



Enterprise Applications Service Technologies (EAST) 2

Attachment L-B Background and Historical

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1 NASA ENTERPRISE APPLICATIONS COMPETENCY CENTER (NEACC) BACKGROUND

1.1 Introduction to the NEACC

The NASA Enterprise Applications Competency Center (NEACC) is responsible for implementing, operating, and maintaining a broad spectrum of NASA's Enterprise Applications, as well as for supporting the extended Enterprise Applications stakeholder and End User communities. The NEACC was established in 2002 in conjunction with the implementation of the Core Financial System—NASA's first integrated, Agency wide Financial Management application deployed under the Integrated Enterprise Management Program (IEMP). In establishing the NEACC, key components of Gartner's Competency Center model were adopted; namely the emphasis on fully integrating business process expertise with application and technical know-how. As a result, the NEACC is comprised of multiple Delivery Functions that encompass business process functional support, application development and quality assurance, and application and technical operation functions.

The NEACC continues to be engaged in both sustaining operations activities as well as in the implementation of new applications and capabilities and the scope of the NEACC's work continues to expand.

1.1.1 DISCLAIMER

The background and historical data contained herein is not intended to restrict prospective offerors in their approach to proposal preparation. This information is provided for the sole purpose of giving all offerors a better understanding of the requirements contained in this solicitation. The information provided constitutes a historical overview of the NEACC operations. The Service Request data provided in Attachment **L-B1**, *Background and Historical Resource Baseline* consists of a snapshot of data from February 1, 2013 - January 31, 2014 for Enterprise applications and October 1, 2013 – September 30, 2014 for MSFC applications. The historical data provided herein is subject to modifications due to hardware/software technology changes, changing information in resource management philosophies, process changes, current trends, new developments, and other factors. This historical data does not necessarily reflect the optimum approach for performing the work requirements and, further, should not be construed as being precise parameters governing the size of the effort. Further, the quantity of work to be performed may vary as the NEACC workload expands, or changes, due to changing roles of NASA and/or our funding from Congress. Such changes are considered to be within the general scope of the EAST 2 contract.

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The NEACC is a service organization managed out of the Agency Office of Chief Information Officer (OCIO). The MSFC OCIO retains oversight and input into the activities of the NEACC, while the Agency OCIO and Agency Governance bodies manage the application portfolio and set the general direction for the applications and platforms to be included in the NEACC scope. With the transition from the EAST to the EAST 2 contract, some applications and platforms that were not previously included in NEACC scope have been added. As the Agency continues to refine its Enterprise Architecture strategy and supporting services and portfolios, the NEACC may experience additional changes in scope throughout the life of the EAST 2 contract.

The NEACC is currently located at the Marshall Space Flight Center (MSFC) in Huntsville, Alabama. MSFC occupies about 1,800 acres located within the U.S. Army's Redstone Arsenal in Huntsville, AL. MSFC-managed satellite locations include: a) Michoud Assembly Facility (MAF) in New Orleans, LA, which will be used to manufacture the Space Launch System's (SLS) rocket; b) National Space Science and Technology Center (NSSTC) Executive Office located near the University of Alabama in Huntsville, AL; and c) resident offices at other NASA sites and contractor locations.

In February 2011 the NEACC transitioned from the UNITEs cost reimbursement type contact to the Enterprise Applications Service Technologies (EAST) firm fixed price contract. The NEACC made the transition to a firm fixed price contract in order to:

- Better contain costs
- Improve Demand and Capacity Management
- Increase visibility into resource utilization and productivity rates
- Optimize the overall efficiency of the NEACC

The NEACC had many valuable lessons learned from the EAST contract that it now strives to apply where applicable to the EAST 2 contract.

Below are the NEACC goals which will continue to be followed through the EAST 2 contract:

1. Serve as effective partners with NASA Centers, programs and projects throughout the project development and operations lifecycle such that the Agency's IT investments are optimized, agile, and responsive to customer needs.
2. Optimize the use of standardized IT solutions that meet Agency and Center needs, improve IT security posture, eliminate redundancies, and meet external stakeholder mandates.
3. Achieve development and operations efficiencies, by utilizing common processes and infrastructure across the NEACC-managed Enterprise and Center application lifecycle.
4. Work with other Service Areas to develop an integrated architecture that supports the Agency's IT strategy and Enterprise Architecture.
5. Continually assess NASA's IT architecture to identify opportunities for new technology and process insertions that improve efficiency/capabilities, increase agility, reduce cost, and better enable NASA's mission.

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This Background and Historical section seeks to provide an overview of the current state of the NEACC, including: organizational structure, service offerings, processes, key technologies, and historical data. The information in this section—and in supporting reference documents located on the EAST 2 website: <https://www.nssc.nasa.gov/east2> is offered to facilitate a further understanding of the NEACC’s current scope and historical context, as well as opportunities and challenges. It does not, however, necessarily reflect the future direction, requirements, or improvements sought in conjunction with the EAST 2 contract. The Performance Work Statement in Attachment **J-1** should therefore be considered the sole reference for requirements associated with the EAST 2 contract. The NEACC is dependent on other contracts and providers for many of the core services required to operate the NEACC. This document also attempts to describe those touch-points and the resulting dependencies.

1.2 Government Retained Authorities

1.2.1 NASA Enterprise Applications Competency Center (NEACC) Management

1.2.1.1 NEACC Organizational Structure

The NEACC is managed out of the MSFC Office of Chief Information Officer (OCIO) and is aligned with the Enterprise Applications Service managed out of the Agency Office of the Chief Information Officer. The Agency OCIO Enterprise Applications Service Executive acts as the overall Program Executive for the NEACC and for the systems managed within the NEACC scope.

The NEACC Director has overall responsibility and accountability for all NEACC operations. The areas of NEACC Program Management and Business Readiness (Corporate Change Management) are included within IS01. IS60, with the largest number of civil servants, is responsible for providing Business Process Support and Application Operations functions. IS70 is responsible for delivering all Infrastructure and Operations services required by the NEACC, including functions currently provided by the NASA Data Center (NDC) located at MSFC and supported by the Marshall Information Technology Services (MITS) contract. IS80 is responsible for delivering Application Development, Architecture and Strategy services and for overseeing the delivery of the Product Lifecycle Management, Business Intelligence, and Enterprise Service Bus/Center for Internal Mobile Applications Lines of Business.

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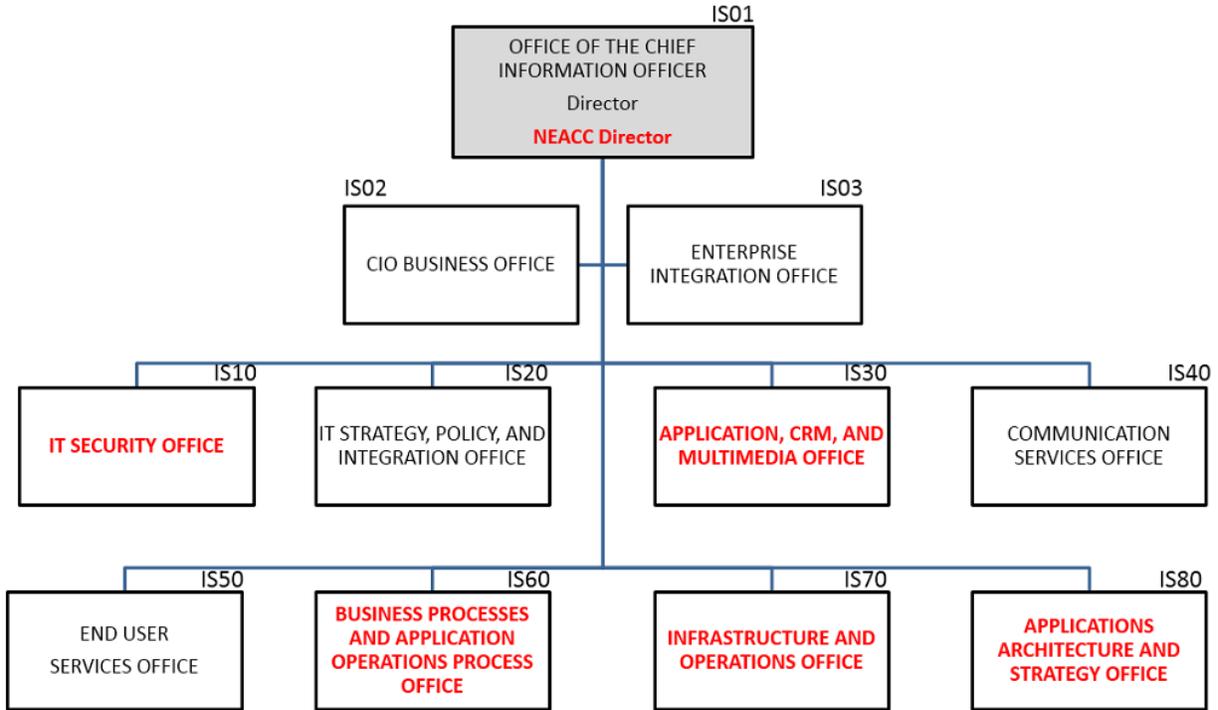


Figure 1.1 – Current MSFC OCIO Organization Chart

The Government is responsible and accountable for efficiently managing the NEACC and for achieving the service levels established with its stakeholder communities. While the EAST model shifted more responsibility to the Contractor for operating the NEACC and ensuring that service levels are attained, the NEACC Director retains overall accountability for the NEACC management and operations.

The NEACC organization is in the process of restructuring in order to recognize the role of the Enterprise Application Service Executive role and to pursue similar synergies across the civil service teams to support both the Enterprise and Center-specific applications under the EAST 2 contract. The proposed structure below reflects the NEACC as the Applications Management group which is a combination of the current IS30, IS60, and IS80 organizations.

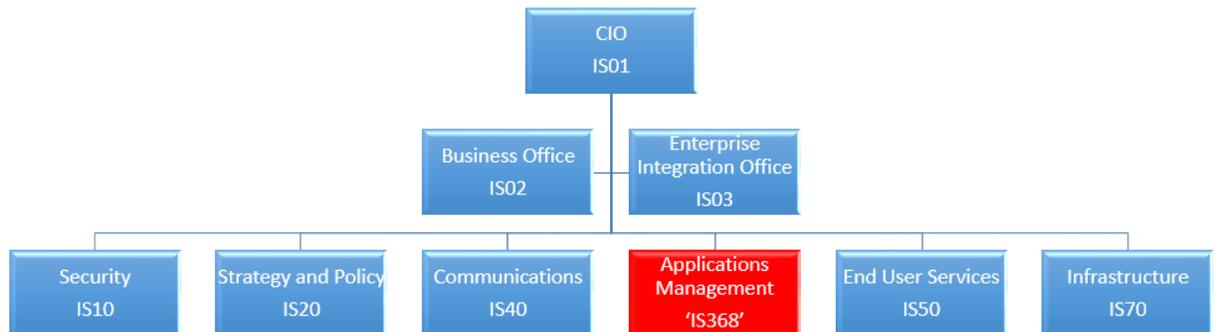


Figure 1.2 – Proposed MSFC OCIO Organization Chart

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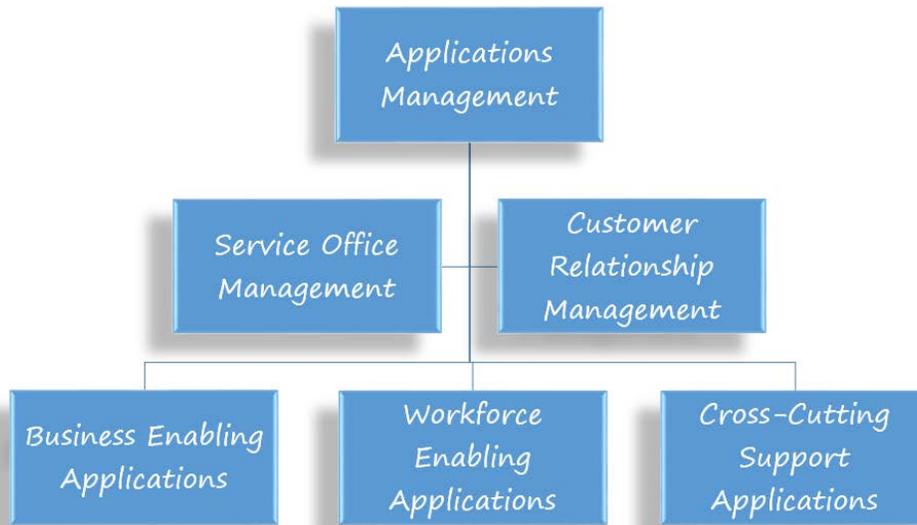


Figure 1.3 – Notional NEACC Management Model

The proposed NEACC organizational structure is still being refined and does not necessarily reflect the final future structure of the NEACC under the EAST 2 contract.

For additional information on the NEACC reorganization, refer to document “NEACC Reorganization Update 02202015” on the EAST 2 website: <https://www.nssc.nasa.gov/east2>.

1.2.1.2 Governance Processes

Enterprise Applications Governance Process

NASA’s IT governance provides complete strategic coverage of the lifecycle of an IT investment – from the initial decision to fund a proposed investment, to oversight of its implementation and operations, and decommissioning. Each of these lifecycle phases has associated with it unique milestones and metrics that require different activities and therefore different memberships. Within the IT governance model approved by the Mission Support Council (MSC), there are several boards:

- Business Systems Management Board (BSMB):
 - This board – consisting of senior stakeholders representing the Agency’s business system functional owners and users – oversees and makes decisions regarding specific strategy, operational performance, integration, and budget priorities

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pertaining to the Agency's Enterprise Business Systems, unless specifically exempted.

- Enterprise Applications Strategy Board (EASB):
 - The EASB is responsible for ensuring that the Enterprise Applications cross-functional target state architecture and strategic roadmap aligns with Agency priorities, providing visibility for critical and high-risk priorities, and providing advocacy for priorities that require additional funding support. The EASB serves in an advisory capacity to the BSMB, focusing on cross-functional business priorities. In the case of budget changes, the EASB will provide prioritization options and recommendations for BSMB consideration.
- IT Management Board (ITMB):
 - This board – consisting of the CIO, Center CIOs, and Mission Directorate CIOs – makes decisions regarding the Agency's IT infrastructure strategy, operations, and budget. The ITMB also serves as a senior-level Configuration Control Board (CCB) for Agency infrastructure requirements.
- IT Program Management Board (PMB):
 - This board oversees investments during development and implementation, to ensure that approved investments, in accordance with NPR 7120.7, stay on track during formulation, design, and implementation. The PMB focuses on ensuring that projects meet their cost, schedule, and scope commitments until they become operational.

The NEACC works closely with all of the boards listed above. In particular, the NEACC provides information to the EASB to assist them in developing the short and longer-term roadmaps for Agency business applications across each Line of Business. The NEACC also makes presentations to the BSMB to inform their decision making process for investments related to enterprise applications.

The Enterprise applications that the NEACC manages are dynamic and require periodic updates and enhancements to ensure that they maintain relevancy and continue to address the needs of a broad user community. All updates are coordinated as part of the internal NEACC Governance process, which ultimately feeds into the NEACC Release Management activities. The current internal NEACC Governance Process provides a Demand Management capability that ensures incoming requests are evaluated, prioritized, and appropriately sequenced for delivery.

The NEACC Governance process currently consists of a tiered approach. The current Governance tiers, listed from the top down, are:

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- Functional Control Board (FCB)
 - The FCB is a working group responsible for managing and prioritizing all Applications Enhancement change requests for a specific functional Line of Business (e.g., Logistics, Financial, and Human Capital & Workforce). Each FCB is led by the Agency Business Process Lead for a specific Line of Business. The FCB membership is comprised of Government personnel who represent Business or Subject Matter Experts (SMEs) from across the NASA centers.

- Cross Organization Review (CORE)
 - The purpose of the CORE meeting is to provide status, review new initiatives and communicate NEACC work priorities. The CORE team acts as a high level, cross-organizational body that reviews inputs of all functionally specific control boards, the NEACC Governance Board, technical roadmaps and EAST. This group is committed to working effectively as a team to ensure smooth entry of new initiatives into the NEACC and communicating status of active initiatives. This includes review of cross-organizational business, technical and operational priorities (including external and internal strategic roadmap initiatives), identification of where there are cross-Line of Business (LOB)/Delivery Area capacity constraints/priority conflicts or dependencies on other contracts, and providing guidance/seeking resolution of those conflicts and/or escalation, if necessary, following the defined escalation process.

MSFC Center Applications Governance Process

- Applications Working Group (AWG)
 - The MSFC Application Working Group (AWG) is chartered to disposition proposed changes, deletions or new additions - collectively referred to as Change Requests (CRs) - For applications funded through the MSFC CMO budget. The mission of the AWG, a subordinate body to the MSFC Information Technology Strategy and Investment Board (ITSIB), is to capture, analyze, and prioritize applications CRs in a manner that will enable strategic and efficient use of resources; minimize duplication, risk, and cost; and maximize mission alignment and conformance with the Federal, NASA, and MSFC enterprise architecture. Applications development funded through other sources may be managed through the AWG at the discretion of the funding originator and the MSFC OCIO.

- IT Strategy and Investment Board (ITSIB)
 - The ITSIB ensures alignment and implementation of MSFC IT strategy, policy, investments, and cross-cutting processes consistent with NASA policy and guidelines. The board will also establish baseline IT reporting requirements for Center IT investments, projects, and initiatives.

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- Engineering Management Council (EMC)
 - The Engineering Management Council renders decision, as part of the MSFC Engineering Technical Authority (TA) adjudication process, on alternate or dissenting opinions within Engineering, between Engineering and a Program/Project, or between Engineering and S&MA that cannot be resolved by Engineering line management or at the Chief Engineer's level. This establishes the MSFC Engineering position to be taken forward by the Program/Project Chief Engineer. IF there are alternate or dissenting opinions with the EMC decision by the Project/Project or S&MA, or by an individual within Engineering, the issue shall be taken to the Center Management Council (CMC) for resolution.

- Engineering Enterprise Architecture Committee (EEAC)
 - The Engineering Enterprise Architecture Committee (EEAC) reviews, approves, and controls changes to the baseline configuration and aids the MSFC Director of Engineering and Chief Information Officer in ensuring integration, value, and security of information and the tools that are used in the creation, discovery, analysis, and dissemination of engineering data.

 - Systems Engineering Architectural Working Group SEAWG
 - The Systems Engineering Architectural Working Group provides analysis and makes recommendations on current and future architectural direction, tool decision, and trade studies pertaining to the implementation of MSFC Systems Engineering practices.

- Business Management Council (BMC)
 - The Business Management Council evaluates existing MSFC business and financial management practices and processes them for compliance with existing policy guidance as documented in the Agency Financial Management requirements, and for effectiveness of management controls. The Council also discusses, understands, and challenges the implementation of MSFC business and financial management practices, and where appropriate, explore medications to existing practices and processes to enhance effectiveness and efficiency.

- MSFC Enterprise Architecture Advisory Committee (MEACC)
 - The MSFC Enterprise Architecture Advisory Committee (MEAAC) is responsible to the MSFC IT Strategy and Investment Board (ITSIB) for the execution of enterprise architecture activities including establishing the guiding principles for the MSFC Enterprise Architecture, ensuring architectural direction is aligned with the Agency mission, strategy, and enterprise architecture, and defining the MSFC enterprise architecture roadmaps including version updates and planned requirement of legacy systems and services.. In addition, the MEAAC will baseline and control systems configuration documents and changes to the IT applications and IT infrastructure services portfolios, review new IT investments

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or changes to previously approved IT investments to ensure architectural consistency and integrity, and finally, make any recommended changes to the IT SIB for decision.

The IT governance for the Center and Enterprise applications are separate and distinct. Over time, the Government will work to increase visibility for major investments across Center and Enterprise applications to drive efficiencies.

1.2.2 Demand Management

NEACC Management is responsible for the overall Demand Management functions associated with the NEACC. Demand Management functions include coordinating all aspects of the Enterprise Applications Governance process, scheduling and facilitating Functional Control Board and CORE sessions, assisting NEACC stakeholders with the prioritization and approval of incoming requests, and collaborating closely with the EAST Contractor to ensure that available NEACC capacity is effectively utilized to address demand based on business priorities.

1.2.3 Business Process Support

The Government has provided the knowledge required to ensure that Enterprise Applications are appropriately configured to support the Agency's business processes and procedures. In addition, the NEACC Government staff has amassed a broad range of functional and technical expertise around the applications managed within the Lines of Business. The Business Process Support (BPS) team provides an oversight function to ensure all changes to applications adhere to appropriate levels of approval, and that all potential system and business process impacts are addressed.

The Government plans to retain authority and control of Business Process Support functions as described below.

NASA Lines of Business Support:

The BPS team serves as a liaison with the various Agency, and Center, stakeholders in each line of business supported by the NEACC.

The BPS team in each line of business participate in the following tasks:

- Ensure adherence to, and consistency of, Agency Design on all new change requests (Regulatory, Policy, User Enhancement)
 - Analysis of impact to Agency Design
 - Recommend approach and timeline for implementation
 - Identify necessary test scenarios and expected test results

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- Sign-off of test results prior to implementation
- Consultation with Application Functional Support team, as needed, regarding Applications Maintenance support
- Liaison for identification of fiscal year end close/start up business processes and identification of new fiscal year start up requirements
- Integration of new projects/activities
- Source of staffing for new projects, including major upgrades
- Provide FCB support to the Agency
- Continuous process improvement
- User enrichment
- Communication

Audit Control and Technical Support (ACTS):**Configuration**

The ACTS Team is responsible for those areas of SAP configuration that are not isolated to a particular module or transaction. These areas of SAP configuration require specific cross-functional system knowledge to ensure that the correct change is made, and that unintended impacts to other areas or processes are prevented. The Application Functional Support teams finalize requirements and ACTS is responsible for completing the configuration according to the release schedule for the applicable service request. ACTS is responsible for unit testing the configuration by performing the necessary transaction that will test the change. Once the change has been successfully unit tested the ACTS team communicates the change and the level of testing required to the Application Functional Support team. The ACTS team member responsible for the configuration ensures that an object migration form is created, is placed in the appropriate status for migration, and ensures that all appropriate updates are made to the service request following release management guidelines and requirements.

Audit Control and Technical Support is responsible for the following SAP configuration items which have financial implications and are largely cross functional in nature. Any one change could negatively impact multiple teams and processes if appropriate level of system knowledge and core system design is not possessed by the individual responsible for the changes:

- Validation Rules
- Substitution Rules
- Budgetary Ledger Classification
- Budget Control System (Accounts Receivable, Budget Distribution, Anticipated Accounting)
- Automatic Budget Postings
- New document types
- Splitting logic
- Account Determination
- FM Derive Structure Changes

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Year End Execution

ACTS is responsible for testing and executing the system close of the Agency's Financial data on a yearly basis. This requires extensive knowledge of SAP's closing programs and details about NASA's Financial data. It also requires close coordination with the Office of the Chief Financial Officer, NEACC Release Management team and NEACC management to work through any issues. Any errors identified during the close, which may be transaction related or technical, are analyzed by the ACTS Team and resolved through coordination with the appropriate parties. This type of analysis requires a wide range of technical, system and functional knowledge to independently research and identify solutions. The Financial system close is a time sensitive process and requires working unusual hours, extended hours and weekends for both the final round of system integration testing and production execution.

Data Analysis and System Monitoring Programs

ACTS serves as the next tier of internal support to NEACC Application Functional Support teams and to the Centers and Agency on system issues. The ACTS team is consulted to research, explain and provide correction approaches. ACTS is also responsible for assessing data monitoring programs available in SAP, providing recommendation on the use of such programs in the Agency configuration. The team schedules these programs to run at regular intervals, reviews the results and addresses any issues identified. Additionally, the ACTS Team provides on-going reconciliation support for complex system issues and on executing specific types of corrections.

Audit Support /Data Collection (and ad-hoc requests)

ACTS supports multiple audit requests for data collection and analysis occurring on a regular basis in support of audit and also ad-hoc data requests.

Vendor Relationship Management

The ACTS Team maintains a close relationship with SAP in several areas of the NEACC. The team's general focus allows them to provide clarity and unbiased assessments for any effort, service or tool provided by an external vendor to make the best decisions and recommendations for the Agency. The team is responsible for logging functional related customer messages with SAP. The ACTS team provides both functional and technical information in the customer message and performs the initial testing of any note provided by SAP prior to handing off to the Application Functional Support team for full testing. On occasion, ACTS may be requested to assess the code included in the note to confirm whether it is isolated to the applicable problem or touches other areas of system functionality which increases the risk or application.

The ACTS team provides detail knowledge of system issues and the business impact of those issues, while working with SAP to develop and test correction processes and execute those corrections on behalf of the Centers.

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ACTS also serves in a testing and liaison role for new tools and capabilities by coordinating with vendor representatives to assess new products and functionality. ACTS evaluates the product and its applicability for NASA's use. The team uses their system knowledge and expertise to determine whether the tool would be useful and makes a recommendation to NEACC Management on the benefit of purchasing the product.

Release and Activity/Project Support

The ACTS Team is responsible for testing specific SRs such as updates to any correction programs, tools or processes. Team members serve as a second tier of support for system integration testing working functional defects where they are responsible for researching and providing resolution for any issue assigned to ACTS.

ACTS is also responsible for providing system and configuration support to any NEACC activity or project. Support includes detailed system knowledge and knowledge of current system design and configuration. The team is also responsible for specific areas of configuration and ensuring that existing processes and procedures are unaffected. ACTS plays an active role on any project or activity requiring large and complex updates or efforts such as archiving, upgrades, support pack applications, and enhancement pack applications.

Special Procedures/Programs/Tools

ACTS is responsible for the initial execution of tools and processes in NASA's Financial system. As the process matures and risks are understood and mitigated, the Agency may extend the use of the tool/process to the Centers. The ACTS Team conducts knowledge transition sessions for the Centers and provides on-going support to Centers using the tools/processes. Due to the volatility of the tool/process or the centralized nature of support, the NEACC ACTS team retains the authority to execute the following:

- Special Purpose Ledger (SPL) Reposts
- Fund Management (FM) Deletion/FM Adjustments
- Payment Correction Tool

ACTS serves as a liaison between NEACC management and the Office of the Chief Financial Officer (OCFO) in addressing audit issues, supporting external reporting and Agency/Center reconciliation activity.

The tasks listed below will be retained by the ACTS team:

- Creation/modification of General Ledger (GL) account reconciliation tools which directly affect the Continuous Monitoring Program (CMP) monthly activities performed by the OCFO and Centers
- Creation of reports for external reporting and for support of CMP monthly activities;
- Creation/modification regulatory Financial Statement reports;
- Supporting Centers and OCFO concerning data issues

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- Creation/maintenance of Agency master data which has an intricate correlation with Agency external reporting requirements :
 - Fund
 - Application of Funds
 - GL accounts
- Liaison with OCFO Quality Assurance Division concerning audits, both financial and Information Technology (IT), and A-123 concerns
- Validation of major release transactional testing to ensure expected results are obtained, including analysis of any Funds Management (FM) / Financial Accounting (FI) differences identified
- Support to OCFO of issues with adjustments or research of issues as needed for financial reporting
- OCFO Liaison for definition of annual Financial closing rules, including the creation of any new GL accounts identified, as well as coordination of OCFO testing/validation of fiscal year end process
- Coordinate ad hoc data requests from OCFO Financial Management Division across NEACC teams
- Lead the SGL/Reconciliation Super User telecom forum
- Monthly execution of the FI recons

Access Management and Technical Approval:

- Review all NEACC NASA Account Management System (NAMS) requests and approve/reject as appropriate
- Review NAMS requests as required from Centers and approve/reject as appropriate
- Review special temporary access requests, for NEACC and Centers, and approve/reject as appropriate
- Lead NEACC Security teleconference with Center Security Administrators (CSAs)
- Review and technically approve all production migrations
- Open/Close fiscal periods in all SAP R/3 clients

1.2.4 Enterprise Application Strategy and Planning

The Government provides oversight and input into the technical operations of the NEACC. As with the Business Process Support area, the NEACC has developed a level of technical expertise related to the platforms and technologies that span the Lines of Business. The Government currently manages the overall infrastructure operations and planning work stream calendar, which consists of a large set of milestones encompassing all the deliverables in the System Management and Platform Management worlds. This work stream view provides an invaluable mechanism for understanding demand and adequately provisioning resources to accommodate infrastructure activities required to support NEACC operations.

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In addition, the Government provides experienced resources to support many aspects of application development and application technology evaluation.

The Government will retain authority for the Enterprise Applications Strategy and Planning functions across all Lines of Business. These functions include: maintaining technology and application roadmaps that address NASA's short and long-term Enterprise Application needs; providing input and direction for Business Case Analyses in support of new Enterprise Application service initiatives; establishing a point of view on technology optimization strategies; evaluating service initiatives within the broader Enterprise Architecture context; providing an Enterprise perspective on Information Technology as it relates to NASA's Enterprise Application Portfolios.

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2 PROGRAM MANAGEMENT

Under the current EAST contract, the Contractor is required to perform Program Management functions in support of managing the overall contract. The Contractor performs management activities necessary to plan, execute, control, and report project performance, schedules, and resources. Program Management consists of Contract Management; Financial Management; Procurement; Asset Management; Program Support; Security Management; and Safety Health and Environmental.

The EAST contractor also maintains and operates a Document Management System that contains controlled versions of all NEACC operational documents.

2.1 Contract Management

Contract Management includes all contract administration functions and activities required in the performance of the contract.

The NEACC has historically operated in an environment that emphasizes timely, open communications between NASA and its Contractor partner. Key to this partnership has been the vesting of autonomy and authority to the contract Program Manager to make and implement critical decisions on behalf the contract's prime and subcontract team members.

Also key to the NASA-Contractor Partner relationship is the ability to work in a collaborative manner to develop a strategic vision for the NEACC and plans to ensure the vision is achieved to the mutual benefit of the NEACC, its Contractor partner, and the Agency.

2.2 Financial Management

The NEACC is responsible for providing budget input to the Agency's annual Performance, Planning, Budgeting, and Execution (PPBE) process for the purpose of establishing Information Technology (IT) budgets for all NEACC funding organizations. To accomplish this, the NEACC is required to collect budget data in sufficient detail to:

- Identify opportunities to achieve efficiencies, improved integration and security, and ensure alignment of the IT with the Agency's mission
- Make decisions for funding alignment
- Provide cost phasing plans
- Meet internal and external reporting requirements such as the Office of Management and Budget (OMB) Circular A-11
- Provide metric reporting for IT investments to OMB and other internal and external entities

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The NEACC is also required to provide monthly Plan vs. Actual (PvA) cost reports to ensure that Agency guidelines for the commitment, obligation and costing of funds are met.

2.3 Procurement

The EAST Contractor maintains the annual license agreements for all software within the NEACC inventory. The amount of purchases associated with the annual renewal of software license agreements for Enterprise and Center applications can be anticipated as follows:

	Total Value (\$K)
Agency Software License Agreements	\$2,800
MSFC Software License Agreements	\$900
Total	\$3,700

Table 2.1 - Estimated Software License Agreements

These amounts can vary depending on requirements as well as budget guidelines and constraints. A summary of the software licenses is included in Attachment **J-5**, *Cost Schedules*.

2.4 Program Support

In the Program Support area, the EAST 2 Contractor is required to prepare and present a monthly overview of the priorities, status, accomplishments, risks and issues associated with the delivery of day to day operations of the NEACC as well as any on-going implementation tasks.

2.5 Security Management

The NEACC is required to adhere to all federal NASA IT Security Requirements. The goal of Information Security Management (ISM) is to align IT security with business security and ensure that information security is effectively managed across all service management and service delivery activities. The purpose of ISM is to provide a point of focus and management for all aspects of IT security.

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2.6 Safety, Health and Environmental

Safety, Health and Environmental (SHE) involves the preparation and implementation of health and safety policies and procedures in compliance with Occupational Safety and Health Administration (OSHA), NASA, and Marshall Space Flight Center (MSFC) standards and requirements. This requirement includes annual safety inspections and surveys of all workspace utilized by the Contractor, monthly safety and health meetings with the entire EAST 2 workforce, annual safety training for all EAST 2 employees and the reporting of occupational injuries and illnesses.

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3 APPLICATIONS OPERATIONS

Applications Operations describes the central activities associated with the NEACC’s core mission. These activities are the primary services visible to the NEACC’s stakeholder and end-user communities, as they result in the application capabilities required by these communities to perform their jobs.

Overview of the EAST Firm Fixed Price Contract Model

Under the EAST contract, the NEACC operates under a firm fixed price model that dictates many of the processes used to manage and measure work. The scope of work performed by the NEACC, which includes the combined contractor and civil servant workforce, is measured in Application Points. Application Points have some general similarity to Function Points, in that they are designed to aid in objectively estimating the size of software items. Unlike Function Points, Application Points primarily measure the complexity of work associated with maintaining, creating, and delivering a software item. The complexity model that underpins Application Points is tailored to the type of applications operations work performed at the NEACC.

Service requests, which comprise both PWS 3.1 Applications Maintenance and PWS 3.2 Applications Enhancement work under the current EAST contract, represent the core unit of work delivered by the NEACC. In a fixed price model, where the precise volume of work produced by the NEACC must be readily measurable, completed service requests must be converted into consistently quantifiable units of work. Because service requests can vary greatly in terms of scope and complexity, any given software release could contain multiple combinations of service request types and sizes. To normalize service requests so that any request can be efficiently converted into consistently quantifiable units of work, the Application Point framework was established. The Application Point concept is described in detail in the EAST Contract, Attachment **J-6**, *Application Point Requirements*.

Complexity Factor	Short Description	Application Points
Very Low	Service request is quickly understood, requires no or minor changes, touches isolated components, no or limited testing is required.	1
Low	Service request is readily understood, requires changes to limited sets of components, does not impact or results in minor impacts to other objects, functional testing but limited integration testing required.	4
Medium	Service request requires investigation, touches multiple components, impacts other objects, requires multiple	15

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Complexity Factor	Short Description	Application Points
	skills sets, and integration testing.	
High	Service request requires major investigation, major planning across multiple skill sets, large numbers of impacted components, lengthy integration testing required.	40
Very High	Applications Enhancement service request that entails implementation of new business processes, has broad impacts across integrated areas, requires extensive testing, large Business Readiness impacts.	70

Table 2.2 – Application Points Scale

Under the current NEACC / EAST process, all service requests are evaluated and assigned Application Points early in the assessment process. As service requests are worked, the number of Application Points completed is tracked and the contractor earns credit for those completed points. When service requests are fully completed and delivered, the contractor earns credit for any remaining points. Ideally, by understanding the flow of Application Points into the work queue and through the entire delivery process, the NEACC gains insight into how to manage demand (work entering the queue) and how to predict the need for capacity (skilled resources capable of completing the work).

The NEACC / EAST process follows a monthly cadence that is similar to the sprints used in Agile Scrum. Incoming work, which can consist of both internal and external work requirements, is managed by each LOB in a backlog. Sprint planning sessions are held by each LOB at the start of each sprint to plan which work items will be addressed during that sprint. Planning is aided by understanding the volume of work, based on Application Point assessments, as well as on the resource capacity available to perform the work. As work is completed, points are “burned down” to indicate both the completion of work and the approaching availability of capacity. Before Application Points can be officially earned, they must be accepted by the Government (in most cases, that means by a NEACC Civil Servant Line of Business Lead). At the end of each monthly sprint, most LOBs hold a sprint review to demonstrate the work that they have completed.

The NEACC / EAST currently publishes monthly reports for each LOB that provide an overview of the number of Application Points earned by that LOB. The monthly LOB report includes

- Current service requests underway and the number of points completed for the month
- Current large initiatives underway and the number of points completed and remaining
- Complete overview of the number of point completed by service request type
 - Overview of 3.1 Maintenance activity and 3.2 Enhancement activity

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- Trending to show which service request types have increased or decreased as opposed to previous months
- Total number of 3.1 and 3.2 Application Points
- Chart showing planned versus actual Application Points delivered
- Notes to include explanations for any important information, including why certain expectations might not have been met during that monthly sprint

Challenges of the Current EAST Contract Model

The EAST contract model was designed to address several core challenges in operating an Enterprise Applications Competency Center. The NEACC must operate within the parameters of a fixed budget. The demand for enterprise application work, be it sustaining or enhancing, always outstrips the available budget. At the same time, the NEACC serves multiple Lines of Business with distinct priorities that vie for competing resources. To further complicate management functions, the very nature of applications support makes the work difficult to estimate and quantify.

The Application Point model was designed to assist both the EAST contractor and NEACC management in developing sound Demand Management (how to assess, prioritize, and forecast delivery dates on pending work) and Capacity Management (how to allocate skilled human resources efficiently to complete the most work as effectively as possible).

In reality, the Application Point model created a number of additional challenges. On the one hand, the effort to estimate all incoming work based on the Application Point Complexity Model was viewed as onerous and time consuming. It was also difficult to ensure that all LOBs were applying the Complexity criteria in a uniform manner. Since the teams completing the service requests did not track actual hours worked, it was not possible to calibrate the Application Points against actual effort, making it difficult to ensure that the Application Points accurately represented true complexity and the true value of deliverables. Based on these shortcomings, the Application Point model did not provide the level of visibility into the cost of work items, which was a requirement of NEACC stakeholders (in particular Agency Business Process Leads). Because the model was viewed as too arbitrary, the NEACC was also not able to leverage Application Points as hoped to truly manage demand and to forecast needed and available capacity.

With the advent of the EAST 2 contract, the NEACC continues to strive to implement an operations model that will effectively address the challenges of Demand and Capacity Management in a constrained budget environment.

The majority of work performed by the NEACC is directly related to service requests logged by end-users and other stakeholders of NEACC applications. NEACC resources also complete

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operational and other support tasks that are not directly related to a service request, but that must be performed in order to ensure optimal operation of NEACC systems and expected levels of customer support.

Below shows the annual work performed for Enterprise applications by Lines of Business based on consumption of application points.

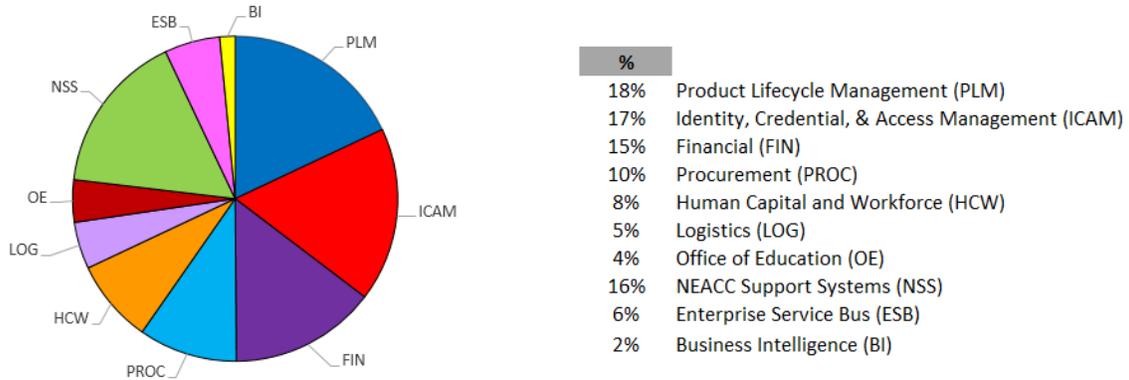


Figure 3.1 – % of Application Points Consumption for Enterprise Applications

Historical data indicates that approximately 60% of the work performed within the NEACC for Enterprise applications is related to Applications Maintenance, or operational “run” activities, and approximately 40% is attributable to Applications Enhancement work.

Enhancement

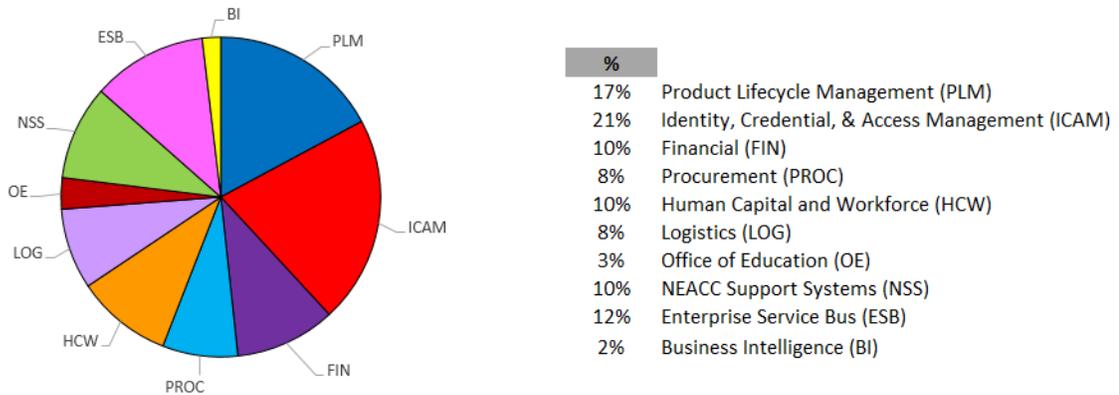


Figure 3.2 – Applications Enhancement for Enterprise Applications

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Maintenance

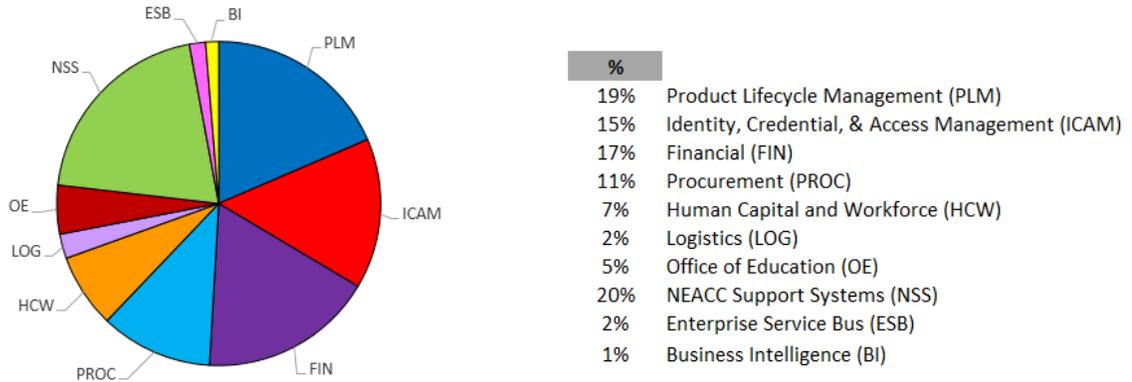


Figure 3.3 – Applications Maintenance for Enterprise Applications

Of the Applications Maintenance work, approximately three fourths ($\frac{3}{4}$) is directly related to the Lines of Business, while the remaining one fourth ($\frac{1}{4}$) is associated with the Cross Functional Infrastructure services or other support tasks.

