



BTA
BUSINESS TRANSFORMATION AGENCY

BEA Development Methodology

14 March 2008

Version History

Version	Publication Date	Author	Description of Change
1.0	March 15, 2006	BEA Development Team	Initial Release
1.1	September 15, 2006	BEA Development Team	Minor updates
1.2	March 2, 2007	BEA Development Team	Updates for BEA 4.1 Deliverable
2.0	September 27, 2007	BEA Development Team	Updates regarding concept of operations (CONOPS) for BEA Requirements and BEA 5.0 Release
3.0	March 14, 2008	BEA Development Team	Updates for BEA 5.0 Deliverable



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Acronym List

Acronym	Description
APG	Architecture Product Guide
AV	Acquisition Visibility (Business Enterprise Priority) All View (DoDAF)
BART	BEA Analysis and Reporting Tool
BEA	Business Enterprise Architecture
BEP	Business Enterprise Priority
BDM	BEA Development Methodology
BIP	BEA Improvement Proposal
BMA	Business Mission Area
BPM	Business Process Modeling
BTA	Business Transformation Agency
BTG	Business Transformation Guidance
CBM	Core Business Mission
CM	Configuration Management
CONOPS	Concept of Operations
CSE	Common Supplier Engagement
CR	Change Request
DBSAE	Defense Business Systems Acquisition Executive
DBSMC	Defense Business Systems Management Committee
DoD	Department of Defense
DoDAF	DoD Architecture Framework
EA	Enterprise Architecture
E2E	End-to-End Architecture Development Process
EP&I	Enterprise Planning and Investment Directorate
ETP	Enterprise Transition Plan
FV	Financial Visibility
HTML	HyperText Markup Language
IRB	Investment Review Board
IV&V	Independent Verification and Validation
LRP	Laws, Regulations and Policies
MV	Materiel Visibility
OSD	Office of the Secretary of Defense
PSA	Principal Staff Assistant
PV	Personnel Visibility
SOA	Service Oriented Architecture
RPA	Real Property Accountability



Acronym	Description
TP&R	Transformation Priorities and Requirements Directorate



1. Introduction

1.1. Purpose

The purpose of the BEA Development Methodology (BDM) document is to describe the overall approach and process for developing the Business Enterprise Architecture (BEA), one of the primary tools used to drive transformation within the Department of Defense (DoD) Business Mission Area (BMA). The BDM reflects the current methodology for developing the BEA and incorporates best practices and lessons learned across the architecture development lifecycle during the successful development of previous releases of the BEA.

The BDM document provides an initial overview of the scope of the BEA, reviews the development approach used to analyze the information that becomes BEA content, details the process steps in the BEA release cycle, and identifies the technology and tools used to develop the BEA.

The BDM is intended for an audience that is familiar with the DoD Architecture Framework (DoDAF) and the overall BEA content and purpose.

This document has been updated to reflect the methodology used in the current release of the BEA – BEA 5.0 delivered March 14, 2008.

1.2. Related Documents

Supporting details on how to execute the processes outlined in this document can be found in one or more source documents: the Architecture Product Guide (APG), the BEA Configuration Management Plan, and the web-based End-to-End (E2E) Architecture Development Process. The E2E includes detailed procedures, forms and templates.

The Concept of Operations (CONOPS) for the BEA identifies and describes BEA Governance structures and processes that provide a mechanism through which strategic and tactical requirements are analyzed, prioritized and approved to affect BEA form and content.

Guidance regarding development and usage of the BEA in the overall context of DoD business transformation is presented in the Business Transformation Guidance (BTG).

The Enterprise Transition Plan (ETP) outlines the major milestones for those systems and initiatives critical to achieving DoD transformation priorities. Although the ETP is a separate document, the BEA and the ETP are integrated and cross-referenced. Together, the BEA and ETP are tools that help ensure solution sets are comprehensive and improve interoperability within DoD.

This documentation, as well as any emerging Decision Memoranda approved by leadership of the Defense Business Transformation Agency (BTA), provides the guidance for BEA development.



2. BEA Scope

The BEA is developed based on a set of integrated DoD Architecture Framework (DoDAF) products, including All View (AV), Operational View (OV), Systems and Services View (SV), and Technical Standards View (TV) products. The BEA defines the DoD's business transformation priorities, their supporting business capabilities and enabling systems and initiatives.

The scope and purpose of the BEA is focused on a set of six Business Enterprise Priorities (BEPs) spanning five Core Business Missions (CBMs). By focusing on a defined set of Business Enterprise Priorities, the BEA provides the foundation to accelerate outcome-based architecture development and implementation going forward.

The scope of the BEA is bounded by six BEPs, which include:

- Acquisition Visibility (AV)
- Common Supplier Engagement (CSE)
- Financial Visibility (FV)
- Materiel Visibility (MV)
- Personnel Visibility (PV)
- Real Property Accountability (RPA)

Complete definitions of the six BEPs can be found in the AV-2, the BEA integrated dictionary.

Within this scope, BEA development is focused on providing tangible outcomes focused on answering the following four questions known as the “Golden Questions”:

- Who are our people? What are their skills? Where are they located?
- Who are our industry partners, and what is the state of our relationship with them?
- What assets are we providing to support the warfighter, and where are these assets deployed?
- How are we investing our funds to best enable the warfighting mission?

For each BEP, the business capabilities and enabling systems and initiatives required to meet transformation objectives are derived from the Golden Questions and frame the content of the BEA. To support this analysis, derivative questions are developed. Sample derivative questions are listed below:

1. Who are our personnel (e.g., active, reserve, guard, civilian)?
2. What is the member's/employee's service/organization? (Army, Navy, Air Force, Marine Corps)
3. How many members/employees are in theater?
4. Who are our suppliers?
5. What products and services do they provide?
6. Where are our suppliers located?



3. BEA Development Approach

This section addresses the development approach that is used to analyze and incorporate information to develop BEA content. The approach involves defining the requirements, developing content through a spiral development process, working with an integrated team, and managing the release cycle to completion.

3.1. “Top Down and Bottom Up” Approach to BEA Development

BEA 5.0 and beyond are intended to provide additional value to the Department’s BMA by evolving the BEA to better suit the uses of key stakeholders (e.g., Investment Managers, System Developers and Integrators). This additional value is demonstrated in two areas and provided by:

