



NASA Procedural Requirements

COMPLIANCE IS MANDATORY

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Subject: NASA Enterprise Architecture Procedures

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CHAPTER 5: Enterprise Architecture (EA) Requirements

5.1 EA Goals and Objectives

5.1.1 EA is a strategic information asset that identifies the Lines of Business (LoB) for the Agency; the services in support of the LoB; the information, technologies, and systems necessary to create and perform the services; and the transitional processes for implementing new services, technologies, or systems in response to the changing needs of the Agency's mission LoB. The goal is to maintain the EA as the primary authoritative resource for IT planning and execution. This goal will be met through the value and utility of the information provided by EA products developed and maintained under the procedures defined in this NPR. The Chief Enterprise Architect (CEA) or designee will make information contained within the EA Repository available to NASA staff for use in evaluating and planning for IT investments. Personnel responsible for IT planning, development, and implementation shall periodically review the EA to ensure that their IT projects are in compliance with the Enterprise Architecture and support the strategic goals of the Agency.

5.1.2 EA largely leverages existing, required project management work products and harnesses them so they can be leveraged by the entire Agency. EA is both a source and a consumer of project management artifacts and, therefore, forms an information bridge and repository between the Enterprise current state and future state. EA-required data elements are the normal products of data generated during the phases of IT system life cycle development. The typical project life cycle incorporating EA activities is shown in Figure 2. In principal, EA products are typically developed in the formulation or initiation stage of a project. Services are subject to EA Review at any time in their life cycle. Projects may also undergo directed reviews at any point in their life cycle. This is presented in greater detail in Chapter 7.

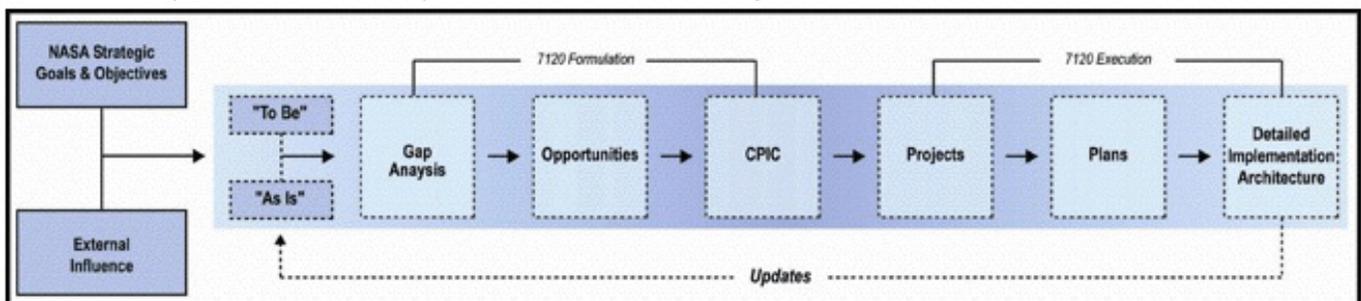


Figure 2

5.1.3 The inclusion of EA information in the above process cycle indicates the importance of ?As-Is? and ?To-Be? data for NPR 7120.5 formulation activities. Project Managers shall consult the EA Repository in the initiation phase to determine the minimum amount of work and expenditure necessary to accomplish the IT mission or goal. This is accomplished through a gap analysis between the current state and the desired state. The opportunities identified by the gap analysis activity are documented in a business case analysis. This analysis is then submitted to the Capital Planning and Investment Control (CPIC) Process for review and approval. The approved project follows its detailed technical planning, execution, and completion phases. As these phases are completed, various management by-products must be generated, and information in the EA Repository must be updated to assure the repository maintains the most current information about NASA?s IT investments (see section 5.2 below). The new project updates the EA ?As-Is? state or the ?To-Be? state, if the project significantly changes NASA?s technology direction.

5.1.4 To achieve the benefits of having a well-documented EA, a number of information requirements must be met to support both internal NASA planning activities and delivery of the Office of Management and Budget (OMB) and Government Accountability Office (GAO) mandated reporting requirements. Both OMB and GAO require the submission of annual reporting assessments that determine the growth in NASA?s EA Program maturity against their respective measurement models. The information requirements levied on the system will be commensurate with the system?s maturity, size, cost, and contemplated change impacts.

5.2 Project Management Artifacts List and Submission Requirements

5.2.1 Project artifacts (i.e., objects or processes resulting from project activity) are required to support a well documented EA for a specific project or for a service portfolio. These artifacts should not be new to any project or service currently following existing NPRs. Project artifacts:

- a. Are already required by other existing NPRs. This NPR is not intended to, nor does it call for, change to those existing requirements.
- b. Are specifically related to what shall be reported to the EA Repository.
- c. Include program and project management documentation typically required and created throughout the project management life cycle.
- d. Include information required by OMB reporting processes.