Service requests in both the Applications Maintenance and Applications Enhancement areas are categorized into varying levels of complexity and associated effort. Looking at historical service request data, the work effort associated with service requests falls into the following groupings:

Service Request Complexity	Rough Estimate of Range of Hours Required to Complete Request
Very Low	< 20
Low	>20< 80
Medium	>80< 320
High	> 320< 800
Very High	> 800

Table 3.1 – Complexity Factor

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Below illustrates the service requests for the MSFC applications by stakeholders:

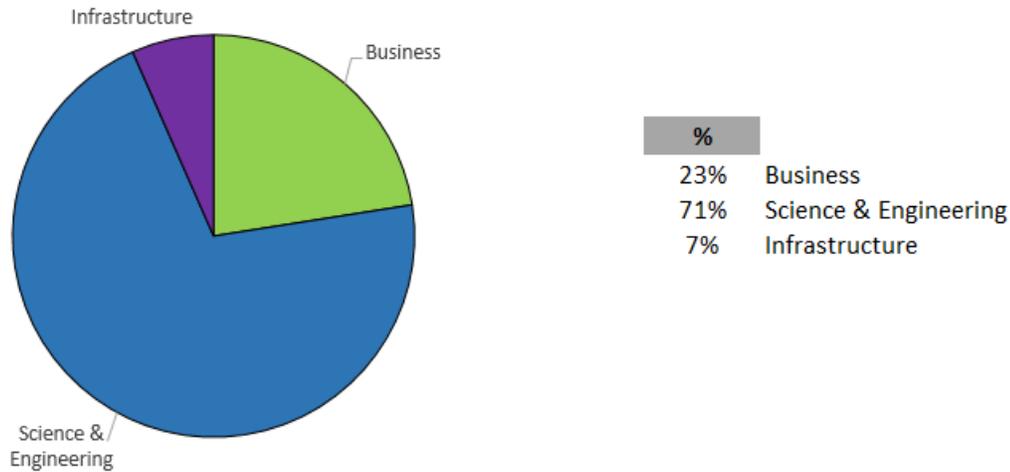


Figure 3.4 – MSFC Service Requests by Stakeholder

Current NEACC Service Management Model and Systems

The NEACC / EAST process currently involves the use of two systems to manage service requests work. The Remedy-based Integrated Service Request System (ISRS) is the customer-facing system that is used to manage many aspects of the initial triage, evaluation, and workflow approvals associated with service requests. The Application Point Capacity Management System (APCMS) is a customized version of Rally Software and is used as an internal work management and Application Point management system. The EAST contractor tracks all work related to service request and releases within the APCMS, breaking down service requests into separate tasks that are assigned to individuals.

In the current operational environment, MSFC operates a Help Desk and supporting call center known as the NASA Incident Services Center (NISC). NISC personnel staff the call center 24/7 and log incidents in an MSFC-operated Remedy application. Some NASA centers also offer center-specific Help Desks that add an additional layer of Help Desk support. Users are also permitted to log into Remedy ISRS and directly enter and submit their incidents. The NEACC has a separate, MSFC-operated instance of Remedy that is used to manage all NEACC incidents and requests. The NEACC ISRS Remedy system is configured with specific attributes and heavy workflow customization that are required to ensure the appropriate routing and approvals of work performed, accommodate unique audit requirements, and provide required data to NEACC management and stakeholders.

Under the I³P consolidation of Agency IT services and infrastructure, NASA Enterprise Service Desk (ESD) and Enterprise Service Request System (ESRS) managed by the NASA Shared Services Center (NSSC) are used by other contracts and associated Agency organizations. The

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NEACC continues to operate using the MSFC-provided Remedy ISRS system as the focal point for the customer.

It should be noted that under the EAST contract, the NEACC services only Agency enterprise applications. With the transition to the EAST 2 contract, it is anticipated that the NEACC will offer support for Center-specific applications. NASA Centers may choose to transition support for all, or for a portion, of their applications to the NEACC. The current set of NEACC systems may need to evolve or transition to a different solution set in order to accommodate the needs of both Agency / Enterprise customers and Center-specific customers.

Currently, the NEACC is in the early stages of the Integrated Service Request System (ISRS) migration to MISM, known as the ISRS Transition Project. Several factors are contributing to the need for transitioning to a more out-of-the-box solution, such as cost, alignment with ITIL processes and IP strategies, ease of updates/upgrades, risk of losing the development resource (legacy customization), and potentially, leveraging the Enterprise Services Desk (ESD) for future Tier 1 support. Additionally, with MSFC and potentially other NASA Centers ultimately moving their applications under the NEACC umbrella, the service management system will need to accommodate those Center users and applications. The new solution will be called NASA Integrated Service Management (NISM) and will unify service management between Center and Enterprise applications while respecting local IT governance. NISM will be operational by contract phase-in.

Key artifacts of the project will be published on the EAST 2 website: <https://www.nssc.nasa.gov/east2>.

Current NEACC Application Portfolio Management

Application Portfolio Management is the process for managing and evaluating IT applications. The process includes an approach to assess the health of existing applications, rationalize the application portfolio and establish and leverage common platforms and reduce duplication and gain synergies.

In response to direction from the Agency IT Governing Boards, the NEACC has established criteria to assess the technical health of Enterprise applications, including systems and tools to capture and report assessment results. The Application Portfolio Management (APM) tool was developed to provide a standard framework for the annual evaluation of applications based on an objective set of criteria from which a technical health score can be determined. This information can be used to categorize type of system, application, tool, line of business and/or organization and can be broken down into tolerate, invest, eliminate and migration.

MSFC has developed a process to assess the technical health of Center applications. The Government is in the process of unifying these Enterprise and Center approaches for Application Portfolio Management such that a common tool can be used to satisfy both requirements and

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processes. The information can be used by Agency and Center governance, as appropriate, to inform investment decisions, prioritize work and identify potential consolidation opportunities. The NEACC will use the APM tool to assess the health of an application as part of the transition process.

NASA's vision is to have a unified APM approach across all Lines of Business. Refer to the Marshall Space Flight Center APM approach in Section 3.3.12.

3.1 Applications Maintenance

Applications Maintenance describes a core set of non-discretionary activities that must be performed to service the needs of NEACC end-users and to keep NEACC applications available, current, and in optimal working condition. Application Maintenance is defined as all activities, both direct and of a supporting nature, that are performed to complete the service request types specified in Attachment **J-1**, *Performance Work Statement, Section 3.1*.

The historical data from Applications Maintenance requests completed during February 1, 2013 through January 31, 2014 for the Enterprise applications and October 1, 2013 through September 30, 2014 for MSFC applications are recorded in the Attachment **L-B1**, *Background & Historical Resource Baseline*. The service request data captured for some Lines of Business is more complete than for others. These differences in the quantity and quality of the data are the result of the integration timelines of each Line of Business into the NEACC processes and procedures. Some Lines of Business, such as Financial and Procurement, have been integrated into the NEACC processes from their inception. Therefore, the service request data logged for those Lines of Business has consistently followed established guidelines, utilizing the NEACC Help Desk and change control processes. Lines of Business such as Product Lifecycle Management and Office of Education were migrated to the NEACC more recently and therefore have a thinner history of service request data within the standard NEACC incident tracking systems.

3.2 Applications Enhancement

Applications Enhancement describes a core set of activities that are performed to improve and optimize existing application capabilities. Under the EAST contract there is a clear distinction between Applications Maintenance and Applications Enhancement and there are contractual and reporting requirements that insists on a clear distinction between the two categories of requests.

There is little or no difference between the Delivery Functions and processes that must be applied to complete 'run' versus 'enhance' requests. In both cases, skilled resources are needed from all directly impacted areas, such as Application Functional Support and Application Development, as well as supporting functions, such as Systems Management, Application Operations Maintenance, etc.

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Applications Enhancements are currently evaluated by NEACC resources from across the impacted Delivery Functions, and are evaluated utilizing the NEACC Governance processes. Specifically, enhancement requests are reviewed and prioritized by the relevant Functional Control Board (FCB), then assigned to an upcoming release by the NEACC Migration Review Board (MRB).

Under the EAST 2 contract, the Government will continue to lead Demand Management activities by prioritizing Applications Enhancement requests across Lines of Business and by working with the EAST 2 Contractor to assign requests to the appropriate release, based on request priority and EAST 2 Contractor operating level capacity.

Survey Support

The NEACC conducts a survey to gauge customer satisfaction with its applications and support. An electronic survey is sent via email to the submitter of Discrepancy Break/Fix SRs. Customers can provide a rating of 1 for Not Satisfied through 5 for Very Satisfied. If the customer responds with a rating of 1 (Poor) or 2 (Fair), the Customer Satisfaction coordinator will forward the response to the LOB Manager. LOB Managers are responsible for contacting the assigned technician who completed the SR and the technician will contact the customer. If a customer responds with a rating of 5 (Excellent) and includes comments of high praise mentioning the technician's name, then the response is forwarded to the technician and the technician's manager. Results of the survey are used in reporting on program performance to OMB.

3.3 Applications Overview – Detailed Information

3.3.1 Financial (FIN) Line of Business

The Financial Line of Business represents a large set of functionality that spans NASA's Financial Accounting, Budgeting, Asset Accounting and Travel functions. The Financial Line of Business is comprised of the following operational applications:

- Core Financial
- Agency Labor Distribution System (ALDS)
- Electronic Travel Management System (ETS2)
- NASA Conference Tracking System (NCTS)
- eBudget Suite
 - Clearinghouse
 - Integrated Budget & Performance (IBPD)
 - Budget Formulation (N2)
 - Metadata Manager (Mdm)
 - Cost & Schedule
 - Performance Measures Manager Extension (PMMe)

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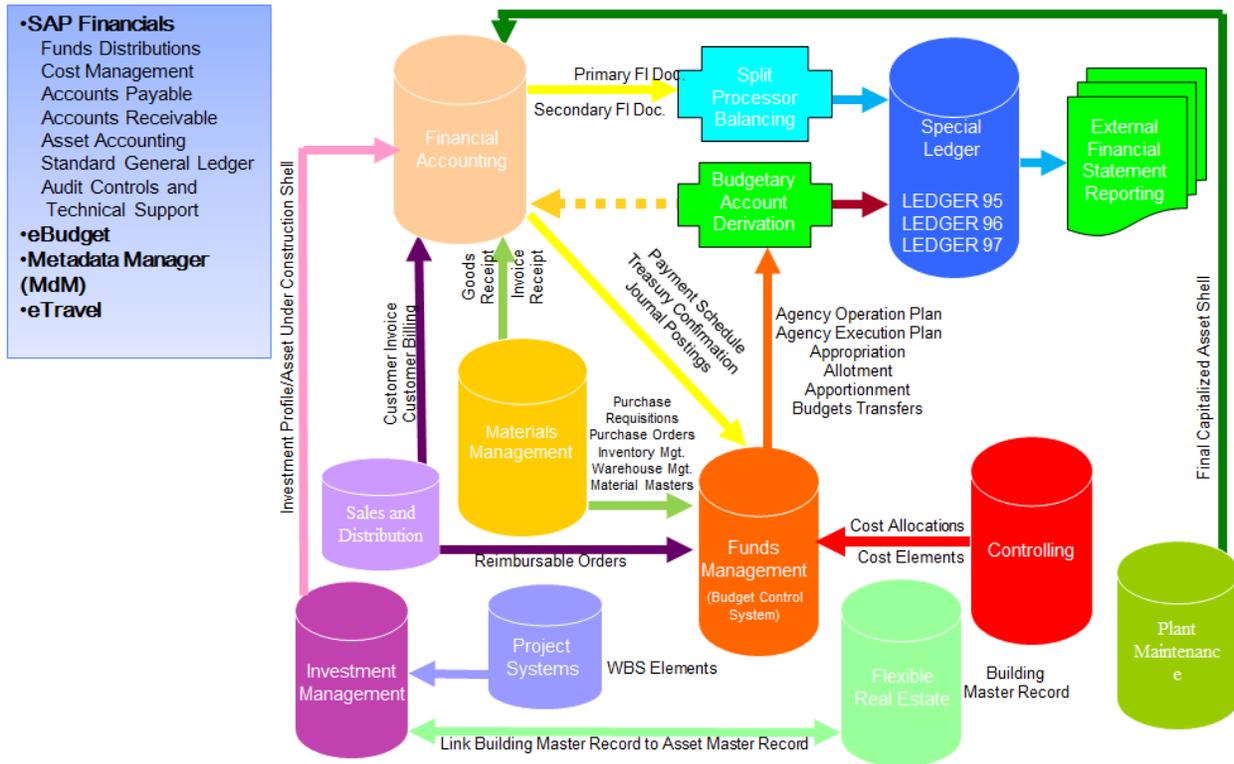


Figure 3.5 – Financial Systems

3.3.1.1 Core Financial

The Core Financial module represents a large set of functionality that spans NASA’s Financial Accounting and Asset Accounting functions. Core Financial consists of the following sub-processes.

Budget and Projects

The Budget and Projects sub-process utilizes the SAP Budget Control System in the Funds Management (FM) module , the Controlling (CO) module and the Project Systems (PS) module to:

- Establish and maintain NASA budget structure
- Record and maintain Agency Operating Plan (AOP)
- Record and maintain Agency Execution Plan (AEP)
- Execute Budget Distribution

Largest Areas of Customization:

1. Custom programs which transfer the budget execution structures (master data records) from the eBudget Metadata Manager (MdM) tool into Core Financial.

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2. Custom programs to ensure end users are processing budget documents according to NASA's policies and procedures.

Cost Management

The Cost Management sub-process utilizes the SAP Financial (FI) module and the CO module to record cost related to services.

Cost Management supports end users located at multiple NASA centers with the recording of costs:

- Monthly cost accrual and reversal processing
- Cost Assessment processing which provides for cost to be collected in a pool and then allocated or 'assessed' to various programs/projects based on pre-defined agreements.
- Processing of supply type transactions both receipt and issues

Largest Areas of Customization:

1. Contractor Cost Reporting (CCR) Custom programs to process the contractor cost (NF533) reported monthly. This consists of multiple custom programs that have complex calculations to separate the actual and estimated cost. Approximately 85% of NASA's cost is processed through the programs. The cost is posted with a standard SAP transaction code.
2. Straight Line Extension – Custom program (Straight-Line Extension) to process other cost that is not NF533 related. These programs calculate service related cost and then the cost is posted into the accounting system with a standard SAP transaction code.
3. Multiple custom interfaces that process supply type transactions.

Accounts Payable

The Accounts Payable (AP) sub-process utilizes the electronic invoicing tool provided by the Department of Defense's Wide Area Workflow (WAWF), Invoice Routing and Information System (IRIS) for routing of all NASA invoices for approvals and concurrent routing capability for cost, goods receipt, funding, and requests related to a specific invoice, SAP FI module and the Materials Management (MM) module to provide Invoice Processing, Payment confirmations with Treasury, Grant Processing using Health and Human Services (HHS) Payment Management System, Intra-Governmental Payment and Collection (IPAC) Processing. Centralized Vendor master data related to payment processing is also included in this sub-process.

Accounts Payable (AP) is responsible for NASA vendor payments. Vendor Payments are sent to Treasury on a daily basis via an outbound flat file. The payments are paid the next day and a confirmation file is received after the payment has been made and/or rejected. NASA Grants, which are provided via Letter of Credit financing, are managed from a payment perspective by the Department of Health and Human Services. These documents are issued and managed at the

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individual contract level. NASA has three interfaces to support this process. AP supports the inbound purchasing card statements and invoices for payment.

Payments to other government agencies are achieved via a flat file sent to the Intra-Governmental Payment and Collection System (IPAC).

Largest Areas of Customization:

1. Department of Defense
 - a. Wide Area Workflow (WAWF)
2. Invoice Routing and Information System (ISRS)
3. Treasury
 - a. Outbound Treasury Payment File
 - b. Inbound Payment Confirmation File
4. Department of Health and Human Services
 - a. Outbound Authority File
 - b. Inbound Drawdown File
5. Intra-Governmental Payment and Collection System (IPAC)
6. Government Services Administration (GSA) System for Award Management (SAM)
 - a. Inbound Vendor information

Accounts Receivable

The Accounts Receivable (AR) sub-process utilizes the SAP FI, FM and Sales Distribution modules to support Accounts Receivable for Reimbursable Agreements and non-reimbursable receivables.

Largest Areas of Customization:

1. Several custom programs to prevent end users from processing sales orders and bills incorrectly
2. Interface with Intra-Governmental Payment and Collection System (IPAC)
3. Interface with Reimbursable Roll Up (unique interface for the Stennis Space Center)

Asset Accounting

The Asset Accounting sub-process comprises functions used to manage capital assets, including asset master record management, integration with Equipment Management, automated depreciation, and reporting. Provides support for recording all NASA Owned/NASA Held and NASA Owned/Contractor Held Equipment, Internal Use Software, Theme Assets, Capital Leases and Real Property items that fall under NASA Policy Directive 9250. Provides support for the recording of Depreciation. Provides support for the transfers of capital assets either from and to another government agency or internally from one center or another. Provides support for retirement of capital assets.

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Largest Areas of Customization:

1. Asset Master Record / Equipment Master Record Reconciliation

3.3.1.2 Agency Labor Distribution System (ALDS)

The Agency Labor distribution system is a custom-built application that provides NASA's labor distribution solution. ALDS replaced the Centers' 10 legacy systems in October 2005. After payroll is processed in the Department of Interior's Federal Payroll and Personnel System (FPPS), the costed payroll is imported into ALDS for validation and funds distribution. Full time equivalent (FTE) calculation is performed, funds are validated, and the costed payroll data is posted into the financial system (SAP). Reports are available to the labor analyst to assist with the processing of labor. After posting is complete, Program/Project and Resource Managers can view the results of labor processing through various reports in the Business Warehouse (BW). The ALDS application also supports other Enterprise applications by providing information (via interfaces) for HR reporting and trending analysis and to project managers for workforce planning and budgeting. Data integrations with Personnel Data Warehouse (PDW), Web-based Time and Attendance System (WebTADs) and SAP are managed in support of ALDS.

3.3.1.3 eTravel

NASA has implemented the next generation of the government's eGov initiative for travel, Concur's Government Edition (CGE). The solution provides NASA employees with one tool for completing all travel activities – authorization, vouchers, local voucher, etc. As the service provider, Concur is responsible for software release/configuration update tasks, Agency-level system/hardware configuration and help desk application support. NASA's responsibility for system maintenance includes updates/changes to master data and technical interfaces to NASA systems (SAP, BW, NAMS and FPPS). Additionally, NASA performs testing of the vendor's monthly software/configuration releases to ensure they do not adversely impact NASA.

The NEACC continues to maintain the previous travel system, Hewlett Packard's FedTravler.com. The maintenance of historical data from FedTraveler.com must continue for a period of 6.3 years in order to respond to requests from inside and outside of the agency.

3.3.1.4 NASA Conference Tracking System (NCTS)

To accomplish the monitoring and reporting needed to meet Congress's requirements, NASA created Conference Tracking System (NCTS) to standardize monitoring and reporting of conference-related cost and attendance data across various systems Agency-wide. The web-

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enabled database, accessible by all NASA employees, assigns a unique Identifier (number/name) to each conference, facilitating tracking of associated costs and oversight of the foreign conference registration process.

Largest Areas of Customization:

1. Account Code, Funds Availability, Travel Document integration with the Core Financial application
2. User, Traveler Profile, Identity Management and Account Management integrations with NAMS
3. Traveler Profile integration with Federal Personnel and Payroll System
4. Travel Management level Reporting integration with BW
5. Providing historical information related to Freedom of Information Act (FOIA) requests for NASA Travel
6. Single Sign-On capability

3.3.1.5 eBudget Suite

NASA's eBudget suite of applications provides an integrated solution to facilitate NASA's Planning, Programming, Budgeting and Execution (PPBE) process.

Clearinghouse is the Agency's document repository for managing electronic OMB documents, the Budget Offices' related PPBE documents, and the Office of Legislative and Intergovernmental Affairs (OLIA) budget documents. Clearinghouse is a standalone custom application.

Integrated Budget & Performance (IBPD) is a tool used for NASA's Congressional Justification with OMB and Congress. IBPD is a standalone custom application.

Budget Formulation (N2) is NASA's Agency budget formulation tool which enables online budget entry, upload, and review for the PPBE and other budget related activities. N2 is a standalone custom application.

Metadata Manager (Mdm) is a tool which provides an integrated system for managing master data records and provides front-end universal access for Centers to submit master data requirements. The Metadata Manager is a web-based Enterprise application that contains the Agency's official NASA Structure Management (NSM) data elements and associated codes. Mdm is the only Enterprise application used for identifying, creating, tracking, organizing and archiving of Mission, Theme, Program, Project and Work Breakdown Structure (WBS) levels 2 through 7 NSM structural elements. As the Agency's Enterprise repository for NSM data, Mdm

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supplies NSM codes to the core financial (SAP), budget formulation (N2) and project management (POLARIS) systems that require coding structure data.

Cost & Schedule is a tool that houses Quarterly, Budgetary, and Key Decision Point (KDP) cost and schedule data for NASA Projects.

Performance Measures Manager Extension (PMMe) is a business intelligence solution supporting the Performance Measures Manager (PMM) application maintained at Treasury to facilitate the collection of the Agency's performance data, and provide consolidated, archiving capability while creating new efficiencies in workload and outputs. It provides the ability to create standard reports, graphs, and provide ad hoc query/reports capabilities via a Cognos-based solution. Pre-defined reports are available to support standard business questions and external reporting requirements. Current and future PMM and extension capabilities are part of OCFO's strategy to meet current GPRAMA Modernization Act of 2010 (GPRAMA) mandates, as well as constantly evolving OMB requirements for federal strategic planning, performance management and reporting.

EAST contractors, located at NASA Headquarters, provide both functional and technical support for the eBudget systems.

3.3.1.6 Financial Future Projects

The Financial LOB is currently developing or planning for the following future projects:

- Continuous Monitoring Program (CMP) Automation
 - CMP is a process of management controls used to assess and evaluate internal financial controls. On a monthly basis, all Centers and the NASA Shared Services Center (NSSC) perform CMP compliance activities based on guidance provided by Headquarters (HQ) Office of the Chief Financial Officer (OCFO), Data Analysis Branch. The goal of the CMP Automation project is to create an agency-wide process that all Centers and the NSSC will utilize to input the monthly/quarterly/yearly CMP compliance activities and will also include the monthly effort performed by HQ OCFO Data Analysis Branch. The tool will include data sources from SAP, Business Warehouse (BW), Agency Labor Distribution System (ALDS), Contractor-Held Asset Tracking System, Procurement and Treasury.
- Cost and Schedule Report Automation
 - This initiative includes converting the manual input and review process of the Agency's Strategic Investments Division's offline forms to an online/automated procedure within the eBudget Cost & Schedule module. This will allow users to import data which is currently maintained offline into a centralized online database and will also include an automated approval process.

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- Multiple initiatives to increase Integration of NASA Budget System
 - Research & Development Report
 - This initiative will allow for the integration of Research and Development data requirements into both the eBudget MetaData Manager and Formulation systems in order to expedite electronic reporting to the National Science Foundation.
 - N2 to BW integration
 - This initiative will include the transfer of budget formulation data from the eBudget N2 system to Business Warehouse to facilitate comparative analysis between budget formulation and budget execution data in selected budget structures.
 - Top-Down capability in N2
 - This initiative will enhance the flexibility within N2 to add budget data at a top level and distribute it down to various levels of the budget hierarchy. This enhancement will facilitate development of a “Budget Tracker” report which tracks direct appropriated funds by year through each Planning, Programming, Budgeting, and Execution (PPBE) milestone.
 - Phasing Plan
 - Phasing Plan is the monthly estimate of obligations and cost (spending plan) at the project level for the current fiscal year. Currently, the phasing plan system is the Project Management Tool which is managed by Ames Research Center. The goal of this initiative is to consolidate and automate the Budget Division’s budget transactional requirements into the Agency’s official systems of record (eBudget or SAP) to ensure continuity, consistency and accuracy in the Agency’s internal and external reports. This effort also includes the development of all phasing plan reports in Business Warehouse.
 - Enhance the Agency Operating Plan (AOP) and Agency Execution Plan (AEP)
 - This initiative is to enhance the AOP-AEP process in SAP to support the funds control requirement to reflect budget authority as defined by the Continuing Resolutions and to capture the Budget Division and Mission Directorates’ annual budget plan requirements to support both the phasing plan efforts and the Center CFOs’ annual planning requirements. Currently, the annualized plan is entered in eBudget N2. Enhancing SAP to include an annual plan functionality would eliminate the need to maintain the duplicate data in two systems, eBudget N2 and SAP. The AOP/AEP will also provide the baseline for the new integrated Phasing Plan tool.

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3.3.2 Logistics (LOG) Line of Business

The Logistics line of business includes Equipment Management, Supply Management, and Disposal Management.

Equipment Management

The Equipment Management sub-process provides functionality that includes how NASA acquires and disposes the equipment. The events in the life of the equipment are managed by transactions, a web based tool and an automated inventory process. It also maintains Agency and Center level Custodian and Manufacturer master data.

Largest Areas of Customization:

1. Extensions to Equipment Master Record transaction in the Plant Maintenance module
2. Web Frontend for Property end-users and Custodians (N-PROP)
3. Application is integrated with Disposal Management (DSPL) to excess and reuse equipment
4. Application is integrated with NASA Enterprise Directory (NED)
5. Application is integrated with Asset Accounting for capital equipment
6. Custom reports in business warehouse for legacy system history and also current transactional data

Inventory management functionality is where inventory data is collected by various means (barcode readers, Radio Frequency Identification (RFID), mobile app) and uploaded along with discrepancy processing and status reports.

Web-based Property Management (Equipment)

Equipment is a web-based front end to the equipment management system that allows any equipment end user in NASA a limited amount of functionality related to their equipment. This functionality includes accepting accountability; managing attributes such as location, end users and custodians; creating property passes and reports of equipment; as well as reporting the equipment as excess. Equipment integrates directly with SAP and manages updates in real time.

Web-based Property Disposal (Disposal)

Disposal is a custom built web application that provides the NASA Agency-wide disposal solution. All excess property at NASA is processed through Disposal; not only the equipment managed through SAP but also supplies managed in SAP and other non-controlled property.

Disposal is integrated with General Services Administration's (GSA) federal screening application in three ways. Using a web service, DSPL transmits property information to GSA in

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real-time for immediate screening. Time based activity is submitted to GSA through a batch file interface. Sales lotting information is transmitted to GSA via a web service.

Supply Management

The Supply management sub-process provides functionality that allows NASA to manage supplies including store, program and stand-by stock.

1. Largest Areas of Customization:
2. Extension to Material Master Record in the Material Management module
3. Web Frontend for Supply end-users and Reservationists (OSCAR)
4. Application is integrated with Disposal Management (Disposal) to excess and reutilize supplies
5. Application is integrated with NASA Enterprise Directory (NED)
6. Custom reports in business warehouse for legacy system history and also current transactional data

Online Supply Catalog and Reservation (OSCAR)

OSCAR is a web-based front end to the supply management system that allows any user at NASA to search for supplies either at their Center or at any other Center that uses SAP for supply management. It also allows a limited number of users to enter reservations for existing stock.

Future Initiatives

The Logistics Line of Business is currently planning and working the following future initiatives:

- Mobile Disposal
- Mobile Equipment
- Make Logistics Applications RFID ready
- Standardizing nomenclature (Cataloging) for Equipment and Supply
- N-PROP Modernization (moving from Ruby on Rails to JAVA)

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3.3.3 Real Property Management (RPM) Line of Business

The Real Property Management (RPM) system was configured using the SAP Flexible Real Estate module (RE-FX). RPM was customized to add NASA specific functionality for Real Property and Facilities management purposes. Real Property Management provides a comprehensive view of the Agency's Real Property portfolio. The master data property records include all pertinent information related to the individual property such as; Building/Land/Structure classification and location information, facilities engineering data and all associated measurements and characteristics of the property as well as property values and Current Replacement Value (CRV). RPM also provides a link to the SAP Asset Management system to maintain the relationship between the Real Property Master record and the Asset Master record.

Largest Areas of Customization:

1. Facilities Utilization data upload program for yearly reporting
2. Other Upload programs including Deferred Maintenance, Facilities Condition Index, Operating & Maintenance Costs, Historical Classification Status, Percent Space Utilization and Sustainability data for yearly reporting
3. Use of Authorization Groups in Security to restrict access to Centers based on the Business entity
4. Added extensive functionality for Asset Accountants to maintain the Asset Master record via the Real Property Master record and query RPM data via SAP custom reports
5. Customization of the CRV calculation based on HQ requirements
6. Master Data Summary known as the RPM Property Card
7. Addition of multiple custom data elements including General Services Administration (GSA) required data
8. Complex programs were developed to interface with GSA Federal Real Property Profile system for yearly Agency reporting – these are updated yearly based on GSA requirements changes
9. There are currently 15 custom RPM Business Warehouse reports

Mission Dependency Index (MDI)

The Mission Dependency Index is a custom web application developed to track the mission criticality rating of each property in the Agency portfolio. When MDI is updated it then updates the RPM Measurements Tab with the MDI Score. There are currently 2 custom RPM Business Warehouse reports specific to MDI.

Future Initiatives

The RPM Line of Business is currently planning and working the following future initiatives:

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- RPM Mobile App for Property Inventory with Geographical Information System (GIS) Integration
- Improve integration with NASA Environmental Tracking System (NETS)
- Integration with NASA Emergency Preparedness & Safety and Mission Assurance Incident Reporting Information Systems
- Reporting for McKinney Act and Property Disposition

3.3.4 Procurement (PROC) Line of Business

The Procurement Line of Business represents a large set of functionality that provides capability for NASA's Contract/Grant administration, tracking and payment of Purchase Card transactions, and industry access to NASA procurement information. The Procurement Line of Business has launched the Destination Paperless initiative, which emphasizes the following three key areas for processing procurement and financial assistance documents: electronic signature, common document destruction capability, and a single data container at the Enterprise level. The Procurement Line of Business is comprised of the following operational applications:

- Contract Management Module (PRISM)
- SAP Purchasing
- Enhanced Procurement Data Warehouse (EPDW)
- Purchasing Card (P-Card)
- NASA Acquisition Internet Service (NAIS)
See list and descriptions of NAIS sub-applications below

As depicted in the figure below, award transactions are generated in the PRISM application whereas transactions for Purchase Requisitions, Service/Goods Receipts, and Invoices are performed in the SAP/Core Financial system. Outside Buyer transactions (i.e., Training orders) and Space Act Agreements are also entered in SAP.

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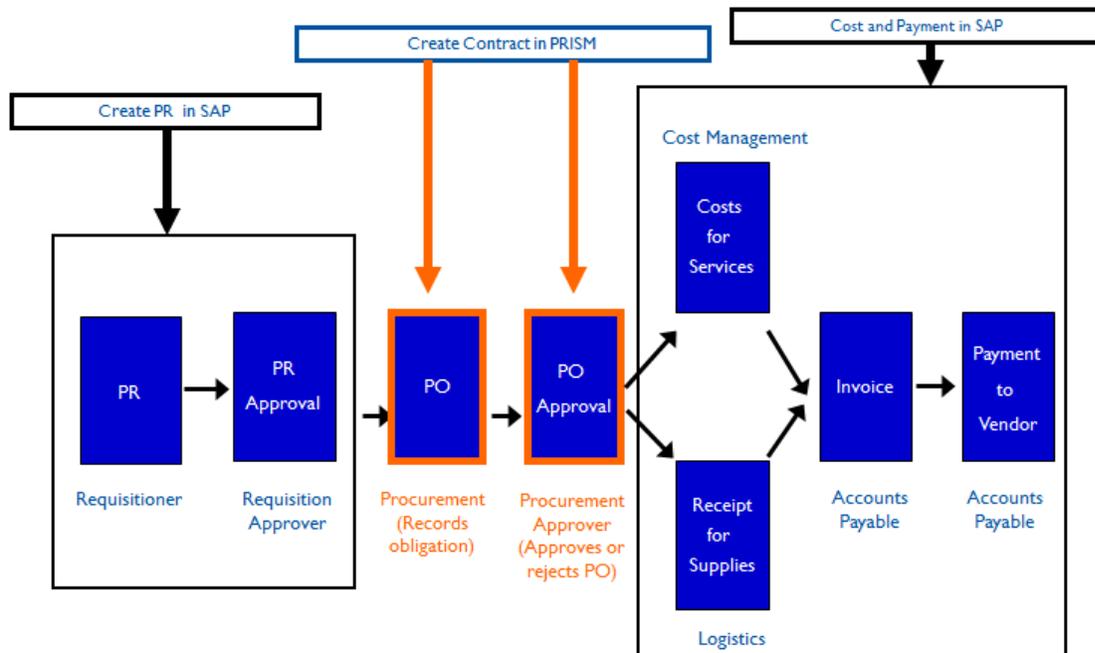


Figure 3.6 – Purchasing Transactions

Contract Management Module (CMM) - PRISM

CMM/PRISM (PRISM) is NASA’s Contract Writing System, and is used by all NASA Center Procurement offices to generate all Contract Award and Financial Assistance (Grants/Cooperative Agreements) documents. NASA’s PRISM instance supports a transactional user base of approximately 1,000 GS-1102 personnel. Software maintenance for the PRISM software is provided by Compusearch Software Systems, Inc. The PRISM COTS package is a comprehensive tool that supports contract/grant writing, procurement workload management, and contract/grant administration for NASA. The functionality provided by CMM provides added efficiency to the procurement processes, including automated updates of Federal Acquisition Regulation (FAR), the NASA FAR Supplement (NFS), Federal Grant Regulations, NASA Grant Handbook, Standard and NASA forms, NAICS and Product Service codes, as well as integration with NASA’s SAP Core Financial system. NASA is currently using PRISM version 7.1 Service Package 8, but may install more recent Service Packages based on Agency priorities and regulatory requirements.

Though Compusearch Software Systems, Inc. provides general software maintenance for the PRISM application, the EAST contractor is responsible for performing key tasks as part of PRISM operational support. These tasks include, but are not limited to:

- Execution/installation of scripts provided by Compusearch for Regulatory updates (i.e., FAR, NFS, Federal Grant Regulations, NASA Grant Handbook, NAICS codes) throughout the PRISM landscape, including verification that the updates correspond to those published in the Federal Register
- Implementation of PRISM Upgrade packages, Service Packages, and Hotfixes, including planning, installation, testing, and end user training

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- End user support and resolving data issues
- Submission of trouble tickets (Footprint tickets) to Compusearch, tracking ticket status, and working with Compusearch to drive PRISM issues to resolution
- Maintenance of interfaces with the PRISM application (see interface diagram below)

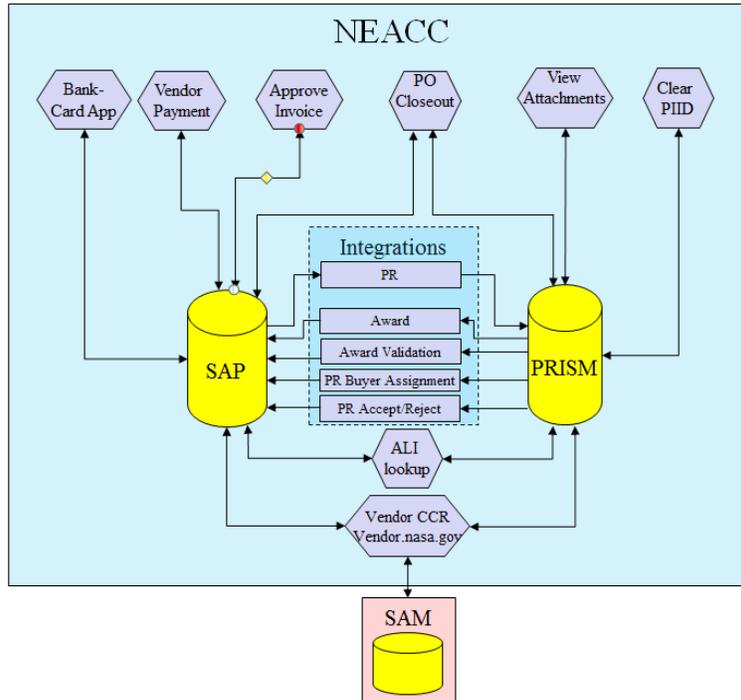


Figure 3.7 – Procurement Portlets and Integrations

Largest Areas of Customization:

1. SAP Purchase Requisition (PR) from SAP to CMM
2. SAP PR Attachments from SAP to CMM
3. PR Accept/Reject from CMM to SAP
4. PR Buyer Assignment from CMM to SAP
5. Award Validation from CMM to SAP
6. Award (Outline Agreement and/or Purchase Order (PO)) from CMM to SAP
7. Award modification data from CMM to SAP
8. Vendor data from SAP to CMM
9. Federal Procurement Data System – Next Generation (FPDS-NG)
10. System for Award Management (SAM)
11. bReady Portal CMM portlets

Federal Procurement Data System – Next Generation (FPDS-NG) – Per FAR Part 4.603 and the Federal Funding Accountability and Transparency Act (FFATA) mandates that all Federal award

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data must be publicly accessible and executive agencies must use FPDS-NG to maintain this public access. PRISM provides a certified interface to FPDS-NG for most of the standard data elements required by the Federal system. In addition, NASA is the only Agency that reports all of its Grants / Cooperative Agreements to FPDS-NG. As a result, NASA purchased a customization from Compusearch Software Systems, Inc. for PRISM to interface Grants / Cooperative agreement data to FPDS-NG, along with about 17 NASA- specific fields.

System for Award Management (SAM) – Per FAR Part 4.1201 prospective contractors are required to complete annual representations and certification in the System for Award Management database. PRISM provides an interface to SAM, and the ability to pull back representations and certifications into the PRISM document.

bReady Portal CMM Portlets- A set of bReady Portal pages that augments CMM/PRISM functionality with additional data and capability to assist Procurement personnel with the review/approval of SAP invoices and performing PRISM closeout functions. As much of the data presented in these portlets are sourced from SAP and PRISM, this functionality also facilitates general communication among personnel across Procurement and Financial organizations. These portlets are listed below:

- PO Details/Closeout
- Vendor Payments
- View Attachments
- ALI (Accounting Line Item) Lookup

SAP Purchasing

SAP Purchasing provides the capability for NASA users to create Purchase Requisitions and route them electronically for approval. NASA also utilizes the Purchase Order capability within SAP for limited Space Act Agreement and Outside Buyer (or Outside Procurement) transactions. In addition, all contractual actions generated by Procurement personnel in the Contract Management Module/PRISM document generation tool are interfaced to SAP. Primary areas of operations support include configuration updates for Release Strategies (workflow approval routing), Purchasing Groups (Buyer codes), and processing MR11 requests to return unliquidated obligations to budget.

Largest Areas of Customization:

1. Release Strategy configuration for SAP Purchase Requisitions and Purchase Orders
 - There are approximately 5,000 PR Release Strategies configured for PR approval routing
 - There are approximately 20 PO Release Strategies configured for Space Act Agreement and Outside Buyer PO approval routing
2. Purchasing Group Configuration
3. ABAP List Viewer (ALV) Reports
4. PR and PO User Exits/Extensions

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5. Vendor interface from the SAM database

Purchasing Card

NASA utilizes the P-Card Web Solutions as its purchasing card system. P-Card allows NASA users the ability to simplify the tracking and payment of credit card purchases by providing for the reconciliation of individual purchase credit card transactions against their monthly statements. NASA’s credit card provider (i.e., bank) is JPMorgan Chase.

Largest Areas of Customization:

1. P-Card Order creates a Purchase Requisition in SAP via a real-time interface
2. P-Card Statement Reconciliation and Invoice Payment creates Purchase Orders, Goods Receipts, Invoices, and Credit Memos in SAP via a batch interface

NASA Acquisition Internet Service (NAIS)

NAIS is a custom built web-based Agency-wide suite of Procurement applications which provide on-line access to NASA procurement information including advance procurement notices, solicitations, financial and contractual status summary information, and procurement regulations.

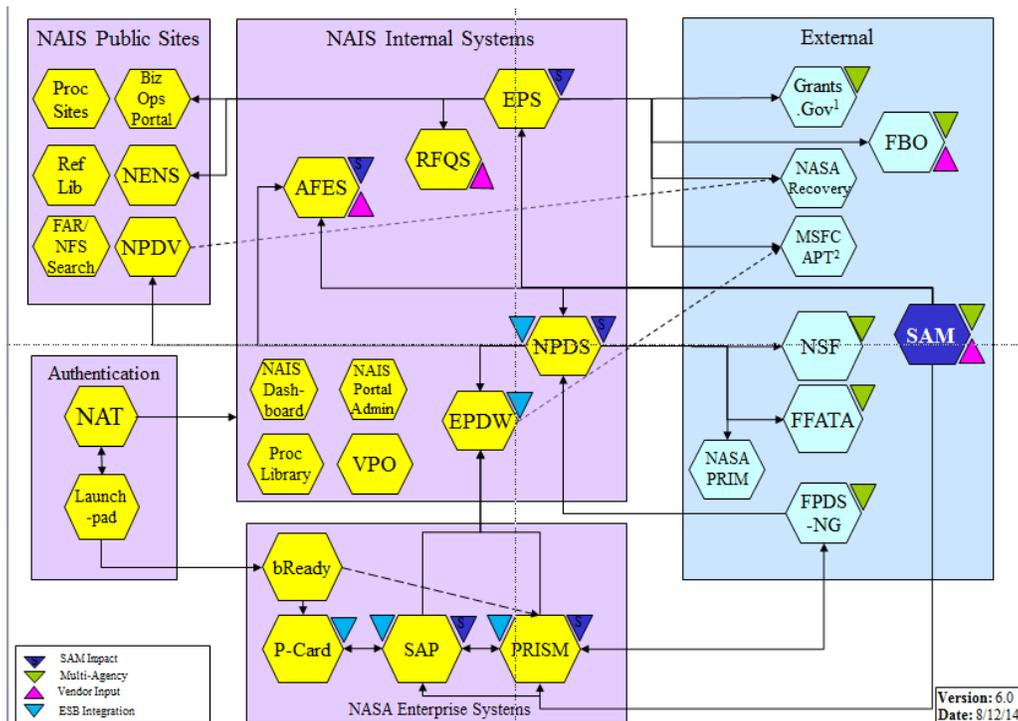


Figure 3.8 – Procurement Architecture

Authentication: NASA’s Central Authentication tool, as of December 2011, all Procurement internal sites are protected by eAuthentication

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Award Fee Evaluation System (AFES): The Award Fee Evaluation System allows NASA to implement Award Fee performance evaluations. All other contractor performance evaluations must be entered in the federal system, the Contractor Performance Assessment Reporting System (CPARS). CPARS replaced the NASA Acquisition Internet Service (NAIS) Past Performance Database (PPDB) application effective February 25, 2011.