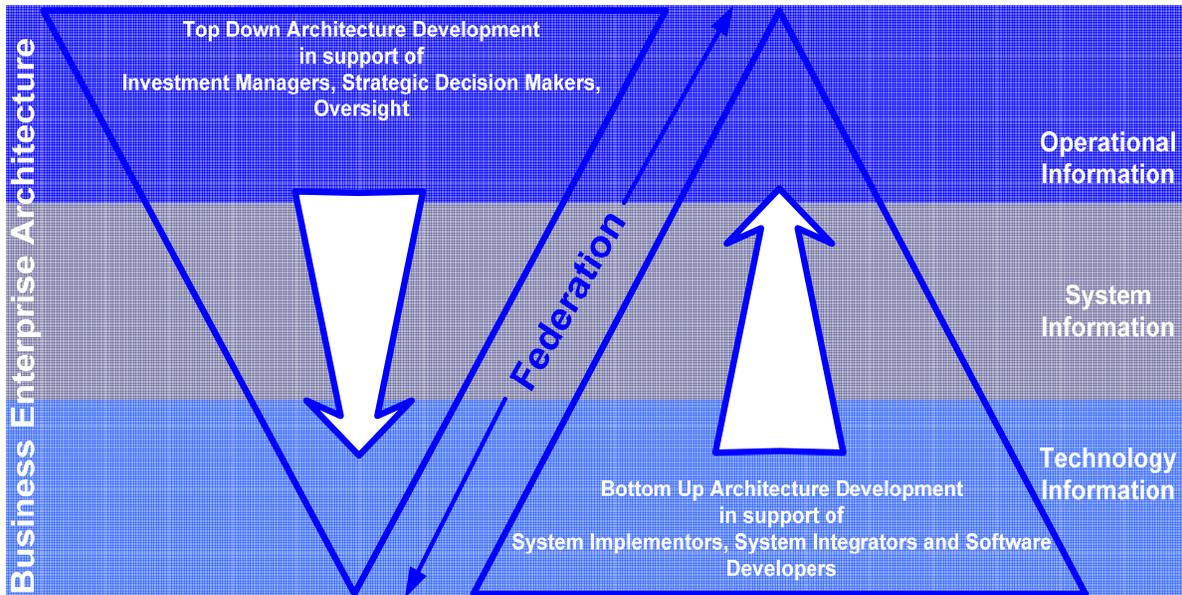
- Enterprise Transformation
 - Improving system level information, capturing the target environment and capturing planned enterprise services and associated information in support of a Service Oriented Architecture (SOA)
 - Improving BEA ability to facilitate System Interoperability and development by focusing on top-down data initiatives, identified by the Principal Staff Assistants (PSA) of the Core Business Missions (CBM), which are used as a source of system requirements. Including additional system level information in support of target systems and their interfaces is another focus for BEA 5.0. In addition, identification of system data exchanges and development of appropriate business rules are focuses which will allow the BEA to become more implementable.
- Enterprise Capabilities
 - Improving BEA Business Capability¹ threads (i.e., BEA integrated information related to a specific capability) through tighter integration between architecture products
 - Using Business Capabilities to aid in scoping BEA content development for each release.

The above improvements allow a mixture of Business Capability, technical integration and standardization, and enterprise systems and services framework content to describe the target environment. To coordinate and balance these architecture development efforts as it addresses these various types of requirements, BTA has adopted a “top-down and bottom-up” approach to architecture development as shown in Figure 3-1.

¹ The Business Transformation Guidance defines a Business Capability as “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.”



Figure 3-1, BEA Development Approach



The “top-down” portion of the approach pertains to architecture development from a strategic perspective with the PSAs and other DoD Business Mission Areas as the primary sources of requirements.² These strategic requirements are directly related to achieving Core Business Missions (CBMs) and support associated BEPs. It entails the identification of Business Capability gaps and improvements and uses these gaps and improvements to guide architecture content for a particular release. In this context, architecture content is developed starting with the Business Capabilities and builds out the necessary OV, SV and TV product information to support the appropriate stakeholders. This portion of the approach does not require a change in the way architecture products have been developed in the past.

The “bottom-up” portion of the approach considers architecture development and implementation from a tactical perspective. This approach provides support to engineering of solutions through alignment to BEA requirements. The solutions being engineered and architected equate to the systems developed and implemented at the Enterprise level as shown in Figure 3-2, Conceptual Structure Supporting BEA “Bottom Up” Development. In this approach, the enterprise systems and enterprise data standards are used to drive the SV product information and products that complement the OV information generated via the “top down” portion of the approach. This tactical information is used to determine the appropriate leveling of architecture content from the enterprise systems, ensuring that the BEA is capable of supporting implementation of services and systems. The target enterprise-level architectural information is incorporated into the BEA while the non-enterprise-level architectural information is federated to the BEA and owned and maintained by the appropriate Components and/or Programs consistent with the principle of tiered accountability.³ The Logical Data Model (OV-7) is a fundamental bridge for supporting the Conceptual Structure Supporting BEA’s “bottom-up” Development. To make this model relevant to transformation and for supporting the warfighter requirements, it is imperative the OV-7 be developed using authoritative Data Elements along with meta-data supported and published by the PSAs from the Office of the Secretary of Defense (OSD).

Federation helps bring together the “bottom-up” architecture information gleaned from enterprise systems analysis and the “top-down” information gleaned from the business capability analysis. Systems information that is identified as being appropriate to the Component or Program levels shall be included in the appropriate Component or Program architectures and federated to the BEA. The same is true for the “top-down” architecture

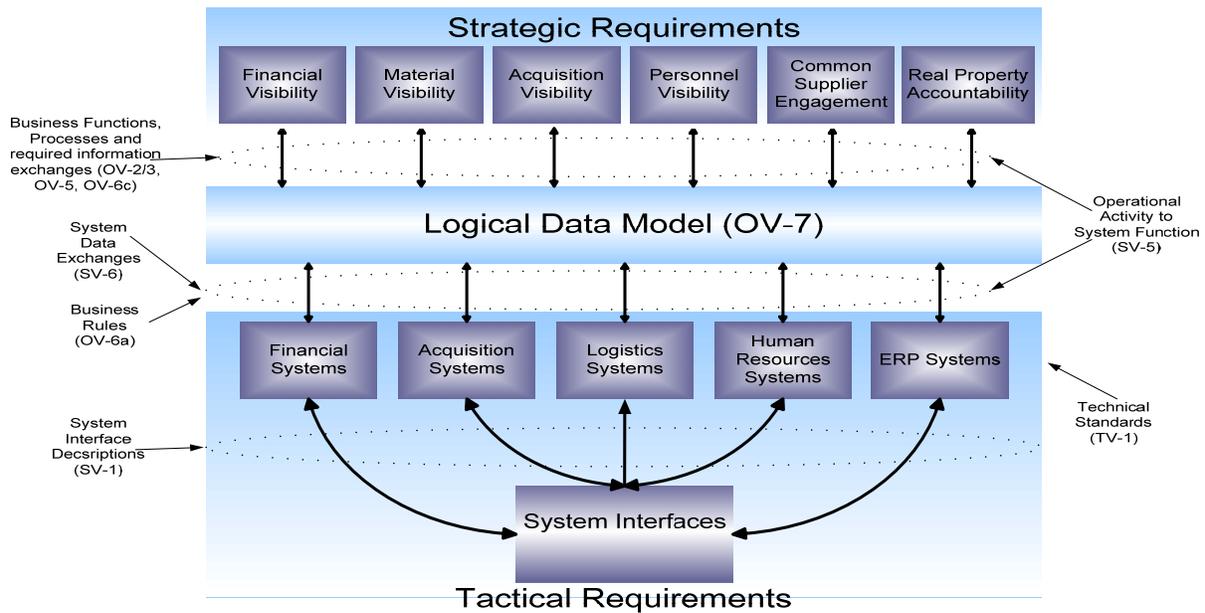
² The requirements of these users are usually documented in the forms of Strategic Plans and other architectures. Therefore, these items may also serve as sources of requirements.

