in a Diagram

Operational Activity Node Tree

Use the following conventions:

- The font must be Arial Black.
- The Operational Activity box border shall be a solid black line.
- The Doc Block shall be a box with no fill color and a black border.
- The diagram shall not have a border.
- Operational Activities that are on an Operational Activity Model shall be white (no fill).
- Operational Activities that are on the OV-5 Node Tree only shall be light blue.

Operational Activity Model

Use the following conventions:

- The font must be Arial Black.
- The Operational Activity box border shall be a solid black line.
- The Operational Activities shall be yellow.
- The Doc Block should be a box with no fill color and a black border.
- The diagrams shall not have a border.
- ICOM Arrows shall be solid straight lines.
- ICOM line crossings will be minimized to the maximum extent practical.
- ICOMs shall be drawn using the SA default pen width and shall be black in color.
- ICOM Arrowheads shall be solid black.

5.3.1.2. Diagram Conventions

Operational Activity Node Tree

- There is only one Enterprise-level OV-5 Operational Activity Node Tree diagram for the BEA in the SA encyclopedia.
- The Operational Activity Node Tree Diagram shall include a diagram description that shall be stored in the Description attribute under Diagrams Properties.
- All modeling objects shall have no truncated entries on the diagram.
- If a parent Operational Activity is decomposed on the diagram, it shall be decomposed to at least two, but no more than nine, child Operational Activities.
- The Operational Activity box label shall use title case (first letter of each word capitalized, other letters lowercase) should be non-plural (exception approved by BTA), and can use only the special character "-". Any acronyms used in the Operational Activity name must be from the approved acronym list that is part of the BEA AV-2. New Acronyms will be added to the Acronym list in the AV-2.
- The Operational Activity box label shall fall within the Operational Activity box border when printed.
- The Operational Activity box label shall not contain truncation indicators (dots) indicating that text is not visible.
- Operational Activity box labels and definitions shall be identical to those used in the OV-5 Operational Activity Model.
- The Operational Activity box numbers shall be sequential. Each Operational Activity node number will be assigned based on the position of the box within the model and will be generated automatically by SA. The Operational Activity numbers shall be prefaced by the capital letter "A" and will be shown at the beginning of the Operational Activity box label.
- Operational Activities must have a definition that is clear, concise and uses active voice. The definition must cover the type of information coming in (not specific Inputs), what the activity does with that information and identify the Controls that impact the Systems (if identified) that perform that activity, and what information it produces. It should also discuss major and minor flows of the activity as well what triggers the performance of the activity.
- Use the "Stakeholders" tab on the Operational Activity definition in SA to assign CBMs and BEPs that have an interest in the Activity.
    - The top box of the diagram shall be centered on the diagram.
    - A Doc Block representing header information for the diagram (including the diagram name and date last updated) shall be placed in the upper left-hand corner of every diagram with no white space above or to the left of the Block. This Doc Block shall contain the title of the diagram and other pertinent information as automatically provided by the SA tool. No graphic comment shall be included. The Doc Block shall be enlarged so there are no truncation indicators (dots) indicating that text is not visible. The Doc Block shall be a box with no fill color and a black border.

Operational Activity Model

The following guidelines shall apply to the OV-5 Activity Model diagrams:

- All modeling objects shall have no truncated entries on the diagram.
- A Doc Block representing header information for the diagram (including the diagram name and date last updated) shall be placed in the upper left-hand corner of every diagram with no white space above or to the left of the Block. This Doc Block shall contain the title of the diagram and other

pertinent information as automatically provided by the Telelogic SA tool. No graphic comment shall be included. The Doc Block shall be enlarged so there are no truncation indicators (dots) indicating that text is not visible. The Doc Block shall be a box with no fill color and a black border. For each diagram below the A-0, the Doc Block shall have gray shaded areas on the left and right side indicating a parent relationship to the activity diagram above it.

- The Operational Activity Model shall have a top-level A-0 Context Diagram consisting of a single Activity Box, labeled A0, with associated boundary ICOM Arrows representing appropriate interfaces with Activities outside the model.
- Each OV-5 diagram must be associated with an Operational Activity Node on the Operational Activity Node Tree.
- In the Operational Activity Model diagrams at the A0, A1, and A11 levels (and subsequent levels as necessary), Operational Activity boxes shall be arranged in a stair-step fashion from the upper left corner down to the bottom right corner of the page. The top of any subsequent Operational Activity must be below the *top* (not the *bottom*) of the previous Operational Activity.
- For each Diagram in the OV-5, a text description shall be written to provide a clear, understandable narrative of what the Diagram portrays. The narrative shall describe the Operational Activities and their information interactions in general, both internal to the diagram and external. The diagram description should also attempt to discuss the main themes of the diagram by following the critical ICOMs and their relationships to activities as shown in the diagram interactions, as well as the minor themes by following other ICOM interactions.
- During workshops, Operational Activity definitions shall be refined to reflect ICOMs. It must address the information received, what action is performed on that information, what regulations constrain the Operational Activity and what Outputs are produced by the Operational Activity.

5.3.1.3. Object Naming Conventions

- Operational Activities shall be named as verb-noun objects. They should represent succinct expressions of what the Operational Activity does, suitable to the level of Operational Activity decomposition. The Operational Activity Names must be unique and use only approved acronyms, as contained in the BEA AV-2. For new acronyms, the acronyms must be noted and passed to the AV-2 product team lead for inclusion in the product.
- The only special characters allowed are "-" and " ' ".
- Use Title Case; the first letter of each word in an object name shall be uppercase; other letters should be lowercase. Incidental words, such as prepositions within the object name ("with," "at," "in," "and" or "the"), shall be all lowercase.
- Object names shall use the singular form (no plurals) with exceptions approved by BTA.
- Object names shall be spelled correctly and shall not use future tense.

5.3.2. Modeling OV-5 Objects

The following subsections provide guidelines for the individual elements or components that comprise the Operational Activity Model Diagrams.

Operational Activity

- All Operational Activities must be defined. Definitions should reflect the information transformation, creation and consumption actions performed by the Operational Activity. Each definition must be clear, concise, use active voice, and be a complete, grammatically correct sentence.
  - Example of a good Operational Activity definition:

  Manage Entitlement: This activity includes calculating the amount to be paid as a result of a commercial vendor having provided materiel or services to the Department of Defense. The activity verifies funding availability for payment along with conducting a three-way match between the contract, the receiving report, and the certified invoice. The activity also applies any outstanding debt, such as a credit, for monies owed to a federal, commercial, and DoD entity against open invoices. The activity calculates interest and discounts in accordance with the contract and the Prompt Payment Act and generates a Certified Business Partner Pay file with the applicable banking information, which is sent to a disbursing activity.
- The Operational Activity label shall begin with a RETURN so that the label does not touch the upper border of the Operational Activity Box (required for Telelogic SA text formatting).
- The Operational Activity box label must fall within the Activity box border when printed.
- The Operational Activity box border shall be a solid black line.
- The Operational Activity box numbers must be sequential. The Operational Activity Box numbers shall be positioned in the lower right corner of the Operational Activity box.
- Operational Activities are mapped to one or more CBMs and BEPs that have a stake in that Operational Activity.
- Leaf-level Operational Activities will be associated with a BRM Sub-function(s) where appropriate.
- All Operational Activity modeling decompositions must follow the "2 to 9 Activity box" rule with the exception of the top-level A-0.

ICOMs

- All ICOMs shall be defined. All ICOM definitions shall be consistent with the level of decomposition of the Activity.
- An ICOM Arrow cannot connect to the same Operational Activity more than once.
- Definitions shall be complete enough to support linkage of ICOMs to attributes and synonyms in the OV-7 through IEs. If the ICOM supports IEs at the Attribute level then its definition needs to be narrow enough to enable the IE to contain a finite set of Attributes supporting specific Data Initiatives. Each Input and Output shall have at least a one-for-one relationship with an IE unless there are additional Information Exchanges, Data Objects and SDEs associated to the ICOM.
  - Example of a good ICOM definition:

  (Input) **Returned Payment Notice**: This is a notification that a previously issued payment has been returned and the reason(s) why. The payment was returned for at least one of the following reasons: invalid account number, invalid routing transcript number, account closed, or rejected by payee.

  (Output) **Wire Transfer Information**: Information that is provided to the U.S. Treasury for the wire transfer transaction. Information could include payee's name, bank account and routing number, amount of transfer and transaction date.

(Mechanism) **DTS**: The Defense Travel System (DTS) transforms what is currently a paper-based, labor-intensive travel process into a fully automated and web-based system that will support official travel. When fully implemented, DTS will be the designated single standard system for temporary duty travel requirements for all DoD personnel.

- For the definition of an internal control, the definition should use control-oriented nouns, i.e. words that indicate elements of control and not performance or consumption.
  - Example of a good Internal Control definition:

  ESOH Control Requirement: This is the required set of operational controls implemented by a mission activity to comply with environment, safety, and occupational health legal, regulatory, policy and performance requirements. The controls take the form of terms and conditions established by agreement between stakeholders such as the owner or operator of the mission activity; supporting environment, safety, and occupational health organizations; permitting agencies; and the public. A documented terms and conditions agreement might be a: process authorization, permit, license, exemption, explosives safety site plan and management decision or operating exception. Environment, safety, and occupational health controls influence the doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) of mission activities. They may also define standard operating procedures, specify safety requirements, detail experience levels and training requirements, prescribe monitoring and reporting requirements, or specify other required activities.

- ICOM names shall be consistent with their assigned Operational Activity box name and definition and names shall be unique within the model.
- ICOMs shall be linked to each CBM and BEP that has a stake in or uses that ICOM.
- Internal ICOMs (on the same diagram) shall have two 90-degree curves rather than be a straight line between two Operational Activity Boxes. The internal ICOM labels shall be placed on the horizontal line where it is the most legible.
- The vertical line segments for multiple child ICOMs must align exactly and have a clean connection line to the parent ICOM Arrow.
- If the label of an Input or Output ICOM is too long for the line or interferes with branch points, it shall be wrapped to two lines only.
- An Output of an Operational Activity cannot go into that same Operational Activity as an Input without changing the ICOM name and definition.
- Boundary ICOMs come from (Input, Control) or go to (Output) one boundary location.
- An ICOM Arrow on a diagram that is connected to multiple Operational Activities shall be drawn from a common source ICOM or to a common destination ICOM. The ICOM name shall be displayed once.

ICOM Bundling

ICOM bundling refers to creating ICOMs of higher levels of abstraction as parents of a number of more detailed child ICOMs. Grouping like ICOMs together, either by type or by producing and consuming Operational Activities, creates the bundles. Bundling is used to reduce the number of ICOMs on the A-0, A0, or A1 Activity

Model diagrams and to keep ICOM detail consistent with that of the Activities at a given diagram level. Bundles represent the more detailed ICOMs shown on the lower-level diagrams, and are derived from other information sources relevant to the information dependency between Activity Boxes on a given OV-5 diagram.

The bundling process is done bottom-up. The rule is to only form these higher-level ICOMs when absolutely necessary using a "type of" or "part of" rule. If the original lower-level ICOM is sufficient at its level of abstraction for the higher-level diagram, it should be left unchanged. Otherwise, a higher-level ICOM for which the lower-level ICOM is a part or a type should be created and connected to the appropriate Operational Activity box.

Inputs

- Input ICOM labels shall be left justified above the ICOM Arrow, closest to the boundary.
- Input boundary ICOMs must originate as a horizontal line from the left diagram boundary.
- Child Input ICOM labels should be placed above the horizontal line where most legible, preferably close to the using Operational Activity.
- When a child ICOM is drawn, or decomposed from a parent boundary ICOM, that ICOM and all siblings shall be attached at the same spot on the parent ICOM and connect to their appropriate Operational Activity. The ICOMs shall align vertically with each other.

Outputs

- Output ICOM labels are right justified above the ICOM Arrow and closest to the boundary.
- Output boundary ICOMs must terminate as a horizontal line at the right side of the diagram far enough way from the activity boxes that the labels can be legible. The Output ICOMs must align vertically with each other.
- Child Output ICOM labels should be placed above the horizontal line where most legible, preferably close to the producing Operational Activity.
- When a child ICOM is drawn and attached to a parent boundary ICOM, said ICOM and all its siblings shall attach to the same spot on the parent ICOM and connect from the appropriate Operational Activity. The ICOMs shall align vertically with each other.

Controls

- Controls shall be bundled into one of the following high-level Controls, which will appear on the A-0 in descending stair-step order from left to right:
  1) Laws, Regulations and Policies
  2) Information Assurance
- Control ICOM labels shall be positioned to the right and at the top of the Control ICOM Arrow. Control ICOMs originate as a vertical line above the first Activity Box (top right) on an OV-5 Activity Model Diagram. (An Output that becomes a Control shall be shown starting as a horizontal line coming from the left boundary and then turning down with the arrow terminating at the top of an Activity box.).
- A maximum of 12 Controls are allowed per Operational Activity box.
- Controls are drawn as a stair-step with the tallest Control on the left and the shortest on the right side of the Operational Activity box.

Mechanisms

- Mechanisms shall be assigned from the bottom up and will only be attached to the Operational Activity if they perform all or part of the activity being performed in the activity and not just support the activity by sending information. Mechanisms will be assigned to the leaf or lowest, level

Operational Activities first, and will then be balanced upward into parent diagrams. The Mechanism will attach to the parent boundary Mechanism either on the leaf-level diagram or the parent diagram.

- The following high-level Mechanisms are the parents for all lower-level Mechanisms in the OV-5, and are shown on the A-0 diagram:

  1) Core Business Mission

  2) System and Initiative

- Each Operational Activity is associated with at least one Mechanism.
- A maximum of 12 Mechanisms are allowed per Operational Activity box.
- Mechanisms shall be arranged in descending stair-step order with the tallest Mechanism on the left. (This is an exception from IDEF0, which calls for Mechanisms to be drawn from the right to left).
- Mechanism ICOM labels shall be positioned to the right and at the bottom of the Mechanism ICOM Arrow. If the Mechanism is decomposed from a parent Mechanism and there are 90-degree turns in the ICOM Arrow, the Mechanism label shall be along the horizontal line closest to the arrowhead.
- Mechanisms shall originate as a vertical line below the first Operational Activity box on the OV-5 Operational Activity Model Diagram. When child Mechanisms are decomposed from the parent, there will be two 90-degree turns in the Mechanism to attach the Mechanism to the appropriate Operational Activity box.

ICOM Balancing

- All ICOMs in the OV-5 Operational Activity Model diagrams should be balanced (that is, if you have an Input to an Operational Activity at a parent-level diagram, then that same Input will appear as a boundary Input on the child diagram). If that Input is to be decomposed, then the child Input(s) will be pulled out at the lower-level model.
- If an Operational Activity Box has a child diagram, each arrow connected to the parent box shall appear on the child diagram.

Information Exchange

- Every leaf-level Operational Activity Input and Output ICOM has at least one associated Information Exchange (IE).
- All IEs shall have the same name, definition and CBM /BEP tag as the corresponding ICOM unless there are multiple IEs supporting Data Objects and SDEs.
- Each IE must be linked in the Telelogic SA tool to the corresponding ICOM.
- Mechanism and Control ICOMs shall not be mapped to an IE.

5.4. OV-5 Modeling Problems to Avoid

This section discusses lessons learned from previous OV-5 architecture development and mentions common modeling pitfalls and mistakes to avoid while modeling the OV-5 architecture product.

5.4.1. OV-5 Modeling Lessons Learned

- Operational Activity Node Tree must be stabilized before OV-5 diagram modeling can begin.
- All internal Operational Activities must be with tagged with a CBM and a BEP.
- All internal leaf-level Operational Activities must be associated with a BRM Sub-function.
- All External Operational Activities must be specified and tagged as being external.
- All leaf-level Operational Activities must be specified.
- All leaf-level Input and Output ICOMs must be defined and their sources or destinations must be explicitly specified.
- Parent-child ICOM linkages on diagrams must be clear and consistent.

- OV-5 diagrams should be balanced across associated Operational Activity diagrams.

5.4.2. OV-5 Modeling Pitfalls

- ICOM Arrows cross each other unnecessarily
- ICOM Arrows not touching Operational Activity Boxes
- Ineffective use of diagram space
  - Activity boxes too large or too small
  - ICOM connections unclear
  - Diagram overly dense or too spread out
- Inappropriate color coding of diagram objects
- Incorrect bundling of ICOMs on diagram
- Activities that do not match the level of decomposition of their ICOMs
- Truncated text on ICOMs
- Operational Activity diagrams description not properly defined
- Operational Activity and ICOM definitions do not conform to guidance
- Acronyms not spelled out in definitions
- Incorrect use of acronyms

6. OV-6a – Operational Rules Model

6.1. Summary Description

This section describes the OV-6a Operational Rules Model architecture product and its relationship to other BEA products, the model-development method and the modeling guidelines used for development of the OV-6a Operational Rules Model.

6.1.1. Product Purpose

The OV-6a Operational Rules Model is the set of operational rules that constrain an Enterprise, mission, operation, business, or architecture. For the BEA, the operational rules are called "Business Rules." Business Rules are required in the BEA to fulfill the DoD business mission; describing what the business can and cannot do. Business Rules define or constrain some aspect of the business, whereas the OV-5, OV-2 and OV-7 describe the business structure.

The development of Business Rules is an art rather than a science. It requires close collaboration between the stakeholders, SMEs and the Business Rules Analyst to create Business Rules that provide clear unambiguous guidance. There are few fixed guidelines that can be applied. One of the sources the Business Rules Analyst uses as a guideline is the methodology developed by Ronald G. Ross and Gladys S.W. Lam, internationally acclaimed experts of Business Rule techniques and methodology. This methodology is documented in Ross's book *Business Rule Concepts: Getting to the Point of Knowledge* (2nd ed. Business Rule Solutions, LLC, 2005).

6.1.2. Product Structure

The OV-6a is manually created. It resides in the System Architecture encyclopedia in the form of definitions. There are no diagrams for the OV-6a in the SA encyclopedia. Please refer to Section 6.1.4 for the required fields for the Business Rules to make the definition complete. Each BEP as well as each CBM can have an unlimited number of Business Rules within the BEA SA encyclopedia.

6.1.3. Relationship to Other BEA Products

OV-6a is related to other BEA products through the following:

AV-2 All OV-6a terms with specific meaning must be defined in the AV-2 Terms These terms must include, as a minimum, all object types included in the deliverable. All acronyms used in OV-6a descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-5 While DoDAF maps Action Assertion Business Rules to the OV-5's Controls and Mechanisms, the BEA does not use direct links of Business Rules to the OV-5.

Note: Business Rules are not mapped to the OV-5 in the BEA.

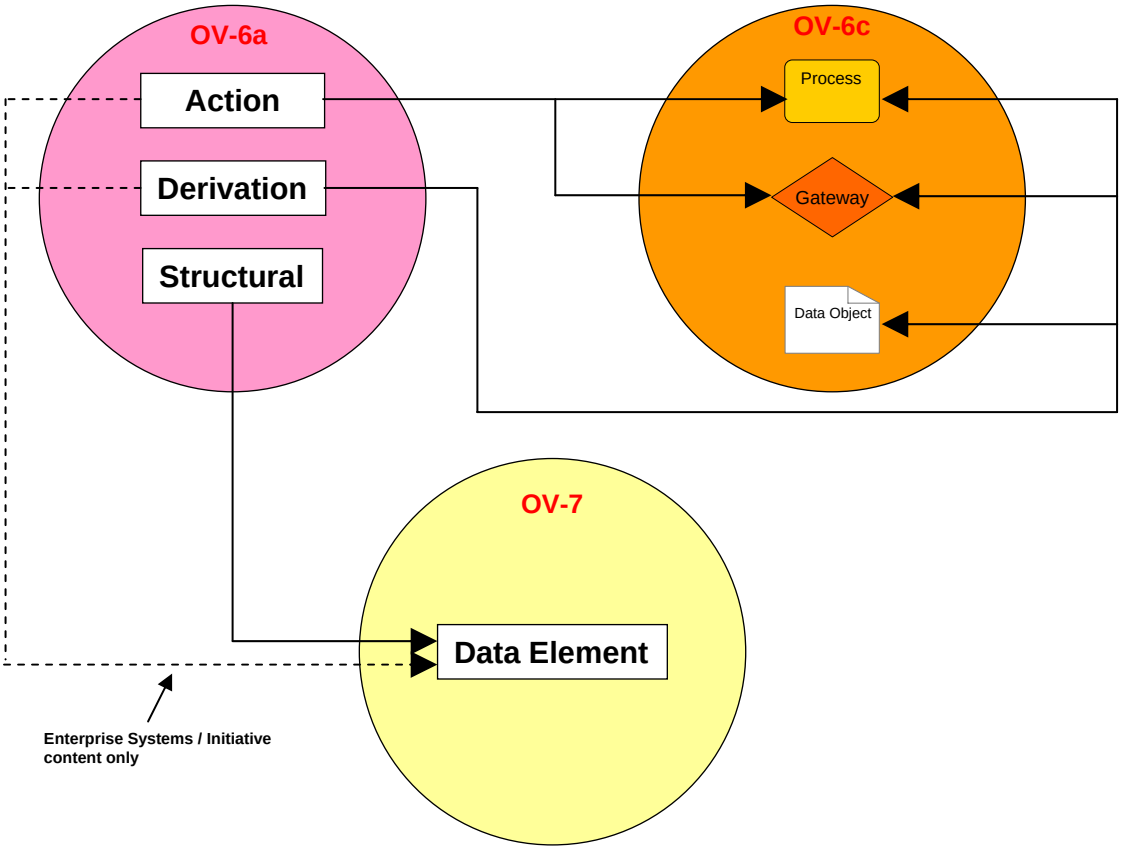
OV-6c Action Assertion Business Rules help to define, and are mapped to, BPM Processes and/or decision Gateways in the OV-6c Business Process Diagram. Derivation Business Rules help to define, and are mapped to, either BPM Processes, decision Gateways and/or Data Objects in the OV-6c Business Process Diagram. Structural Assertion Business Rules help to define, and are mapped to, Data Objects in the OV-6c Business Process Diagram.

OV-7 Structural Assertion Business Rules constrain the structure and validity of Data Elements and may be captured in the Logical Data Model (OV-7). The structure of the Entities, Attributes and Entity Relationships must be consistent with the Business Rules.

Note: In the BEA, Business Rules do not map directly to the Entities, Attributes and Entity Relationships. Instead, they can be directly mapped to specific OV-7 Data Elements supporting enterprise systems and initiatives. Action Assertion and Derivation Business Rules also may be directly mapped to specific OV-7 Data Elements supporting enterprise systems and initiatives; in this case, the system or initiative must be identified in the "Initiatives" field.

Figure 6-1 graphically illustrates the interrelationships between the OV-6a product and other BEA products. These relationships are recorded in the BEA via the mappings that may be established.

Figure 6-1, Relationships between OV-6a and Other BEA Products

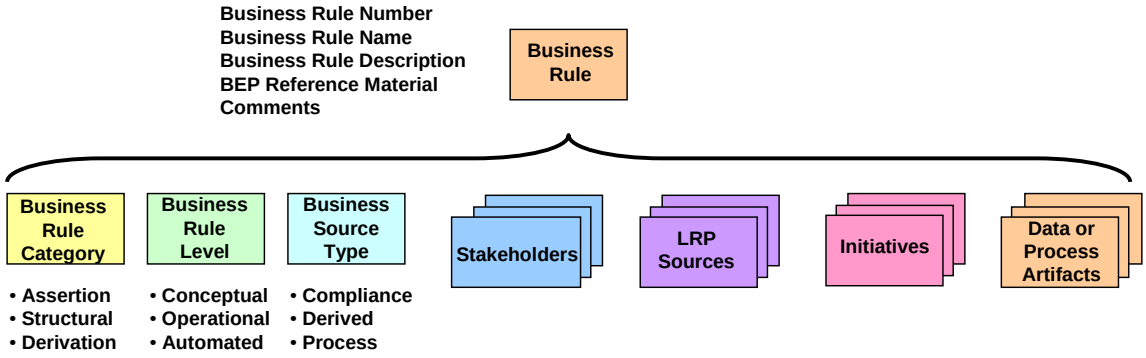


6.1.4. Definitions

This section defines concepts and terms often used when discussing Business Rules. DoDAF terms are not repeated. Refer to DoDAF, Volume 2, Section 4.6, for the OV-6a Operational Model terms.

Figure 6-2, Data Fields and Structure of a Business Rule illustrates the twelve (12) data fields and structure of a System Rule. Five data fields are text entry. Three of the data fields are single list selections. Four of the data fields are multiple value list selections.

Figure 6-2, Data Fields and Structure of a Business Rule



1. **Business Rule Number:** A mandatory data files that is a unique number given to a Business Rule for identification purposes. The unique number is manually assigned. The following are examples of correct Business Rule Numbers:

   - 1000
   - 185444

2. **Business Rule Name:** A mandatory data filed that is a unique name given to a Business Rule for identification purposes. The Business Rule Name is limited to 80 characters and contains an underscore between each term. A term can be either alphabetic or numeric. The Business Rule Name must begin with an alphabetic term. Each alphabetic term must start with an uppercase letter followed by lowercase letters unless the term is a capitalized acronym. The Business Rule Name is used to map to other architecture artifacts such as a BPM Process. The following are examples of correct Business Rule Names:

   - Access_To_Online_Training
   - Accounting_For_Federally_Owned_PPE
   - Budget_Sub_Activity_Identifier_Association_1

3. **Business Rule Description:** A mandatory data field that contains the actual Business Rule. It is a statement of constraint or permission. The following is an example of a correct Business Rule Description:

   - An appropriation must be recognized as revenue when it is used for goods and services received.

4. **Business Rule Category:** A mandatory data field that defines a category to assist in mapping in mapping the Business Rule to the OV-6c Business Process Diagram and the OV-7 Logical Data Model

   - **Action Assertion:** A Business Rule that reflects dynamic aspects of the mission or business and specifies constraints of a BPM Process or Gateway in the OV-6c Business Process Diagram. It must have a mapping to a BPM Process or Gateway. If it is related to an Enterprise System or Initiative, then it may be mapped to an OV-7 Data Element. The following is an example of a correct Action Assertion Business Rule.

     Business Rule Name: Match_Acquisition_Requirement

     Business Rule Description: Each acquisition requirement must be matched with a source of funds before creating a commitment.

   - **Structural Assertion:** A Business Rule that reflects static aspects of the mission or business terms and facts. Structural Assertion Business Rules may result from important structural assertions graphically represented in the OV-7 Logical Data model due to BEA Compliance Assessment requirements. It must have a mapping to a Data Element in the OV-7 or Data

Object in the OV-6c. The following is an example of a correct Structural Assertion Business Rule.

Business Rule Name: Period_Of_Availability_1

Business Rule Description: If a Period of Availability is associated with a no-year budget account, the last four digits must be "XXXX".

- **Derivation:** A Business Rule that uses algorithms to compute derivable facts from other terms, facts, derivations, or action assertions. It must have a mapping to an OV-6c BPM Process, Gateway, or Data Object and requiredOV-7 Data Elements. The following is an example of a correct Derivation Business Rule.

  Business Rule Name: Acquisition_Cost_Of_Asset

  Business Rule Description: The acquisition cost of an asset must be computed as the sum of the original cost of the asset, plus the appropriate purchase and production costs incurred to bring the item to its current condition and location.

5. Business Rule Level: A mandatory data field that is a concept used to help the end user understand the Business Rule in the context of the architecture.

- **Conceptual Level:** A high-level Business Rule that tends to be abstract in nature and/or a directive. For instance, a Conceptual Business Rule may be that DoD shall adopt a specific technology. Typically, Conceptual-level Business Rules are not directly tested. Instead, they are used to indicate a general direction or to flag a system or process for portfolio management purposes. The following is an example of a correct Conceptual Level Business Rule.

  Business Rule Name: Common_Validation_Processes

  Business Rule Description: Common standards and procedures must be used to validate similar transactions.

- **Operational Level:** A declarative Business Rule that is directly applicable to a BPM Process. Operational Level Business Rules may be tested during a system assessment or system acquisition to determine if a gap exists or if there is an acceptable workaround. The following is an example of a correct Operational Level Business Rule.

  Business Rule Name: Match_Acquisition_Requirement

  Business Rule Description: Each acquisition requirement must be matched with a source of funds before creating a commitment.

- **Automated Level:** A specific Business Rule stated in a form recognizable by a rules engine, programming language, application generator, or data modeler. Automated Level Business Rules may be tested during a system assessment to determine if a gap exists or if there is an acceptable workaround. The following is an example of a correct Automated Level Business Rule.

  Business Rule Name: Department_Regular

  Business Rule Description: Each Department Regular must only be associated with one Allocation Unique Identifier (AUID).

6. Business Rule Source Type: A mandatory data field that shows the source or target of the Business Rule.

- **Compliance Requirement:** The origin of this type of a Business Rule is a law, regulation, and/or policy applicable to a particular Business Process and/or system.
- **Derived Requirement:** This origin of this type of a Business Rule is a technical, architectural, or compliance requirement. For instance, a BEP may have a derived requirement Business Rule from a Regulation or Requirement Document.

- **Process:** The target of this type of a Business Rule is an OV-6c Business Process Diagram symbol that is the result of business transformational efforts and the need to constrain, or give permission to an OV-6c BPM Process. This type is not directly traceable to compliance requirements. Business Rules are important to the understanding and use of the OV-6c Business Process Diagram. Each Business Rule with a Source Type of "Process" must be mapped to a BPM Process. Gateway and or Data Object in the OV-6c Business Process Diagram.

7. Stakeholder: A mandatory data field that can have multiple values that assigned a Business Rule to one or more owners. An owner may be an individual CBM designation or a BEP designation. The selections are made from drop down lists.

8. Initiatives: A data field that can have multiple values that relates Business Rules to initiatives. It identifies the enterprise initiative that the Business Rule enforces. Action Assertion and Derivation Business Rules directly mapped to specific OV-7 Data Elements must have the enterprise system or initiative they support identified here. The following are the valid Initiatives presented in a drop down list:

- SFIS: Standard Financial Information Structure
- FFMIA: Federal Financial Management Improvement Act

9. BEP Reference Material: An optional data field to store relevant Business Rule information in. It is recommended to store Derived Requirement sources here but not required. In addition, BEP teams may use the BEP Reference Material field for any other information they do not wish to maintain in the comment field. For example, a BEP may choose to enter in this field a list of related Operational Activities.

10. Comments: An optional data field for use of the CBM team, BEP team, or other Stakeholder(s).

11. LRP Sources: An optional multiple valued data field that contains a link to the specific Law, Regulation or Policy the LRP Database. The LRP Sources are selected from a list of available LRP Sources.

12. Data or Process Artifacts: A mandatory multiple valued data field that contains the name or names of BEA Data Elements, Processes or Data Elements. The Data or Process Artifacts are selected from the list of BEA Definitions.

6.1.5. Business Rule Input Field Capture

This section describes capturing the Business Rules field values for inserts or changes to the System Architect encyclopedia.

6.1.5.1. Input Document

The primary input document is a spread sheet that has the following four tabs:

1) Main Load
2) LRP Sources
3) BEP Stakeholders
4) BPM Processes

The Main Load tab contains all of the above single entry fields as columns. That is, the fields for which there is only one value; such as the Business Rule Definition.

The other three tabs contain the fields for which multiple occurrences are possible; for example, a Business Rule can be mapped to more than one BPM Process. The map between the Business Rule and the other BEA artifact is the Business Rule Name. The following is an example of entries in the BPM Process tab.

BPM Process Name	Business Rule Name
Manage Financial Management Policy	Audit_Trails_9
Manage Financial Reporting	Deferred _Maintenance_And_Cleanup_Costs_1
Manage Financial Management Policy	Deferred _Maintenance_And_Cleanup_Costs_1

The LRP Sources and the BEP Stakeholders tabs have the same construct as the above.

This input document is also used as a "turn around" document for reviews between the OV-6a Team and the Stakeholders.

6.1.5.2. System Architect Update Process

There are two basic System Architect update processes; one for a large update volume and the other for a small update volume.

A large update volume requires assistance from the System Architect Build Team. The System Architect Build Team uses the spread sheet as input to an automated procedure.

A small update volume is manually entered into System Architect by the OV-6a Team members.

6.1.5.3. Mapped Field Validation

The mapped field names must be correct, otherwise errors will be generated and the Business Rule will not be complete. The BEP Sources are few (AV, CSE, FV, MV, PV RPA) and pose little problem. However there are many LRP Sources and BPM Process Names.

The System Architect Build Team automated load procedure automatically inserts artifacts when a match is not found. For example, an incorrect BPM Process name will cause a new BPM Process to be added with that name. This is an error that must be manually corrected. Consequently, care must be taken to assure that the mapped names are valid and already exist in System Architect.

6.2. Developing OV-6a Models

This section describes the approach used by the Business Rules Analyst to develop the OV-6a Operational Rules model. The Business Rules Analyst works with BEP Stakeholder functional SMEs to produce Business Rules that support the business transformation. The Business Rule Process includes development, maintenance and retirement of Business Rules.

6.2.1. Pre-Analysis Tasks

In general, there are a number of ways BEPs choose to identify Business Rule concepts for inclusion into the OV-6a Operational Rules model. Each BEP has there own Process for deciding Business Rules content and may request the assistance of the Business Rules analyst to provide pre-analysis work. Pre-analysis work may include suggesting general guidance on how to develop content, answering any form and structure questions, or generating and analyzing System Architect reports from the prior BEA release. This Process for Business Rule creation does not require detailed analysis of the architecture. The BEP Stakeholders provide the Business Rules Analyst with their identified Business Rule concepts mapped to an architectural object for pre-analysis.

6.2.2. Development Tasks

The BEA development schedule must allot time for OV-6a development tasks. This period of time is referred to as the OV-6a workshop, but these tasks are performed outside of a formal workshop setting.

6.2.2.1. Refine Business Concept

Once stakeholders identify the Business Rule concept, its architectural mapping, and the LRP Requirement Identifier(s), if applicable, during the Pre-Analysis Task, the Business Rules Analyst must develop the concept into a form ready for functional review and refine the Business Rule to meet the project's BEA/DoDAF standards.

First, the Business Rules Analyst determines whether the Business Rule concept already exists in the BEA. If the proposed Business Rule concept does not duplicate an existing rule, the Business Rules Analyst further analyzes the concept for accuracy and potential conflict with existing Business Rules.

Then, the Business Rules Analyst determines the Business Rule Level. This helps stakeholders determine if they wish to include the Business Rule concept in the architecture. Stakeholders may postpone working on lower-level Business Rules if a higher-level Business Rule is sufficient to achieve the objective.

Following, the Business Rules Analyst refines the Business Rule concept by applying the RuleSpeak guidelines to ensure the proposed language of the Business Rule meets the BEA standards. The Business Rules Analyst shall use Ron Ross' BRS *RuleSpeak*™ as its technical language standard for Business Rules. This is the private sector standard for what constitutes a quality Business Rule.

Generally, OV-6a Business Rules will be stated in *RuleSpeak*™ format. But, if appropriate to achieve the stakeholder's goals, it is not required to state the Business Rule in *RuleSpeak*™ — due to their nature, only Derivation Category (formulaic) and Process Source Type (not derived from a documented requirement) Business Rules must be in *RuleSpeak*™ format.

The Business Rules Analyst also determines the Business Rule Category and Business Rule Source Type. The Business Rules Analyst develops the Business Rule Name and assigns the OV-6a Operational Rules Model unique Business Rule Numbers.

All of the above artifacts are placed in an MS Excel spread sheet referred to as the "Load Sheet" that is used to add the Business Rules to the OV-6a Operational Rules Model.

In the last step, the Business Rules Analyst forwards the proposed Business Rules to the Business Rule Team Lead for technical review. The Business Rule Team Lead verifies the Business Rules for technical compliance. The Business Rules Team Lead returns any Business Rules that do *not* pass the technical review to the Business Rules Analyst for further refinement.

In extreme cases, a Business Rule may be accepted with a technical violation, provided the Business Rules Team Lead documents why the Business Rule was accepted with the violation noted on the OV-6a Product Checklist.

6.2.2.2. OV-6a Operational Rules Model Coordination with BEPs and Other BEA Products

After the Business Rules Analyst completes the technical review with the Business Rules Team Lead, each Business Rule is passed back to stakeholders for a functional review. Stakeholders verify that the proposed Business Rule conveys the same idea as the original Business Rule concept. When analysis is complete, the stakeholders communicate the results of the functional review to the Business Rules Analyst. If the proposed Business Rule passes the functional review, the stakeholders return it to the Business Rules Analyst for pre-load verification. If the proposed Business Rule does not pass functional review, the stakeholders return it to the Business Rules Analyst for further refinement. In that case, the Business Rules Analyst uses stakeholder comments to refine the Business Rule concept. Normally, the stakeholder and Business Rules Analyst work closely to achieve a consensus on a functionally and technically solid Business Rule.

6.2.2.3. OV-6a Operational Rules Model Cleanup

Once the stakeholders and the Business Rules Analyst agree upon the validity of the Business Rules, the Business Rules are ready for the Business Rules Analyst to load them into the BEA. The Business Rules Analyst uses the load sheet, which is an MS Excel spreadsheet that lists the Business Rules and all associated fields discussed in 6.1.4 Definitions. This load sheet is submitted to the stakeholders for approval through the designated End-to-End Process Workshops. Once the stakeholders grant final approval, the Business Rules Analyst submits the load sheet and a copy of the approved CR to the Build Team. If a Business Rule does not successfully pass the final approval stage, the Business Rules Analyst works with the stakeholders towards final approval.

The Business Rules Analyst can manually input the approved Business Rules into System Architect. This is normally done when the Business Rule volume is less than 20.

Once the Business Rule is in SA, the Business Rules Analyst verifies that the load sheet is correctly represented in the BEA. This step must wait for the Build Team to perform an Encyclopedia update so that the Business Rules Analyst can conduct the Post-Build Verification on the latest Encyclopedia build. If the Business Rules Analyst discovers a discrepancy at this point, he or she works with the Build Team to correct it.