Dashboard: Provides high level customizable graphical reports

Metrics: An admin tool that allows for the monitoring of applications usage across centers.

Electronic Posting System (EPS): Enables procurement representatives to generate advance and post-award notices and post them into the NAIS business opportunities portal. Also enables them to upload all solicitation and related documents into the portal service. Automatically transmits relevant information on these acquisition opportunities to the FedBizOps portal service and Grants.gov with links pointing back to the NAIS business opportunities portal containing the solicitation-related files. Automatically updates and maintains the NAIS business opportunities portal service. Includes automatic email notification to the procurement points-of-contact reminding them to archive posted acquisition documents. Allows buyers to flag Recovery actions.

Enhanced Procurement Data Warehouse (EPDW):

EPDW fills a gap for the agency's procurement reporting needs. EPDW provides procurement related reports that are used by NASA personnel to track and monitor procurement actions through the many phases of the procurement process. Source data comes from PRISM, SAP and Federal Procurement Data System – Next Generation (FPDS-NG via NAIS/NASA Procurement Data Store (NPDS)). EPDW offers 100+ standard reports ranging from Purchase Requisition data, Award data as well as reports used to ensure data integrity across the multiple source systems. Many of the standard reports are “Excel enabled” and allow users to easily save the information into an Excel worksheet. EPDW also provides a “Customize” option for many of the reports to allow users flexibility in choosing what information is displayed on the reports.

Procurement Library: Portal used by NASA Procurement officials to share information and regulations

bReady: bReady Portlet capability used by Procurement personnel to review/approve SAP invoices and perform PRISM closeout functions.

NASA Procurement Data Store (NPDS): Contains NASA's post award procurement data since the FPDS-NG go live, 2004. It collects nightly data from FPDS-NG, integrates Buyers Information nightly from CMM, maintains source data in original format, provides data feeds to NASA (EPDW, PRIM, AFES, NPDV) and Federal systems (USAspending/FFATA,

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Research/NSF), contains detailed and netview level data. Data may be collected from new sources as needed. Currently, the following data types may not be available in FPDS-NG, however if they become available, they will be pulled into NPDS:

- 1) Space Act Agreements
- 2) Small Purchases (less than \$3000)
- 3) Interagency Agreements

RFQS: Request For Quote System: Enables vendor transmission of quotes in response to simplified acquisition solicitations. Applies to all simplified acquisitions of commercial items between \$25,000 and \$5,000,000. Automatically generates the bid abstract of vendor quotes and the purchase order of the successful quote.

Virtual Procurement Office (VPO): Provides user-friendly access to all on-line resources and tools relevant to the procurement cycle. VPO is presented in a matrix format depicting the procurement cycle, from cradle to grave, showing each procurement step. VPO provides links for each procurement step to relevant rules, samples, build tools (e.g., templates, applications). Facilitates status tracking of an acquisition requirement through the procurement cycle.

P-Card: P-Card Web Solution™ (also known as Bankcard) is used to simplify the purchase of goods and/or services typically at or under the micropurchase threshold (currently \$3,000). NASA purchase cardholders login to enter and modify purchase information, reconcile their individual purchase credit card transactions to the recorded purchases, and send those transactions on to a designated approver for review and final validation. Interfaces with the NASA's financial system, SAP, to record these actions in the form of fund commitments and obligations.

SAP: SAP Core Financial (CF) serves as NASA's financial accounting system of record and is the foundation for NASA's business systems providing the core accounting functionality. CF includes the standard SAP modules of funds distribution, cost management, accounts payable, accounts receivable, purchasing, asset accounting, and standard general ledger.

PRISM: NASA's Contract Management Module (CMM) / PRISM is NASA's contract writing system and is used as a hub to modernize/standardize Procurement business functions. It provides an integrated Agency-wide procurement solution that interfaces with SAP and FPDS-NG.

NAIS Portal Admin: Allows users with proper access to manage contents of dynamic portals:

- Procurement Library
- Procurement Knowledge Management Portal
- NEACC Procurement Scrum Team Activities Portal
- Destination Paperless Portal

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- Grant Line of Business (GLB) Process Flow Team Portal
- NAIS Standing Policy Advisory Sub-team (NPAT) Portal
- NASA Management Office Jet Propulsion Laboratory (NMO JPL) Benchmarking Portal
- Procurement Steering Committee (PSC) Team Information Portal
- Recovery Act Information Portal
- Research.gov (NSF) Information Portal
- Cost/ Pricing Team Information Portal
- NASA Grant and Cooperative Agreement Handbook Rewrite and Reform Portal Information Page
- Ombudsman for Acquisition Page Administration Tool
- NASA Procurement Technology Representatives Page Administration Tool
- Agency Patent Representatives Page Administration Tool
- NASA Procurement Officers Page Administration Tool

Static portals not managed thru the Portal Admin tool:

- NAIS/USAspending.gov Information page
- NAIS Information Page

Biz Ops Portal: Business Opportunities Portal (http://prod.nais.nasa.gov/cgi-bin/nais/link_syp.cgi)

Web-based library of upcoming and current acquisition opportunities. Includes all competitive acquisitions over \$25,000 and many of the acquisitions below \$25,000. Contains advance and post-award notices, draft solicitations, final solicitations, and all related documents. The portal enables the user to sort these business opportunities by product / service classification code, posted date, and NASA center. Also, it allows for viewing of Recovery Actions.

FAR/NFS Search (<http://prod.nais.nasa.gov/far/>): Web-based search capability that combines the FAR and NASA FAR Supplement. Enables users to conveniently search for both NFS and FAR regulations from one location

NAIS Email Notification System (NENS) (<http://prod.nais.nasa.gov/cgi-bin/nens/index.cgi>):

Integrated with the NAIS business opportunities portal service to automatically transmit email notifications of newly-posted acquisition opportunities to prospective offerors. Interested industry representatives can register for notifications based upon specific acquisition number, product / service classification code, and NASA center. Email notifications are transmitted for all new postings (i.e., synopses, draft solicitations, final solicitations, amendments, other solicitation-related documents). Allows for the automatic subscription to Recovery actions.

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NASA Procurement Data View (NPDV), the Map (<http://prod.nais.nasa.gov/cgi-bin/npdv/npdv.cgi>): An on-line query web-based with access to NASA database system containing summary-level data (e.g., contract number and description, contractor and address, period of performance, Congressional District information, value). Includes geographic (map) and ad hoc query capabilities. Enables users to view Recovery actions at the congressional district level.

Proc Sites: NASA Center Procurement Sites (<http://prod.nais.nasa.gov/cgi-bin/nais/nasaproc.cgi>) An electronic directory that contains links to NASA Center procurement sites.

Ref Lib: NASA Procurement Reference Library (http://prod.nais.nasa.gov/cgi-bin/nais/nasa_ref.cgi) An electronic library that provides NASA users/customers with an abundance of procurement information site. It includes links to the Business Opportunities Portals, Federal Acquisition Regulations (FAR), FAR Supplements and other Regulations, Miscellaneous Procurement Reference Sites, Business Assistance, Electronic Commerce Resources, etc.

SAM: System for Award Management (SAM) Phase I included CCR, ORCA and EPLS. SAM includes the primary vendor database for the U.S. Federal Government, it collects, validates, stores, and disseminates data in support of agency acquisition missions. NAIS validates Data Universal Numbering System (DUNS) using SAM webservice 5.0. Vendor.nasa.gov and the SAP nightly batch file will be upgraded to the latest SAM version on October 1, 2014.

FFATA: The Federal Funding Accountability and Transparency Act (USAspending.gov), NASA provides assistance data to USAspending.gov twice a month

FBO: Federal Business Opportunities Portal (hosted by GSA); also flags recovery actions, all EPS postings are sent real time to FBO via XML e-mail attachment.

FPDS-NG: Federal Procurement Data System - Next Generation. Source for contacts/grants. It allows Buyers to flag recovery actions. Nightly incremental data pull.

Grants.gov: Hosted by GSA, all postings with grants are sent to grants.gov real time, in the process of modernizing from XML attached in e-mail to webservices.

NSF: The National Science Foundation (Research.gov). Research.gov is a Grants portal and it supports the viewing of Recovery actions. NASA's assistance data is sent to Research.gov on the 20th of each month via a webservice interface.

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NASA Recovery: The official NASA Recovery site, maintained by the Office of Chief Financial Officer (OCFO)

Recovery: Refers to the American Recovery and Reinvestment Act (ARRA)

PRIM: Procurement Related Interface Management (PRIM) Data Feed - Data extract that is comprised of FPDS-NG data that is emailed to a point of contact at NASA HQ on monthly basis

MSFC APT: The MSFC Acquisition Planning Tool (APT) receives data directly from the NAIS EPS database and EPDW

Future Initiatives

The Procurement Line of Business is currently planning and working the following future initiatives:

- PRISM 7.2 upgrade – targeted for implementation in 2016
- Contract Management Transformation with SAP Procurement for Public Sector (PPS)
- SAM – System for Award Management Phase II (Fed Biz Ops)
- Implementation of FAR case 2012-023: Activity Address Code (AAC) / Procurement Instrument Identifier (PIID)
- Implementation of FAR case 2013-014: Uniform Line Item Numbering
- SAM Phase III (FPDS-NG)

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3.3.5 Human Capital and Workforce (HCW) Line of Business

The Human Capital and Workforce (HCW) line of business represents a large set of functionality that spans NASA's Human Resources functions. HCW applications maintained and supported by the NEACC are often tightly coupled with HCW applications maintained and supported by other HR information technology offices across NASA. Be it through data integration or collaboratively developed user interface, The Human Capital Information Environment (HCIE) encompasses all applications and IT processes that support the Human Capital and Workforce Line of Business for the NASA. Within the HCW line of business, cross-collaboration and communication are required to successfully develop, support and maintain the health of the overall HCIE environment. NEACC supported applications within the HCIE infrastructure include:

FPPS and Datamart (previously ePayroll)

Currently, FPPS and Datamart is supported by a centralized team that provides assistance to the Agency in the use of the Department of Interior's (DOI) Federal Personnel & Payroll System (FPPS) and Datamart. The members of this team serve as the Agency's Subject Matter Experts (SME) for personnel and payroll action processing. The team represents the Agency in providing support and guidance to DOI by serving as the FPPS User Group representatives and the FPPS System and Security Administrators. The team is also responsible for the delivery of interfaces that provide data to FPPS such as: Time and Attendance, Awards, and Performance Ratings. The team provides FPPS data to centers/agency systems on a regular basis via interfaces: systems include workforce, security, travel, and competency management. The team also provides FPPS data to external customers such as the Office of Personnel Management (OPM), MetLife and Employee Express (EE). The custom built inbound /outbound interfaces currently total 45.

HCW Personnel Data Warehouse (PDW)

The HCW Personnel Data Warehouse contains the authoritative data source (ADS) for Human Capital information, applications used to manage Human Capital resources, and reporting tools integrated with other applications within NASA's IT infrastructure. Data from various agency wide applications is stored in the PDW and provides a single source for cross functional data reporting. The PDW offers an environment for effective, real-time decision making and provides ability to analyze "what if" scenarios with data analysis and forecasting engines, and forecast workforce trends within NASA, and across the labor market, using current and historical information. Furthermore, the PDW provides an integrated, interoperable architecture of HC information that uses one common database, with a standard data structure. Each data element is stored in the PDW once to be shared with other HCW and non-HCW systems. Data reliability, achieved by eliminating duplicate data elements and repetitive data entry provides a level of confidence to the NASA HC professionals, managers, supervisors charged with decision making. The PDW is the source of data supporting support many and varied integrations with internal and external to the HCW line of business.

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Historical NASA Personnel and Payroll System (HPPS)

The NASA Personnel and Payroll System (NPPS) was developed as an agency-wide application to satisfy a core set of requirements for personnel and payroll processing in the mid-1980s. NPPS was utilized by ten NASA centers until August 8, 2004, NASA transitioned to the Federal Personnel and Payroll System serviced by DOI in August of 2004. In 2007, NASA developed the web-based Historical Personnel Payroll System (HPPS) which provides easy access to historical personnel and pay data preceding previously contained in NPPS.

NASA's Procedural Requirements (NPR 1441.1D, Schedules (3) and (9)) define the retention periods for Personnel and Payroll records as fifty-six (56) and sixty-five (65) years, respectively, following an employee's separation. HPPS was created in order to fulfill this requirement in a cost effective manner and to be used for historical data analysis. HPPS provides query and reporting capability against historical NPPS personnel and payroll information. This information is presented in a web-based application that mirrors selected capabilities drawn from the NPPS legacy application. The data in HPPS is strictly historical in nature, and thus is static. Except for essential administrative functions (i.e., adding or deleting authorized users), there is no update capability in HPPS.

This HPPS is for use by several NASA Personnel and Payroll offices for a number of purposes including the research of retroactive settlements, workforce analysis, —gross through net pay calculations, the support of internal and external payroll audits, and to fulfill NASA's data retention requirement.

Secure Print Servers

Secure Print Servers provide various options for routing print output to printers and print servers located at customer sites. These options include encrypted print and standard print. Each of these options requires that client sites provide the network address and queue. Secure Print Servers are used in support of the Federal Personnel and Pay Systems.

Staffing and Recruiting System (StaRS)

The NASA Staffing and Recruiting System (StaRS) application supports the end-to-end hiring process at NASA. StaRS contains the tools necessary to post job vacancies, in accordance with regulatory requirements, to the Office of Personnel Management's site USAJOBS.gov, receive resumes from USAJOBS.gov, collect supplemental applicant information, process resumes for skills extraction and storage, analyze candidates' skills, and complete the post interview hiring cycle with a paperless signature process. This is accomplished with a mix of customized and COTS products which include web services between NASA and OPM. The destination of all StaRS actions is the Case Management module which provides a detailed view of the hiring documents for any given job. The Case Management Module is used primarily to facilitate audits and other required reviews. Various data integrations from/to FPPS and PDW are also maintained in support of StaRS.

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Various hiring and recruiting reports are also available to HR Specialists, hiring managers, and agency stakeholders. These reports are developed in Cognos and made available via the STARS user interface.

Web-based Time and Attendance System (WebTADS)

WebTADS is a custom built application that provides NASA with the agency's web-based time and attendance and labor collection. WebTADS allows for employee level entry of current timesheets as well as prior pay period adjustments. Leave taken by the employee is allocated, at the point of timesheet approval, to the projects directly supported by the employee. In addition to timesheet entry, users of WebTADS have access to additional functionality to include:

- Voluntary Leave Bank
- Voluntary Leave Transfer
- Official Supervisor designation
- Telework Requests
- Combined Federal Campaign
- Reports and displays for various user roles

Data integrations from/to FPPS, ALDS, and PDW are also maintained in support of WebTADS.

HR Portal

The HR Portal, www.hr-nasa.gov, is a fully integrated, strategically focused, business environment for online, near real-time access to reliable, comprehensive information that employees, managers, and supervisors need for rapid and accurate decision making. The HR Portal is integrated with the HCW PDW, and provides a common, robust data source removing the need for redundant systems across NASA centers. The HR Portal also provides a single point of entry for all HR applications used to manage HC resources, and for reporting tools integrated with other applications within the Agency information technology (IT) infrastructure. Through the HR Portal, employees and managers are provided online access to near-real-time HC information through state-of-the-art technology.

The Human Capital infrastructure consolidates data from disparate HR information systems into an integrated model. The basic system architecture is presented below.

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3.3.6 Office of Education (OE) Line of Business

The Office of Education is currently supported through Task Orders under the EAST contract. There are three applications and a website that are currently included to support the Office of Education Infrastructure Division. The applications are One Stop Shopping Initiative (OSSI), Office of Education Performance Measurement System (OEPM) and Office of Education Data Collection (OEDC). The OSSI website is currently hosted on Marshall servers, but the EAST responsibility is limited to the deployment of website content developed by a third party vendor.

One Stop Shopping Initiative (OSSI)

The OSSI application is accessed through the OSSI website by Education stakeholders, including students, faculty, mentors, project managers, and industry partners. The OSSI allows students to apply for NASA Internship, Fellowship and Scholarship opportunities. It is also a tool for the administrators of these programs to select candidates and award opportunities to selected pool of students.

Office of Education Performance Measurement (OEPM)

The Office of Education Performance Measurement (OEPM) System is an extensive application that is a single, consolidated performance measurement system that supports the collection of like data across all NASA Office of Education projects using the data collected through OSSI and automatically produces OMB and other performance measurement reporting. This data is reported through various methods (Cognos Dashboards and reporting) and on various platforms (desktop and mobile devices). Each Fiscal Year data is a separate database with its own unique schema.

The OEPM System evolved because more than one database was being used to store NASA educational information, and there was a growing need to consolidate into one system. The functionality of OEPM falls into the following main categories:

- Evaluation Management
- Performance Measurement
- Portfolio Management

Office of Education Data Collection (OEDC)

This site is similar to the OEPM and provides similar functionality, but it supports Office of Education users that are outside the NASA network community (e.g., teachers and broker-facilitators).

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3.3.7 Identity, Credential & Access Management (ICAM) Line of Business**3.3.7.1 History**

At the end of 2008 three major projects; Centralized Badging, Access Control System (CBACS) and NASA Integrated Services Environment (NISE) and Homeland Security Presidential Directory 12 (HSPD-12), executed Project Closeout Reviews and merged into the NEACC Operational model and created an ICAM Business Architecture with an associated ICAM LOB.

In 2012 NASA had a requirement to modernize and replace the current Identity, Credential & Access Management (ICAM) applications. Based on the results of a full and open competition, it was requested that the contractor acquire expert labor resources to support the custom built implementation of NASA's Identity, Credential and Access Management solution.

NASA had a requirement to replace the Oracle (Sun) Identity Manager product in support of ICAM's current business processes due to the fact that the product suite was reaching "end of life" in the near future, and would no longer be maintainable. It was determined that the current market place did not have a COTS solution that satisfied the NASA functional and technical requirements for Identity and Access Management. Therefore, a decision was made by senior NASA management at Headquarters' to build a custom solution to meet NASA's ICAM business processes requirements.

NASA also had a requirement to support ICAM with NASA Consolidated Active Directory (NCAD) engineering services. The contractor was directed to acquire expert labor resources skilled in NASA's ICAM NCAD business processes and associated delivery technologies.

3.3.7.2 Introduction

The NASA ICAM LOB has been and continues to work toward implementation of the Federal ICAM (FICAM) initiatives which can be found at <http://www.idmanagement.gov/>. The ICAM LOB's sole purpose is to perform Identity, Credential, and Access management in a manner that is consistent with FICAM. To that end, NASA has implemented several systems that are coupled together to achieve this goal:

1. Identity Management
2. Access Management (Access Management has been split into Physical and Logical access)
3. Credential Management

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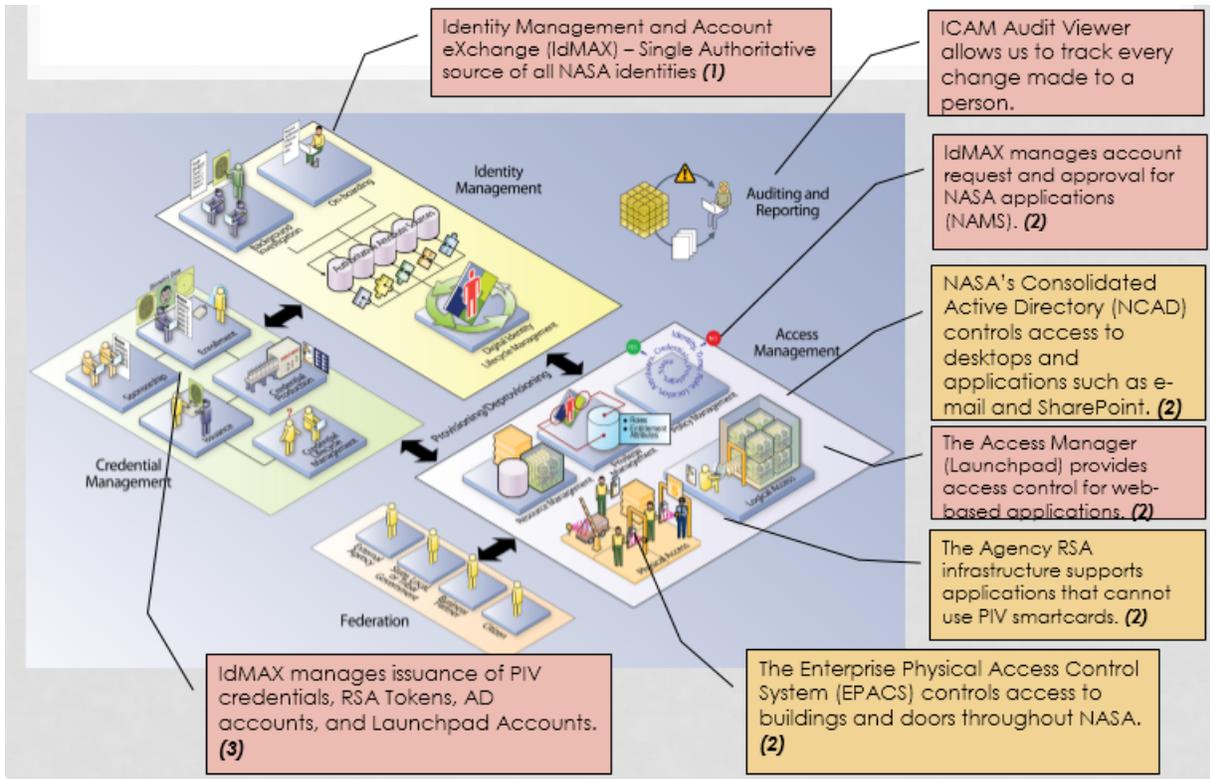


Figure 3.10 – ICAM systems

3.3.7.3 Identity Management (1)

Identity management is defined as the creation, management and deletion of NASA Identities and associated data elements. This includes but is not limited to Social Security Number (SSN), Date of Birth, Place of Birth, Uniform Universal Personal Identifier Code (UUPIC), Last Name, First Name, and center unique location information. Data information is managed through a user and several system interfaces.

The Identity Physical architecture consists of the following systems:

Identity Management and Access Exchange (IdMAX)	Custom code written in: Java leveraging Spring framework, Bootstrap and myBatis
Data Management processing	ICAM DAO
Identity Management Database (IDDB)	Microsoft SQL 2008 Standard
UUPIC	Table within Identity Management Database (IDDB)

Table 3.2 – Identity Physical Architecture systems

Attachment L-B - Background and Historical

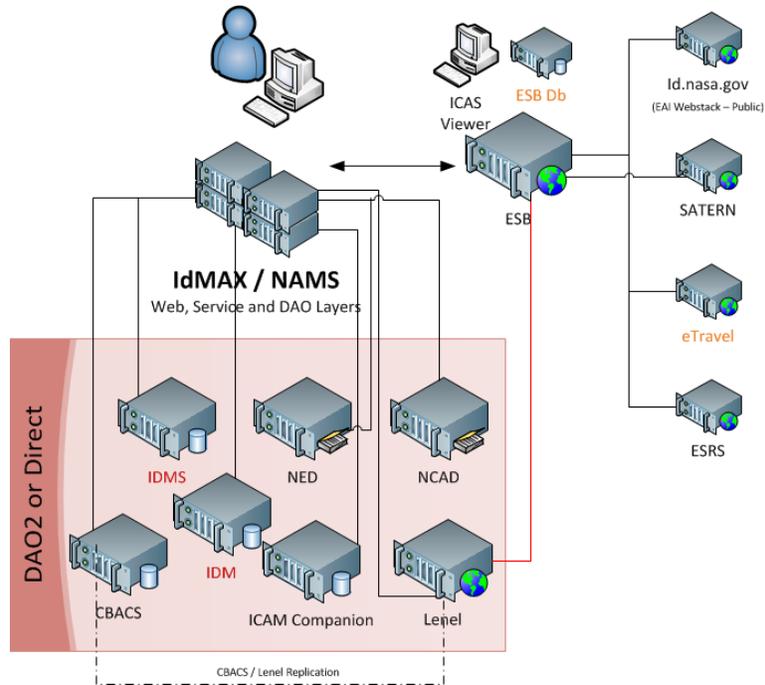


Figure 3.11 – IdMAX Physical Architecture

NASA Worker Identities can be created via an IdMAX user interface or the interfaces with Human Capital and Security Foreign National systems. Non-NASA Worker Identities can be created via the IdMAX user interface. Table 3.3, *NED Data Mapping* describes how some of the identity attributes in the NASA Enterprise Directory (NED) are managed.

Attachment L-B - Background and Historical

NED Attribute	NASA - Create	NASA - Modification	Non-NASA Create	Non-NASA Modifications
First Name	WTTS	FPPS	Create Identity	Modify Identity
Middle	WTTS	FPPS	Create Identity	Modify Identity
Last Name	WTTS	FPPS	Create Identity	Modify Identity
Display Name	WTTS	USS	USS NAMS	USS
Email	WTTS	USS	NAMS	USS
Phone	Center IDA	Center IDA	Center IDA	Center IDA
Mobile	Center IDA	Center IDA	Center IDA	Center IDA
Fax	Center IDA	Center IDA	Center IDA	Center IDA
Address	Center IDA	Center IDA	Center IDA	Center IDA
Zip Code	Center IDA	Center IDA	Center IDA	Center IDA
City	Center IDA	Center IDA	Center IDA	Center IDA
Center	WTTS	FPPS	Create Identity	Modify Identity
Title	WTTS	FPPS	PIV Request	Center IDA
Org Code	WTTS	FPPS	PIV Request	Center IDA
Bus State	Center IDA	Center IDA	Center IDA	Center IDA
Building	Center IDA	Center IDA	Center IDA	Center IDA
Employer	WTTS		PIV Request	PIV Request
Room	Center IDA	Center IDA	Center IDA	Center IDA
UUPIC	Create Identity		Create Identity	
Agency User ID	Create Identity		Create Identity	
Legacy ID**	Center IDA	Center IDA	Center IDA	Center IDA
X.500 ID	Center IDA	Center IDA	Center IDA	Center IDA
US Citizen	WTTS	Modify Identity	Create Identity FNMS	Modify Identity FNMS
Status	PIV Process	PIV Process	PIV Process	PIV Process

Table 3.3 - NED Data Mapping

The Identity architecture interconnects and processes data with various systems as depicted in Table 3.4, *Identity Interfaces and Process*.

Interface	Approx. Qty	Description
IdMAX User Interface	On change 1,500/month	Creation of Non-NASA Worker identities
Workforce Transformation Tracking System (WTTS)	Processed daily 50/week	Creation of NASA Worker identities
Federal Personal Payroll System (FPPS)	Processed daily 500/week	Modification of NASA Worker identity information
NASA Foreign National Management System (FNMS)	Processed daily 500/month	Creation on Non-NASA Foreign National Worker

Attachment L-B - Background and Historical

Interface	Approx. Qty	Description
OneNASA Email system	Processed nightly 3,000/day	Modification of NASA and Non-NASA identity information
Center Interfaces (12 unique)	Processed nightly 5,000/day	Modification of NASA and Non-NASA identity information
NED	Processed nightly 5,000/day	Published repository of identity information and used by several applications for authentication
NASA Consolidated Active Directory (NCAD)	Processed nightly 5,000/day	Published identity information
NASA Public Key Infrastructure (PKI) Directory	Processed nightly	Published identity information
Card Management System (CMS)	Processed every 15 minutes	Card Personalization Request (CPR) for Permanent Badge production (PIV Badge)
Universal Registration Client (URC)	Processed on demand	Identity Verification (PIV Enrollment)
BAS	Processed on demand	Identity Verification (PIV Enrollment)
Enterprise Physical Access Management System (EPACS)	Processed every 30 minutes – constraint of 500 records	Identity information to support center badge production and physical access

Table 3.4 – Identity Interfaces and Processes

The Identity infrastructure has undergone significant change over the past several years to bring it to the mature working model that exists today. This change has established several interconnects with both internal and external systems which all rely on it for providing identities, authentication, and all aspects that go into supporting these processes. The current application integrations are shown in Figure 3.12, *ICAM Application Integrations*.

Attachment L-B - Background and Historical

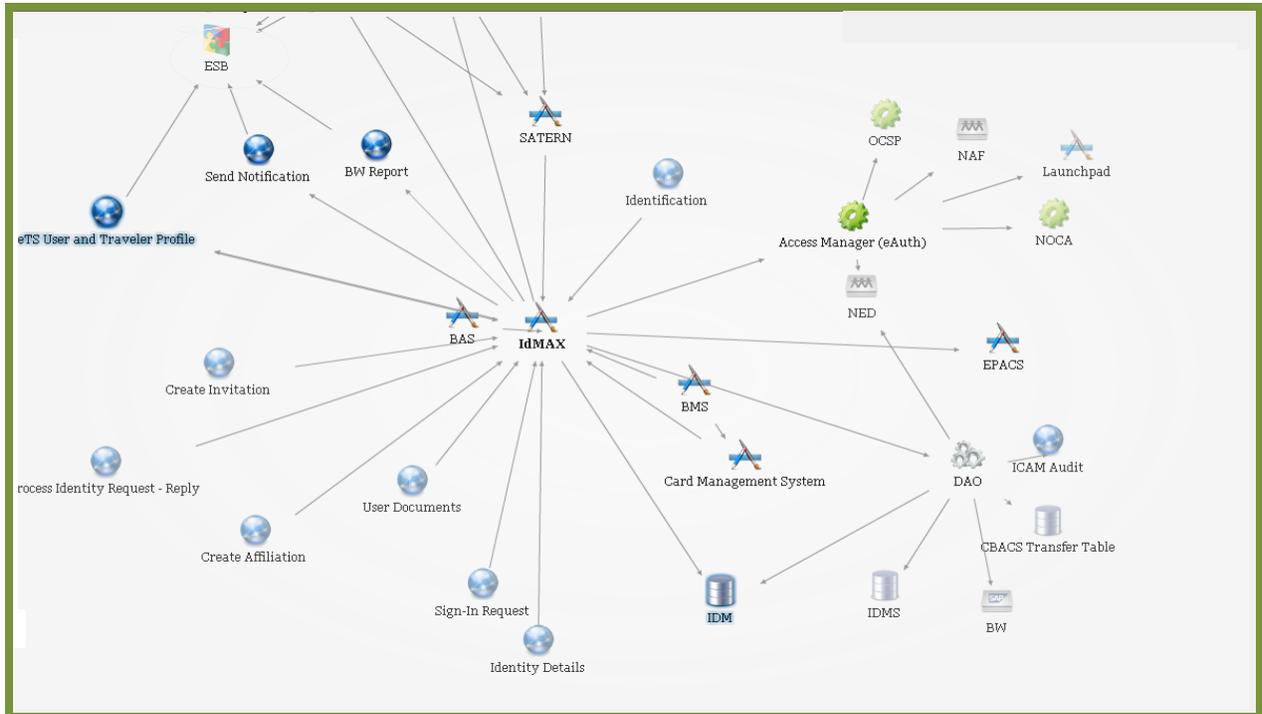


Figure 3.12 – ICAM Application Integrations

The data architecture as shown in Figure 3.13, *ICAM Identity Data Architecture Model* was implemented during calendar year 2009. A supporting centralized audit capability is included in the Enterprise Service Bus (ESB) architecture as shown.

Attachment L-B - Background and Historical

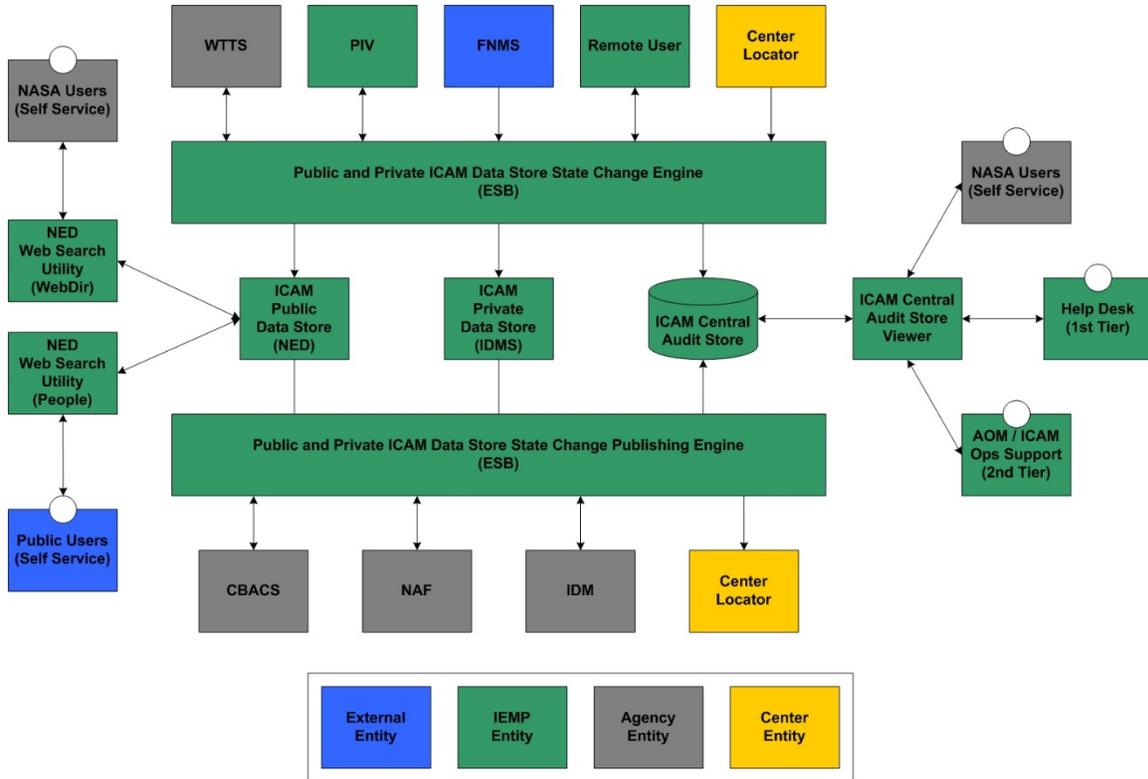


Figure 3.13 – ICAM Identity Data Architecture Model

id.nasa.gov was implemented in August 2013. This application provides 'user self service' functionality to all NASA employees (contractors/civil servants) and allows end user to request modifications of common names, display names in the Agency email system (NASA Operational Messaging and Directory (NOMAD)), request Agency email services and managing email addresses with a prefix of @nasa.gov. Additionally users can manage their Launchpad password profile (security questions/launchpad password), perform annual revalidation of system and physical access need and manage emergency notification information (contractors only). This information is published in the NED, NOMAD NASA Post Forwarders (NPF) and the NOMAD Active Directory.

The original User Self Service (USS) was implemented within IdMAX in December 2008 and still exists in production. This functionality within IdMAX is available only for users who need to support 'on behalf of' capability for users who cannot access id.nasa.gov due to insufficient credentials (no PIV Smartcard or RSA Token).

PIV Workflow is the process to support HSPD-12 as documented in FIPS 201. At a high level, NASA Identities are created using the Identity Management system and processes as represented in Figure 3.14, *PIV Workflow*. These identities are sponsored, validated, verified and produced appropriate to the credential that has been requested. The credentials that are currently issued are the Permanent (PIV) Badge. The workflow supports, Badge Renewal, Badge Reissuance, and a NASA Temporary Badge.

Attachment L-B - Background and Historical

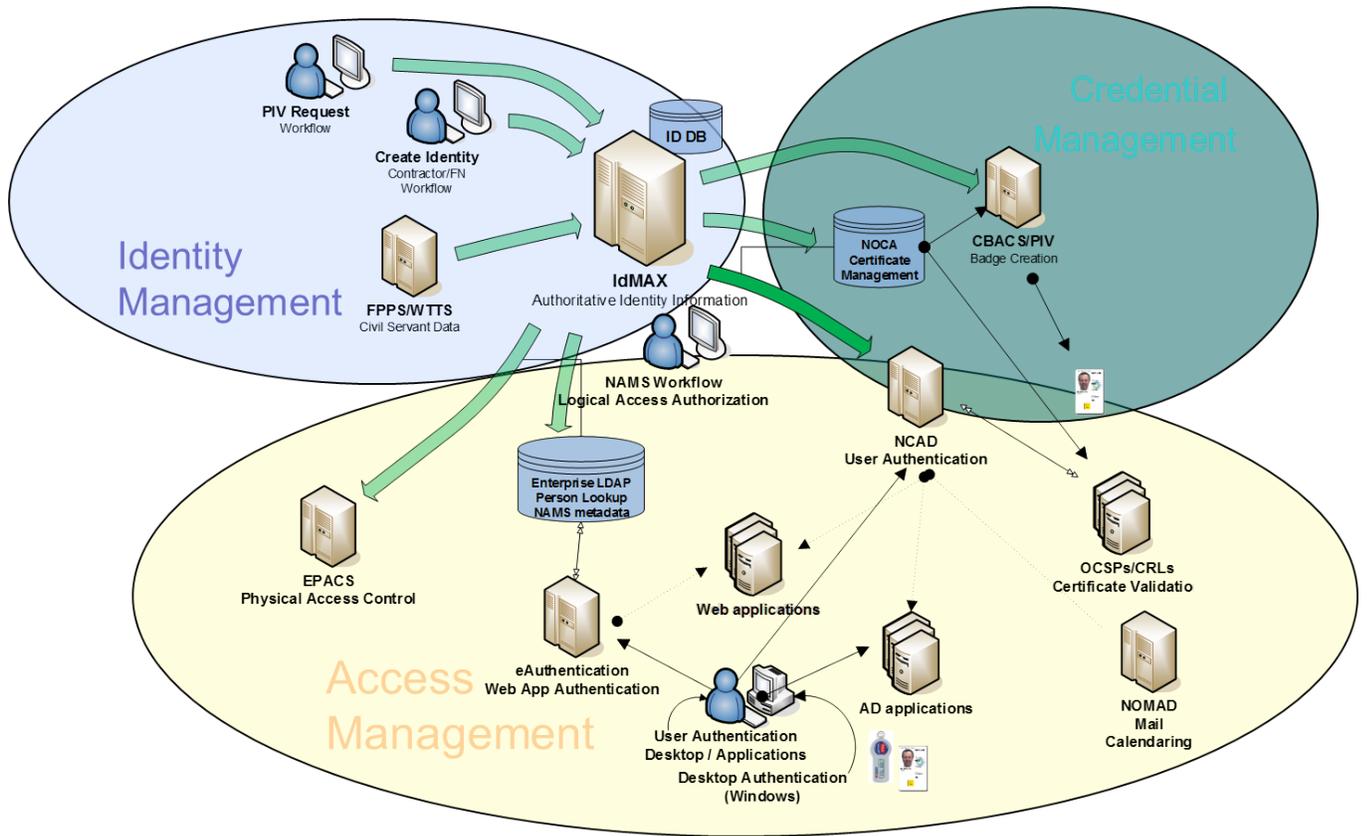


Figure 3.14 - PIV Workflow

Remote User process is designed to accommodate NASA IT users that do not require physical access to a NASA Center. There are two implementations: a) the user submits their PII information directly into IdMAX via ESB integration and b) a PIV Requestor submits the users PII information on their behalf. Once the request has been submitted and approved by the identified Sponsor, the center PIV Authorizer authorizes this user for access NASA’s IT Infrastructure.

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3.3.7.4 Credential Management (3)

Credential Management provides the centralized service for management of NASA Credentials used to access physical and logical resources – directly associated with NASA HSPD-12 Business processes. These Business processes includes request, sponsor, verify, validate, authorize. Systems include:

IdMAX	Custom code written in: Java leveraging Spring framework, Bootstrap and myBatis ...Microsoft SQL 2008 –	Identity Management
NED	Sun JAVA Directory 6.3	Data Repository
BioSP	BioSP 8.6.1	Biometrics Repository
URC	Aware URC version 1.0.2711.24356	Identity Verification – Enrollment
CMS	ActivIdentity CMS v4.2 SP BN10	Card Production, Encoding and Finalization
BMS	ActivIdentity BMS v2.9 Update 6	Card Production
EPACS	Lenel OnGuard 6.5 624 HotFix 0.2	Card Production – Physical Access

Table 3.5 – Credential Management Systems

The credentials that are created through this process are managed via this portion of the ICAM architecture. Currently the agency credentials are PIV II, RSA Tokens and Temporary Worker. There are several center unique credentials that are produced and managed using the EPACS Lenel OnGuard implementation.

3.3.7.5 Access Management (2)

Access Management allows usage of NASA authorized identities to access NASA Logical and Physical resources. After an identity has been created in the Identity Management system, then authorized in the Credential Management System, the user can be granted access to approved logical and physical resources.

Logical Access

NASA Account Management System (NAMS)

NAMS is the agency process for requesting, approving and provisioning of access to NASA’s logical resources. Currently, there are over 2300 applications integrated into NAMS. NAMS is a custom built application using the Identity Management architecture. There are several

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additional tools used to support NAMS processes. These included reconsolidation of accounts, account request tracking, account revalidation and account closure.

Access Manager 3.0 (Launchpad)

NASA’s Access Manager implementation (launchpad.nasa.gov) started as an OMB e-Gov directive for authentication across several lines of government business. ICAM is in the process of migrating from Sun Access Manager to CA Siteminder. Sun Access Manager is currently implemented at NASA to support the e-Gov initiative and internal authentication within NASA web enabled applications. This is a custom configuration to support authentication using NED, NCAD and the Online Certificate Status Protocol (OCSP) architectures depending on the application specifics. The NEACC provides centralized management and point of presence for all applications to connect to for authentication services. See Figure 3.15 for the *AM 3.0 System Description* and Figure 3.16 for the *AM 3.0 System Interfaces*.