³ In the case of BTA and its enterprise systems, the non-enterprise level information shall be maintained within the Defense Business Systems Acquisition Executive (DBSAE).



information in that it also shall be federated to the BEA if deemed as Component or Program level information. More detailed information on the concept of federation is contained in the BMA Federation Strategy and Roadmap and the DoD EA Federation Strategy.

Figure 3-2, Conceptual Structure Supporting BEA “Bottom Up” Development

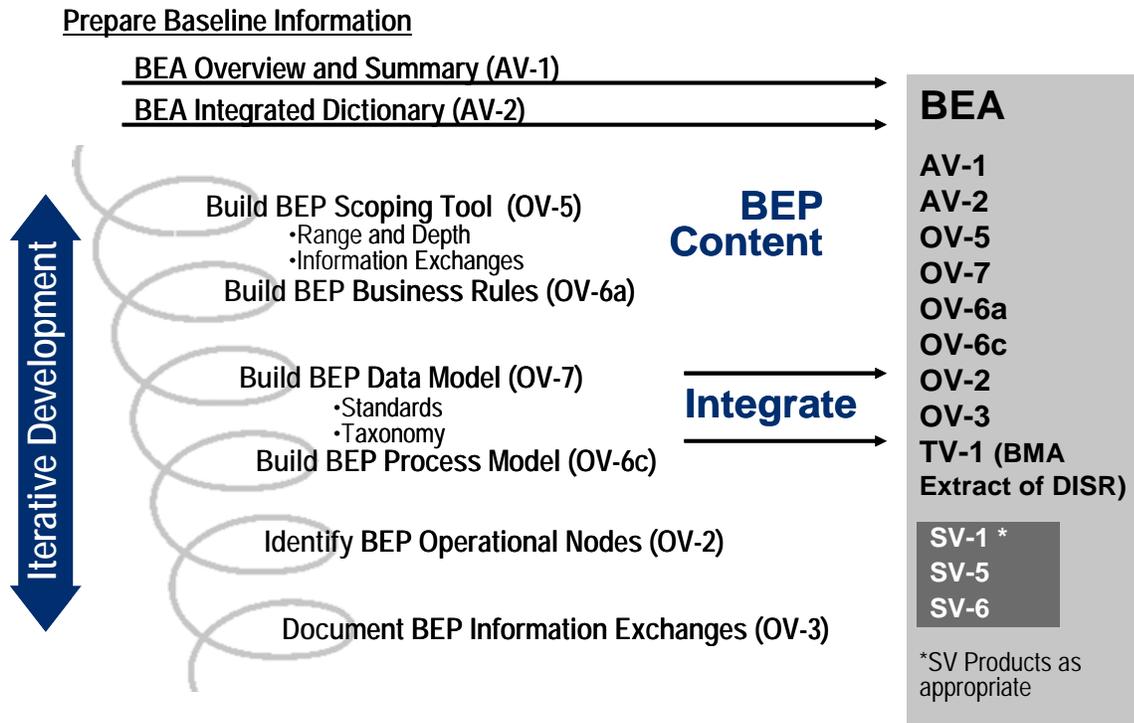


3.2. BEA Content Development

BEA products are developed using a spiral development approach to architecture development. A spiral approach allows the architecture to evolve through the successive application of business analysis, systems analysis and modeling. The cycles of analysis and modeling occur in integrated workshops with all affected stakeholders, each cycle building on the previous one, until overall development is complete within the scope of the Business Improvement Proposal (BIP). A cycle equates to the development of all the required products for a specific BIP or planned capability improvement. These products are then integrated across BEPs and the current BEA baseline is updated. Although the DoDAF allows for 29 architecture products, the BEA only consists of a selected set of DoDAF architecture products. Over time, this product set may be extended. The set of DoDAF products necessary and sufficient to meet current BEA objectives and complete the development sequence deployed during each BEA release is presented in Figure 3-3, BEA Spiral Development.

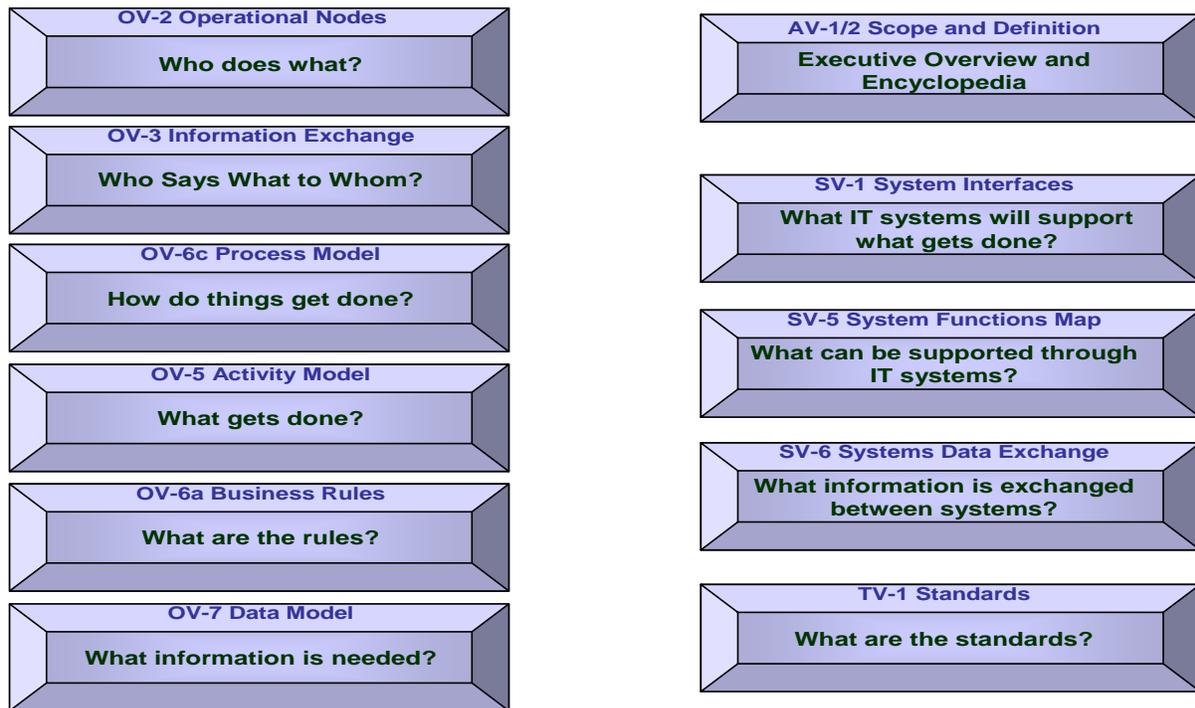


Figure 3-3, BEA Spiral Development



The set of DoDAF products delivered in the BEA provides transformation planners and system developers/implementers with answers to the questions presented in Figure 3-4.