6.2.3. Post Analysis Tasks

To ensure that the Business Rules remain valid, the Business Rules Analyst follows a maintenance and retirement process.

6.2.3.1. Maintenance Process

The stakeholders notify the Business Rules Analyst that there is a change in the BEA affecting existing Business Rules. The Business Rules Analyst identifies the Business Rules and makes any necessary adjustments in System Architect. Next, the Business Rules Analyst analyzes the architecture for potential changes to the existing processes and other linkages in System Architect. Finally, the Business Rules Analyst validates the above Process for continued support of the business transformation. The following discusses the maintenance process in detail:

Identify Business Rules

Either a stakeholder or Business Rules Analyst may initiate an analysis to determine if changes are needed. A number of circumstances may trigger a change to some aspect of the Business Rule and/or its artifacts. Below are typical (but not an inclusive list of) triggers:

- Business Objective change
- Process Step change
- Information Exchange / Data Object / SDE change
- Decision Gateway change
- Requirement change
- Laws, Regulations and Policies (LRP) Source change

Note: If a LRP unique Identifier or description already mapped to a Business Rule changes in the LRP Repository (DOORS database), the LRP team will notify the Business Rules Analyst and/or the stakeholders. The Business Rules Analyst will manage the change in System Architect.

Analyze Potential Changes

Once the change is identified, the Business Rules Analyst conducts analysis to determine any potential impacts on the BEA. The analysis includes impact to other architectural products, existing Business Rules and/or requirements.

Validate Business Rule Changes

The Business Rules Analyst hands off the Business Rule for technical review to the Business Rules Team Lead. After completing technical review, the Business Rules Analyst works with the appropriate stakeholders for functional approval.

Update System Architect

Upon approval, the Business Rules Analyst makes the changes in System Architect or creates a load sheet to present to the Build Team for automated loading.

6.2.3.2. Retirement Process

As with the Business Rule maintenance process, a number of Events may trigger the retirement process, such as:

- A Business Objective change or elimination
- BPM Process modification or elimination

- LRP Source change or elimination

The stakeholders notify the Business Rules Analyst that a Business Rule needs to be retired. The Business Rules Analyst, working closely with the stakeholders, documents the reason for retirement, and then the Business Rule is retired from the SA encyclopedia. Finally, the appropriate validation steps are executed to ensure that the Business Rule was actually retired.

> **Note:** The stakeholders review each Business Rule identified for retirement, verifying whether it is appropriate to retire the Business Rule for all Processes. If a Business Rule, identified for retirement, still has a valid mapping to another Process Step, the Business Rules Analyst retains the Business Rule, removing only the link to the retired Process Step.

The following discusses the retirement process in more detail:

Identify Obsolete Business Rule

The stakeholders are responsible for identifying a Business Rule that needs to be retired. In addition, if an architecture object deletion or change is the trigger, the stakeholders identify whether each instance of the Business Rule must be deleted or just the mapping between the Business Rule and the architecture object being changed.

Retire Business Rule

The Business Rules Analyst removes the identified Business Rule from SA. The Business Rules Analyst also identifies to the LRP team a retired Business Rule that has a LRP Identifier associated with it. If the Business Rule is still valid, and possesses valid mappings to other architecture objects, the analyst removes only the prescribed mapping.

Validate Business Rule Retirement

The Business Rules Analyst SME conducts the appropriate quality assurance checks. These checks validate the appropriate retirement of a Business Rule and prevent the creation of orphan Processes and Data Elements.

6.3. Modeling OV-6a Using SA

6.3.1. OV-6a Attributes Conventions

Some of the guidelines that assist in the identification and definition of Business Rules are:

- Each Business Rule must have a unique Business Rule Name. The Business Rule Name format is described in Subsection 6.1.4 of this document.
- Each Business Rule must be assigned a unique Business Rule Number by which it can be identified.
- Each Business Rule must have a unique description. The Description is the actual Business Rule. Subsection 6.3.2 of this document provides details on the construction of Business Rules.
- Each Business Rule must have a Stakeholder. The Stakeholder may be an individual CBM designation or a BEP designation.
- Each Business Rule must be classified into only one of three Business Rule Levels: Conceptual Level, Operational Level, or Automated Level.
- Each Business Rule must be classified into only one of three Business Rule Categories: Action Assertion, Derivation, or Structural Assertion.
- Each Business Rule must be associated with only one of three Business Rule Source Types: Compliance Requirement, Derived Requirement, or Process.
- Each Business Rule with a Source Type of "Compliance Requirement" must be associated with one or more LRP authoritative sources. The LRP Source is the unique identifier from the LRP Repository (DOORS) database.

- Each Business Rule with a Source Type of "Derived Requirement" should have a source identified in the BEP Reference Material Field. This information is not required, but highly recommended.
- Each Business Rule with a Source Type of "Process" must be mapped to a BPM Process, Gateway and/or Data Object in the OV-6c Business Process Diagram.
- Each Business Rule may be optionally associated with an Integration Stakeholder. The stakeholder designation must be from the approved stakeholder acronym list.
- Every Structural Assertion Business Rule must have a mapping to a Data Element in the OV-7 or a Data Object in the Ov-6c Business Process Diagram.
- Each Action Assertion Business Rule must have a mapping to at least one BPM Process and/or decision Gateway in the OV-6c Business Process Diagram. Action Assertion Business Rules supporting enterprise systems or initiatives may be linked to Data Elements in the OV-7 instead.
- Each Derivation Business Rule must have a mapping to at least one Data Object, decision Gateway and/or BPM Process. Derivation Business Rules supporting enterprise systems or initiatives may be linked to Data Elements in the OV-7 instead.
- Each Action Assertion and Derivation Business Rule linked to any OV-7 Data Element must be associated with the enterprise system or initiative it supports in the Initiatives field.
- Each Requirement Source Identifier must be associated with a unique Identifier from the DOORS database.

6.4. OV-6a Modeling Problems to Avoid

This section discusses lessons learned from previous OV-6a architecture development and mention best practices while developing the OV-6a architecture product.

6.4.1. OV-6a Lessons Learned

- A clear understanding of the OV-6c Business Process Diagram and OV-7 Data Elements must come before OV-6a development.
- BEP OV-6a content that affects other BEPs should be socialized before the workshop.
- Prior to the workshop, the fields associated with a Business Rule, like Source Type and OV-6c BPM Process mapping, should be socialized with the BEP Coordinator and Team Lead to ensure these mappings are captured, in addition to the content of the Business Rule.
- Avoid embedding term definitions in Business Rules (Use AV-2 to define terms)

6.4.2. OV-6a Best Practices

- Avoid ambiguity
- Simplify as much as possible by not over-explaining or adding unrelated information
- Make sure subject is quantified and singular (e.g. by using the word "each")
- Separate compound statements ("and" or "or") into several individual Business Rules
- Use the "If - Then" statement construct for conditional Business Rules
- For the Business Rule Category of Derivation rules, make the result of a computation the subject of the Business Rule
- Ensure that the logical structure of the Business Rule makes sense
- Review all domain specific Business Rules for contradictory or redundant statements.
- Validate the existence of System Architect mapped names using spreadsheet macros such as VLOOKUP. This helps reduce errors in the load process.

7. OV-7 – Logical Data Model

7.1. Summary Description

This section describes the OV-7 architecture product and its relationship to other BEA products, the model development method, and the modeling guidelines used for development of the OV-7.

7.1.1. Product Purpose

The OV-7 Logical Data Model describes the structure of the BEA's data in terms of data types as Entities and their characteristics as Attributes. It provides wide definitions of the Entities and their Attributes and captures BMA structural Business Rules governing the interrelationships between these Entities and their Attributes.

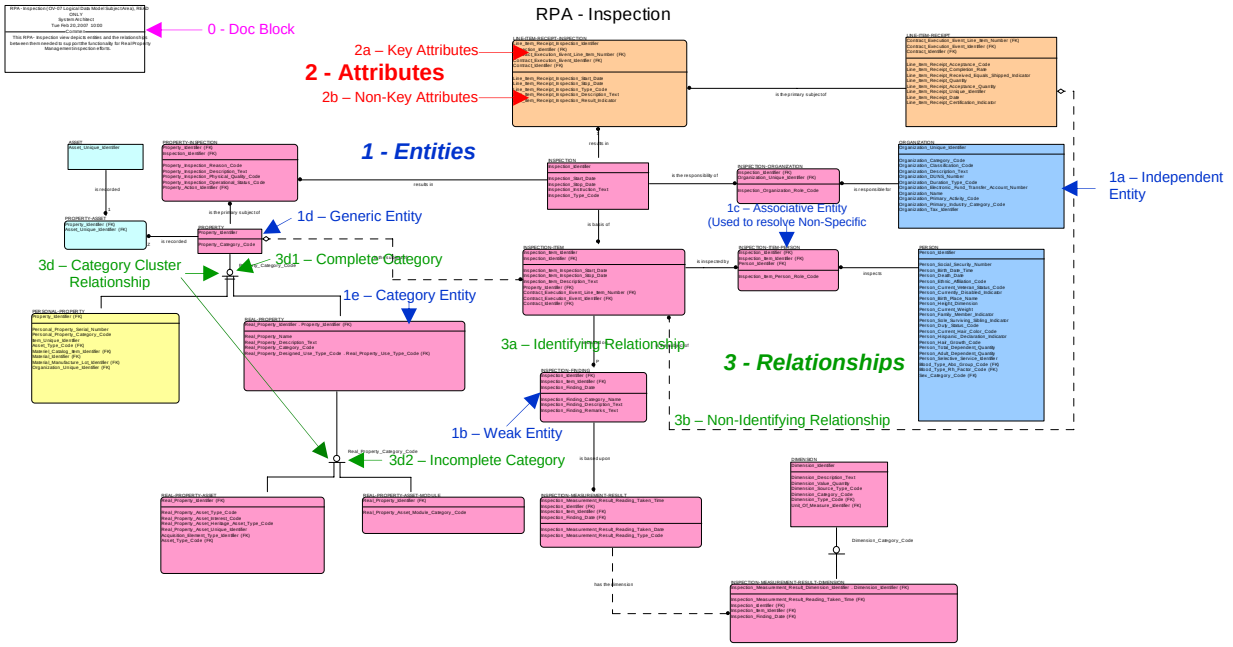
The OV-7:

- Enables effective management of data resources by providing a single set of consistent data definitions for use within the Business Mission Area (BMA) of DoD.
- Captures the Business Rules describing the structure of data needs within the BMA of DoD.
- Serves as a data reference architecture to support the sharing of data between DoD BMAs, across the DoD Components, Services and Agencies and organizations outside DoD.

7.1.2. Product Structure

Figure 7-1 is an illustrative example of an OV-7 Logical Data Model used within BEA. Each individual OV-7 diagram represents a particular BEP's view into the single OV-7 data model integrated across the entire BMA of DoD.

Figure 7-1, Example of an OV-7 Logical Data Model Represented Within BEA



7.1.3. OV-7 Definitions

The objects used to represent the OV-7 Logical Data Model within BEA adhere to the IDEF1x Standard as implemented by the Telelogic System Architect tool. The following numbered objects refer to Figure 7-1. The main features of this diagram are as follows:

- 0 - **Doc Block:** A Doc Block (also known as a Title Block) contains the diagram name, last modification date and a brief description of the contents of the diagram. It is located in the upper left corner of the diagram.
- 1 - **Entities:** An Entity refers to a unique person, place, or thing about which the DoD BMA CBMs desire to maintain information. In the context of an Entity, a thing may be either physical or conceptual (an event, a deed, an idea, a notion, a point, ect.). This information captured is on the characteristics of an Entity and/or on relationships between Entities.

  Each Entity represents a set of things having common characteristics and/or relationships to other Entities. The characteristics of each Entity are represented as having a common set of Attributes. The types of Entities are as follows:

  - 1a - **Independent Entity:** Also known as an Originating, Parent or Generic Entity, is an Entity that does not rely on another Entity for identification.
  - 1b - **Dependent Entity:** Also known as a Weak or Child Entity, is an Entity that relies on another Entity for identification.
  - 1c - **Associative Entity:** Also known as an Intersection Entity, it resolves a Non-Specific (many-to-many) Relationship between Entities.
  - 1d - **Generic Entity:** Also known as a Supertype Entity, it is an abstraction representing the common characteristics in a set of Attributes shared by two or more Category (Subtype) Entities.
  - 1e - **Category Entity:** Also known as a Subtype Entity, represents additional characteristics that differentiate it from the other Category Entities of the same Generic (Supertype) Entity.
- 2 - **Attributes:** Attributes are characteristics that either identify or describe Entities. Attributes that identify Entities are key Attributes. Attributes that describe an Entity are non-key Attributes. Attributes are associated to one and only one Entity and represent the normalized view of Data Elements within OV-7 Entities.
  - 2a - **Key Attributes:** Attributes that are used to identify Entities as well as describe Entities. Key Attributes uniquely identify an instance of an Entity.
  - 2b - **Non-Key Attributes:** Attributes that are used to describe Entities.
- 3 – **Relationships:** In IDEF1X an Entity Relationship is simply an association or connection between two Entities. A Relationship instance is the meaningful association or connection between two Entity instances. For each Entity instance at one end, the Relationship shows the minimum and maximum number of instances possible for the Entity at the other end. Optionality describes the minimum and Cardinality describes the maximum. The types of Relationships are as follows:
  - 3a - **Identifying Relationship:** A Relationship between two Entities in which the Dependent Entity is identified through its association with another Entity.
  - 3b - **Non-Identifying Relationship:** A Relationship between two Entities in which the Attributes carried to the receiving Entity are used to describe the receiving Entity.
  - 3c - **Non-Specific Relationship: A** many-to-many Relationships between two Entities.

    Note: Non-Specific Relationships are not allowed in the BEA OV-7. Therefore all Non-Specific Relationships must be resolved with an associative Entity (1c).
  - 3d - **Category Cluster Relationship:** (Supertype – Subtype Relationships) is used to express a set of one or more mutually exclusive categorization Relationships for the same Generic Entity.

- **3d1 - Complete Category:** Denotes that all possible categories are represented in the BEA Logical Data Model.
- **3d2 - Incomplete Category:** Denotes that all possible categories are not represented in the BEA Logical Data Model.

7.1.4. Relationship to Other BEA Products

OV-7 Logical data Model relates to other BEA products as follows:

AV-2 All OV-7 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

The OV-7 deliverable objects that must be listed and defined in the AV-2 are:

- Attribute Definitions
- Data Element Definitions
- Entity Definitions

All acronyms used in OV-7 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-3 One or more OV-7 Entities link to IEs in the OV-3, describing the IEs in terms of the Entities that comprise it. Each Entity in the OV-7 must link to one or more IEs. . If the IE is sufficiently narrow and it supports a Data Initiative, then it may be populated with Attributes within Entities.

OV-5 Entities in the OV-7 support the Inputs and Outputs on the OV-5 via the IEs in the OV-3.

OV-6a Business Rules in the OV-6a may constrain the structure and validity of elements of the OV-7. The structure of the Entities, Attributes and Entity Relationships must be consistent with the Business Rules.

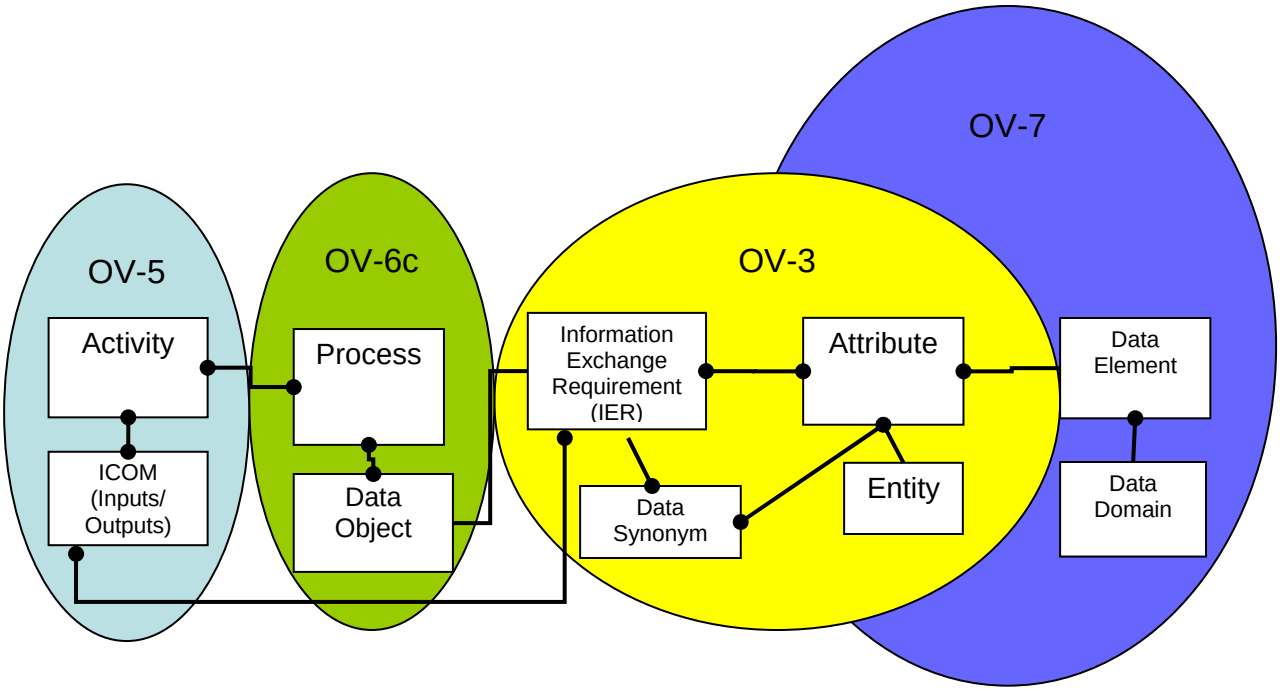
> **Note**: In BEA, Business Rules do not link directly to the OV-7 Entities, Attributes and Relationships. Instead, Business Rules may be linked directly to specific Data Elements supporting enterprise systems and initiatives or to OV-6c objects.

OV-6c OV-6c Data Objects inherit their OV-7 characteristics from the OV-3 Information Exchanges as outlined above.

SV-6 The SDEs represented in the SV-6 inherit their OV-7 characteristics from the OV-3 Information Exchanges as outlined above.

The interrelationship between the OV-7 and other BEA products is shown in Figure 7-2.

Figure 7-2, Relationship between OV-7 and Other BEA Products



7.2. Developing OV-7 Models

The team works with the BEP representatives to identify the BEA data requirements. The team then captures these data requirements and structural Business Rules within the OV-7. The team participates in collaborative working sessions with BEA representatives to support the BEP needs and ensures proper integration with other BEA products.

The following is a list of required background material each modeler must understand to ensure a proper OV-7 development:

- The OV-5 Inputs and Outputs inherit their OV-7 characteristics from the OV-3 Information Exchanges.
- The OV-6c Data Objects inherit their OV-7 characteristics from the OV-3 Information Exchange.
- The SV-6 SDEs inherit their OV-7 characteristics from the OV-3 Information Exchanges.
- An Information Exchange contains a finite set of characteristics from the OV-7.
- Different sets of data characteristics require the creation of unique IEs.
- Each IE relates to one or more Entities in the OV-7.
- Attribute level OV-3 Information Exchanges are the publication vehicle of Data Initiatives and enterprise interoperability standards, used for BEA compliance. The contents of these IEs may represent a partial implementation in support of an emerging enterprise standard.
- Attribute level OV-3 Information Exchanges may contain Data Synonyms related to their Attributes.
    - Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.

- If stakeholder provided Data Elements adhere to the following constraints; are at the atomic level, conform to BEA standards, have agreement among all stakeholders on the name and definition; then the BEP provided Data Element is directly incorporated into the BEA or an exisiting Data Element is updated to reflect the new standard. The Data Element is modeled as an Attribute of one or more OV-7 Entities without the creation of any OV-3 Data Synonyms.

- Stakeholder contributed Data Models are incorporated into the BEA OV-7 to support the level of decomposition of the supporting OV-5.
  - All concepts gleaned from these models must be normalized into Entities and their supporting Attributes across the entire BEA OV-7.
  - No information may be represented within the OV-7 that is outside of OV-5 activities, their supporting Inputs and Outputs and further decomposition in the OV-3 Information Exchanges with corresponding Data Objects on the OV-6c.
- All Data Elements in the BEA are at the atomic level, as known and must be represented as one or more Attributes within one or more OV-7 Entities.
- Data Elements directly related to one or more Data Initiatives or enterprise interoperability standards may have a Data Domain to capture the physical characteristics, authoritative source and may contain Domain Permitted Values along with their descriptions.
- Data Domains directly related to one or more Data Elements supporting a Data Initiative may have Domain Permitted Values only if the entire set is included.

7.2.1. Pre-Analysis Tasks

Develop a thorough understanding of the scope, context, constraints, objectives and product deliverables of the BIP. The following items are the responsibility of the individual modelers assigned to each BIP.

1. Using the BEA HTML, determine existing content from the OV-5 Activity model and identify the leaf-level activities supporting the BIP. (This represents the existing scope of the BIP within the BEA.)
   - Each leaf-level activity has supporting ICOMs. Review the Input and Output ICOMs and their associated IEs in the OV-3.
   - Each OV-3 IE is supported by either one or more Entities or a specific set of Attributes within the OV-7.
   - In addition, an OV-3 Information Exchange may have Data Synonyms associated with one or more Attributes within the context of a particular Information Exchange. The contents of the Information Exchanges are depicted as one or more Entities within the single OV-7 Logical Data Model.
2. Review OV-6c Process Steps and their associated OV-6a Business Rules to determine additional constraints on the OV-7.
3. Review OV-6c Data Objects and their associated OV-6a Business Rules to determine additional constraints in the OV-7.
4. Identify existing/proposed IEs in support of OV-6c Data Objects that impact the content of the OV-7.
5. Identify existing unresolved or deferred OV-7 Change Requests (CRs), Child and Feedback Tickets that fall within the scope of the BIP.
6. Identify existing/proposed solutions to the OV-7 CRs in support of the BIP.

7. Identify existing/proposed OV-6a Structural Assertion and Derivation Business Rules that impact the content of the OV-3 and the OV-7 as are required to achieve the desired outcome of the BIP.
8. Identify existing/proposed IEs in support of SDE in the SV-1 / SV-6 that impact the content of the OV-7.
9. Identify existing/proposed IEs in support of OV-6c Data Objects that impact the content of the OV-7.
10. Identify existing/proposed IE definitions that impact the content of the OV-7.
11. Work within the SMEs to identify proposed revisions to IEs supporting specific Data Initiatives or enterprise interoperability standard transaction sets.
12. Identify existing/proposed operational nodes and needlines required to support the data requirements between our federation partners.
13. Ensure that only IEs sufficiently narrow in scope (with the correct business context to impact the target audience) are populated at the Attribute level and they directly support Data Initiatives or enterprise interoperability standards.
14. Determine all Entities required that support the BIP and capture the following kinds of Entities: the published transaction sets, their derivation rules, and referential integrity constraints necessary for the aggregation of raw data required to produce accurate and consistent transaction sets.

    Note: For emerging Data Initiatives and enterprise interoperability standards, break the Information Exchange requirements down into atomic level data elements, compare their physical characteristics and underlying Data Domains, separate them into repeating groups, identify candidate keys and structure them into a set of one or more Entities that precisely capture the contents of the transaction set according to the rules of normalization. Compare the Information Exchange and the preliminary contents identified against existing transaction sets in the Meta Data Registry, Government and International consensus standards and determine the authoritative source for each Data Element and propose a standard transaction set to the governance authority.
15. Model an integrated straw-man representation of the BEP OV-7 that includes all items identified above.
16. Identify any individual Data Elements required for Data Initiatives.
17. Review work with the BEA OV-7 Product Lead to ensure that data products properly integrate into the OV-7 and the other products within the BEA.

7.2.2. Development Tasks

All of these tasks must be completed while developing in the OV-7 and are all the responsibility of the individual modelers.

Identify data related changes that impact the OV-7 Views, Entities, Attributes, Relationships or Data Elements. Work with the BEP representatives on the development and refinement of the OV-2 Needlines, OV-5 ICOMs, OV-3 IEs, OV-6a Business Rules, OV-6c Data Objects, SV-1 System Interfaces and SV-6 SDEs, and ensure their proper representation within the OV-7 Logical Data Model.

7.2.2.1. Creating / Modifying Diagrams

1. Select impacted diagrams or create new diagram(s) as required.
2. Model new/revised Entities, Attributes and Relationships to capture the SME's functional requirements and meet the objectives of the BIP.

- Determine the level of abstraction required to successfully meet the objectives of the BIP in the context of each IE.
  - Treat conceptual requirements with Entity level Information Exchanges modeled at the highest level of abstraction available to capture the high-level or fundamental referential integrity constraints.
  - Use existing high-level Entities such as PERSON, LOCATION and DOCUMENT to cover notional requirements.
  - For emerging Data Initiatives and enterprise interoperability standards capture the exact contents of the transaction approved by the governance body.
  - Model the results as a set of one or more Entities in the BEA directly supporting the requirements of the transaction.
  - Model additional Entities, Attributes and Relationships required to accurately aggregate data in the Information Exchanges from our federation partners.
  - Apply Derivation and Structural Assertion Business Rules to both sets of Entities directly supporting the IE and indirect.
  - Test the resulting model with SMEs to uncover requirement gaps and design flaws.
  - Adjust the model and make refinements as required.

3. To ensure that there is no duplication of Entities, their supporting Attributes underlying Data Elements (Data Domains and Domain Permitted Values) ,and Relationships across the single BEA Logical Data Model (OV-7), the modeler verifies that Entities:
   - Do not duplicate existing entities within the BEA OV-7
   - Either notionally support the Entity level Information Exchanges (serves as a place holder fro further concept refinements and interactions with the Data Initiatives and enterprise interoperability standards)

   or

   - Directly support published content of the Data Initiatives or enterprise interoperability standards in Attribute level Information Exchanges

   or

   - Indirectly support the Information Exchange's required Derivation and Structural Assertion Business Rules required to produce and constrain the contents associated with Attribute level Information Exchanges
4. Review Data Domains when identifying new Data Elements (A data element must have a single Data Domain).
5. Model new/revised Data Elements as Attributes of Entities that directly support the published content of the Information Exchanges.
6. Model new/revised Data Elements as Attributes of Entities that indirectly support the published content of the Information Exchanges (required to capture their required Data Derivation and Structural Assertion Business Rules, required to produce and constrain the contents associated with the Information Exchanges when published as a finite set of Attributes).
7. Modify assignment of Entities or Attributes/Entity pairs to IEs based on the addition and deletion of Entities and Attributes.
8. If necessary, assign Attributes to the Information Exchanges based on the IE-Entity mappings.
9. Finalize the individual Data Elements supporting Data Initiatives required for Systems Certification.
10. Assign Data Initiatives to the Data Elements.

11. Ensure that only IEs sufficiently narrow in scope are populated at the Attribute level and that they must directly support Data Initiatives and enterprise interoperability standards.
12. Review work with SMEs, Product Lead, IV&V and Architecture Verification team to ensure that data products are properly integrated within both OV-7 and the BEA.
13. Integrate the approved work products into the BEA.
14. Validate the depiction of the content within the OV-7 with the functional SMEs.

7.2.2.2. Diagram / Model Coordination with BEP's and Other BEA Products

All of these tasks are completed in the development phase for the OV-7. These tasks are all the responsibility of the individual OV-7 Data Modelers.

- Integrate the approved work products into the BEA.
- Incorporate additional change modifications that impact the BEPs' data representation caused by subsequent BEP work sessions.
- Identify subject areas and fundamental Entities for incorporation into the model from the BEP approved content.
- Ensure that all IEs have OV-7 Entities or Attributes within Entities that cover the definitions of the leaf-level Input and Output ICOMs for all activities that fall within the scope of the developmental effort. Coordinate with the OV-5 and OV-3 teams on the coordination and population of the IE. Have the mapping validated by the SMEs.
- Ensure that all IE proposed to contain Attributes are sufficiently narrow as to enable their population by a finite set of characteristics. Work within other teams to make any required adjustments to the IEs as needed.
- With OV-3 Information Exchange Data Synonyms, ensure that any Data Synonyms provided by the stakeholders cross-references the Attributes within the context of the particular IE and are represented as Attributes in one or more OV-7 Entities.
- Review work with SMEs, Product Lead, IV&V and Architecture Verification team to ensure that data products are properly integrated within both OV-7 and the BEA.

7.2.2.3. Diagram / Model Cleanup

- Ensure that the BEP and CBM team stakeholders agree with their representation on diagrams.
- Remove invalid and duplicate access paths that cause the display of AK1 designations in the primary key portion of Entities.
- Ensure that all Relationship lines on all OV-7 Diagrams display properly and are not hidden.
- Ensure that the associated tags of all Relationship lines are positioned properly on the diagram.
- Ensure that, at 21% zoom, all Attribute names are displayed on a single line within the Entity.
- Ensure that all Relationship lines are straight, not broken, and that all Relationship lines avoid crossing other Relationship lines whenever possible.
- Ensure that all diagram descriptions, diagram doc blocks, diagram notes, diagram names, object names and object descriptions are not truncated and spell checked.
- Ensure that all Entities are properly colored.
- Ensure that all Acronyms are added to SA and that they are defined in the Terms list of SA.

- Ensure that words in the "Terms" list of SA are correctly and consistently represented in all object names and descriptions. Ensure that other definitions do not redefine the Terms.
- Ensure that all table names exactly match their corresponding Entity names with "_" separating the terms instead of "-".
- Ensure that all the primary index and access path names exactly match the Entity name followed by "_PK" suffix.
- Ensure that the IDEF1X categorization names match the discriminator Attribute names with the removal of their class word and the replacement of the "_" between terms with spaces.
- Ensure that all column names exactly match their corresponding Attribute names.
- Address all items in the OV-7 Product Checklist (Diagrams, Definitions and Integration).
- Ensure that the CR packet includes all necessary items.
- Remove OV-7 objects from the encyclopedia that are not shown on or associated with OV-7 Diagrams

7.2.2.4. Post-Development Tasks

- Incorporate additional updates to the OV-7 based upon approved child tickets.
- Incorporate additional updates to the OV-7 based upon approved HTML tickets.
- Document known deficiencies to be resolved within the next release.

7.3. Modeling OV-7 Using SA

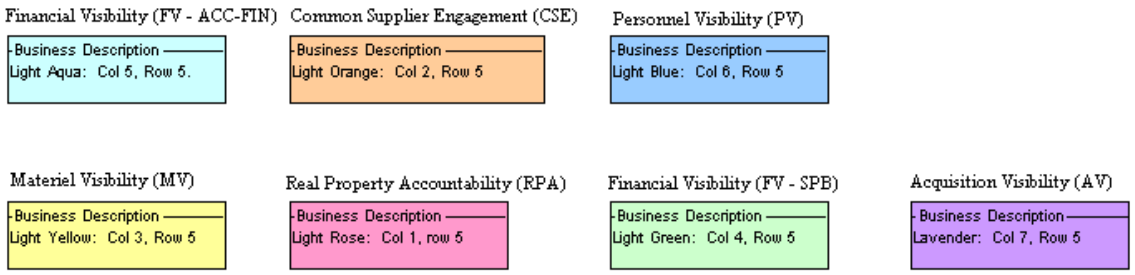
The BEA OV-7 Logical Data Model development is in accordance with the standardized modeling techniques delineated in FIPS 184 as implemented within the confines of the SA tool.

7.3.1. Modeling Conventions

7.3.1.1. Use of Color in OV-7 Diagrams

Each of the Business Enterprise Priority areas shall have a specific color scheme to be used on the diagrams for the OV-7s. The colors can be found in the Basic Color Set within Telelogic on the lower row of the color palette. The colors are applied to Entities within OV-7 Diagrams as per Figure 7-3.

Figure 7-3, OV-7 BEP Color Set



7.3.1.2. Diagram Conventions

The Doc Block representing header information for the diagram (including the diagram name and date last updated) is placed on the diagram.

- A Doc Block is placed in the upper left-hand corner of every diagram as close to the corner as the printer margins will permit.
- Enlarge the Doc Block, so truncation indicators (dots) are not displayed and all text is visible.
- The Doc Block must be a box with no fill color and a black border.
- Borders are not needed for the OV-7 diagram.
- Group the logical structure within a diagram to minimize crossing Relationship lines and to make the diagram more readable and understandable. Absent a specific reason to do otherwise, each view in the OV-7 shall display for each included Entity:
  - The name of the Entity
  - Each primary key Attribute within the Entity
  - Each non-primary key Attribute within the Entity
  - Each Relationship connected to or from the Entity
- The Title of the diagram shall include the following:
  - Be centered on the top of the diagram and in title case (determine center placement by printing single page printable diagrams on 8.5"x11" paper, and folding sheet in half side to side).
  - Not be underlined or bolded.
  - Be in Arial font with appropriate font size so the title is in proportion to all other diagrams when single page printable diagrams are printed on 8.5"x11" paper.
  - Be an exact match of the Diagram Name.
- Include for each included Entity Relationship:
  - The Relationship line and the nature of the Relationship (identified or non-identified).
  - The label (name) for at least one direction of the Relationship.
  - The Cardinality and Optionality of each end of the Relationship.
- When doing so adds value to understanding the particular aspect of the model being presented in the view:
  - One or more of the display characteristics listed above may be left out.
  - An Entity business description may be included.
- Each Entity shall have a black outline.
- Relationship lines shall be in black.

7.3.2. Object Conventions

7.3.2.1. Entities

Each Entity must refer to a unique person, place, thing, or concept within the Enterprise about which the Enterprise desires to and can keep information.

7.3.2.1.1. Entity Names

Each Entity name must:

- Refer to the class of information, not the occurrence of the class.
- Be a singular noun or noun phrase.
- Include only uppercase alphabetic characters (A-Z) with the terms separated with dashes and no special characters (for example, BILLING-STATEMENT).

- Not contain abbreviations
  - Exception: The abbreviation is extremely common or too long to be spelled out.
- Not contain acronyms.
  - Exception: The acronym is in the approved acronyms list.
- Not contain articles (a, an, the) or prepositions (at, by, for, from, in, of, to).
  - Exception: The article or preposition is commonly used in Business and clearly aids in identifying the concept behind the Entity.

7.3.2.1.2. Entity Definitions

Each Entity must have a definition. Each Entity definition must:

- Describe the Entity in ordinary business language.
- Define what the Entity is, not how, where, or when the Entity is used, or who uses it.
- The definition should not merely restate or rephrase the name, or just provide a list of the Attributes or meta-Attributes within the Entity.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition must be clear enough to allow only one possible interpretation. (Examples may be included to clarify the meaning.) Describe a term in such a way that it has only one meaning within its definition.
- Avoid using any word that appears in the Entity name. Instead, paraphrase or use synonyms whenever possible.
- Not be defined in terms of one Entity that is also defined in the terms of another Entity. (That is, no circular definition.)
- Describe one instance, not a group of instances. For example, begin the definition with "A" or "An."
- Be stated in terms of the thing of interest to the business, not in terms of the information captured about the thing of interest.

7.3.2.1.3. Reference Entities

A Reference Entity is one that contains a codified list of standard values as its primary key Attribute (for example, a U.S. State Code table for Virginia and Vermont). To avoid unnecessary visual clutter, a reference table will not be used except:

- When it is necessary to show additional information in the table other than name and description, or
- To provide clarity when the codified list is used in more than one place in the model.

7.3.2.1.4. Entity Primary Keys

An Entity Primary key must:

- Be a natural key (not artificial) whenever possible – a natural key is one composed of Attributes that are natural characteristics of instances of the Entity.
- Be minimal – a key is said to be minimal if the removal of any Attribute would make the key not unique.
- Not have any component that is null.
- Be included on every Entity.
- Be absent of a compelling business reason; no Attribute chosen as a Primary Key should end in a class word other than Code, Date, Identifier, Name, Number, Time or (sometimes) Indicator.

- It must be recognized that common identifiers like Employee ID is a surrogate key. Other cases where a surrogate key may be used include:
    - Cases where there is no possible natural key—for example, a collection of items that creates a group of arbitrary size, but there may be two or more of the same item.
    - Cases where the Entity is an abstract concept—for example, geographic location.
    - Cases where one or more Attributes of a potential natural key could be null.

7.3.2.2. Attributes

Each Attribute must describe a characteristic of its Entity. The use of a compound Attribute is not permitted. Each Attribute must:

- Represent a distinct piece of business information
- Must be associated with at least one Entity
- Be functionally dependent on the primary key

7.3.2.2.1. Attribute Names

The Attribute name is a business term used to recognize the Attribute. Each Attribute Name must:

- Be a singular noun or noun phrase.
- Be title cased with all terms separated with underscores and no special characters or blanks. For example: *Billing_Statement_Identifier*.
- Match exactly to its corresponding Data Element name, with the exception of Role-based Attributes.
- Be in title case.
- Use only acronyms as defined in the BEA AV-2, and not plural
- End in a Class Word represented in Table 7-1
- Avoid using any word that appears in the Attribute name. Instead, paraphrase or use synonyms whenever possible.
- Not contain abbreviations or acronyms, unless they appear in the approved acronym list in the AV-2 document.
- Be unique, not associated with the name of another non-key Attribute, and be associated with only one Attribute description.
- Not use names of organizations, computer or information systems, directives, forms, or reports.
- Not use the possessive forms of a word (that is, a word that denotes ownership).

7.3.2.2.2. Attribute Class Words

Table 7-1 illustrates class words and their definitions. A Class Word, which describes the category to which the Attribute belongs (for example, date, identifier, or quantity), must be added to the end of each Attribute's name. Abbreviations for class words may be used when appropriate.

Table 7-1, BEA-Accepted Class Words

Class Word	BEA Definition [1]
Amount	A monetary value.