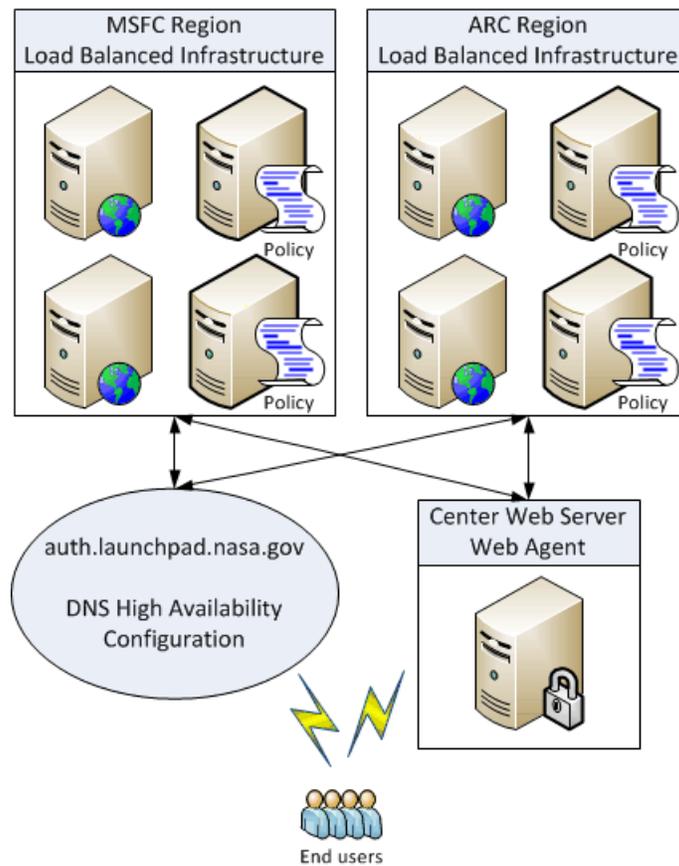


Figure 3.15– AM 3.0 System Description

Attachment L-B - Background and Historical

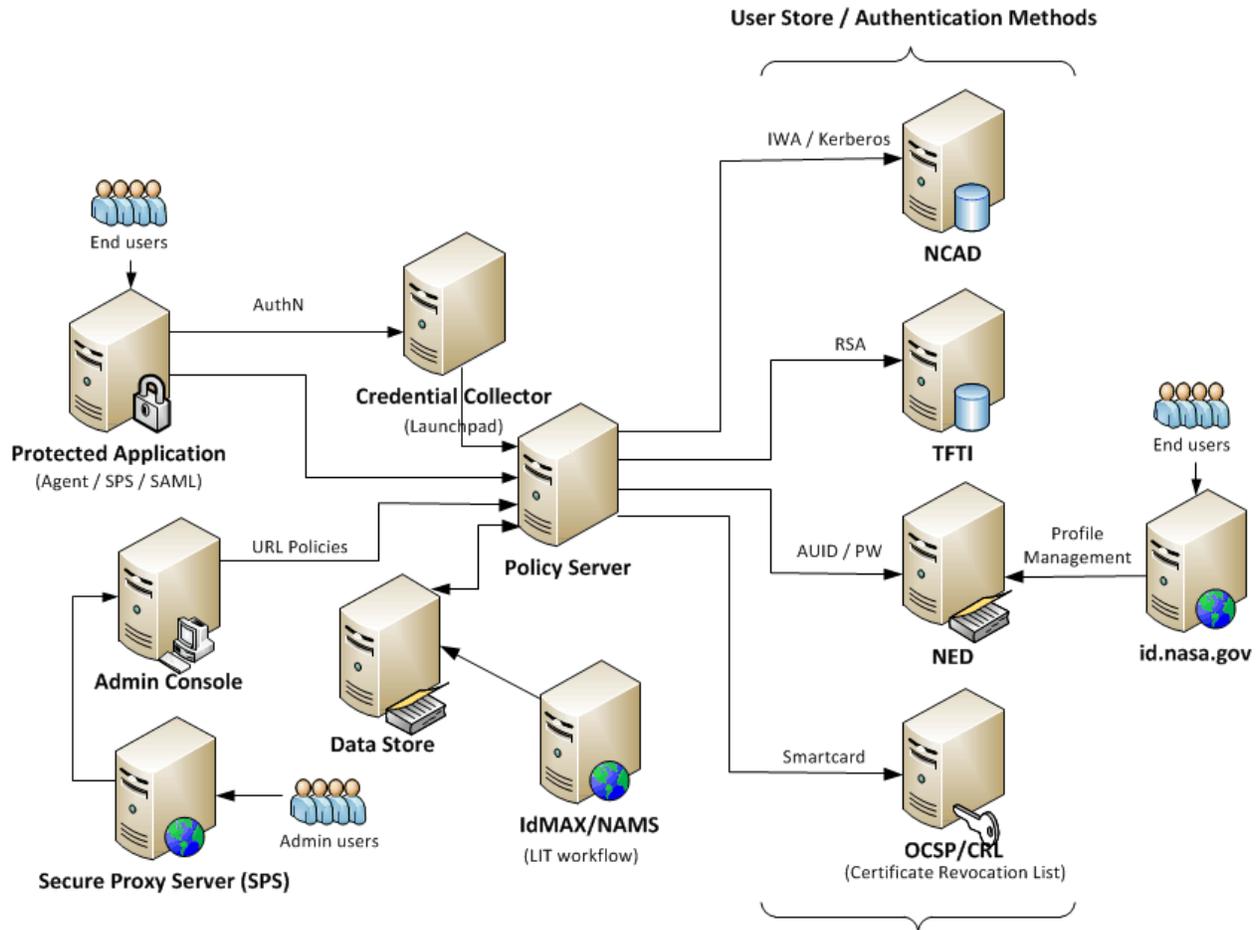


Figure 3.16 - AM 3.0 System Interfaces

Physical Access

Enterprise Physical Access System (EPACS)

EPACS is the agency infrastructure providing a common NASA enterprise physical access control system that secures all NASA facilities, personnel, and assets. EPACS controls physical access to any facility at each Center. The approved identity information is pushed from the Identity systems to the EPACS system for granting of physical access. The EPACS system is a Commercial off the shelf (COTS) implementation using Lenel OnGuard software.

The centralized and decentralized components of the EPACS hardware are described in Figure 3.17, *EPACS Physical Architecture*.

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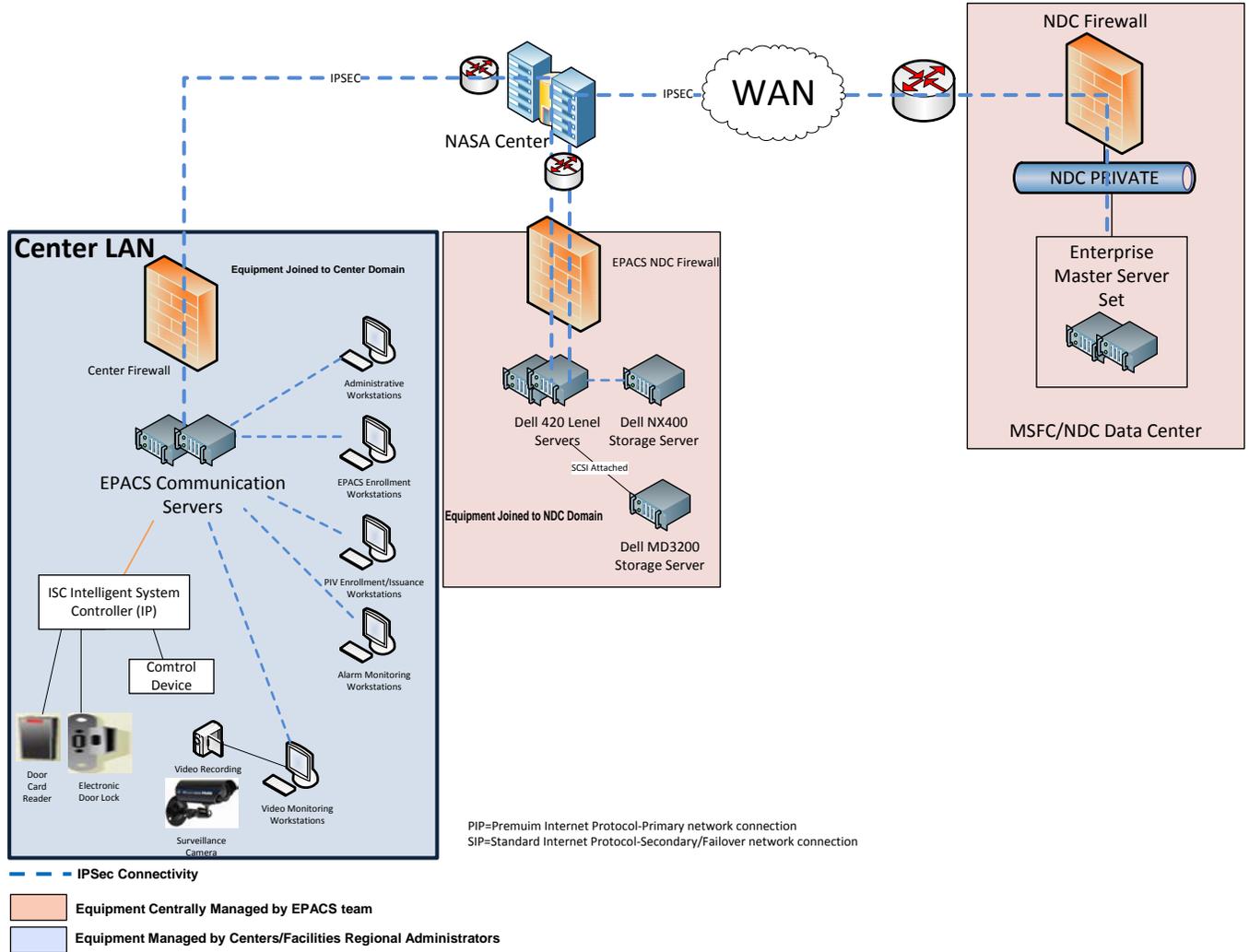


Figure 3.17 - EPACS Physical Architecture

Currently, there are seventeen regional implementations, which are located at NASA Centers and Facilities. These include: Ames Research Center (ARC), Armstrong Flight Research Center (AFRC), Glenn Research Center (GRC), Goddard Space Flight Center (GSFC), Headquarters (HQ), Jet Propulsion Laboratory (JPL), Johnson Space Center (JSC), Kennedy Space Center (KSC), Langley Research Center (LaRC), Michoud Assembly Facility (MAF), Marshall Space Flight Center (MSFC), Stennis Space Center (SSC), Wallops Flight Facility (WFF), and Enterprise Master (EM). The Enterprise Master implementation is located in the MSFC NASA Data Center (NDC). We are in process of adding White Sands Complex (WSC) as a new region. WSC will manage the hardware configuration, and the NEACC will manage the Lenel Application and replication. Figure 3.18, *EPACS Logical Architecture* displays the same information in a logical view format.

Attachment L-B - Background and Historical

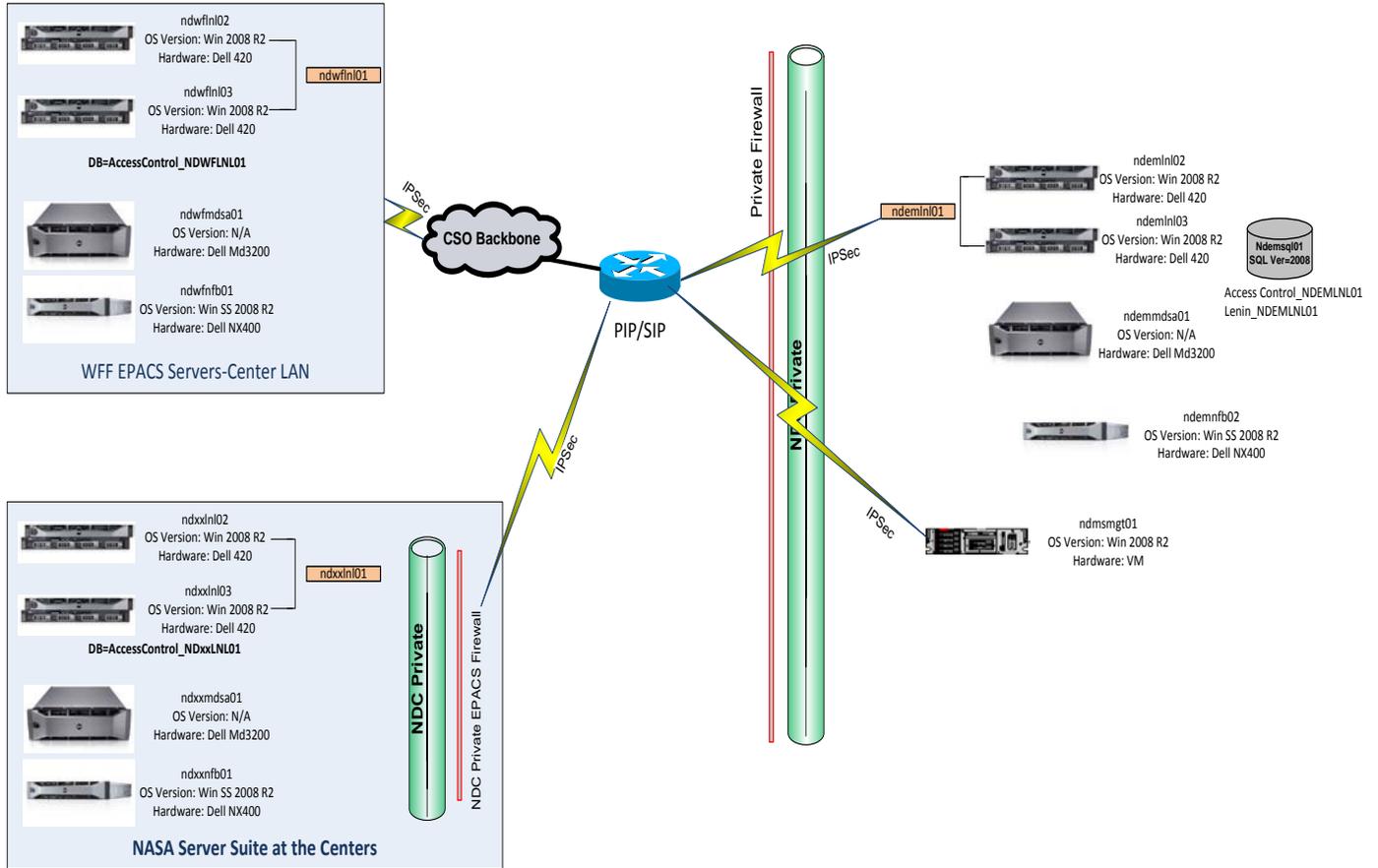


Figure 3.18 – EPACS Logical Architecture

Centralized RSA SecurID Token Infrastructure

The current RSA infrastructure is located at four NASA centers. The primary system is located at MSFC with secondary replica systems located at GSFC, JSC, and ARC. See Figure 3.19.

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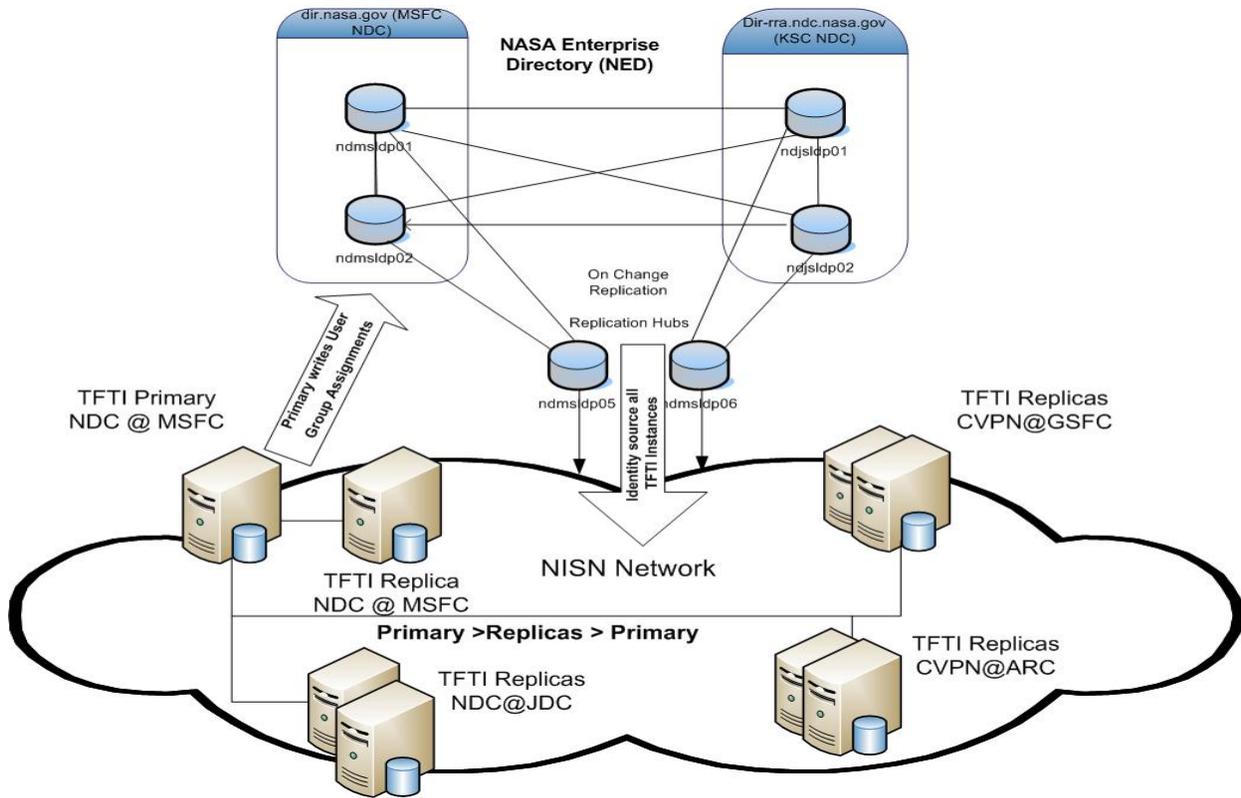


Figure 3.19 – RSA Infrastructure

The NASA Shared Services Center (NSSC) manages the procurement and distribution of the RSA SecurID tokens.

NEACC is the service delivery agent for the Agency RSA SecurID solution. This includes: RSA infrastructure, credential lifecycle management, logical access management integration, and level 3 operational support. The RSA infrastructure supports two factor authentication for 35,000 users against hundreds of applications. Common uses for RSA tokens in the NASA environment is for VPN access, both center and agency level, network switch authentication, and applications that require two factor authentication but do not currently support PIV Cards.

3.3.7.6 Supporting Infrastructure

NASA Enterprise Directory

The NASA Enterprise Directory (NED), as shown in Figure 3.20, *NASA Enterprise Directory Physical Architecture*, is an industry standard LDAP directory which is the repository of identity information to be made available to the agency. A small sub-set of this identity information is made available to the public via the Internet. There are supporting web interfaces to both the public and private instances of NED. Several applications around the agency use NED for authentication and therefore are a highly visible component of the ICAM architecture.

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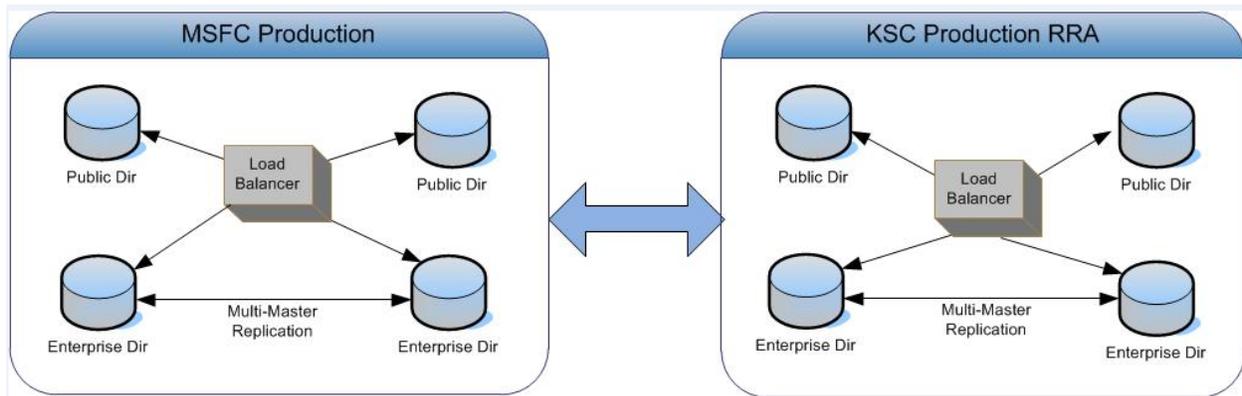


Figure 3.20 - NASA Enterprise Directory Physical Architecture

Public Key Infrastructure (PKI)

Public key infrastructure (PKI) is a combination of software, encryption technologies, and services that enables NASA to protect the security of its communications and business transactions on networks. PKI integrates digital certificates, public key cryptography, and certification authorities into a complete NASA-wide network security architecture.

PKI allows NASA user's to conduct business electronically with the confidence that:

- The person or process identified as sending the transaction is actually the originator.
- The person or process receiving the transaction is the intended recipient.
- Data integrity has not been compromised.

PKI encompasses the issuance of digital certificates to individual users and servers; end-user enrollment software; integration with certificate directories; tools for managing, renewing, and revoking certificates; and related services and support.

In PKI, digital certificates are used to ensure the integrity of a transaction by proving the identities of both the sender and receiver. In fact, digital certificates are one of the underlying requirements of the IPSec protocol that is designed to securely transmit data over Windows networks. A public key certificate is a credential that a) binds public keys and their associated private keys with people or systems b) documents one or more names of the person or system c) identifies the authority is the person or system is operating under, d) identifies policies supported by the credential, and e) documents certain services for use by parties that rely on the credential and key material for trusted system functions. The designated organizational entity, along with its associated support systems is called a certificate authority (CA). The user identity must be unique for each CA. This is carried out for NASA by the Department of Treasury through the NASA Operational Certificate Authority (NOCA). For each user, the user identity, the public key, their binding, validity conditions and other attributes are made unforgeable in public key certificates issued by the CA.

Attachment L-B - Background and Historical

In general, a PKI enables the parties in a dialogue to establish confidentiality, message integrity and user authentication without having to exchange any secret information in advance, or even have any prior contact.

PKI Project Description

Roles and Responsibilities for NASA PKI infrastructure are divided between its Federal Shared Service Provider, Treasury’s Office of Fiscal Services and NASA as shown below in the diagram. The NASA Operational Certificate Authority (NOCA) is located in Parkersburg, West Virginia, with a disaster recovery site in Kansas City.

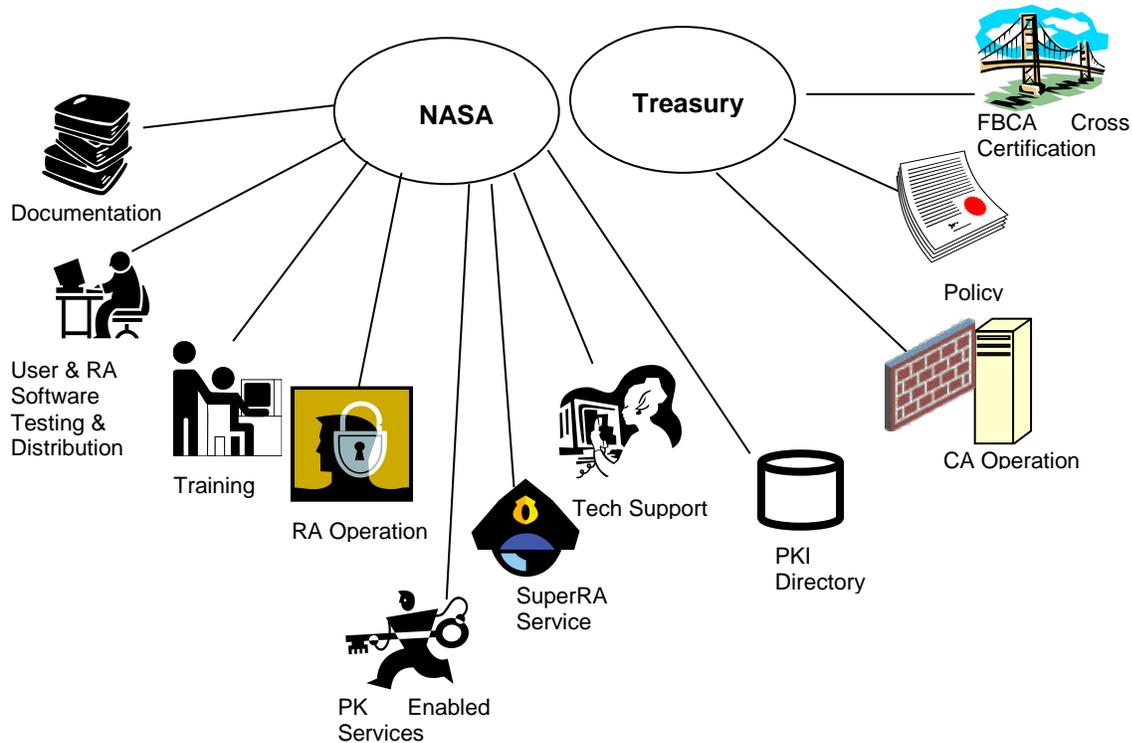


Figure 3.21 - Roles and Responsibilities for NASA PKI infrastructure

The NEACC ICAM Team is responsible for the overall management of the Agency wide PKI solution which includes the NASA PKI Directory, tech support, Super RA service and other online services currently located at the Marshall Space Flight Center and Ames Research Center.

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Registration Authority (RA) is currently divided among all the 11 NASA centers throughout the US. Each NASA Center has at least two RAs employed and managed by ACES.

NEACC is the service delivery agent for the Agency Wide PKI solution. This includes: Online Certificate Status Protocol (OCSP), and ActivIdentity integration and engineering. The desktop client package is produced and delivered to the ACES Contractor for deployment and client desktop integration.

NASA PKI services are integrated within many facets of the ICAM infrastructure; in the diagram below is the data flow of the NOCA certificate as it is used by the Identity, Credential and Access management.

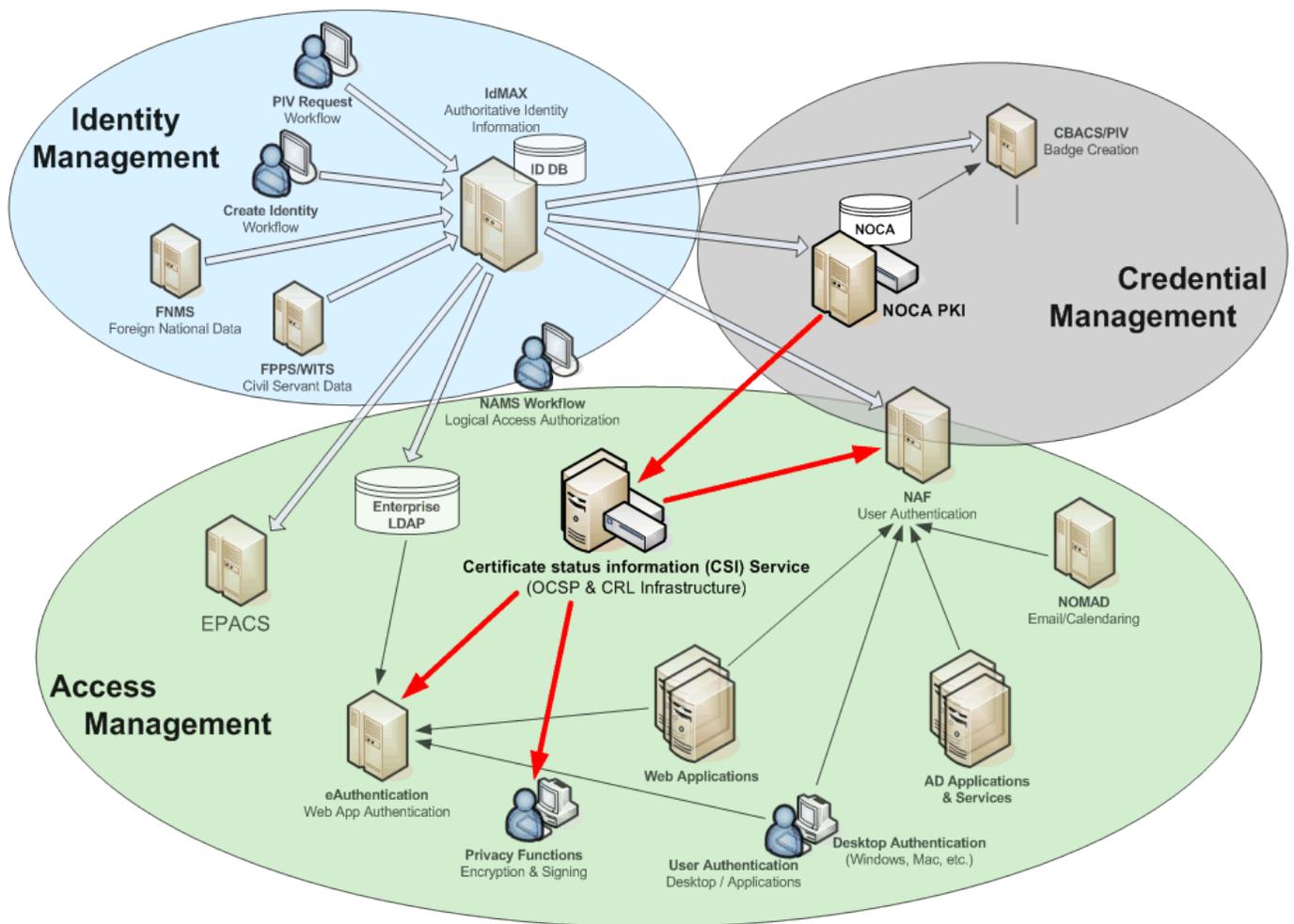


Figure 3.22 – Data flow of NOCA certificate

THE PIV Process

Attachment L-B - Background and Historical

This process covers creation of the credential that is used for PIV authentication within NASA's IT Infrastructure. There are multiple integrated applications that support this process end to end. See Figure 3.23, *PIV Integrations*:

- Card Management system (CMS)
- Creates/Manages PIV Badges
- Sends Notifications to IdMAX
- Batch Management System (BMS)
- Creates Card Orders to vendor (Oberthur)
- Vendor prints & Pre-personalizes the card
- Imports Card Orders from vendor
- Binds large batches of cards
- Biometric Services Platform (BioSP)
- Performs Identity Search
- Completes enrollment
- Transmits data for investigation to OPM
- Universal Registration Client (URC)
- Enrollment Interface
- Captures scanned images of primary and secondary I-9 documents
- Capture Type 4 and Type 14 Fingerprint images using OMB-standard fingerprint scanners
- Perform a match ability test between the system-generated MINEX template and the American National Standards Institute (ANSI) 378 Runtime.
- Take and store PIV-compliant photo using cameras that meet OMB standards.
- Captures signature via Topaz signature pad.
- Submits data to Identity Management System via standard Simple Object Access Protocol (SOAP) web interface.

Attachment L-B - Background and Historical

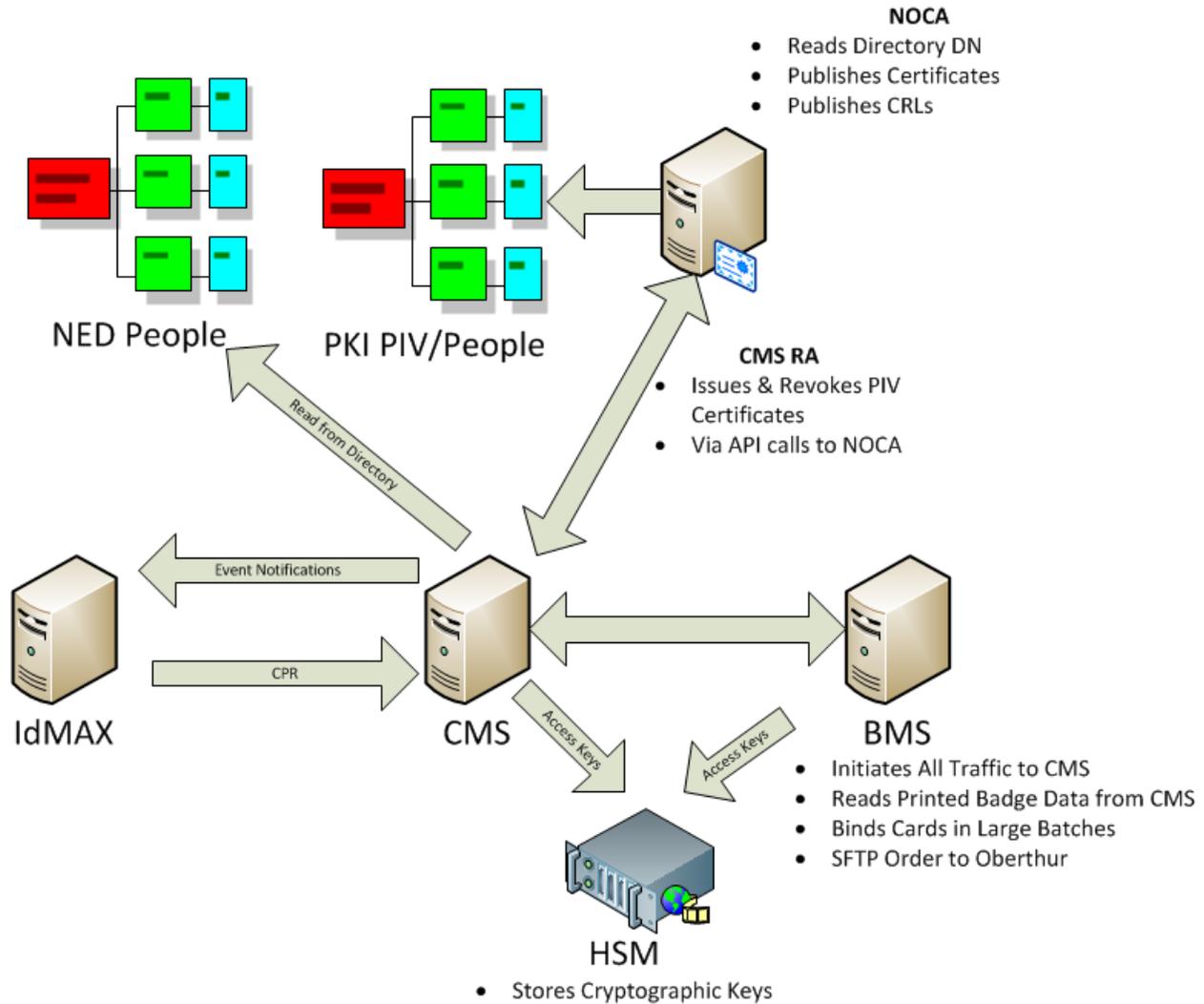


Figure 3.23 - PIV Integrations

OCSP

The NASA OCSP infrastructure consists of two pair of responders located at KSC and MSFC which are used as part of the NOCA validation infrastructure for PIV Authentication to NASA desktops and access manager protected web applications as well as Digital Signing and Encryption certificates used for secure file and email.

Network based hardware security modules (HSM)

NASA’s HSM infrastructure consists of three Thales nShield Connect appliances located at MSFC and failover device at KSC. The HSM’s are used to store the private keys for the Microsoft CA and the CMS/BMS application.

Attachment L-B - Background and Historical

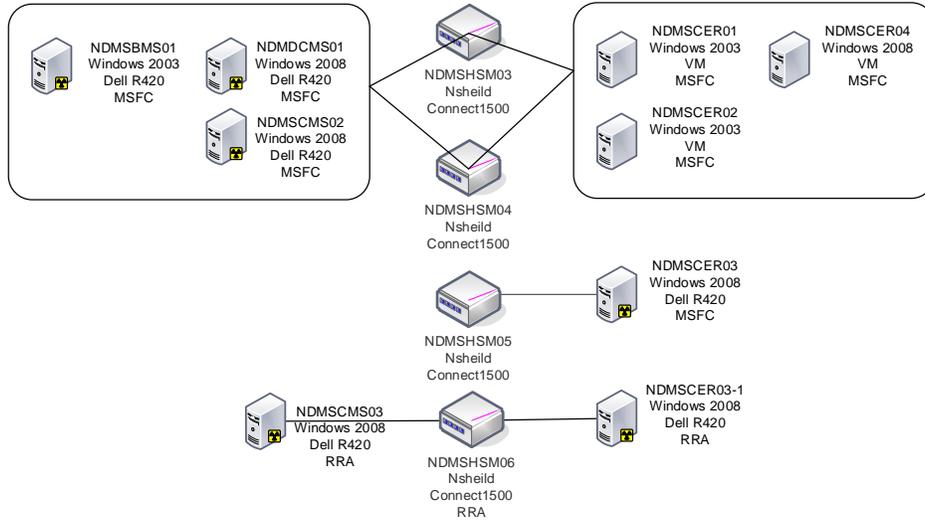


Figure 3.24 - HSM Infrastructure

Microsoft Certificate Authority

The Microsoft Certificate Authority (CA) is maintained by the EAST contract and is primarily used to issue IPSEC Certificates for windows systems in NASA’s Consolidated Active Directory (NCAD) discussed later in this document. Every NCAD domain controller leverages the Microsoft CA to encrypt communications between each other as well as the Active Directory Management System (ADMS). All NDC domain controllers rely on the Microsoft CA infrastructure for enabling all NASA users to authenticate into their desktops with their NASA PIV card.

Microsoft CA Certificate Types:

- Computer
 - IPSEC communications between systems
 - System specific PKI operations
- IPSEC certificate
 - IPSEC communications between systems
- Domain Controller certificate
 - Center/Enterprise applications using LDAPS communications with NDC domain controllers for authentication
 - Smart Card desktop logon for NDC domain joined machines
 - Secure Global Catalog communications with NDC domain controllers
 - Any Macintosh or Linux system communicating with an Active Directory domain controller on port 3269 for email global address book lookups
- Derived Certificates

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- Support user authentication to Center for Internal Mobile Applications (CIMA) applications
- WebTADS Mobile, apps@NASA app, NASA Contacts, Equipment Inventory, and PR QuickStatus

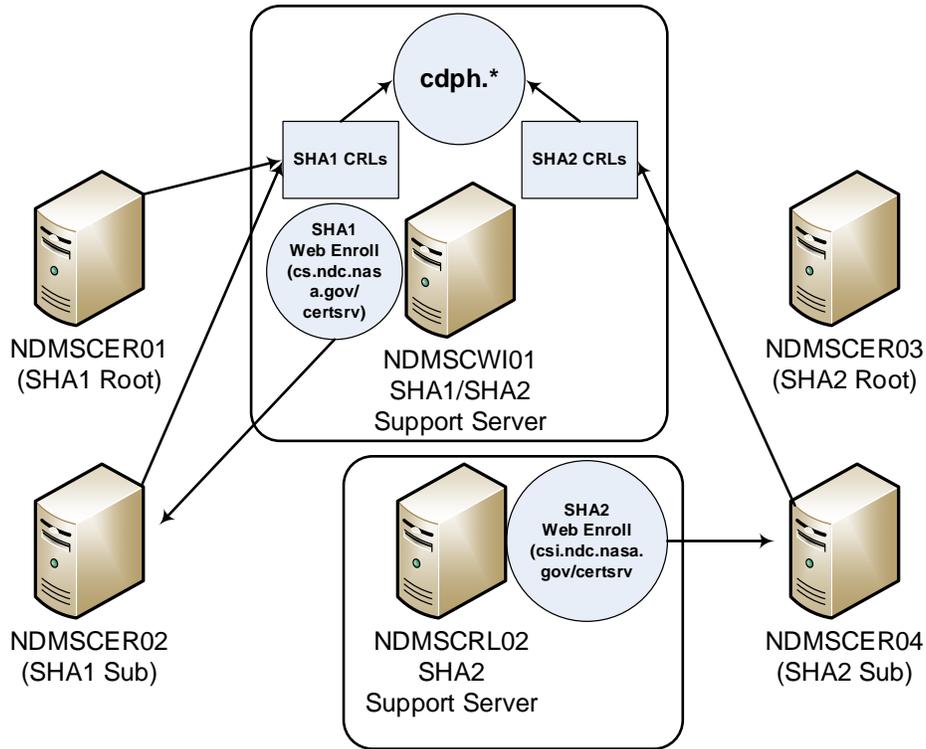


Figure 3.25 - Microsoft CA

Applications supported by NASA PKI Infrastructure

- NTAM (NASA Trust Anchor Management)
 - Federal Private Key Infrastructure (FPKI) Trust path chaining management
- Credential Registration
 - Agency processes must accept and electronically verify Personal Identity Verification / Common Access Card (PIV/CAC) credentials issued by other federal agencies.
- CIMA (Center for Internal Mobile Applications)
 - NASA Derived credential
- PKI Related Client Applications
 - Active ID client
 - Entrust Entelligent Security Provider/ Entrust Entelligent Security Provider Outlook (ESP/ESPO)

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- Secure/Multipurpose Internet Mail Extensions (S/MIME)
- Encrypted Files
- Entrust Secure Desktop for MAC
 - Encrypted Files

NASA Consolidated Active Directory (NCAD)

In 2014, NASA made the decision to add NCAD engineering support to the ICAM Line of Business. NCAD engineering services include developing engineering design packages for all design enhancements and newly deployed products related to Active Directory Management System (ADMS), Security Monitoring for Active Directory (SMAD) and core active directory system configuration and enhancements. NCAD operations is the responsibility of the End User Services Office and is currently performed by the ACES contract. Operational support for the Operating System (OS, hardware, and monitoring is currently under a separate contract and is not to be done by EAST. Additionally NCAD engineering performs design review and support for all upgrades performed by the contractor responsible for operations of NCAD infrastructure.

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NCAD is comprised of a single active directory forest running at domain and forest functional level of 2008 R2 supporting approximately 60,000 user accounts and 100,000 system accounts. Sixty eight Domain controllers comprise the domain and are distributed to nineteen NASA sites as shown in Table 3.6.

Location	Totals
ARC	4
DFRC	2
GRC	3
GSFC	4
HQ	3
JPL	1
JSC	7
KSC	5
LaRC	3
Sub Totals	32

Location	Totals
MSFC	4
SSC	3
NDC/MSFC	11
NDC/JSC	7
IVV (GSFC)	2
MAF-ET	1
NSSC	2
WFF (GSFC)	2
WSC (GSFC)	2
WSTF (JSC)	2
Sub Totals	36

Table 3.6 – Domain Controllers

ADMS is a suite of NetIQ tools, Directory Rights Administrator (DRA) and Group Policy Administrator (GPA) that have been customized to work in the NASA environment for the delegation of roles to end users for the purpose of managing users, groups, and systems without requiring the use of native rights.