Figure 3-4, Uses of BEA Products to Answer Questions



3.3. Integrated Development Team

Within both aspects of BEA development (Ex. the “Top-down and Bottom-up” approach as well as the spiral development process), BTA makes strong use of an integrated development team. Development of the BEA is performed via collaborative effort between two primary groups: content providers and architecture builders. Requirements that drive BEA content are provided by BEP representatives both within and outside of the BTA TP&R Directorate. For BEP representatives that are organizationally outside of BTA, TP&R serves as coordinator for ensuring appropriate scope and participation is provided for each BEA release. The BTA EP&I Directorate is responsible for translating the content provided by BEP representatives into DoDAF products that conform to BEA product guidelines while managing the release schedule and ensuring architecture integration with the ETP.

Collaboration among the following two groups occurs at various levels and through multiple forums:

- **BEP Leadership:** A BEP Lead is identified for each of the Business Enterprise Priorities to lead the content development effort and approve BEP content for each release. Supporting each BEP is a Coordinator role from both the government and contractor support teams. The BEP Leads coordinate issue resolution across the BEP efforts and work closely with the BEA Chief Architect to manage the BEA release scope and schedule.
- **BEP Teams:** Integrated product development teams comprising content providers⁴ and architecture builders are established for each BEP or planned capability improvement. Team members include appropriate BEP representatives, BTA support (e.g., EP&I and ETP members), contractor support, and other support staff, to include representatives from the Architecture Verification, Quality Assurance, and Independent Verification and Validation (IV&V) teams.

The specific roles and responsibilities for developing the BEA are described in Table 3-1, BEA Development Roles and Responsibilities.

Table 3-1, BEA Development Roles and Responsibilities

Role	Responsibility
Architecture Development Lead	<ul style="list-style-type: none"> • Determine resource allocation across the Architecture development team based on the BIPs • Coordinate technical analysis and approve Parent and Child Change Requests (CRs) • Provide technical oversight and recommendations on impact to architecture based on the approved plan for each deliverable
Architecture Verification Reviewer	<ul style="list-style-type: none"> • Perform analysis and document the results from independent reviews of architecture products • Provide feedback in a timely manner to product developers
BEP Lead	<ul style="list-style-type: none"> • Create the BEA Improvement Proposals • Identify and authorize work on proposed capability improvements to be included in the BEA
BEP Subject Matter Expert	<ul style="list-style-type: none"> • Provide business expertise for development of content and functional verification of the BEA

⁴ In this context, the requirements that generate the content are provided by an extended group of stakeholders to include the Enterprise Integration Directorate of BTA as a representative of the Components and ERPs, the DBSAE as owner of the enterprise systems, and the PSAs. As mentioned in the Governance Section of this document, all requirements shall be prioritized by the TP&R Directorate.



BEA Chief Architect	<ul style="list-style-type: none"> • Establish the proposed architecture content. • Act as final arbiter for BIPs as with respect to release content issues. • Delegate responsibilities for coordinating technical analysis and resource allocation across the Product Team Leads. • Approve Parent and Child Change Requests (CRs)
BEP Coordinator	<ul style="list-style-type: none"> • Assist in the development of the BIPs, managing the Change Requests • Define architecture content changes • Participate in HyperText Markup Language (HTML) and Integration sessions and Product reviews
BEA Management	<ul style="list-style-type: none"> • Work with the BEP Leads and Coordinators to establish release content and managing the contract
BEA Support Staff	<ul style="list-style-type: none"> • Support decision-making forums via meeting planning, facilitation and documentation of meeting minutes • Collect and manage information on the physical and electronic BEA Information Hub team work space
Build Team	<ul style="list-style-type: none"> • Provide architecture tool support • Developing HTML products and generate • Deliver the BEA CD and deliverables need for generation of the web-based products
Configuration Management (CM) Team	<ul style="list-style-type: none"> • Support the configuration management tools
Data Repository (DR) Team	<ul style="list-style-type: none"> • Support the network, servers, license management and installation of software to support BEA development
Enterprise System Owner	<ul style="list-style-type: none"> • Provide support to the “Bottom-up” analysis portion of the BEA Development Approach • Ensure that system-level information is accurately used to affect BEA content
Independent Verification & Validation (IV&V) Reviewer	<ul style="list-style-type: none"> • Monitor and measure compliance to standards and external review comments • Assess both architecture integration and usability
Modeler	<ul style="list-style-type: none"> • Develop and update the BEA products per the Child CR with content guidance from BEP Subject Matter experts, using the development methodology and conforming to the established guidelines
Product Team Lead	<ul style="list-style-type: none"> • Lead the development and review of content within specific architecture products
Quality Assurance	<ul style="list-style-type: none"> • Document and develop processes related to the E2E process and workshop procedures • Monitor and measure process compliance and architecture quality
Release Manager	<ul style="list-style-type: none"> • Oversee overall schedule, development and deliverables
Scribe	<ul style="list-style-type: none"> • Document decisions made during the product development workshop in the meeting minutes and Technical Notes
Transition Planning Lead	<ul style="list-style-type: none"> • Lead the development of the Enterprise Transition Plan, including integrating with the BEA
Workshop Facilitator	<ul style="list-style-type: none"> • Prepare the workshop agenda with the BEP Lead, Capability SME, Capability Coordinator and manage the execution of the workshop



3.4. BEA Release Cycle

Previously, the BEA has been released on a semi-annual basis. Future releases are planned to occur annually, beginning with the BEA 5.0 release in March 2008. The decision to move the BEA to an annual release concurrent with the March 2008 Congressional Report released by BTA detailing the status of the Department of Defense's business transformation efforts will allow services and programs one year to address and align with the current release of the BEA and said Congressional Report, while also corresponding with the Investment Review Board' (IRB) Fiscal Year appropriation decision schedule.

Planning for each release begins with the identification of specific gaps or business capability improvements to be addressed in a future release of the BEA. These gaps or business capability improvements are documented in the form of BEA Improvement Proposals (BIPs). BIPs are generated and submitted from multiple sources and may include proposed BEA modifications resulting from:

- Emerging or existing functionality from each BEP
- Planned capability improvements addressing BEP capability gaps
- Identification or modification of DoD Enterprise systems or initiatives
- Integration of existing architecture products from a technical or content perspective
- Deferred Change Requests (CRs) and Feedback Tickets generated from previous releases
- Findings and Recommendations from the BEP representatives or BEA AV-1s
- Changes to Laws, Regulations, and Policies (LRP)
- Revisions to BEA-related guidance information, such as the DoDAF or the BEA System Compliance Criteria
- Visualization enhancements to the BEA
- Additions and extension of architecture development environment tool, methods and procedures
- Development or revision of supplementary products