5.2.2 Each of the following requirements will identify primary documents, which are required to supply EA information for either a specific project or a services portfolio. Some of the requirements will also identify supporting documents, which can provide additional instruction and/or rationale for certain requested artifacts. The requirements are:

5.2.2.1 Requirement 1: Project Management Artifact Submission Requirements

a. Primary Documents for projects and services portfolios:

(1) NPR 7120.5 compliant project plan or its equivalent, including the documentation from the system readiness review (SRR), preliminary design review (PDR), critical design review (CDR), and operational readiness review (ORR) presentations.

(2) NPR 7150.2 compliant software plans or their equivalent.

(3) NPR 2810.1 compliant Agency Master Security Plan as defined by the OCIO standard operating procedure (SOP), System Security Plan Template, or its equivalent.

b. Supporting Documents:

(1) NASA NPR-7150.2, Compliant Software Documentation or its equivalent.

c. Project management artifact documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.2 Requirement 2: OMB Reporting Submission Requirements

a. Submission of the OMB 300 for incorporation into the EA, with emphasis on current state and future state descriptions, will ensure consistency between the OMB 300 submission and the EA submission to OMB in both breadth and depth. OMB 300 currently asks for both a description of the program/project and a series of performance measures and milestones. This data usually can be arranged by current state and future state along with a gap analysis and transition plan. This information will help map and define the overall future state of the EA and provide other NASA developers with the ability to leverage any designs or engineering performed under the program/project.

b. Primary Documents:

- (1) OMB 300's Capital Asset Plan.
- (2) OMB 300's Business Case or equivalent.

c. Supporting Documents:

- (1) OMB Circular A-11. (Defines OMB 300's reporting guidelines).
- (2) OMB Circular A-130. (Reference for using the CPIC Process).
- (3) Capital Planning Investment Control (CPIC). (Reference for Business Case Development and Capital Asset Plan.)

d. The OMB documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.3 Requirement 3: FEA Reference Model Classification Submission

- a. a. Complete a mapping to the Federal Enterprise Architecture (FEA). The FEA consists of a set of interrelated reference models designed to facilitate cross-Agency analysis and the identification of duplicative investments, gaps, and opportunities for collaboration within and across Federal agencies.

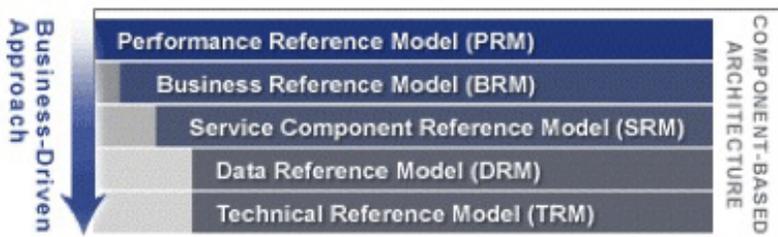


Figure 3

OMB also requires this data during the annual EA audit.

b. Primary Document:

- (1) Federal Enterprise Architecture (FEA) Reference Model Classifications: Mappings to the FEA, BRM, SRM, TRM, DRM.

c. These documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.4 Requirement 4: NPR 7120.5, Program and Project Management Document Submission Requirements

a. The program and project plans detail the approach and plans for formulating, approving, planning, implementing, and evaluating programs and projects. This ensures that the Agency and all supporting organizations understand the programmatic, technical, and management system requirements and commit to providing the necessary resources. NPR 7120.5 also requires the capture of knowledge and the commercialization of technology, where applicable. The knowledge capture component directly supports the EA initiative as it applies to IT.

b. The CEA will designate specific programs and/or projects for which documentation shall be submitted.

c. The combined collection of NPR 7120.5 plans, which will:

- (1) Allow assessment of initial designs against the baseline architecture.
- (2) Allow assessment of EA inventories for reusable assets.
- (3) Allow assessment of EA inventories for reusable designs.
- (4) Permit leveraging of existing talent and prior knowledge work across the Agency to reduce duplicative development work.
- (5) Provide data to generate initial designs in a cognizant, contextual manner.
- (6) Allow the development of initial designs that align with the ?As-Is? or ?To-Be? architecture.
- (7) Promote standardization.

d. These documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.5 Requirement 5: NPR 7150.2, Software Engineering Documentation Submission Requirements

a. NASA makes significant investments in software engineering to support the Agency?s product lines. NASA must ensure that programs, projects, systems, and subordinate systems that utilize software follow a basic set of requirements. Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software. With much of the cost of developing systems tied to software development, it is important that any significant work performed be leveraged to the maximum extent possible through incorporation into the EA.