DRA provides policy based and granular administrative delegation to improve security and administrative efficiency within Active Directory (AD). DRA also provides extensive auditing, reporting, and process driven task automation. Currently we are running DRA version 8.6 and are in the process of engineering the upgrade to version 8.7 SP2

Attachment L-B - Background and Historical

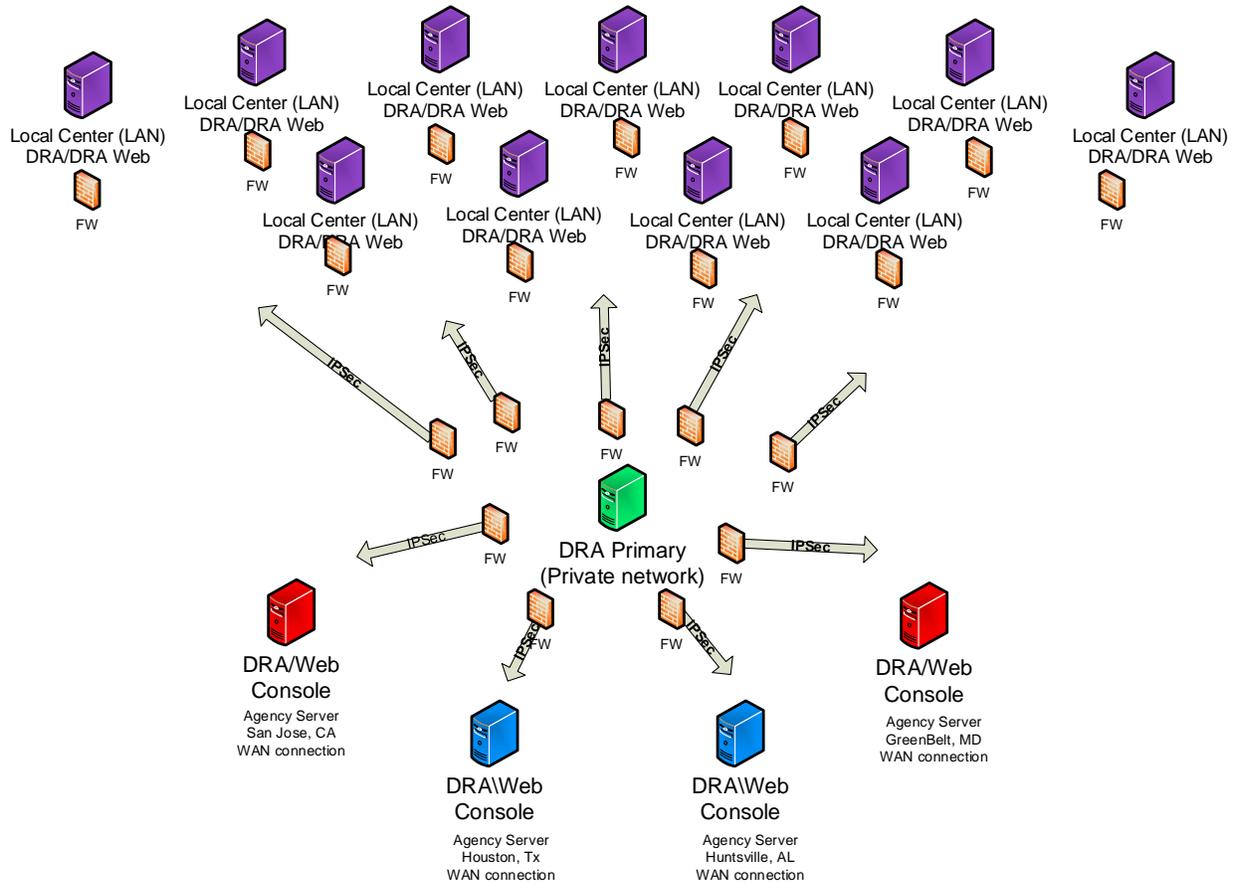


Figure 3.26 - High Level DRA Architecture

GPA supports planning, controlling, troubleshooting and reporting on group policy changes. It ensures Group Policy Object (GPO) changes have followed approved change & release management process while supporting total offline management of group policy. GPA manages GPO changes in a safe, offline environment without impact to performance and availability of the live AD environment. It helps comply with regulatory requirements with flexible and knowledge-rich reporting capabilities to increase management visibility into group policy actions. Currently we are running version 6.2 of GPA and are in the process of engineering the upgrade to version 6.6 SP2.

Attachment L-B - Background and Historical

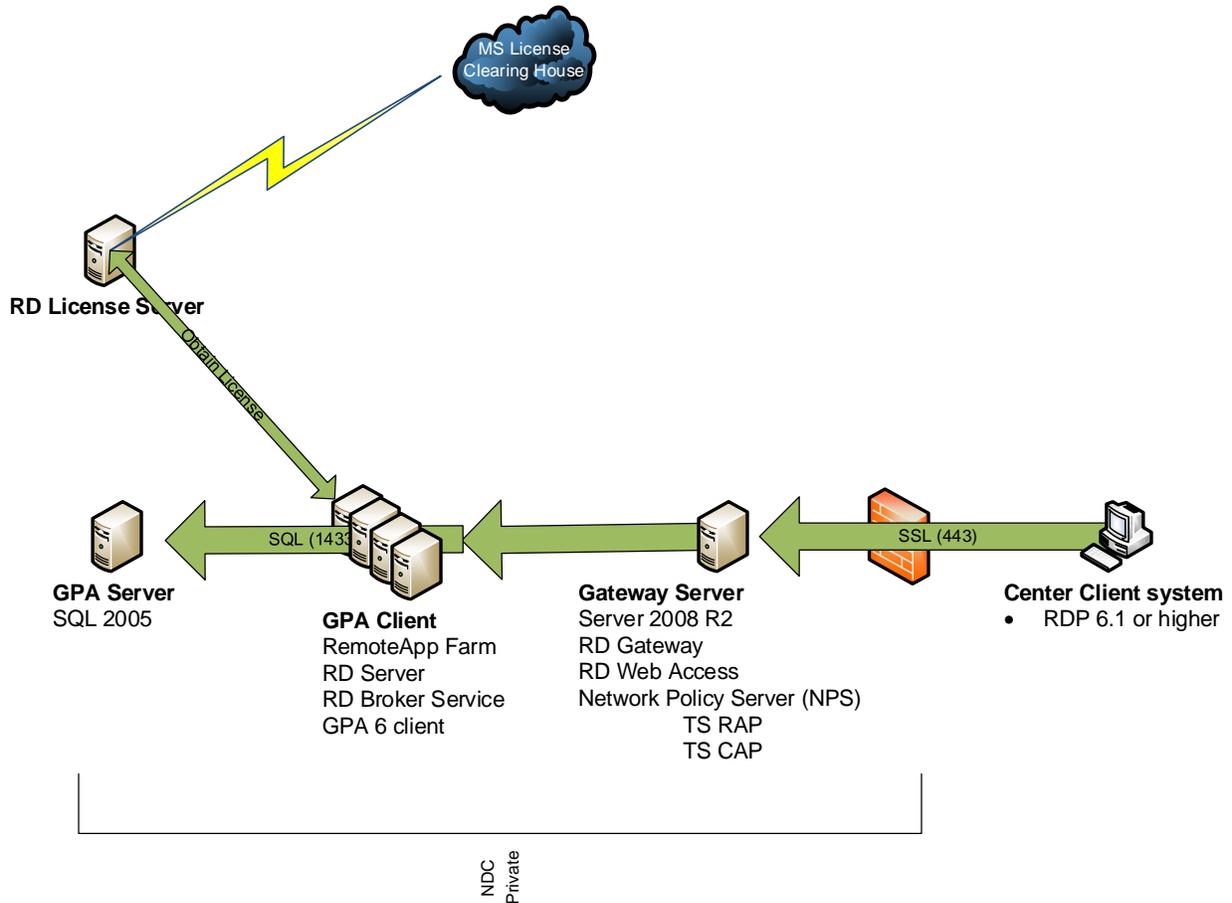


Figure 3.27 - High Level GPA Architecture

SMAD is the NCAD implementation of NetIQ Security Manager (SM) 6.5.4 automated security information and event management system. SMAD automatically identifies hidden threats while meeting audit, regulatory, and legal requirements with scalable and centralized log and event consolidation. SMAD identifies incidents using event correlation to reduce false positives, minimize event noise, and improve system/service availability. SMAD is used for security monitoring and log consolidation the NCAD and ADMS systems.

Security Management (SM) is comprised of the following sub-components; Change Guardian version 2.0.3 and SCM version 5.9. Plans are underway to upgrade to SM to version 7.1.1.2 which will upgrade sub-components as well.

Attachment L-B - Background and Historical

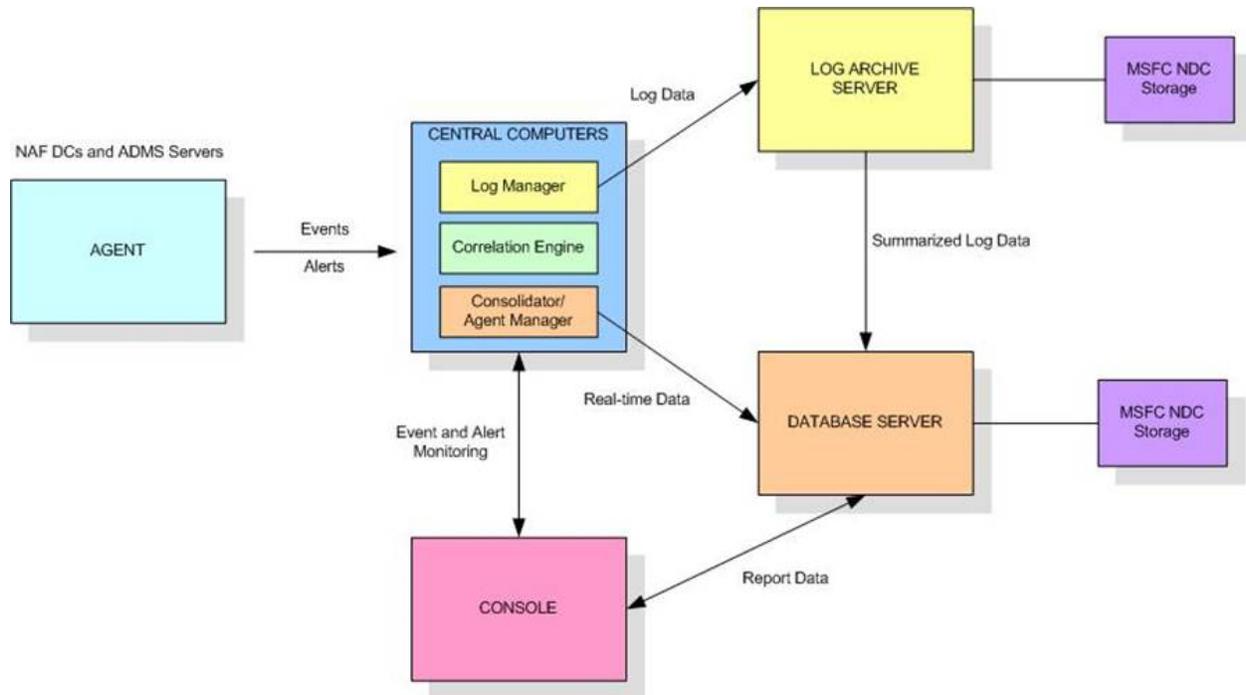


Figure 3.28 - High level SMAD Architecture

3.3.7.7 Future Initiatives

The ICAM Line of Business is currently planning and working the following future initiatives:

- Badging - 4 Certs on a Card (FIPS 201-2), NASA Smartcard, BMS Upgrade
- Access Management - (beyond AM 3.0 transition and NAMS 7.0 stabilization) Federation, System Administration via PIV Card
- Identity - ICAM-M Identity Manager 3.0, Credential Registration Lifecycle, PIV Mandatory (Non-NEACC)
- EPACS - EPACS 7.0 Upgrade, PAM Auto-Provisioning, White Sands Integration to EPACS, Visitor Manager, Perimeter Access Agency/Center (Non-NEACC)
- PKI - PKI-enabled EPACS-Agency, support EUSO/CIMA with Mobile Device Solution

Attachment L-B - Background and Historical

3.3.8 Product Lifecycle Management (PLM) Line of Business

Product Lifecycle Management is currently managed under the EAST contract as the NEACC PLM LOB. The PLM LOB is offered as a suite of services known as the Integrated Collaborative Environment (ICE). PLM currently supports the NASA Human Exploration & Operations program primarily with emphasis on three Exploration Systems Development areas: Orion Multi-Purpose Crew Vehicle, Space Launch System, and Ground Systems Development and Operations; however, all programs and projects sponsored by Human Exploration and Operations Mission Directorate (HEOMD) have PLM LOB services available to them. In addition, MSFC Engineering has adopted ICE as its standard PLM solution.

3.3.8.1 Integrated Collaboration Environment (ICE) OverviewSystem Description

ICE is a web centric suite of applications accessed and used by over 6000 users. ICE is designed for use by industry, academia and government for: sharing, collaborating, integrating, accessing and controlling management information and product data defining all of the products which are part of Human Exploration and Operations.

The ICE architecture includes a load balanced front end with multiple redundant web servers. All ICE applications are accessed through Apache reverse proxy web service and require user and service authentication. ICE architecture is supported using NASA Data Center-provided services for networking, storage, and processor systems. Standardized high performance server configurations designed for high availability are deployed using integrated data center virtualized processor/storage/network infrastructure virtual servers clustered for high availability. ICE landscapes supporting integration for unit testing, staging for pre-production verification and validation, and production workloads are deployed on separate private networked zones in the NASA Data Center.

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The following diagrams illustrate the architecture of ICE:

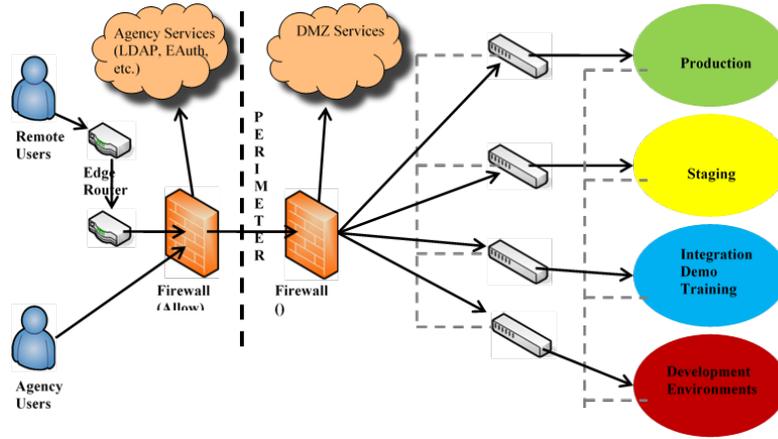


Figure 3.29 - ICE Multi-tier Architecture

Attachment L-B - Background and Historical

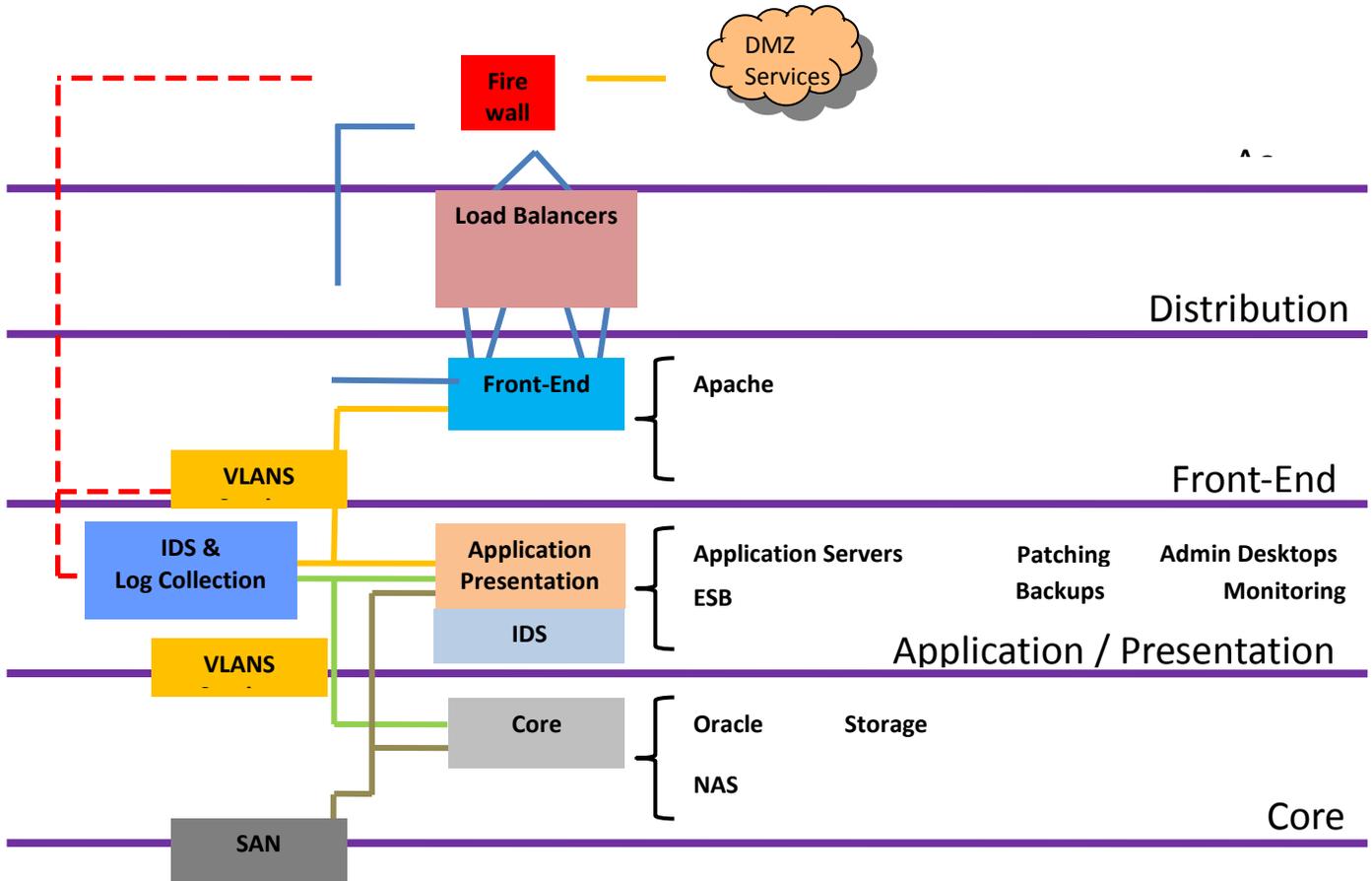


Figure 3.30 - 2 Logical Overview of ICE Production

ICE is currently designed and implemented to provide a suite of integrated application services that provide capabilities to engineers across the Agency in the following areas:

- Product Data Management
- Project Management
- Collaboration (structured and unstructured)
- Earned Value Management
- Cost Management
- Risk Management
- Requirements Management
- Decision Support and Analysis
- Application and Business Process Integration via Enterprise Service Bus

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ICE supports 24x7 production operations only diminished by data center power and network connectivity and weekly, monthly, and quarterly maintenance. The ICE architecture is extensible vertically and horizontally with new hardware and software technologies as required and offered through the NASA Data Center (NDC).

ICE Applications

Applications which are used for the service offerings include the following:

- Cradle – Requirements Management System
- Windchill – Product Life Cycle Management and Document Management
- Aphelion LDAP – Embedded LDAP server for Windchill, but functions as the security policy server
- Active Risk Manager (ARM) –Risk Management System
- Cobra – Cost Management
- Liferay – Document Management and Portal services
- Wiki – Confluence Wiki – Structured and Unstructured Data Management
- ThinkTank – Decision Support and Analysis
- Empower and wInsight – Earned Value Management

Today's Usage

The applications are being used across the Exploration Systems Development areas: Orion Multi-Purpose Crew Vehicle, Ground Systems Development and Operations, Space Launch System, and EVA.

Orion/MPCV

- Uses Windchill for Project and some Product Data, with Lockheed Martin being the primary source for their Mechanical Computer Aided Design (MCAD) data.
- Uses ARM (risks) and Cradle (requirements); extensively make use of Confluence Wiki for repository, collaboration and program reviews, utilizing plug-ins, macros, and reporting capabilities to simulate process management.
- Does not use Liferay Portal
- Uses wInsight, Cobra, Empower for cost and Earned Value Management (EVM)
- Uses ThinkTank for Program decision support

GSDO

- Uses Windchill as primary source for released product data and project collaboration data
- Uses ARM, Cradle, Wiki ; uses Liferay Portal applications such as Object viewer and Federated Search
- Uses wInsight, Cobra, Empower for cost and EVM

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- Uses ThinkTank for Program decision support

International Space Station: Extravehicular Activity (EVA)

- Uses Liferay Portal application to store, review , and update Windchill data via Windchill Info-Engine Tasks calling webjects

Space Launch System (SLS)

- Uses Windchill as primary source for MCAD management, document management, product management and configuration management
- Uses ARM, Cradle, Wiki; uses Liferay Portal applications such as Object viewer and Federated Search
- Uses wInsight, Cobra, Empower for cost and EVM
- Uses ThinkTank for Program decision support

MSFC Transition

In an effort to collapse systems and push towards a common approach for managing detailed design and configuration management, MSFC began an effort in December of 2011 to transition from the MSFC Windchill instance (Design and Data Management System – DDMS) to the ICE Windchill environment. Requirements for detail design and configuration management were gathered and implemented into the ICE Windchill environment February 24, 2013. This included the implementation of workflows, objects, reports, lifecycle states, and customizations (see Figure 3.31, Configuration Management / Detail Design Contents). The Electrical Computer Aided Design (ECAD) Component Loader was also transitioned from the MSFC instance and implemented within the ICE Windchill instance. The ECAD Component Loader enables the Windchill ECAD library of components to be synced with the Mentor Graphics library of components on a periodic basis. The As-Designed to As-Built Comparison Capability also was implemented as part of the MSFC transition. This capability pulls information from the MSFC As-Built Configuration Status System (ABCSS), compares this to the As-Designed configuration stored within ICE Windchill to provide a comparison report. All Windchill implementation details are documented within the ICE Windchill 10.1 Configuration Specification document. The Migration of the MSFC DDMS data into the ICE Windchill environment was performed on July 7, 2013. There were 103,217 documents, 815,150 CAD models/drawings, 85,958 parts, along with 36 other object types migrated. Today, the implemented capability is being used by SLS for detail design and configuration management, including pushing the products through release processes.

Attachment L-B - Background and Historical

Workflows	Objects	Customizations	Product Components
<ul style="list-style-type: none"> NASA CR Process NASA CN Process NASA CT Process Technical Approval Process NASA WGA CR Process Quick Release Promotion Process 	<ul style="list-style-type: none"> NASA Document (modified) NASA Document – Numeric Scheme NASA Change Document NASA Deviation-Waiver Document NASA Engineering Order Document NASA Drawing Representation Document NASA Engineering Parts List Document NASA Manufacturing Document NASA Engineering Notes List Document NASA Part (modified) MCAD Document ECAD Document (modified) NASA WGA Change Request NASA Change Request NASA Change Notice NASA Change Task 	<ul style="list-style-type: none"> Set State on Data Objects (P3) Clear Release Date and Approval Attributes When Objects are Revised (P8) Populate Release Date and Approvals (P9) Confirm Mandatory Role (P11) Confirm Check-In (P12) <p>Custom Reports</p> <ul style="list-style-type: none"> Engineering Parts List (P2) Indentured Parts List without Effectivity (P5) Indentured Parts List with Effectivity (P10) 	<ul style="list-style-type: none"> NASA Change Request Team NASA Change Notice Team NASA Change Activity Team NASA WGA Change Request Team 36 Roles 481 ACL Rules 17 Preference Settings 16 OIRs NASA Document Life Cycle (modified) NASA DD Life Cycle NASA Change Document Life Cycle NASA Deviation-Waiver Life Cycle NASA WGA Change Request Life Cycle NASA Change Request Life Cycle NASA Change Notice Life Cycle NASA Change Activity Life Cycle

Figure 3.31 - Configuration Management / Detail Design Contents

ICE Enterprise Service Bus (ESB)

The ICE ESB Architecture is based on the principles of a Service Oriented Architecture (SOA). ICE provides loosely coupled business service, business process services, and technical services that enable the collaboration and data sharing among the different disciplines within the ICE environment. The services enable ICE systems as well as remotely located non-ICE systems to access data and functions from authoritative sources, enabling data reuse and real-time event management. The ICE ESB is a conduit for data transfer, service call messages, and event services, and it ensures that usage via the ESB is logged monitored and controlled.

Attachment L-B - Background and Historical

The diagram below shows how services are logically exposed:

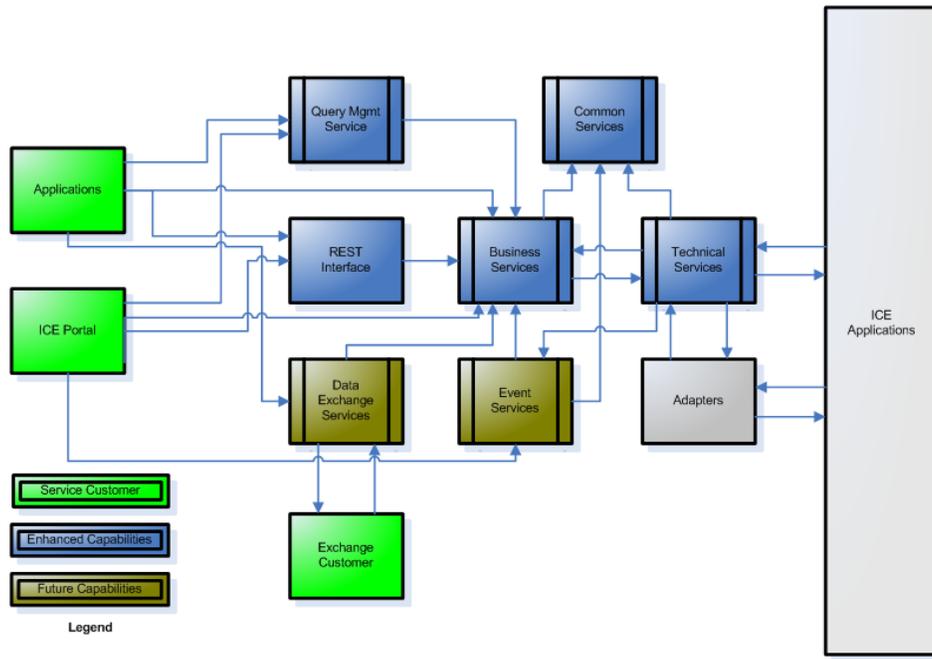


Figure 3.32 - ICE Service Integration – Logical View

ICE Concept of Operations

ICE is located in the NASA Data Center (NDC) in MSFC Building 4663. The configuration currently consists of:

- 71 Virtual servers running Redhat Enterprise Linux (RHEL)
- 30 Virtual Servers running MS Windows
- 20 Virtual servers running Solaris

All Solaris servers are Solaris Local Zones and therefore considered virtual servers although in most cases they are hosted as one Local Zone per physical server.

These servers are housed in the NDC with supporting infrastructure that includes network switches, load balancers, monitors and keyboard/video/mouse (KVM) switches. ICE Operations depends upon services provided by the NDC, ICE Operations Team, and the NASA Integrated Communications Services (NICS)

The NDC provides the following services to ICE:

- Uninterruptible Power
- Heating, Ventilation, & Air Conditioning (HVAC)
- Raised floor space
- 24x7 Data Center Operations, including backup and recovery

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- Hardware maintenance for Storage and Processors
- Software maintenance of various Monitoring, Citrix, Microsoft and Storage Software
- Server Administration

The NDC facility uses dual redundant power feeds into multiple Uninterruptible Power Supplies backed up by motor generators to power the servers and HVAC equipment. The data center is in an internally and externally controlled access area (controlled access building surrounded by protective bollards) with interior visual monitoring.

NICS Services

The NASA Integrated Communications Services provides network services for the ICE systems. These services include:

- External Switched Infrastructure Management
- Load Balancer Management
- Firewall Management
- Premium Internet Protocol and Standard Internet Protocol (PIP/SIP) Network Interfaces
- Wide Area Network (WAN) Services
- 24x7 Network Operations

ICE Operations:

The EAST contract provides labor for the following functions supporting ICE application operations:

- Tier 1, 2 and 3 Help Desk
- Virtual Training
- IT Security Support
- Application Administration
- Database Administration
- Minimal software procurement (e.g., Wiki Plug-ins, ThinkTank maintenance)
- IT Engineering and Project Planning Services
- Application Integration Development
- Enterprise Service Bus install and maintenance

ICE Managed Environments:

The ICE configuration consists of four distinct environments: Production, Staging, Integration and Development. These four environments support the entire software and product development lifecycle. Application changes are typically developed and delivered to the ICE

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Application Admin team for installation in the Integration environment. There they undergo regression testing. ICE employs a team of test engineers that perform this function using a combination of manual test scripts as well as automated tools from Mercury Inc. and Quality Center. Following successful regression testing in the Integration environment, the application changes are installed in the Staging environment for performance testing. The Staging environment closely mirrors the Production configuration and enables testing with a copy of Production data. Following successful performance testing, changes are scheduled for deployment in the ICE Production environment. An NDC Change Request is submitted to document any required server configuration changes and to receive Data center approval for implementation. Software application updates and maintenance are managed through the existing NEACC pre-production processes. An NDC Activity Request is submitted to schedule the deployment of ICE Team release packages.

ICE Active Monitoring

ICE systems are actively monitored via the ICE Active Monitoring System (IAMS). This is a customized implementation of open source tools (Nagios) that provide near real-time indications of server and application health with web, email and audio alerts on predefined thresholds. IAMS also collects performance trend data for use in monthly capacity planning activities.

Backup and Vaulting

ICE systems and data storage are backed up per NDC processes on a regular schedule with data stored offsite at the NASA Remote Recovery location.

Development and Maintenance

The EAST support contractor, located at both MSFC and JSC, is responsible for providing the Risk, Requirements, Product Data Management, and Collaboration Service Managers as well as developers, and testers who interface with ICE Customers and the rest of the ICE Team. The Service Managers are responsible for requirements gathering, customer communication, service request management and status, and scrum and sprint management. Other members of the team also perform the following services for ICE:

- Windchill Software Development
- End-to-end Testing (staging and integration)
- Service request management
- Release Management
- Scrum and Sprint Management

Future Initiatives

- Upgrade Windchill from 10.1 M040 to 10.2 M020
- Upgrade Confluence Wiki 5.2 to Confluence Data Center (clustered) Wiki 5.6
- Extend ICE Federated Search to Cradle (requirements system)

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- Implement Tripwire Application Monitoring for all ICE applications
- Convert all ICE Oracle data to virtualized databases
- Convert Windchill application to fully virtualized applications
- Implement full and temporary Disaster Recovery for all ICE Production applications
- Implement Cradle 7.x providing SysML Modeling

3.3.9 Business Intelligence (BI) Line of Business

The NEACC developed an Information Delivery Strategy as a part the original SAP rollout. One of the basic tenets was to develop an integrated Enterprise Data Warehouse (EDW) and integrate new lines of business into the EDW as they became operational. SAP's Business Warehouse (BW) was chosen to provide the underlying data warehouse architecture and technology to support the EDW. The EDW continues to expand from its initial Core Financial roots, integrating additional systems to provide reporting across the Agency's business systems for varying user needs.

Over time an adjustment was made to the Information Delivery Strategy to integrate data into the EDW only if there was a need to either transform or integrate the data with other systems. As a result, the role of the BI LOB expanded to provide BI support to data stored in EDW as well as access to data not stored in EDW.

The BI LOB is responsible for the NEACC BI suite. The BI suite consists of SAP Business Warehouse, IBM Cognos, SAP Business Object Suite and the Business Warehouse Accelerator (BWA). This responsibility includes the development of the components needed to support the functional LOBs, including development and maintenance of BW data models, data extractors and integrations, Cognos Frameworks and reports/dashboards.

The BI LOB supports over 3,000 unique users on a monthly basis. The users range from resource analysts needing the drill down capability of the Analysis products, to Super Users utilizing the Cognos Query Studio to answer an Ad-hoc question, to Managers reviewing summary or detail data via dashboards developed using Cognos Report Studio. The BI LOB supports: the NASA Office of Education, Financial, Procurement, Human Capital, ICAM, and Logistics LOBs.

3.3.9.1 SAP Business Warehouse

The Business Warehouse environment is a combination of databases and database management tools. BW supplies the infrastructure typical of data warehouses, but also includes preconfigured data extractors, analysis and report tools, and business process models.

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The BW architecture consists of three primary layers. The bottom layer consists of source systems, which can be R/3 systems, flat files, and other systems. The middle-layer of the BW Server consists of the following components:

- **Administrator Workbench** which maintains meta-data about and all BW objects. It has two components: BW Scheduler for scheduling jobs to load data and BW Monitor for monitoring the status of data loads
- **Metadata Repository** contains information about the data warehouse. Meta-data comprise data about data. Metadata Repository contains two types of meta-data: business-related (for example, definitions and descriptions used for reporting) and technical (for example, structure and mapping rules used for data extraction and transformation).
- **Staging Engine** implements data mapping and transformation. Triggered by BW Scheduler, it sends requests to a source system for data loading. The source system then selects and transfers data into BW.
- **PSA (Persistent Staging Area)** stores data in the original format while being imported from the source system. PSA allows for quality check before the data are loaded into their destinations, such as ODS Objects or Info Cubes.
- **ODS (Operational Data Store) Objects** provides a multilayer structure for operational data reporting. They are not based on the star schema and are used primarily for detail reporting, rather than for dimensional analysis.
- **InfoCubes** are the fact tables and their associated dimension tables in a star schema.
- **Data Manager** maintains data in ODS Objects and InfoCubes and tells the OLAP Processor what data are available for reporting.
- **OLAP Processor** is the analytical processing engine. It retrieves data from the database, and it analyzes and presents those data according to users' requests.
- **Business Explorer (BEx) Web Application Designer** is an application for creating Web applications with BW-specific contents. Using the BEx Web Application Designer, you can create an Hypertext Markup Language (HTML) page that contains contents such as various tables, charts or maps. This HTML page (Web application) provides the basis for Web applications with complex interaction
- **BEx Query Designer** defines queries for InfoProviders. By selecting and combining InfoObjects (characteristics and key figures) or reusable structures in a query, you determine the way in which the users navigate through and evaluate the data in the selected InfoProvider.

The top layer of the BW architecture consists of the front-end tools user's utilize to access the queries developed via the Query Designer.

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3.3.9.2 Development and User Front-end tools

IBM Cognos Framework Manager is the data modeling tool for IBM Cognos Business Intelligence. The packages that are used to generate reports are based on models that are created in IBM Cognos Framework Manager. A model is a set of related objects, such as query subjects, dimensions, filters, and calculations.

IBM Cognos Report Studio is a Web-based report authoring tool that developers use to build sophisticated, multiple-page, multiple-query reports against databases. Reports can contain any number of report objects, such as charts, crosstabs, and lists, as well as non-BI components such as images, logos, and live embedded applications that you can link to other information. We have used Report Studio to develop reports and dashboards for both data stored in BW and non-BW data.

IBM Cognos Query Studio is the reporting tool for creating simple queries and reports in Query Studio. Users can view data and connect to a data sources to view data in a tree hierarchy. This tool functions best when accessing a true relational database and is not used to access data stored in SAP BW, but to access other relational sources such as the PMME data or the ICAM data which is not stored in BW.

SAP Business Objects Business Intelligence (BOBJ) Suite: Capabilities within the SAP Business Objects suite include operational reporting, ad-hoc query and analysis, exploration, visualization, and dashboards. Suite includes:

- Lumira - Self-service data visualization software used to combine data from multiple sources, visualize it, and analyze trends.
- Business Objects Dashboards - Provides drag-and-drop functionality and interactive gauges, charts, and widgets to create dashboards
- Business Objects Design Studio - Used to create multi-dimensional visualizations for dashboards. Provides native connection to SAP Business Warehouse (BW) and SAP HANA. Leverage existing analyses by operating on SAP BEx queries, InfoCubes, and SAP HANA views
- Crystal Reports -Creates highly formatted, pixel-perfect reports. Connect to data sources directly or through a common semantic layer
- Business Objects Analysis Microsoft Office - Microsoft Excel and PowerPoint multi-dimensional data analysis software. Makes it easy to filter and manipulate data, identify trends and outliers and analyze large data sets.
- Business Objects Analysis, edition for OLAP - Web-based data analysis tool to access multi-dimensional data. Makes it easy to filter and manipulate data, identify trends and outliers and analyze large data sets.
- Business Objects Explorer provides an intuitive, self-service data exploration tool

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As of the end of calendar year 2014, the NEACC had implemented the Business Object Analysis for Office and Analysis for OLAP products from the BOBJ Suite. Plans are under development for the implementation of the other tools within the BOBJ Suite.

3.3.9.3 Business Warehouse Accelerator (BWA)

The BWA improves SAP BW performance and is based on SAP's search and classification engine, Text Retrieval (TREX), utilizing preconfigured hardware delivered by SAP hardware partners. It is packaged as an appliance for use with SAP Business Intelligence (BI) and provides enhanced performance for OLAP in an Enterprise Data Warehousing scenario. A TREX aggregation engine for processing structured business data enhances the performance. The data from the BW Info Cubes is indexed in the BW Accelerator and stored as TREX indexes in its storage subsystem. The BWA indexes are loaded into memory and used to answer OLAP queries entirely in memory. The BW Accelerator reduces the response time, especially for large data volumes.

3.3.9.4 NEACC Development/Support Roles

There is a varied set of skills required to support the BI environment. The development skills include:

- Cognos Framework Developer - The creation of Framework Manager Models. The Meta layer data models that expose data from the underlying data source.
- Cognos Developer – Develops reports/dashboard using either Cognos Report Studio or Cognos Query Studio with the framework developed by the Framework developer
- BW Architect - responsible for the overall data design of the data model. The BW Architect plays a critical role and is the link between the end user's business requirements and the data architecture solution that will satisfy these requirements. The architect has responsibility for design of data extraction and loading, transfer rules, and update rules. Create, maintain, enhance and debug SAP extractors, create and enhance user exits to support BW extractors develop Process chains, and Open hub processes.
- BW Developer – Works with the functional LOB to understand the report/dashboard requirements and then utilizes the BEx Query designer to develop queries to be accessed via the front-end tools. BW developer under the direction of the BW Architect will perform some of the functions identified in the previous section.
- SAP BASIS and BW Security - Supports BW Landscape, transport environment, authorization, performance issues with the Database, BW or front-end tools, Installation of BW Server, plug In and Frontend tools.

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3.3.9.5 ETL – Extract, Transformation and Load

Data from multiple source systems is extracted and loaded into BW on a nightly basis, Monday 12:01 A.M. through Thursday 12:01 A.M. During year-end and other requested times loads are executed Sunday through Saturday. All data loads are monitored to insure the data is available the next morning for reporting. Any issue involving the loads must be addressed to insure the loads are successful and on time.

Source Systems include: SAP ERP consisting of Core Financial, Logistics, Labor Distribution, Real Property Management, Meta Data Manager, and Materials Management. Other systems include Disposal, SATERN, ECI, HRMIS, FPPS, NAAS, N2, NISE, CMS, NED, Fed Traveler and ETS2.

There are also situations where data is extracted from external source systems and loaded into a reporting database structure, separate from BW. An example of this is the PMME data loaded from the external source system into a non-BW database structure to support specific BI needs.

3.3.9.6 Outbound Integrations

On a nightly basis outbound integrations are executed to provide data to external systems. Two methods are employed to provide these outbound integrations. BW Open Hub is utilized to provide integrations where there is not a need to utilize a multi-provider, which Open Hub does not support. These integrations are primarily executed in support of the Human Capital LOB. The other integration method is a custom developed capability that allows the definition of a query. The query is executed and a file is produced on a scheduled basis to provide data either via a push or pull method. This method is used primarily in support of the Core Financial LOB.

3.3.9.7 Center Reporting Teams

The BI LOB also supports the Center Reporting Teams. These teams are located at the eleven NASA field centers and they are the first line of support to the users at their centers. The Center Reporting Leads essentially function as an extension of the NEACC BI team. Some of these teams have developers (BW and Cognos) at their center that utilize the NEACC tools to develop reports and dashboards. While the work of the center-level development teams is not within the scope of the EAST contract, the BI team provides support to these developers in the areas of Cognos framework development, BW query development, training, issue resolution, and best practice documentation. The BI team also reviews and tests the center-developed queries/reports before they are migrated to production to insure they do not negatively impact performance.

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3.3.9.8 Future Initiatives

The BI Line of Business is currently planning and working the following future initiatives:

- The EDW will continue to evolve as data from additional source systems is integrated into BW to support analysis and reporting. Additional front-end tools from SAP BOBJ Suite will be implemented to support reporting, dashboards, search, ad-hoc and mobile access. These tools will be utilized to access both data stored in BW as well as external to BW.
- Near-line storage provides the ability to reduce the size of the operational database. Near-line data remains accessible for reporting, data load and analysis tools. Data that is not continuously being used is a good candidate for near-line storage.
- BW migration to SAP HANA - SAP HANA - "High-Performance Analytic Appliance" is an in-memory computing appliance that combines SAP database software with pre-tuned server, storage, and networking hardware from one of several SAP hardware partners. It is designed to support real-time analytic and transactional processing.
- BW Unicode Conversion
- BOBJ SP03 Patch 6 Implementation

3.3.10 Enterprise Service Bus (ESB) and Center for Internal Mobile Applications (CIMA) Line of Business

The ESB LOB operationally owns and provides operational support for the following platforms: ESB (OpenSource and TIBCO), Application Stack, Liferay Portal and Mobile Applications.

3.3.10.1 Enterprise Service Bus

The ESB supports the following system facing integration patterns:

- Service Driven Architecture-SDA (Services)
- Event Driven Architecture-EDA (Messaging)
- Extract, Transform, and Load-ETL (Bulk Data)

Examples of system facing integration:

- BankCard (real-time integration)
- eTravel (near real-time integrations)
- MdM (real-time integration)

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ESB Platform Defined

The OpenSource ESB platform provides middleware software that supports the exchange of data between entities. An entity may represent an internal or external system, application, service, schema, wsdl, component, and/or server. Examples of entities include: the Department of Interior's Federal Personnel & Payroll System (FPPS) or Concur CGE (eTS2) User & Traveler Profile web service.

The ESB platform supports the integration of data across entities in a non-intrusive manner. Data can be integrated using existing entity adapters / connectors. Data inbound / outbound to the ESB can be transformed across protocols to support integration of data between entities that don't communicate via the same protocol.

The Production ESB platform is a highly available load-balanced system running on two physically separate servers. In 2014, the Production ESB platform transitioned to a highly available load-balanced system running on two virtualized servers located on physically separate ESX servers. The real-time ESB loads configuration data for components at startup from a single virtual Oracle database instance. If the database is unavailable, the real-time ESB configuration data is retrieved from the file system. The batch ESB loads control tables, application tables, transaction tables (logging / audit), and ETL tables from separate virtual Oracle database instances. If the database is unavailable, any ETL based integrations that leverage the database will also be unavailable to process data. The ESB records inbound / outbound messages and event / integration status details via the Enterprise Service Manager (ESM). Additionally, the ESM supports administrative functions for ESB component and registry operational maintenance.