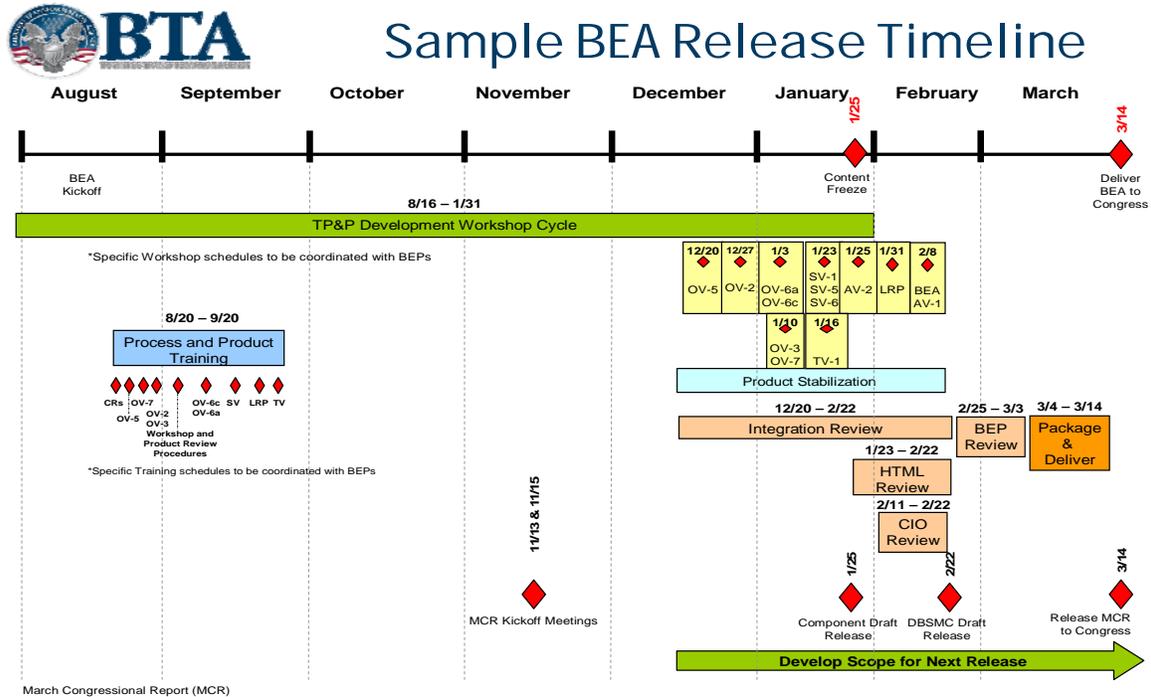
All of these sources are examined and prioritized by the PSAs and the BEP representatives. The Enterprise Planning and Investment Directorate (EP&I), in conjunction with BTA Leadership, determines the scope for the next release. This development process requires each BIP to be described in terms of the business capabilities affected by the improvement(s), its impact across the Core Business Missions, the level of effort required to architect a solution to the gap, and the specific architecture products that must be modified to complete the proposed effort and enable improved BEA scoping and planning decisions. At the end of the development cycle, the work that was planned is reviewed against work accomplished to determine if the BIPs have been satisfied as planned at the beginning of the release cycle.

The key milestones for releases and the approximate timeframes for key activities within the high-level release process are presented in Figure 3-5, Sample BEA Release Timeline. Although relative timing of milestones will differ from release to release, this type of timeline has been used for overall release planning to ensure BEA schedule is consistent with resource availability and other constraints

It is supported by more detailed project plans that specify development periods, milestones, dependencies and responsible persons for all approved development work for a specific BEA release.



Figure 3-5, Sample BEA Release Timeline



In order to optimize the time available for BEA content development, the identification of high-level scope and preliminary planning for a subsequent release begins during the second half of the development cycle of the current release. Also, during this time, an effort to refine the AV-1 at the conclusion of product development is undertaken to identify gaps in the architecture and incorporate findings and recommendations for future architecture content.



4. BEA Development Process

The high-level process performed within each BEA release cycle consists of the following activities:

1. Develop Scope for the Release
2. Plan the Release
3. Develop the Release
4. Conduct Integration and Acceptance Reviews
5. Package and Deliver the Release

This section presents an overview of the BEA development process. Detailed information for performing each activity and associated business rules and procedures are available on the End-to-End Architecture Development Process which is maintained in System Architect.

4.1. Develop Scope for the Release

Each release begins with the receipt of prioritized gaps or business capability improvements for the BEA and a high-level timeline for release activities. This process is triggered by the identification of a focused body of work to be added to a specific release of the BEA, or by the identification of gaps or non-conformances that must be corrected in a specific release of the BEA. During this process, the BIP is completed for proposed changes, Parent and Child CRs are created and approved and the BEP Scoping AV-1s are created. The major tasks performed during scope development follow.

4.1.1. Document Proposed Architecture Changes

Proposed changes to the BEA are documented as BIPs, Parent Change Requests and Child Change Requests.

4.1.1.1. Develop and Approve BEA Improvement Proposals (BIP)

BIPs are developed by the primary stakeholders and submitted to the Architecture Development Lead and Chief Architect for review. While the scope of the proposed changes may impact multiple BEPs, one BEP team is designated as the primary stakeholder and will be responsible for coordinating content changes during the development process. When the review and socialization process for the proposed BIP is completed with all required stakeholders and all proposed BIPs that pass the review process are finalized, they are prioritized to ensure the scope of work proposed can be accomplished during the release cycle and presented to the BTA Director for final review and approval. Approved BIPs for a specific release become the basis for scheduled development as detailed in Parent and Child Change Requests.

4.1.1.2. Create and Approve Parent Change Requests (CR)

A Parent Change Request is created for each approved BIP to track and manage each major focused body of work planned for the release. The BIP is attached to the Parent CR to ensure traceability to the original scoping document. Parent CRs require approval signatures of the responsible BEP Lead, the BEA Chief Architect and the Contractor Architecture Lead. Changes that impact the ETP also require the signature of the ETP Lead. For example, if a new Business Capability is being introduced, its definition must be included in the Enterprise Transition Plan.

4.1.1.3. Create and Approve Child Change Requests

A Child CR is created for each DoDAF product that requires updating to implement the changes defined in the Parent CR. Child CRs need to identify specific changes to architecture products and to contain documentation that allows verification of intended changes in the architecture tool. The approval of a Child CR indicates that changes to the specified DoDAF product are necessary and should be developed within the scope outlined in the Parent CR. The BEP Coordinators will be responsible for opening Child CRs for the BEP developed products. Child CRs



for Enterprise or derived products will be opened by the corresponding Product Leads. Approval of Child CRs indicates agreement on the schedule and resources to develop the BEA release. Child CRs require approval signatures of the BEA Chief Architect and Contractor Architecture Lead. This step represents “authority” to do the work.

4.1.2. Develop AV-1

Concurrently with approval of the BIPs, a BEP Overview and Summary Information (AV-1) document is developed to describe the scope of planned changes with respect to each BEP. The structure and content of the BEP AV-1 is based on DoDAF guidelines and includes the BEP purpose and viewpoint, BEP context and information about the scope of work to be performed for the release. The scope of the BEP AV-1 should reflect the approved BIPs for each release. The BEA AV-1 is developed from the BEP AV-1 documents to provide a total overview of the BEA release. Near the conclusion of product development, the AV-1 is updated to incorporate BEP findings and recommendations.