[1] Department of Defense Data Dictionary System

Class Word	BEA Definition [1]
Code	A combination of one or more numbers, letters, or special characters substituted for a specific meaning.
Date	A particular day of a calendar year.
Identifier	A combination of one or more numbers, letters, or special characters that designates a specific object or Entity occurrence, but has no readily definable meaning.
Indicator	A binary condition of two mutually exclusive options in a code set.
Name	A designation of an object expressed in a word or phrase.
Number	A series of symbols, letters, or numbers used to represent a reference or identification. This is basically the same as an Identifier. It is used when number is the natural, expected, or commonly used terminating word (for example, Social_Security_Number or Disbursing_Voucher_Number).
Quantity	A non-monetary numeric value. This Class Word should not be used if another more restrictive Class Word is more appropriate (for example, Rate, Volume, Weight, or Dimension).
Text	An unformatted character string generally in the form of words, numbers, blanks and special characters. Formatting codes can be embedded in the character string.
Time	A chronological point within a day.
Year	A particular calendar year.

7.3.2.2.3. Attribute Definitions

Each Attribute must have a definition. Each Attribute definition must:

- Be concise, brief and comprehensive.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition should be clear enough to allow only one possible interpretation. (Examples may be included to clarify the meaning.)
- Describe a singular instance, not a group of instances; thus, the definition begins with "A" or "An."
- Explain the Attribute in terms of one value, not several values (singular form).
- Not be defined in terms of one Attribute that is also defined in the terms of another Attribute. (No circular definitions.)
- Start with what the data is, not how, where, or when the Attribute is used, or who uses the data. Subsequent parts of the definition can optionally contain the business reason that the Attribute is important to the organization.
- Use ordinary business language. Where it helps communicate the nature of the Attribute, list a few typical values.
- Use a noun phrase for the first sentence that states the essence of the Attribute. Standard English grammar, including the use of subject and verb, is appropriate for the rest of the definition.

7.3.2.3. Data Element

In the BEA, a Data Element is the smallest unit of stored data, which means it cannot be broken down further, or that it makes no sense to break it down further. The Data Element, however, can inherit properties from a Data

Domain. Data Elements are unique across the BMA and are associated with one or more Attributes within the BEA Entities.

- Data Elements must be linked to no more than one non-foreign key Attribute within each Entity.
- Each Data Element must represent a characteristic of a concept that is unique across the Enterprise.
- Only one Data Element may exist for a given data concept.

7.3.2.3.1. Data Element Name

The name of each Data Element must:

- Always end with a class word represented in table 7.1.
- Be title cased with all terms separated with underscores and no special characters or blanks. For example: *Billing_Statement_Identifier*.
- Be unique across the enterprise (no synonyms are allowed).
- Consist of a singular noun or noun phrase.
- Contain characters A-Z (no special characters are permitted).
- Not contain abbreviations or acronyms
  - Exception: They appear in the approved acronym list in the AV-2.
- Represent the Business Term used.
- Use the following format: Prime Word (logical grouping/category), Class Qualifier (Optional), Class Word.

7.3.2.3.2. Data Element Definition

Each Data Element must have a definition. Each Definition must:

- Be concise, brief and comprehensive.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition should be clear enough to allow only one possible interpretation.
- Describe a single instance, not a group of instances; thus, the definition begins with "A" or "An."
- Explain the Data Element in terms of one value, not several values (singular form).
- Not be defined in terms of another Data Element. (No circular definitions.)
- Start with what the data is, not how, where, or when the Data Element is used, or who uses the data. Subsequent parts of the definition can optionally contain the business reason that the Data Element is important.
- Use ordinary business language. Where it helps communicate the nature of the Data Element, list a few typical values.
- Use a noun phrase for the first sentence; it must state the essence of the Data Element. Standard English grammar, including the use of subject and verb, is appropriate for the rest of the definition.

7.3.2.4. Data Domain

In the BEA, the Data Domain represents a named and defined set of permitted values from which one or more Data Elements draw their values. A Data Domain is associated with Attributes through Data Elements. There are two kinds of Data Domains: Specific Domain and General Domain:

- *Specific Domain*: The precise set of possible values for a Data Element. Specific Domains may have Domain Permitted Values attached that reflect the entire set of values is available for publication.
- *General Domain*: A specified range of values a Data Element is permitted to have. In general, these domains are too large to be completely enumerated easily. For example: The general domain, *Date(8)* , is defined to contain any date possible, all using the same format (YYYYMMDD).

7.3.2.5. Domain Permitted Values

Domain Permitted Values are the entire set of the possible values with their definitions for a Specific Domain.

7.3.2.6. Data Synonym

Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.

7.3.3. Modeling within OV-7 Diagrams

7.3.3.1. Entity Relationships

IDEF1X Entity Relationships model certain kinds of Business Rules (structural assertions). Those Business Rules describe the nature of a two-way association between potential instances of two Entities, one found at each end of the Relationship. For each Entity instance at one end, the Relationship shows the minimum and maximum number of instances possible for the Entity at the other end. Optionality describes the minimum and Cardinality describes the maximum. (The term Cardinality can also be used to describe both the minimum and the maximum, but this section of the guidelines uses separate terms as a way to distinguish the two concepts.)

If the Relationship is non-specific (many-to-many) in nature, an associative Entity must be used to resolve the Relationship. If the Relationship is not many-to-many but is optional-to-optional, an associative Entity may be used to resolve the Relationship.

To determine the set of applicable Business Rules for the Relationships in the data model for each Relationship, there are several questions that a data modeler should ask.

- What is the Cardinality of the Relationship (e.g., "one-to-many" and "many-to-many")?
- Is the Relationship mandatory or optional in either or both directions?
- Is the Relationship identifying or non-identifying?

The general approach for managing Relationships can be summarized as follows:

- Each many-to-many Relationship (often referred to as a non-specific Relationship) is resolved by replacing it with an associative Entity. The key for the associative Entity consists of the Attributes that are the primary key for both Entities in the Relationship.
- Each optional-to-optional Relationship that carries data is resolved by replacing it with an associative Entity to carry the data.
- Each OV-7 shall include for each included Entity Relationship:
  - The Relationship line and the nature of the Relationship (identified or non-identified).
  - The label (name) from the source Entity to the target Entity direction of the Relationship.
  - The Cardinality and Optionality of each end of the Relationship.

7.3.3.1.1. Relationship Label

Each Relationship Label must:

- Be a meaningful verb phrase that is assigned to each Relationship line (e.g., "is related to" is not adequate, as the Relationship line obviously infers this Relationship).
- Match the Relationship from the source Entity to the target Entity
- Be independent of target end's Optionality and Cardinality.
- Exist for each identifying and non-identifying Relationships.
- Be placed on each diagram:
  - As close to the Relationship line and the originating Entity as possible; or
  - Intersecting the Relationship line.
- Be specific, concise and comprehensive.

7.3.3.1.2. Relationship Definitions

Relationship definitions are not required, but may be added for better understanding of the Relationship.

7.3.3.2. Supertypes and Subtypes

A Supertype is an Entity whose instances have Attributes that are common to one or more Entity Subtypes. A Subtype is an Entity that inherits common Attributes or Relationships from an Entity and contains at least one other Attribute or Relationship that distinguishes it from other Subtypes of the same Supertype.

7.3.3.2.1. Subtype and Supertype Definitions

Each Supertype Entity must:

- Be related to at least one Subtype Entity.
- Connect to each of its subtype Entities through an IDEF1X Category cluster circle.

Each Subtype Entity must:

- Have the same Primary Key as its related Supertype.
- Must have either additional Relationships and/or Attributes from the Supertype.
- Be mutually exclusive of the others in the same IDEF1X category cluster.
- Be related to exactly one Supertype Entity.

7.3.3.2.2. Subtype and Supertype Naming Convention

- Each IDEF1X Categorization in the LDM shall have a name.
- Each IDEF1X Categorization name consists of a title cased singular noun or noun phrase.
- Each IDEF1X Categorization name may use hyphens between words when using hyphens in proper English construction but no other special characters.
- Each IDEF1X Categorization name uses normal business language.

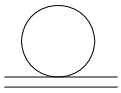
7.3.3.2.3. IDEF1X Categorization Definitions

Each IDEF1X Categorization definition must:

- Be concise, brief and comprehensive
- Define the scheme that distinguishes among the related subtype Entities. It will define what the scheme is, not how, where, or when the scheme is used or who uses it.

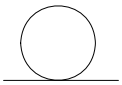
- Indicate the relevant named subtype Entity. If a value is known, that exact value should be used to indicate the correct subtype. Otherwise, the meaning of the value must be stated clearly enough to unambiguously indicate the correct subtype.
- Must have its first sentence constructed as a noun phrase, and subsequent sentences should have normal subjects and verbs.
- Avoid using terms that appear in the IDEF1X Categorization name.
- Use the Complete Category cluster circle (double bar under a circle) if all possible categories have been identified and assigned to subtype Entities in the relevant project model (Figure 7-4, Complete Category).

Figure 7-4, Complete Category



- Use the Incomplete Category cluster circle (single bar under a circle) if fewer than all possible categories have been identified and assigned to subtype Entities in the relevant project model (Figure 7-5, Incomplete Category).

Figure 7-5, Incomplete Category



Be assigned a discriminator from among the Attributes in the related Supertype Entity. The discriminator must have determinable values, each mapping to a maximum of one subtype Entity related to the categorization.

7.4. OV-7 Modeling Problems to Avoid

This section discusses lessons learned from previous OV-7 architecture development and mentions common modeling pitfalls and mistakes to avoid while modeling the OV-7 architecture product.

7.4.1. OV-7 Modeling Lessons Learned

- Changes in the OV-5 development (especially activity and ICOM changes) need to be closely monitored to catch potential impacts on the Entities within the OV-7.
- Monitor the changes of OV-6c Data Objects and SV-6 SDEs for a potential impact on the OV-7 models.
- Work with the SMEs to determine the rules that govern the content of the OV-7 and explain the proposed solutions to these same SMEs to validate the model content.
- Comparison results must be reviewed and validated with functional SMEs prior to the completion of the OV-7 workshops.

7.4.2. OV-7 Modeling Pitfalls

- Failure to follow the rules of normalization.
- Using a single Data Element to represent more than one Data Domain.
- Failure to map Entities and Attributes to all IEs within scope prior to the product review.
- Attempting to map Attributes to ill-conceived or broadly defined IEs.
- Adding Attributes to IEs that do not directly support Data Initiatives or enterprise interoperability standards.
- Failure to capture the published contents of Information Exchanges.
- Failure to capture the essential Business Rules used to derive and constrain Attribute level contents of Information Exchanges.

- Failure to assign stewardship to BEP and CBMs. Entity stewardship must match the Entity depiction on one or more BEP prefixed diagrams across the entire OV-7 Logical Data Model.
- Failure to justify child and subtype Entities. All child and subtype Entities must have at least one non-key Attribute and/or at least one Relationship that differentiate the child/subtype from the parent/supertype.
- Inappropriate color coding of Entities. Entity color must match one of the stewards (may require placement of the Entity on additional diagrams within the OV-7).
- Use of acronyms not appearing in the acronym list and/or using an acronym without checking the official acronym definition.
- Invalid placement and formatting of OV-7 objects.
    - First, set display to 21% zoom to verify that:
        1. Truncation indicators (dots) are not displayed and all text is visible
        2. All Attributes appear on a single line
        3. All Attributes appear within Entity boxes
        4. All Relationship and categorization labels are properly placed
    - Second, repeat the first step from the single page printable diagrams on a color printer, checking plots at 8.5"x11" and 11"x17". Correct any additional diagram errors uncovered.

8. OV-6c – Business Process Model

8.1. Summary Description

8.1.1. Background

This section describes the OV-6c Business Process Model (BPM), its relationship to other BEA products, the model development method and the modeling guidelines used for development of the OV-6c.

8.1.2. Product Purpose

The OV-6c BPM diagram shows in clear, unmistakable terms, how an activity will be accomplished; it is a plan for action. At its highest level, the BPM diagram depicts organizational strategy aimed at the executive level, while at its lowest, most detailed level, it can be used as the basis for "how to" instructions aimed at the manager / worker. Since the BPM diagram emphasizes actions, timing, people, decisions, and communication in the world of touchable things, it is no coincidence that it is one of the most looked-at and closely analyzed and monitored diagrams. The BPM diagram gets the "what" (Activity) and data (input and output ICOMs) from the OV-5, relevant data through IE's in the OV-3, displayed as Data Objects, and constraints and rules from the OV-6a.

The OV-6c BPM Diagrams currently in the BEA are a representation of the Business Processes identified within each CBM and supporting the BEPs. The models are developed in a layered approach using structured decomposition techniques. The following is the list of BEPs included in the BEA and their respective CBM sponsor:

- Acquisition Visibility (Weapon Systems Lifecycle Management (WSLM)).
- Common Supplier Engagement (MSSM, RPILM and WSLM).
- Financial Visibility (Financial Management (FM)).
- Materiel Visibility (Materiel Supply and Service Management (MSSM)).
- Personnel Visibility (Human Resources Management (HRM)).
- Real Property Accountability (Real Property and Installation Lifecycle Management (RPILM)).

Specific goals of the Business Process models include:

- Align all processes to Business Capability
- Correlate Data Objects to Information Exchanges.
- Correlate the Business Processes to the corresponding requirements and Business Rules.
- Supply input for development of other architecture products.
- Support reporting requirements of other agencies (specifically, Office of Management and Budget Exhibit 300 reporting requirements).

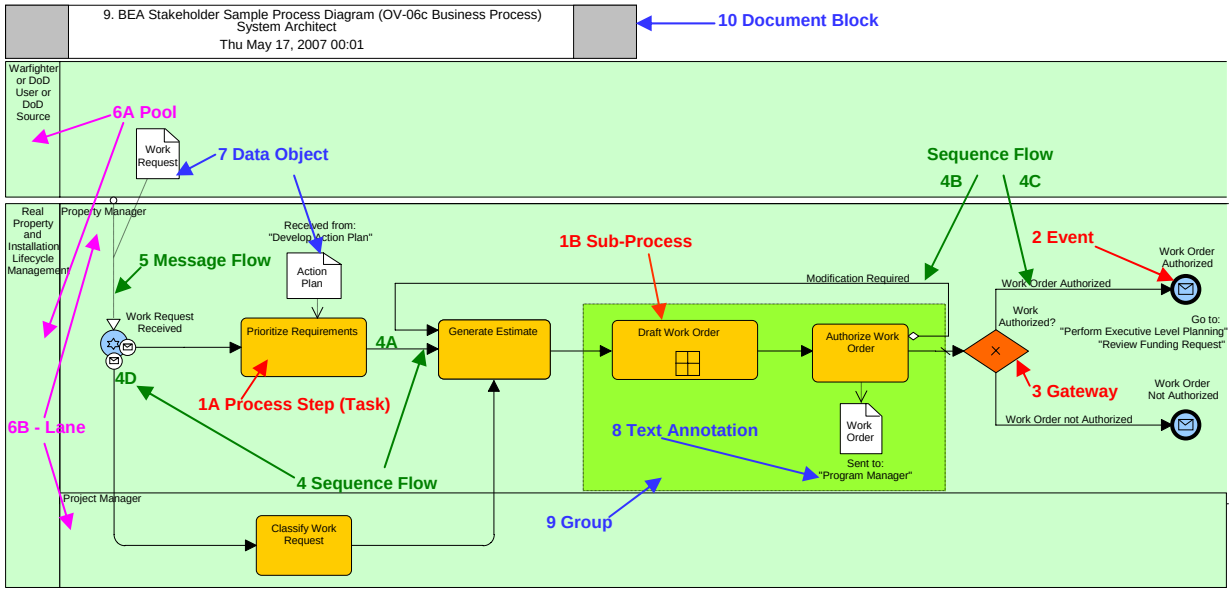
8.1.3. Product Structure

OV-6c models are developed using the Business Process Modeling Notation (BPMN). BPMN is a standard notation used across industry and Government to document Business Processes and is promoted by the Object Management Group (OMG). This standard has been developed specifically to model collaboration across organizations and support the implementation of Service Oriented Architecture (SOA). The primary goal of BPMN is to provide a standard notation that is readily understandable by all business stakeholders; the business analysts who create and refine the process, the technical staff responsible for designing and developing the software and infrastructure to support the process, and the business managers who implement, manage and monitor it. Consequently BPMN (BEA OV-6c) is intended to serve as common language to bridge the communication gap that frequently occurs between business process design and implementation.

A complete copy of the BPMN Version 1.0 standard used for the BEA OV-6c, "BPMN 1.0 " is located at www.BPMN.org. Later versions will be found at the Object Management Group website.

The OV-6c product consists of a set of BEA Business Process Diagrams, which may drill down in detail. The BEA repository contains descriptions, attributes and linkages to objects in other BEA products described in this document. The OV-6c Diagram objects, as shown in Figure 8-1, are characterized into four major groups: Flow Objects, Connection Objects, Swimlanes and Artifacts.

Figure 8-1, Objects of an OV-6c Diagram



Flow Objects actually perform the work and produce the products, synchronize the Process Steps, and direct the process flow. Red numbers identify these on Figure 8-1. The Flow Objects are:

1. **Process Steps** perform the work and produce the product. Process Steps, are also called *tasks* (1A). Tasks that are further decomposed into subtasks are called *Sub-Processes* (1B). Sub-Processes are identified with a "+" sign at the bottom center of the Process Step symbol. Sub-Process detail is included in a separate Diagram.
2. **Events** act like traffic signals and hold up the process or allow it to proceed in response to things that happen, called *triggers*. A *Start Event* starts the process in response to a trigger (in this case receipt of one of many allowable messages, shown by the envelope stereotype). An *End Event* (2) signifies the completion of the process. There are three types of Events, based on when they affect the flow, *Start, Intermediate* and *End:*

- **Start Event** – A 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. A Trigger is a mechanism that signals the start of a Business Process. A Start Event shall have a Trigger, indicating how the process starts: Message, Timer, Rule, Link, or Multiple. The Start Event shares the same basic shape of the Intermediate Event and End Event, a circle, but is drawn with a single thin line.
- **Intermediate Event** - Intermediate Events occur between a Start Event and an End Event. This is an Event that occurs after a process has been started; it will affect the flow of the process but will not start or (directly) terminate the process. The Intermediate Event shares the same basic shape of the Start Event and End Event, a circle, but is drawn with two thin lines.
- **End Event** - The End Event indicates where a process will end. In terms of Sequence Flow, the End Event is the end of a Task or an output that concludes the process, and thus, will not have any outgoing Sequence Flow. An End Event can have a specific Result that will appear as a marker within the center of the End Event shape. End Event Results are Message, Error, Compensation, Link and Multiple.

If there is more than one starting or ending Event for a process, combine them into a single Multiple (start or end) Event. Link all Initiating Events or Ending Events to the definition of the Multiple Event. Create a graphic comment on the Event that starts with "Initiating Events:" and list each initiating Event in quotes on a new line. If there is more than one Sequence Flow from the Start Event, use "Initiating Events" followed by a list of Initiating Events for that process. Follow this by a blank line and repeat for each process.

3. **Gateways** control the divergence and convergence of a flow. Thus, it determines decisions, as well as the forking, and merging paths. The following types of Gateways may be used, depending in the conditions:

- **Exclusive Gateway** - Exclusive decision Gateways take only one (of many possible) outgoing paths regardless of the input Sequence Flow. Exclusive Merge Gateways take the single output Sequence Flow when any (of many possible) input Sequence Flow occurs. A data-based Gateway makes the decision from data passed as part of the Sequence or Message Flow. An Event-based Gateway makes a decision based on the type of triggering Event.
- **Event-Based Gateway** - The Business Process may need to make a decision based on an Event, such as the receipt of a message or the passage of time. Use an *Event-Based* Gateway. The Event triggers determine the course of action. The *Event-Based* decision Gateway must be used when the passage of time is not data-dependent.
- **Inclusive Gateway (or)** - Inclusive decision Gateways take more than one Sequence Flow when more than one decision condition evaluates as True. Think of each condition independently activating its own Sequence Flow. The major difference between Inclusive and Exclusive Gateways is that the Exclusive Gateway only takes one Sequence Flow when more than one condition evaluates as true, while the inclusive Gateway takes all the Sequence Flows.
- **Complex Gateway** - Complex Gateways handle situations not easily handled by the other Gateways. Process Architects provide complex expressions that determine the merging/splitting behavior of the Gateway. Use a single Complex Gateway to simplify and replace a set of linked Gateways. Do not use back-to-back Gateways unless their use clarifies the process flow.

Connection Objects are arrows that show the flow via sequence or by synchronizing messages between different organizations. These are identified on Figure 8-1 with green numbers. The Connection Objects are:

4. **Sequence Flows**, shown by solid arrows, are like railroad tracks that simply take the process flow from one Process Step to the next. Names on Sequence Flows are optional (4A) with the exception of *Conditional Sequence Flows* (4B), those representing Gateway decisions (4C) or if it adds clarity to the Diagram. Conditional Sequence Flows are identified by a diamond icon at the starting end and are taken when the condition is true. Some Sequence Flows have an *initiating Event* (4D) that triggers the Sequence Flow, as when receiving a message.
5. **Message Flows**, shown by dotted arrows, are messages between Participants (represented by separate *Pools*) that synchronize their separate internal processes.

Swimlanes represent process Participants and their roles. There are two types of Swimlanes:

6. **Pools** (6A) are shown by an open rectangle with a *Participant's* name on the left. The Pool contains the processes performed by a Participant. It also acts as a graphical container for portioning a set of Process Steps from other Pools. A Pool may be further divided into **Lanes** (6B), if it is necessary to show *Roles* within the Pool.

The diagram may contain *Artifacts*; notations that do not affect the process flow, but provide clarity to the reader. Artifacts should be used only when necessary. These artifacts are:

7. **Data Objects**, shown by a folded paper icon, reflect data used or produced by a Process Step. Data Objects are a mechanism to show what data is consumed or produced by Process Steps.
8. **Text Annotations** are shown by textual comments. OV-6c frequently uses the comments to show where Messages, Sequence Flows, or Data Objects come from or go to.
9. **Groups:** A grouping of diagram objects that does not affect the Sequence Flow. It can be used for documentation or analysis purposes. Groups may also be used to identify the objects related to a distributed transaction that is shown across Pools.
10. **Document Block** must be located in the upper left corner of all OV-6c diagrams. It displays the diagram name and the last update date.

For more details see Section 8.3.1.

11. **Association** is represented by a dotted line with an arrowhead and is used to associate data, text, and other Artifacts with Flow Objects. Associations are used to show the inputs and outputs of Process Steps.

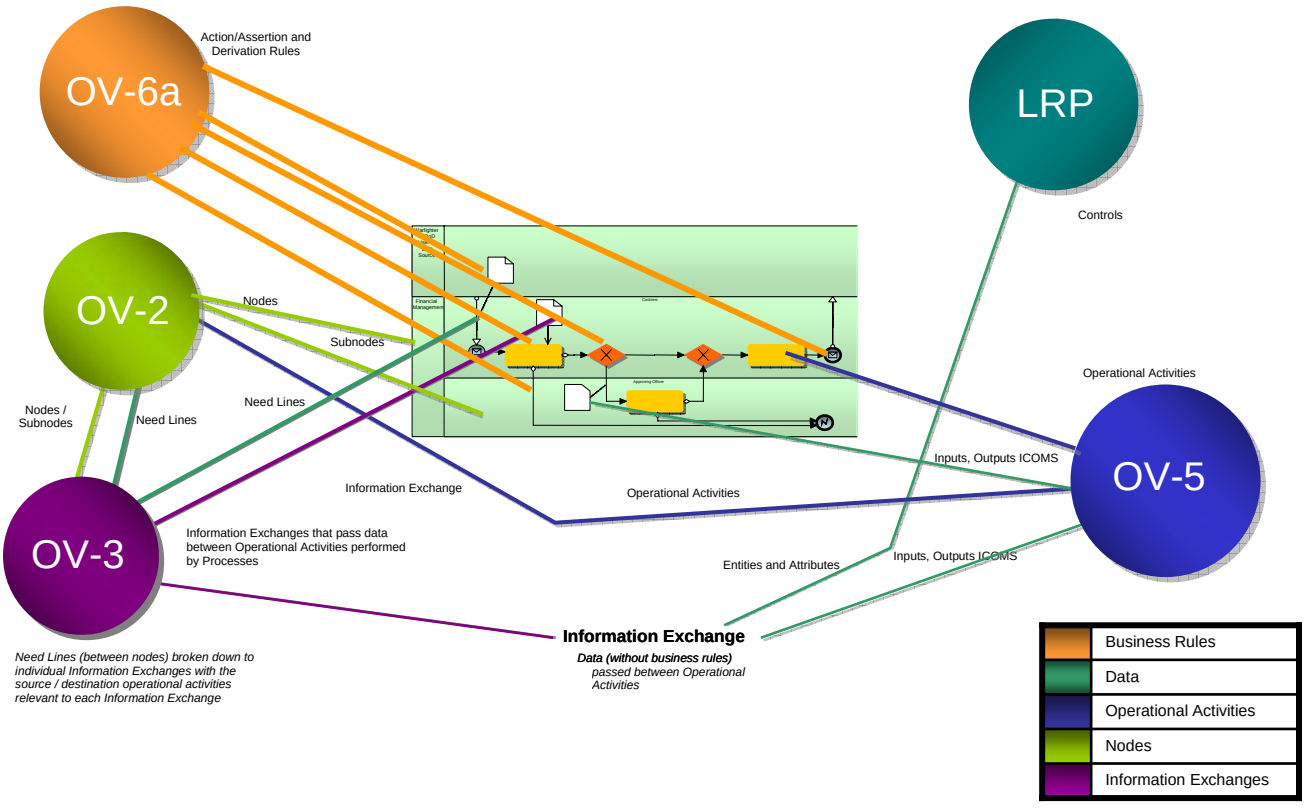
8.1.4. Relationship to Other BEA Products

Integrated architectures provide a structured and organized approach for defining capabilities and understanding the underlying relationships and requirements for achieving those capabilities. The full spectrum of the business can be effectively modeled and related in the OV-6c, so that detailed analyses and decisions can be supported by describing the sequence of business activities, tying them to Operational Nodes (representing functional areas, organizations or human roles), relating them to supporting systems or System Functions, and specifying the actions, events and related guard conditions or Business Rules that constrain those activities.

Figure 8-2 depicts the linking rules and relationships among the following elements in other BEA products and the OV-6c elements:

- Process Steps in the OV-6c are derived from and linked to leaf-level Operational Activities in the OV-5 Activity Model. Each of these process level activities must have at least one Process Step mapped to them.
- IE's in the OV-3 are represented as Data Objects. Each Data Object may be linked to one and only one IE.
- Each Process Step may be linked to one or more OV-6a Business Rules. Action Assertion Business Rules from the OV-6a help to define and are linked to Process Steps and Gateways in the OV-6c
- Pools represent OV-2 Nodes and Lanes represent OV-2 Subnodes.
- Each Process Step must be associated with one or more LRPs in the DOORS database.

Figure 8-2, Relationship between OV-6c and Other BEA Products



In addition, all OV-6c terms and acronyms with specialized meaning must be defined as *Term Definitions* in the AV-2; these must include, as a minimum, all deliverable object types:

These OV-6c deliverable objects must be listed and defined in the AV-2:

- BPM Event Definitions
- BPM Process Definitions
- Data Object Definitions
- Gateway Definitions

8.2. Developing OV-6c Models

A top down modeling approach is used; at each level of decomposition, more detailed information is added. The Business Process models depict end-to-end Business Processes representing how a Business Capability is achieved and its interaction with other Business Capabilities. DoD strategic direction for business transformation has evolved, requiring that future Business Processes be aligned with their respective Business Capabilities. SMEs and architects enhance and extend the current models as gaps and or new capabilities are identified.

The OV-6c provides a sequence-ordered examination of Business Process Steps to achieve a Business Capability. The Model represents the "To Be" Operational View of a Business Process, displaying a series of business steps that are executed sequentially or in parallel in response to business events, to produce a specific business result.

Secondary purposes include:

- Aligning LRP requirements and Business Rules with specific Business Processes.
- Providing a basis for capital planning and assessing the value of potential investment.
- Setting the foundation for controlled, systematic transformation.
- Establishing a basis for measuring the progress toward achieving transformation objectives.
- Establishing key criteria for testing and evaluating transformation solutions.
- A Business Process should produce a measurable improvement to a product or service. If the effect of a process cannot be measured, then it would be impossible to measure its effectiveness and would also be difficult to control.
- Business Processes should be as autonomous as possible. Tightly linked activities are less flexible and harder to change.
- Business processes should add value to a product or service. If they are not doing so, then the reason for their existence should be questioned.

Model development or extension of a current Business Process model is accomplished in facilitated workshops to address model content and provide preliminary validation of the results. The remainder of this subsection describes in detail the approach to develop the OV-6c. Each subsection represents a step in the approach. Although most of these steps are sequential, some may be started before the previous step is completed. In each subsection are the specific tasks that must be accomplished to complete a given step. The appropriate standards/guidelines that direct task accomplishment are contained in subsection 8.3.

8.2.1. Pre-Analysis Tasks

Analyze BEA Improvement Proposal (BIP)

If there is an existing OV-6c for the Capability related to the BIP ensure that Activities identified in the Node Tree as supporting the BIP are represented as Process Steps in the OV-6c and are sequenced correctly.

Review fully attributed OV-5 and OV-2

Ensure all Activities are represented as Process Steps in the OV-6c, verify Input and Output ICOMS, verify OV-3 IE's for Data Objects linkages and usages, and verify Nodes in the OV-2 to provide Pool and Lane structure.

8.2.2. Development Tasks

The primary source for changes to the OV-6c is the BEA Stakeholder working group. Each team will conduct workshops with appropriate SMEs and business analysts from the BEA Stakeholder community. During the workshops, business analysts capture changes to models and/or object descriptions. The business analysts conduct detailed analysis of approved changes and raise integration issues for resolution.

After revising all available materials and getting a better understanding of the requirements, the OV-6c architect (applying architectural standards in this document), and working with the BEA Stakeholder analysts, may develop new/revised OV-6c objects. The objects are driven by Stakeholder requirements in accordance with the configuration management procedures. This may involve updating existing symbols/definitions or creating new ones.

8.2.3. Creating / Modifying Diagrams

Create a new diagram if the diagram is a decomposition of a process or Sub-Process. Modify existing diagrams if the modifications are a result of a workshop review.

- Create or modify an existing diagram. If the new diagram is a decomposition of an existing Process Step, the new diagram shall be created as a child to the existing Sub-Process. The new diagram shall inherit the same name as the parent Sub-Process. For each newly created diagram, the BEA Stakeholder representatives should develop a summary of the process model in the diagram "properties" dialog box.
- When decomposing a Sub-Process:
  - Locate all instances of the Sub-Process in the diagrams and replace each instance with the appropriate leaf-level Process Step on the decomposed diagram.
  - Verify that all Events in the Sub-Process child diagram correspond to Initiating Events, Sequence Flows and Message Flows on the parent diagram.
- When creating a new diagram, ensure SME provides proper name and description. If the diagram already exists and content is added or changed, update name and description as required.
- Create new roles (Lanes) or modify existing ones per BEP guidance:
  - Individual Stakeholder teams may design role-based Lanes within its CBM Pool.
  - Each process has one or more BEP and CBM Stakeholders assigned.
- Create/Revise Events (start, intermediate and end). Each Event shall have clear and concise name and a well-formulated description that identifies and describes the trigger for start and intermediate Events and the result for End Events. Every diagram must have at least one start and one End Event.
- Verify that the path from an End Event to the next sequential Process Step incorporate the End Event as an Initiating Event trigger for all Events and Sequence Flows in the path.
- Events cannot reference themselves:
  - An Event cannot have itself as an Initiating Event
  - A single Sequence Flow from an event must not have an Initiating Event
- Create/Revise Process Steps, Sub-Processes and tasks. All processes shall have a clear and unambiguous description which describes in detail how the following participate within the Process Step:

- Inputs; what is consumed or used as reference.
- Pertinent Business Rules.
- Value-added action; what is performed, what decisions are to be made.
- Outputs; what is created or altered.

- Place Process Steps from left to right and top to bottom when possible. Process Steps are connected using Sequence Flows.
  - Sequence Flows are not required to have names unless a name adds clarity. When naming a Sequence Flow, use unique names unless the Sequence Flow is exactly duplicated in another diagram or view.
  - All Conditional Sequence Flows must be named.
  - Make Sequence Flow lines as straight as possible.
  - Sequence Flows may only be drawn within Pools
  - Sequence Flows must be drawn between Lanes in the same Pool
- Place Sequence Flow and Message Flow names above the flow line and close to the arrowhead, whenever possible.
- Conditional Sequence Flows may also be used in lieu of an OR Gateway, to represent alternative paths based upon a condition expression, when the decision logic resides within the Process Step.
- Place object as effectively as possible to make best use of space and enhance diagram readability.
  - When modeling a parallel process, try to place the objects above or under the other process, especially if the two paths merge.
- Not every Message or Sequence Flow needs to have a Data Object associated with it.
- Add Data Objects only when it adds clarity to the process and reflect IE's recorded in the OV-3 corresponding to inputs and outputs on corresponding OV-5 diagrams.
- Data Objects can be associated to Sequence Flows, Message Flows, Events, and as inputs or outputs to Process Steps. SA allows multiple Data Objects to be associated to a Sequence Flow or Message Flow in the Flow Objects definition.
- Represent message exchange between Participants (Pools) using the Message Flow line.
  - Unnamed Message Flows that emanate from a Message Event carry the same information as the Event.
  - It is recommended that Unnamed Message Flows – those whose names are hidden – be named with the format *BEA Stakeholder_Messsage_Flow_n*, where "*BEA Stakeholder*" is the *BEA Stakeholder* abbreviation and "*n*" is a unique number
  - All Message Flows names must be unique with the following exceptions:
    - Message Flows with the same business purpose originating from the same Event and ending in different Pools must have the same name. (e.g. a request for the same specific information from different CBMs)
    - Message Flows that are exact copies of those on another diagram must have the same name
  - Message Flows cannot originate from a Start or Intermediate Event.
  - Draw Message Flow lines as straight as possible.
  - Message Flows may only be drawn between Pools.
- Create Gateways (merge/split) to represent joining or splitting of the flow. Diagram layout should highlight logical structure, using standard patterns to show parallel or alternate paths and iteration.

- Think of the clearest way to ask the question. Be as specific and as succinct as possible with the question. The question and answers must include the context, as the answer must be global in nature.
- Business Rules should be identified, whenever appropriate, to address the logic of the Gateway.
- The Gateway should be identified as a Data-based Gateway or as an Event–based Gateway.
- Data-based Gateways use the values of process data to determine which path should be taken.
- The Event-Based Gateway uses the basic idea that the Decision represents a branching point in the process where the alternatives are based on Events that occur at that point in the process, rather than the evaluation of expressions using process data. A specific Event, usually the receipt of a message or expiration of a timer, determines which of the paths will be taken.
- Whenever possible, use complex Gateways to avoid using back-to-back Gateways.\
- All Gateways should be named by a phrase ending with a question mark, except for the Event-driven Gateways, and Gateways associated with a fan-in or fan-out of multiple alternatives from a Process Step.
- All Gateways named with a question mark phrase should have Sequence Flow outcomes in concert with the Gateway name.

- All diagram objects must have a clear and concise description except un-named Sequence Flows, all Message Flows, and all Event-Based and fan –in and fan-out Gateways.
- Make sure a Document Block is in the upper left hand corner of the diagram and it contains all pertinent information including a Diagram Title, Diagram Type and Date.
- All Process Steps, Data Objects, Events and Gateways must have at least one BEP and one CBM Stakeholder.

8.2.4. Diagram / Model Coordination with BEA Stakeholders and Other BEA Products

Make sure that all objects are consistent with existing OV-6c diagrams and with other BEA products. Below is a list of the actions to ensure linkage between the OV-6c and other BEA products.

- Perform an impact analysis where a change in other products may affect the OV-6c. If a change is made to an OV-6c, notify the owners of the other products
- Remind BEA Stakeholders to map all Process Steps to the respective OV-5 Operational Activities.
- Remind BEA Stakeholders to link OV-6a Business Rules to the appropriate Process Step, Gateway, or Event.
- Remind BEA Stakeholders to identify the LRP constraining the processes. OV-5 Control ICOMs are created based on mapping of OV-6c Process Steps to LRP in the Repository.
- Verify each of the linkages with the appropriate BEA Repository report.
- All Process Steps must be mapped to their respective Business Capability. This is accomplished indirectly through the OV-5 Operational Activity mapping.

8.2.5. Diagram / Model Cleanup

- Use Microsoft Word to check the spelling and grammar of all objects in the diagram by exporting all object names, descriptions and graphic comments into a Word document.
- Make sure all objects are connected via Sequence Flows, Message Flows or associations, as appropriate.
- Remove orphan objects, which do not appear on any diagram or are not connected to or contain any other object.
- Make sure only relevant Pools are used.

8.2.6. Post-Analysis Tasks

These tasks are performed after the work has been approved by the BEA Stakeholders.

- Integrate the OV-6 with other work products into the BEA Architecture.
- Incorporate additional updates to the OV-6c based upon subsequent BEA Stakeholders working group sessions.
- Incorporate peer reviews, quality control reviews, IV&V reviews and architecture verification changes into the BEA.
- Change graphic borders of all objects changed or added during the call to the standard border colors specified in section 8.3.1.1.

8.3. Modeling OV-6c Using SA

8.3.1. Modeling Conventions

This section is a brief overview of the OV-6c and the notation used in System Architect selected to model DoD Business Processes.

BTA selected Business Process Modeling Notation (BPMN) to depict Business Processes in the BEA. BPMN is a standard notation and is utilized across industry and the government to document their Business Processes. The Business Process Management Initiative developed BPMN.

An OV-6c diagram consists of a set of graphical elements. These elements enable the development of diagrams that have a familiar look to most business analysts (for example, a flowchart diagram). *The diagram elements are chosen to be clearly distinguishable from each other and to utilize shapes that are familiar to most process architects.* For example, Process Steps are represented by rectangles and decisions by diamonds. It should be emphasized that one of the drivers for choosing BPMN is that it facilitates development of simple Business Process models, while handling the complexity inherent to real Business Processes.