For additional details of the ESB, refer to document "OpenSource ESB" located on the EAST 2 website <https://www.nssc.nasa.gov/east2>.

Application Stack Platform Defined

The Application Stack is defined as the resources owned and operated by the NEACC development group in support of hosting web sites and running web based applications. Web based applications include traditional browser based applications and applications with non-browser clients that access server side resources over the network (e.g. mobile application clients).

The application stack currently consists of a Web Broker for intelligent request processing and the Tomcat application container for application hosting.

The purpose of the Web Broker is to intelligently distribute an application's request load between application containers. The Web Broker permits the rapid implementation of new java virtual machines to support application load peaks. The Web Broker is placed between the hardware load balancers and the application container.

The Tomcat application container or simplified application container hosts and executes the web application. This is where all the application business logic resides. When a user executes a request, the content that is displayed in their browser is all generated by an application running

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inside of this simplified container. The use of simplified containers allows an application to scale independently of other unrelated applications. When an application requires more resources, new java virtual machines can be created just for that application to handle the load and then brought back down when / if the load returns back to normal.

Mobile Application Platform

The ESB LOB Mobile Application platform consists of mobile related web applications hosted via the Application Stack platform and mobile related services presented via the ESB platform.

Mobile Enterprise Application Platform (MEAP)

Mobile enterprise application platform (MEAP) is a complete solution that provides tools and middleware for developing, testing, deploying and managing enterprise/internal software on mobile devices. NASA has chosen to build the foundation of its internal mobile application architecture on the MEAP foundation, as it allows us to leverage a single reusable platform to support all enterprise mobile applications.

Liferay Portal Platform Defined

The Liferay Portal Platform provides a secure and stable environment, which integrates information, people and processes across various organizational communities within NASA. Currently the portal platform services the needs of the NASA, Procurement, Financial, and Identity Credential and Access Management (ICAM) communities. The portal platform provides users an easy mechanism for accessing multiple NASA business systems through the use of logon tickets (Single Sign On enabled) or links to other launchpad enabled applications. The portal platform also allows for a decentralized approach to content management and documentation allowing communities to manage their own content.

The Liferay Portal Platform is built using the Liferay Portal product and is integrated with various components of the ESB LOB including the Application Stack, Enterprise Service Bus (ESB) and supporting databases. The Liferay Portal Platform currently hosts the bReady and ICAM portal storefronts. The Liferay Portal Platform is configured as a highly available load-balanced system consisting of two (2) standard build virtual servers running Red Hat Linux v.6.3 as the operating system. For details related to the Application Stack and ESB please refer to those sections.

There is a second instance of the Liferay Portal Platform that supports the PLM LOB.

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Platform Interdependency

The following diagram shows an example of the interdependency of the platforms:

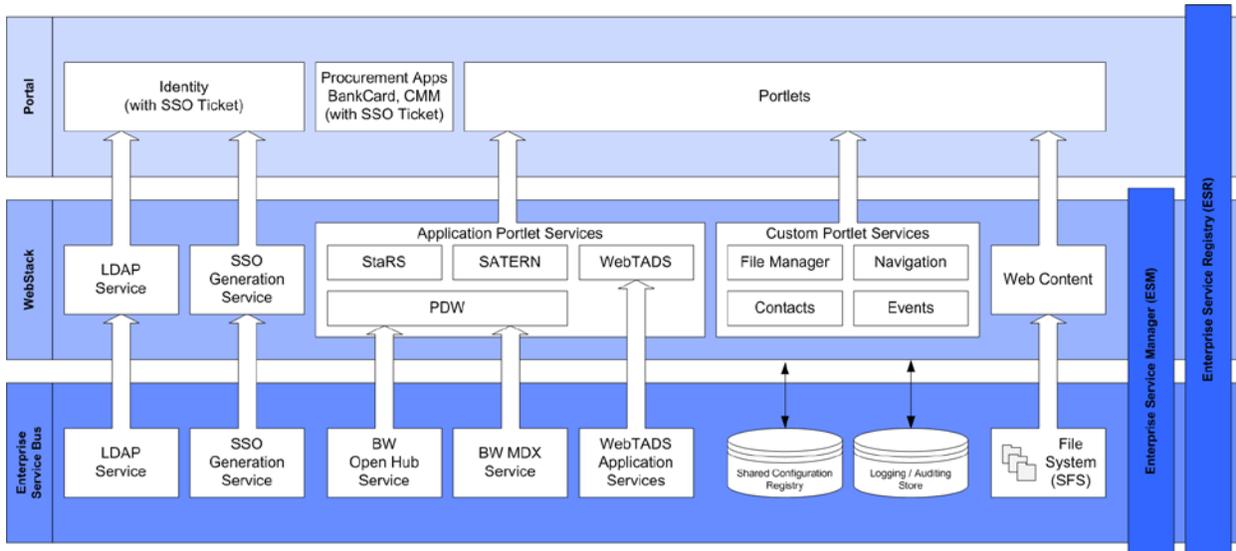


Figure 3.33 - Portal / AppStack (WebStack) / ESB Application Services Interdependency

The following diagram provides a subset of the applications and integrations supported by the ESB platforms.

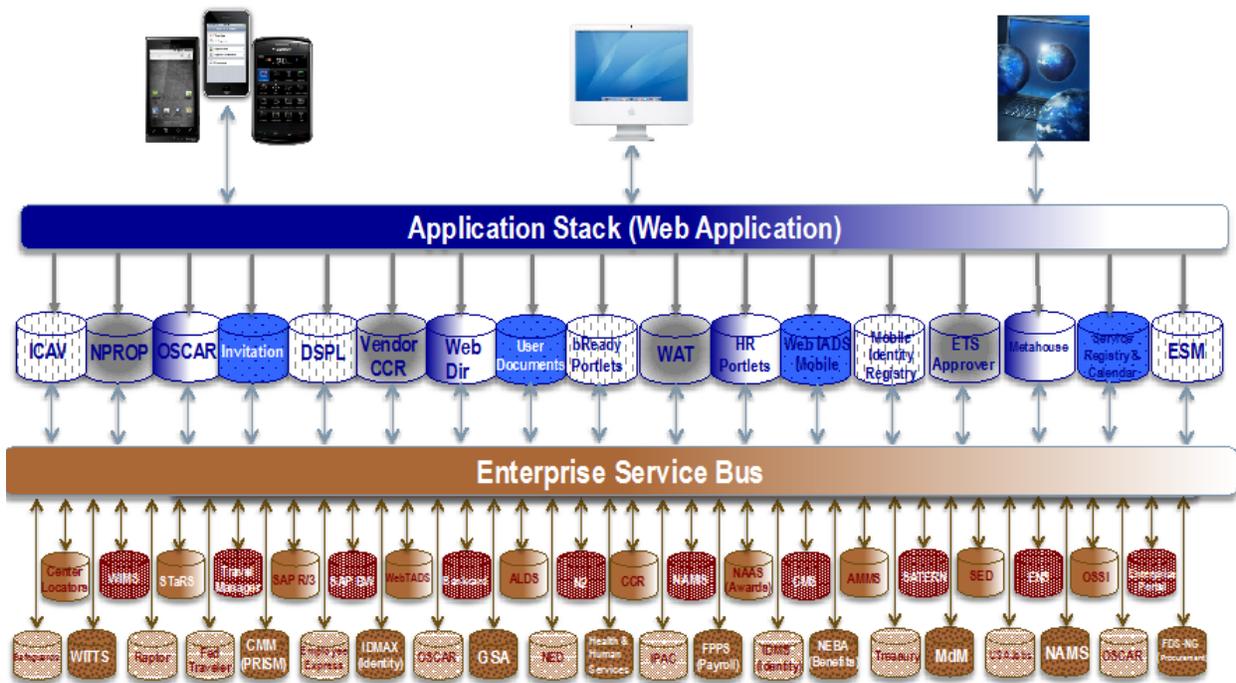


Figure 3.34 - ESB Application and Integration Services

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Software Configuration Management (SCM) Defined

ESB LOB migrations occur on an emergency, weekly, monthly and semi-annual basis in conjunction with the Migration Review Board (MRB) schedule.

JIRA provides customized workflow management supporting builds and migration requests destined for the Production environment. Eclipse is used to access and deploy builds to the promote-to-Production (Minor, Major, Staging and Production) environments. All builds are checked in/out of the SubVersion (SVN) software version control system. All migrations are based upon approved Services Requests (SRs) managed via the Integrated Service Request System (ISRS)/Rally/ Application Point Capacity Management System (APCMS).

All ESB LOB migration requests are assigned to the SCM team for deployment to Release Management owned environments.

3.3.10.2 MetaHouse

Meta-House is a web-based application for tracking entities located throughout the NEACC and NASA landscapes. An entity can be a physical object such as a database or a logical object such as a migration activity. A dependency between entities represents a relationship from one entity to another. There are two types of events (i.e., activities and outages), which can have dependencies to locations, systems, and services. MetaHouse was developed to provide: entity discoverability (search), dependency matrix, entity and calendar integration, targeted user notifications, multiple channels of notification, and automatic provisioning of NEACC developed entities. MetaHouse is utilized by the SLM team to send user notifications for activities and outages that are managed in the entity and calendar integration component of MetaHouse. The diagram below depicts the primary functions of MetaHouse.



Figure 3.35 – MetaHouse Functionality

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For additional details of the MetaHouse, refer to document “MetaHouse” located on the EAST 2 website <https://www.nssc.nasa.gov/east2>.

3.3.10.3 ESB - NEFS/Adobe LiveCycle Enterprise Suite 4 (ES4)

System Definition: NASA Policy Directive (NPD) 1420.1A - NASA Forms Management

NASA Electronic Forms System (NEFS): The hardware, software, equipment, facilities, personnel, processes, and procedures that function together to support the NASA forms management program.

Legacy System

The legacy IBM FileNet system was approaching twenty years old and was no longer supported by the vendor. It had Section 508 compliance issues and failed integration tests with digital signature certificates. There were interoperability issues with the Mac-Lion OS and Entrust signatures. Date transposition issues surfaced at the beginning of calendar year 2014. The legacy system was hosted and supported by the Ames Research Center (ARC).

New Agency Solution

An Agency Business Case Analysis (January 28, 2011) was conducted by HQ-OCIO personnel. It contained baseline requirements, solution alternatives, and recommended a Forms-Specific tool. This recommendation led to the acquisition and licensing of Adobe LiveCycle - Enterprise Suite at the end of FY12 by the Solutions for Enterprise-wide Procurement (SEWP) team located at the NASA Shared Services Center (NSSC). Due to budget constraints, the decision was made to execute the implementation of the new solution in a two phase approach, referred to as Initial and Final Operating Capability, over FY13 and Fy14. The decision was also made to re-host the new Agency solution at the NASA Enterprise Applications Competency Center (NEACC).

The Initial Operating Capability (IOC) phase was executed during FY13. The goals for this phase were:

- Establish standard NEACC 3-Tier Development, Stage, and Production platforms
- Implement Adobe’s latest release of LiveCycle Enterprise Suite (ES4)
- Begin training the Center/Agency Form Teams to develop the new skillset required
- Begin the conversion and migration of legacy forms to the new solution

The Final Operating Capability (FOC) phase was executed during Fy14. The goals for this phase were:

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- Complete the conversion and migration of legacy forms to the new solution
- Scale the system based on performance metrics that are impacted by hosting and rendering the Agency’s form template inventory to the end-user community
- Replace the ARC-hosted front-end portal by a NEACC-hosted portal
- Replace the form template meta-data database by a NEACC-hosted solution
- Note: Adobe LiveCycle ES4 - Service Pack 1 (SP1) was applied

The NEACC’s support for this Agency solution is unique compared to the majority of the other Agency solutions hosted and supported by the NEACC. It is primarily technical in nature based on the fact that each Center has a Forms Team. These teams have been in place for many years and provide form design, development, as well as functional support for their Center’s forms. NASA Headquarters is recognized similar to the other Centers because they have forms unique to their location. In addition, they are responsible for Agency-level forms. The solution is utilized by the NASA workforce and the public. The following summarizes the Help Desk support model:

Tier 0 & 1	FAQ, System Access, etc.	NSSC – Enterprise Service Desk
Tier 2	Functional	Center Form Teams
Tier 3	Technical	NEACC

Table 3.7 Help Desk Support Model

The following summarizes the NEACC and Center Form Teams roles:

NEACC – Civil Servant	Service Requests - Assessment and Approval NAMS requests – Review & Approval
NEACC- EAST Contractor	System Administration & Configuration
Center Form Teams (NASA Electronic Forms Working Group)	Form Design & Development

Table 3.8 - NEACC and Center Form Teams roles

Solution Component Summary

- NASA Data Center (NDC) provides the hardware platform
 - Server Virtualization, Rapid Recovery Architecture (RRA), Disaster Recovery
- Adobe LiveCycle Enterprise Suite 4 (ES4) implemented as the core solution

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- Web-based (nef.nasa.gov) electronic forms platform, providing end users access via a browsers and providing support for forms routing\approval
- NEACC front-end portal and Meta-data management
- ACES provides desktop capabilities
- NICS provides network access
- Adobe ES4/SP1 - Adobe Platinum Support

Below is a display of the Solution Architecture:

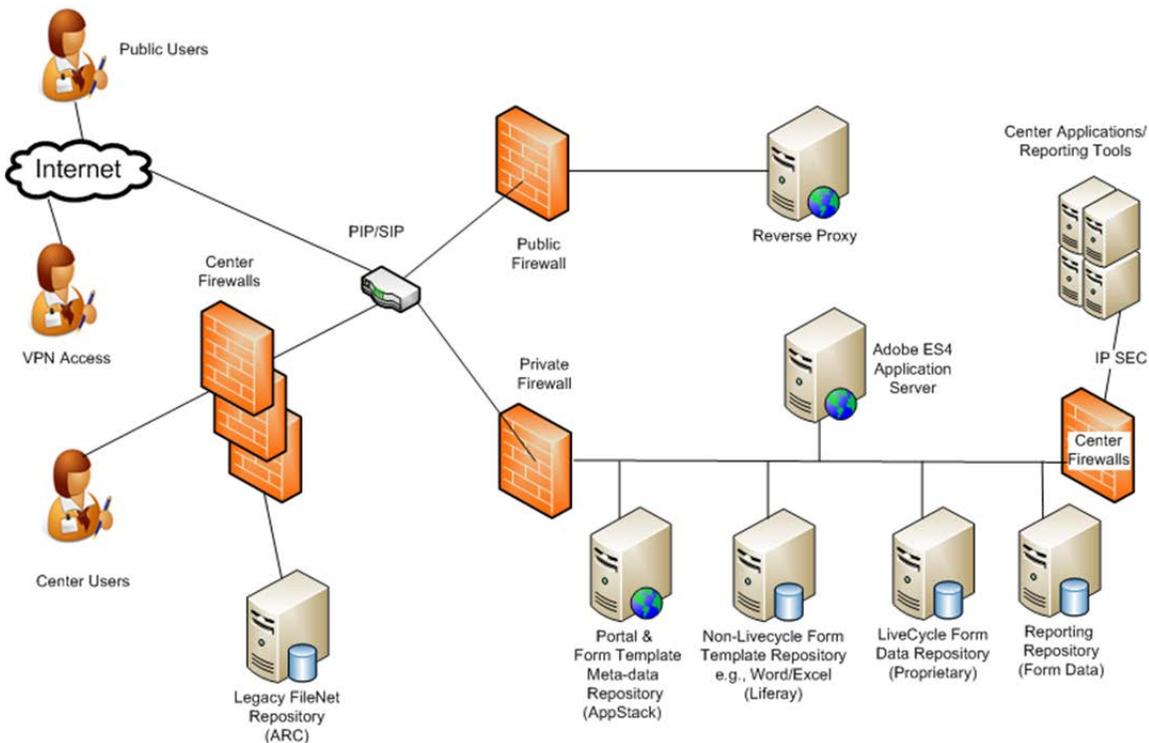


Figure 3.36 – Solution Architecture

3.3.10.4 Center for Internal Mobile Applications

Introduction

The NASA Center for Internal Mobile Applications (CIMA) is the creator and manager of apps@NASA – the Agency solution for centralized distribution of internal mobile applications, which are intended for use by NASA-only audiences. The NASA Enterprise Applications Competency Center (NEACC) is the service provider for CIMA, and in 2011, NASA’s Information Technology Management Board (ITMB) recognized CIMA as the NASA internal

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Mobile Application Service Center. CIMA operates as a part of the Enterprise Service Bus (ESB) Line of Business (LOB).

The main objective of CIMA is to enable NASA's workforce access to the information they need, anytime, anywhere using CIMA's proven and secure architecture to deliver critical business functions directly to mobile devices. CIMA provides benefit and value to the Agency by localizing a center of mobile excellence, which can be utilized throughout the Agency for the development of internal and external applications and the hosting of internal applications. This centralized approach provides a consistent proven methodology for securing mobile applications, and reduces the risk related to identity caching on mobile devices with the implementation of PKI for our developed and hosted mobile applications.

CIMA Services

CIMA provides a variety of services, including development and hosting/distribution as well as a proven product set. The CIMA catalog of Mobile Application Services and Products provides a description of the wide range of service offerings and products that enable customers to select services that most appropriately fit their organizational needs and requirements.

apps@NASA

The CIMA approach to centralization and distribution of NASA internal apps is Mobile Application Management (MAM) – which is best characterized as application-centric. CIMA's current implementation of MAM includes the lifecycle management of NASA enterprise mobile apps through the NASA app store - apps@NASA, the management and security of the data utilized by those apps (data on the device), and the management and security of the data between NASA enterprise services and the device (data on the wire). This approach makes it easier to target the things that matter most to NASA – the internal mobile apps and NASA data that may be used. It allows for the use of both agency issued and personal devices. User device preferences and personal private data are left alone.

apps@NASA is NASA's agency level mobile application distribution platform where NASA employees and contractors can install apps that access NASA systems. The website supports all mobile platforms that provide over the air installation (iOS, Android, Blackberry). Each application hosted receives a showcase page where users can read details about what the application does, what's new in the latest release, and see a history of all changes. Users are also able to rate and review the application to provide app owners with community feedback on their applications. CIMA provides apps@NASA hosting to any mobile application regardless if they have used any of the other CIMA services or not. In addition to the website, CIMA has also developed a native version of apps@NASA that NASA users can install on their device. The native version provides an 'apple appstore like' interface that simplifies searching for and installing applications from the device. Users also receive notifications on their device when new applications are released or when newer versions of currently installed applications become available.

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The following is a list of applications which were developed and are managed by the NEACC:

Application	Description
<u>apps@NASA</u>	apps@NASA lets NASA authorized users search and install the latest internal mobile apps created or hosted by the Center for Internal Mobile Applications (CIMA).
<u>WebTads</u>	<p>WebTADS Mobile is a lighter version of the desktop-based WebTADS developed to provide NASA Civil Servants with the convenience of recording time when they're not in the office or connected via VPN.</p> <p>Many (but not all) of the functions are available in this mobile version. Project codes, leave balances, and - of course - the ability to enter time are among its many functions. All work recorded in WebTADS Mobile is immediately reflected in regular WebTADS - and vice-versa. However, when in doubt about unique functions and connectivity, always revert to the desktop-based WebTADS to ensure timely and accurate recording of your work. Also, no support is offered from within the mobile version (this includes FAQ's, training, etc.).</p> <p>The best features of the mobile version are that it can be on both personal and NASA-issued devices, and you don't have to be connected to the NASA network in order to use it! Any cellular or wireless connection can work.</p>
NASA Contacts	Look up NASA colleagues' contact information directly from your phone.
Equipment Inventory	The NASA Equipment Inventory Program is used to facilitate the NASA equipment inventory process by allowing users to scan an ECN barcode or manually enter an ECN via a mobile device which will then update SAP. This program is for the use of those with the Inventory Team Member Role only.
MSFC - Emergency Procedures Handbook	This application is intended for use by all Marshall Space Flight Center (MSFC) employees and contractor employees, and has been designed as a quick reference to be used during emergency conditions that may occur at the Center. This application is available in Mobile and Web version.
MSFC - Emergency Procedures Handbook CMS	This application is intended for use by Marshall Space Flight Center (MSFC) Emergency Procedures Handbook App administrators, and has been designed as a quick modification of Emergency Procedures and provide notifications to users of the MSFC - Emergency Procedures Handbook App. This application is available in Mobile and Web version.
ExplorNet	This app is a 'web wrapped' website. ExplorNet allows the MSFC workforce to collaborate from their mobile device.
Space 365	Mobile app Space 365 content management. This application is deployed via Google Play and the Apple App Store.

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Application	Description
Space 365 CMS	Space 365 CMS provides a content management system that provides Space 365 content editors to create and maintain the content for the mobile application. This application is deployed via Google Play and the Apple App Store.
OSSI Analytics Dashboard	This app is a ‘web wrapped’ Cognos dashboard. The OSSI "analytical dashboard" contains data that illustrates the recruitment outcomes of collaborative efforts by OSSI’s internal and external partners, as well as student selection outcomes by personnel within NASA Centers, Headquarters, and Mission Directorates from all institution types.

Table 3.9 – Applications Developed and Managed by NEACC

The following is a list of applications which were developed by other NASA Centers and are deployed by the NEACC via apps@NASA:

NASA Center	Applications
ARC	iARC, myNAS
HQ	HRonTheGo
JSC	iMorpheus, Visual ISS Configuration Tool, Multimedia Control Program, iGLACIER, iMerlin
KSC	Extended Voice System (EVS)
MSFC	Quick Status
SSC	SSC Engine Test Mobile

Table 3.10 – Applications Developed by other Centers and Deployed by NEACC

Secure Mobile Access Point (S-MAP) and ICAM Authentication/Authorization

NASA has a specialized set of mobile applications that utilize CIMA’s secure channel to protect data from NASA enterprise services that is utilized by the NASA mobile applications. This solution, known as the Secure Mobile Access Point (S-MAP) is a NASA developed solution, based on ICAM standards, that provides a means for App Owners to guarantee secure access to their data through their mobile applications. The S-MAP technology allows mobile devices outside of NASA locations to access protected NASA services and data. The S-MAP components are available for use by any NASA internal app developer, are provided by CIMA, and should be the standard technology used by all NASA developers of internal mobile apps that need to access enterprise data.

CIMA utilizes ICAM’s NED authorization services for all CIMA related services including CIMA native mobile applications, CIMA mobile web applications, CIMA hybrid mobile applications, S-MAP data/service access, Pulse, DevCenter, and apps@NASA. The CIMA authorization model allows CIMA services to utilize both NED attributes and NED groups for determining authorization levels for both users and devices.

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Attribute-based access control (ABAC) is a model where access rights are granted to users through the use of policies which combine attributes together. Attributes can be compared to static values or to one another thus enabling relation-based access control. CIMA utilizes both user based attributes via ICAM NED and device centric attributes including device type, OS type, OS version, application, application version, network, and location to determine proper authorization/access for users and devices. Role-based access control (RBAC) is a model where access rights are granted to users through the use of user groups. CIMA utilizes RBAC via ICAM NED to provide proper authorization/access for users.

CIMA utilizes ICAM's eAuth authentication service for all CIMA related services including CIMA native mobile applications, CIMA mobile web applications, CIMA hybrid mobile applications, S-MAP data/service access, Pulse, DevCenter, and apps@NASA. This provides a cohesive one credential approach for application and service access regardless of platform, application, user, and location.

CIMA is currently implementing a NASA derived credential service utilizing ICAM's eAuth authentication service and Certificate Authority (CA) services to provide strong authentication for mobile devices. The objective of the NASA derived credential effort is to provide an enterprise solution for the implementation, utilization, and management of derived credentials for mobile services utilizing Agency approved ICAM infrastructure and services. This will provide strong authentication for CIMA mobile applications and provide future use cases including mobile VPN, mobile 802.1X, email encryption, file encryption, and email signing. Initial pilot for strong authentication for CIMA mobile applications on iOS devices is expected in spring 2014.

Pulse

CIMA's Pulse analytics tool provides metrics on three different vectors: users, devices, and application. The Pulse user related metrics include information by center, organization, geographic location, usage by day, month, and year. The Pulse device related metrics include information on device type (iOS, Android or Blackberry), device models (e.g., iPhone 5, Nexus One), and device version OS (iOS 7.1) Pulse also provides similar analytics for websites, including browser related analytics (e.g., browser type and version). Pulse application related analytics includes information on usage by application version. Because Pulse is also tightly integrated with apps@NASA, the Pulse application analytics also provide download metrics for each application. Pulse provides the data needed to make more informed decisions regarding marketing efforts and updates to mobile applications. Pulse also provides server side Role and Attribute Based Access Control (RBAC and ABAC) that allows CIMA to enable/disable mobile application services based on center, user, device, OS, and application version.

DevCenter

CIMA's DevCenter is an online community for those wanting to learn more about mobile development. The online community provides developers access to framework modules, mobile

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libraries and already developed code to assist in jump-starting new projects. DevCenter also houses several 'how to' videos to assist developers with getting started developing a mobile app on DevCenter and a developer forum where developers can share ideas and lessons learned. DevCenter was implemented to help enable the Agency to share ideas, resources and innovation across multiple Directorates, Projects and Programs.

Mobile enterprise application platform (MEAP)

Mobile enterprise application platform (MEAP) is a complete solution that provides tools and middleware for developing, testing, deploying and managing enterprise/internal software on mobile devices. CIMA followed these guiding principles when implementing the CIMA MEAP:

- Leverage existing enterprise services instead of introducing duplicative functionality
- Extend existing enterprise services to address gaps not met by existing enterprise services
- Create or Procure only when existing NASA enterprise services are not extendable to fit

CIMA leveraged and/or extended the following NASA enterprise services for the CIMA MEAP solution:

- NASA OpenSourceESB – (Leveraged) - Utilized the NEACC OpenSourceESB to provide integration with back-end enterprise services and data
- NEACC AppStack – (Extended) - Utilized the NEACC AppStack to implement a secure mobile access point (S-MAP)
- ICAM Services – Launchpad, NED, IdMAX – (Leveraged) - Leveraged existing ICAM services for authentication (Launchpad) and authorization (NED)
- Hybrid Integrated Development Environment (IDE) – Web development services – (Extended) - NEACC has strong technical capability in web development and leverages that in our hybrid approach which utilizes the following technologies: HTML5, CSS, javascript, phonegap

The support services provided by the ESB and CIMA Line of Business shall be used for both Enterprise and MSFC Center applications.

3.3.10.5 Future Initiatives

NASA is currently, through the End User Service Office, in the process of deploying a Mobile Device Management solution. There are efforts underway to integrate the ICAM/CIMA infrastructure and PIV derived credential capability with MDM as well as evaluate those capabilities of CIMA that can be replaced by off-the-shelf capability within the MDM solution.

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3.3.11 NEACC Support Systems (NSS) Line of Business

The NEACC Support Systems (NSS) LOB manages the operation, maintenance and enhancement of NEACC systems, tools, and applications that support or cross Lines of Business. NSS also oversees the management of the technical infrastructure across NEACC Applications and maintains common tools used across all LOBs. In this role, the NSS team interacts regularly with the NEACC Computing Systems (NCS) team on the Marshall Information Technology Services (MITS) contract to ensure effective coordination of infrastructure tasks that are dependent upon the NCS team.

NSS is not an “official” LOB, in that it does not appear as an LOB when the NEACC is presented to external stakeholders, nor was it depicted as an LOB in the EAST contract resource baseline documentation. However, NSS is managed similarly to other LOBs (i.e. Finance, Business Intelligence, ESB, etc.) in regards to capacity management and resource allocation. Work priority is determined with input from the LOB Managers, taking into account other more pressing functional or security priorities that exist in the LOB backlog. The NSS LOB leverages the bi-monthly cross LOB governance meeting (CORE) to coordinate work items. This planning culminates in a monthly sprint meeting to schedule and assign the work for the upcoming month.

The NSS application suite includes, but is not limited to: job scheduling tools, a test management system and automated testing tools, performance monitoring and service applications such as PDF generators, document management applications, and storage virtualization software. In addition, the NSS LOB includes contractor support that provides solution oversight and architectural assistance for the technical implementation of SAP products, including ERP ECC, Business Warehouse and Solution Manager.

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3.3.12 MSFC Center Applications (MSFC-CA) Line of Business

3.3.12.1 Overview

Marshall Space Flight Center maintains an inventory of about 300 active applications in the Applications Inventory Module (AIM). These applications are managed by the Marshall Information Technology Services (MITS) contract as well other science and engineering support contracts. However, these applications were developed with a diverse set of technologies (see Figure 3.37) for a diverse set of organizations. The applications were developed and deployed without holistic consideration to an integrated Center Architecture or long term sustainability. In 2011, the Center Management and Operations (CMO) IT resources were pooled to more effectively manage the Center’s applications.

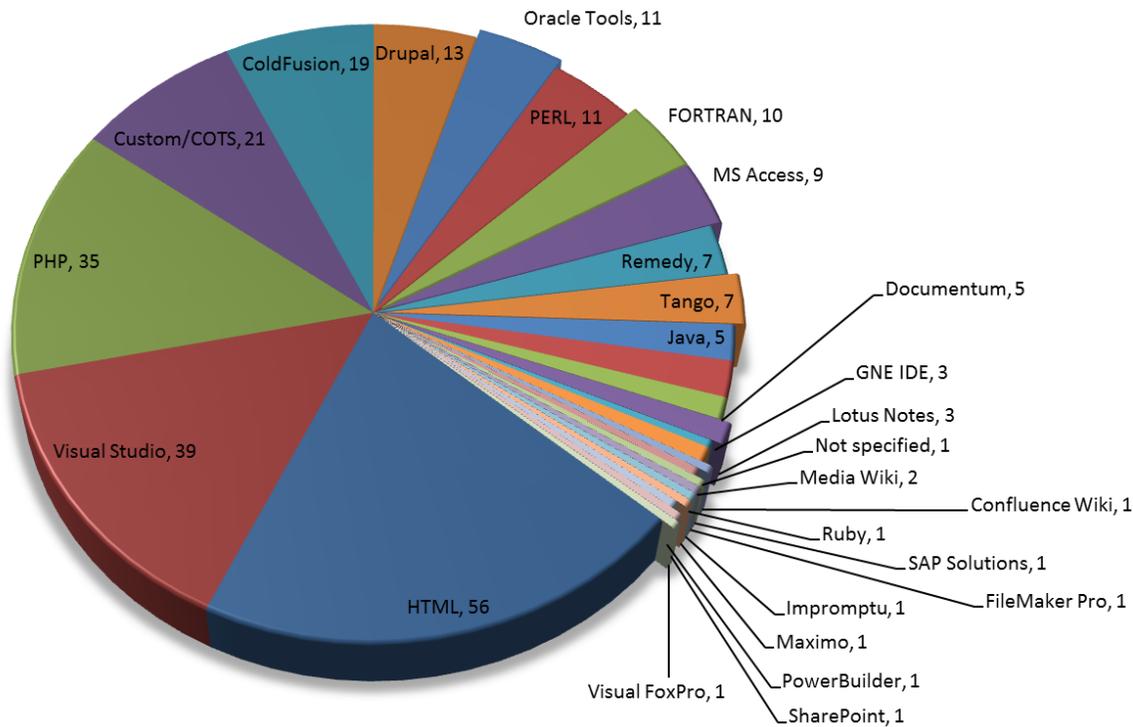


Figure 3.37 - Number of Applications by Development Technologies

To further improve upon realized efficiencies, the Center developed and implemented an Application Portfolio Management (APM) process to continually assess applications based on their security, sustainability, cost, support to the business needs, and architectural alignment. The process is shown below.

Attachment L-B - Background and Historical

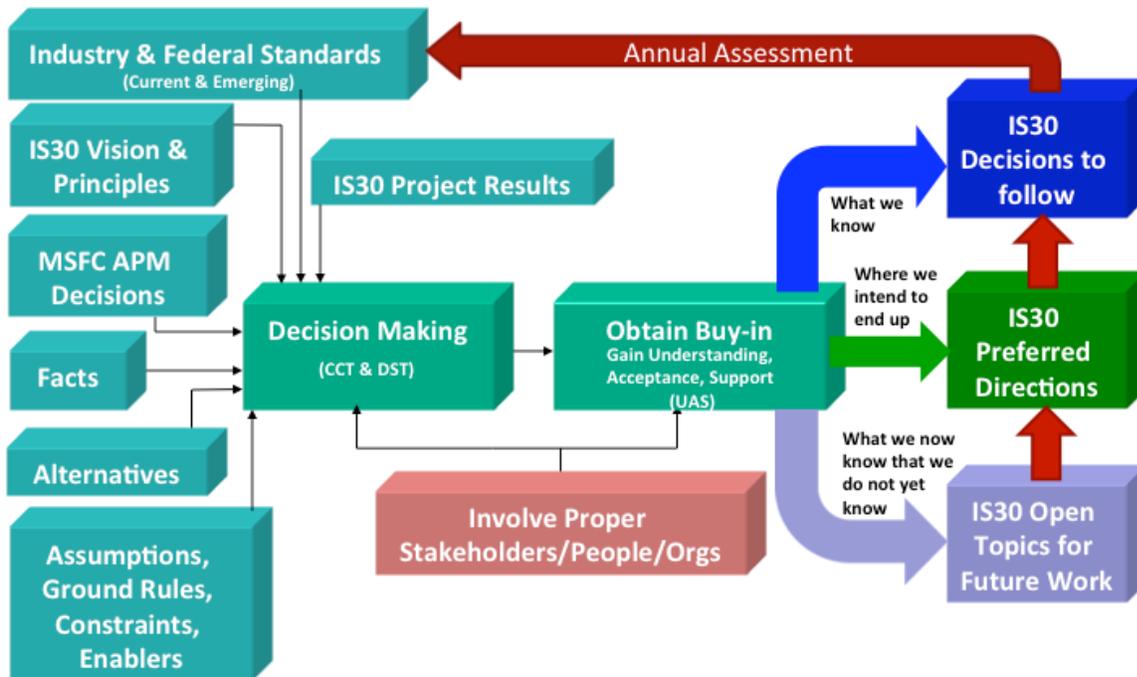


Figure 3.38 - Application Portfolio Management

More information regarding the APM approach can be found on the EAST 2 website: <https://www.nssc.nasa.gov/east2>.

NASA’s vision is to have a unified APM approach across all Lines of Business. Refer to the Enterprise APM approach in Section 3.0.

Finally, the data generated from this assessment was used to develop specific investment decisions and architecture roadmaps. The resulting rationalization has allowed MSFC to eliminate vulnerable and duplicative apps/technologies; reduce long term sustainment/maintenance cost through the consolidation into the primary platforms; and increase the overall capability of the applications portfolio through focused investments.

With these roadmaps in place, the OCIO identified approximately 120 applications to be initially transitioned to the EAST 2 contract based on defined criteria. These applications are identified in Attachment **J-21**, *Inventory of Enterprise and Center Applications*. The following Figure 3.39 demonstrates the complexity of the MSFC’s application interfaces and touch points.

Attachment L-B - Background and Historical

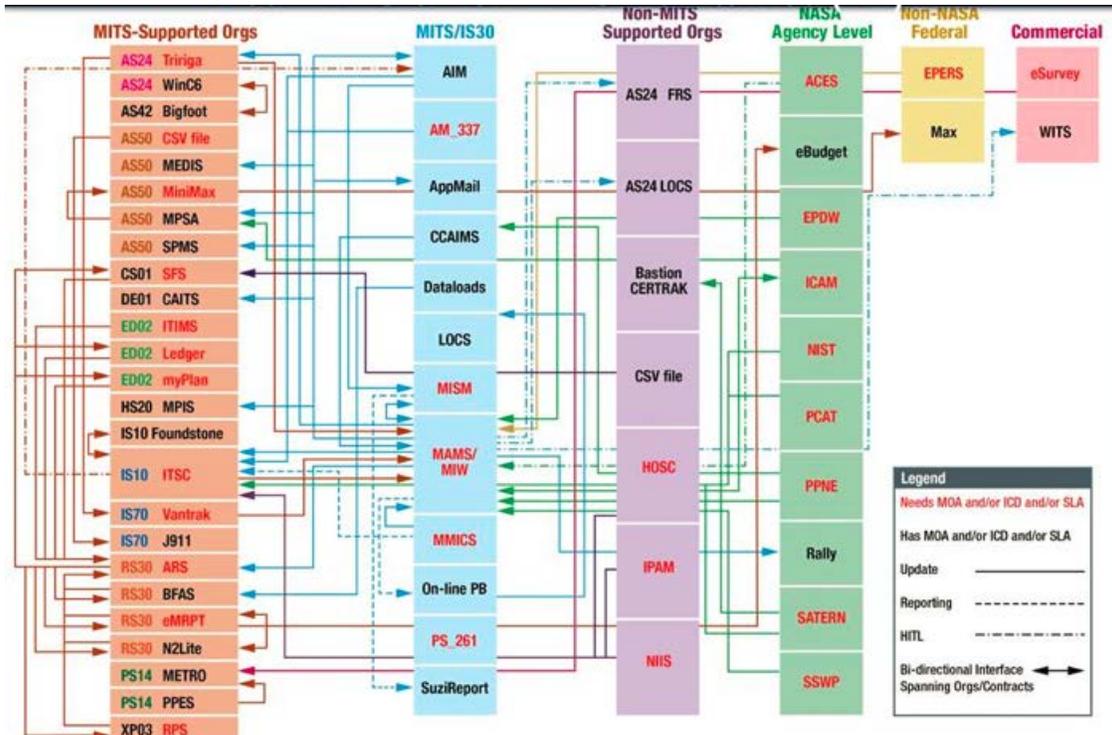


Figure 3.39 – System Integration Architecture

The intent of MSFC’s APM approach is to avoid customization of COTS products. When the platforms are unable to meet user requirements, other COTS products may be considered. As a last resort, customizing a platform technology or the development of a custom application, using either LAMP (Linux-Apache-MySQL-PHP) or WISA (Windows-IIS-SQL Server-ASP.NET) suite, may be considered.

MSFC has five primary investment platforms as architected in the following diagram. These platforms are listed below and expanded upon in the following section:

- MAXIMO/Computerized Maintenance Management System (CMMS)
- Marshall Integrated Service Management (MISM)
- JIVE/ExplorNet
- Drupal As A Service (DaaS) Framework
- Sharepoint

Attachment L-B - Background and Historical

Investment Platforms & Architecture

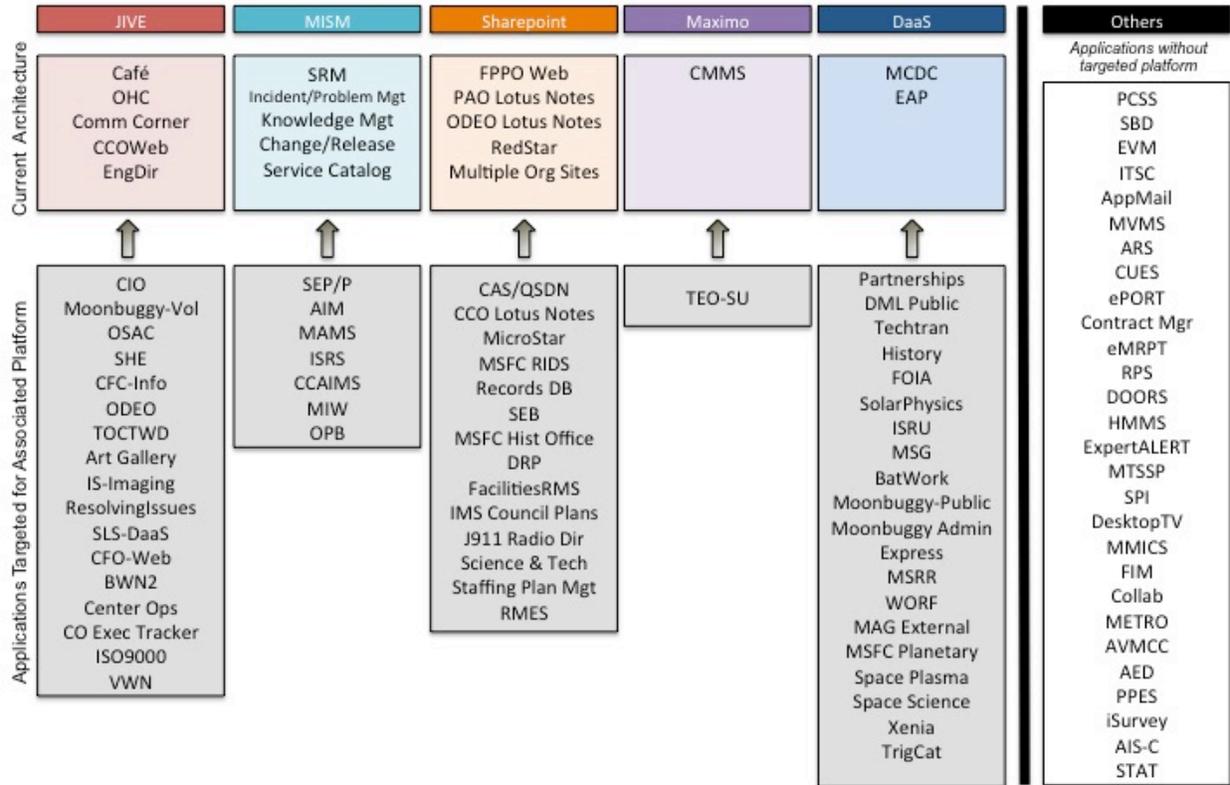


Figure 3.40 – Investment Platforms and Architecture

3.3.12.2 Investment Platforms

MAXIMO/Computerized Maintenance Management System (CMMS)

CMMS is a customized implementation of Maximo, a user-friendly windows-based COTS product. CMMS allows the user to maintain detailed facilities maintenance and work order status information. It also allows the user to schedule Preventive Maintenance (PM) tasks and calls attention to scheduled PM tasks not yet completed for the Facilities Management Office (FMO). This application provides maintenance managers and users closed-loop processing for the recurring day-to-day work functions required to inspect, operate and maintain facilities (buildings, structures, grounds, utility systems and collateral equipment) in an acceptable condition. Additional modules are being considered to meet future customer requirements.