4.2. Plan the Release

The detailed plan for a release is developed after the scope is identified based on the approved BIPs. Resource requirements for BEP functional experts and BTA modeling support are determined based on the functional scope and architecture products impacted by each planned capability improvement (i.e., Parent CR). Given the spiral development process employed for the BEA, an architecture product may need to be updated by multiple Parent CRs. Workshops must be carefully planned to provide a stable baseline for sequential changes and to optimize resource utilization. The major tasks performed during release planning are updating the integrated schedule and approving Child CRs.

4.2.1. Update Integrated Schedule

Through a process of balancing resources against scope requirements, a detailed schedule is developed for each Parent CR to identify the start and stop dates for development, integration and product review of each Child CR. If the proposed content exceeds available time and resources, this process will feed back to scoping for adjustments to the release content. Alternatively, time and resources are adjusted to accommodate the prioritized scope.

4.2.2. Approve Child Change Requests

Approval of Child CRs indicates agreement on the schedule and resources to develop the BEA release. Child CRs require the signature of the responsible BEP Lead or the BEA Chief Architect for approval, as well as other key roles as outlined in the E2E Architecture Development Process. This step represents “authority” to do the work.

4.3. Develop the Release

Architecture development begins once the Child CRs have been approved and is conducted by BEP Teams working in parallel to develop BEP-specific DoDAF products. During this process, workshops are conducted to collect requirements to update an architecture product per each Child CR. During a series of development workshops, the requirements are analyzed, the architecture product is updated and impacts to other architecture products are identified. An Integration session is conducted at the end of the development phase to ensure that all content issues have been addressed. Following the Integration session, a Product Review session is conducted to verify technical architecture compliance to modeling guidelines. The completed product is then presented to the BEPs for approval. This process ends with BEP approval of the developed Child CR. As cross-BEP touch points and/or shared objects are addressed, BEP teams work collaboratively to ensure consensus and real-time integration. The major tasks performed during release development follow.

4.3.1. Conduct Pre-Workshop Activities

Pre-workshop activities are an opportunity for BEP Leads, if desired, to assemble teams, brief team members on BEA/BTA processes and procedures, and provide other guidance as necessary. Pre-workshop activities may be conducted to develop draft architecture products for review and refinement during product development



workshops. To accomplish this, BEP Leads may reach out to the subject matter expert community for their input. Where applicable, the results of CBM-led Business Process Reengineering (BPR) efforts are brought forward for incorporation in the BEA. Pre-workshop activities may serve to familiarize other BEP Teams with the content to identify impacts.

4.3.2. Conduct Workshop Activities

Once the BEP Leads have conducted pre-workshop activities, workshop activities begin. Architecture products are reviewed and refined during workshops based on the spiral development process outlined in Figure 3-3. During each product development workshop, diagrams are marked up and technical notes are recorded to documented discussions and decisions. After each workshop, modelers analyze decisions, identify impacts to other architecture products, apply changes to the architecture repository and prepare questions for the next workshop session. A workshop concludes when participants agree the updated diagrams and definitions match the decisions documented in the technical notes and the product meets the objectives defined in the Child CRs and the BIPs.

4.3.3. Develop Supporting Products

In addition to the work products specifically listed in the DoDAF, supporting products are developed and included in the BEA to provide management perspective and architectural context. Supporting products include the BEA Release Summary, the LRP Repository and the HTML version of the BEA.

- **BEA Release Summary:** At the conclusion of each release, a summary document is developed that explains the changes between the current and previous release as well as any new supporting products or visualization features being delivered. Architecture configuration management statistics are also provided that, over time, will provide a guide as to the size and impact of change from one release to another.
- **LRP Repository:** With each BEA release, a series of LRP Baseline reports are delivered as well as a repository database of all of the source documents as a tool for the functional community to use. These supplemental reports cover those laws, regulations and policies that are mapped into the BEA, which remains the authoritative source for laws, regulations and policies. The LRP Repository is delivered with the BEA to provide users with the current set of compliance constraints and their linkages to the BEA. The scope of each baseline includes all authoritative constraint information delivered in that version of the BEA, as well as any additional authoritative source updates approved by the Core Business Missions.
- **HTML:** HTML is developed to format and present the integrated BEA in a more user friendly version than that presented in the core architecture development tool. HTML requirements (identified during scoping) provide guidance for new web content or navigation capabilities (for example, linking System definitions to the ETP). Draft HTML is used during Product Review sessions. Creating the linkage with the ETP is critical to HTML development.

4.3.4. Conduct Integration Session and Product Reviews

After an architecture product is completed in a workshop, an Integration session is conducted to ensure that the changes made in the workshop are correct and complete within the scope of the BIP and the related CR's. Participants include BEP Leads and Coordinators, Product Leads, representatives from Architecture Verification and IV&V, and all stakeholders affected by the changes agreed to in the workshops. Product checklists and architecture reporting tools are used to review the completed product for architectural integrity and conformance to modeling guidelines. All outstanding questions and remaining issues are documented and action items are assigned for resolution at the conclusion of the integration session.

If a significant issue with the product is identified during the integration session which requires additional time to analyze and resolve, the scheduled Product Review session will be delayed until the issue is resolved. At the end of that session, additional work sessions should be scheduled for resolution of the issue, and the Release Manager should be notified in order to adjust the development schedule and reschedule the Product Review and BEP Vote as appropriate. When the significant issue is resolved, a follow-on Integration session may be scheduled to ensure that the resolution is agreed to by all stakeholders.



After a successful Integration session, the Product Review session is conducted to ensure that all technical architectural requirements have been met and that the work was implemented as described in the CR documentation. Required Product Review participants include Architecture Verification, IV&V, and at least one representative for each BEP. Any remaining issues are identified in the meeting minutes and corrected prior to the BEP vote. If the issue cannot be resolved within the scheduled timeframe, the BEP vote is delayed until the issue is resolved.

4.3.5. BEP Approval

After an architecture product has completed the Product Review, it is presented to the BEP Leads for a vote. CR documentation for review, containing all the artifacts provided in the Integration sessions and Product Reviews, is posted to the “Virtual Folders” on the BTA portal.

BEP Approval indicates that the business information is properly represented in the architecture product. BEP Approval is documented by means of electronic vote and subsequently the Child CRs are moved from the “Approved to Dev” state to the “Awaiting Integration” state.

4.4. Conduct Integration and Acceptance Reviews

As products are completed and approved by the BEP Leads (i.e., Child CRs at “Awaiting Integration” state), selected product sets enter integration and acceptance review and the Child CRs are moved to the “Integration Test” state. This is accomplished in three phases:

1. Integration and HTML Review
2. External review of BEA
3. BEP Acceptance Review

At the conclusion of the BEP Acceptance Review, the BEP Leads vote to accept or reject the planned release.

This process begins when all required Child CR's for a given integration review are in the "Integration Test" state, the necessary HTML has been generated and Integration Test Kickoff(s) have occurred.

During execution of the Integration and HTML Testing activities, BEA products are reviewed for identification of issues related to integration across products and BEPs. [Additional unit testing is not prohibited and may occur as a consequence of other testing.] Any discrepancies that are identified are recorded in Merant Tracker as Test Tickets (Child or HTML). Each Child or HTML Ticket is then reviewed to determine which of the following actions will be taken:

1. Cancelled - Tickets can be cancelled for numerous reasons, including lack of validity, lack of reproducibility, duplication, if the condition reported becomes overcome by other events (OBE).
2. Deferred - Tickets can be deferred to a future release for reasons such as inadequate schedule or resources, or need for further analysis.
3. Completed - Tickets that are completely addressed (to the satisfaction of the submitter or the submitter's organization) within the given release will be designated "complete" (state).