BPMN provides a graphical notation for expressing Business Processes in a Business Process Diagram (BPD), as reflected in DoDAF. The objective is to support process management for both technical and business users by providing a notation that is familiar and understandable to business users, yet able to represent complex process semantics.

The OV-6c provides the capability of understanding internal business procedures in a graphical notation and gives organizations the ability to communicate these procedures in a standard format.

The OV-6c should not represent Data Flow modeling. However, the OV-6c may depict the flow of data (messages) and the association of Data Objects to Activities in a manner consistent with the OV-5 and OV-3.

- While the general flow of objects within diagrams will be from left to right and top to bottom, due to programmatic and space constraints, objects may be connected to other objects in a manner that is logical and readable, taking into account the constraints listed above.
- A Process Diagram must have at least a start and End Event and at least two Process Steps.
- All modeling objects should not have truncated name entries on the diagram.
- Pools and Lanes are used to associate organizations with particular processes.

8.3.1.1. Use of Color, Size and Lines in Diagram

These are the standard border colors and line types:

- Font Color – Black (always)
- Object Border by Product –Black (always)

- Groups
- Process Steps
- Data Objects
- Events
- Gateways
- Pools

- Types of Lines
  - Sequence Flow – Solid Black
  - Message Flow – Dashed Black (SA Pen 7)

Use the following fill colors for the OV-6c objects:

- Participant / Pools / Lanes - Light Green
- Data Objects – White with Black Borders
- Event Objects – Light Blue
- Process Steps – Gold
- Collaborative Process Steps – Peach
- **Note:** In OV-6c diagrams, collaborative Process Steps are used to depict an exchange of information with Process Steps that are not in the diagram's main sequence.
- Gateways – Red
- Groups – Light pastel colors that do not conflict with other colors on the diagram and do not obscure text

Use the following fill colors to represent changes to the diagram:

- New symbols – dark green
- Deleted symbols – red (appears on previous version of the diagram or on current version of the diagram to verify prior to actual deletion)
- Changed object – orange (e.g. definition or name changes)

Use the above fill colors as line colors for modifications to Process Steps, Sequence Flows, Message Flows and Associations during the development stage of OV-6c model creation and for architecture verification prior to Product Review and approval of changes.

Restore the objects to the standard colors prior to the final BEP vote.

8.3.1.2. Diagram Conventions

All Diagrams must be clearly named and defined:

- Diagram Names shall contain at least one (1) verb and one (1) noun, unless the diagram is the Enterprise Process Model or one of the BEP threads.
- Avoid using generic terms such as "Manage", "Perform", "Execute"; instead use:
  - For "Manage", use "Handle", "Collaborate", "Sustain", "Maintain", "Monitor", etc.
  - For "Perform", use "Implement", "Develop", "Produce", "Distribute", "Publish", etc.
  - For "Execute", use "Initiate", "Finalize", etc.

- The Diagram Name shall start with the BEA Stakeholder abbreviation followed by a dash. If the process is shared among BEPs, all relevant BEPs shall be listed, separated by dashes.
- Diagrams that depict a Sub-Process must be named for the Sub-Process.
- Each OV-6c Diagram shall include a description to provide a clear understandable narrative of what the Diagram portrays. This information should be included in the Diagram Properties.
- The Diagram description must be clear, concise and unambiguous. The description shall include, as a minimum, a summary of the main Process Thread, a reference to the Events and their relationship to other diagrams, a reference to the Gateways and the decisions made, and a summary of the major Business Rules that impact the diagram.

Participants, Data Objects, and Process Steps must have labels containing name and/or other attributes placed inside the shape. Events, Gateways Sequence Flows and Message Flows labels should be placed above the shape as much as possible. However, labels may be placed below or to the right or left of the object to enhance readability of the Diagram.

Use "Arial" font for all objects in the Diagram. Use font size 12 for all objects, except Data Objects (font size 10) and Process Steps (any size that makes the label readable).

While extensible, OV-6c diagrams still have the basic look and feel for any viewer to easily understand a diagram created by any process architect. Thus, the footprint of the basic flow elements (Events, Process Steps and Gateways) should not be altered.

Pools must be in the same order on all diagrams. Pools that do not contain objects or do not touch a Message Flow must not appear on the diagram.

8.3.1.3. Object Naming Conventions

Objects in the OV-6c diagrams shall have a concise and intuitive name according to the following standards:

- All OV-6c object names shall be title-case. Use only approved acronyms. Must be singular (unless it results in a more appropriate name).
  - Process Steps must be clearly named and defined. The Process Step name shall contain at least one verb in the present tense and one (1) noun. For example, "Analyze Record."
  - Events shall be clearly defined and labeled. Event names shall consist of at least one noun and one verb or adjective, for example, "Record Analyzed", "Booking Successful." Event names shall be as specific as possible, avoiding generic names such as "End", "Stop", or "Start." Do NOT use verb-noun names for Events; for example, "Send Notification" is not a proper name for an Event.
  - Data Objects shall be clearly named and defined. The name must have at least one noun that accurately describes the Data Object. A Transition State shall be used as necessary to identify changes in objects content or State. The Transition State shall be indicated by a past-tense verb in brackets (for example "Record [Analyzed]").
- Decision Gateways must be clearly named and defined with a combination of nouns and verbs conveying a question or query, ending in a question mark. The question and answers must include the context, as the answer must be global in nature. For example, the question "Adjustment required?" with the answers "Adjustment not required" and "Adjustment required" are not acceptable because they may also refer to other unrelated adjustments elsewhere in the architecture. A more specific question incorporating context would be "Adjustment to cost model required?" with the answers being "Adjustment to cost model required" and "Adjustment to cost model not required" would be better.
- Gateway Control Types should be displayed consistently.

- Participants (Pools) and Roles (Lanes) names shall be composed of nouns, and adjectives, where appropriate, and must be clearly defined.
- Groups may be used to cluster related objects. Groups shall be named and must be clearly defined using appropriate nouns and verbs.
- The following special characters shall not be used in object names:
  - "*"
  - "(" or ")"
  - "/"
  - "&"
  - "?" (except in Gateways)
- Use Title Case. Incidental words, such as prepositions within the object name ("with", "at", "in", "and", "no", "not", "a", "an", "to", or "the"), shall be all lowercase.
- Object names shall use the singular form (no plurals). For example "Record" not "Records."
- Object names shall be spelled correctly and shall not use future tense.
- Refer to the AV-2 for the approved list of acronyms and abbreviations.

8.4. OV-6c Modeling Problems to Avoid

This section discusses lessons learned from previous OV-6c architecture development and mentions common modeling pitfalls and mistakes to avoid while modeling the OV-6c architecture product.

8.4.1. OV-6c Modeling Lessons Learned

- When decomposing a Process Step into a Sub-Process, ensure that all of the objects in the decomposition diagram support the purpose of the diagram.
- Account for multiple Data Objects associated with a Sequence Flow or Message Flow as they show up incorrectly as orphans on the current BART reports.
- Account for initiating Events that only show up on Message Flows or Sequence Flows; they show up incorrectly as orphans on the current BART reports.
- Delete a Pool on a diagram when all objects are removed from it and no Message Flows touch it.
- Remove the object from the encyclopedia after the symbol has been removed from the diagram, after first determining that the object has not been referenced in any other diagram.
- Verify that comparison reports are run using the most up to date correct baseline BEA modeling tool encyclopedia.
- Use Microsoft Word to check an object's description's spelling and grammar.
- Obtain a written BEP product approval to assure traceability to the final product.
- Track version dates of the baseline and approved models.
- Ensure correct Gateway stereotypes are used.
- Ensure correct Event stereotypes are used.

8.4.2. OV-6c Modeling Pitfalls

- BEA Stakeholder duplication of Events on parent and child diagrams

- Crossing of Sequence Flow and Message Flow lines
- Hiding of object labels (Data Objects, Sequence Flows, Message Flows, Events, Pools, Lanes)
- Not identifying all condition expressions out of a Gateway
- Not associating a child diagram with its parent process
- Not accounting for consistent Message Flow logic across diagrams.
- Not balancing "Send" and "Receive" annotations for data Objects across diagrams.
- Forgetting to populate metadata (Stakeholder information, mapping Process Steps to Operational Activities, etc.)
- Improper diagram descriptions
- Improper Process Step descriptions
- Improper Event naming conventions
- Incomprehensive object descriptions
- Not fully accounting for all integration with other BEA products.

8.5. Integration

- It is recommended that collaborative flows are depicted with input from both the sending and the receiving CBM. If, however, the two BEA Stakeholders cannot come to agreement on the depicted collaboration, the receiving BEA Stakeholder convention shall be used, since it is the receiving BEA Stakeholder who best knows if the message is a triggering Event of if it is just information.
- Data Objects with associations are used only to convey instances where information is accessed, used or published. This type of depiction does not trigger a process or Process Step.
- Integration using Message Flows are used to convey instances in which an Event sends a message or an Event receives a message. For instances in which an Event receives a message, it is important to use a multiple Start Event when two or more Events trigger the process. Remember that one Sequence Flow goes from the Multiple Event to one Process Step. For instances where a Process Step receives a message, the message must trigger the Process Step.

9. OV-2 – Operational Node Connectivity Model

9.1. Summary Description

This section describes the OV-2 architecture product and its relationship to other BEA products, the model development method, and the modeling guidelines used for development of the OV-2.

9.1.1. Product Purpose

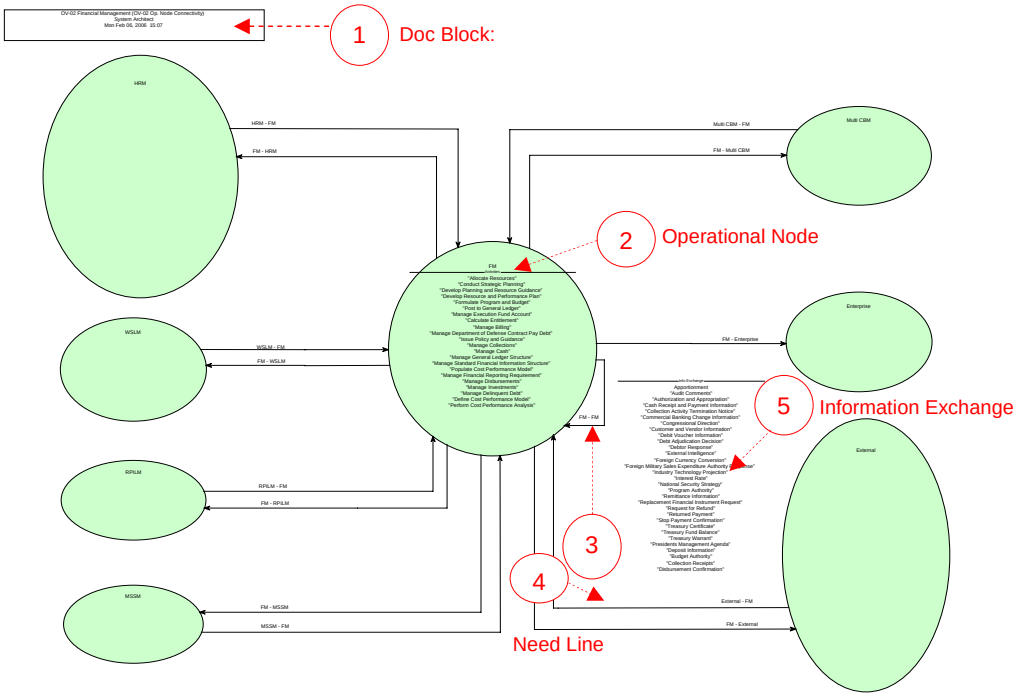
The OV-2 Operational Node Connectivity Model graphically depicts Operational Nodes and the related Need Lines required in the BEA to fulfill the DoD business mission. OV-2 diagrams contain Operational Nodes, which are logical collections of Operational Activities extracted from the OV-5 Activity Model, and Need Lines, which represent the collection of all required IEs between these Nodes. The OV-2 Operational Nodes are internal or external to the DoD BMA. For the current BEA OV-2, the internal Operational Nodes correspond to the DoD CBM. External Nodes are Nodes not strictly within the scope of the DoD CBMs (e.g., Industry, Customer/Vendor, and the U.S. Congress), but with which the internal nodes must exchange information to accomplish their functions.

OV-2 models typically avoid representing Operational Nodes as real physical facilities and focus on virtual or logical nodes that can be based on operational roles or missions. Where appropriate, system or physical nodes that constitute the location of an Operational Node may augment the description of an Operational Node in corresponding System View architecture products.

9.1.2. Product Structure

Figure 9-1, OV-2 Model Structure Diagram for Financial Management CBM is an example of an OV-2 Operational Node Connectivity model for the Financial Management CBM. Individual OV-2 diagrams are developed for each CBM. An integrated, Enterprise-level OV-2 is also developed, incorporating all of the CBM Operational Nodes.

Figure 9-1, OV-2 Model Structure Diagram for Financial Management CBM



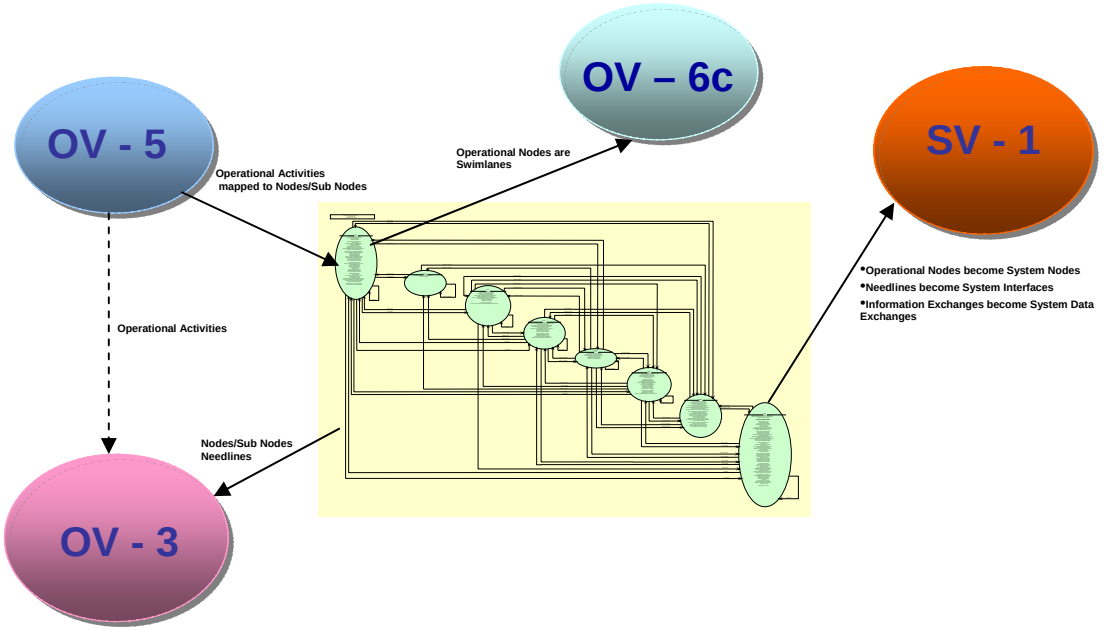
The objects used to represent the OV-2 product are numbered as shown in Figure 9-1, OV-2 Model Structure Diagram for Financial Management CBM . The main features of this diagram include:

- **Doc (title) block (1)** is located in the upper left corner of the diagram. The title block contains the diagram name, type 'OV-2 Financial Management (OV-2 Op Node Connectivity)' and last modification date.
- **Operational Nodes (2)** are the oval shapes in the diagram. In each OV-2 Diagram, an oval in the center of the diagram represents the primary CBM Operational Node that is the focus of the diagram. Figure 9-1 shows the Financial Management (FM) CBM Operational Node exchanging information with the other CBMs (WSLM, HRM, RPLIM, MSSM, Multi CBM and Enterprise) as well as the External Operational Node. On each OV-2 diagram, only the primary node displays the list of related Operational Activities in the central Operational Node. As shown, the FM Operational Node displays the list of needed Operational Activities from the OV-5 model to associate with DoD Financial Management needs. For example, the 'Allocate Resources' Operational Activity, assigned to the FM Operational Node, distributes approved DoD resources or adjustments (e.g., reprogramming and supplemental) within guidelines provided by statute, policy and regulation. This includes distribution of resources from the Office of the Secretary of Defense (OSD) to DoD Components and subsequent distribution to lower-echelon commands down to the lowest level designated. Thus, it comprises the process of allocating and sub-allocating resources, End Strength and other targets that impact other CBM Operational Nodes to fulfill the Department's resources need.
- ***Need Lines* (3), (4)** in Figure 9-1 symbolize the grouping of information to be exchanged between Operational Nodes. For example, the FM Operational Node for this diagram is exchanging information with itself through Need Line *FM-FM* (3) or with other Operational Nodes such as External through Need Lines FM-External or External-FM (4). Need Lines are labeled by an abbreviation that indicates the sending Operational Node to the Receiving Operational Node.
- **Information Exchanges (5)** are assigned to a Need Line, from ICOMs in the OV-5 models, and used to depict information being exchanged between OV-5 Activities assigned to Operational Nodes. For example, the "Apportionment" IE, assigned to the External-FM Need Line, depicts the need to exchange information with agencies outside DoD, such as the Office of Management and Budget. The "Appropriation" IE is one of the three main sources that must be approved prior to issuing the Budget Authority to Components. An IE can be assigned to more than one Need Line. Need Lines can have multiple IEs assigned to them. There is a many-to-many relationship between Need Lines and IEs.

  NOTE: IEs usually are not shown graphically on the OV-2 diagram to avoid cluttering the model with too much information. It is shown in Figure 9-1 only for illustration purposes.

9.1.3. Relationship to Other BEA Products

Figure 9-2, Relationship between OV-2 and Other BEA Products



The OV-2 product is linked directly to the following DoDAF products:

AV-2 All OV-2 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These OV-2 deliverable objects must be listed and defined in the AV-2:

- Need Line Definitions
- Operational Node Definitions

All acronyms used in OV-2 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-3 A Need Line in an OV-2 includes one or more IEs from the Operational IE Matrix (OV-3). The OV-3 provides the detailed attributes that define each IE.

OV-5 Operational Nodes in the OV-2 represent logical groupings of Operational Activities from the Operational Activity Model (OV-5). Once the OV-5 is stabilized, the Activities are assigned to the Operational Nodes in the OV-2, and related Inputs and Outputs from the OV-5 are then translated to IEs that depict the required information flow represented on the OV-2 as Need Lines between Operational Nodes.

SV-1 A System Node in a Systems Interface Description (SV-1) is linked to an Operational Node in the OV-2, indicating that the systems contained in that System Node are required to support the activities performed at the Operational Node.

9.1.4. Definitions

The key objects that comprise the OV-2 are Operational Nodes and Need Lines. The following are definitions for these objects and others related to the OV-2 diagram:

- **Operational Node**: An Operational Node is an element of the Operational Architecture that represents a logical grouping of Operational Activities.
- **Need Line**: A Need Line documents the requirement to exchange information between Operational Nodes. The Need Lines are directional but do not indicate how the information transfer is to be

implemented or sequenced. Need Lines are mapped to IEs, corresponding to Inputs and Outputs in the OV-5 Operational Activity diagram.

- **Operational Activity**: An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence. For example, 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.
- **Information Exchange**: The IE between two Operational Nodes. A corresponding leaf-level Activity Input and Output ICOM is associated to the IE with the same name, definition, and linked CBM and BEP.

9.2. Developing OV-2 Models

The Operational Nodes Connectivity model is generated and redrawn after the OV-5 models are stabilized. These models are reviewed with SMEs from the BEP community developing the Operational Activities from the OV-5 activity model. This section explains the tasks needed to develop the OV-2 models.

9.2.1. Pre-Analysis Tasks

The following tasks are performed to define the BEA Operational Nodes:

- Know and understand the BEA development methodology, the required formats, syntax and mappings for the end product, and the validation requirements from the Product Checklists required to complete the analysis phase of the work.
- Identify, for each OV-2 CBM Focus Area diagram, the SMEs required for content contribution, validation and communication of Operational Nodes, Need Lines, IEs and hierarchy to primary stakeholders.
- Define specification/format for all object descriptions (Internal Operational Nodes, External Operational Nodes, Need Lines and IEs).
- Using approved sources and SME support, select Operational Nodes covering the full scope of the DoD BMA. Currently, the internal Operational Nodes will be limited to the Core Business Missions (CBMs). For each focus diagram, a single External Operational Node will represent all external node interactions.
- Validate leaf-level Operational Activities to each Operational Node. Determine and map appropriate logical Operational Activities to each identified Internal and External Operational Node, based on BEP requirements.
- Convert leaf-level ICOMs to IEs. From all Inputs, Controls, Outputs and Mechanisms (ICOMs) associated with the leaf-level Operational Activities assigned to each Operational Node, identify the Inputs and Outputs and convert these to IEs. IEs are defined using the same name and definitions as their corresponding Input or Output ICOMs.
- Validate the external Operational Activity to be assigned to the correct leaf-level ICOM.
- Validate the parent ICOM to the child ICOM.
- Define and analyze Need Lines and IEs. Review and analyze from–to Operational Activity relationships for each IE. This is a starting point for determining the direction and exchange of information between Operational Nodes. Assign the Need Lines as groupings of IEs that share the same Source and Destination Operational Nodes on an OV-2 diagram, based on source and destination activity assignments and associated ICOMs on associated OV-5 diagrams. For each Need Line, enter the associated IEs.
- Validate OV-5 Linkages. Insure all of the diagrams are linked all the way up to the OV-5 Context level (A-0).

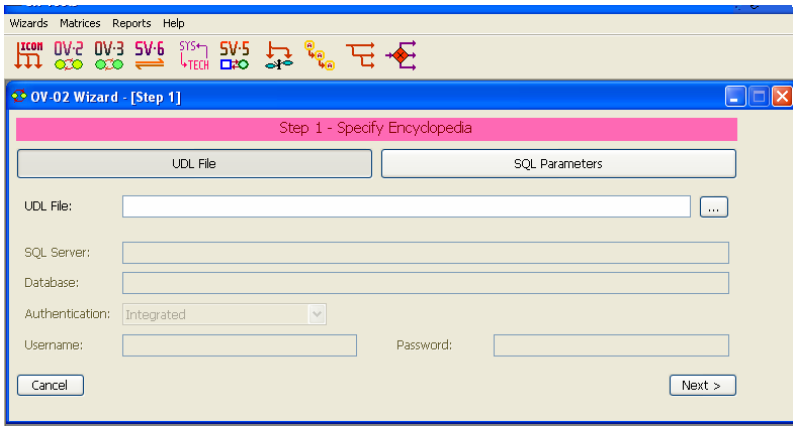
9.2.2. Development Tasks

When a well-defined OV-5 architecture product is completed and stabilized, the list of Operational Nodes is identified, and all the leaf-level Operational Activities are assigned to an Operational Node, the OV-2 Operational Node Connectivity diagram is automatically generated using the OV-2/3 auto generation tool for SA.

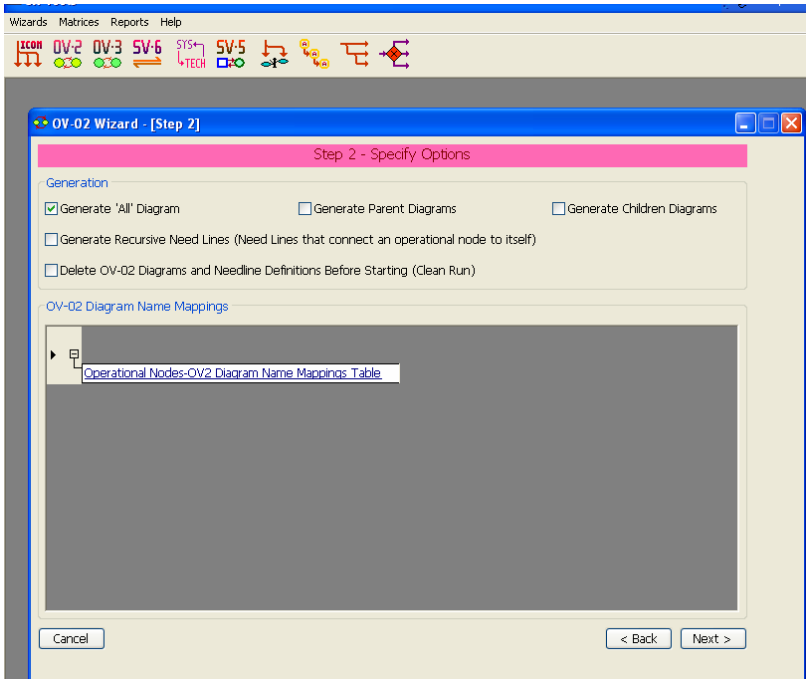
9.2.2.1. Creating/Modifying Diagrams

The following are the procedural steps to generate the OV-2 Diagram:

- Run the OV-2/3 generation tool
- Click on the OV-2 icon, then the "OV-2 Wizard – [Step 1]" screen will be displayed

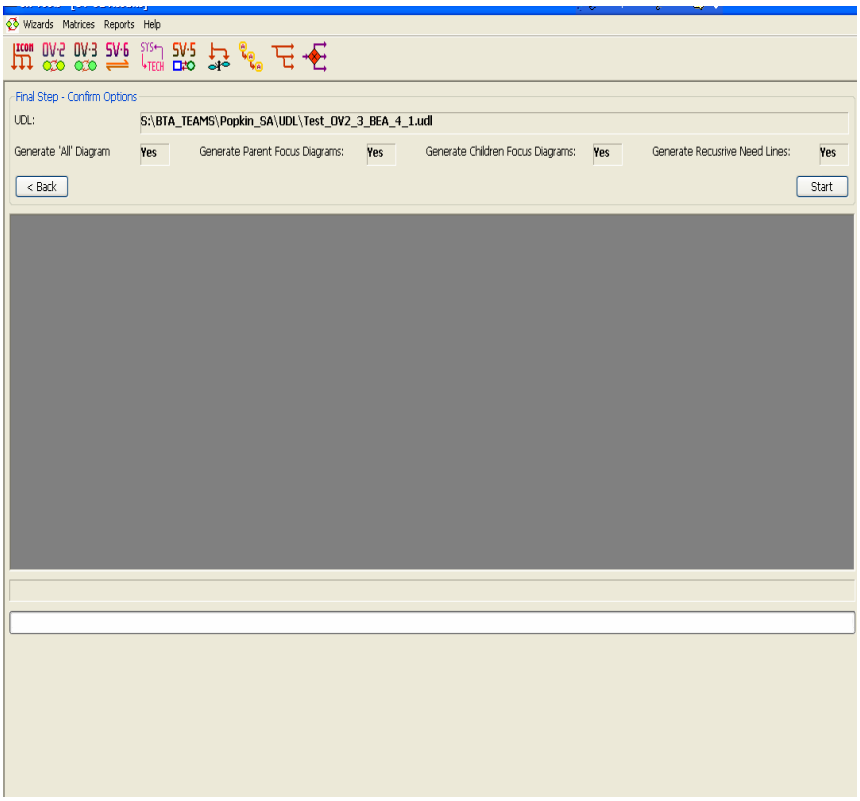


- Retrieve the development Encyclopedia UDL for the "UDL File" tab
- Click the "Next>" command, then the "OV-2 Wizard – [Step 2]" screen will be displayed



- To delete the existing OV-2 Diagrams and Need Lines, then the new set of OV-2 Diagrams and Need Lines will be generated; select (or check) all five optional items as follows:
  - Generate 'All' Diagram

- Generate Parent Diagrams
- Generate Children Diagram
- Generate Recursive Need Lines (Need Lines that connect an Operational Node to itself)
- Delete OV-2 Diagrams and Need Line Definitions Before Starting (Clean Run)



- Click the "Next>" command, then the "OV-02 Results" screen will be displayed
- Click the "Start" Command
- Manually delete the External OV-2 Diagrams
- Manually adjust the Need Lines in the OV-2 Diagrams
- Add the description for each OV-2 Diagram
- Add the description for each Need Line
- To update the OV-2 Diagrams and Need Lines, select (or check) four optional items as follows:
  - Generate 'All' Diagram
  - Generate Parent Diagrams
  - Generate Children Diagram
  - Generate Recursive Need Lines (Need Lines that connect an Operational Nope to itself)
- Click the "Next>" command, then the "OV-2 Results" screen will be displayed
- Click the "Start" command

9.2.2.2. Diagram Model Coordination with BEPs and other BEA Products

- Perform impact analysis where a change in other BEA products may affect the OV-2. If a change is made to OV-2 products notify the owner of other products.

- Map all OV-2 Nodes to OV-5 leaf-level Operational Activities
- Verify each linkage with the appropriate SA report: OV-2 to Other Products.

9.2.2.3. Diagram/Model Cleanup

The process for completing the OV-2 products will proceed as follows. (It should be noted that some of these tasks can be performed concurrently and that several of them actually can begin only when the other products are completed):

- Review, refine and modify Operational Node diagram objects. Perform an internal peer review to validate the OV-2 Operational Node Connectivity Model against the most current APG Modeling Guidelines. Adjudicate and incorporate peer review recommendations and obtain approval for the OV-2 and OV-3 products.
- Ensure that OV-2 product development is in alignment with the BEA End-to-End development process.

9.2.3. Post-Analysis Tasks

- Conduct a product review to ensure that the OV-2 products adhere to the APG *Modeling Guidelines,* have clean BART reports and comply with the *OV-2 Product Checklists.*
- Incorporate quality control and Architecture Verification changes into the BEA OV-2 product.
- Incorporate recommendations from the peer review and obtain final approval for the OV-2 diagrams.
- Ensure that OV-2 product development is in alignment with the BEA End-to-End development process.

9.3. Modeling OV-2 Using SA

9.3.1. Modeling Conventions

The following subsections describe the detailed standards and guidelines to be followed in preparing OV-2 products for the BEA.

9.3.1.1. Use of Color, Size and Lines in a Diagram

- Operational Nodes shall be defined in accordance with the related CBM as appropriate, Use Arial font size 14, normal and black font for Operational Node names.
- Operational Nodes shall be represented on the OV-2 as light green ovals, each with a black border and black lettering.
- Need Lines should be solid straight lines, containing 90-degree angles, Use Arial font size 14, normal and black font for Need Line names (where appropriate) to achieve readability.

9.3.1.2. Diagram Conventions

- There shall be at least one OV-2 diagram for each CBM, plus an integrated Enterprise-level OV-2 representing the sum of the CBM OV-2s.
- Use only a single Need Line to represent the interactions of all IEs that have a common source and destination pair of Operational Nodes.
- The OV-2 diagram should not have a border.
- Each OV-2 Diagram shall include a text description to provide a clear understandable narrative of what the Diagram portrays.
- All modeling objects should not have truncated name entries on the diagram.

- A Doc Block representing header information for the diagram (including the diagram name and date last updated) is placed in the upper left-hand corner of every diagram, with no white space above or to the left of the Doc Block.
    - Enlarge the Doc Block, so there are no truncation indicators (dots) depicting text that is not visible.
    - The Doc Block should be a box with no fill color and a black border.
    - The Doc Block should not have a graphical comment.
    - In SA, right-click on Doc Block and choose Display Mode. Uncheck Graphical Comment.
    - The Doc Block should be elongated so title text fits on one line.

9.3.1.3. Object Naming Conventions

- Valid Operational Node names are the acronyms for the five CBMs, plus three additional Nodes: "Enterprise," "Multi CBM" and "External."
- Sub Operational Nodes names shall start with the acronym for the parent CBM, followed by the name.
- Need Line names shall consist of the sending Operational Node name or its approved abbreviation, a dash and the receiving Operational Node name or its approved abbreviation.
- IEs shall be named the same as the leaf-level ICOM. They should represent every OV-5 Input and Output linked to a leaf-level Operational Activity as an IE.

9.3.2. Modeling OV-2 Objects

9.3.2.1. Operational Nodes:

- Enlarge Operational Nodes so there are no truncation indicators (dots) depicting text that is not visible.
- Depict all Operational Nodes that must interact with a given CBM in the corresponding OV-2 Diagram.
- Assign the appropriate Operational Activities, from the OV-5 models, which are performed at that Node.
- Operational Node labels are the Operational Node name. Below the node name is the word "Activities," accompanied by a solid black horizontal line, and below the "Activities" label is a list of the associated Operational Activity names, in quotes. (Only display the associated Operational Activities for the central Operational Node on each diagram.)
- Each Operational Node must be associated with at least one Operational Activity.
- Each leaf-level Operational Activity is assigned to at least one Operational Node.
- Each Operational Node must be referenced by at least one Need Line
- Using SA, fill in the "Stakeholders" tab on the definitions of each internal Operational Node with the appropriate name(s) of BEP and CBM elements that have an interest in that Node. Internal Operational Nodes are related only to the CBM for which they are named.
- Each Operational Node must be associated with a Type, either "Abstract" or "Physical."

9.3.2.2. Need Lines

- Arrows indicating the direction of information flow represent Need Lines.
- Need Lines shall be a grouping of OV-3 IEs, sharing common source and destination Operational Nodes. In SA, use the "Info. Exchanges" tab on the definition of the Need Line to link the appropriate IEs to the Need Line. Every Need Line must have at least one IE assigned.

- Every effort should be made to ensure that Need Line arrows do not intersect.
- Need Lines shall use the default SA pen width and be black in color.
- Do not display the associated IEs under the Need Lines on the OV-2 Diagram.
- A Need Line Name can exist on only two OV-2 diagrams unless it is linked to an External Operational Node or if a sub-node exists.

9.4. OV-2 Modeling Problems to Avoid

This section discusses lessons learned from previous OV-2 architecture development and mention common modeling pitfalls and mistakes to avoid while modeling the OV-2 architecture product.

9.4.1. OV-2 Modeling Lessons Learned

- OV-5 Models must be stabilized before OV-2 modeling can begin.
- All Operational Activities in the OV-5 model must be tagged to CBM(s) and/or BEP(s).
- All leaf-level Operational Activities must be assigned to at least one Operational Node.
- All External Activities in the OV-5 models must be specified and tagged.
- All leaf-level Input and Output ICOMs must be defined and their sources or destinations must be explicitly specified.
- If the leaf-level ICOM is associated with an external activity, the external activity must be explicitly specified.
- If the ICOM is associated with a parent ICOM, the parent ICOM must be explicitly specified.

9.4.2. OV-2 Modeling Pitfalls

- Need Lines are intersecting.
- Ineffective use of diagram space:
  - Nodes too large or too small
  - Need Line connections unclear
  - Diagram overly dense or too spread out
- Inappropriate color coding of diagram objects
- Not displaying Operational Activities associated with focused CBM Node
- Inappropriately displaying IEs associated with Need Lines
- Truncated text on Need Lines
- Acronyms not spelled out in definitions

10. OV-3 – Operational Information Exchange Matrix

10.1. Summary Description

This section describes the product development methodology and modeling guidelines needed to develop the OV-3 Operational IE matrix of the BEA architecture.

10.1.1. Product Purpose

The OV-3 matrix defines the information to be exchanged by identifying who will exchange the information, what information is to be exchanged, and with whom it will be exchanged. It shows how IEs must occur and expresses why the information is necessary to be exchanged. The OV-3 matrix is developed to represent the BEP Operational Activities. All OV-3 information is associated to an IE.

10.1.2. Product Structure

The key objects that comprise the OV-3 are IEs and their associated OV-7 Entities and Attributes, as shown in Figure 10-1. Columns within the BEA OV-3 Matrix are: Need Line, IE, BEP(s), Source Node, Source Activity(ies), Destination Node, Destination Activity(ies), OV-7 Data Entity(ies), OV-7 Data Attributes and IE Description.

Figure 10-1, A Sample Operational Information Exchange Matrix

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Need Line	**Information Exchange**	**BEP(s)**	**Source Node**	**Source Activity(ies)**	**Destination Node**	**Destination Activity(ies)**	**OV-7 Data Entities**	**OV-7 Data Attributes**	**Information Exchange Description**
Enterprise - Enterprise	Information Assurance Technology Self Assessment	AV CSE FV MV PV RPA	Enterprise	Provide Information Assurance Services	Enterprise	Perform Reporting	GUIDANCE		This is the annual documentation developed in order to satisfy the requirements of 44 U.S.C., Chapter 35 Subchapter III, Information Security: "Federal Information Security Management Act of 2002" (FISMA) and other Information Assurance requirements.
Enterprise - External	Certified Financial Statement Information	AV CSE FV MV PV RPA	Enterprise	Perform Reporting	External	Process Treasury Information	PRO-FORMA-PAIR SUB-ACCOUNT TRAVEL-AUTHORIZATION-FUNDED-EXPENSE TRAVEL-CASH-ADVANCE TRAVEL-CLAIM TRAVEL-EXPENSE-PAYABLE		This is information derived from financial statements for external agencies that have been certified as meeting Federal Accounting Standards Advisory Board and other compliance requirements by the Accounting Process.
Enterprise - External	Information Assurance Technology Self Assessment Report	AV CSE FV MV PV RPA	Enterprise	Perform Reporting	External	Process Office of Management and Budget Information	GUIDANCE		This is the annual report developed to satisfy the reporting requirements of 44 U.S.C., Chapter 35 Subchapter III, Information Security: "Federal Information Security Management Act of 2002" (FISMA), Risk Assessments, and other Information Assurance reporting requirements.
Enterprise - External	Management Report of Cash Accounting	AV CSE FV MV PV RPA	Enterprise	Perform Reporting	External	Process Treasury Information	PAYABLE		Form prepared by the deputy, agent, and cashier as a summary of the days cash transactions and receipts for cash and vouchers each time settlement occurs.