Marshall Integrated Service Management (MISM)

MSFC Integrated Service Management (MISM) is the MSFC branded BMC ITSM Suite, facilitating ITIL processes including Remedy Service Desk (Incident & Problem Management), Knowledge Management, Change & Release, Service Request Management, Asset Management,

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and Service Request Management (SRM)/Service Catalog. MISM is designed for integration, authoritative data, and enterprise use. As one of MSFC's growing technologies, MISM has enabled the consolidation of 11 customized applications and the automation of numerous manual processes into a single tool. These previously isolated applications/processes are now using a single configuration management database, populated with data from other authoritative sources, and standardized processes using ITIL principles. MISM manages more than 1,600 service requests each week across MSFC.

Future investments in MISM include the implementation of MAMS and AIM functionality for end user device and application asset management, and the development of a SW license management module. Additionally it will have an increased presence throughout the agency beginning with the NEACC Integrated Service Request System (ISRS) migration to MISM and continuing support for End User Service Office (EUSO) by automating the change request and work management processes. The new solution, called NASA Integrated Service Management (NISM), will catalog more than 170 active services available through SRM.

JIVE/ExplorNet

ExplorNet is an Enterprise 2.0 social networking tool used for Group communication, community development (organizational and interest based groups / sites), connecting people, ideas, interest, & content for all MSFC employees. ExplorNet is a COTS tool, Jive Social Business Software (SBS) Version 7. ExplorNet interfaces with eAuth via Security Assertion Markup Language (SAML) 2.0 for authentication and the NASA Enterprise Directory (NED) via Lightweight Directory Access Protocol (LDAP) for authorization. ExplorNet uses the NED for individual user profile information. Existing NED user attributes are used Read-Only to populate information about users in ExplorNet. Also, extended profile information, voluntarily added by the user, is pushed into the NED into new user attributes. These new user attributes are readable only with a particular NED service account and password. These attributes are for future use with other NASA social platforms. Future investments in ExplorNet include a connector with SharePoint, Email templates, and IP tracking to enable the platform to manage moderate content.

Drupal As A Service (DaaS) Framework

Drupal 7 is used by MSFC for the development of websites that must reach audiences outside of MSFC or contain functionalities beyond that provided by SharePoint or ExplorNet. It is designed to deliver optimal functionality through the use of several selectable 'modules' which as the DaaS Framework are taken through compatibility, security and operational reviews to provide a common starting point for customer sites. Additional approved Drupal modules will be assessed as needed to meet customer needs.

Sharepoint

MS SharePoint 2013 is the primary collaboration, and content management platform for MSFC. It is used to enable team collaboration on documents and other data products, automate workflows, perform library management, and as general file storage, for MSFC organizations and programs/projects. It has been enhanced with the Nintex workflow module for complex

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workflows and the Docave application from AvePoint for large file management. Additional approved modules/applications will be assessed as needed to meet customer needs.

3.3.12.3 Custom Applications

The following custom applications represent a subset of MSFC applications that have a unique focus and/or mission impact. For a complete list of MSFC applications, see Attachment **J-21**, *Inventory of Enterprise and Center Applications*.

Athena (MAPTIS II)

The MAPTIS name has changed to "Athena" as of 2/20/2013. Athena still distributes MAPTISII data is unchanged and is available to NASA sites, NASA contractors, military groups and universities. MAPTIS-II was established for recording and disseminating information about materials to help assure safe material selections for NASA-produced space flight hardware. MAPTIS-II (Materials And Processes Technical Information System) is a NASA Internet-accessible database system containing physical, chemical, mechanical and environmental-related material properties and related information. MAPTIS-II is an application of Center's Materials X-Sight System, a World Wide Web Consortium (W3C) compliant HTML and XML presentations system. MAPTIS-II will provide for the acquisition, storage and access of properties data for metallic and nonmetallic materials. A primary feature of the system is a drill-down exploration capability, which progressively narrows down a search to the data desired. Searching is based on an extensive set of materials attributes, test types and test numbers. Once the data of interest is found, it may be viewed in a variety of formats, captured in a range of reports and exported in several standard transfer formats.

In addition, it is important to note that this platform has approximately 5500 users and support projects across the Agency, Department of Defense, European Space Agency, and commercial space worldwide. Funding comes from Space Launch System (SLS), International Space Station (ISS), and MSFC CMO.

MSFC Protective Services Application (MPSA)

MPSA is a custom web application that combines several Microsoft Access applications. It is used primarily by MSFC protective services for the inventory control for locks and keys, vehicle citations, service vehicle passes, visitor badges, foreign escort training, mission essential personnel, mission essential infrastructure, COTR/POC lists, personnel security for contractors and civil servants, and MSFC and MAF blotter including incident reporting, duty roster and dispatch functions, as well as investigations.

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IT Security Center

The contractor shall provide system security support by integrating the data and processes needed to manage a NIST compliant IT Security Program. Utilizing MSFC's IT Security Center (ITSC) application, security compliance can be managed and measured. It is also used to maintain an inventory of IT Systems and provides IT personnel the ability to generate NIST based Assessment and Authorization (A&A) Packages. The Agency recently decided to adopt ITSC as an Agency solution; updates and data migration are under way to meet end of calendar year 2014 target to complete the transition, with MSFC providing maintenance support through FY15.

Electronic Marshall Resource Planning Tool (eMRPT)

The eMRPT shall support the MSFC Planning, Program, Budgeting and Execution (PPBE) process with several resource planning tool modules (as shown in Figure 3.41). The eMRPT tool suite is under the direction of both the RS30 and RS50 offices. It provides the CFO's Budget Integration Office with tools to capture and manage Execution, Fiscal Year, and Program budget planning for Civil Service (CS) Full-Time Equivalents (FTE), Work-Year Equivalents (WYE), Travel, and Procurement data throughout the PPBE cycle. The key element among all modules is the level of detail gathered and reported. The tool adheres to the agency NASA Structure Management (NSM) budget structure. The user community may choose a level of planning that best suits their organizational needs, however, planning at the project level is always required. The NSM structure consists of the Mission/Theme/Program/Project/WBS code breakdown, allowing MSFC/RS50 to gather data at a detailed WBS level and report/roll up to the standard Agency Project level. The Project level resource planning estimates can then be compared with Project level Actuals retrieved from the Accounting Resource System (ARS). In addition, data collected in the eMRPT is reported to the MSFC CFO to review, recommend, and report these plans to center and headquarters management.

eMRPT also provides presentation ready (PDF/MS Excel) reports for Center and Headquarters submission. It provides data for the electronic data submission to the NASA Headquarters N2 Budget Submit system via flat file that is manually uploaded to N2 by the RS50 resource analyst. The eMRPT integrates with the Rosetta Comprehensive Coding Crosswalk to obtain valid project code planning information. The eMRPT shares planning data with the Accounting Resource System (ARS) to generate MSFC project level plans versus actuals (PvA). The eMRPT consists of several different resource planning modules. The modules allow the business user and RS50 to collect varying levels of resource planning data. The modules are for planning and allows RS50 to report on a baseline set of data, while the user community continues to plan on a live duplicate data period.

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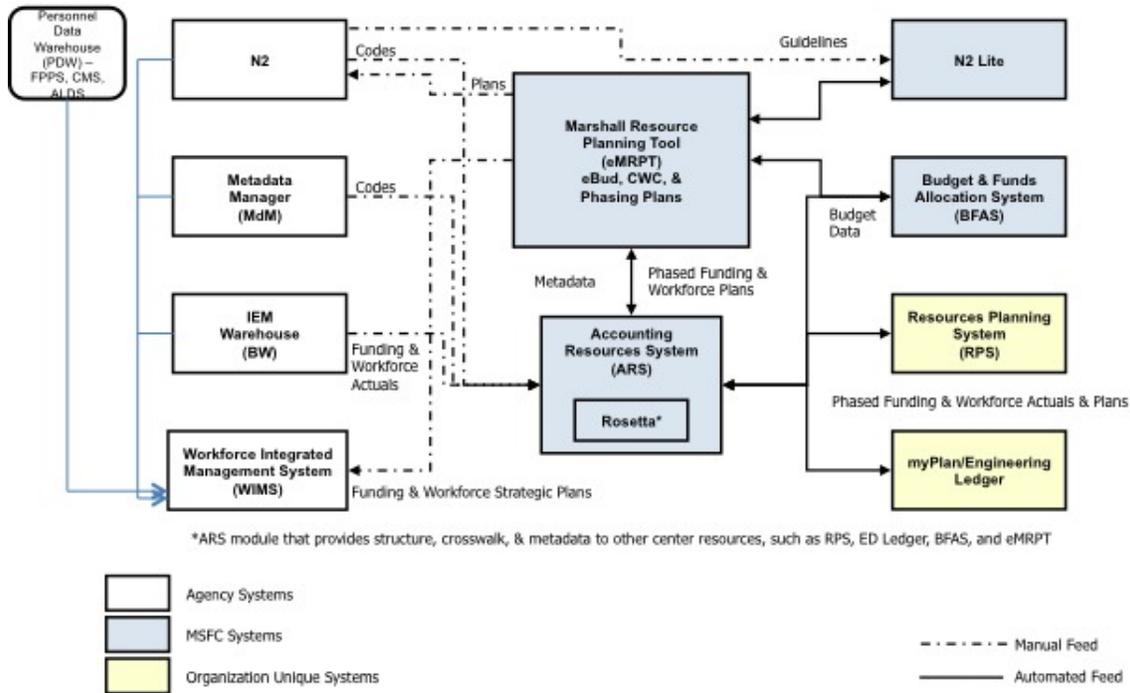


Figure 3.41 – eMRPT Modular Architecture

The eBud is a long term strategic resource planning tool that allows the business user to plan resources at the project level or below for the current budget year out to an additional six years. The data collected by eBud provides the OCFO resource analyst a flat file (.csv) that can be manually uploaded to the Agency N2 Budget System per the PPBE cycle, in addition N2 budget guidelines are imported from the N2 system, manually via flat file, to assist the user in budget planning/comparison. eBud budget planning data is also rolled into the next PPBE planning cycle via Collaborative Work Plan (CWP) for more detailed fiscal year breakdown. The CWP allows the business user to plan at the project level or below, the upcoming fiscal year in detail, phased by month. The data collected by the CWP is reviewed/concurred by project and task managers prior to baseline generation. The data is rolled into the next planning cycle module (ePhasing Plan) for additional RS50 data needs. The ePhasing Plan allows the business user to plan obligations, costs, and cumulative dollars for both Institutional and Center efforts. The data collected during the ePhasing Plan is electronically shared with the Accounting Resource System (ARS) for center planning versus actuals (PvA) analysis. In addition, the eMRPT provides a collection of flexible, formatted, Adobe PDF or MS Excel reports from each data screen or from a selectable list of pre-formatted report options.

Engineering Ledger

Engineering Ledger is a data-driven Oracle Application Express (Oracle APEX) application designed to provide business and management personnel with the:

- Capability to track procurement expenditures/liens

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- Capability to track authority received for procurements
- Ability to add metadata to records for the purpose of creating better reporting to management

The Engineering Business community is the primary user base while management may choose to run reports derived from the Ledger. The system was designed to support the ER02 business office yet was developed to be easily scalable to the entire Engineering Directorate.

myPlan

myPlan is a data-driven Oracle Application Express (Oracle APEX) application designed to provide business and management personnel with the:

- Capability to plan workforce from the bottom-up
- Capability to track workforce by name and by project
- Ability to add metadata to records for the purpose of creating better reporting to management.

A joint development effort between the Engineering Directorate's Propulsion Systems Department and Resource Management Office (ER02) and the Science and Mission Systems Program Planning and Control Office (VP10), myPlan supports both the engineering and project business communities. Custom Crystal Reports will support analysis and management decisions.

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4 OPTIONAL SUPPORT FOR NASA CENTER-SPECIFIC APPLICATIONS

The EAST 2 scope will also include a mechanism to optionally incorporate other NASA Centers to obtain support for Center-specific Application delivery services with the goal to increase Agency visibility into IT expenditures, realize efficiencies by leveraging common tools and development platforms and improve technology platform, collaboration, quality, and security posture.

It is the objective of NASA to manage these services in a consistent fashion; NASA may transition some or all of these functions to Enterprise services as part of Agency transformation. The contractor shall adhere to local Center CIO governance processes for activities that involve design modification/enhancement of these local services.

Potential Centers that are considered to be in-scope and may be included in the future under the EAST 2 contract include the following NASA locations:

- Ames Research Center, CA
- Armstrong Flight Research Center, CA
- Glenn Research Center, OH
- Goddard Space Flight Center, MD
- Johnson Space Center, TX
- Kennedy Space Center, FL
- Langley Research Center, VA
- NASA Headquarters, Washington D.C.
- NSSC Shared Services Center, MS
- Stennis Space Center, MS
- Associated Center facilities (e.g., Michoud Assembly Facility, Wallops Flight Facility, and White Sands Test Facility etc.)

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5 DELIVERY FUNCTIONS

5.1 Operations Management

Operations Management refers to a set of interrelated Delivery Sub-Functions that are critical to ensuring the NEACC is operating at the required performance and quality levels.

5.1.1 Service Level Management

Service Level Management (SLM) is responsible for performing all tasks required to ensure that both NASA's expected levels of performance, as well as the End User Customer's overall expectations, are continually met. Service Level Management defines and oversees the Service Level processes that are used within the NEACC, establishes guidelines for assigning and reviewing service request Severity Levels, and manages the collection of data required to report performance levels to NASA

Day in the life of NEACC Service Level Management:

- Compose and Distribute Event Communications
- Compose Weekly Notes
- Customer Satisfaction (Pending Closure SR) Support
- Daily update of SAP Report
- NEACC Documentation Management
- NEACC Escalation Process Facilitator
- Facilitate and Manage Daily Service Review
- Facilitate NEACC Team Service Request management
- Generate Managers Daily Activity Report
- Generate, Review, Distribute NEACC Weekly Activities Report
- NEACC representative for MSFC International Organization for Standardization (ISO) re-certification
- Manage NEACC Distribution Lists
- Manage Remedy accounts
- Manage NEACC Systems Outage Calendar
- Metrics Compilation and Distribution
- Facilitate Incident and Problem Resolution
- Conduct Risk management meetings (2x/month)
- Schedule and Conduct Root Cause Analysis
- Service Restoration Team Facilitator
- Statistics Generation
- Support NEACC Mailbox Customer Inquiries
- Conduct Internal NEACC Training (Remedy, SRT, RCA, Escalation)

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Capacity Management

NEACC management designated Capacity Management as a strategic focus area for attention and improvement. Historically, the NEACC has found it challenging to precisely quantify the total resource capacity available for a given release or a given timeframe. The NEACC management's goal has been to encourage a standard, reliable Capacity Management process that can be used to understand how much output can be expected and to communicate that expectation to stakeholders and Program Managers.

Background

Over the course of time, the NEACC has gradually moved away from project work to more of an operations and sustaining support (O&SS) model and with that transition the necessity to understand better what the capacity is both in terms of infrastructure and personnel resources has become increasingly more important. The following Wikipedia definition is provided to ensure a clear understanding of what is meant by capacity planning:

“Capacity planning is the process of determining the production capacity needed by an organization to meet changing demands for its products. In the context of capacity planning, "capacity" is the maximum amount of work that an organization is capable of completing in a given period of time. A discrepancy between the capacity of an organization and the demands of its customers results in inefficiency, either in under-utilized resources or unfulfilled customers. The goal of capacity planning is to minimize this discrepancy.”

Introduction

Capacity and Release Planning are interrelated. Release Planning defines what content will be in the Release, but falls short in addressing the capacity needed to deliver the content while maintaining operational commitment levels. There is a limit to the scope that can be delivered within each individual release, the release content is determined based on business value and other weighting factors. The Cross-Organizational Review (CORE) serves as a high level, cross-organizational body that reviews inputs of all functional and technical governance forums to ensure that the release content determination is based on a cross-organizational view that examines proposed changes from a broad, rather than a stove-piped, perspective.

When considering Capacity, there are three organizational levels from which to view capacity (i.e., overall NEACC capacity, capacity by Delivery Function, capacity by an Agile/Scrum team).

Capacity can be summarized as supply and demand equation. The primary benefits of Capacity Management are that it involves a forward-looking process that ensures that the future business requirements for the NEACC's services are considered and understood and that sufficient capacity is available to support the services is planned and implemented in an appropriate timescale. Additionally, a good Capacity Management process provides the necessary

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information on current and planned resource utilization of NEACC teams and it will take into account the overall capacity of the NEACC to address the various demand requests (i.e., enhancements, discretionary and non-discretionary). To show the complete capacity supply and demand equation, Capacity management (i.e., supply) must be integrated with the Project/Release management and the Task Tracking (i.e., demand). The following diagram depicts the NEACC Capacity Management process:

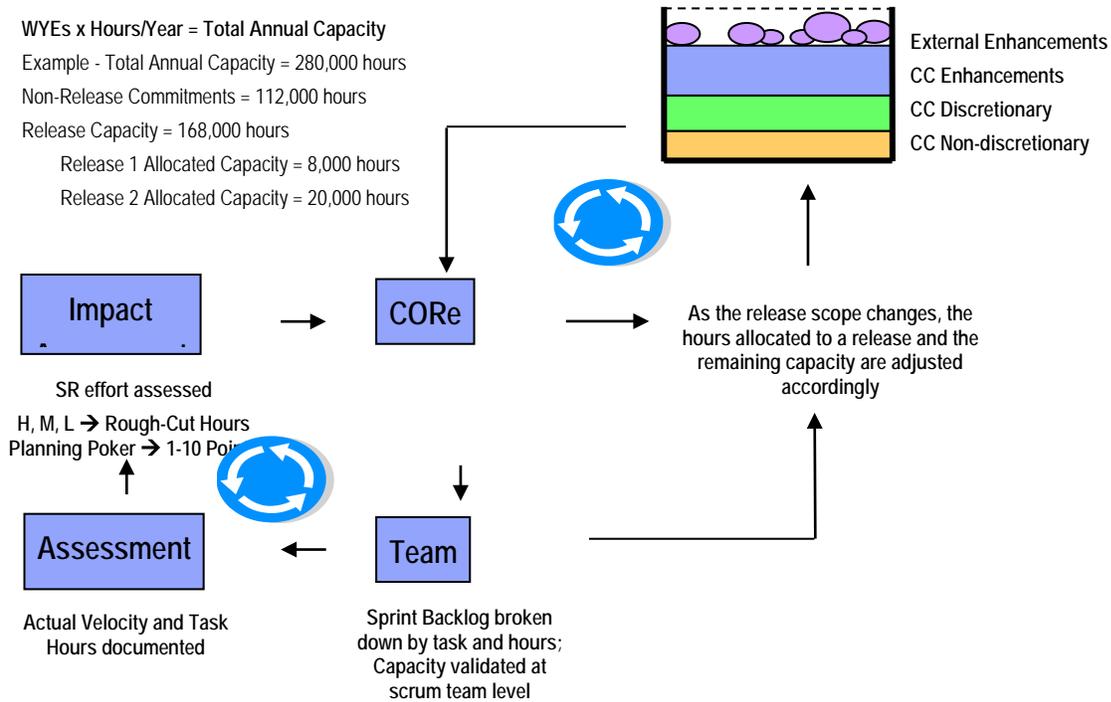


Figure 5.1 – Capacity Management Process

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5.1.2 Release Management

The NEACC utilizes a Release Management approach to bundle changes to existing applications and to ensure delivery of these changes safely into production environments. The Release Management approach seeks to minimize the frequency of large, disruptive changes while providing end users with a steady flow of incremental repairs and improvements that enhance their experience. Release content is based on Governance processes—as described in Section 1.2.1 of this document—that determine priorities of individual change items. The Release process also relies on Capacity Management processes—as described in Section 5.1.1 of this document—that determine the volume of work that can be performed in a given time period.

The Release Management approach must be flexible enough to seamlessly incorporate the increasing number of applications supported by the NEACC. This effort is often subjected to short implementation timeframes and limited resources; therefore communication across the various Lines of business and the delivery functions is fundamental to success. Implementation of a release across all components of the NEACC production landscape requires extensive collaboration and teamwork both internal to the NEACC as well as with the Agency stakeholders.

The Release Management team must demonstrate the following Knowledge, Skills and Attributes:

- Ability to ensure configuration controls are maintained
- Excellent communication skills and customer relationship management required
- Skill in planning and prioritization of work assignments.
- Skill in effectively managing day-to-day coordination activities
- Ability to apply technical knowledge to effectively plan and coordinate software releases

Release Management Duties

- Understand scope for a specific release, which involves understanding cross-project, cross-application, technical and external impacts, dependencies, and integration touch points and ensuring those are communicated and managed throughout the release
- Understand testing required for a specific release, both content of testing and test passes/durations required
- Understand the landscape requirements needed to support the overall release development and testing environments, including specific project requirements
- Determine how, and when, projects will enter the promote to production landscape, both development and testing environments
- Work with the Applications Technical Operations and Maintenance (ATOM) team to develop landscape infrastructure plan to support the release development, testing and deployment for appropriate applications, as well as any special rules of engagement or updates to NEACC support tools for the release
- Maintain NEACC Integrated Landscape view to specifying hardware, database & software patch levels, code base, integration touch points, and owners

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- Ensure the NEACC Integrated Landscape maintains its consistency, i.e., refreshes, migrations, transports, patches, and other technical configuration are propagated appropriately and timely throughout the integrated landscape
- For larger releases, develop and manage release cutover plan detailing specific tasks needed to support release and environment builds; Ensure cutover plan is used for each test pass and is consistent across test passes, replicating the production cutover as closely as possible
- Assist in developing contingency plans related to significant issues that could arise with the release
- Ensure project teams' project plans are synced up with overall release testing and cutover plans
- Coordinate and manage transports/build lists for the release to ensure only items related to the approved release scope are migrated to the release test environments
- Support CORE and MRB meetings and help to work any discrepancies or questions that arise from those meetings
- Work with ATOM team to understand upcoming build and maintenance activities to ensure those are timed appropriately around release development and testing plans
- Help to manage communications to NEACC teams about release plans
- Maintain NEACC backlog of items targeted for future release

For a detailed account of the current NEACC Release Management process, refer to the document "EAST Release and Deployment Management (RDM) Plan" located on the EAST 2 website at <https://www.nssc.nasa.gov/east2>.

5.1.3 Quality Assurance (QA)

Applications QA describes a set of reliable processes that form the underpinning of all Application Operations and Application Implementation services. The NEACC QA Program, which has sought to establish guidelines and procedures that cover all aspects of the Enterprise Application Lifecycle, is comprised of the following major service areas:

Solution Architecture

- Responsible for understanding and creating high level design of overall system.
- Responsible for ensuring overall pieces fit together cohesively (screens, interfaces, reports).
- Coordinates functional and technical resources assigned to that project.
- Supports project activities from "cradle to grave".

Business Analysis

- Clearly articulate and identify customer needs by gaining an in-depth understanding of business processes.
- Assist with solution development which addresses process and system gaps across existing functional communities.

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Agile Project Management / Scrum Process Support

- Maintain subject matter excellence in the practice of Scrum and Agile Project Management, including recruiting and retention of highly qualified Scrum Masters.
- Support Scrum teams where applicable with all aspects of the Scrum process, providing training where necessary.

Requirements Management

- Provide tools, framework, and systems management to support the collection, traceability, and testing coverage of business requirements.
- Provide audit support where required.
- Utilizes both RequisitePro and Quality Center for managing and tracking requirements

Functional Testing Support

- Provides resources to organize, track, and report testing results for each testing cycle.
- Assists the functional testing organization by loading test plans and providing testing metrics.
- Utilizes Quality Center as the NEACC Test Management tool

Automated Testing

- Provides software solutions and resources to assist in the creation and execution of automated test scripts in order to reduce the overall testing cycle both in time and level of effort.
- Provides support for on-going regression testing efforts using automated test scripts.
- Utilizes Quick Test Pro and Quality Center for automated scripts

QA Process Support

- Process and accept new documentation, update existing documentation, create new test plans in Quality Center, and update existing test plans in relation to SR's.

The ultimate goal of the QA program is to contribute to the delivery of application solutions that meet the needs of the business, are satisfying to the End-User, and are cost-effective to maintain. The NEACC has found that Agile-based Software Engineering and Project Management frameworks, such as Agile Scrum, can significantly contribute to improved application acceptance and quality levels. NPR 7120.7 supports the use of iterative, Agile project management frameworks (reference Section 2.5.6.3 of NPR 7120.7). The QA team has taken on a leading role in promoting the use of Scrum. Many of the EAST QA team members have completed Certified Scrum Master training, and the QA team generally provides a dedicated Scrum Master for every Scrum-based initiative.

Some key tenets of the Agile Scrum framework that are supported by the QA team include:

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- Iterative, time-boxed approach that emphasizes the delivery of completed application features in smaller releases
- Designation of a dedicated, knowledgeable Product Owner to own, prioritize, and manage business requirements
- Use of small, cross-functional, self-managed teams
- Emphasis on early identification of all obstacles to progress and concentrated effort to remove obstacles
- Frequent, formal mechanisms for demonstrating completed application features to users and stakeholders and for collecting feedback
- Capturing requirements as user stories
- Applying Agile estimating techniques, such as story points
- Use of retrospectives and other mechanisms to facilitate continuous improvement of team performance

The NEACC has achieved quantifiable successes utilizing the Agile Scrum approach. Areas where improvements are still sought, and where the QA team can contribute, include:

- Increased usage of automated testing
- Greater shift towards test-driven development practices
- Improved techniques and tools for managing User Story-based requirements
- Improved Product Backlog management

The QA team has also been responsible for documenting quality-related processes, including Requirements Management procedures, Test Management procedures, and documentation standards.

Requirements Management

The NEACC has gone through a continuous process of evolution in its Requirements Management processes. Requirements for the original Core Financial project were maintained in a custom-built Lotus Notes Requirements Management tool. Following the implementation of Core Financial, requirements were re-validated and housed in conjunction with Use Case documents in RequisitePro. The NEACC now uses Hewlett Packard Quality Center as the central repository of application requirements. Typically, each application and / or project is comprised of a hierarchical set of requirement levels. All requirement levels are stored and linked in Quality Center. The lowest levels of requirement are also linked to test scripts.

Historical use case documentation, along with associated requirements, is stored within a document repository.

Test Management

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The NEACC Test Management tool has become a central component within the overall Change Management and Release Management processes utilized within the NEACC. The NEACC uses Hewlett Packard Quality Center as its central Test Management tool.

Quality Center has been in use at the NEACC since 2004 and houses a large amount of data, both current and historical, in the form of requirements, manual test plans and test sets, test execution results and defects. Though attempts have been undertaken to convert many of the core manual test plans to automated test script using Quick TestPro , the majority of functional, integration, and regression testing continues to be performed manually using test manual test plans. In today's world, functional tests are executed by NASA Business Process Support (BPS) team members as well as by EAST Application Functional Support personnel. Specific aspects of testing, such as validating Funds Management and Special General Ledger postings, remain the responsibility of NASA's BPS team.

All of NEACC's Lines of Business have been incorporated into one large Production Project within Quality Center (QC), which houses all requirements, test plans, and test sets required to support all levels of testing for productive systems. A number of custom attributes have been added to various components of the project to facilitate reporting.

Documentation Standards

As with Requirements Management, the NEACC has evolved the processes and procedures used for capturing and storing application design documentation. In earlier days, requirements and business rules were written in functional specifications, which were stored within Lotus Notes or some other repository. When RequisitePro was introduced to the NEACC, functional requirements were captured in the form of use cases, which marked and housed in RequisitePro. With the transition toward Agile processes, functional requirements are now typically captured in the form of user stories. Requirements are not marked within user stories. Instead, Agile teams, assisted by their supporting Business Analysts, create detailed test scripts to cover all requirements and business rules needed to support the user stories. The finalized test scripts become the enduring artifact that ensures requirements are understood and met.

5.1.4 Solution Design

Solution Design consists of the processes and skills required to construct integrated solutions that satisfy business requirements within technical constraints. Currently, there is no separate team or group that performs the Solution Design function. Instead, this critical function—currently referred to as Solution Architect role—is typically performed by Senior Business Analysts from the Quality Assurance team or by Solution Architects from the Application Development area.

The Solution Architect has comprehensive understanding of software designs and solutions, combined with the skill and experience needed to help customers articulate their requirements. The Solution Architect typically creates the initial User Stories on which the software design is based, and they assist the team through its first iterations to continually refine their understanding of the customer requirements and zero in on the optimal solution.

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The Solution Design role, although only recently defined as a separate function, has proven to be an extremely critical component of a successful software development effort.

5.1.5 Configuration Management

Configuration Management consists of a set of processes and tools for identifying, controlling, maintaining, and verifying the versions of all configurable platform, system, and application components. Configuration Management represents an area of opportunity as it relates to integration points with other contracts to streamline and enhance services. Currently, the NEACC uses the JIRA system to request changes to configuration of NEACC platforms and systems managed by MITS.

5.1.6 Business Readiness (BR)

The NEACC currently has a BR organization that is aligned with the NEACC's Project Management Office (IS01). The BR Manager is responsible for management and oversight of all activities in the area of BR, which includes customer relationship management, strategic and operational communications, end user documentation and support, and the administration of the supporting tools for those activities. The BR Manager is the functional owner of the bReady Portal.

The BR Approach Document describes the process and tools with which the NEACC analyzes the end user impacts of any changes implemented to applications and access. The tools are a set of matrices which help to identify impacts, assess their level of severity, and determine the appropriate mitigating actions. A data dictionary accompanies the matrices to ensure consistent understanding and application.

The BR team supports all NEACC Lines of Business and is responsible for leading the annual updates to the document and tools.

The application of the BR Approach entails the analysis of impacts of all monthly and semi-annual NEACC releases, including any projects within those releases. The analysis begins with a description of impacts by the functional or technical team primarily responsible for area being changed. The BR team ensures that all applicable SRs in a release (i.e., those with end-user impacts) have such an impact description attached. The BR team performs the impact analysis using the BR Approach tools in interviews with the functional and technical teams involved. The BR team ensures the timely execution (by the BR team and/or Centers as appropriate) of mitigation activities indicated by the analysis, packages the impact descriptions for review with the NASA business community, hosts the reviews, and ensures the review materials are distributed via email and made available via the bReady Portal. For semi-annual releases, the impacts are then prioritized according to the number of users impacted and the extent to which

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their jobs or processes are changing, and core messages are developed and distributed across the NASA business community and to senior Agency management.

As change requests are processed through Remedy, the BR team provides assessments of the effort required to update or create end user documentation. The execution of that work may be entirely the responsibility of the BR team or may be done jointly with the functional or technical teams. In some areas, the BR team has attained a level of subject matter expertise through project or scrum efforts to enable them to handle most of the documentation. It is management's expectation that the BR team will continue to grow its expertise in all lines of business supported to enable this level of support. For that reason, a BR team member is assigned at least on a part-time basis to each project/scrum/initiative. The BR team member may function as a scrum master and/or tester in order to add value to the effort while gaining the necessary expertise, as well as continually assessing and communicating the BR impacts and developing end user documentation.

The tools utilized in end user documentation creation and management are the Enterprise Performance Support System (EPSS), the System for Administration, Training, and Educational Resources for NASA (SATERN) system (maintained by the NSSC), and various training development tools such as Adobe. The BR team members are expected to be expert at maintenance and use of these tools and systems. In EPSS, the team creates and maintains the structure and organization of End User Procedures (EUPs) and Job Aids (JAs), packages new and updated documents for weekly releases, validates the results, and ensures that the content is consistent and complete. In SATERN, the team manages the IEMP discipline which houses the Competency Center's curriculum of training materials, both web-based and instructor-led. The team develops, edits and publishes those courses and makes them available to Centers.

Service requests related to the bReady Portal (for content, master data, access and management of collaboration rooms) and EPSS (structure management) are the responsibility of the BR team. In addition, any updates or upgrades to those systems require work from the BR team in defining requirements, assisting in design, testing, and providing end user support and communication. Business Readiness work is tracked and documented in the Remedy system.

In order to provide consistency and ensure completeness of communications, the BR team may organize and/or lead Operational Support telecons, IT Point of Contact telecons, Business Readiness Network telecons, test readiness reviews and decisional checkpoints for releases. The NASA Business Readiness lead or designee reviews/approves all service level messages.

Other duties performed by the BR team include risk management, schedule management, performance reporting, measurement of customer satisfaction, and organizational change management (within the NEACC).

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5.1.7 MSFC Change Request

Change requests (CRs) are created in MISM and routed to a triage team to determine the validity and criteria associated with the CR. Based on the assessment, the CR follows the appropriate governance and gets communicated back to the customer by way of the Customer Relationship Manager (CRM). The CR is then re-validated against the requirements prior to its disposition. The disposition of the CR will determine if it's approved for action and deployment or rejected for further research and consideration.

Specifically for CMO funded CRs, the Center has established an Applications Working Group as a subordinate body to the IT Strategy and Investment Board. This group has the responsibility to capture, analyze, and prioritize change requests in a manner that will enable strategic and efficient use of resources. The group should also seek to minimize duplication, risk, and cost while maximizing mission alignment and conformance with Federal, Agency, and Center enterprise architecture.

Center organizations and their representatives submit change request packages to the AWG who, in turn, review the technical and business requirements of the request. This includes evaluating for completeness, mission suitability, value, benefit, risk, and cost. With this evaluation, the AWG can identify and document unique development support requirements, inter-relationships among previous request, prioritize all requests, and work with the customer/organization through a delivery schedule.

Customer funded (non-CMO) CRs are typically not reviewed by the AWG but are managed by MPR 2800.2, *MSFC Information Technology Services* and negotiated for customer requirements and center architecture alignment.

For additional details of the MSFC Change Request Process flow, refer to document "MSFC Change Request Process" located on the EAST 2 website <https://www.nssc.nasa.gov/east2>.

Though the scope of the EAST 2 contract is expanding to include support for Center applications, NASA's vision is to have a unified change request process across all Lines of Business.

5.2 Application Functional Support

Application Functional Support (AFS) personnel play a critical role in supporting the business processes and applications offered to the customers of the NEACC. Unlike the other Delivery Function roles, AFS is both internal-facing as well as customer-facing. In order to provide both internal and customer-facing services effectively, the Contractor must ensure that skilled, knowledgeable AFS team members are available to support all NEACC Lines of Business. AFS personnel must retain a deep understanding of NASA business processes and customer requirements. Coupled with this knowledge of how NASA does business, the AFS team members must understand the inner workings and process flows of the applications within their Line of Business. Team members must demonstrate system expertise for any issue arising

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internal to their business processes; as well as the ability to research, test and draw educated conclusions about the cause of a particular issue.

AFS input is required for virtually every service performed by the NEACC. All incidents involving NEACC applications require an assessment by the AFS team to determine functional impacts and appropriate courses of action. Any contemplated change or enhancement to an application must start with a review by the AFS team to assess impacts and feasibility. The AFS team must be structured and staffed in a manner that provides for effective, seamless coverage across Lines of Business. The AFS team must work proactively to maintain all NEACC applications at an optimum working level, to anticipate customer needs, and to ensure that service levels are met.

AFS personnel must collaborate closely with the NASA BPS counterparts, and must understand and follow the processes outlined in **DRD MA-006**, *NEACC Operational Model*.

All members of the team are responsible for the following customer service tasks:

- Coordination with other Delivery Functions to ensure effective team work on providing customer support
- Ensure that software/system checkouts are performed following periodic hardware and application software maintenance are conducted
- Log service requests with I³P towers, third party vendors and/or other external sources as necessary to research application issues
- Monitor performance of all NEACC applications and take corrective action when degradation is observed
- Execute Incident and Problem Management processes to evaluate and resolve service requests, to include Master Data, Break-Fix, Enhancements, etc.
- Compile and deliver statistics to support Performance Measurement reporting
- Review and ensure Job Aids/End User Procedures are up to date and posted to Enterprise Performance Support System (EPSS)
- Evaluate and complete user submitted service requests, per **DRD MA-006**, *NEACC Operational Model*, consulting Business Process Support (BPS) team to ensure adherence to agency design
- Support end user forums to provide updates on recently implemented and planned changes to the super user community and center business process leads
- Maintain the application specific HELP function
- Keep current end user training materials
 - Hands on training
 - Web based training

All members of the team are responsible for the following development, testing and validation tasks:

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- Participate in solution design and requirements discussions
- Support execution of an effective Capacity Plan
- All team members are also responsible for the testing and validations of all changes to any code before it goes into production.
- All systems changes/updates whether enhancements, break fixes or change request are thoroughly tested and validated prior to being released into Production, according to the **DRD MA-006**, *NEACC Operational Model*
- Responsible for the creation and updating of the test plans used in testing.

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5.3 Application Development

The NEACC depends on a staff of application development resources, leveraging a broad range of programming and Software Engineering skills, to maintain the NEACC applications and supporting platforms at the required levels. Application development is a critical service offered by the NEACC and includes work in areas of Applications Maintenance, Applications Enhancement, and Applications Implementation.

5.3.1 Supported Languages and Platforms

Supported programming languages and platforms include:

- Advanced Business Application Programming (ABAP): SAP's proprietary programming language
 - Classic ABAP
 - ABAP Object Oriented
 - SAP Workflow
- Web & ESB
 - Java
 - J2EE
 - JBI
 - Jco – A Java to SAP Connector
 - Flex, BlazeDC, ActionScript
 - Python
 - Visual Basic
 - .NET
 - Web Services
 - XML, XSLT, XSD
 - Perl
 - ColdFusion / Railo
- Business Intelligence
 - SAP Business Warehouse
 - Business Objects (BOBJ)
 - Cognos

As the NEACC application scope is continuously evolving, the above list should not be considered comprehensive.

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5.3.2 Software Engineering Practices**5.3.2.1 NEACC Software Engineering Practices**

Software Engineering practices leveraged by the Application Development teams include Agile Scrum and aspects of Extreme Programming (XP).

Application developers perform all activities required to deliver a functioning software component: understanding and validating requirements, designing and building components, executing thorough testing, recording and resolving defects, and packaging components into releases. The NEACC strongly encourages close collaboration between Application Developers and team members from other Delivery Function disciplines. Application Developers, for example, work hand in hand with Application Functional Support team members to understand and refine requirements and create and execute test scripts. Application Developers also work closely with members of the Integration Management team to ensure that processes are followed and to integrate delivered components into the overall Release Plan.

The NEACC also strongly encourages iterative development practices that provide the following key benefits:

- Commitment and focus of a cohesive, cross-functional team
- Frequent interaction with Application Functional Support team, users, and stakeholders to validate requirements and deliverables
- Continuous testing, with emphasis on automated testing, to ensure work quality throughout the development cycle

5.3.2.2 MSFC Center Applications and Web Services

Application services support is provided to meet Center and specific customer requirements and includes definition and specification, requirements analysis and feasibility studies, design and development, testing and integration, installation and deployment, configuration management, user assistance and training, documentation, ongoing maintenance (repairs and upgrades), and replacement or retirement.

In conjunction with the OCIO, the contractor utilizes discipline and tried methodologies to manage software development and maintenance activities. Primarily, the contractor uses a Software Engineering Framework (SEF) to address NASA requirements at the Federal, Agency, and Centers levels.

The SEF is a model consisting of tools, methods, and practices used to define a process that produces a software product. The objectives of SEF and its processes are to produce products (applications or system software) according to established requirements while simultaneously improving Marshall Space Flight Center's capability to produce better software products.

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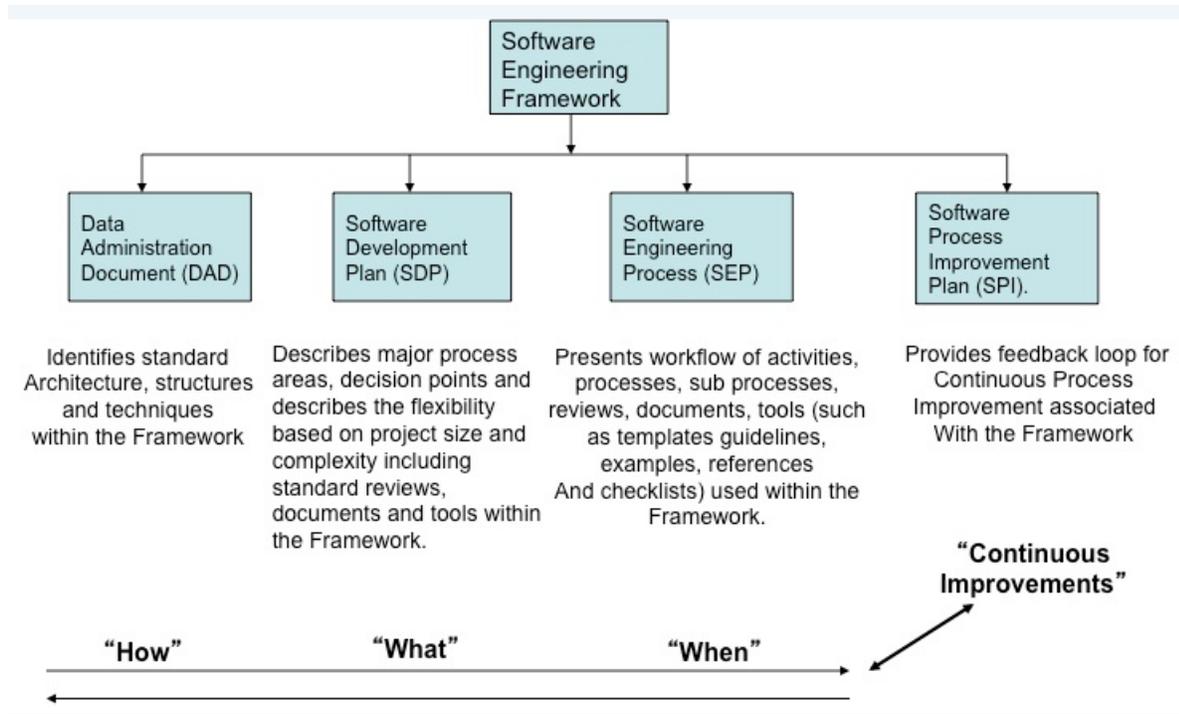


Figure 5.2 – SEF Model

The SEF supports all software tasks and has the flexibility to accommodate special requests or circumstances, expedited projects, or waivers. SEF governance encompasses the following reviews that tied to the SEF software development lifecycle (SDLC):

- MSFC Enterprise Architecture Advisory Committee (MEAAC): chartered to direct, oversee, and approve the MSFC enterprise architecture design and operating configurations that affect MSFC IT investments in the IT Application, and IT Infrastructure Services portfolios
- System Requirements Reviews (SRR) – review and approve requirements
- Preliminary Design Reviews (PDR) – review and approve initial designs
- Critical Design Reviews (CDR) – review and approve final designs
- Test Readiness Reviews (TRR) – System readiness reviews and approval prior to release to user testing
- MSFC Operational Readiness Reviews (MORR) – review and approval to release to production

The SDP/SEP can be used for ongoing maintenance (repairs and upgrades), new development, integration, as well as maintenance. The SDP/SEP provide clear instruction to the IT staff throughout the application development lifecycle. The SEF aligns the application development lifecycle with NPR 7120 and agile methodologies (see Figure 5.3). This includes development and sustaining application support, including evaluation, definition and specification, requirements analysis, feasibility studies, design and development, configuration management,

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user assistance/training, guides, project scheduling, installation, integration, testing, as well as all required reviews. If the requirements for a project leave no options but to deviate from the approved standard architecture, a waiver to the process may be granted. The SDP/SEP includes guidelines for software release that include maintaining application and web portfolio information.