The major tasks performed for integration and acceptance reviews follow.

4.4.1. Integration and HTML Review

The BEA is delivered in two formats; Telelogic System Architect and HTML. During Integration and HTML Review, both formats are examined to ensure the quality and usability of the products to be included in the release as follows.



4.4.1.1. Integration Review

The BEA is a fully integrated architecture. DoDAF 1.5 defines an Integrated Architecture as one in which architecture data elements are uniquely identified and consistently used across all products and views within the architecture. Integration Review includes a technical review and a functional review of the updated BEA and supporting products. The technical review verifies proper linkages between architecture products. The functional review verifies that diagrams and definitions accurately reflect intended outcomes based on the scope of the release. During Integration Review, linkages to the ETP are also verified via ETP integration sessions. Child Tickets are opened to document any defects or deficiencies against each architecture product. Once a problem is resolved, the Child ticket submitter must verify the resolution of the ticket which is subsequently sent to Architecture Verification for final review. Integration Review is complete when all Child CRs for the release have been reviewed and all Child Tickets have been completed, cancelled or deferred.

4.4.1.2. HTML Review

The purpose of the HTML Review is to test the usability of the HTML and to verify that it meets requirements defined in the HTML specification. As part of this review, both internal and external linked are checked using automated tools and manual efforts. HTML Tickets are opened to document any defects or deficiencies identified. Once a problem is resolved, the HTML ticket submitter must verify the resolution of the ticket which is subsequently sent to Architecture Verification for final review. HTML Review is complete when all HTML functions have been reviewed and all HTML tickets have been completed, cancelled, or deferred.

4.4.2. External Review of BEA

The purpose of the external review of the BEA is to allow external stakeholders to review and provide BTA comments and insights prior to the general publication of the release. Examples of external review customers include the CIO and/or the DBSMC. During this review cycle, BEA and ETP content are aligned and a review website is populated, tested and made available for access by the External BEA Review audience. A kickoff presentation for the External BEA Review is developed which will announce the timeline, scope and process for review activities and communication of feedback. Findings and Recommendations from the Final BEA AV-1 from the prior release are also provided.

Upon receiving and coordinating disposition of comments from the External BEA Review Participants, BTA in turn will communicate the final resolution or disposition of comments back to External BEA Review session participants prior to receipt of the endorsement of the current BEA release from the External BEA Review session Leadership/POC. Moreover, a final presentation for delivery to external customers is developed and delivered stating the results of the External BEA Review session.

4.4.3. BEP Acceptance Review

At the completion of Integration and HTML Reviews, the planned release is presented to the BEP Leads or designees for an acceptance review period, during which the final HTML version of the BEA is reviewed for accuracy in content and linkages. BEP Leads, BTA Architects and applicable Product Leads vote to accept the architecture products in the BEA release. The votes are sent in electronically, recorded, posted and distributed to stakeholders.

During this period, the BEA is also socialized with other appropriate stakeholders, such as PSAs, CBM Leadership, and Component representatives.

4.5. Package and Deliver the Release

At this point in the release cycle, the BEA has been accepted by the BEPs and the external review customers. This process is triggered when all Parent Change Requests for a BEA release have moved to the "BEP Accepted" State. The BEA HTML is then integrated with other deliverables, to include the ETP, and tested. At the successful conclusion of testing, the BEA is packaged and delivered on a Compact Disc (CD) and delivered to the Government. Upon Government acceptance, the new release is posted to the BTA Web site.



During execution of Package and Deliver activities, stakeholders continue to review BEA products for identification of issues with the current release. Changes to the architecture that are identified post BEP acceptance of the Parent Change Requests will be managed by creating two new Parent Change Requests; one for in-scope content related issues and one for in-scope non-content related issues. The new Enterprise Parent Change Requests are created by the Government CM lead and authorized by the Chief Architect and the support team. Child and HTML tickets will be issued against the new Parent Change Requests.

All in-scope content related issues will be reported to the Chief Architect's support team to record the issue in Tracker as a child ticket. In-scope content related changes that require more than one business day to complete must be approved by the BTA Director, EP&I Director, or the BTA Chief Architect. In-scope content related issues that can not be resolved within one business day (not including verification) or that cannot be resolved due to schedule will be documented in a child ticket and automatically deferred. All issues requiring BEP input for resolution are content related.

All out-of-scope content related issues identified by BEP Team personnel should be documented in the BEP AV-1 Findings and Recommendations. Out-of-scope content related issues identified by EP&I or IV&V personnel should be documented in a suggestion ticket.

All non-content related discrepancies that are not HTML related are presented to the Test Ticket Coordinator to record the issue in Tracker as a Child Ticket. All non-content related discrepancies that are HTML related are presented to the Visualization Team lead to record the issue in Tracker as an HTML Ticket. In-scope content or HTML related issues that cannot be completed due to schedule will be documented in a Child or HTML Ticket and automatically deferred.



5. Using Technology to Support the Release

Several key technologies are critical for the development of the BEA. These include a Document Control Tool, an Issue Tracking Tool, the BTA Portal, an Architecture Development Tool Set, a Requirements Capture Tool, and the Architecture Artifacts Reporting Tools.

5.1. Document Control Tool

A Document Control Tool is required for version control of the BEA artifacts and BEA-related products. It is the repository where the history of changes made to each artifact is recorded. Each delivered artifact is checked into the tool and assigned a version label with the BEA release number. Daily updates are retained on a weekly basis. The Configuration Management (CM) Team provides daily operational support.

5.2. Issue Tracking Tool

An Issue Tracking Tool is required to document and manage the status of defects, changes and issues identified during the BEA development process. This tool allows a user to document issues or requested changes to architecture products, to establish priorities, to assign ownership, to track issues from submission to resolution and to maintain history. The tool also allows monitoring of states on all items as they progress through the various stages of the process. The Issue Tracking Tool provides a single point of control for communication among team members on the status of recorded issues. It also provides additional functions that permit generation of queries and reports. The CM Team provides daily operational support.

5.3. BTA Portal

BTA Team Workspaces, located on the BTA Portal are used to facilitate collaboration and communication between team members. Access privileges and content resident within team workspaces are managed by designated content managers and team leaders.

Some specific uses for the team workspaces are:

- Sharing, collaborating on and retaining versions of documents
- Delegating and sharing tasks
- Sharing and targeting information to smaller, more focused groups
- Managing meetings
- Accessing Integration Packages
- Creating convenience URL links to internal and external references such as the BTA Web or other Workspaces

The following are examples of active team workspaces that were created to support the BEA:

- The BEA Information Hub is a one-stop shop for the management of and access to information regarding the current BEA development effort.
- The BEA HTML is a centralized workspace to support the development of the HTML that will be delivered as the BEA.
- The E2E Process workspace provides access to information about the process, procedures and forms used to develop the BEA.
- The AV-1 Documents for Review workspace provides for housing and managing versions of BEP and BEA AV-1 Products. Workspaces are used to organize AV-1 documents by BEA release.