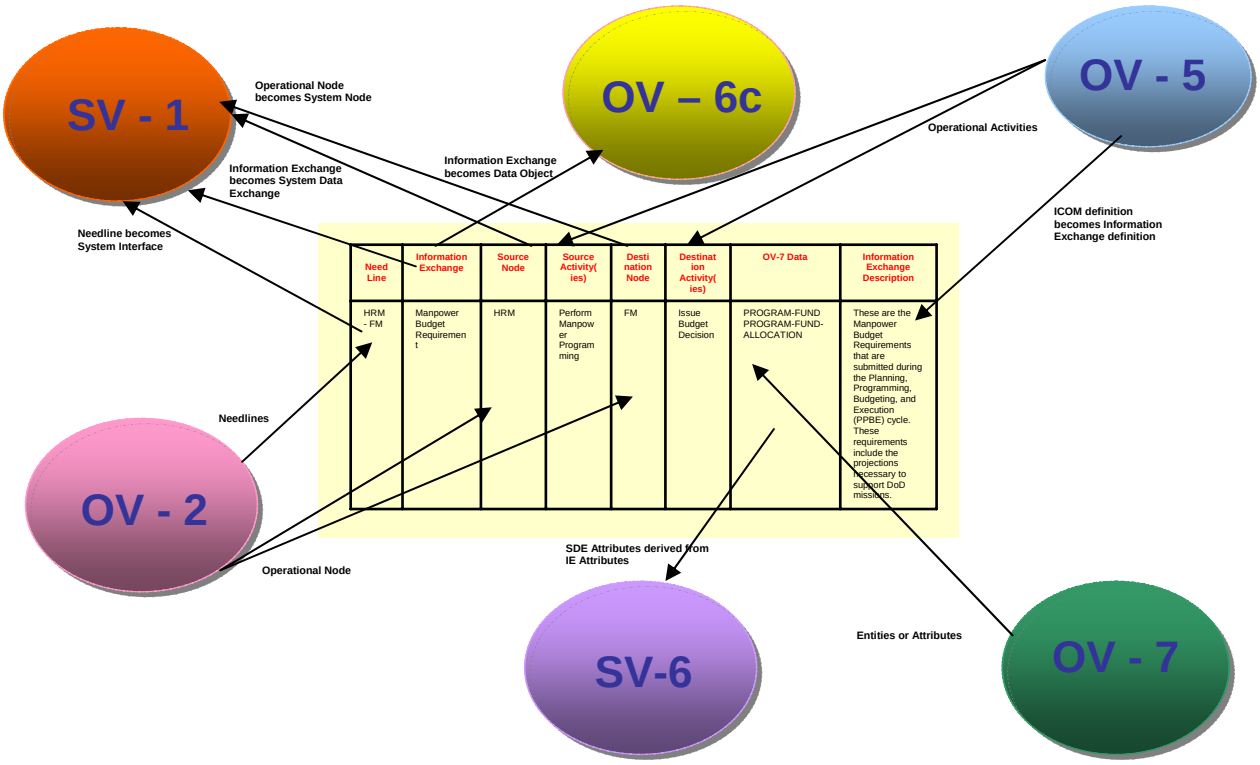
Enterprise - External	Performance and Accountability Report	AV CSE FV MV PV RPA	Enterprise	Perform Reporting	External	Process Office of Management and Budget Information	BILLING-RATE BUSINESS-CALENDAR COST-MODEL COST-MODEL-ACTIVITY COST-MODEL-COST-OBJECT COST-MODEL-DRIVER COST-MODEL-ITEM COST-MODEL-ITEM-DRIVER COST-MODEL-RESOURCE METRIC PERFORMANCE-PLAN PERFORMANCE-PLAN-METRIC PLAN PROGRAM-PLAN-ACTIVITY PROGRAM-PLAN-ASSESSMENT PROGRAM-PLAN-DEFICIENCY PROGRAM-PLAN-OBJECTIVE PROGRAM-PLAN-OBJECTIVE-RISK PROGRAM-PLAN-PERIOD PROGRAM-PLAN-REVISION PROGRAM-PLAN-REVISION-RISK RESOURCE-AGGREGATION-GROUP RESOURCE-DRIVER	Activity_Identifier [ACTIVITY] Cost_Center_Identifier [COST-CENTER] Cost_Element_Code [COST-ELEMENT] Funding_Center_Identifier [FUNDING-CENTER] MEPR_Code [MEDICAL-EXPENSE-PERFORMANCE-REPORT] Project_Identifier [PROJECT] Unit_Of_Measure_Code [UNIT-OF-MEASURE] Work_Order_Number [WORK-ORDER]	Report that provides financial and performance information that enables the President and Congress, and the public to assess the effectiveness of DoD relative to its mission performance, program management, utilization of resources. The report includes Management's Discussion and Analysis, the Departments financial statements and auditors report, and discussion and analysis of fiscal year accomplishments.

The following are definitions for these objects:

- **Need Line (1):** A Need Line documents the requirement to exchange information between Operational Nodes. The Need Lines are directional but do not indicate how the information transfer is to be implemented or sequenced
- **Information Exchange (2):** The information exchanged between two distinct Operational Nodes.
- **BEP(s) (3):** The BEP Stakeholder associated with the Information Exchange based on the ICOM.
- **Source Node (4):** Records the Operational Nodes that create or otherwise provide information to the list of associated IEs.
- **Source Activity(ies) (5):** Records the Operational Activities associated to an Operational Node that create or otherwise provide information to the list of associated IEs.
- **Destination Node (6):** Records the Operational Nodes that require, receive or utilize information from the list of associated IEs.
- **Destination Activity(ies) (7):** Records the Operational Activities associated to Operational Nodes that require, receive, or utilize information from the list of associated IEs.
- **OV-7 Data Entities (8):** One or more Data Entities from OV-7 Logical Data Model that provide data to support an IE.
- **OV-7 Data Attributes (9):** One or more Data Attributes from OV-7 Logical Data Model that provide data to support an IE.
- **Information Exchange Description (10):** A text description for the IE.

10.1.3. Relationship to Other BEA Products

Figure 10-2, Relationship between OV-3 and Other BEA Products



The OV-3 is related to other BEA products as follows:

AV-2 All OV-3 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These OV-3 deliverable objects must be listed and defined in the AV-2:

- IE Definitions

All acronyms used in OV-3 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-2 A Need Line in an OV-2 Diagram represents one or more IEs from the OV-3. The OV-3 provides the detailed attributes (for example, Source Node Identifier or Destination Activity) that define each IE. A Need Line must be associated with at least one OV-2 diagram.

OV-5 Each Input and Output on the OV-5 connecting Operational Activities in different Operation Nodes is represented as one or more occurrences of an IE in the OV-3.

OV-6c An IE represents a unique OV-6c Data Object. The OV3 provides the detailed attributes (Entities / Attributes, Source Activity, and Destination Activity) that define the Data Object and its usage I the Business Process.

OV-7 One or more Entities and/or Attributes in the Logical Data Model (OV-7) are linked to IEs in the OV-3, describing the IEs in terms of the Entities and/or Attributes that comprise it.

SV-6 One or more SDEs from the Systems IE Matrix (SV-6) are linked to each IE in the OV-3, showing which SDEs are required to support the IE. SDE attributes shown in the SV-6 are derived from similar attributes for related IEs in the OV-3.

10.2. Developing OV-3 Models

OV-3 Operational IE Matrix is an IE-oriented report. The matrix expresses the relationship across the three basic architecture elements of the OV: Operational Activities, Operational Nodes and IEs with a focus on the specific aspects or attributes of the IEs. All OV-3 information is associated to an IE associated to a specific BEP community. The OV-3 is generated, using a DoDAF utility in SA.

10.2.1. Pre-Analysis Tasks

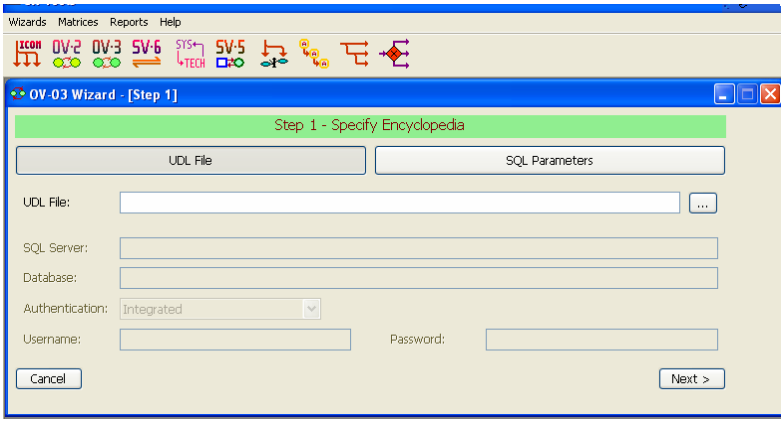
- Identify all ICOMs associated with the leaf-level Operational Activities assigned to each Operational Node of interest to the BEP (Only Inputs, Outputs and assigned Controls are considered.)
- Validate the found ICOMs to IEs.
- Define IEs using the same definitions as their corresponding ICOMs.
- Review and analyze the "from–to" Operational Activity relationship for each IE. Determine the direction and exchange of information between Operational Nodes.
- Identify Logical Entities and/or Attributes associated to IEs.
- Identify Information Assurance attributes associated to IEs (if applicable).

10.2.2. Development Tasks

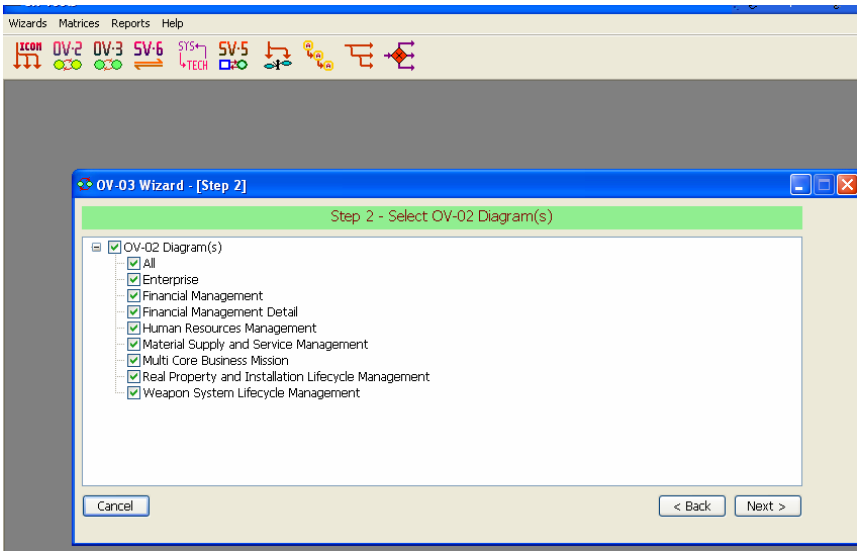
Generation of the Operational Information Exchange Matrix is generated using the OV-2/3 auto generation tool for SA.

10.2.2.1. Creating/Modifying OV-3 Matrix

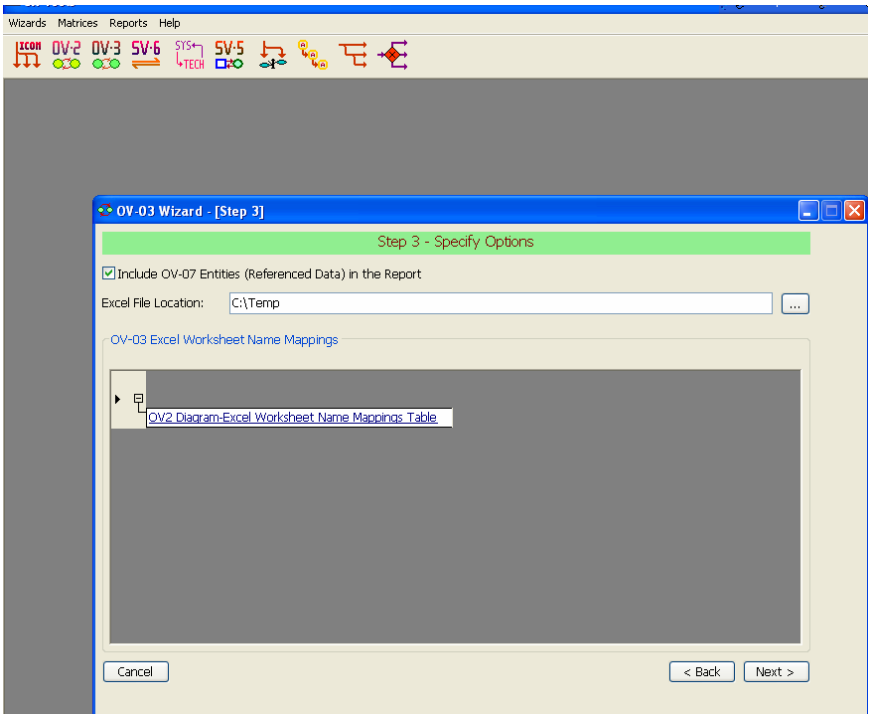
- Run the OV-2/3 generation tool
- Click on the OV-3 icon, then the "OV-3 Wizard – [Step 1]" screen will be displayed



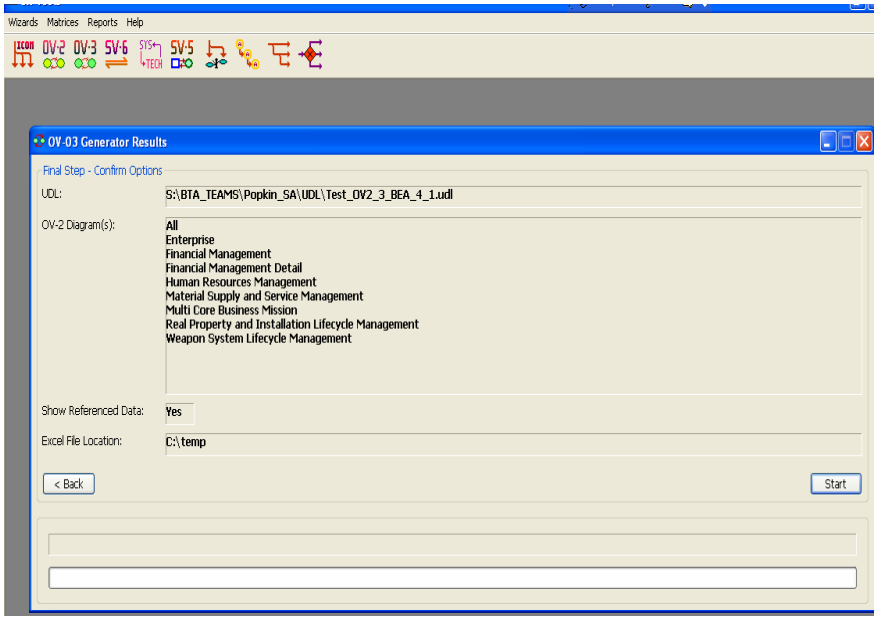
- Retrieve the development Encyclopedia UDL for the "UDL File" tab
- Click the "Next>" command, then the "OV-3 Wizard – [Step 2]" screen will be displayed



- To generate the whole set of the OV-3 architecture products, select (or check) "OV-2 Diagrams(s)"
- To generate part of the OV-3 architecture products, select specific items
- Click the "Next>" command, then the "OV-2 Results" screen will be displayed
- Click the "Start" command, then the "OV-3 Wizard – [Step 3]" screen will be displayed



- Check the default option – Include OV-7 Entities (Referenced Data) in the Report
- Choose the file directory for the final Excel File location
- Click the "Next>" command. then the "OV-3 Generator Results" screen will be displayed



- Click the "Start" command

10.2.2.2. OV-3 Model Coordination with BEPs and Other BEA Products

- Perform impact analysis where a change in other products may affect the OV-3. If a change is made to OV-3 products, notify the owner of other products.
- Validate Logical Entities/Attributes to IEs.
- Validate Information Assurance to IEs where applicable.
- Verify each linkage with the appropriate SA report.

10.2.2.3. Modeling Cleanup

- Review, refine and modify the Operational Information Exchange Matrix.
- Perform internal peer review to validate the OV-3.
- Incorporate peer review recommendation and obtain approval for the OV-3 product.

10.2.3. Post-Analysis Tasks

- Conduct a product review to ensure that the OV-3 products adhere to the APG *Modeling Guidelines,* have clean BART reports and comply with the *OV-3 Product Checklists.*
- Incorporate quality control and Architecture Verification changes to BEA.
- Incorporate recommendation from the peer reviews and obtain final approval.
- Ensure that OV-3 product development is in alignment with the BEA End to End development process.

10.3. Modeling OV-3 Using SA

10.3.1. Modeling OV-3 Objects

The following is a description of the standards and guidelines for the OV-3 objects.

- Need Line
  - The Need Line shall contain the name of the Need Line; the column cannot be blank.

- Need Line names shall consist of the sending Operational Node name, a space, a dash, a space and the receiving Operational Node name.
- A Need Line must be associated with at least one IE.

- Information Exchange
  - The Information Exchange column cannot be blank.
  - Information Exchange Names shall be title-case, use only approved acronyms and can use only the special character "-".
  - The Information Exchange column shall contain the name of the IE.
  - Represent every OV-5 Input and Output that is linked to a leaf-level Operational Activity as an IE.
  - The OV-5 leaf-level Inputs and Outputs are related one-to-one to the IE by a unique name.
- Source Node
  - The Source Node column cannot be blank.
  - The Source Node column shall contain the name of the Source Node for the IE from the OV-2.
  - The Source Node must contain the sending Operational Activity from the OV-5 that corresponds to the Output ICOM related to the IE.
- Source Activity(ies)
  - The Source Activity column cannot be blank.
  - The Source Activity name in the OV-3 shall be a valid leaf-level Operational Activity from the OV-5.
  - The Source Activity shall have as an Output the ICOM that corresponds to the IE.
- Destination Node
  - The Destination Node column cannot be blank.
  - The Destination Node column in the OV-3 shall contain the name of the Destination Node for the IE from the OV-2.
  - The Destination Node shall contain the receiving Operational Activity from the OV-5 that corresponds to the Input ICOM related to the IE.
- Destination Activity(ies)
  - The Destination Activity column cannot be blank.
  - The Destination Activity in the OV-3 shall be a valid leaf-level Operational Activity from the OV-5.
  - The Destination Activity shall have as an Input the ICOM that corresponds to the IE.
- Referenced OV-7 Entity(ies) / Attributes
  - The Referenced Data column cannot be blank.
  - The Referenced Data column shall contain one or more data Entities/Attributes from the OV-7 that are linked to the IE.
  - Each IE in the OV-3 shall be linked to at least one data Entity/Attribute in the OV-7.
- Information Exchange Description
  - The Information Exchange Description column cannot be blank.
  - The Information Exchange Description column shall contain the textual definition of the IE.

- Information Assurance (IA) Attributes
  - The IA attribute columns will be populated and shown in the OV-3 only if approved by the BTA Chief Architect. These attributes are not now included in the OV-3 for the current release, but they may be populated in future BEA releases.
  - If included, the four IA attribute columns must be: Confidentiality, Integrity, Availability and Classification.
  - When populated, the accepted values for the four IA attributes are:
    - Confidentiality: Not Required, Need To Know, or Clearance.
    - Integrity: Basic, Medium, or High.
    - Availability: Low, Medium, or High.
    - Classification:
      - Confidential
      - Confidential Restricted
      - For Official Use Only
      - NATO Confidential
      - NATO Confidential Atomal
      - NATO Restricted
      - NATO Secret
      - NATO Secret Atomal
      - NATO Top Secret
      - NATO Top Secret Atomal
      - Secret
      - Secret Restricted
      - Top Secret
      - Unclassified
      - Sensitive
      - NATO Unclassified
      - No Classification
      - Confidential/No Foreign
      - Secret/No Foreign

Note: IA attributes are not used in BEA 4.1.

10.4. OV-3 Modeling Problems to Avoid

This section discusses lessons learned from previous OV-3 architecture development efforts and includes common modeling pitfalls and mistakes to avoid while modeling OV-3 architecture products.

10.4.1. OV-3 Modeling Lessons Learned

- The OV-5 Operational Activity Model must be stabilized across all BEPs.

- All Operational Nodes must be identified.
- All leaf-level Operational Activities must be assigned to Operational Nodes.
- An IE must to be assigned to each Input or Output ICOM associated with a leaf-level Operational Activity.
- All new or modified leaf-level Input or Output ICOMs (IEs) must have associated source and destination Operational Activities.
- All External Operational Activities must be identified and labeled as "Process…. Information."
- External Operational Activities must be linked to ICOMs via an ICOMs property sheet.
- All OV-5 Operational Activity diagrams must be balanced.
- The linkages from the Context Diagram to the leaf-level diagrams must be consistent and well defined.

10.4.2. OV-3 Modeling Pitfalls

- ICOMs in the OV-5 Diagrams are not well defined or linked across different diagrams.
- ICOM Arrows are not touching Operational Activity boxes.
- IE descriptions contain special characters such as a carriage return code or acronyms not in the AV-2.
- OV-7 Data Columns contain special characters or acronyms not defined in the AV-2.

11. SV-1 – Systems Interface Description

11.1. Summary Description

This section describes the product development methodology and modeling guidelines used to develop the BEA System-to-System Interfaces. The SV-1 identifies the CBM enterprise systems that support the activities defined in the OV products and their required key System Interfaces.

11.1.1. Product Purpose

The SV-1 System Interface Description model depicts System Nodes, the systems resident at these nodes and System Interfaces needed to implement the automated Information Exchanges referenced by the OV-2 Operational Nodes and corresponding Need Lines.

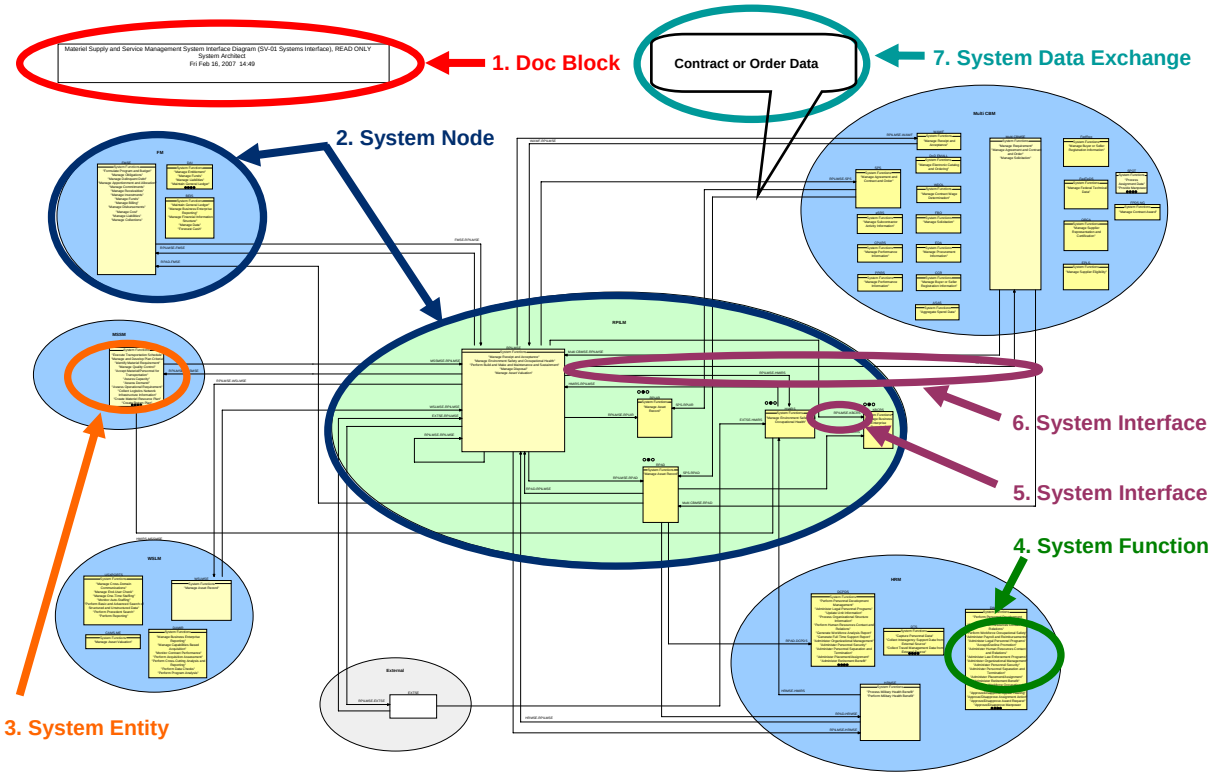
The purpose of the SV-1 is to portray the relationships of Systems to Systems Functions, Systems Nodes to Operational Nodes, System Data Exchanges to Information Exchanges, and Systems Interfaces to Need Lines in the OV-2, thus integrating and creating a bridge between the operational view business requirements and systems view that supports these requirements.

11.1.2. Product Structure

For the BEA, individual SV-1 diagrams are developed for each CBM. Each CBM has a System Node that represents a set of systems and functions performed by DoD for a specific line-of-business. In each SV-1 diagram, an oval in the center of the diagram represent the focus CBM System Node. All other System Nodes, whether internal or external, that exchange information with the focus CBM System Node are presented on each CBM-specific SV-1 diagram. With the exception of the External Node, each System Node includes CBM identified Enterprise Systems, System Interfaces with associated SDEs, and System Functions performed by the Enterprise Systems. The System Interfaces on each model represents both internodal and intranodal exchanges of information with the focus CBM System Node in support of Business Capabilities shown in the Operational Views. The External Node represents non-DoD systems that interface with the CBM Enterprise Systems.

Figure 11-1 is an example of an SV-1 Systems Interface Description model for the Real Property and Installations Lifecycle Management (CBM).

Figure 11-1, SV-1 Model for Real Property and Installation Life Cycle Management CBM



Individual SV-1 diagrams are developed for each CBM. The objects used to represent the SV-1 product are numbered as shown in Figure 11-1. The main features of this diagram are:

Doc (title) block (1) is located in the upper left corner of the diagram. The title block contains the diagram name and is named after the focus CBM ("Real Property Lifecycle Management"), type "(SV-1 Systems Interface)" and last modification date.

System Nodes (2) are the large oval shapes in the diagram that are named after the CBM. The SV-1 diagram name represents the focus System Node.

System Entities (3) are the rectangles contained within each System Node. They represent the DoD CBM enterprise systems. Each node contains a generic system that represents enterprise functionality for which no enterprise system has been identified or component systems that perform the enterprise functionality.

System Functions (4) may be displayed within the System Entity. They represent the functionality of the enterprise system.

System Interface (5), (6) are the directional lines between the System Entities. They represent intranodal communications between systems within a System Node (5) and internodal communications between systems across System Nodes (6).

11.1.3. Relationship to Other BEA Products

The SV-1 is a graphical product that describes systems and interconnections providing for, or supporting, both DoD warfighting and business functions. The SV-1 associates systems resources to the business requirements in the OV products. These system resources are based on the Operational Activities and facilitate the automated portions of the Information Exchange among Operational Nodes.

The SV-1 relationships to other BEA products are as follows:

AV-2 All SV-1 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These SV-1 objects must be listed and defined in the AV-2:

- System Entity Definitions
- System Interface Definitions
- System Node Definitions

All acronyms used in SV-1 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-2 In the BEA, System Nodes in the SV-1 are directly derived from the Operational Node of the OV-2. This is to clearly show that the systems contained in that System Node are required to support the Operational Activities performed at the corresponding Operational Node. Similarly, one or more System Interfaces in an SV-1 have a corresponding Need Line in an OV-2, thus showing the relationship between information flows and system data dependencies. Each OV-2 Need Line is comprised of Information Exchanges (IEs) with their associated characteristics. As OV-2 Need Lines are comparable to SV-1 System Interfaces, IEs on those Need Lines are comparable to the System Data Exchanges on the System Interface.

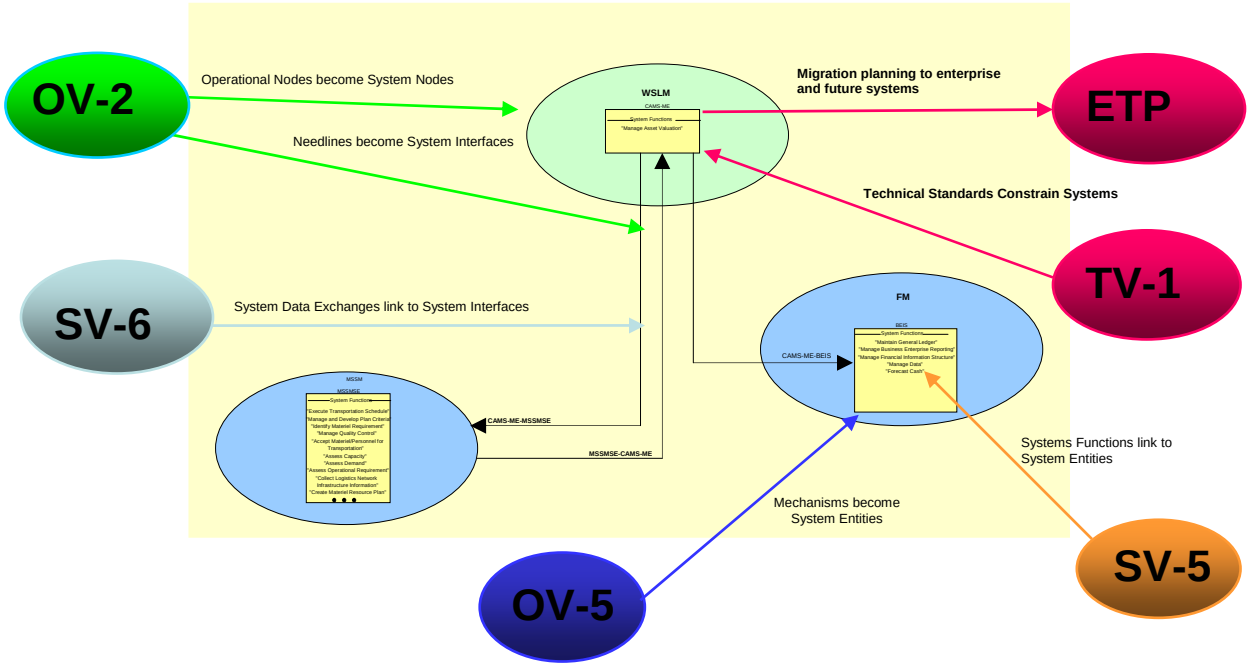
SV-5 The SV-5 links Business Capabilities and their Operational Activities to the System Functions and System Entities that supports them.

SV-6 The SV-6 describes the detailed characteristics of the System Data Exchanges assigned to the System Interfaces on the SV-1.

ETP Planned steps for either migrating the current suite of systems to a more efficient suite, or evolving a current system towards a future implementation. These future systems are identified as System Entities on the SV-1 and are detailed in the System Migration Summary Spreadsheet, of the ETP.

TV-1 Technical Standards in the TV-1 apply to and constrain System Entities in the SV-1.

Figure 11-2, Relationship between SV-1 and Other BEA Products



11.1.4. Definitions

The following are definitions of the key elements of the SV-1 model:

- **System Node:** A BEA System Node represents one or more systems that work together within a Core Business Mission (CBM) to support the automated portion of the business requirements described in the Operational View.
- **System Entity:** System Entities represent DoD systems. In the BEA, these systems are identified as being enterprise systems, components systems, or generic systems. Generic systems represent the case where specific System Functions have been identified but no specific future plans have been developed to support those functions. In short, a generic system represents a potential future system.
- **System Interface:** System Interfaces represent the data exchange between System Entities.
- **System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.
- **System Data Exchange (SDE):** System Data Exchanges represent a collection of system Data Elements that System Functions produce or consume. In the BEA implementation of the SV-6, information assurance and performance characteristics of the exchange are not provided.

11.2. Developing SV-1 Models

The SV-1 model development begins concurrently with the development of the OV-5 and OV-2 products and continues after the completion of these products. The development is done in collaboration with the BEP representatives and, when necessary, DoD Program Managers who are responsible for the enterprise systems. Pre-work sessions and formal workshops are held with BEP Stakeholders to identify and define system functionality represented by Enterprise Systems in the BEA.

11.2.1. SV Product Analysis

The System View represents the business requirements in the Operational View products. The SV analysis consists of pre-analysis and development tasks. During pre-analysis the BEP's are provided with worksheets to collect information about their enterprise systems from the Program Managers and the community of interest. During development this information is analyzed, along with changes to Operational View products, to create the SV-1 products.

11.2.1.1. Pre-Analysis Tasks

The BEP Team Lead is responsible for identifying the BEP mission thread, defining information and data standards needed to implement the threads and defining the System Functions (automations) that systems provide in support of those threads.

The BEP Team Lead determines the appropriate enterprise systems and, if applicable, contacts the responsible Program Manager for the following information about their enterprise systems:

- Enterprise system name and definition.
- System Function(s) performed.
- Interfacing systems and definition.
- System Interfaces and SDEs with definitions.
- SDEs and associated Data Elements.
- Applicable data standards needed for implementation.

The Program Managers provide information on their respective Enterprise System to their CBM representative. The CBM representative reviews the information and provides it to the BTA System View Product Lead for analysis and inclusion in the BEA.

As part of the pre-analysis the SV product team works with the BEP to ensure that any new business requirements are represented in the system requirements and that any new system requirements are also reflected in the Operational View business requirements. A tight link between the SV-1 and the OV-5, OV-2 and OV-3 is maintained to ensure that the System View is integrated with the BEP business requirements.

The System View models are developed for each CBM:

- Financial Management (FM).
- Human Resource Management (HRM).
- Materiel Supply and Service Management (MSSM).
- Real Property and Installations Lifecycle Management (RPILM).
- Weapon System Lifecycle Management (WSLM).

The models are developed based on analysis of information from CBM representatives, Program Managers and Operational View products.

11.2.1.2. Analysis Tasks

Prior to any changes, an impact analysis is conducted to assess the impact to the SV-1. The following impact analysis tasks are performed:

- For creation or any changes to Systems Nodes:
  - Assess impact to OV-2 Operational Node.
  - Verify that the Operational Nodes supports the System Functions identified by the BEP Leads and Program Managers.

- Determine if the Operational Node definition needs to be refined.
- Verify that the OV-2s support the CBM/Program Manager provided System Interfaces and SDEs.
- Assess impact to OV-5.
- Assess impact to other CBM SV-1 diagrams.
- Verify that other SV-1 diagrams support the required System Node and System Interfaces.

- For creation or changes to System Entities:
  - Assess impact to OV-5 models.
  - Verify that enterprise systems show up as Mechanisms on corresponding Operational Activities in the OV-5 models.
  - Assess impact to System Nodes.
  - Assess impact to other SV-1s diagrams.
  - Assess impact to System Functions.
  - Assess impact to Enterprise Sub-Services.
  - Assess impact to BEP team Stakeholders.
  - Assess impact to CBM team Stakeholders.
- For creation or changes to System Interfaces:
  - Assess impact on OV-2 models.
  - Assess impact on OV-5 models.
  - Assess impact to System Interface name.
  - Assess impact to SDEs.
  - Assess impact to IE.
  - Assess impact to Data Entities.
  - Assess impact to BEP Stakeholders.
  - Assess impact to CBM Stakeholders.

Because the OV-5, OV-2 and OV-3 are so closely linked to the SV-1, the SV-1 is completed after the OV models are stabilized. The OVs and SVs must be in accord. All SV-1 interfaces must be supported by an OV-2 Need Line. All SDEs must have a corresponding OV-3 IE. Each System Nodes must be associated with a corresponding Operational Node. All SV-1 systems must be represented by a corresponding OV-5 ICOM mechanism.

11.2.2. Development Tasks

The section describes a list of tasks for developing SV-1 architecture product.

11.2.2.1. Creating / Modifying Diagrams

Create a new diagram or open an existing diagram. The following procedures are used for creating the various elements of the SV-1:

- To create System Nodes:
  - Analyze OV-2 Operational Nodes
  - Create a System Node for each CBM
  - Define System Node
  - Map System Node to OV-2 Operational Node

- To create System Entities (enterprise systems):
  - Name System Entity
  - Define System Entity
  - Assign System Entity to System Node
  - Assign System Functions
  - Assign Enterprise Services
  - Assign BEP team Stakeholders
  - Assign CBM team Stakeholders
  - Ensure all enterprise systems are represented as mechanisms in the OV-5.
- To create SDEs:
  - Name SDE
  - Define SDE by using the definitions of the corresponding Information Exchange.
  - Assign BEP team Stakeholder
  - Assign Data Elements
  - Link SDEs to IEs
- To create System Interfaces between Enterprise Systems:
  - Name System Interface ("Source-Destination")
  - Define System Interface
  - Assign SDEs to System Interfaces

Following analysis of any changes to the OV products, existing SV-1 content shall be updated to reflect any impact of these changes. This may require creation or update of System Nodes, System Entities, SDEs or System Interfaces to the SV-1 product. For example, the addition of a new leaf-level output ICOM in the OV-5 will require the creation of a new system data exchange.

The SV-1 tasks that are performed whenever specific changes are made in the OV-5 are detailed below.

Changes to Operational Activity ICOMs:

- If a new leaf-level input or output ICOM is added to an OV-5, check to see if an IE was created. If there is an IE, identify the Need Line in the OV-2 where the IE is associated. Identify the System Interface that maps to the Need Line. Determine if there is an existing SDE that maps to the IE. If the SDE exists, map it to System Interface. If not, and the IE is to be automated, create a new SDE and map it to System Interface.
- If a leaf-level ICOM is deleted from an OV-5, identify the IE that maps to the ICOM. Identify the Need Line in the OV-2 where the IE is associated. Identify the System Interface that maps to the Need Line. Identify the SDE that maps to the IE. Delete the SDE from the System Interface.
- If the leaf-level ICOM definition has been revised, identify the supporting SDE, review the definition and revise as necessary.

Changes to Operational Activity:

- If a leaf level Operational Activity is added to an OV-5, check to determine if an existing System Function may support the activity. If there is a System Function, review definition and revise as necessary. Otherwise, create new System Function to support the Operational Activity if it is to be automated.

- If a System Mechanism is added to an OV-5, check to see if the system exists. If not, create a new System Entity and add System Functions associated to the Operational Activity.