b. Primary Documents:

- (1) Documentation that is required for compliance with NPR 7150.2.
- (2) The Agency CIO/CEA will designate specific software projects for which this documentation shall be submitted.

c. The documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.6 Requirement 6: NPR 7150.2, Software Documentation Standard Documentation Submission

a. NPR 7150.2, Chapter 5, is designed to support the documentation of all software developed for NASA. IT provides a framework and model for recording the essential information needed throughout the life cycle development and maintenance of a software system.

b. The project manager must ensure compliance with NASA NPR 7150.2 by tailoring project software to a minimum set and by ensuring that the resulting documentation meets the following criteria:

- (1) The documentation goals of the project are adequately satisfied.
- (2) Clear descriptions of the software management, engineering, and assurance processes and products are provided.
- (3) Consistency of format across the project documentation is achieved.
- (4) Traceability to the untailed standard is maintained.
- (5) Traceability between products of each phase of the development life cycle is maintained.
- (6) Specified information is captured and retained during the development effort and, therefore, is crucial to determining the updated ?As-Is? state of the EA.

c. The documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

d. Projects started after September 27, 2004, shall use the software documentation requirements of NPR 7150.2, Chapter 5.

5.2.2.7 Requirement 7: CPIC -- Mission Directorate/Mission Support Office/Center IT CPIC Result Submission

a. The NASA Integrated IT CPIC process is an integrated approach to managing IT through continuous identification, selection, control, life cycle management, and evaluation of NASA's entire IT investment portfolio. The CPIC process ensures that all IT capital investments are aligned with the Agency's mission, EA, and business needs, while balancing risk and return throughout each investment's life cycle.

b. Primary Document:

(1) The Investment Portfolio. Follow the instructions in Appendix C, Investment Portfolio Requirements.

c. The documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.8 Requirement 8: Compliant IT Security Plan Submission Requirements

a. All IT master systems and their subordinate systems must have complete

security plans in place following the Agency CIO SOP, Information Technology System Security Plan. The master and subordinate systems must be fully certified, accredited, and have an authorization to operate. This can be accomplished by compliance with the requirements set forth in NPR 2810.1, Security for Information Technology and NIST SP 800-37, Guide for the Security Certification and Accreditation of Federal Information Systems.

b. The Agency Deputy CIO for IT Security shall collect and make available IT security system plans and information for inclusion in the NASA EA Repository. The accumulation in the EA Repository of security plans will provide a valuable resource that can be leveraged for the new system developments or modifications.

c. Security plans with sensitive information, which must be protected appropriately, shall be stored in the single authoritative source for security plans. The EA Repository shall have a reference that indicates where the security information can be obtained.

d. Primary Document:

(1) The completed Executive Summary for Master System Security Plans, as defined in the Agency CIO SOP, Information Technology System Security Plan.

e. For EA reviews, the documents shall be submitted to the CEA or designee by the Program or Project Manager. The CEA or designee shall enter the documents into the EA Repository.

5.2.2.9 Requirement 9: Certification of compliance with NASA's EA "To-Be" state

a. IT investments will be classified according to whether they are a new capability to be developed, which will undergo a project review, or are a continuing investment for an ongoing service, which will undergo a service review. The specific reviews and products vary slightly and are described separately in Chapter 6.

b. All IT investments shall be certified for compliance with the NASA EA, in particular, compliance with the EA "To-Be" state. This certification will take one of three paths depending upon the owning investment portfolio and whether the investment is a new or existing service.

(1) All investments in the OAIT investment portfolio, projects, and services will undergo an EA review according to the specifications described in Chapter 6. The CEA or designee will conduct the review. The project or service manager will provide review materials. Upon completion of the review, the CEA will certify compliance, issue a waiver for compliance, or recommend termination of the investment.

(2) Multi-Program/Project - The Mission Directorate program managers and Mission Directorate CIOs are responsible for providing semiannual updates to the NASA EA and for determining if EA project reviews or annual service reviews are required in accordance with the specifications described in Chapter 6. The project or service manager will provide review materials. Upon completion of the review, the CEA will certify compliance, issue a waiver for compliance, or recommend termination of the investment.

(3) Program/Project Unique - The Mission Directorate program managers and Mission Directorate CIOs

are responsible for providing semiannual updates to the NASA EA and for determining if EA project reviews are required in accordance with the specifications described in Chapter 6. The project or service manager will provide review materials. Upon completion of the review, the CEA will certify compliance, issue a waiver for compliance, or recommend termination of the investment.

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