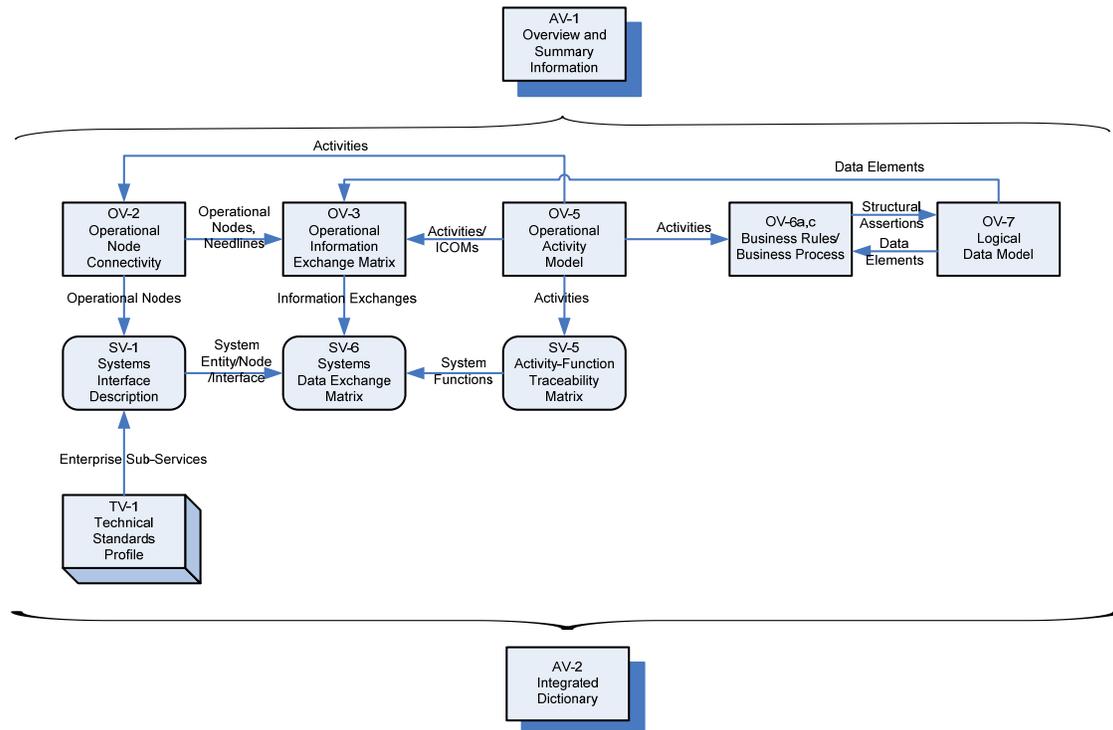


5.4. Architecture Development Toolset

An architecture development toolset is used to produce DoDAF products. The definitions, techniques and standards to produce the DoDAF products are contained in the APG.

Figure 5-1, BEA DoDAF Products depicts the BEA DoDAF products with linkages and the main data exchanges or flows. The shapes of the products designate the type of product, i.e., All View, Operational View, Systems View or Technical Standards View.

Figure 5-1, BEA DoDAF Products



5.5. Requirements Capture Tool

The Requirements Capture Tool maintains the LRP database interfaces with the architecture development toolset to allow information to be transferred between these tools. Once in the requirements capture tool, information can be linked to compliance constraints utilizing the integrated tool functionality. Elements of Laws, Regulations and Policies (constraints) are associated with appropriate architectural elements (such as Business Process Modeling (BPM) Processes) in the BEA. Once associations are made, gap reports are produced showing existing processes without constraints. This interface is refreshed after each new encyclopedia build is updated.

Utilizing the results of this interface and additional data, controls can be associated with architecture objects. Reports can then be generated which include architecture object/control associations for the BEA, by BEP or any gap among architecture objects and controls.

5.6. Architecture Artifacts Reporting Tools

Several architecture artifacts reporting tools are provided to assist modelers in developing the BEA.

The electronic BEA Analysis and Reporting Tool (BART) is a set of reports available from a custom-built Web application designed to check a target encyclopedia for compliance to modeling guidelines as stated in the APG.



The BEA Compare Report consists of a set of reports available from a custom-built Web site designed to compare definitions and diagram characteristics between two encyclopedias and confirm if updates to the BEA were made correctly.

The BEA Thread Tool provides detailed mappings of selected related BEA artifacts. The Thread Tool allows users to create ad hoc reports that follow the relationships between BEA objects to quickly and accurately identify possible gaps and to analyze the impact of changes throughout the architecture.

These reporting tools are organized by architecture product and object. Reports can be run by modelers, primarily during development, or participants of product review or integration sessions to analyze integration issues and address the impact of proposed changes.



6. Summary

This BEA Development Methodology (BDM) is a living document that outlines the methodology and repeatable process used to evolve the BEA. At the conclusion of each BEA release, the BDM and related documents are reviewed and updated to incorporate any lessons learned, new development methods and Decision Memoranda developed prior to the release as evidenced by the inclusion of the “Top-down and Bottom-up” approach and the new BEA Governance Model. The intent is not to continuously reinvent the process and approach to developing the BEA, but to refine the methodology as appropriate to adjust to real-time learning that supports BTA’s goal to produce an architecture that can be harnessed as an executive decision-making mechanism while simultaneously supporting the implementation of information technology systems and services.



Appendix A: References

- 1) *BEA Architecture Product Guide* (APG), March 14, 2008
- 2) *BEA Configuration Management Plan*, Version 5.0, February 29, 2008,
http://bta-is-w-1.btads.bta.mil:8080/BTA/Release_Management/ConfigurationManagement/Plans
(**Note:** Requires access to Version Manager)
- 3) *Federation Strategy and Roadmap*, January 29, 2008,
http://www.defenselink.mil/dbt/federation_strategy.html
- 4) *Business Transformation Guidance* (BTG), Version 1.1, July 6, 2007,
<http://www.defenselink.mil/dbt/products/BTG/index.html>
- 5) *Concept of Operations for BEA Requirements*, September 14, 2007,
http://www.defenselink.mil/dbt/products/BEA_CONOPS_14SEP2007.pdf
- 6) *DoD Architecture Framework* (DoDAF), Version 1.5, April 23, 2007
- 7) *End-to-End (E2E) Architecture Development Process* Share Point site, October 22, 2007,
https://btaportal.bta.mil/beat_val/E2E_Dev_October_22_2007/default.htm
- 8) *Enterprise Transition Plan*, September 28, 2007,
http://www.defenselink.mil/dbt/products/2007_BEA_ETP/etp/ETP.html
- 9) *Version Manager Users' Guide*, July 19, 2006,
http://bta-is-w-1.btads.bta.mil:8080/BTA/Release_Management/ConfigurationManagement/Procedure/PVCS_VM,
(**Note:** Requires access to Version Manager)