The SV-1 tasks associated with OV-2 updates are:

Changes to Operational Node:

- Assess impact to System Node: Determine if System Node exists or one has to be created. If it exists, verify that the definition supports the Operational Node and revise as necessary. If the node does not exist, create node on each CBM specific SV-1 based on revisions to the OV-2 product.

Changes to Need Line:

- If a Need Line is deleted, identify the System Interface that maps to the Need Line and delete.
- If a Need Line is added, determine if an existing System Interface maps to the Need Line. Create a new System Interface if there is not an existing System Interface, provided the Need Line represents an automated exchange.
- If an unexpected System Interface appears on the SV-1, an analysis of the OV products will be required to determine the corrective action that must be made to the OV or SV-1 products.

Changes to IE:

- If an IE is added, identify the Need Line where the IE will be added. Determine if there is an existing SDE or if a new SDE needs to be created. Link the new SDE to the System Interface.
- If an IE is deleted, identify the System Interface that maps to the Need Line where the IE is being deleted. Delete the SDE from the System Interface.

11.2.2.2. SV-1 Model Coordination with BEPs and Other BEA Products

- When a SV-1 diagram is updated, provide copies of the updated diagrams to the BEP team representatives to review, identify corrections and finalize acceptance of the product.
- Verify all SV-1 acronyms are in AV-2.
- Verify that all SV-1 Enterprise-level systems, Enterprise-wide systems and Component-level systems are in the Enterprise Transition Plan.
- Review changes to the OV-2, OV-3 and OV-5 products and follow the SV-1 tasks that are mentioned in section 11.2.2.1.

11.2.2.3. SV Team Quality Assurance Checks

The purpose of the model SV Team Quality Assurance checks is to prepare for the formal quality assurance tasks conducted by IV&V and BEP team review. The SV-1 Product Checklist is used to verify the content is in accordance with the modeling guidelines. The major steps to ensure compliance include:

- Spelling of all objects within the diagram is correct.
- System Interfaces are connected to System Entities.
- System Nodes are identified as either Physical or Abstract.
- System Entities are within System Nodes.
- System Nodes are associated with at least one System Entity.
- Each System Node references at least one Operational Node.
- Each System Entity has a definition.
- Each enterprise System Entity is associated with at least one System Function.

- Each System Interface has a definition.
- Each System Interface references at least one SDE.
- Each SDE has a description of the data it represents that is based on the Information Exchange definition it supports.
- Each SDE is linked to an IE.
- At least one SDE is assigned to every System Interface.
- Complete the SV-1 Checklist.

11.2.3. Post-Analysis Tasks

After the work has been approved by the BEP teams, the following tasks are performed:

- Incorporate additional updates to the SV-1 based upon subsequent BEP team OV and SV work sessions.
- Incorporate quality control and architecture verification changes into the SV-1.
- Incorporate integration changes identified after performing a cross-product integration analysis of other product changes affecting the SV-1.

11.3. Modeling SV-1 Using SA

11.3.1. Modeling Conventions

The SV-1 in System Architect uses the following modeling conventions to standardize the models and present them in a common form:

- Modeling objects shall not have truncated entries on the diagram, except System Entities with more than seven System Functions.
- All System Node labels shall be centered at the top of the System Node border and the label should not fall outside the boundary of the ellipse.
- Each System Node name shall be title-case, use only approved acronyms, non-plural and use no special characters except "-".
- All System Entity labels should be centered at the top of the System Entity box and the label should not fall outside the box boundary.
- All System Entities must be contained within their associated System Node elliptical boundary.
- Each System Entity name shall be upper-case or title-case, use only approved acronyms, non-plural and use no special characters except "-".
- Each System Node shall contain a generic System Entity to represent current and future CBM systems that have not been identified for the current release of the BEA architecture.
- Each System Entity must have a Parent system assigned.
- Need Lines and Information Exchanges from the OV-2 that enterprise system interfaces do not reflect will show on the SV-1 as a generic interface.
- System Interface lines are not permitted to traverse intermediate System Entities. To the maximum extent possible, System Interface lines shall not cross intermediate System Nodes.
- System Interface arrows shall be black with black filled arrowheads.
- System Interfaces must be connected to a System Entity at both ends.

11.3.1.1. Use of Color, Size and Lines in Diagram

The SV-1 diagrams use a standard color scheme, font and line size as follows:

- All System Node labels must be Arial 14, bold, black font.
- The central System Node on each diagram shall be elliptical with a light green fill and a black border. The custom color settings are: Hue – 140, Sat. – 240, Lum – 192; Red – 204, Green – 255, Blue – 204.
- Internal System Nodes shall be elliptical with a light blue fill and a black border. The custom color settings are: Hue – 40, Sat. – 240, Lum – 210; Red – 255, Green – 255, Blue – 191.
- The External System Node shall be elliptical with a light gray fill and a black border. The custom color settings are: Hue – 160, Sat. – 0, Lum – 225; Red – 239, Green – 239, Blue – 239.
- All System Entity labels should be Arial 10 and a black font.
- Enterprise-level System Entities shall be represented by yellow boxes with a black border. The custom color settings are: Hue – 40, Sat. – 240, Lum – 192; Red – 255, Green – 255, Blue – 153.
- Generic System Entities shall be represented as light yellow boxes with a black border. The custom color settings are: Hue – 40, Sat. – 240, Lum – 210; Red – 255, Green – 255, Blue – 191.
- Non-DoD System Entities shall be represented as white boxes with a black border.
- System Interfaces shall be solid, straight lines with 90 degree angles (orthogonal), when necessary.
- System Interface labels will be placed, where possible, above the horizontal line and closest to either the arrowhead or 90 degree angle.
- System Interface line intersections are permissible, but should be minimized to the extent possible.

11.3.1.2. Diagram Conventions

Each SV-1 diagram shall have a Diagram Description contained within the Description block of the diagram properties that describes the purpose of the diagram, the CBM enterprise systems and System Interface Information.

- A Doc Block representing header information for the diagram (including the diagram name and date last updated) is placed at the top center of every diagram. The Doc Block is enlarged so there are no truncation indicators (dots) indicating text is not visible. The Doc Block is a box with no fill color and has a black border.
- The SV-1 diagram shall not have a border.
- Each diagram is named after the CBM (for example, Weapon System Lifecycle Management).
- Decomposition diagrams are named after the CBM and enterprise system name (for example, Weapon System Lifecycle Management – DAMIR System Interface Diagram).

11.3.1.3. Object Naming Conventions

Each SV-1 diagram uses standard object naming conventions as follows:

- The System Node name shall be the CBM acronym as used in the OV-2 to name the corresponding Operational Node.
- System Entity names are the official acronyms of the CBM systems.
- The System Function form is a verb followed by a noun.
- System Entity names are used to create System Interface names. The naming convention for System Interfaces is "sending System Entity acronym" - "receiving System Entity acronym".

- Each System Interface name shall only use approved acronyms, non-plural and use no special characters except "-".
- The SDE names shall be provided by the BEP representatives. If they are not provided, the name of the IE that the SDE is linked to shall be used.
- An IE ending with "Information" will link to a SDE with the same name ending with "Data".

11.3.2. Modeling Objects

For the standards and guidelines for the SV-1 objects, refer to sections 11.2.2.3 and 13.3.1.

11.4. SV-1 Modeling Problems to Avoid

This section discusses lessons learned from previous SV-1 architecture development and mentions common modeling pitfalls and mistakes to avoid while modeling the SV-1 architecture product.

11.4.1. SV-1 Modeling Lessons Learned

- Ensure that the SV-1 analysis occurs concurrently with OV-5 development; ensuring systems mechanisms are properly assigned to Operational Activities that they automate.
- Regular and early communication with other architecture product teams is needed to assess impact of proposed changes in other products on the SV-1. The SV team will actively participate in the pre-analysis workshops to ensure that changes in the Operational View business requirements can be properly reflected in the System View.

11.4.2. SV-1 Modeling Pitfalls

- Acronyms not included in AV-2.
- Late changes to the OV-2, OV-3 or OV-5 products do not leave adequate time for complete impact analysis or post analysis tasks to modify the SV-1.
- The exact diagram convention, including the various shapes, colors, label fonts and label placement, are not precisely followed.
- The SV-1 diagrams are not reviewed in the HTML/SVG rendition until after product stabilization, so flaws that do not show up in System Architect, such as superfluous line segments on System Interfaces, are exposed in the web version of the architecture. Superfluous line segments are eliminated on the System Interfaces by using the "reduce line segment" feature in System Architect.

12. SV-5 – Operational Activity to System Function Traceability Matrix

12.1. Summary Description

This section describes the SV-5 architecture product and its relationship to other BEA products, the matrix development method and the modeling guidelines used for development of the SV-5.

12.1.1. Product Purpose

The SV-5 depicts the relationships between the Operational Activities in the OV-5 Activity Models and the System Functions. BTA uses the DoDAF SV-5b to meet a program requirement to link Business Capabilities, Operational Activities and System Functions. The Enterprise-level systems identified by each BEP team are shown on the SV-5 matrix, where the Enterprise-level system supports an Operational Activity/Business Capability, and is aligned with a specific System Function.

12.1.2. Product Structure

The SV-5 matrix relates System Functions to Operational Activities across the BEA Business Capabilities. For each matrix cross area or intersection the related Enterprise Systems are presented. There can be many Operational Activities related to a single Business Capability. The matrix is illustrated in Figure 12-1.

Figure 12-1, SV-5 Sample

Business Capabilities / Operational Activity	Manage Acquisition Oversight Integration	Conduct Program Management	Monitor Commercial Request for DoD Technology Export	Manage Request			Manage Sourcing
	Manage Acquisition Oversight Integration	Conduct Program Management	Monitor Commercial Request for DoD Technology Export	Manage Request and Sourcing Strategy	Conduct Solicitation and Source Selection	Establish Sourcing Vehicle	Monitor Sourcing Execution
System Functions							
Manage Capabilities Based Acquisition	DAMIR						
Manage Cross-Domain Communications			USXPORTS				
Manage End-User Check			USXPORTS				
Manage One-Time Staffing			USXPORTS				

12.1.3. Relationship to Other BEA Products

SV-5 is related to other BEA products as follows:

AV-2 All SV-5 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These SV-5 objects must be listed and defined in the AV-2:

- System Function Definitions

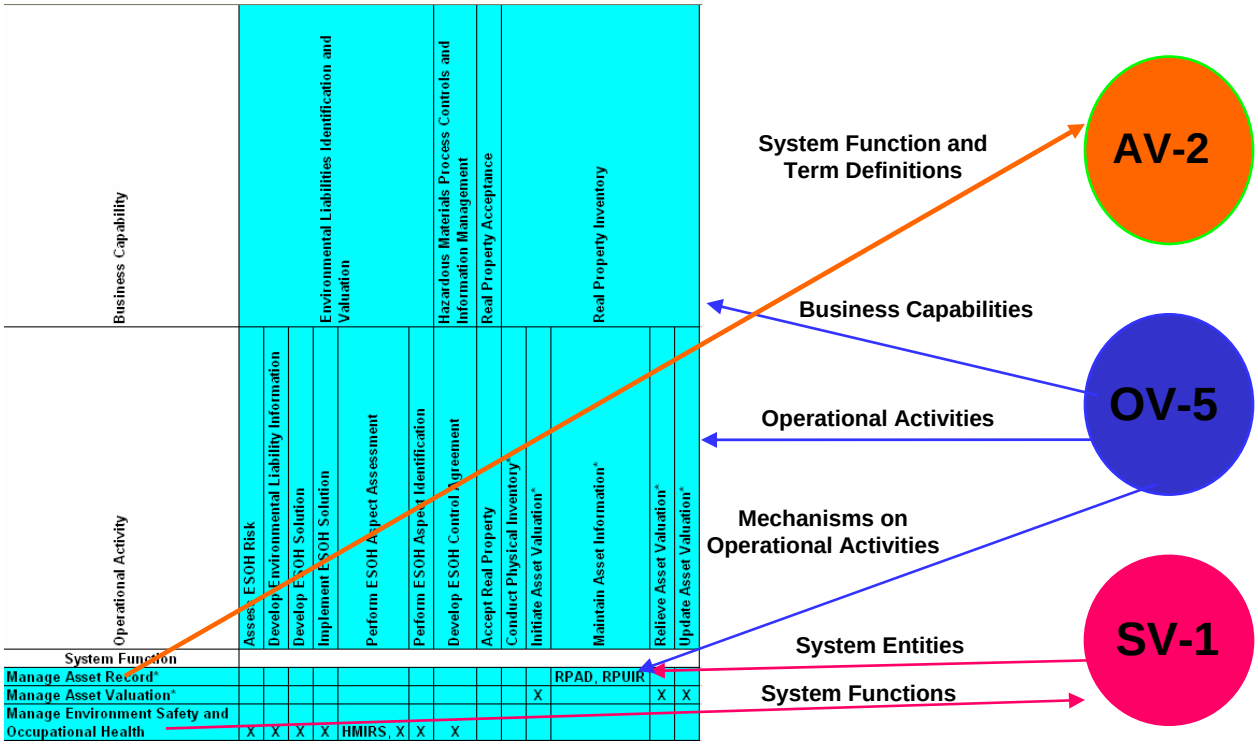
All acronyms used in the SV5 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-5 OV-5 Operational Activities are linked to the System Functions in the in the SV-5. In addition, Enterprise-level Systems are Mechanisms on the Operational Activities.

SV-1 The SV-1 System Entities and supporting System Functions match systems in the SV-5 matrix.

Figure 12-2 represents the SV-5 relationship to other BEA products.

Figure 12-2, Relationship between SV-5 and Other BEA Products



12.1.4. Definitions

- **Business Capability:** Each capability represents the ability to execute a specific course of action. It can be a single business enabler or a combination of business enablers (e.g. business processes, policies, people, tools, or systems information) that assist an organization in delivering value to its customer.
- **System Entity:** System Entities represent DoD systems. In the BEA, these systems are identified as being enterprise systems, component systems, or generic systems. Generic systems represent the case where specific System Functions have been identified but no specific future plans have been developed to support those functions. In short, a generic system represents a potential future system.

- **Operational Activity:** An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence (for example, 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).
- **System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.

12.2. Developing the SV-5 Traceability Matrix

A single enterprise matrix represents the SV-5 for all BEPs. The SV-5 provides an integrated architecture depiction of the relationships of Operational Activities to System Functions, and enterprise systems to both Operational Activities and System Functions. Through the mapping of Business Capabilities to Operational Activities, there is an indirect link between System Functions and Business Capabilities. Figure 12-1 represents a sample SV-5.

12.2.1. Pre-Analysis Tasks

Prior to the start of SV-5 development and/or maintenance:

- Verify that BEA enterprise systems are included in the ETP.
- Identify leaf-level Operational Activities that are on OV-5 diagrams.
- Collect System Function information from BEP team leads for each leaf-level Operational Activity that may be automated.
- Collect System Function information from BEP team leads for each enterprise system.
- Verify the mapping of System Functions to leaf-level Operational Activities with the BEP team leads.
- Identify changes in the OV-5 and SV-1 that may impact the SV-5.
- Identify System Functions that are performed, in whole or partially, by an enterprise system.
- Verify mapping of System Functions to enterprise and generic systems.

12.2.2. Development Tasks

12.2.2.1. Creating / Modifying SV-5 Matrix

To create the SV-5 matrix, the following tasks are performed:

- Analyze definitions of Operational Activities and associated ICOMs.
- Identify and create System Functions that will support leaf-level Operational Activities.
- Analyze System Function name and definition provided by BEP team leads to ensure they support the leaf-level Operational Activities.
- Analyze System Function name and definition provided by the BEP team leads and assign to enterprise systems to ensure these systems execute the functions assigned.
- Verify enterprise systems as Mechanisms to Operational Activities.
- Verify enterprise system shares at least one System Function with the Operational Activity where it appears as a mechanism.
- Verify mapping of Operational Activities to Business Capabilities.
- Link System Functions to Operational Activities
    - The enterprise system name is placed at the intersection of the System Function and the Operational Activity.

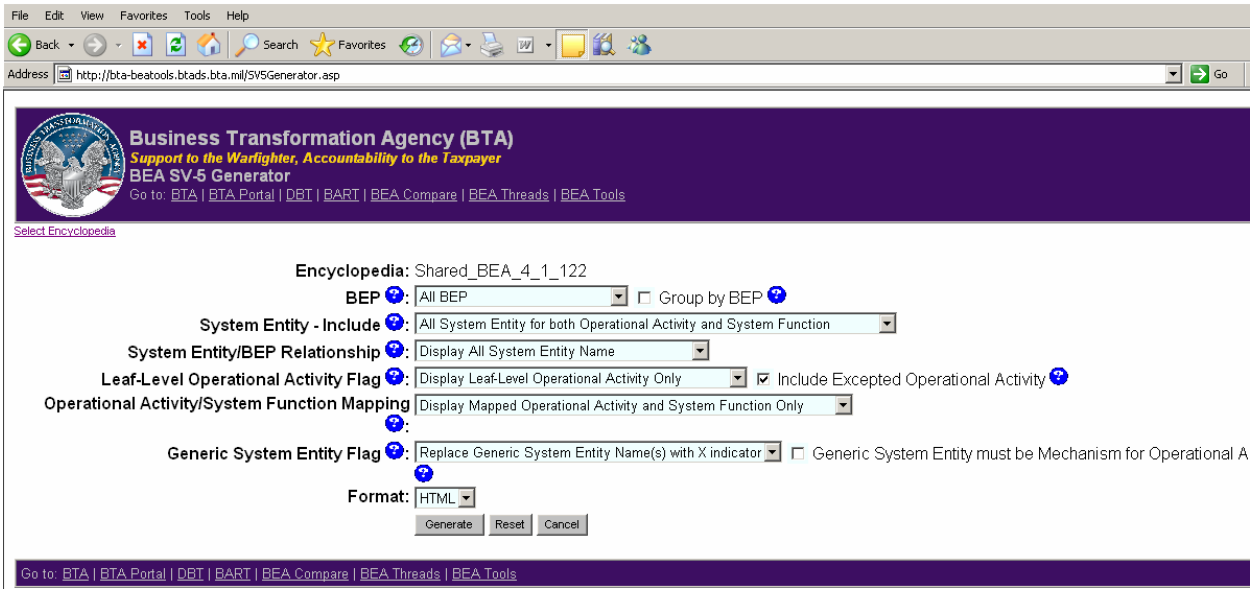
- If an enterprise system has not been designated for an existing System Function, place an "X" at the intersection of the Operational Activity and System Function.
- If an enterprise system partially supports an existing System Function, place an "X" at the intersection of the Operational Activity and System Function.

- Finally the actual generation of the SV-5 matrix has been automated and is available for use as a tool by the BEA. Provided the proper descriptor and links are developed for each SV-5 part, the matrix can be generated automatically. The general application resides at this web location:

  http://bta-beatools.btads.bta.mil/SV5Generator.asp

  The following graphic shows the default display settings used to create the Enterprise SV-5. Use this setting to see the entire matrix at one time.

Figure 12-3, Default Settings for Creation of Enterprise SV-5 Matrix



- There are several different settings that one may use to generate and view the SV-5. The default setting, the setting that appears when one opens the tool, creates an SV-5 for the entire enterprise. This view is not sorted by BEP.
- To create a BEP specific SV-5b, use the BEP drop down list box and select the BEP of interest. Next, in the System Entity / BEP Relationship drop down list box, select, "Display Only System Entity Related to BEP".

12.2.2.2. SV-5 Matrix Coordination with BEPs and other BEA Products

- Coordination with BEP team leads
  - Print copy of SV-5b for BEP team leads to review proposed changes and confirm linkages.
- Coordination with Enterprise Transition Plan
  - Compare enterprise systems in the ETP with enterprise systems in SV-5 for consistency.
  - Print copy of SV-5b for the ETP team to review proposed changes and provide comments.
- Coordination with BEA SV-1
  - Ensure that any System Function assigned to an enterprise system in the SV-5 is properly displayed on the corresponding System Entity on the SV-1 diagrams.
  - Ensure that any System Function that has an "X" linking it an Operational Activity shows up on the SV-1 diagrams as a System Function for the corresponding generic System Entity.

- Coordination with BEA OV-5
  - Ensure that any enterprise system that links a System Function to an Operational Activity is a Mechanism on that Operational Activity in the OV-5.
  - If an enterprise system is not a Mechanism for an OV-5 Operational Activity, it should not link that Operational Activity to any System Function in the SV-5b.
- Coordination with BEA AV-2
  - Ensure that all enterprise system acronyms are expanded correctly in the Long Name attribute of the System Entity and in the AV-2.

12.2.2.3. SV-5 Matrix Quality Assurance Review

- Ensure that Names of Operational Activities, System Functions, Business Capabilities and enterprise systems are current and accurate.
- Add rationalization to the SV-5 to explain any anomalies.

12.3. Modeling SV-5 Using SA

12.3.1. Modeling Conventions

A single SV-5b matrix represents all CBMs. A Microsoft Excel worksheet represents the final SV-5 product. The SV-5 product includes Business Capabilities, and identified enterprise systems where a System Function supports an Operational Activity. Please note that the SV-5 is very large and can only be legibly viewed in electronic format.

12.3.1.1. Use of Color, Size and Lines in Matrix

- The title of the product is "SV-5b" and appears above the matrix.
- The first row of the SV-5b matrix lists the Business Capabilities and the second row lists the corresponding Operational Activities. Thus, each column of the SV-5b matrix represents a Business Capability and Operational Activity intersection.
- The first column of the SV-5 lists the System Functions and so each row represents a specific System Function.
- The Operational Activities are sorted by BEP so that enterprise systems that are relevant to a specific BEP are clustered near each other on the SV-5b.
- The System Functions are sorted alphabetically.
- All data cells are gray.

In addition to the standard SV-5b matrix, a BEP only view is created for each BEP. These are created as follows:

- The list of System Functions and Operational Activities are both sorted by BEP so that enterprise systems that are relevant to a specific BEP are clustered near each other on the SV-5b.
- Data Cells containing the Operational Activities, System Functions, Business Capabilities and enterprise systems are color coded by BEP. All other data cells are gray. The color scheme for the data cells is listed in Table 12-1.

Table 12-1, Color Scheme for Data Cells

Acquisition Visibility	
Common Supplier Engagement	
Financial Visibility	
Materiel Visibility	

Real Property Accountability	
Personnel Visibility	
No specific BEP	
Empty data cells	

12.3.1.2. Matrix Conventions

The SV-5 modeling conventions are:

The names of Business Capabilities, Operational Activities and System Functions in the SV-5 should be consistent throughout the encyclopedia.

- All updates to the SV-5b matrix are implemented through System Architect's Matrix browser, SV-5 System Function to Operational Activity file.
- The SV-5b matrix only contains relationships between leaf-level Operational Activities, Business Capabilities, Enterprise-level systems, including generic systems and System Functions.
- Every System Function mapped to an Operational Activity shall be reflected in the SV-5b properties tab of the Operational Activity.
- Each System Function must be mapped to at least one leaf level Operational Activity.
- The SV-5b should list all leaf-level Operational Activities from the OV-5.
- Each System Function should map to at least one Operational Activity with an Enterprise System Name or an "X" where "X" represents a generic, as yet undefined system.
- Each System Function must have at least one BEP team Stakeholder.
- Each System Function must have at least one CBM team Stakeholder.
- Each Business Capability Definition must list at least one Operational Activity from the OV-5.
- Each Business Capability Definition must list a BEP team Stakeholder.

12.3.1.3. Object Naming Conventions

Enterprise system names are the official acronyms of the CBM Enterprise Systems and are expanded in the Long Name attribute of the System Entity and in the AV-2.

- The form of the System Function, Operational Activity and Business Capability is a verb followed by a noun.
- The first word and all the main words in System Function, Operational Activity and Business Capability names should have initial capitals, and all the joining words should be left in lower case.

13. SV-6 – System Data Exchange Matrix

13.1. Summary Description

This section describes SV-6 architecture product and its relationship to other BEA products, the matrix development method and the modeling guidelines used for development of the SV-6.

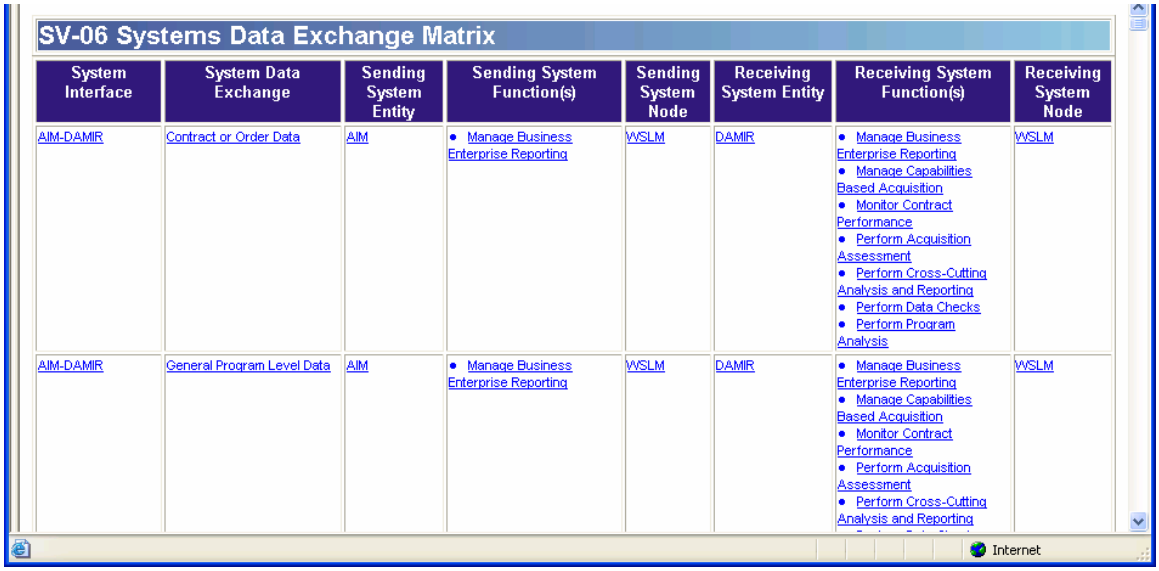
13.1.1. Product Purpose

The SV-6 System Data Exchange Matrix provides details of system Data Elements exchanged between systems and the characteristics of that exchange. The SV-6 is capable of providing additional detail for each SDE such as the source and destination System Entities; source and destination System Functions; OV-7 Entities and Data Elements; as well as performance and information assurance attributes. The SV-6 relates to, and is derived from, the OV-3. The operational characteristics in the OV-3 Information Exchange matrix are used to develop the corresponding SDE attributes in the SV-6. Each SDE exchanged is related to the System Entity from the SV-1 that produces or consumes information.

13.1.2. Product Structure

The SV-6 report is generated through the reporting tool provided by SA. It provides the information in tabular form for each SDE linked to System Interfaces in the SV-1. Figure 13-1 represents a sample SV-6 Systems Data Exchange Matrix.

Figure 13-1, SV-6 Systems Data Exchange Matrix



SV-06 Systems Data Exchange Matrix

System Interface	System Data Exchange	Sending System Entity	Sending System Function(s)	Sending System Node	Receiving System Entity	Receiving System Function(s)	Receiving System Node
AIM-DAMIR	Contract or Order Data	AIM	• Manage Business Enterprise Reporting	WSLM	DAMIR	• Manage Business Enterprise Reporting • Manage Capabilities Based Acquisition • Monitor Contract Performance • Perform Acquisition Assessment • Perform Cross-Cutting Analysis and Reporting • Perform Data Checks • Perform Program Analysis	WSLM
AIM-DAMIR	General Program Level Data	AIM	• Manage Business Enterprise Reporting	WSLM	DAMIR	• Manage Business Enterprise Reporting • Manage Capabilities Based Acquisition • Monitor Contract Performance • Perform Acquisition Assessment • Perform Cross-Cutting Analysis and Reporting	WSLM

13.1.3. Relationship to Other BEA Products

SV-6 relationship to other BEA products is through the following:

AV-2 All SV-6 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These SV-6 objects must be listed and defined in the AV-2:

- SDE Definitions

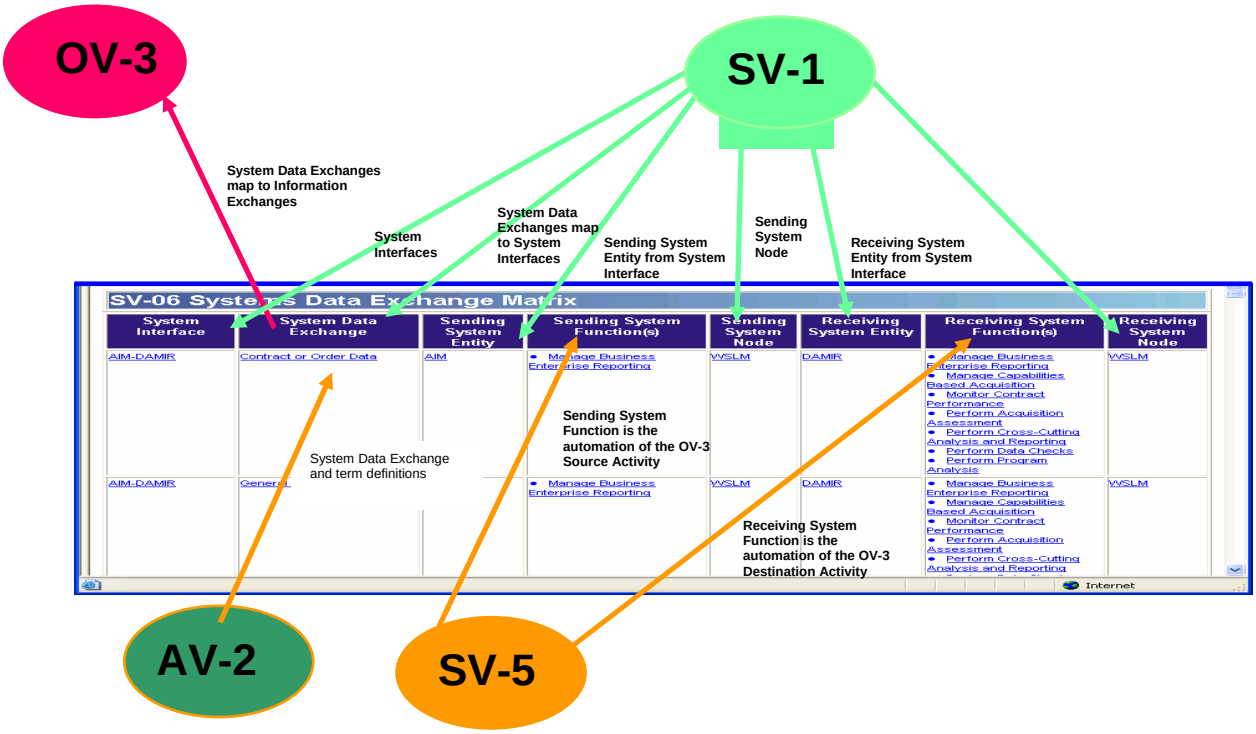
All acronyms used in the SV5 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-3 One or more SDEs described in the SV-6 are linked to each IE in the OV-3, showing which SDEs support an IE.

SV-1 The SV-1 provides the information needed to generate the SV-6 and is shown in Figure 13-2.

Figure 13.2 represents the relationship between the SV-6 and other BEA products.

Figure 13-2, Relationship between SV-6 and Other BEA Products



13.1.4. Definitions

- **System Node:** A BEA System Node represents one or more systems that work together within a Core Business Mission (CBM) to support the automated portion of the business requirements described in the Operational View.
- **System Entity:** System Entities represent DoD systems. In the BEA, these systems are identified as being enterprise systems, component systems or generic systems. Generic systems represent the case where specific System Functions have been identified but no specific future plans have been developed to perform these functions.
- **System Interface:** System Interfaces represent the data exchange between System Entities.
- **System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.
- **System Data Exchange:** System Data Exchanges represent a collection of system Data Elements that System Functions produce or consume. In the BEA implementation of the SV-6, information assurance and performance characteristics of the exchange are not provided.

13.2. Developing the SV-6

13.2.1. Pre-Analysis Tasks

Pre-analysis is not required, as the SV-6 content is generated from other SV products in the BEA.

13.2.2. Development Tasks

As shown in Figure 13-1, the automated SV-6 report lists the following information for each SDE in the BEA:

- System Interface
- System Data Exchange
- Sending System Entity
- Sending System Function(s)
- Sending System Node
- Receiving System Entity
- Receiving System Function(s)
- Receiving System Node

13.2.2.1. SV-6 Model Coordination with BEPs and other BEA Products

- Validate the generated SV-6 against the SV-1 and the OV-3.
- When the SV-6 is generated, provide copies of the generated matrix to the BEP teams to review, identify corrections and for acceptance of the product.
- Meet with BEP teams to review comments.
- Perform Impact Analysis to determine impact to OV and SV products.
- Initiate Change Request process to address identified issues.
- Upon completion of changes to impacted OV and SV products, regenerate the SV-6 matrix.

13.2.2.2. SV-6 Model Cleanup

The SV-6 matrix cleanup follows the steps in Section 11.2 Developing SV-1 models.

13.2.3. Post-Analysis Tasks

Compare information on generated SV-6 to SV-1:

- Validate that each System Node in the SV-1 is represented in the SV-6.
- Validate System Entities:
  - Ensure that every System Entity in the SV-6 is associated with the correct System Node.
  - Validate that the System Function to System Entity linkage on the SV-6 matches the content of the SV-1.
  - Validate System Interfaces:
    - Validate that only inter-nodal System Interfaces are in the SV-6 matrix.
    - Validate the sending and receiving System Entities against the content of the SV-1.
    - Ensure that SDEs map to System Interfaces based on the content of the SV-1.

Compare information on generated SV-6 to OV-3:

- Validate source and destination System Nodes against source and destination Operational Nodes.
- Validate System Interfaces against Need Lines.

- Validate SDEs against IEs.
    - Validate Data Elements.

13.2.3.1. Creating / Modifying SV-6

The SV-6 is a matrix generated upon completion of the SV-1 product. Any change to the SV-1 product requires a regeneration of the SV-6.

13.3. Modeling the SV-6 in SA

The SV-6 is an automated report that is generated from the architecture and modeling of all the content for the SV-6 is detailed in the SV-1 section of this guide.

13.4. SV-6 Modeling Problems to Avoid

This section discusses lessons learned from previous SV-6 architecture development and mentions common modeling pitfalls and mistakes to avoid while modeling the SV-6 architecture product.

13.4.1. SV-6 Modeling Lessons Learned

- Need regular and early communication with other architecture product teams to assess impact of changes to the SV-1.
- Ensure that the OV-5 and OV-3 products are stabilized prior to SV-6 development.
- Ensure that the SV-6 is regenerated whenever there is any change to the SV-1 product. The products are directly linked so a change in the SV-1 will result in a change to the SV-6.
- BEPs should thoroughly review System Data Exchanges and Attributes for each System Interface to ensure they are properly aligned to the Operational View products.

13.4.2. SV-6 Modeling Pitfalls

- Changing the specific information fields that are included in the SV-6 requires significant programming changes to the reporting tool.
- As the SV-6 exists only as a large HTML report that is generated by the build team, flaws are only exposed in the Web version of the architecture, which may not be fully reviewed until after BEA product stabilization efforts.

14. TV-1 – Technical Standards Profile

14.1. Summary Description

This section describes the Technology Standards Profile (TV-1) architecture product, its purpose, product structure, relationships to other BEA products, development method, guidelines used for development and modeling problems to avoid.

14.1.1. Product Purpose

The purpose of the BEA TV-1 is to describe the mandated IT standards that a BEA-compliant system must implement, as needed, to provide interoperability and net-centric services across the DoD Enterprise. The fundamental requirement driving the content of the TV-1 is the mandate for compliance with the DoD IT Standards Repository (DISR).

The TV-1 collects the various systems standards rules that implement and sometimes constrain the choices that can be made in the design and implementation of an architecture. It is concerned with delineating systems standards rules and conventions that apply to architecture implementations. When the standards profile is tied to the system elements to which they apply, TV-1 serves as the bridge between the SV and TV.

The TV-1 is a listing of standards that must be followed when implementing a given architecture. This will ensure the implementation will provide the system capabilities identified in the Systems Views (SV) that are required to meet the operational needs defined by the architecture's Operational Views and its specific concept of operations.

14.1.2. Product Structure

The TV-1 is constructed in line with the SV-1, SV-5 and SV-6 Systems Views. In the architecture, the selected standards are related to the Systems in the SV-1. In support of the architecture implementer or system designer, each standard listed in the profile is associated with the SV elements that implement or use that standard.

The TV-1 Technical Standards Profile is in a table matrix format. The hierarchical structure of the TV-1 consists of a three-tier set of categories: Technology Service Areas, which contain Technical Services that conform to Standards. Such a structure makes it easier for architecture implementers and system designers to locate the standards that apply. The structure adopted for the BEA TV-1 is that defined by the C4ISR (Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance) Core Architecture Data Model (CADM) for a DoDAF-compliant architecture.

The categories used to represent the TV-1 product are numbered as shown in Figure 14.1 BEA TV-1 Matrix

Figure 14-1, BEA TV-1 Matrix

Technology Service Area	Technical Service	Enterprise Sub-Service	Standard	Standard Description
Component Framework 1	Access Control 2	Information Assurance and Security 3	FIPS Pub 140-2 4	Security Requirements for Cryptographic Modules, May 25, 2001. 5
Component Framework	Information Assurance	Information Assurance and Security	SDN.801	Access Control Concept and Mechanisms, Revision C, May 12, 1999.
Service Access and Delivery	Collaboration	Collaboration	ISO/IEC 11171-2	Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s - Part 2 Video, 1993.

The tabulated columns of this matrix are the following:

(1) Technology Service Area
Technology Service Areas group similar Technical Services together for increased organization and comprehension. There may be one or more Technical Services in a Technology Service Area. The current TV-1 takes its highest-level structure from the DoD Enterprise Architecture (EA) Technical Reference Model (TRM). It contains four Technology Service Areas, drawn from the Core Service Areas of the DoD EA TRM. This provides a high degree of traceability between the two documents and makes optimal use of the DoD EA TRM as the interface between the BEA and the FEA TRM, to which DoD programs must map for Office of Management and Budget (OMB) Exhibit 300 purposes.