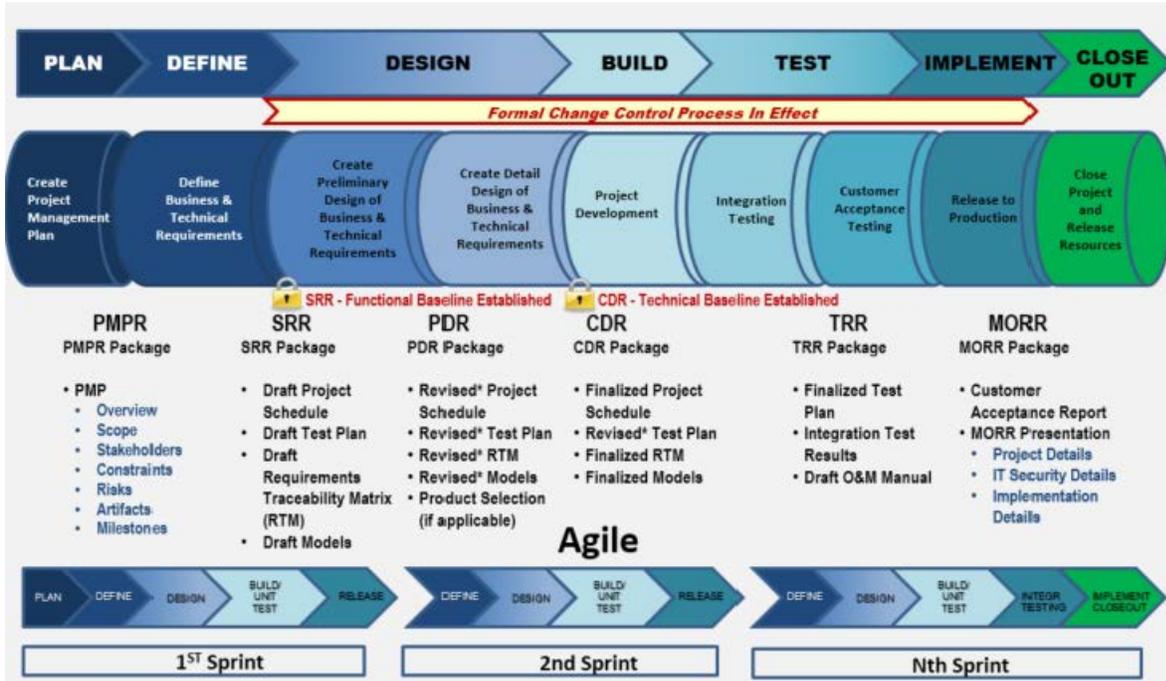


Figure 5.3 – MSFC Application Development Lifecycle

5.3.3 Web Application Development

Over the course of the NEACC’s evolution, the industry trend in Business Applications has shifted gradually from Client/Server, Graphical User Interface (GUI) based systems to light-weight Web Applications that mimic the friendly look-and-feel of Internet Applications. In keeping with this shift, the NEACC has expanded its delivery capabilities in the areas of Web Application Design and Development and offers services comprised of the following general categories:

- Rich Internet Application (RIA) Development (Portlets or Standalone)
 - Web applications that behave like traditional desktop applications
 - Web enablement of traditional desktop functionality
 - Graphical Reporting Dashboards

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- Composite Application Development (Portlets or Standalone)
 - Delivers a single access method to business processes that span multiple disparate applications
 - Simplifies complex processes
 - Simplifies security access/role management

- Mini-Application Development (Portlets or Standalone)
 - Serves up specific transactions or functionality from SAP or other complex UI systems
 - Simplifies complicated SAP functionality
 - Suited for casual SAP users

- Web Application Hosting
 - Supports all open source platforms (Java, Ruby, PHP, Perl, Python, Flex, etc.)
 - Centralized migration/deployment toolset, administration, configuration
 - Standardized application auditing/logging
 - Common user authentication/authorization via NASA ED LDAP, eAuth

The following general principles guide the Web Application service delivery:

- Java Based Implementation (OS Isolation (JVM), Open Source Libraries, Work Pool)
- Open Standards (REST, J2EE Servlet/ Java Server Pages (JSP))
- Open Source
- System Failure Isolation
- Lightweight (Runs In Java Servlet Container (Tomcat))

The following diagram depicts the Web Application logical layers, which are:

- Client Platform - Platform that the client Web Application runs on
- Business Logic - Contains all the business logic for the application, coordinates with the data access layer to retrieve and store information in the data store, and accesses the common platform libraries for executing reusable logic
- Data Access - Provides ORM (Object to Relational Mapping) access the backend data stores
- Common Platform Libraries – Contains the common reusable logic

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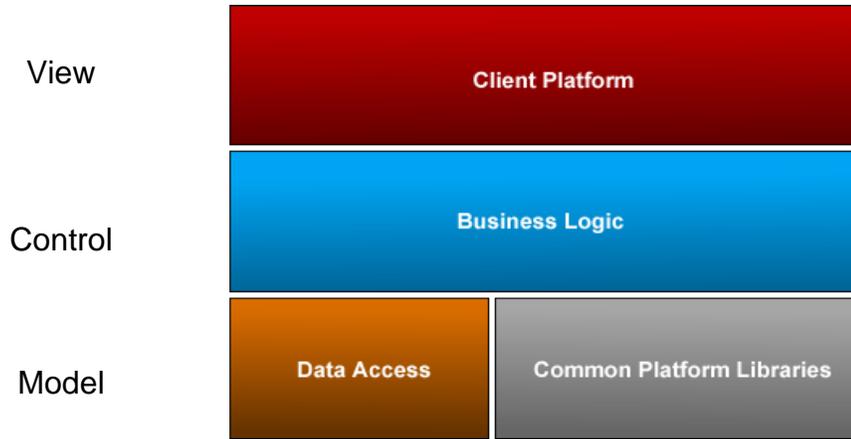


Figure 5.4 – Web Application logical layers

The following diagram depicts the Application stack load balanced/web broker architecture:

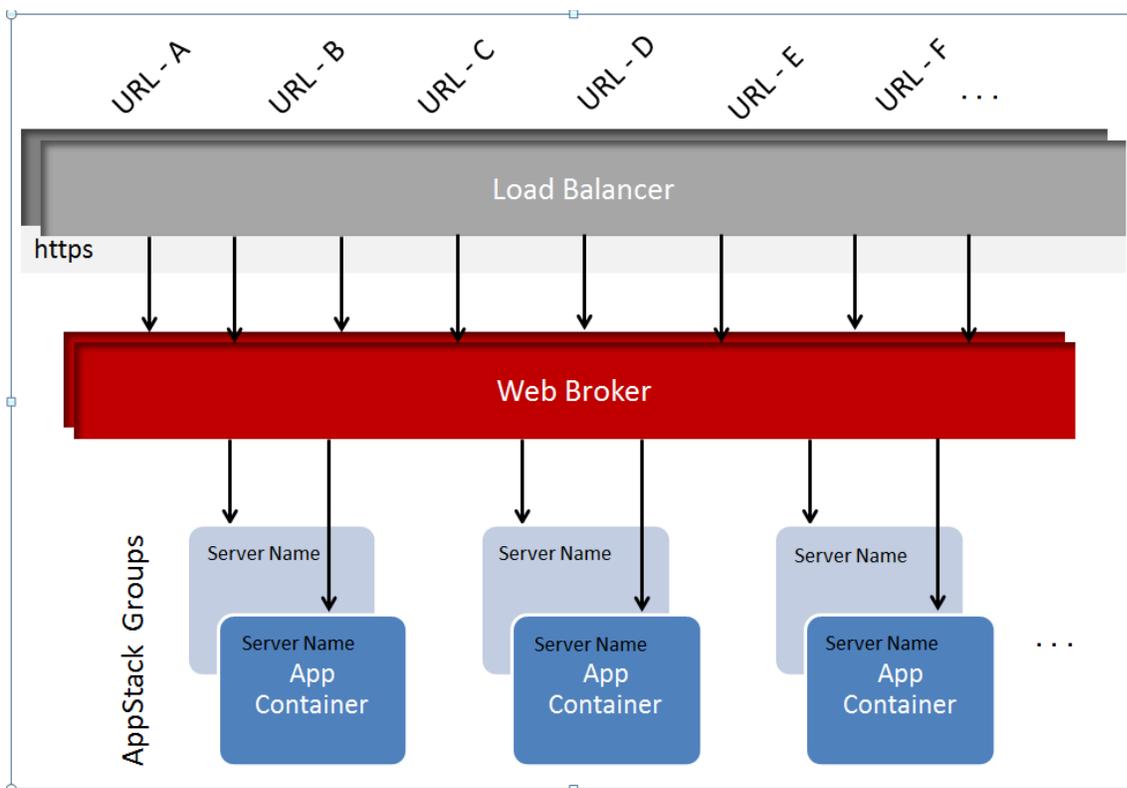


Figure 5.5 - Application stack load balanced/web broker architecture

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The following diagram depicts the Application stack simplified container architecture:

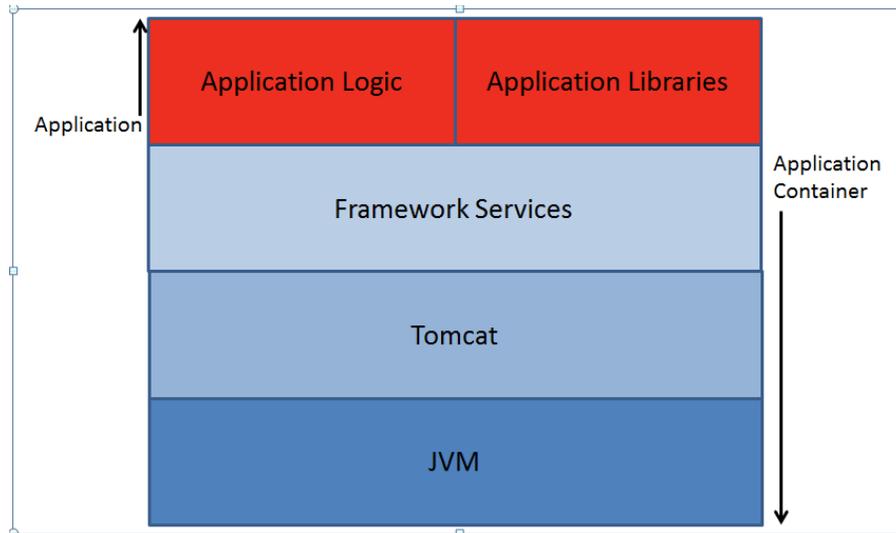


Figure 5.6 - Application stack simplified container architecture

Examples of recently delivered Web Applications include the following:

- Disposal - an application used by NASA Logistics teams to execute the complex disposal process for NASA Government equipment
 - Disposal utilizes a custom-designed Oracle schema that resides within the SAP database
 - Disposal interfaces with the federal Government Services Administration (GSA)
- Equipment – Equipment system available to all NASA and contractor personnel to view equipment inventories and assignments and to make minor updates to equipment profiles, such as location or ownership
 - Equipment provides a friendly frontend to data and functionality that resides within the SAP system
 - Equipment does not have its own data store, but rather interfaces back to the standard SAP data sources

5.3.4 Web and ESB Developer Skills

To successfully accomplish their work, developers leverage an ability to:

- Understand objected-oriented programming (encapsulation, polymorphism, data structures, etc.)
- Understand principles of thread programming
- Design and implement reusable framework libraries and components
- Gather, compile, and construct a presentable quality Interface Development Agreements and High Level Design documentation

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- Develop integrated process utilizing the XSLT Engine
- Develop integrated process utilizing the Rules Engine
- Develop integrated process utilizing the Scripting Engine
- Design and implement enterprise level business service client interfaces (CIPS)
- Design and implement reusable business service objects (components / assemblies)
- Develop integrated process utilizing the SAP Inbound / Outbound Components
- Develop integrated process utilizing the DB Inbound / Outbound Components
- Develop integrated process utilizing the Rule Engine Component
- Develop integrated process utilizing the SQL Engine Component
- Develop integrated process utilizing the LDAP Inbound / Outbound Components
- Develop integrated process utilizing the BW Inbound / Outbound Components
- Design and implement enterprise level ETL integrations separating connection logic from the business logic
- Design and implement stand-alone web applications
- Design and implement platform independent Portlets

Attachment L-B - Background and Historical

5.3.5 SAP Advanced Business Application Programming (ABAP)

Since the advent of the IEM Program, many NASA-specific enhancements and customizations have been incorporated into the standard SAP product suite. The following table provides a recent high-level view of the total number of custom ABAP objects. RICEF stands for: Reports, Interfaces, Conversions, Enhancements, and Forms.

Category	Current Count
Number of Reports:	189
Number of Interfaces:	55
Number of Conversions:	34
Number of Extensions:	124
Number of Forms:	40
TOTAL RICEF Objects:	442
Number of Mobile Applications:	1
Number of Report Painters:	53
Number of Others:	311
Number of Workflows:	37
Number of Objects from OSS Notes:	63
Number of Local Objects:	14
TOTAL Objects:	921

Table 5.1 – Custom ABAP Objects

For additional details of custom SAP Objects, refer to document “ABAP Custom RICEF Objects” located on the EAST 2 website <https://www.nssc.nasa.gov/east2>.

The standards and procedures utilized within the NEACC for SAP custom development have matured over the year. The NEACC has refrained from modifications to core code, instead leveraging customer exit or customer enhancement technologies. Where appropriate, developers make use of ABAP Object Oriented technologies and work to maximize component reuse.

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The NEACC has not adopted SAP's Web-enabling technologies (ABAP Webdynpro, Java Webdynpro). Instead, the NEACC has chosen to use Open Source Web technologies to provide friendly front-end alternatives to underlying SAP transactions.

5.3.6 508 Compliance

5.3.6.1 Background for 508 Compliance

“In 1998, Congress amended the Rehabilitation Act of 1973 to require Federal agencies to make their electronic and information technology (EIT) accessible to people with disabilities. Inaccessible technology interferes with an ability to obtain and use information quickly and easily. Section 508 was enacted to eliminate barriers in information technology, open new opportunities for people with disabilities, and encourage development of technologies that will help achieve these goals. The law applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508 (29 U.S.C. §794 d), agencies must give disabled employees and members of the public access to information that is comparable to access available to others.” (Ref: <http://www.section508.gov/section508-laws>)

In accordance with the intent of Section 508 of the Rehabilitation Act as stated above, the MSFC CIO has documented an official 508 compliance policy for all NEACC software accessible to end-users.

5.3.6.2 MSFC/NEACC 508 Compliance - Policy

The MSFC NEACC 508 compliance goal is two-fold: 1) to develop and provide fully accessible applications for NEACC end-user communities, and 2) to achieve full Section 508 compliance for all NEACC custom-developed applications.

In addition to the NEACC 508 Policy & Approach (11/9/2012), the CIO also compiled an initial inventory of existing NEACC/Agency/Public applications for the first wave of 508 compliance testing, and is currently in the process of performing this QA testing on the applications listed in the inventory matrix. The ultimate goal is to assure 508 compliance testing of all NEACC applications (web or mobile), whether developed or procured, and to firmly establish 508 testing as part of the standard process related to all software procurement, design, development, and modification.

5.3.6.3 Governing Documentation

- Section 508 of the Rehabilitation Act (29 U.S.C. §794 d)
- NEACC 508 Policy & Approach

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5.3.6.4 NEACC Process – Incorporation of 508 Testing during Development

NEACC software is developed using the following phased approach:

- Phase 0 – Requirements Gathering
- Phase 1 – Mock-ups: User Interaction and Layout
- Phase 2 – Prototypes: Look and Feel
- Phase 3 – Development
- Phase 4 - Testing

Early 508 functionality testing is incorporated at the following points:

- Phase 2/Prototyping – 508 Reader Review. Identify functions in each Sprint cycle to review with a Job Access with Speech (JAWS) screen reader to insure the prototype is on track for 508 reader interaction.
 - The NEACC has defined a Reader Validation Checklist to be used during this phase
 - The Reader Review utilizes a screen reader (e.g., JAWS) for analysis.
 - Reader Review recommendations are provided to NASA to determine the next steps. Defect Prioritization and Remediation are folded into the process.
- Phase 3/Development – Developers perform internal/unit test for 508 compliance, using JAWS or the WAVE tool
- Phase 4/Testing – Perform 508 Validation with the WAVE tool. All functional test plans include a WAVE Validation step for the related UI. 508 defects uncovered by WAVE are recorded in Quality Center, and an email sent to the NEACC 508 Coordinator for appropriate action.

5.3.6.5 QA Process - 508 Compliance Testing

In addition to the 508 testing and validation performed during the Prototyping, Development, and Testing phases of NEACC software, separate QA testing is performed independent of the development teams, and currently uses the following tools for web based analysis:

- WAVE
- Total Validator Pro
- JAWS screen reader (optional Window Eyes screen reader)
- SortSite

Mobile apps developed in the NEACC are also tested while under development and before rollout on iOS and Android platforms, and utilize the native tools provided on each platform:

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- iPhone, iPad – VoiceOver
- Android - TalkBack

For the MSFC web environment, the Compliance and Usability Peer Review (CUPr) provides governance and ensures that the MSFC web environments comply with Federal laws, Agency directives, and Center policies. This includes, but is not limited to requirements of Section 508 of the Rehabilitation Act of 1973. The review functions as a final internal technical review prior to presenting the project for MORR.

MSFC uses similar processes and tools for the incorporation of 508 during development and quality assurance testing for the MSFC applications.

5.4 Applications Technical Operations & Maintenance (ATOM)

The NEACC Applications Technical Operations and Maintenance (ATOM) Team is responsible for operating and maintaining the NEACC applications (with the exception of the PLM applications). Within ATOM, Application Administration is provided by the Application Operation Maintenance (AOM), DevOps, and Basis teams, while Database Administration is provided by the Database Administration (DBA) team. ATOM also includes Architecture/Engineering. ATOM represents a broad set of technical services that provide the underpinning for all work performed in PWS Section 3.0. The NEACC relies on the NEACC Computing Services (NCS) team, managed under the Marshall Information Technology Services (MITS) contract for all compute services. As part of the ATOM domain, the current EAST team provides a broad range of application solution services that can be described as Design, Acquire, Build, and Operate:

The NEACC will rely on other service entities to provision elements of infrastructure services. Most significantly, this will include NEACC consumption of computing, and storage services provisioned by MITS.

The MITS Contractor provides full operational responsibility for all NEACC computing storage infrastructures. MITS and NICS provide full operational responsibility for data center networking and business continuity infrastructure. Therefore, all NEACC computing hardware, computing operating systems, storage hardware, storage operating systems, associated support infrastructure and maintenance and licensing for all the aforementioned are managed by MITS.

JIRA workflows are used in conjunction with other systems (e.g., Remedy) to facilitate a variety of cross-contract activities/tasks. Specifically, the following NCS workflows are used: NCS Build Request, NCS Infrastructure Decommission Request, NCS Password Reset Request, NCS Service Account Provisioning Request, NCS TAG Request, and NEACC System Decommission Request.

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NEACC Systems Summary

The NEACC consumes compute, storage, backup and infrastructure services from Marshall Information Technology Services (MITS) contract vehicle. This contract vehicle handles all of the infrastructure design, acquisition, build and operational support for Operating Systems and Data Center facility requirements.

Approximately eighty five percent of the NEACC applications run on commodity infrastructure in a purely virtualized environment. The NEACC suite of applications run on Windows and Redhat Enterprise Linux (RHEL). There is a very small Solaris Unix footprint that is being phased out in favor of RHEL. The NEACC databases run on MS SQL, MySQL and Oracle on virtualized OS's of Windows or RHEL.

The NEACC primarily uses EMC and NetApp for storage. The NEACC relies on infrastructure support provided by the MITS contract to manage this infrastructure.

The NEACC depends on the NICS Data Center Network Service (DCNSS) to manage all network activities. The NEACC uses the NDC private and public network. DCNSS manages the security perimeter (firewall and VPN) for NEACC network access.

The NEACC primarily relies on virtual tape backup/library (VTL) for business continuity protection. NEACC Production systems are backed up to VTL in the event of a limited hardware/software failure, the VTL are replicated offsite to KSC to another VTL at the NEACC DR site. Production instances may be recovered to any point in time. Production systems are asynchronously replicated to the NEACC DR site located at KSC using EMC Recover Point for the application suite and MS SQL and MySQL. Oracle databases are replicated using Oracle DataGuard to the NEACC DR site located at KSC. Should a disaster require systems to be recovered at an alternate data center site, there is a goal of 24 hours to complete an integrated recovery of centralized NEACC application components.

- Design
 - System requirements management
 - New technology integration (insertion of new technology)
 - Awareness of NASA Enterprise Architecture
 - Awareness of NEACC Enterprise Architecture
 - Formal work product creation, review and maintenance
- Acquire
 - Development of Rough order of magnitude cost estimates
 - Development of acquisition strategy options and recommendations

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- Development of purchase requests and associated documentation
- Support the procuring organization
- Build
 - Execute hands-on system builds
 - Execute integrated testing of system components within the NEACC testing strategy and tool-sets
 - Manage and ensure transition to operations for all technology elements
- Operate
 - Event Management
 - Problem Management
 - System Monitoring
 - Configuration Management
 - System Maintenance (patches, upgrades, enhancements)
 - Performance Management

Solution Service	Solution Service Components	EAST Application Support (DABO)	MITS/NCS Linux/Windows/UNIX/Storage Ops
Design	<ul style="list-style-type: none"> • Solution design • System requirements management • New technology integration • Enterprise Architecture (EA) awareness • Formal work product creation, review and maintenance 	Application	System (O/S and Storage O/S and below)
Acquire	<ul style="list-style-type: none"> • Develop ROM estimates • Manage the acquisition of services and products from vendors and service providers • License management 	Application	System (O/S and Storage O/S and below)
Build	<ul style="list-style-type: none"> • Execute hands-on system builds • Execute integrated testing of system components within the NEACC testing strategy and tool-sets • Manage and ensure transition to operations for all technology elements 	Application	System (O/S and Storage O/S and below)
Operate	<ul style="list-style-type: none"> • Continuous Monitoring • Event Management • Business Continuity Design, Testing and Operations • Performance Management • Configuration Management • Maintenance (upgrades, patches) 	Application	System (O/S and Storage O/S and below)

From a skills perspective, the ATOM core competencies are centered around three areas:

- Solution Architect/Engineer
 - Manages all elements of solution design from an IT environment perspective
 - Includes Level 3 problem resolution
- Application Operations (AOM, DevOps, and Basis Teams)

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- Manages all hands-on build and configuration work for application components.
- Manages all elements of application monitoring and event management
- Database Administration (DBA Team)
 - Manages all hands-on database system build and configuration
 - Manages all elements of database system monitoring and event management

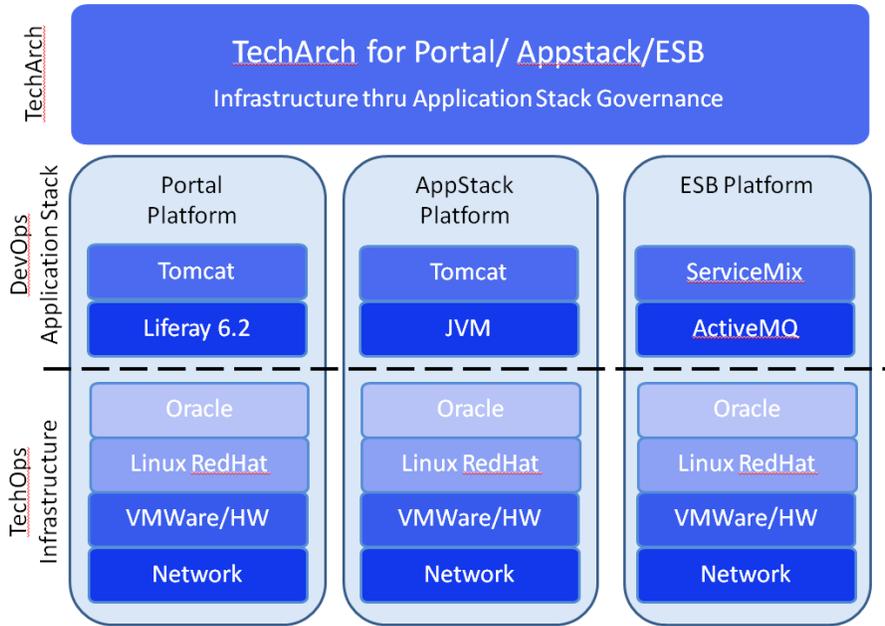


Figure 5.7 - DevOps and TechOps

Application Operations

The Application Operations within the NEACC is provided by AOM, DevOps, and Basis teams which are a part of the ATOM delivery area. Each of these teams provides operational support, including code migration/transports and application monitoring for the applications they support.

One primary area of responsibility for the ATOM team is to ensure that the integrity of any Test or Production environment is maintained. Based on Segregation of Duties (SOD) that NASA has defined, ATOM is responsible for making application changes as specified in approved service requests. Once migrations/transports are made to the Test environments, ATOM is responsible for supporting all testing activities. When issues arise, ATOM often takes the lead to resolve the issues from a technical perspective.

The ATOM team also monitors test jobs and production jobs based on the current event handling module employed by the NEACC. Once testing is complete and all approvals have been given, ATOM moves the migration/transport package to the next environment in the life cycle testing

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migration path as defined by Release Management (RM). ATOM is also responsible for making any approved configuration changes to any application environment other than Development.

The predominant NEACC tool for managing and monitoring automated "jobs" is BMC Control M. The NEACC uses the legacy tool "What's Up Gold" to provide application monitoring and Information Assurance (IA) uses "Tripwire" for application security monitoring. The SAP BASIS team utilizes SAP Solution Manager and a daily check list for SAP transaction monitoring as well. DevOps utilizes the Enterprise Service Manager (ESM) to monitor integrations. The ESM tool supports administrative functions for ESB component and registry operational maintenance.

It should be noted that the Application Operations team makes extensive use of custom, application-specific scripts to monitor the health of application processes as well. The successful offeror is free to design, implement and operate monitoring solutions they deem necessary to meet their service levels.

The JIRA application is used by each of these ATOM teams as well as other NEACC teams to track a variety of activities. Currently there are 4 primary types of workflows related to code migration/transport, which are Development Requests, Transport Migration Requests, BI Migration Requests, and Control M Requests. Additionally there are specific workflows for DevOps Support and Mobile app hosting/support.

ATOM Team	Jira Issue Type	Applicable Platform	Usage Example
BASIS	BI Migration Request	Business Objects (BOBJ) Cognos	Used by the ATOM – BASIS team for Cognos and BOBJ migrations to configuration controlled environments
AOM	Control-M Request	BMC	Primarily used by the ATOM – AOM team in support of BMC job requests
AOM	Development Request	Variety of Application Platforms	Used by the ATOM – AOM team in support of code migrations. Examples include the development for applications such as: WebTADS , eBudget , IdMAX
DevOps	Development Request	ESB Platform Application Stack Platform Liferay Portal Platform Mobile Application Platform	Used by the ATOM – DevOps team in support of code migrations. Examples include the development of an: ETL integration, ESB integration, web application, portlet , or mobile application
BASIS	Transport Requests	SAP SAP Business Warehouse	Used by the ATOM – BASIS team for SAP and SAPBW migrations to configuration controlled environments

DevOps Team

DevOps is the combination of the application operational support functions and development support functions under a single support team with distinct units to ensure controls and separation of duties. Over the course of the EAST contract term, the NEACC has successfully implemented a DevOps capability for the ESB Line of Business.

The NEACC Enterprise Portal applications and the supporting platforms (AppStack and Enterprise Service Bus (ESB)) are managed using a DevOps framework, as these three platforms are tightly integrated through the use of user facing and system facing services. Moving the

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Enterprise Portal, AppStack and ESB to the DevOps concept of operations resulted in real benefits to the NEACC. By transferring key operational support functions under a team with an in-depth knowledge of identified platforms and holding them accountable for achieving efficiencies, there was a reduction in the volume and response time required to address incidents occurring during or as a result of migrations, maintenance, and other activities assigned. The transfer of those key operational support functions reduced the workload of the Application Operations Management (AOM) Team, allowing that team to better focus on the key areas they support and for which they are held accountable. The DevOps concept of operations also aligned the portal administrator responsibilities within an area where it could benefit from stronger controls and separation of duties, ensuring optimum configuration, configuration control and documentation of changes.

The DevOps Software Configuration Management (SCM) team installs code updates to all ESB LOB platforms based upon an approved SR. A JIRA ticket is the migration workflow artifact and is associated with an approved SR. A JIRA ticket may consist of different issues.

This DevOps model has been successful and the NEACC will continue to look for opportunities to evolve the DevOps model where appropriate.

Basis

The Basis team provides Application operations support for SAP and BI systems. The Basis team is responsible for managing transports (e.g., code migrations, OSS notes), applying support packs and enhancement packs, monitoring the applications.

Application Operations Maintenance (AOM)

The Application Operations and Maintenance (AOM) team supports a number of NEACC applications from a technical and operational perspective. AOM is responsible for executing application upgrades or patches for the applications supported. AOM schedules most of the jobs outside of SAP utilizing Control M, an Enterprise Scheduler, and they are responsible for setting up all jobs in a distributed system.

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The following chart delineates the primary areas of responsibilities, including a few examples, of each ATOM subteam:

ATOM Team(s)	ATOM Areas of Responsibility	Examples
AOM BASIS <u>DevOps</u> DBA	Environment Management	<ul style="list-style-type: none"> • Non-production (Dev, Test, Staging) and Production Environment Management • Controlled Build Management
AOM BASIS <u>DevOps</u>	Code Installation/Migration	<ul style="list-style-type: none"> • Code Migration • Application Framework Configuration Management
AOM BASIS <u>DevOps</u>	Testing Support	
AOM BASIS <u>DevOps</u> DBA	Upgrades/Maintenance Applications	<ul style="list-style-type: none"> • Application Upgrades • Database Upgrades • Kernel Upgrades • Patching
AOM BASIS <u>DevOps</u> DBA Engineer DBA	Operational Maintenance	<ul style="list-style-type: none"> • Functional Checkout • Failover/Recovery Procedures • Refreshes • Startup/Shutdown • Application Monitoring and Performance Verification
	Database Management	<ul style="list-style-type: none"> • Database software installation • Refreshes • Startup/Shutdown • Failover Recovery Procedures • Monitoring
Solution Architect/Engineer	Architecture Design	<ul style="list-style-type: none"> • Solution design • Maintain architecture design and associated diagrams

Database Administration

DBA roles are increasingly identified by the databases, the processes they administer and the capabilities of the database management system (DBMS) in use.

Typical responsibilities include some or all of the following:

- Monitoring user access and security;
- Monitoring performance and managing parameters to provide fast query responses to front-end users;
- Mapping out the conceptual design for a planned database in outline;
- Considering both back-end organization of data and front-end accessibility for end-users;
- Refining the logical design so that it can be translated into a specific data model;
- Further refining the physical design to meet system storage requirements;
- Installing and testing new versions of the DBMS;
- Maintaining data standards, including adherence to the Data Protection Act;
- Writing database documentation, including data standards, procedures and definitions for the data dictionary (metadata);
- Controlling access permissions and privileges;
- Developing, managing and testing back-up and recovery plans;
- Ensuring that storage, archiving, back-up and recovery procedures are functioning correctly;

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- Capacity planning;
- Working closely with IT project managers, database programmers and multimedia programmers;
- Communicating regularly with technical, applications and operational staff to ensure database integrity and security.

The list of current NEACC and MSFC databases is depicted in Attachment **L-B1**, *Background & Historical Resource Baseline, Enterprise DBs tab and MSFC Managed DBs tab*.

5.5 Information Assurance

Within the governance, risk and compliance work area there are several overarching elements that ensure that the security program maintains a level of adherence to standards and regulations, as well as oversight through an internal auditing process. These activities include security plan management that governs the continuous monitoring of over 200 security controls; audit and internal audit support which conduct routine assessments of the adherence to security controls, standard operating procedures and work instructions; compliance reviews which conduct routine reviews of evolving guidance and their impacts on the overall NEACC security program; continuous diagnostics and mitigation monitoring activities to adhere to Federal guidelines and increase preventive solutions; and training and awareness which enhances the Agency security awareness with real-time, relevant security considerations for the NEACC.

One of the most important aspects of any security program is to manage change. Change to the personnel, change to the infrastructure, and change to service offerings all entail a key aspect of security through which we are challenged to ensure that the security program is ever vigilant and changing within itself. The security program must maintain a clear lifecycle management approach through which elements of change are supported with the proper security controls and improvements. The security program should clearly describe how change would be managed through various aspects of IT Management:

- Policy
 - Maintain awareness of current and emerging NASA IT security policies and directives
 - Develop and maintain applicable security planning work products
- Identity
 - Managed a consolidated, centralized account management capability within the NASA ICAM tool-set
- Security
 - Manage a business continuity program for the NEACC
- Audit
 - Support internal and external NEACC Audits

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Regarding audits, the NEACC IT Security Team is involved in both internal and external audits each year. Internal audits include those performed by the NEACC IT Security Team where we annually visit 3 to 4 Centers and review security processes and procedures around SAP and remote access. In addition, the Office of the Chief Information Officer (OCIO) includes NEACC systems in periodic system penetration testing. Externally, the NEACC IT Security Team supports 2 to 4 audits per year including the annual FISCAM (Federal Information Security Controls Audit Manual) audit which includes an extensive review of our IT Security processes and procedures and penetration testing of our financial systems; and the NASA Office of the Inspector General (OIG) FISMA (Federal Information Security Management Act) audit that checks a sample of internal and external systems for compliance with FISMA requirements. In addition, both the NASA IG and the GAO periodically include the NEACC in other audits. For example, the GAO recently reviewed an NEACC project (CBACS) as part of a congressionally mandated audit of NASA Information Security controls.

Access Management

The NEACC provides a level of access management into our systems/applications that includes several key elements – Authorization Management, User Management, as well as management of system/application controls. Additionally, through the oversight of a distributed access management workforce, the NEACC manages the entire lifecycle of user access management for the entire Agency.

The NASA Account Management System (NAMS) is built around Sun's "IDMax" platform. The NEACC uses NAMS as a workflow for account add, change, deletion workflow requests. The NEACC does not use any external tool to add, change, or delete application accounts. The application-specific code/capability is used to effect account changes. "EAuth" is an emerging ICAM capability that will ultimately "provision" NEACC application accounts, EAuth is currently in the planning and testing phase and anticipated to be active sometime after EAST 2 contract award.

Access Management Team

- Daily Responsibilities
 - Provide Account Administration support for the NEACC and 10 NASA centers
 - Provide De-Centralized Account Administration Management to all Center Security Administrators (CSA) covering 10 NASA Centers
 - Prepare and coordinate CSA access training for all new applications and new CSAs
 - Organize and support the Center Business Process Lead (CBPL)/ CSA summit
 - Address Security Inbox SAP Security related emails
 - Analyze service requests (SRs), Defects and Errors identified during testing
 - Analyzing and correcting complex SAP Security Issues
 - Support NASA as the Agency SAP Security Administrator including creation and maintenance of SAP roles and users, including Business Warehouse

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- Perform analysis and coordinate issue resolution in support of NASA audits
- Assess user access needs and resolve issues quickly
- Provide on-call support for response to critical issues
- Create and maintain custom authorization objects, program groups, and table groups to meet specific business requirements
- Create and maintain developer access, developer keys and user accounts in SAP Online Support System (OSS)
- Administer user master data including user accounts, groups, Parameter Identifiers (PIDs), and licensing
- Perform trace analysis, troubleshooting, and resolution of SAP authorization issues
- Utilize SAP and third-party scripting tools to automate and maintain users, create test accounts and scripts, and perform user and role administration
- Support application development projects
- Support System Integration Test (SIT) cycles and work related defects
- Review Service Requests for impacts to system account access
- Submit/monitor SRs to enhance NAMS Workflows
- Test SRs being completed in NAMS
- Review/complete NAMS requests for NEACC applications
- Assist NEACC users with submitting and tracking NAMS requests
- Provide guidance to application owners in the development of NAMS for their application
- Perform Account maintenance for existing IEMP application accounts
- Weekly Responsibilities
 - Chair weekly CSA Teleconference
 - Update Access Management Milestones in NASA Integrated Information Reporter (NIIR)
 - Provide Support to the Cross-Organizational Review (CORE)
 - Monitoring the Sensitive Roles Report every 2 weeks
 - Conduct Post processing after system refreshes
 - 24/7 on call security support
- Monthly Responsibilities
 - Reset all system passwords in the SAP/BW landscape every 60 days
- Annual Responsibilities
 - Support Access Management Document Review (30 documents)
 - Support NEACC Audit
 - Support NASA Fiscal Year-End activities
 - Support Access Management NASA site audit

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Security Architecture

- Perform application security analysis
- Support scrum activities
- Facilitate security involvement within application development projects
- Review project requirements
- Organize meetings with the appropriate stakeholders
- Apply the Security Development Life Cycle (SDLC) to all projects
- Ensure project deliverables are met within the project timeline
- Review High Level Design Documents for clarity and security controls
- Review Architecture Designs
- Security Manager alert review
- Update NIIR
- Provide status reports on all security requirements
- Perform Positive and Negative testing on all security roles

Governance, Risk & Compliance

- Daily & Weekly Responsibilities
 - Security patch monitoring
 - Security Controls gap analysis
 - Corrective Action Plan (CAP) guidance
 - Security control advisement
 - Review NASA Automated Systems Incident Response Capability (NASIRC) events
 - Review daily reports from IT Security
 - Review IntelliShield alerts
 - Incident Handling
 - Firewall Service Request (SR) Review
 - Assign each application to a security plan and eliminate the duplicates
 - Review security plans
 - Review Plan of Action and Milestones (POA&Ms) listed in IT Security Center (ITSC)
 - Prioritize POA&Ms based on their due dates, impact, and complexity
- Monthly Responsibilities
 - Review the Internal Audit process for NEACC
 - Perform quarterly audits against build documents on all systems and databases

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- Perform quarterly audit of the NEACC vault, firewall rules, lab access and privileged accounts.
- Assist the System Administrators with the quarterly scan reviews
- Maintain up to date list of National Institute of Standards and Technology (NIST), OMB, NASA Procedural Requirements (NPR) documentation
- Security Awareness training
- Review security scan reports
- Review patch plans
- Annual Responsibilities
 - Internal Audit support and coordination
 - Security Plan updates, new revisions
 - Certification and Accreditation (C&A) process
 - Audit support
 - Quarterly Engineering test
 - Quarterly Vulnerability Scans
 - Pen Test Support
 - Configuration check of the server being audited
 - Review server build checklist
 - Review Virtual Private Network (VPN) accounts
 - Firewall Rule review

Business Continuity

The NEACC has a very mature business resiliency program based on best practices, as well as NASA and Federal Guidelines. Within the business resiliency program the NEACC maintains four key plans – Disaster Recovery (DR) Plan, Contingency Plan, Cyber Incident Response Plan and Business Continuity Plan. Through these plans and their subsequent testing, the NEACC assures that the systems and the business of the NEACC are aligned with the business impact assessments of the consumers of those services. The disaster recovery plan describes numerous aspects of the recovery of the systems/applications as they relate to a catastrophic outage that may occur and last longer than 72 hours.

The Contingency Plan describes numerous aspects of the recovery process and teams required for the systems/applications that may be required for an outage that may last between 4 and 96 hours.

The Cyber Incident Response Plan describes the processes, as well as the roles and responsibilities of the personnel in case a security incident is realized on one of the NEACC systems/applications.

The Business Continuity Plan describes the critical resources and procedures that would be required in case the NEACC cannot operate in a normal capacity. Each of these key plans is

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tested at least annually in one of three methods – Exercise, TableTop, or Review. These methods help to ensure that the plans maintain a high level of accuracy and continuous improvement.

Business Continuity Team

- **Daily & Weekly Responsibilities**
 - Ensure that disaster recovery hardware matches NEACCs production environment and business recovery time objectives
 - Ensure that all new applications are added to DR plan
 - Ensure that all applications being decommissioned are removed from DR Plan tabletop exercises, contingency exercises and SunGard DR drills
 - Make appropriate updates to all DR and Contingency plan documents
 - Ensure POA&Ms, CAPs and DR action items are completed within timeline
 - Research industry best practices for DR and make recommendations

- **Monthly Responsibilities**
 - Ensure that disaster recovery hardware matches NEACC production environment and business recovery time objectives Ensure that all new applications are added to DR plan
 - Ensure that all applications being decommissioned are removed from DR Plan upcoming tabletop exercises, contingency exercises and SunGard DR drills
 - Make appropriate updates to all DR and Contingency plan documents
 - Meet with NEACC management to review Emergency preparedness project plans

- **Annual Responsibilities**
 - Facilitate tabletop exercises and report results
 - Facilitate SunGard DR drills and report results
 - Facilitate Contingency drills and report results
 - Prepare documentation for auditors
 - Research and recommend new recovery strategies
 - Conduct business impact analysis to ensure that NEACC recovery strategy meets NASA recovery requirements

5.6 Cross Functional Integration

The EAST contract relies on services provided from these other NASA IT contracts list below. Success is dependent upon the ability of the Contractor to work within, and across, other NASA service contracts to ensure a seamless IT service delivery environment and capability across the Agency.

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- Agency Consolidated End-user Services (ACES) - The ACES contract provides a variety of end-user services, e.g., e-mail and collaborative calendaring; end-to-end computing services and back-office infrastructure support; and IT product catalog services to NASA and NASA Contractors.
- NEACC Computing Services (NCS) - Compute services provided by the NEACC Computing Services (NCS) team is managed under the Marshall Information Technology Services (MITS) contract.
- NASA Integrated Communications Services (NICS) - The NICS contract will consolidate LAN and WAN services for the Agency.
- Web Enterprise Service Technologies (WEST) - The WEST Prime contract includes public Web site hosting, Web content management and integration, and support of other Web site services.
- Enterprise Service Desk (ESD) - The ESD contract provides Tier 0/1 Help Desk support services in response to reported incidents and problems and provides an integrated service ordering capability for all services.