The current BEA Technology Service Areas are:

- **Component Framework**: The underlying foundation, technologies, standards and specifications by which system capabilities are built, exchanged and deployed across the BMA.
- **Service Access and Delivery:** The collection of standards and specifications that support external access, exchange and delivery of a system capability.
- **Service Interface and Integration:** The collection of technologies, standards and specifications that govern the interface with a system capability.
- **Service Platform and Infrastructure:** The collection of delivery and support platforms, infrastructure capabilities and hardware requirements to support the construction, maintenance and availability of a system capability.

(2) Technical Service
In the TV-1 model a Technical Service, with its constituent standards, is a technical capability designed to support an Enterprise Sub-Service. Technical Services are assigned to each Technology Service Area within the BEA TV-1 to support the development of BEA-compliant systems. There may be one or more Technical Services in any given Technology Service Area.

(3) Enterprise Sub-Services
A fundamental component of the BEA framework is the Enterprise-wide infrastructure that will provide the foundation for all relevant business services. Whereas much of the framework development centers on the operational business aspects of the architecture, there are several areas that focus on those components that support the business processes, but are not directly related to the business requirements. They describe the intersection between the business processes and Technical Services, and define standard attributes to bring order to that point. The BEA refers to these components as Enterprise Sub-Services.

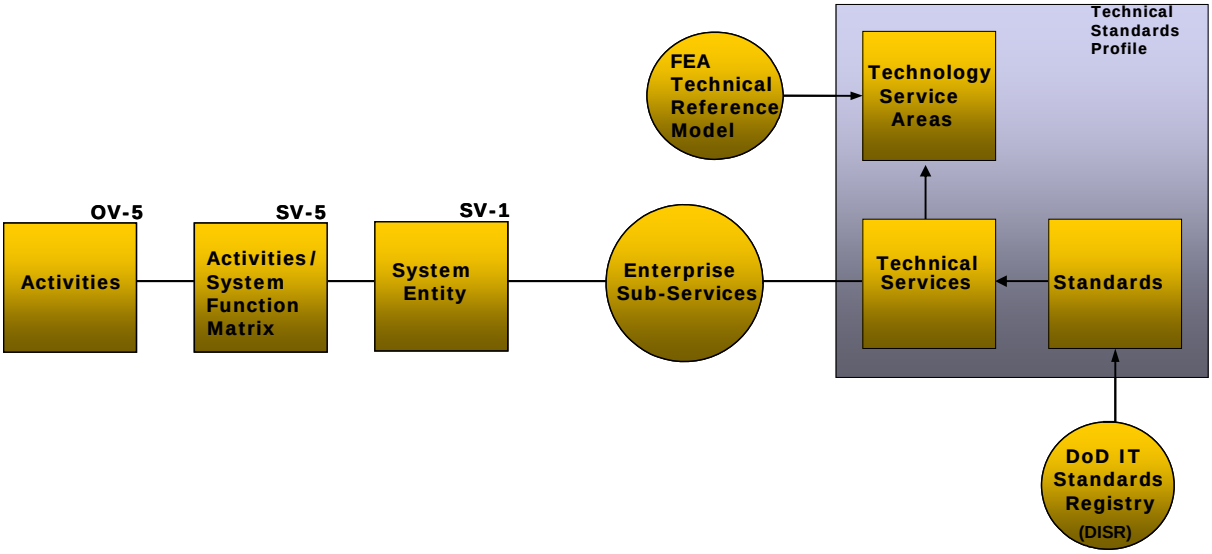
(4) Standards
Standards represent agreed upon means to implement all or part of a Technical Service. The DISR is the origin of all Standards in the BEA TV-1, and appropriate references to the DISR and to additional information about the Standards is provided for each Standard. As content of the DISR changes over time, the BEA TV-1 updates will reflect the relevant changes in the Standards. Since a fundamental requirement driving the content of the TV-1 is the mandate for compliance with the DISR, all updates to DISR are analyzed and then updated Standards are included into the BEA Technical Standards Profile. Mandated Standards are essential for providing interoperability and net-centric services across the DoD Enterprise. These are current and established Standards that are required as the "must comply" Standards that implement the Technical Services without deviation. Mandated Standards usually are widely adopted and mature technologies. Compliance with the DISR is mandated for all new DoD information systems to support interoperability and net-centricity across the DoD Enterprise. To accommodate this requirement, all the BEA TV-1 Standards are adopted from Standards in the latest version of the DISR. One or more Standards support a given Technical Service.

(5) Standard Description
This is a brief definition of the associated Standard.

14.1.3. Relationship to Other BEA Products

Identifying how the Enterprise Sub-Services relate to all of the other constituents of the framework is critical for determining how the infrastructure will specifically bring all of the pieces together. Figure 14-2 illustrates the BEA approach to this relationship.

Figure 14-2, Relationship between TV-1 and Other BEA Products



Many of the Enterprise Sub-Services currently defined in the BEA are, in fact, core enterprise services and relevant to all BEA systems. In compliance with the net-centric concept of core enterprise services, all enterprise System Entities are linked to all the core enterprise services. Currently there are only three Enterprise Sub-Services defined in the BEA (Logistics Services, Human Resources Services and Real Property) that are exclusively used by specific enterprise systems.

The TV-1 is related to other BEA products through the following:

AV-2 All TV-1 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.

These TV-1 deliverable objects must be listed and defined in the AV-2:

- Enterprise Sub-Services Definitions
- Standard Definitions
- Technical Service Definitions
- Technology Service Area Definitions

All acronyms used in the SV5 descriptions must be listed and spelled out in the AV-2 Acronyms.

OV-5 Technical Standards in the TV-1 are selected based on operational requirements derived from the business operations defined by the OV-5.

SV-1 Technical Standards in the TV-1 apply to, constrain, and are linked to System Entities in the SV-1.

14.2. Developing the TV-1 Technical Standards Profile

Typically, development of the TV-1 starts with one or more overarching reference models or Standards profiles to include the FEA TRM, the DoD EA TRM, and the DISR, which replaced the Joint Technical Architecture (JTA). From these reference models or Standards profiles, the analyst selects the service areas relevant to the architecture. The identification of relevant services within these service areas subsequently points to Standards that have been adopted from the DISR for use in the technical infrastructure supporting the BMA. The resulting profile should

guide a program manager towards system designs that will interoperate with other systems supporting the BMA. The profile identifies the source document used for each Standard it identifies.

The process used by the TV Team to develop and maintain the TV-1 products involves a lifecycle of two pre-development tasks and four development tasks:

- **Pre-Development:**

  1. Collect additional information through Subject Matter Expert interviews.
  2. Coordinate internal TV-1 Development Cycle with DISR release schedule.

- **Development:**

  1. Identify and Define Technical Services and Standards Data.
  2. Organize information into a local data repository
  3. Conduct data analysis to target BEA requirements.
  4. Produce the TV-1 product.

The preceding combination of activities and requirements analysis outlines the procedural lifecycle used to establish, develop and maintain the Technical Standards View of the BEA. A review of DoDAF documents and a concurrent analysis of the CADM data schema helped to identify all the Data Elements required for development of the TV-1 product. A baseline model for the TV-1 and a data repository facilitate the recording and reporting of TV-related data as it is developed for the BEA. Specific selection criteria, including DISR compliance and BEA applicability, are applied to data collected during extensive research, interviews and analysis to develop the preliminary Standards data used to populate and update the data repository. Collected data selected for inclusion in the TV-1 is reviewed by designated Government representatives and approved prior to inclusion in the Data Repository. The content of the data repository is extracted using pertinent reporting tools and assembled to represent the official BEA TV-1 product.

The fundamental requirement driving the content of the TV-1 data repository is the mandate for compliance with the DISR. This was an appropriate requirement to begin with in light of the relative immaturity of SV products in the initial stages of BEA development. As the BEA products mature, however, it is becoming possible to derive requirements for Technical Services in the TV data repository from the linkage of these services to System Entities as shown in the SV-1. The result of this effort has been a comprehensive mapping of Enterprise Sub-Services in the SV to Technical Services shown in the TV. Based on the results of that mapping, a gap analysis facilitates the identification of Enterprise Sub-Services for which Technical Services have not been established, or conversely suggest Technical Services that might support an as yet unrecognized Enterprise Service.

In preparation for the data collection effort, TV analysts review guidance and requirements from several sources, including Department of Defense Directive (DoDD) 5101.7 and overall BEA guidance. With this guidance, the TV team revalidates the plan to use Standards recorded in the latest version of the DISR. TV analysts subsequently generate a baseline collection of data for input to the data repository. This accomplishment requires a period of Standards analysis, in which data from the latest version of the DISR is sorted and mapped into the schema of Technology Service Area, Technical Service and Standards. After loading the data into the repository, the TV team generates updated draft versions of the TV-1.

Producing an updated version of the product does not signal the end of the TV development process. Using the latest draft versions, the TV team enters a phase of analysis, which tailors the contents of the data repository to meet the specific needs of the current BEA release. This activity is driven by changes in the BEA SV products and results in the addition of new Standards into the repository while simultaneously removing others. The decisions made during this phase will continue to drive refinement and change in the TV-1 product as it evolves over time. During this analytical procedure, the TV team considers additional sources of data. These sources include technical experts (from contractor, commercial and government organizations), industry newsletters, and white papers.

Iterations of the development process introduce new information, which the TV team refines, imports and relates to the BEA through subsequent releases of the TV-1. Ongoing performance of this analytical lifecycle will keep these products of the BEA at a point where they remain relevant and valuable to systems developers.

14.2.1. Detailed Method for Developing and Maintaining the TV-1

Development of the TV-1 starts with collecting information relevant to the standards contained in the BEA and ensuring the most up-to-date DISR release is being used. Enterprise Sub-Services are then developed that may be used by the specific enterprise systems listed in the Operational Activity to Systems Functionality Traceability Matrix (SV-5). Each of these identified Enterprise Sub-Services link to the specific Technical Services that will implement the Enterprise Sub-Service. Individual IT Standards that are required to implement each identified Technical Service are from the DISR and associated with the Technical Service. Identified Enterprise Sub-Services and Technical Services that do not have Standards associated with them are not included in the final TV-1. The TV-1 identifies the source documents used for each Standard it identifies. The TV-1 also includes any relevant IA Standards listed in the latest DISR baseline.

Throughout the development of the BEA TV products, analysts and engineers make a number of decisions that affect the content of each new product release. These decisions occur periodically during the TV development process, a process comprised of five high order procedures. The Engineering Decisions made during these procedures, and their impact upon the BEA Technical Standards View products, is as follows:

14.2.1.1. Pre-Development Tasks

1. **Collect Information through Subject Matter Expert interviews.**

    - Conduct periodic interviews with industry and DoD technology authorities.
      This decision is derived from the project plan; however, specific implementation is subject to the team consensus regarding areas of technology that should be addressed first. Therefore, areas such as security or web services may hold an apparently arbitrary advantage over technologies such as Extensible Markup Language (XML) based upon the Engineering Decision of the TV analyst.

    - Participate in DISR Information Technology Standards Working Groups (ISWGs).
      This provides a forum for discussing the Standards with representatives from various DoD organizations who have the proper technical, functional and acquisition expertise from their organizations. The ISWGs are responsible for making recommendations for updating the DISR. The technology areas provide the primary body for identifying the lifecycle stage of each Standard and profile contained in the DISR. The ISWGs are responsible for making recommendations for updating the DISR.

2. **Coordinate internal TV-1 Development Cycle with DISR release schedule.**

    - The TV-1 must be developed using the latest DISR update, which happens three times a year. This insures that all standards within the BEA are accurate and up-to-date.

14.2.1.2. Development Tasks

1. **Identify and Define Technical Services and Standards Data**

    - The widest possible array of authoritative sources is consulted for guidance and cross reference of Standards, either mandated or emerging, within DoD and its services. Ongoing business and technical analysis of mandated Standards in the DISR determines relevance to the BEA TV-1. Standards that do not directly apply to business systems (such as Standards for routing protocols, backplane buses and weapons systems) in the business domains are outside the scope of the BEA TV-1.

    - The Scope of BEA does not extend to the wide area network.
      BEA-based systems are implemented largely on existing communications infrastructure, or in places where Standards for such infrastructures already exist. It is outside of the realm of responsibility for

BEA to mandate the wide area communications Standards deployed at a given facility. This decision allows the TV analysts to scope the area to which BEA Standards apply. Telecommunications devices such as routers and switches are considered part of the site infrastructure and therefore beyond the limits of the BEA.

2. Organize Information into a Local Data Repository

- Use System Architect v10 (and updates) as the Data Repository and schema for standards-related data to facilitate the integration of data between Operational View (OV), SV and TV products.

- Use Microsoft Excel as the working repository of Technical Services-related data.
  The use of Excel decreases the requirement for additional operator training on the System Architect product. It increases the flexibility with which multiple analysts can interact with the data repository. Excel increases the ease with which draft versions of the repository are shared with other members of the BEA development team. It also alleviates the limitations placed upon users who need access to work with the data repository (licenses, learning curve and level of effort). Excel increases the team's ability to perform analytical reviews of the data repository using Excel's data analysis capabilities.

5. Conduct Data Analysis to Target BEA Requirements

- Tailor the collection of Technical Services to meet BEA requirements.
  The repository of Technical Services changes as needed by Engineering Decision to eliminate Technical Services that are outside the area of direct interest to BEA and include new Technical Services when appropriate. For example, to better align with the newly emerging DISR Standards organization schema, the Application, Collaboration, Discovery, Enterprise Service Management (ESM), Information Assurance and Security (IAS), Infrastructure Transport, Mediation, Messaging, Storage, and User Assistance, Logistics and Human Resources enterprise services may be treated as BEA Technical Services.

6. Produce the TV-1

- Load the System Architect Data Repository immediately prior to product delivery.
  The latest available version of data available through Systems Architect is the version last delivered as a finished product.

- Customize the System Architect Technical Standards View reports, and generate the TV-1 and associated reports.
  The predefined Technical Standards View reports were found to be inadequate to the needs of the BEA. Customized reports are created to show the TV-1 and the linkage to the System View products.

14.3. TV-1 Modeling Problems to Avoid

This section discusses lessons learned from previous TV-1 architecture development efforts and includes common modeling pitfalls and mistakes to avoid while modeling TV-1 architecture products.

14.3.1. TV-1 Modeling Lessons Learned

- The SV-1, SV-5 and SV-6 products must be stabilized.
- Technical Standards must be grouped into meaningful Technical Services to ensure that only the appropriate Standards are mapped to enterprise systems.

14.3.2. TV-1 Modeling Pitfalls

- Excluding acronyms in the AV-2.

- Grouping too many Standards into too few Technical Services.

Appendix A: References

1) *Introduction to BPMN*, Stephen A. White, IBM Corporation (date of publication not known).
2) *Business Process Modeling Notation (BPMN)*, Version 1.0, Stephen A. White, Business Process Management Initiative (BPMI), May 3, 2004.
3) *BRS RuleSpeak™, Version 1.0,* Ronald G. Ross and Gladys S.W. Lam
4) *Principles of the Business Rule Approach*, Ronald G. Ross
5) *Business Rule Concepts: Getting to the Point of Knowledge,* Ronald G. Ross
6) *BEA Development Methodology, March 10, 2008*
7) *Business Transformation Guidance. Version 1.1, July 06, 2007*
8) *DoD Architecture Framework (DoDAF, Version 1.5, April 23, 2007*
9) *Integrated Definition for Function Modeling* (IDEF0)
10) *Integrated Definition for Data Modeling* (IDEF1X)

Appendix B : Product Checklists

B-1: AV-1 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

			Reviewer Name:		
#	**Source**	**BART Report**	**Inspection Item Description**	**Modeler**	**Reviewer**
1		Manual	BEP Names and Descriptions should be same in Enterprise Transition Plan (ETP). BEP AV-1 is authoritative source for BEP Names, Description Goals and Objective.		
2		Manual	Lead and support Core Business Missions (CBM) should be correctly identified and in accordance with the ETP.		
3		Manual	Listing of "Products Developed" should be accurate and complete.		
4		Manual	All spelling is correct and there are no grammatical errors.		

B-2: OV-2 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-2.1: OV-2 Diagrams Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual	Verified intended content changes with Subject Matter Expert		
2	9.2 9.3.1.2	Manual check	There is at least one OV-2 diagram for each internal Operational Node, which are CBMs.		
3	9.3.1.2	Manual Check	The OV-2 diagram does not have a border.		
4	9.3.1.2	Genrl-001	The OV-2 diagram has a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
5	9.3.1.1	Manual Check	Operational Nodes are depicted as light green ovals with black borders and black lettering (the SA default), with no truncation indicators.		
6	9.3.1.1	Manual Check	Operational Node names are in Arial 14, Normal and Black font.		
7	9.1.2	Manual Check	The Operational Node for the CBM represented by the diagram shall be shown at the center of the diagram. Only Operational Nodes that interface with the center Operational Node shall be shown on each diagram.		
8	9.1.2	Manual Check	Operational Activities are only displayed for the center Operational Node on the diagram.		
9	9.3.2.1	OV02-004	All existing Need Lines are used on at least one OV-2 Diagram.		
10	9.3.1.1	Manual Check	Need Lines are solid straight lines, containing 90-degree angles (where appropriate) to achieve readability.		
11	9.3.2.2	Manual Check	Need Lines use the default SA pen width and black font.		
12	9.3.2.2	Manual Check	Individual IEs are not displayed under the Need Lines on the OV-2 Diagram.		
13	9.3.2.2	Manual Check	Need Line arrows do not intersect if at all possible.		
14	9.3.2.2	Manual Check	Need Line can exist on only two OV-2 diagrams unless is linked to an external Operational Node or if a sub-node exists.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
15	9.3.1.2	Genrl-002	The OV-2 Diagrams have a narrative description of the diagram, using the diagram properties comment box to explain the Operational Nodes and their relationships.		
16	9.3.2.1	OV02-001	All Operational Nodes must be referenced by at least one Need Line		

B-2.2:OV-2 Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	9.3.1.3	OV02-007	Only the following valid Operational Node names are used: Acronyms for the CBMs plus three additional Nodes: Multi CBM, Enterprise and External.		
2	9.3.1.1	AV02-015 AV02-006	Operational Nodes shall be defined in accordance with the related CBM.		
3	9.3.2.1	OV02-007	Each Operational Node is identified by Type ("Abstract" or "Physical").		
4	9.3.1.3	OV02-007	Need Line names are in the following format: Sending CBM – Receiving CBM (for example "HRM – FM").		

B-2.3: OV-2 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	9.3.2.1	OV02-002	Each Operational Node is mapped to one or more leaf-level Operational Activities.		
2	9.3.2.1	OV05-019	Each leaf-level Activity is assigned to at least one Operational Node.		
3	9.3.2.2	OV02-003	A Need Line includes one or more IEs.		
4	9.3.2.2	Manual Check	A single Need Line is used to represent the interactions of all IEs that have a common source and destination between a pair of Operational Nodes.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
5	9.3.2.1	OV02-005 OV02-006	Each Operational Node has only one CBM Stakeholder assigned, and one or more BEP Stakeholders assigned.		

B-3: OV-3 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-3.1: OV-3 Matrix Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	10.3.1	Manual Check	All fields in each column are filled in.		
2	10.3.1	Manual Check	The "Information Exchange Description" column contains the IE definition.		
3	10.3.1	OV03-003	IE names must be in title case, use only approved acronyms and can use only the special character "-".		

B-3.2: OV-3 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	10.1.2	OV03-001	Each IE is mapped to one or more Entities or Attributes in the Logical Data Model (OV-7).		
2	10.2.1	OV03-002	Each IE is mapped to an ICOM Arrow.		

B-4: OV-5 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-4.1: OV-5 Diagrams Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
			OV-5 Node Tree		
1	5.1.2.1 5.3.1.2	Manual Check OV05-017	The OV-5 Node Tree Activity names match the Activity Diagram.		
2	5.3.1.2	Manual Check	The Activity boxes are numbered sequentially, relative to position and match corresponding activity numbering on the Activity Diagram.		
3	5.3.1.2	Manual Check	The top-level box of the Node Tree is centered on the diagram as permitted by the tool.		
4	5.1.4.1	Manual Check	Parent Activities are decomposed to at least two, but not more than nine, child Activities.		
5	5.3.1.1	Manual Check	The Operational Activity Node Tree follows modeling conventions: Names are Normal and Black font. The Operational Activity box border shall be a solid black line. The integrated Operational Activities shall be white. The stand alone Operational Activities that appear on the Node Tree only shall be green.		
6	5.2.3.1	Manual Check	Activities on the Node Tree should be decomposed to a level low enough to support the Business Capability.		
7	5.3.1.3	Manual Check	Each Operational Activity is named as a Verb-Noun, using an active verb phrase (for example, Allocate Resource).		
			OV-5 Activity Diagrams		
8	5.2.3.2	Manual Check	The A-0 Activity Diagram (Context Diagram) has a purpose and a viewpoint in the lower left corner of the diagram.		
			Operational Activities		
9	5.3.1.1 5.3.2	Manual Check	Activity names follow modeling conventions: The font must be normal and Black. The Activity name begins with a RETURN character. Activity name falls within the Activity box border with no truncation indicators The Activity Box has a solid black line border. All activities should be colored Yellow.		
10	5.3.1.2 5.3.2	Manual Check	Activity boxes are numbered sequentially in the lower right corner. The number inside the Activity box shall match the last digit of the Activity number sitting outside the box beginning		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
			with an "A." Activity boxes are stair-stepped vertically and numbered in descending order appropriately.		
11	5.2.3.2	OV05-014	Each Operational Activity has at least one (1) Input or Control and one (1) Output.		
12	5.2.3.2	Manual Check	Each Activity shall have one or more Mechanism(s).		
13	5.3.1.2	OV05-22	Diagram name (Operational Activity box label) shall use title case (first letter of each word capitalized, other letters lowercase), should be non-plural (exception approved by BTA) and can use only the special character "-". Any acronyms used in the Operational Activity name must be from the approved acronym list that is part of the BEA AV-2.		
			ICOMs		
14	5.2.3.2	Manual Check	ICOMs follow modeling conventions: Naming conventions for External Controls are "{Activity Name} Law Policy Reg" Initiatives are Internal Controls and are represented as Controls Mechanism are CBMs or Multi-CBM and/or Systems Controls and Mechanisms are stair-stepped in a descending manner from left to right in relation to the positioning of the activity.		
15	5.4.2	OV05-004 OV05-018	All ICOMs are physically connected to a given Activity.		
16	5.4.2	Manual Check	ICOM Arrows have minimal crossings in respect to other ICOM Arrows on any given diagram.		
17	5.3.2	AV02-019 OV05-003 OV05-005	Input ICOMs cannot be represented as Outputs for the same activity. Output ICOMs cannot be represented as Inputs for the same activity.		
18		Manual Check	ICOMs are evenly spaced relative to the edge of an Activity box.		
19	5.3.2	Manual Check	Boundary Input ICOMs come into the diagram even with the first Activity it is attached to, Input ICOM names are left justified, Boundary Output ICOMs exit the diagram at even with the highest Activity it exits from, and names are right justified.		
20	5.3.2	Manual Check	Controls and Mechanisms are vertically aligned as per guidelines.		
21	5.3.2	Manual Check, SA Function Query Analyzer	ICOMs are balanced: Input/Output ICOMs on a parent activity are consistent with Inputs/Outputs on its child diagram and vice versa		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
			General		
22	5.3.1.1	Manual Check	The Node Tree diagram and Activity diagrams do not have a border.		
23	5.3.1.1	Genrl-001	The Node Tree diagram and Activity diagrams have a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
24	5.3.1.2	Genrl-002	The Node Tree diagram and Activity diagrams have a narrative description of the diagram, using the diagram properties comment box to explain the Activities and their relationships.		

B-4.2:OV-5 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	5.3.1.3	AV02-018	Object names are unique and in the proper tense.		
2	5.3.1.3	AV02-012 AV02-009 AV02-008	Object names are in title case.		
3	5.3.2	AV02-005 AV02-015 AV02-006 AV02-002 AV02-014 Spell Check	Each Operational Activity and ICOM has a unique grammatically correct definition.		
4	5.3.1.2	AV02-001 AV02-002 AV02-004 AV02-014 AV02-015 AV02-020	The Activity definition identifies what the Activity does, suitable to the level of decomposition and how information is transformed, created or consumed in the Activity.		
5	5.3.2	AV02-001 AV02-002 AV02-004 AV02-014 AV02-015 AV02-020	Each ICOM definition is consistent with the definition of the Activity that produces or consumes it and is consistently decomposed with the Activity.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
		Manual Check			
6	5.3.2	GENRL-003 GENRL-004	Each Activity and ICOM has one or more BEP and CBM Stakeholders assigned.		

B-4.3: OV-5 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	5.1.3.2 5.2.3.3	OV06c-005	Each Leaf-Level Activity is mapped to one or more Leaf-Level Processes.		
2	5.2.3.1 5.2.3.3	OV05-015	Each leaf-level Activity is mapped to the FEA BRM Sub-functions.		
3	5.2.3.2 5.3.2	OV05-002 OV05-020 OV05-024	Each leaf-level Activity Input and Output ICOM has a corresponding IE, with the same name, definition and linked to the same BEPs and CBMs unless there are multiple IEs. Controls and Mechanisms are not mapped to Information Exchanges.		
4	5.1.3.2 5.3.1.2 5.3.1.3	AV02-008 AV02-011 AV02-013 OV05-008	Object names use only approved abbreviations and acronyms contained in the AV-2 and are free of symbol characters, (for example, /, $, @, &).		

B-5: OV-6a Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-5.1: OV-6a Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	6.3.2	Manual	Rule can be readily understood by any business or DoD party and is always interpreted the same.		
2	6.3.2	Manual	Rule is atomic.		
3	6.3.2	Manual	Rule is unambiguous.		
4	6.3.2	Manual	Rule is in declarative form – no reference to how, where, when, or who.		
5	6.3.2	Manual	No indication of how rule to be enforced (how).		
6	6.3.2	Manual	No indication of where to enforce the rule (where).		
7	6.3.2	Manual	No indication of when to enforce the rule (when).		
8	6.3.2	Manual	No indication of Events or Event sequence (when).		
9	6.3.2	Manual	No indication of who will enforce the rule (who).		
10	6.3.2	Manual	Rule is not procedural (use of "else" and "if").		
11	6.3.2	Manual	Rule constrains (or alternatively permits).		
12	6.3.2	OV06a-009	Rule contains one of the key rule words such as "is," "may," "must," "no," "not," "shall," "should," "will," or "only if."		
13	6.3.2	Manual	Words such as "can" are not used.		
14	6.3.2	Manual	Rule uses standard terminology such as the common language from the data model.		
15	6.3.2	Manual	Facts are explicitly expressed in the rule (no hidden facts or computations).		
16	6.3.2	Manual	Rule is written in *RuleSpeak* formal language.		
17	6.3.2	Manual	The rule does not have a plural subject.		
18	6.3.2	Manual	Plural objects in the sentence avoided.		
19	6.3.2	Manual	A time element is not the subject.		
20	6.3.2	Manual	Rule has explicit subject.		
21	6.3.2	Manual	Computations are the subject of the rule.		

B-5.2: OV-6a Integration Checklist

			Reviewer Name:		
#	**Source** APG	BART Report	**Checklist Item Description**	Modeler	Reviewer
1	6.2.2.3	N/A	All required fields filled in properly from load.		
2	6.1.4, 6.3.1.1	OV06a-006	All action assertion and derivation Business Rules are linked to the appropriate Process Step or Gateway.		
3	6.1.4, 6.3.1.1	OV06a-005	All derivation Business Rules linked by a Data Object, BPM Process, or Gateway.		
4	6.1.4, 6.3.1.1	OV06a-007	All structural assertion Business Rules linked to a Data Element.		
5	6.3.1.1	OV06a-013	All Business Rules with a source type of "compliance requirement" must have at least one requirement source listed.		
6	6.3.1.1	OV06a-012	All Business Rules must have one Business Rule category: action assertion, structural assertion, or derivation.		
7	6.3.1.1	OV06a-011	All Business Rules must have one valid source type: compliance requirement, derived requirement, or process.		
8	6.3.1.2	OV06a-015	All Business Rules must have unique rule number associated with it.		
9	6.2.2.1	OV06a-016	All Business Rules must have one valid Business Rule level: automated, operational and conceptual.		

B-6: OV-6c Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-6.1: OV-6c Diagrams Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual Check	Verified intended content changes with BEP Subject Matter Expert		
2	8.3.1	Manual Check	All Diagrams have at least 2 Events and 2 Processes.		
3	8.2.3	Genrl-001	All OV-6c Diagrams have a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
4	8.3.1.2	Manual Check	Diagrams are named in accordance with APG OV-6c guidelines.		
5	8.3.1.2	Manual Check	The Pool structure is in accordance with the APG OV-6c guidelines.		
6	8.3.1.3	AV02-011	OV-6c objects must comply with naming conventions and not use special characters except for Question Marks at the end of Gateway names.		
7	8.2.3	OV06c-004	Data Objects are either associated with a Process Step (as an Input and/or Output) or linked to a Sequence Flow or Message Flow or Event and are in accordance with APG OV-6c guidelines.		
8	8.2.3	OV06c-006 OV06c-007	Message Flows are used between Pools and Sequence Flows are used within Pools and are in accordance with APG OV-6c guidelines.		
9	8.3.1.2	General-002	The OV-6c Diagram has a narrative description of the diagram, using the diagram properties comment box to explain the Activities and their relationships.		

B-6.2: OV-6c Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	8.3.1.3	Genrl-008 AV02-005 AV02-008 AV02-020	All Pools, Swimlanes, Process Steps, Data Objects, Gateways, Events and groups are named and defined and are in accordance with APG OV-6c guidelines. Names and definitions are optional for Sequence Flows and Message Flows		
2	8.3.1	AV02-013 (in AV02-008)	Only approved acronyms have been used.		
3	8.2.3	OV06c-001	Events do not reference themselves.		

B-6.3: OV-6c Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	8.1.4	Manual Check	Relationships to other products have been considered (for example, OV-5, OV-6a and OV-7).		
2	8.1.4	OV06c-005	Each leaf-level Process has been mapped to one or more leaf-level Activities in the OV-5.		
3	8.1.4	OV6a-005 OV6a-006	OV-6a non-SFIS Business Rules have been mapped to OV-6c Process Steps, Gateways, or Conditional Sequence Flows		
4	8.1.4	New BART	All Data Objects must be mapped to one and only one Information Exchange.		
5	8.2.3	Genrl-003 Genrl-004	Each Process, Data Object, Event, or Gateway has one or more BEP and CBM Stakeholders assigned.		
6	8.2.5	AV02-004	All OV-6c objects that do not appear on any diagram must be removed.		

B-7: OV-7 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead
_____

B-7.1: OV-7 Diagrams Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	7.2.1 7.2.2.1 7.2.2.3	Manual	Verified intended content changes with BEP Subject Matter Expert		
2	7.3.1.2	Manual	All diagrams are prefixed with the BEP Name or approved BEP acronym.		
3	7.3.1 7.3.1.2	Manual	All diagram titles match the diagram name.		
4	7.3.1.1 7.3.1.2	Manual	Each Diagram has a Doc Block describing the diagrams contents in sufficient detail as to aide the viewer in understanding the diagram.		
5	7.1.3 7.3.1.2	Manual	Diagram definitions must describe the intended use of the particular view and level of maturity information may be placed in the Notes area.		
6	7.3.2.1.1 7.3.2.1.2	OV07-006, OV07-018	All Entity names follow OV-7 section of the APG.		
7	7.3.2.2 7.3.2.2.1 7.3.2.2.2	OV07-001 OV07-002 OV07-004 OV07-011 OV07-016	All Attribute names follow OV-7 section of the APG.		
8	7.3.2.3 7.3.2.3.1 7.3.2.3.2	OV07-012 OV07-014	All Data Element names follow OV-7 section of the APG. (Never use a single Data Element to represent more than one Data Domain.)		
9	7.3.3.1.1 7.3.3.1.2	Manual	All Relationships between Entities follow OV-7 section of the APG		
10	7.3.2.1.4	Manual	Each Entity has a Primary Key.		
11	7.3.2.1.4	Manual	Each Primary Key uses the natural key when one is available.		
12	7.2 7.3 7.4	Manual	All diagramming techniques follow the OV-7 section of the APG.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
13	7.3.3.2.1	OV07-007	All Subtypes have the same primary key as the super-type (Role-based names are allowed).		
14	7.3.3.2.1	Manual	All subtypes have one or more Attributes and/or one or more Relationships to differentiate them form the supertype and the other subtypes.		
15	7.3.2.1.1 7.3.2.2	OV07-009	All Child Entities have one or more non-key Attributes and/or one or more Relationships that differentiate them from their parent Entity.		
16	7.3.2.1.1	OV07-009	Each Entity must contain at least one Attribute.		
17	7.2.2.3	Manual	Ensure that BEP and CBM Stakeholders agree with their representation on diagrams.		
18	7.2.2.3	Manual	Remove invalid and duplicate access paths that cause the display of AK1 designations in the primary key portion of Entities.		
19	7.2.2.3	Manual	Ensure that all Relationship lines on all OV-7 Diagrams display properly and are not hidden.		
20	7.2.2.3	Manual	Ensure that the associated tags of all Relationship lines are positioned properly on the diagram.		
21	7.2.2.3	Manual	Ensure that, at 21% zoom, all Attribute names are displayed on a single line within the Entity.		
22	7.2.2.3	Manual	Ensure that all Relationship lines are straight, not broken, and that all Relationship lines avoid crossing others whenever possible.		
23	7.3.1.2	Manual	Ensure that all diagram descriptions, diagram doc blocks, diagram notes, diagram names, object names and object descriptions are spell checked.		
24	7.3.1.1	Manual	Ensure that all Entities are colored properly.		
25	7.3	Manual	Ensure that all OV-7 printable diagrams display correctly.		

B-7.2: OV-7 Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	7.1.4 7.2.2.3	AV02-002	All objects are defined (Diagrams, Entities, Attributes and Data Elements).		
2	7.3.2.1.2	AV02-002	All Entity definitions follow OV-7 section of the APG.		
3	7.3.2.2.3	OV07-008	All Attribute definitions follow OV-7 section of the		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
		AV02-002	APG.		
4	7.3.2.3.2	AV02-002	All Data Element definitions follow OV-7 section of the APG.		
5	7.3.3.2.2	OV07-010	Logical View IDEF1X Categorizations have a Name or Discriminator		
6	7.1.4 7.2.2.3	Manual	Ensure that words on the "Terms" list are represented correctly and consistently in all object names and descriptions. Ensure that the Terms are not redefined within definitions.		
7	7.2.2.3	Manual	Ensure that all table names exactly match their corresponding Entity names with "_" separating the terms instead of "-".		
8	7.2.2.3	Manual	Ensure that all the primary index and access path names exactly match the Table Name with the addition of the "_PK" suffix. This will remove the existing "-" and replace them with "_" as used in the Table Names.		
9	7.2.2.3	Manual	Ensure that the IDEF1X categorization names match the discriminator Attribute names with the removal of their class word and the replacement of the "_" between terms with spaces.		
10	7.2.2.3	Manual	Ensure that all column names exactly match their corresponding Attribute names.		
11	7.2.2.3	AV02-004 OV07-015	Remove OV-7 objects from the encyclopedia which are not on or referenced from any OV-7 Diagram		

B-7.3: OV-7 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	7.2.2.3 7.2.2.4 7.1.4	Manual	By-product changes resulting from the CR solution have been identified (Items 2 thru 7 below).		
2	7.2	OV05-008 OV03-001	Each OV-3 IE within the scope of a BEP is related to one or more OV-7 Entities or Attributes within Entities.		
3	7.2.2.2	OV07-013	All OV-7 Entities provided by the BEP are accounted for in the BEP's IEs in their OV-3.		
4	7.2.1	OV07-005	All Data Synonyms in the OV-3 IEs link to one or more OV-7 Attributes attached to the same IE.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
5	7.3.2.6 7.2 7.2.2.2	Manual	All BEP provided Data Synonyms are linked to one or more Attributes with Derivation Business Rule(s) created to resolve any derived data.		
6	7.3.2.3	OV07-005	All BEP provided Data Elements are linked to one or more Attributes within one or more Entities within the BEP's OV-7.		
7	7.2.2.1	Manual	Any Data Elements required by the BEP for system certification are identified.		

B-8: SV-1 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-8.1: SV-1 Diagrams Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual	Verified intended content changes with Subject Matter Expert		
2	9.3.1	Manual	There is a SV-1 for each CBM that has identified Enterprise Systems for the BEA.		
3	9.3.1	Manual	Each SV-1 diagram has a Diagram Description.		
4	9.3.1	Manual	Each SV-1 diagram has a Doc Block representing header information for the diagram (including the diagram name and date last updated) that is placed at the top left of every diagram.		
5	9.3.1	Manual	Doc Block has been enlarged so there are no truncation indicators (dots) indicating text is not visible.		
6	9.3.1	Manual	The Doc Block has a box with no fill and a black border.		
7	9.3.1	Manual	The SV-1 diagram name is the name of the focus CBM, light green, on the diagram.		
8	9.3.1	Manual	The SV-1 decomposition diagram name is the CBM and Enterprise System name.		
9	9.3.2	Manual	All System Node labels are Arial 14, Bold and Black font.		
10	9.3.2	Manual	All System Node labels are top center of the System Node border and the label does not fall outside the boundary of the ellipse.		
11	9.3.2	Manual	Internal System Nodes are elliptical with a light blue fill and black border.		
12	9.3.2	Manual	The central System Node on each diagram is elliptical with a light green fill and a black border.		
13	9.3.2	Manual	The external System Nodes is elliptical with a light gray fill and a black border.		
14	9.3.3	Manual	All System Entity labels are Arial 10, Bold and Black font.		
15	9.3.3	Manual	All System Entity labels are at top center of the System Entity box and the label should not fall outside the box boundary.		
16	9.3.3	Manual	Enterprise-level System Entities are yellow boxes with a black border.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
17	9.3.3	Manual	Generic System Entities are light yellow boxes with a black border.		
18	9.3.3	Manual	Each System Node shall contain a generic System Entity.		
19	9.3.3	Manual	Non-DoD System Entities are white boxes with a black border.		
20	9.3.3	Manual	All System Entities are contained within their associated System Node elliptical boundary.		
21	9.3.3	SV01-004 SV01-003	Each internal System Entity lists related System Functions.		
22	9.3.4	Manual	The naming convention for System Interfaces is "sending System Entity abbreviation"- "receiving System Entity abbreviation."		
23	9.3.4	Manual	System Interface labels are placed, where possible, above the horizontal line where most visible and close to the arrowhead.		
24	9.3.4	Manual	System Interface lines should not traverse intermediate System Entities.		
25	9.3.4	Manual	To the maximum extent possible, System Interface lines should not cross intermediate System Nodes.		
26	9.3.4	Manual	System Interface arrows are black with black filled arrowheads.		
27	9.3.4	Manual	System Interfaces connect to a System Entity at both ends.		
28	9.3.4	Manual	System Interfaces are solid, straight, lines with 90-degree curves, when necessary.		

B-8.2: SV-1 Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	9.3.1	Manual	Each SV-1 has a diagram description that explains what it represents and a brief description of the Enterprise Systems.		
2	9.3.2	Manual	Each System Node has a definition consistent with that of the related Operational Node.		
3	9.3.3	Manual	Each System Entity has a description of what the Enterprise System does.		
4	9.3.4	Manual	Each SDE has a description of the data it represents.		

B-8.3: SV-1 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	9.2, 3.2	SV01-002	Operational Nodes (Physical Nodes) are assigned to the System Node from the OV-2.		
2	9.3.3	SV01-004 SV01-003	Each BEA Enterprise System must have at least one System Function assigned.		
3	9.3.3	Manual	System Entities have both BEP and CBM Stakeholders assigned.		
4	9.3.3	Manual	System Entities must have a Parent system assigned.		
5	9.2, 3.2	Manual	System Interfaces between System Entities reflect Need Lines from the OV-2.		
6	9.3.4	SV01-001	Each System Interface must link to at least one SDE		
7	9.3.4	SV01-005	Each SDE must link to at least one IE from the OV-3.		
8	9.3.4	Manual	System Interfaces between Generic System Entities reflects Need Lines from the OV-2 and IEs from the OV-3 not reported by the BEPs or DoD Program Managers for the current release of the BEA.		

B-9: SV-5 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-9.1: SV-5 Matrix Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual	There is one SV-5 matrix that represents all CBMs.		
2		Manual	The SV-5 consists of Business Capabilities, Operational Activities, and System Functions and Enterprise-level Systems.		
3		SV04-009	All systems functions must be referenced by at least one Operational Activity.		

B-9.2: SV-5 Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual	Each Business Capability shall have a definition.		
2		Manual	Each System Function should describe the automation of the OV-5 leaf-level Operational Activity it supports.		

B-9.3: SV-5 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1		Manual	The SV-5 matrix only contains relationships between leaf-level Operational Activities, Business Capabilities, Enterprise-level systems and System Functions.		
2		Manual	Each System Function should map to at least one leaf-level Operational Activity with an Enterprise System/Enterprise Entity Name or by an "X".		
3		Manual	Each System Function must have at least one BEP Stakeholder.		
4		Manual	Each System Function must have at least one CBM Stakeholder.		

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
5		Manual	The SV-5 must be consistent with the ETP		
6		Manual	System Functions shall be used to develop Enterprise Sub-Services		

B-10:SV-6 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-10.1: SV-6 Matrix Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	14.3	Manual	There is a System Interface abbreviation from the SV-1 diagram in the first column of the SV-6 matrix.		
2	14.3	Manual	Corresponding SDEs for each System Interface appear in the second column.		
3	14.3	Manual	System Interface Sending System Entity and System Function from the SV-1 diagram appear.		
4	14.3	Manual	The Sending System Node from the SV-1 appears.		
5	14.3	Manual	System Interface Receiving System Entity and System Function from the SV-1 appear.		
6	14.3	Manual	The Receiving System Node from the SV-1 appears.		
7	14.3	Manual	The Data Entity for the SDE appears.		

B-10.2: SV-6 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	14.3	Manual	The SV-6 only shows System Interfaces between System Nodes.		
2	14.3	Manual	Each SDE has a corresponding OV-7 Data Entity		

B-11: TV-1 Product Checklist

CR#: _____ Date: _____ Approval Signatures:
Contractor Product Lead _____ Government Product Lead _____

B-11.1: TV-1 Definitions Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	16.3	Manual	The Standards are mandated in the DoD Information Technology Standards Registry.		
2	16.1	Manual	Brief descriptions for the Information Technology Standards are provided.		
3	16.3	Manual	References to the Standard administration/publishing organization are provided.		
4	16.3	Manual	DISR reference to where the Standards details can be obtained is provided.		

B-11.2: TV-1 Integration Checklist

			Reviewer Name:		
#	**Source APG**	**BART Report**	**Checklist Item Description**	**Modeler**	**Reviewer**
1	16.3	Manual	Each Technical Service shall map to a Technology Service Area, which represents a Core Service Area of the DoD EA TRM.		
2	16.3	Manual	Each Standard shall link to the Technical Service it supports.		
3	16.3	Manual	Each Technical Service shall link to Enterprise Sub-Services that it supports.		

Appendix C: Glossary

Table C-1, Glossary, contains a list of terms and associated descriptions used in this document.

Table C-1, Glossary

Term	Description
A-0 Diagram	The special case of a one-box IDEF0 A-0, containing the top-level function being modeled and its Inputs, Controls, Outputs, and Mechanisms, along with statements of model purpose and viewpoint.
A0 Diagram	An IDEF0 diagram contains the first tier sub-activities under the A-0 diagram, their ICOM relationships, their Inputs, Controls, Outputs, and Mechanisms, along with a diagram description.
Abstract Processes	See Public Processes. [OV-6c]
Acronym	The initials of a standard phrase used in the BEA or ETP.
Activity Box	Represented by an enclosed rectangular box within which an operational function is performed in conducting the business of the enterprise.
Activity [OV-6c]	Business Process Modeling Notation uses the term "Activity" to mean work that can be performed within a Business Process. An activity can be atomic or non-atomic (compound). The types of activities that are a part of an OV-6c Business Process Diagram are Process Step, Sub-Process and Task. OV-6c uses the term "Process Step" to avoid confusion with the term "Activity" used in OV-5 to mean "Operational Activity."
Action Assertion Business Rule	These rules concern some dynamic aspects of the business and specify constraints on the results that actions produce. There are three types of action assertions: − Condition: This is a guard or the "if" portion of an "if-then" statement. If the condition is true, it may signal the need to enforce or test additional action assertions. − Integrity Constraint: These must always be true (for example, a declarative statement). − Authorization: This restricts certain actions to certain human roles or users.
AND-Split	See "Fork (AND-Split)". [OV-6c]
AND-Join	See "Join (AND-Join)". [OV-6c]
Arrow	A directed line, composed of one or more arrow segments, that models an open channel or conduit conveying data or objects from source (no arrowhead) to use (with arrowhead). There are four arrow classes: Input Arrow, Output Arrow, Control Arrow and Mechanism Arrow (includes Call Arrow).
Arrow Label	A noun or noun phrase associated with an IDEF0 arrow or arrow segment, specifying its meaning.
Arrow Segment	A line segment that originates or terminates at a box side, a branch (fork or join), or a boundary (unconnected end).
Attribute	An Attribute is a property or characteristic that is common to some or all of the instances of an Entity. Attributes that identify Entities are key Attributes. Attributes that describe an Entity are non-key Attributes. Attributes are associated to one and only one Entity and represent the normalized view of Data Elements within OV-7 Entities.
Artifact	A graphical object that shows additional information about a process that is not directly related to the Sequence Flow or Message Flow. There are three artifacts: Data Objects,

Term	Description
	Groups and Annotations. [OV-6c]
Association	An Association is used to link information with Flow Objects. An Association may or may not have direction. [OV-6c]
Availability	Timely, reliable access to data and information services for authorized users.
Boundary Arrow	An arrow with one end (source or use) not connected to any box on a diagram. Contrast with Internal Arrow.
Boundary Arrow Box	A rectangle, containing a name and number, used to represent a function.
Box Name	The verb or verb phrase placed inside an IDEF0 box to describe the modeled function.
Box Number	The number (0 to 9) placed inside the lower right corner of an IDEF0 box to uniquely identify the box on a diagram.
BPM Event	See "Event".
BPM Process	See "Process".
Branch	A junction (fork or join) of two or more arrow segments.
Branching Point	Branching points are Gateways within a Business Process where the flow of control can take one or more alternative paths. Synonymous with *Decision*. [OV-6c]
Bundling/Unbundling	The combining of arrow meanings into a composite meaning (bundling), or the separation of arrow meanings (unbundling), expressed by arrow join and fork syntax.
Business Capability	This is the ability to execute a specific course of action. It can be a single business enabler or a combination of business enablers (e.g., business processes, policies, people, tools and systems information) that assist an organization in delivering value to its customer.
Business Enterprise Priorities (BEP) Stakeholder	A Business Enterprise Priority (BEP) is an area where transformed business operations will provide improved warfighter support, reduced costs and better regulatory compliance. A BEP is formulated based on requirements identified by the warfighter, the Components and BTA. Initial priorities in the BEA are: 1) Acquisition Visibility 2) Common Supplier Engagement 3) Financial Visibility 4) Materiel Visibility 5) Personnel Visibility 6) Real Property Accountability.
Business Process	A Business Process is a set of activities that are performed within an organization or across organizations. A Business Process, as shown in a Business Process Diagram, may contain more than one separate process. [OV-6c]
Business Rule	Listed in the OV-6a, a Business Rule is a "constraint on an enterprise, a mission, operation, business, or architecture". A Business Rule describes what the business must or cannot do. A Business Rule is "an atomic piece of business logic, specified declaratively, whose intent is to control, guide, or enhance behavior."
Call Arrow	A type of Mechanism Arrow that enables the sharing of detail between models (linking them together) or within a model.
Categorization Relationship	A relationship in which instances of both Entities represent the same real or abstract thing. One Entity, Supertype, represents the complete set of things the other Subtype represents a sub-type or sub-classification of those things. The Subtype may have one or more characteristics or a Relationship with instances of another Entity not shared by all Supertype instances. Each instance of the Subtype is simultaneously an instance of

Term	Description
	the Supertype.
Child Box	A box on a Child diagram.
Child Diagram	The diagram that details a Parent box.
Class Word	A Class Word is a word selected from a specified list that is used in an Attribute name to establish the general structure and domain of that Attribute.
Collaborative Process	A collaboration process depicts the interactions between two or more business Entities. This is shown as two or more processes communicating with each other. In OV-6c, collaborative processes also include processes from the same Business Entity, but commonly assigned to a different higher-level process. [OV-6c]
Collapsed Sub-Process	A collapsed Sub-Process is a graphical representation of a Process Step in which the details of the Sub-Process are not visible in the diagram. This is indicated by a "+" stereotype. [OV-6c]
Conditional Flow	A Sequence Flow that has a condition expression evaluated at run time to determine whether the flow will be used. [OV-6c]
Confidentiality	Assurance that information is not disclosed to unauthorized individuals, processes or devices.
Connecting Objects	Connecting objects connect Flow Objects together. There are three connecting objects: Sequence Flow, Message Flow and Association. [OV-6c]
Context	The immediate environment in which a function (or set of functions on a diagram) operates.
Context Diagram	A diagram that presents the context of a model, whose node number is A-n (n greater than or equal to zero). The one-box A-0 is a required A-0; that with node numbers A-1, A-2, are optional A-0s.
Control Arrow	The class of arrows that express IDEF0 Control, that is, conditions required to produce correct Output. Data or objects modeled as Controls may be transformed by the function, creating Output. Control arrows are associated with the topside of an IDEF0 box.
Core Business Mission (CBM) Stakeholder	The CBM Stakeholder for an OV-6c process is one or more of the Core Business Missions that is responsible for executing that process.
Criticality	The criticality assessment of the information being exchanged in relationship to the mission being performed.
Data-Based Decision	A Gateway in which the Decision represents a branching point where Alternatives are based on conditional expressions based on data contained within the outgoing Sequence Flow. [OV-6c]
Data Element	A Data Element is the smallest unit of stored data, which means that it cannot be broken down further, or that it makes no sense to break it down further. The Data Element, however, can inherit properties from a Data Domain. Data Elements are unique across the BMA and are associated with Attributes within the BEA.
Data Synonym	Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.
Data Model	A graphical and textual representation of analysis that identifies the data needed by an organization to achieve its mission, functions, goals, objectives, and strategies and to manage and rate the organization. A data model identifies the Entities, domains (Attributes) and Relationships (or associations) with other data.
Data Object	Additional information on an OV-6c, which does not have any direct effect on the Sequence Flow or Message Flow but does show the data that may be passed, created,

Term	Description
	or consumed by the BPM Process. Data Objects are a mechanism to show how data is required or produced by Process Steps. A Data Object is considered an artifact because it does not have a direct effect on the Sequence or Message Flow of the process. [OV-6c]
Decision	See "Branching Point". [OV-6c]
Decision (OR-Split)	Synonymous with "Branching Point." [OV-6c]
Decomposition	The partitioning of a modeled function into its component functions.
Default Flow	Sequence Flow, for Data-Based Exclusive Decisions or Inclusive Decisions, which shall be used only if all the other outgoing Conditional Flows are not true at run time. [OV-6c]
Derivation Business Rule	These rules concern algorithms used to compute a derivable fact from other terms, facts, derivations, or action assertions.
Description	Text description of mission or role being performed by the Node.
Diagram	A single unit of an IDEF0 Model that presents the details of a box.
Diagram Node Number	That part of a diagram's node references that corresponds to its Parent box node number.
End Event	An Event that indicates where the process concludes. [OV-6c]
Enterprise Sub-Services	Used in the SV-TV Bridge, it describes the intersection between enterprise systems and Technical Services, and defines Standard attributes to bring order to that point.
Entity	An Entity is the representation of a set of real or abstract things (people, objects, places, events, ideas, combination of things, etc.) that are recognized as the same type because they share the same characteristics and can participate in the same Relationships.
Event	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 (trigger) or an impact (result). Events are represented as circles with open centers to allow internal markers to differentiate different triggers or results. There are three types of Events, based on when they affect the flow: Start, Intermediate and End. [OV-6c]
Event-Based Decision	The Decision represents a branching point where Alternatives are based on an Event that occurs at a particular point in the process. [OV-6c]
Event Name	Name of the Event that triggers the IE.
Exception Flow	Sequence Flow occurring outside the Normal Flow of the process and is based upon an Intermediate Event that occurs during the performance of the process. [OV-6c]
Exclusive Gateway (XOR)	An Exclusive Gateway restricts the flow such that only one of a set of alternatives may be chosen during runtime. There are two types of Exclusive Gateways: Data-based and Event-based. Also see "Inclusive Decision". [OV-6c]
Expanded Sub-Process	An expanded Sub-Process is a graphical representation of a Sub-Process in which the boundary of the Sub-Process icon is expanded and the details (a process) are visible within its boundary. [OV-6c]
Flow Object	Flow Objects are the main graphical elements to define the behavior of a Business Process. The three Flow Objects are Events, Process Steps and Gateways. [OV-6c]
Fork	The junction where an IDEF0 arrow segment (going from source to use) divides into two or more arrow segments. May denote unbundling of meaning.
Fork (AND-Split) [OV-6c]	Dividing a path into two or more parallel paths, where Process Steps can be performed concurrently, rather than sequentially. [OV-6c]

Term	Description
Function	An activity, process, or transformation (modeled by an IDEF0 box) identified by a verb or verb phrase that describes what must be accomplished.
Gateway	Used on an OV-6c, this Flow Object controls the divergence and convergence of multiple Sequence Flows. [OV-6c]
Grouped Attribute	Grouped Attributes bring together several Attributes in a particular order to form a group. The classic example of a Grouped Attribute is Person Name that brings together First Name, Middle Name and Last Name.
ICOM	The acronym of Input, Control, Output, Mechanism. A code that associates the Boundary Arrows of a Child diagram with the arrows of its Parent box; also used for reference purposes.
IDEF0 Model	A graphic description of a system or subject that is developed for a specific purpose and from a selected viewpoint. A set of one or more IDEF0 diagrams that depict the functions of a system or subject area with graphics, text and glossary
ICOM Arrow	Used on an OV-5, it represents the Input, Control, Output, or Mechanism that defines information relationships in an Activity Model. − Input: Information received from another Operational Activity, either internal or external to the model, which is needed for the given Operational Activity to be carried out. − Control: Information that affects the way an activity is performed or that constrains that activity. Primary sources are policies, regulations and laws. BEP initiatives are also reflected as Controls to emphasize the impact on a specific activity of those business transformation concepts. In the BEA, there are two types of Controls: External and Internal. External Controls are decomposed from the LRP Parent. Internal Controls are Initiatives that are created as Outputs from other Operational Activities within the BEA OV-5 Activity Model. − Output: Information that has been transformed or created by the Operational Activity and is sent to another internal Operational Activity or to an external activity (one outside the scope of the model/viewpoint). − Mechanism: Resource used to perform the activity. Mechanisms will be CBMs and those Systems or Initiatives defined by the BEP Executives.
Identified Relationship	A specific connection relationship in which every Attribute in the Primary Key of the Parent is contained in the Primary Key of the Child Entity.
Inclusive Decision	A branching point (Gateway) where Alternatives are based on conditional expressions contained within the Sequence Flow. Since each path is independent, all combinations of the paths may be taken. Also see "Exclusive Gateway". [OV-6c]
Integrity	Quality of an IS reflecting the logical correctness and reliability of the operating system; the logical completeness of the hardware and software implementing the protection mechanisms; and the consistency of the data structures and occurrence of the stored data. Note that, in a formal security mode, integrity is interpreted more narrowly to mean protection against unauthorized modification or destruction of information.
Intermediate Event	An Event that occurs between a Start Event and an End Event. It affects the flow of the process, but will not start or (directly) terminate the process. [OV-6c]
Information Exchange	Listed in the OV-3, shows the Information Exchanged between two Operational Nodes. A corresponding leaf-level Activity Input or Output ICOM is associated to the IE with the same name, definition, CBM Stakeholder and BEP Stakeholder.
Information Exchange Identifier	Identifier for the IE – usually based on the relevant Need Line identifier; should be unique for the architecture.
Input Arrow	The class of arrows that expresses IDEF0 Input that is the data or objects that are transformed by the function into Output.

Term	Description
	Input arrows are associated with the left side of an IDEF0 box.
Interface	A shared boundary across which data or objects are passed; the connection between two or more model components for the purpose of passing data or objects from one to the other.
Internal Arrow	An Input, Control, or Output arrow connected at both ends (source and use) to a box on a diagram. Contrast with Boundary Arrow.
Interoperability Level Required	Level of information systems interoperability, or other interoperability measure, required.
Join	The junction at which an IDEF0 arrow segment (going from source to use) merges with one or more other arrow segments to form a single arrow segment. May denote bundling of arrow segment meanings.
Join (AND-Join) [OV-6c]	A Gateway that combines two or more parallel paths into one path. Synonymous with "AND-Join" and "synchronization". [OV-6c].
Lane	A Lane is a sub-partition within a Pool and extends the entire length of the Pool. Lanes are used to organize and categorize Process Steps within a Pool (representing a single Business Entity). [OV-6c]
Leaf-level	Refers to the lowest level of detail described for a given Operational Activity, system, or process model. It represents the lowest level of decomposition of higher-level models needed to represent objects and relationships of interest to the topic under study.
Level Identifier	If using hierarchical decomposition of Nodes: identifier that corresponds to the Node's place in the Node hierarchy.
Logical Data Model	The OV-7 data model that provides the structure for organizing the data as well as the metadata need for an understanding of the data. The OV-7 can serve as a guide for the acquisition and evaluation of systems by assisting portfolio managers in quantitatively assessing the contents of their portfolios in the evaluation of how well the alternative solutions meet the data needs of the BMA.
Mandatory Non-Identified Relationship	A non-identified Relationship in which an instance of the Child Entity must be related to an instance of the Parent Entity.
Mechanism Arrow	The class of arrows that express IDEF0 Mechanism, that is, the means used to perform a function; includes the special case of call arrow. Mechanism Arrows are associated with the bottom side of an IDEF0 box.
Merging (OR-Join)	Merging exclusively combines two or more paths into one path. A Merge Gateway represents merging. [OV-6c]
Message Flow	A Message Flow shows the flow of messages between two Entities that are prepared to send and receive them. Two separate Pools in the Diagram will represent the two business Entities. [OV-6c]
Model Note	A textual comment that is part of an IDEF0 diagram used to record a fact not otherwise depicted.
Name	Name or label of Node box on diagram.
Need Line	Shown on an OV-2, it documents the requirement to exchange information between Operational Nodes. Arrows on Need Lines indicate the direction of the information flow. Each arrow only indicates that there is a need for some kind of information transfer between the two connected nodes, not how the information transfer is implemented.
Need Line Identifier	Identifier for the Need Line that carries the exchange.
Node	A box from which Child boxes originate; a Parent box.

Term	Description
Node Index	A listing, often indented, showing nodes in an IDEF0 Model in outline order. Same meaning and content as Node Tree.
Node Reference	A code assigned to a diagram to identify it and to specify its position in the model hierarchy; composed of the model name (abbreviated) and the diagram node number, with optional extensions.
Node Tree	The graphical representation of the Parent-Child relationships between the Nodes of an IDEF0 Model, in the form of a graphical tree.
Non-Identified Relationship	A specific connection Relationship in which some or all of the Attributes contained in the Primary Key of the Parent do not participate in the Primary Key on the Child Entity.
Non-Specific Relationship	Non-specific Relationship: A Relationship in which an instance of either Entity can be related to a number of instances of the other.
Normal Flow	Normal Sequence Flow refers to the flow that originates from a Start Event and continues through Process Steps via alternative and parallel paths until it ends at an End Event. [OV-6c]
Normal Form	Normal form is the condition of an Entity relative to satisfaction of a set of normalization theory constraints on its attribution. A specific normal form is achieved by successive reduction of an Entity from its existing condition to some more desirable form.
Normalization	The process of refining and regrouping Attributes in Entities according to the normal forms.
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. [OV-5]
Operational Activity Name	Name of the Operational Activity (at the originating Node of the Need Line) that produces the IE.
Operational Node	Shown in an OV-2, it describes what type of mission or role will be performed within an organizational unit. It is a job performed within an organizational unit.
Operational Node Name	Name of the Operational Node that produces the IE.
Optional Non-Identified Relationship	A non-identified Relationship in which an instance of the Child Entity can exist without being related to an instance of the Parent Entity.
OR-Split	See "Decision". [OV-6c]
Organizational Unit	An Organizational Unit is a business organized in terms of roles also known as Operational Nodes. Each Organizational Unit includes a list of roles performed within that Organizational Unit only. In the BEA, CBMs represent Organizational Units.
Output Arrow	The class of arrows that express IDEF0 Output; that is, the data or objects produced by a function. Output arrows are associated with the right side of an IDEF0 box.
Parent Box	A box that is detailed by a Child diagram.
Parent Diagram	A diagram that contains a Parent box.
Participant	A Participant is a single business Entity or a business role, which controls or is responsible for a Business Process. A Pool represents a Participant in the process. [OV-6c]
Periodicity	How often the IE occurs; may be an average or a worst-case estimate and may include conditions (for example, wartime or peacetime).

Term	Description
Persistent Data	Data that has been saved and remains available even when it is not being used.
Pool	A Pool represents a Participant – a single Business Entity – in a process. It also acts as a Swimlane and a graphical container for partitioning a set of Process Steps from other Pools. [OV-6c]
Primary Key Attribute	Represented by one or more textual names in the upper portion of the Entity box. Primary Key Attributes contain characteristics that uniquely define a single instance of an Entity.
Private Business Process	Private Business Processes are those internal to a specific organization and are the types of processes that have been generally called workflow or BPM Processes. [OV-6c]
Process	Used on an OV-6c, this denotes a set of activities performed within a business organization, where an activity (not to be confused with the OV-5 usage for 'Operational Activity) is a generic term for work that a business organization performs. A BPM Process is depicted as a graph of Flow Objects, which are a set of other Process Steps and the controls that sequence them. [OV-6c]
Process Break	A location in a process that shows where an expected delay will occur within a process. An Intermediate Event is used to show the actual behavior. [OV-6c]
Process Step	Work that can be performed within a Business Process. A Process Step can be atomic or non-atomic (compound). The types of Process Steps that are a part of an OV-6c Business Process Diagram are: Process Step, Sub-Process and Task. The term "Process Step" is a synonym for the Business Process Modeling Notation term "Activity." OV-6c uses the term "Process Step" to avoid confusion with the OV-5 term "Activity," representing an "Operational Activity." [OV-6c]
Protection Duration	How long the information must be safeguarded.
Protection Suspense Calendar Date	The calendar date on which the designated level of safeguarding discontinues.
Protection Type Name	The name for the type of protection.
Public Processes	Public processes represent the interaction between a private Business Process and another process or participant. Only those activities that are used to communicate outside the private Business Process, plus the appropriate flow control mechanisms, are included in the public process. All other internal activities of the private Business Process are not shown in the public process. Synonymous with "Abstract Process". [OV-6c]
Purpose	A brief statement of the reason for a model's existence.
Receiving Operational Activity	The identity of the Operational Activity consuming the information.
Receiving Operational Node Name	Name/identifier of the Operational Node that consumes the information.
Relationship	A Relationship is an association between two Entities or between instances of the same Entity.
Relationship Cardinality	Relationship Cardinality is the number of Entity instances that can be associated with each other in a Relationship.
Relationship Cardinality Constraint	A Relationship Cardinality Constraint is a limit on the number of Entity. Instances that can be associated with each other in a Relationship.
Relationship Name	A Relationship Name or label is "a verb or verb phrase, which reflects the meaning of the Relationship expressed between the two Entities shown in the diagram on which, the name appears."

Term	Description
Semantics	The meaning of the syntactic components of a language.
Sending Operational Activity Name	The identity of the Operational Activity producing the information.
Sending Operational Node Name	Name/identifier of Operational Node that produces the information.
Sequence Flow	Arrows that show the order that Process Steps will be performed in a process.
Standard	An agreed upon means that establishes uniform engineering and technical requirements to implement all or part of a Technical Service.
Start Event	An Event that indicates where a particular process will start. A process must have one or more Start Events. [OV-6c]
Stereotype	A graphical icon that indicates the type of Flow Object. [OV-6c]
Structural Assertion Business Rule	These rules concern mission or business CBM terms and facts that are usually captured by the Entities and Relationships of Entity-Relationship models. They reflect static aspects of Business Rules that may also be captured in the OV-7. − Terms: Entities. − Facts: Association between two or more terms (for example, relationship).
Sub-Process	A compound Process Step that is included within a process. It is compound in that it can be broken down into a finer level of detail (a process) through a set of Sub-Processes. A Sub-Process may be shown graphically as a collapsed or expanded Sub-Process. [OV-6c]
Swimlanes	Swimlanes group the primary modeling elements by organization or other criteria. There are two Swimlane objects, Pools and Lanes. [OV-6c]
Synchronization	See "Join (AND-Join)". [OV-6c]
Syntax	Structural components or features of a language and the rules that define relationships among them.
System Data Exchange	Listed in the SV-6, it represents data exchanges between System Functions and may include additional information assurance or performance attributes to characterize the exchange. The data in the SDE is represented using data Entities and/or Data Elements within the DoDAF OV-7 architecture product.
System Entity	Shown on a SV-1, it represents computer systems, family of systems or systems of systems. A System Entity resides within a System Node and may contain one or more System Functions.
System Function	Used in the SV products, this set of organized actions produces a defined automated output when given specific data inputs. Within the context of DoDAF, a System Function transforms the data in an IE as constrained by operational and structural Business Rules.
System Interface	Shown on an SV-1, it represents the data exchange between System Entities.
System Node	Shown on an SV-1, it represents the system capabilities that are required to support the business practices that are described in the Operational View.

Term	Description
Task	An atomic Process Step that is included within a process. A Task is used when the work in the Process Step is not broken down to a finer level of process model detail. [OV-6c]
Technical Service	Listed in the TV-1 with its constituent Standards, represents a technical capability designed to support an Enterprise Sub-Service.
Technology Service Area	Shown in the TV-1, it groups similar Technical Services together for increased organization and comprehension. There may be one or more Technical Services in a Technology Service Area. The current TV-1 takes its highest-level structure from the DoD Enterprise Architecture Technical Reference Model (EA TRM). It contains four Technology Service Areas, drawn from the Core Service Areas of the DoD EA TRM.
Term	Used in the BEA or ETP, this is a word or group of words designating a selected concept.
Text	An overall textual (non-graphical) comment about an IDEF0 graphic diagram.
Text Annotation	Text Annotations are mechanisms (Artifacts), attached with an Association, for a process architect to provide additional information for the reader of the Process Diagram. [OV-6c]
Timeliness	Required maximum allowable time of exchange from Node to Node (in seconds).
Title	A verb or verb phrase that describes the overall function presented on an IDEF0 diagram; the title of a Child diagram corresponds to its Parent box name
Transaction Type	Descriptive field that identifies the type of the IE.
Triggering Event	Brief textual description of the Event(s) that trigger the IE.
Tunneled Arrow	An arrow (with special notation) that does not follow the normal requirement that each arrow on a diagram must correspond to arrows on related Parent and Child diagrams.
Uncontrolled Flow	Sequence Flow that is not affected by any conditions or does not pass through a Gateway. [OV-6c]
View	A subset of Entities, Attributes and Relationships that has meaning from a specific perspective. For example, a view can show only that portion of the data model that is relevant to a specific domain or to a macro Process Step.
Viewpoint	A brief statement of the perspective of the model.
XOR	See "Exclusive Gateway". [OV-6c]

Appendix D : BEP AV-1 Template

<BEP Name (Acronym)>
Overview and Summary Information (AV-1)
<Version, Date>

<Description of the purpose of this document > The AV-1 is an executive-level summary of the DoD <*BEP Name*> Business Enterprise Priority (<*Acronym*> BEP). Initially, the AV-1 is used to focus the <*Acronym*> BEP development effort and document its scope. The final version shall include findings and recommendations from the effort.	
Architecture Project Identification	
BEP Name	*<BEP full name and acronym>*
BEP Description	*<The BEP Description. Must match the BEP Description in the ETP Appendix E and in the BEA in SA.>*
Architect	DoD Business Transformation Agency (BTA)
Developed By	*<Lead Core Business Mission >* *<Supporting Organizations>*
Assumptions and Constraints	The <*BEP Name*> BEP: • Will make maximum reuse of existing BEA products with changes only made when necessary. • Will address only DoD Enterprise-level business and strategic plans, goals, objectives, and strategies, which are the primary drivers for the BEA. *<Additional list of BEP specific assumptions and constraints placed on the architecture>*
Approval Authority	The Deputy Secretary of Defense, acting through the Defense Business Systems Management Committee (DBSMC).
Date Completed	Architecture content freeze date, January 25, 2008, internal DoD delivery date, February 25, 2007 and final release date March 14, 2008.
LOE and Development Costs	Level of effort and projected and actual costs to develop the BEP Products may be requested from the Director, BTA.
Scope: Architecture View and Products Identification	
Products Developed	*List of architecture products to be developed or updated for this deliverable.*
BEP Capabilities	*<List of Business Capabilities that are related to the BEP. From the ETP Appendix E >*
Scope	*<Summary of development effort for BEP for current deliverable.>* See approved Change Forms for details.

Time Frames Addressed	The BEA is the "To Be" architecture for transformation efforts at DoD. The current BEA "To Be" end state has intermediate time frames for implementation addressed in the Enterprise Transition Plan (ETP).
Organizations Involved	All DoD Business Mission Area CBMs.
Purpose and Viewpoint	
Purpose (Problems, Needs, Gaps)	*<A summary description of problems, needs and gaps addressed in this release.>*
Questions to be Answered	*<BEP specific questions derived from the four Enterprise-wide 'Golden Questions'.>*
Architecture Viewpoint	*<The viewpoint from which the architecture is being developed.> Sample from PV:* PV-BEP shall be developed from a personnel management perspective focusing on using strategic plans, key DoD Enterprise-level processes and information. The Enterprise level deals with Business Capabilities that are DoD wide as established by statute, policy, or longstanding practice and include the systems and initiatives that support those capabilities.
Context	
Mission	*<A functional statement from the Core Business Mission as it pertains to the BEP.>*
Vision	*<A statement regarding the intended capability end state of the BEP in relation to the Core Business Mission. >*
Goal	*<The BEP Goal. From the BEP Goal in the ETP Appendix E.>*
Objectives	*<The objectives for the BEP. From the BEP Objectives in the ETP Appendix E>*
Rules, Conventions, and Criteria	**Rules:** The <*BEP Name*> BEP adheres to the DoD Architecture Framework (DoDAF) Version 1.5. **Conventions:** The conventions and methodology to be followed are documented in the BEA Business Transition Planning Guide and the Architecture Product Guide, as well as applicable Decision Memorandums approved by BEA Leadership. **Criteria:** BTA establishes detailed evaluation criteria for the delivery. **Information Assurance Posture:** The <*BEP Name*> BEP information confidentiality, integrity and availability must be protected to the extent required by applicable DoD policy.
BEA Tasking / Linkages to Other Architectures	**Tasking --** The 2005 National Defense Authorization Act (NDAA) requires architectures to assess and maintain investments throughout the BMA. **Linkages to Other Architectures** – BEA work products link to the Federal Enterprise Architecture (FEA) and the DoD Global Information Grid (GIG) Architecture. *<Additional list of architectures to which the BEP may link.>*
Tools and File Formats to be Used	
Telelogic System Architect v 10.7, Merant Version Manager, Merant Tracker, Microsoft SQL Server, Word, Access and Excel.	

Note: *Text in italics to be added by BEP's.*

Appendix E: Business Improvement Proposal (BIP) Template

BEA Improvement Proposal

BEA Improvement Background Information

BEA Improvement Name	*Name of proposed BEA Improvement.*	
Improvement Originator (Check One)	_ CBM or BEP Team _ DBSAE _ EI	_BMA Federation Team _ LRP _ Chief Enterprise Architect
Originator	*Name of person / Organization submitting the proposed BEA Improvement.*	
IRB	*Name of IRB with authority over the investment decisions primarily impacted by this BEA Improvement, if any.*	

BEA Improvement Scope Description

BEA Improvement Description	*Provide a brief, narrative description that clearly identifies the proposed improvements to the BEA (scope: breadth and depth).*
Affected Enterprise Business Capability	*Identify the Enterprise Business Capabilities impacted by this proposed improvement. Identify any new or revised Business Capabilities required with definition changes.*
Affected Enterprise Systems and Initiatives	*Identify the Enterprise Systems impacted by this proposed improvement. Also, identify any affected initiatives that define data standards or other controls. Identify whether new or revised enterprise systems are involved.*
BEA Product	*To the extent known, provide an overview of the BEA products that will be developed or updated for either a proposed Business Capability or Architecture Usage Improvement.* *For Business Capability Improvements, set scope of change by identifying all OV-5 Operational Activities impacted and describe the key changes to the activities. Within that scope of change, describe the changes to all other products related to the Capability Improvement.* *For Architecture Usage Improvements, describe the changes to the SV products. In addition, describe the changes to all related architecture products resulting from the new system content.*
Laws, Regulations and Policies	*Describe any LRP changes related to this improvement, including OV-5 controls, mapping to OV-6c process objects and derived OV-6a Business Rules, if applicable. LRP changes can be related to existing, revised or new LRP's.*

BEA Improvement Benefits Description

Business Capability Improvement Outcome	*Describe the anticipated beneficial outcome(s) for specific DoD stakeholders in terms of improved:* • *Transformed business operations* • *Efficiency and effectiveness of business operations* • *Responsiveness to warfighter needs* • *Decision-making information* • *Stewardship of resources* • *Implementation or modification of a major system* • *Implement standard or policy change* *(Note: What will change in the way DoD executes its business practices as a result of this BEA Improvement? This outcome can be addressed by referring to improvements in the BEA's ability to answer Golden Questions, Derived Questions, BEP/IRB Objectives or BVA Outcomes.)*
Architecture Usage Improvement Outcome	*Describe the anticipated beneficial outcomes by identifying how adding the architecture usage information to the BEA will make it more usable for a specific purpose, e.g., incorporation of enterprise system requirements, enabling system interoperability requirements, improving BEA compliance certification, implementing DoD Business Transformation Objectives, enabling the Federation strategy or supporting Portfolio Management.*

Problems, Needs and Gaps Addressed	*Describe any other problems, needs or gaps that this improvement addresses. Provide a link or reference to documentation (e.g., GAO reports, Material Weakness, President's Management Agenda (PMA), Quadrennial Defense Review (QDR)) as appropriate.*

BEA Improvement Impacts

BEP Team Most Affected	*Identify the BEP Team that the proposed BEA Improvement affects the most. Supporting BEP Teams that are affected by this improvement may also be referenced.*
CBM Most Affected	*Identify the CBM most closely related to the proposed BEA. Supporting CBMs that are affected by this improvement may also be referenced.*
BMA Coordination	*Identify other organizations in the DoD Business Mission Area with which this BEA Improvement will need to be coordinated.*
Non BMA Coordination	*Identify other DoD Mission Areas, other federal organizations or any other organizations outside the BMA with which this BEA Improvement will need to be coordinated.*
Risks / Dependencies	*Explain the risks of making the changes described as well as the risks of not making the changes. Identify dependencies that could pose a risk.*
Level of Effort	*To the extent known, provide an estimate of the level of effort required to make this improvement – FTE's and hours.*

Submission Date:

Approver:	Signature:	Date: