Attachment #5

National Computer Center
Operations Plan FY2010 – FY2012

Empowering environmental awareness and protection through innovative, world-class IT solutions

OFFICE OF ENVIRONMENTAL INFORMATION

October 2009

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Table of Contents

List of Appendices

List of Figures

List of Tables

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency's (EPA) Office of Environmental Information (OEI) is leveraging technology to ensure the availability of environmental information for collaboration and informed decision-making. Due to significant advances in collaboration technologies, EPA is poised to provide unparalleled access to and analysis of environmental data from an array of sources to enhance public empowerment. Key factors for managing emerging information technologies (IT) are agility, the ability to quickly deliver technologies, and security, the ability to protect the integrity of data.

The EPA's Office of Technology Operations and Planning's (OTOP) National Computer Center (NCC) developed the *National Computer Center Operational Plan FY2010 – 2012* to address the changing IT landscape and the use of IT to advance collaboration and access to environmental information. The Plan aligns the NCC's solutions and services to meet customer needs efficiently and effectively, facilitating the use of IT to advance EPA's mission.

The Plan provides for adjustments to the NCC's operations that will yield several benefits:

- Position the NCC to become a more agile, efficient and cost-competitive organization.
- Streamline the NCC's business processes to ensure transparency to customers and employees.
- Position the NCC to serve as a technology leader within the Agency and the federal sector.
- Improve communications and build on relationships with customers to better support the Agency's mission.
- Implement energy efficient, green IT practices to demonstrate comprehensive cost savings.

The Plan is aligned to four objectives, which are outlined below.

Improved Customer Services: Reengineer and improve existing customer services to meet customer needs.

- Provide a range of Hosting Services that utilize virtual technology solutions to provide customers with cost-effective options that meet their application hosting needs.
- Evaluate competitive hosting services offered by external providers and broker partnerships where they are deemed to be the most effective solution.
- Offer Managed Development Services that provide customers with an application development environment and support the development and testing of specialized and emerging technologies.
- Continue to provide a wide range of consulting and technical support services.

Streamlined Service Delivery Process: Simplify, streamline and integrate the NCC's service delivery processes.

- Reengineer the NCC's service delivery process to provide customers with improved and expanded self-service options, transparent service delivery monitoring and timely service delivery.
- Develop a self-service ordering tool to allow customers to request services efficiently.

Reengineered Infrastructure Operations: Reengineer the NCC's infrastructure to leverage virtualization technologies that enable faster and more flexible delivery of the NCC's services.

- Implement virtual server environments to enable more efficient use of the server infrastructure, allow faster server deployment, and offer an agile hosting service at a competitive cost.
- Use a tiered storage model to keep pace with growing demands for storage while lowering costs.

- Continue to support and implement green IT initiatives and obtain ENERGY STAR data center certification.
- Standardize the wide area network (WAN) environment and its associated processes, procedures and practices to ensure EPA customers receive consistent network performance.
- Implement automated tools to monitor performance and improve processes for capacity planning.
- Deliver a more mature security architecture that creates zones based on data sensitivity, system and application functionality, and acceptability of risk as determined by the data or application owners.
- Provide a comprehensive set of virtual services to support and deliver continuity of operations (COOP), disaster recovery (DR) and failover services to the Agency more cost effectively.

Enhanced Service Tracking: Implement service delivery tracking and performance dashboards that enable customer visibility and transparency into the NCC service objectives and delivery practices.

- Provide customers with a service request tracking dashboard with information on service level objectives, metrics and transparency into the service delivery process.
- Provide customers with real-time monitoring of application performance.

This Plan will be implemented over the next three years by the NCC's dedicated and technically-proficient employees and contractors who are motivated to realize the objectives of this Plan and the success of the organization's efforts to support EPA's mission. The NCC will ensure that the objectives described in this Plan are incorporated into recently awarded and upcoming contract bids. The ability to introduce the Plan's requirements in a competitive arena will give the NCC the opportunity to obtain diverse technical and operational solutions at a competitive price. This Plan will position the NCC and its employees as the technology provider of choice and as a leader in providing agile and cost-competitive services for EPA Programs and other federal agencies.

1 INTRODUCTION

1.1 Purpose

The U.S. Environmental Protection Agency's (EPA's) National Computer Center (NCC) provides large-scale computing services for EPA offices nationwide. The NCC enables environmental progress through partnerships with its customers and an understanding of their information technology (IT) needs to support the achievement of their goals and the mission of the Agency.

In May 2009, the NCC formed a team of internal managers and senior experts to align the NCC's technology, processes and service offerings with the changing landscape of IT and service delivery. The *National Computer Center Operations Plan FY2010 – 2012* documents the NCC team's vision for reengineering the NCC products, services and solutions to meet its customers' emerging development, hosting and data integrity needs.

The objective of the Plan is to align the NCC's solutions and services with its customer needs to ensure its solutions and services efficiently and effectively enable and facilitate EPA programs' use of IT to advance EPA's mission. This objective closely aligns with the Office of Environmental Information's (OEI) *FY 2009 National Program Manager Priorities*, Goal #3: Maintain an agile and secure infrastructure.

The NCC Plan provides for adjustments to the NCC's operations that will yield several benefits:

- Position the NCC to become a more agile, efficient and cost-competitive organization.
- Streamline the NCC's business processes to ensure transparency to customers and employees.
- Position the NCC to serve as a technology leader within the Agency and the federal sector.
- Improve communications and build on relationships with customers to better support the Agency's mission.
- Implement energy efficient, green IT practices to demonstrate comprehensive cost savings through their implementation.

1.2 Drivers for Change

The Plan outlines a three-year initiative to enhance, evolve and align the NCC's technology, processes and service offerings with commercial, federal and EPA initiatives. The following provides an explanation of these internal and external initiatives as drivers for change.

- The Administration's focus on data transparency and citizen access to data has brought a new vision for the expansion of data sharing across government agencies. Many federal initiatives are underway to meet this challenge.
- The widespread and accelerated use of Web 2.0 technologies has enabled the empowerment of interested communities to affect change. The uses of mobile computing and the integration of mobile devices are also advancing rapidly.
- Virtualization technology has enabled organizations to employ low-cost hardware to deliver significantly more computing power and improve the agility and speed of delivering hosting services to customers.
- Cloud computing, an emerging technology, will deliver large amounts of computing power and storage to customers virtually at a more cost-effective price by leveraging virtualization technologies and Web 2.0 tools.

- EPA's Computer Room Server and Storage Management (CRSSM) Initiative's architecture will provide for an internal "cloud" IT infrastructure that can be leveraged to support other critical Agency needs such as continuity of operations (COOP), disaster recovery (DR) and failover via a virtual data center. The CRSSM Initiative is a multi-year project to migrate EPA's CRSSM services for email to four data centers across EPA including EPA Headquarters (Potomac Yard Building), Region 5 (Chicago), Region 8 (Denver) and the NCC (Research Triangle Park, NC).
- E*xecutive Order: Federal Leadership in Environmental, Energy, and Economic Performance* requires the implementation of best management practices for energy-efficient management of servers and federal data centers.

1.2.1 Strengths, Weaknesses, Opportunities and Threats

The NCC conducted a strengths, weaknesses, opportunities and threats (SWOT) analysis to highlight internal and external drivers for change. *Table 1-1* provides an overview of the key areas identified in the analysis. With this Plan, the NCC will leverage its strengths and opportunities to address and mitigate the identified threats and weaknesses.

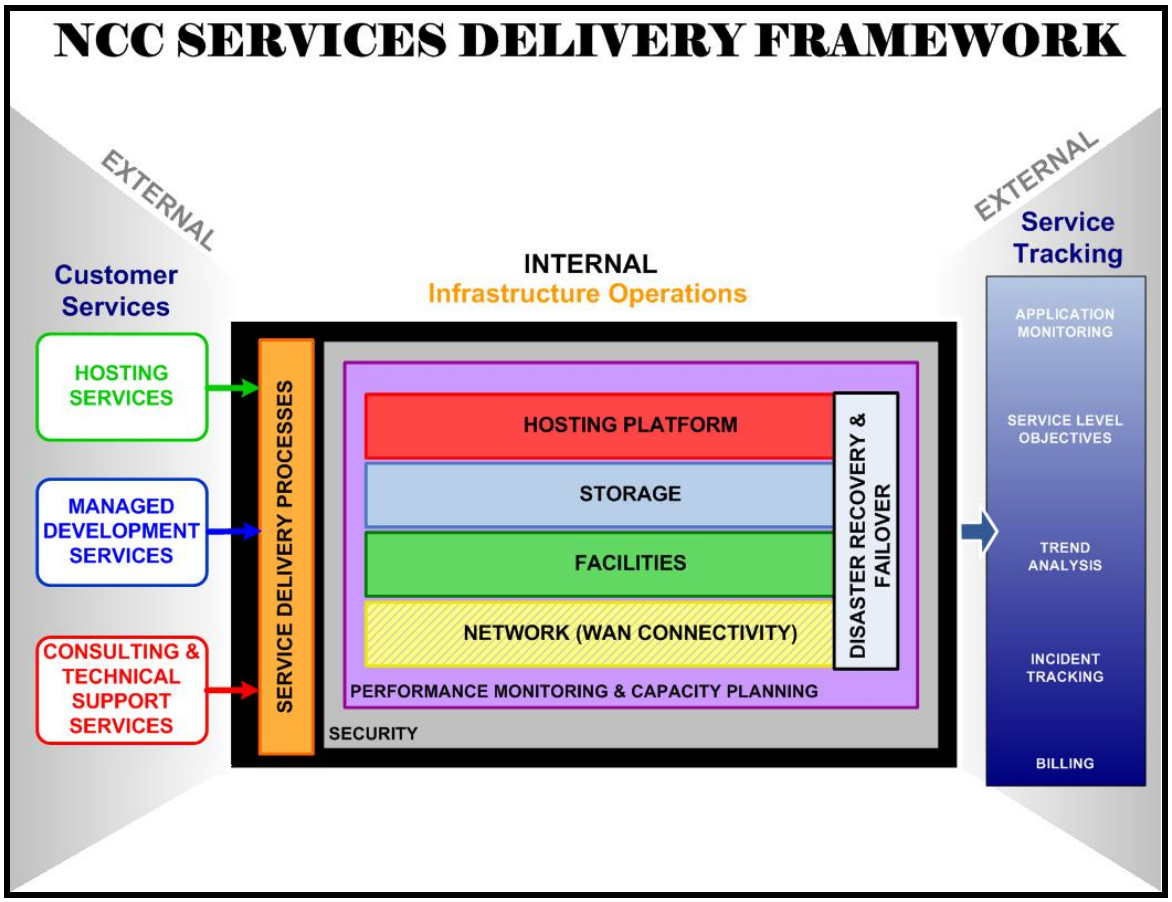
Table 1-1: The NCC SWOT Analysis

Strengths	Weaknesses
• Good customer relationships • Positive track record of service delivery • Strong IT expertise across staff and management • The NCC staff work effectively in teams • Services delivered meet customer timetables • Pricing worksheet and eBusiness process work well for customers • Initiatives are underway to improve communications • Strong support for Agency's scientific computing requirements	• Complex and confusing services are difficult for customers to understand • Processes can be daunting to customers • Operational structure lacks clarity to NCC customers • Core NCC operations are understaffed to support priority projects • Some hosting services are not priced competitively
Opportunities	**Threats**
• Improved agility through virtualization • Improved efficiency through green IT • Improved service delivery through Information Technology Solutions (ITS)-EPAII contract and Wide Area Network (WAN) 2010 implementation • Increased collaboration with Regions and Programs • Package services into solutions • Provide leadership in utility computing	• Losing institutional knowledge due to retirement • Unknown security implications in external hosting • Low-cost commercial hosting providers • Unknown scope, integration and impact of federal cloud services • Possible mandates for agencies to aggregate applications and data to the "Federal Cloud"

1.3 The NCC Services Delivery Framework

*Figure 1-1*provides a structured view of the target state for the NCC services as proposed in this Plan. Following the figure are descriptions of key areas depicted in the framework.

Figure 1-1: NCC Services Delivery Framework



1.3.1 Customer Services

Three key NCC customer services are addressed in this Plan—Hosting Services, Managed Development Services and Consulting and Technical Support Services.

Hosting Services: The NCC Hosting Services provide managed infrastructure, supporting business processes and expertise to test, deploy, host and maintain applications supporting EPA programs. Planned improvements will allow the NCC Hosting Services to provide more agile and flexible solutions, reduced deployment timelines and improved cost-efficiency. *Section 2.1.1: Hosting Services* provides a more detailed description of this service.

Managed Development Services: The NCC Managed Development Services are new services that enable systems development in an environment that mirrors the NCC's production hosting environments. The NCC Managed Development Services provide a managed server environment for evaluating emerging technologies or non-standard technologies. The objective of these services is to provide a cost-effective alternative to program investment in contract-specific servers and software licenses, and to streamline application transition from development to production. *Section 2.1.2: Managed Development Services* provides a more detailed description of this service.

Consulting and Technical Support Services: The NCC's Consulting and Technical Support Services provide technical expertise supporting IT project management; application development; application hosting; network design and configuration; IT security evaluation; design and operations; and scientific computing. *Section 2.1.3: Consulting and Technical Support Services* provides a more detailed description of this service.

1.3.2 Service Delivery Processes

Service delivery processes provide the mechanism by which customers request the NCC's services. In the target state, the NCC will provide a more customer-friendly, transparent and streamlined service delivery model. *Section 2.2: Streamlined Service Delivery Processes* describes the target state of the NCC's service delivery processes.

1.3.3 The NCC Infrastructure Operations

The NCC Infrastructure Operations provides for the ongoing operations and maintenance of the technical infrastructure supporting NCC Customer Services:

- Hosting infrastructure.
- Storage infrastructure.
- Network operations.
- Data center facilities.
- Performance and capacity management.
- Information security management.

These services are necessary to support the customer-facing services but are not seen by customers. *Section 2.3: Reengineered Infrastructure Operations* highlights the target state for infrastructure operations.

1.3.4 The NCC Service Tracking

The NCC Service Tracking provides for customer visibility into the NCC service delivery as well as the performance and availability of the technical infrastructure. In the target state, customers will have online access to information regarding the progress and status of their services. *Section 2.4: Enhanced Service Tracking* highlights the target state for service tracking.

2 TARGET STATE

The following sections provide an overview of the target state of each of the components depicted in *Figure 1-1: NCC Services Delivery Framework*. The sections are organized by the NCC's objectives:

- **Improved Customer Services:** Reengineer and improve existing customer services to align with customer needs.
- **Streamlined Service Delivery Process:** Simplify, streamline and integrate the NCC's service delivery processes.
- **Reengineered Infrastructure Operations:** Reengineer NCC infrastructure to leverage virtualization technologies that enable faster and more flexible delivery of the NCC Customer Services.
- **Enhanced Service Tracking:** Implement service delivery tracking and performance dashboards that enable customer visibility and transparency into the NCC service objectives and delivery practices.

By meeting the objectives listed above and described in the following sections, the NCC will achieve its goal of providing competitively priced solutions and services that are

- Aligned with customer needs for technology and service.
- Agile and flexible, accommodating rapidly evolving technologies.
- Easily understood, requested, tracked and monitored by customers.

2.1 Improved Customer Services

The following sections provide a description of three of the NCC's customer services in the target state—Hosting Services, Managed Development Services and Consulting and Technical Support Services.

2.1.1 Hosting Services

Hosting Services		
Features	Current State	Target State
Managed Application Platforms	✓	✓
Dedicated Server Platforms	✓	✓
Tiered Hosting Offerings		✓
Virtual Server Platforms		✓
Application Platform Support Options		✓
Brokered External Services		✓

The NCC currently offers three hosting services: Shared Application Hosting, Dedicated Server Hosting and High Performance Computer Hosting. The current hosting services are perceived by many to be too costly when compared to commercial services. In the target state, the NCC Hosting Services will provide the application platforms, processing, server and storage management capacity to test, deploy and maintain applications supporting EPA Programs. Four main components of the hosting service will be provided:

- Basic Hosting Service.
- Advanced Hosting Service.
- Comprehensive Hosting Service.
- High Performance Computing (HPC) Hosting Service.

Basic Hosting, Advanced Hosting and Comprehensive Hosting services are targeted to information systems supporting EPA Programs. The key factors that differentiate these services are the levels of software license and specialized labor included in the service. Each hosting service option will include different levels of support with associated costs, allowing customers to decide which hosting service best

meets their needs and available budget. By providing different service options, the NCC will be more cost competitive with external hosting solution providers while allowing customers to determine the hosting service that best meets their needs.

The High Performance Computing (HPC) Hosting Service is targeted to support scientific modeling and visualization applications.

The NCC will evaluate competitive services offered by external providers and may broker partnerships where they are deemed to be the most effective solution. The NCC will provision and maintain the operating infrastructure for these services using a variety of methods:

- Government or contractor owned infrastructure operated and maintained in the NCC.
- Government or contractor owned infrastructure operated and maintained in the contractor's data center.
- Commercial hosting services.
- Federal cloud services.

Appendix A: NCC Hosting Framework provides more detail about the current and target states of the NCC's Hosting Services.

2.1.2 Managed Development Services

The NCC currently offers a limited application development service. In the target state, the NCC will offer Managed Development Services that provide a hosting environment for the development of applications and support for the development and testing of specialized and emerging technologies. This service will provide:

Managed Development Services		
Features	Current State	Target State
Application Development Support	✓	✓
Application Development Environment		✓
Environment for Emerging Technologies		✓

- The NCC managed development servers for Agency-approved standard technologies (e.g., ColdFusion, Oracle Application Server, Oracle Database, and Domino).
- The NCC managed virtual desktops for application development for a select suite of development products.

The NCC will provide sufficient administrative privileges to customers, as approved, to allow them to develop and test their applications in the NCC's environment. The NCC will provide customers access to its development environments through multiple mechanisms provided by Agency-approved remote access solutions. All development servers and desktops will meet Agency standard configuration requirements and the standards will be managed by the NCC.

Appendix B: Managed Development Services contains more detail about the current and target states of the Managed Development Service.

2.1.3 Consulting and Technical Support Services

Consulting and Technical Support Services		
Features	Current State	Target State
IT Project Management	✓	✓
Business Application Support	✓	✓
Scientific Computing	✓	✓
Geographic Information Systems	✓	✓

Consulting		
Tiered Hosting Technical Support		✓

The NCC currently provides a broad range of technical consulting and operations services to support and facilitate customers' use of the NCC solutions and services. In the target state, the NCC will continue to provide a wide range of consulting and technical support services:

- IT Project Management.
- Business Application Support.
  - Application Development.
  - Web Site Management.
  - Application Security Assessment.
  - Application Platform Administration.
  - Application Performance Assessment.
  - Business Intelligence and Analytics Consulting.
  - Tiered Hosting Technical Support.
- Scientific Computing.
  - High Performance Computer Operations.
  - Environmental Modeling and Visualization.
- Geographic Information Systems Consulting.

These services will be aligned closely with the NCC's improved customer services, streamlined service delivery processes and service tracking. The NCC will clearly document the level of technical support included in service baselines so that customers have a clear understanding of the circumstances that require technical support services and their associated fees. In addition, technical consulting skills will be aligned with the reengineered infrastructure.

2.2 Streamlined Service Delivery Processes

Currently, the NCC's customers request services via multiple mechanisms, and the customers' requirements are often defined through numerous communications between the NCC staff and the customer. In the future, the NCC's service delivery processes will be reengineered, integrated and tracked in a comprehensive manner to provide customers with improved and expanded self-service options and transparent service monitoring and delivery. The result will be more timely service delivery and lower costs.

Service Delivery Processes		
Features	Current State	Target State
Performance metrics and service level objectives		✓
Self-service ordering process		✓
Clear documentation of customer requirements	✓	✓
Component-based costing information (e.g., a la carte ordering)		✓

The new service delivery model will streamline the application deployment, firewall rules and telecommunications service requests, and provide a consistent, clear ordering process for technical consulting. The two key areas of change include:

- **Technical Services** – An integrated and streamlined approach to ordering and delivering Hosting and Managed Development Services, processing firewall rule requests and implementing telecommunications service requests.

- **Technical Consulting** – Provide a clear, consistent and automated approach to ordering and delivering technical consulting services.

By simplifying and streamlining the business and service delivery processes, the NCC will provide its services to the customer in an integrated and consistent manner. Several improvements will be implemented:

- Provide customers with easy to use, one-stop, self-service option for requesting and tracking service delivery.
- Be responsive to customers' needs with clear performance metrics and service level objectives.
- Support multiple hosting options through the application deployment process.
- Establish and communicate the documentation requirements of the application deployment process.
- Establish and communicate clear documentation requirements for firewall rule requests.
- Establish clear documentation requirements for telecommunications service requests.
- Collapse redundant technical consulting services where appropriate.
- Provide a consistent, documented approach to the delivery of technical consulting services.

A key component to improved technical service delivery is drafting clear processes and associated documentation for service delivery. The customer will know upfront the service requirements and materials the NCC will need to process their service request. This structured process will result in the customer's clear understanding of the requirements and a consistent approach to ordering and delivering services.

2.3 Reengineered Infrastructure Operations

The following sections describe the target state for the NCC's infrastructure operations, including the hosting platform, storage, facilities, network, performance monitoring and capacity management, security, and DR and failover.

2.3.1 Hosting Platform

Hosting Platform		
Features	Current State	Target State
Mainframe	✓	*(phased out by 2012)*
Virtualized server environment		✓
Automatic scaling and deployment of virtual servers		✓

Hosting platforms provide the server context for hosted applications. While the NCC's current hosting platforms leverage extensive virtualization for databases, the majority of the NCC's servers are traditional physical servers. Traditional physical server environments are more costly and less flexible than virtual server environments, which allow many logical servers to share a single physical server. Virtual server environments enable more efficient use of server infrastructure, allow faster server deployment, and simplify options fault tolerance and disaster recovery. These features are critical to the NCC's goal of providing an agile hosting service and faster service delivery at competitive costs.

In the target state, the NCC will extend virtualization beyond the database platforms so that virtual servers are used whenever practical. To achieve the target state the NCC must

- Establish a virtual server infrastructure.
- Reengineer server operations and resource accounting processes.

- Migrate over 200 physical servers to the virtual infrastructure.
- Align the NCC hosting and development service delivery to leverage the virtual infrastructure.

2.3.2 Storage

Storage and backup management are integral components of the NCC infrastructure services and include the design, provisioning, installation, operation and maintenance of storage systems to support hosted servers and applications. The NCC currently leverages storage virtualization to simplify storage management and maximize efficient use of the infrastructure.

Storage		
Features	Current State	Target State
Storage Area Network (SAN) storage architecture	✓	✓
Storage virtualization	✓	✓
Scalable tiered storage environment		✓
Data de-duplication		✓
Storage encryption		✓

In the target state, the NCC will implement tiered storage to improve cost efficiency and expand the implementation features that support improved services for data security, backup, DR and COOP. Tiered storage will be delivered in two tiers:

- Tier 1 – High to moderate performance primarily for high transaction volume.
- Tier 2 – Moderate to low performance primarily for read access for files.

In addition, the NCC will offer new or expanded features:

- Full encryption to provide additional security for stored data.
- Data de-duplication to reduce system and file backup and recovery times.
- Long distance data replication to support failover and DR pairing with other EPA data centers.

2.3.3 Facilities

The NCC data center facilities are currently housed in a Leadership in Energy and Environmental Design (LEED) Silver certified facility commissioned in 2001. The NCC power and cooling infrastructure was engineered to support mainframe, scientific computing and high-end mid-range servers of that period. Since that time, the platform mix has changed substantially, which has resulted in significant reductions in power and cooling demand. The NCC benefits from both surplus power and cooling capacity. While this is an advantage for growth potential, some reconfiguration and tuning is necessary to optimize power, cooling and infrastructure provisioning.

Facilities		
Features	Current State	Target State
LEED certified	✓	✓
ENERGY STAR certified		✓
Automated power management		✓
Pre-action fire suppression system		✓

The NCC has collaborated with the Department of Energy and EPA's ENERGY STAR program since 2008, as they develop requirements for ENERGY STAR data center certification. Once the requirements are finalized, the NCC will begin implementing improvements to receive the certification.

The NCC target state for facilities is a data center configuration that maximizes power and cooling efficiency and improves hosting agility by minimizing the time and effort required to bring new servers and storage online. The following key issues will be addressed in the future.

Environmental Controls

- Reengineer the physical layout of the data center to optimize use of power, cooling and network infrastructure.

- Standardize server racks to improve airflow and cooling efficiency.
- Enable automatic light diming in unused areas.

Power Infrastructure

- Reconfigure power distribution layout to reduce single points of failure and simplify provisioning of new servers and storage.
- Implement automated power management for servers and storage systems.
- Analyze generator options and consider moving from diesel to natural gas.

Data center Network

- Evaluate, procure and implement next generation data center communications network.
- Evaluate, procure and implement next generation data center storage network.

Facility Upgrades

- Replace wet-pipe fire-suppression system with a pre-action system.
- Add smoke detectors/sensors on the data center floor.

Off-Site Backup Facility

- Evaluate alternatives for leased off-site backup facility.

2.3.4 Network

Network		
Features	Current State	Target State
Readily available network performance data		✓
Secure, reliable network	✓	✓
A scalable and adaptable network		✓

EPA's WAN connects approximately 110 EPA offices to each other and to the NCC, and provides enterprise computing services and access to the Internet. Today, EPA's network design does not provide the performance and scalability required to meet the growing demands of EPA's business. Through the EPA's WAN 2010 Initiative, the NCC will standardize the WAN environment and its associated processes, procedures and practices to ensure EPA's customers receive consistent network performance. The NCC will implement the WAN 2010 Initiative with several objectives:

- **Availability:** A solution that minimizes outages, as much as possible.
- **Scalability and Adaptability:** A network that can readily adapt to changing requirements.
- **Security:** A network managed and operated in compliance with federal security standards.
- **Transparent Performance Metrics:** Agency network managers will have access to tools that will give visibility into network performance data.
- **Affordability:** A network that continually meets EPA's objectives and represents the best value.

The NCC expects to complete the transition to WAN 2010 in spring 2010.

2.3.5 Performance Monitoring and Capacity Planning

Performance Monitoring and Capacity Planning		
Features	Current State	Target State

The NCC's current performance monitoring and capacity planning capabilities rely on labor intensive, platform-specific tools that are limited in their ability to provide a comprehensive view of infrastructure capacity utilization and application or platform performance.

Active capacity and performance monitoring and analysis		✓
Dashboards for detailed infrastructure monitoring		✓
Proactive capacity planning to anticipate and address growth trends		✓

The target state of the NCC performance monitoring and capacity planning provides several tools:

- Automated tools for monitoring performance and capacity consumption.
- Integrated, internal dashboards for detailed infrastructure monitoring and operational awareness.
- Integrated customer dashboards to provide customer visibility into application performance and service availability (refer to *Section 2.4: Enhanced Service Tracking* for more information).
- Improved processes for issue escalation and capacity planning.

2.3.6 Security

The NCC effectively delivers IT security to mitigate risks and ensure compliance with applicable federal guidance and regulations. This function is currently performed at the system level and, as a result, is not optimized for cost or service delivery efficiencies.

Security		
Features	Current State	Target State
A secure data center environment	✓	✓
Security zoning		✓
Security architecture based on data sensitivity		✓

The target state of IT security focuses on delivering a more mature security architecture that creates zones based on data sensitivity, system and application functionality, and acceptability of risk as determined by the data owners. Each of these defined zones will have authorized ports, protocols and services that are considered normal and necessary for standard communications within and outside the zone.

The NCC will apply security controls (i.e., protection, monitoring and oversight) to each zone that are commensurate with the accepted level of risk. Customer requests for exceptions within a zone will be formally documented, reviewed and applied at the system level once approved. The NCC will reduce time for system deployment by managing at the zone level rather than managing individual systems. This approach will increase the NCC's capability for quickly accommodating customer needs without sacrificing EPA's current security posture.

The NCC's redesigned IT security architecture will utilize the benefits of virtualization technology. *Appendix C: Security* provides more information about the target state for security and a depiction of the architectural framework necessary for delivering the NCC's enhanced security services (see *Figure C-1: Conceptual Architecture of the Proposed NCC Virtual Environment*).

2.3.7 Continuity of Operations, Disaster Recovery and Failover

The NCC will provide a comprehensive set of virtual services to more cost effectively support and deliver COOP, DR and failover services to the Agency. Although each of these services has a specific set of requirements, together they are part of a continuum of critical services that provide for the operational and data integrity of core assets under adverse circumstances and conditions.

2.3.7.1 Continuity of Operations

IT support requirements for COOP include telecommunication, email, geographic information system (GIS) and access to other critical data services required to sustain business operations in the event of a disaster or pandemic event. The NCC will provide the necessary data telecommunications access needs including alternate routes and technologies, should the normal circuits become impaired. Email and BlackBerry services will be continuously available through EPA's internal (CRSSM) "cloud" infrastructure. GIS and other critical data services will be securely hosted at the NCC and will be provided virtually from users' desktops.

2.3.7.2 Disaster Recovery

Disaster Recovery and Failover		
Features	Current State	Target State
A full-scale DR service for customers	✓	✓
Virtualized DR model		✓
Flexible DR and failover options for customers		✓

Should the NCC experience a systematic building failure or a catastrophic application outage in which hosting and data services at the NCC are lost, subscribers to the NCC's DR service will have fully restored application functionality and data availability within a 24–48 hour window. Over the next two years, the NCC will offer improved DR performance at a lower cost by moving from an outsourced service to an internal, virtualized DR model. The NCC will leverage the CRSSM internal "cloud" infrastructure to support virtual instances of applications that require DR service. This is a fundamental shift in DR in which the application can be dynamically re-provisioned across the WAN to another functional site, thus making it easier and more cost effective to deliver DR services.

2.3.7.3 Failover

For applications that require 24×7 uptime, the NCC will support a failover service by leveraging the virtualized infrastructure and load balancing features to provide continuous service. This service will be priced at a premium because of the redundant infrastructure and administration necessary to assure uninterrupted application availability.

2.4 Enhanced Service Tracking

Service Tracking		
Features	Current State	Target State
Application performance tracking	✓	✓
Customer dashboard to track application performance		✓
Ability for customers to track order status and progress		✓

Service tracking is the NCC's solution to provide customers with insight into various aspects of internal operational and service delivery processes. The NCC currently performs application performance tracking on an ad hoc basis to satisfy specific customer requirements. Service tracking will be included as a basic, self-service option allowing the NCC customers to check on the status of their requests for service or to monitor application performance for hosted systems. The NCC will provide a dashboard tool for this service and provide two basic services:

- Service Request Tracking.
- Application Performance Tracking.

The NCC will offer an optional, more in-depth service tracking service under the Consulting and Technical Support Service for an additional fee.

2.4.1 Service Request Tracking

The NCC will implement service request tracking to enable the NCC customers to verify the status of their specific service request. The benefits of service request tracking are twofold:

1. Customers requesting services from the NCC will be able to verify the status of their request easily.
2. The processes for service fulfillment will be documented with the criteria for moving from one phase of the process to another.

The service request tracking dashboard will provide service level objectives, metrics and transparency into the service delivery process. The enhanced service delivery processes and the dashboard will ensure that the NCC management is able to readily identify and resolve workflow issues.

2.4.2 Application Performance Tracking

The NCC will procure and implement an application performance tracking tool that will provide real-time monitoring of an application's performance. The tool will analyze network traffic, pinpoint application bottlenecks and graphically display the information. The NCC and customers will be able to use the tool to optimize applications.

3 TRANSITION PLAN

The NCC must implement a number of activities and tasks to ensure its goals of improving customer services, streamlining service delivery processes, reengineering infrastructure operations, and enhancing service tracking are realized. *Figures 3-1* and *3-2* outline the key activities the NCC will implement for the external customer services and internal NCC infrastructure areas to ensure the target state is realized. In addition to the tasks laid out below, a number of other related pieces of work (e.g., contracting, budget formulation, Working Capital Fund (WCF) business processes) will be aligned to the timelines to ensure the successful completion of the activities.

Figure 3-1 depicts the activities the NCC will undertake to implement the customer-facing services.

Figure 3-1: NCC Operations Planning Timeline FY 2010-2012—Customer Services

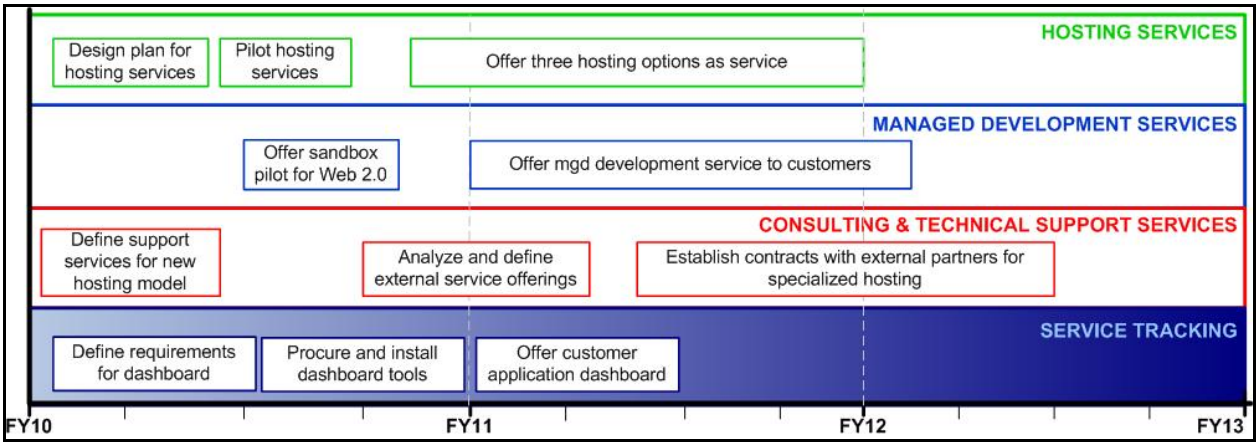
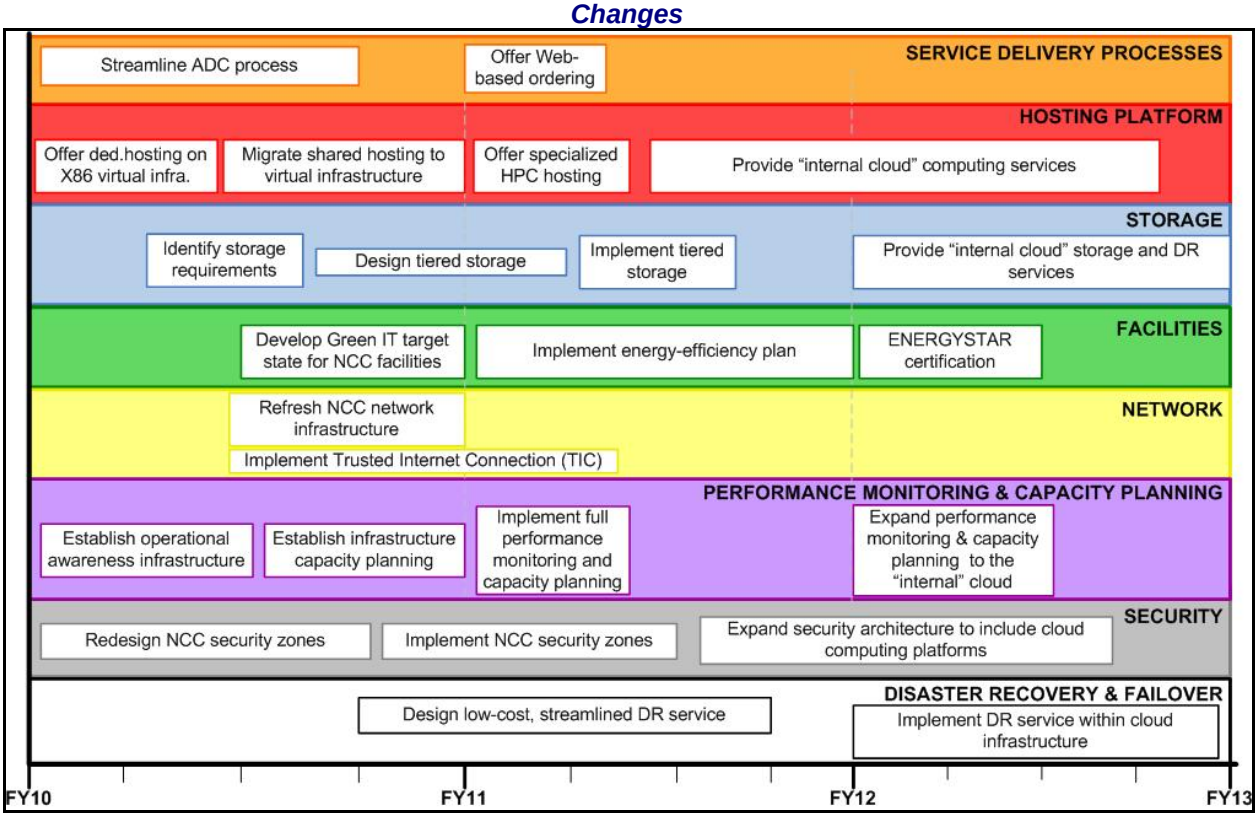


Figure 3-2 depicts the activities the NCC will undertake to implement the internal infrastructure and process changes.

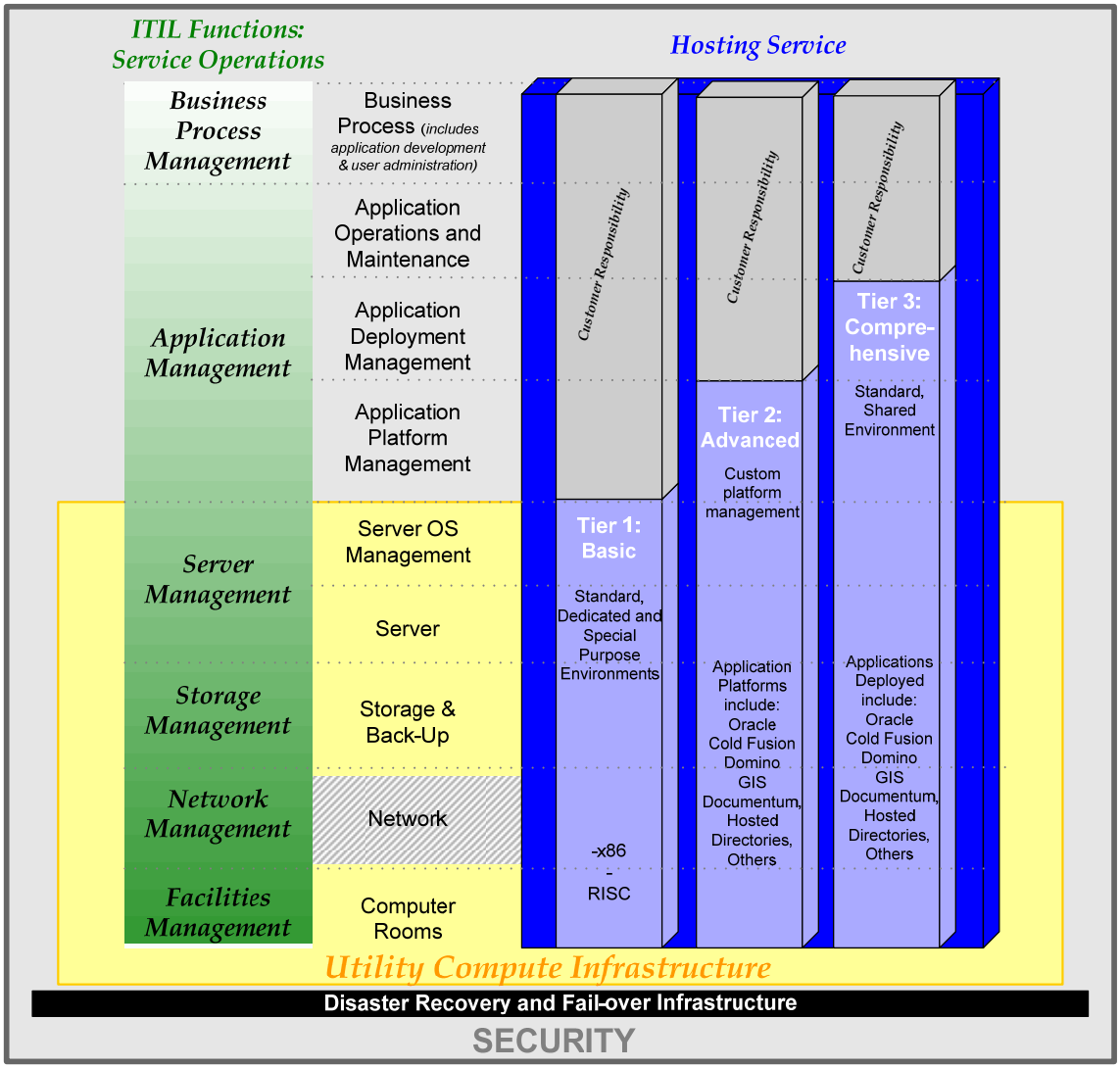
Figure 3-2: NCC Operations Planning Timeline FY 2010-2012—Internal Infrastructure and Process Changes



APPENDIX A: NCC HOSTING FRAMEWORK

Figure A-1 depicts the future the NCC Hosting Services within a uniform service delivery and technology standards framework with clear service standard responsibilities delineated between the service provider and customers. The Information Technology Infrastructure Library (ITIL) functions shown on the left side of the diagram follow a set of industry best-practice processes that will be an important guide for delivering these services.

Figure A-1: NCC Hosting Framework



The following is a description of the current and target state of the NCC's Hosting Services.

Hosting Services Current State

The NCC currently offers three hosting services: Shared Application Hosting, Dedicated Server Hosting and High Performance Computer Hosting.

The NCC Shared Application Hosting offers a variety of managed application platforms into which customer applications are installed and operated. Hosting capacity, operating system administration and

application platform administration are included in fixed price service offerings specific to each application platform. Included in the fixed price are staging or pre-production environments for application validation and production environments. Storage is offered under a separate service at fixed price per gigabyte month. Currently supported shared application platforms include

- Lotus Domino.
- Adobe Cold Fusion.
- Apache Tomcat.
- Oracle Enterprise Application Server.
- Oracle Portal.
- ESRI ArcIMS GIS Application Servers.
- Oracle Enterprise Edition Database.

Shared application platforms provide managed server and application platforms that allow customers to leverage shared hosting capacity, license and platform maintenance costs.

Dedicated server hosting offers a dedicated hosting environment with managed operating systems and application platforms. Customers are required to use the NCC administrative resources for both operating system and application platform management.

Dedicated server platforms offer customers a hosting alternative to accommodate application platforms not provided as shared platforms and dedicated application platforms for large and/or complex applications.

Many application customers blend shared and dedicated hosting to meet their application needs. The most common configurations pair dedicated application servers with shared platform databases.

The NCC application deployment and technical consulting services provide for the installation, configuration and operation of customer applications within the shared and dedicated hosting platforms. These services are paired with each of the offered hosting platforms. Deployment services are offered at fixed prices that include initial configuration of the hosting environments and 20 hours of ad hoc deployment coordination. Deployment activities beyond 20 hours per platform are provided as ad hoc technical consulting services billed by the hour.

Application hosting and deployment services are delivered through the Application Deployment Checklist (ADC) process. The checklist itself is designed to ensure each application can be hosted in the target environments, that sufficient capacity and required configurations are in place, and that Agency required procedures and documentation are in place. The existing ADC process relies heavily on verbal and email communications between application developers and the hosting teams.

The current hosting services are perceived by many to be too costly when compared to commercial services and the ADC process is perceived as too cumbersome. The target state must address these issues by

- Aligning the hosting services with comparable commercial service offerings.
- Aligning hosting prices with comparable commercial service offerings.
- Optimizing the NCC business processes to enable rapid service delivery and deployment.

Hosting Services Target State

The NCC target state hosting services will provide the application platforms, processing, server and storage management capacity to test, deploy and maintain applications supporting EPA Programs. There are four main components of the hosting service that will be provided:

- Basic Hosting Service.
- Advanced Hosting Service.
- Comprehensive Hosting Service.
- HPC Hosting Service.

Basic Hosting, Advanced Hosting and Comprehensive Hosting services are targeted to information systems supporting EPA Programs. The key factors that differentiate these services are the levels of software license and specialized labor included in the service.

The HPC Hosting service is targeted to support scientific modeling and visualization applications.

The NCC will provision and maintain the operating infrastructure for these services using a variety of methods:

- Government or contractor owned infrastructure operated and maintained in the NCC.
- Government or contractor owned infrastructure operated and maintained in the contractor's data center.
- Commercial hosting services.
- Federal cloud services.

NCC Basic Hosting Service

The Basic Hosting Service offers customers a managed server platform with greater control over and responsibility for application platform configuration and operation. This service offers several key advantages:

- Customers may leverage existing application expertise within their development contracts to manage production application platforms hosted at NCC.
- Customers have greater freedom over the features and configuration of application platforms.
- Customers can host emerging or specialized application platforms that are not supported in the shared platforms offered as shared platform under the NCC Comprehensive Hosting Service.

Basic hosting is best suited to customers with applications and access to technical expertise with established procedures for implementing NIST 800-53 compliant controls for application platform management. Customers without an established NIST 800-53 compliance framework should consider the NCC Advanced or Comprehensive Hosting Services, which provide for custom application platform configuration within the NCC's NIST 800-53 control framework.

Basic Hosting Service Description

The NCC's Basic Hosting Service will provide a dedicated server instance with managed operating system. Customers will have sufficient administrative privilege to install and manage application platforms and custom applications, but access to operating system configuration and control will be restricted and require the NCC provided administration.

Basic hosting customers will have the ability to install, configure, monitor and operate application platforms on the server. These services can be provided through customer contractors, or customer designated staff. Administrative access to servers must be through EPA approved methods (currently

AAA service with two factor authentication). Individuals with privileged administrative access must meet EPA requirements for security clearance and are subject to EPA security policies, procedures and rules of behavior.

NCC Basic Hosting will provide:

- A virtual or physical server platform sized to the customer's requirements, billed at a uniform monthly rate and managed to defined service levels for availability, performance and recovery.
- A licensed operating system managed in compliance with EPA configuration standards and including technical labor for installation configuration, maintenance and patching.
- Server deployment and operations coordination services billed at a uniform monthly rate to support initial application deployment and change management coordination.
- Access to utility storage services billed at a uniform monthly rate based for requested storage quantity and storage features (performance tier, backup type, replication, encryption).
- Access to optional technical consulting services for project management, coordination, application security evaluation and integration support.
- Access to optional services for off-site recovery or failover.
- Access to a service delivery and performance management dashboard providing visibility into service request status and server performance.
- 24×7 response to infrastructure or operating systems failures.
- Inclusion of the server in an NCC General Support System managed with NIST 800-53 compliant controls appropriate to the customer's sensitivity classification of the application supported by the server (low, medium, high). Controls are limited to those associated with the facility, network and operating systems. Application platform controls are not included.
- Documentation describing the NIST 800-53 controls implemented for the general support system and proof that the controls have been independently audited.

NCC Advanced Hosting Service

The NCC Advanced Hosting Services add NCC technical consulting services for configuring and managing customer application platforms on servers operated under the Basic Hosting Service.

The Advanced Hosting Service offers customers a managed server platform and greater control over application platform configuration without the burden and complexity of providing 7x24 operations support or a NIST 800-53 compliant security control framework for the application platform. The key advantages of this service are

- Customers have greater freedom over the features and configuration of application platforms than available in the shared platforms offered under the Comprehensive Hosting Service.
- Customers can host emerging or specialized application platforms that are not supported in the shared platforms offered as shared platform under the Comprehensive Hosting Service.
- Customers leverage a comprehensive NIST 800-53 compliant security control framework with supporting documentation.

The Advanced Hosting Service is best suited to customers who need a customized application context without assuming the burden, responsibility and risk of managing 7x24 operations and security compliance.

Advanced Hosting Service Description

Advanced Hosting includes all Basic Hosting Service features with application platform management services provided through NCC's Technical Consulting Services. Customers will have the freedom to define custom configuration requirements that will be implemented and maintained by NCC provided services. Access to operating system and application platform configuration will be restricted to authorized NCC systems administrators.

Application platform license and maintenance costs are not included in the service. The NCC acquisition services are optionally available to acquire necessary license and maintenance services or customers can provide proof of licenses purchased through other methods.

The NCC Advanced Hosting Service will provide:

- All the features of Basic Hosting.
- Custom application platforms managed in compliance with EPA configuration standards including installation configuration, maintenance and patching.
- Application platform deployment and operations coordination services billed at a uniform monthly rate to support initial application deployment and change management coordination.
- 7x24 response to application platform issues.
- When provided for NCC standard hosting platforms, inclusion of the application platform in an NCC General Support System managed with NIST 800-53 compliant controls appropriate to the customer's sensitivity classification of the application (low, medium, high). Controls are limited to those associated with the Application Platform.
- Documentation describing the NIST 800-53 controls implemented for the general support system and proof that the controls have been independently audited.

Comprehensive Hosting Service

The NCC Comprehensive Hosting Service provides for managed application platforms in a shared operating environment. The following application platforms are supported under the Comprehensive Hosting Service:

- Lotus Domino.
- Adobe Cold Fusion.
- Apache Tomcat.
- Oracle Enterprise Application Server.
- Oracle Portal.
- ESRI ArcIMS GIS Application Servers.
- Oracle Enterprise Edition Database.

The Comprehensive Hosting Service offers customers managed application platforms that include hosting capacity, software license, 7x24 operations support and a NIST 800-53 compliant security control framework for all aspects of hosting for the application platform. The key advantages of this service are:

- Reduced capacity and license costs compared to dedicated options.
- Reduced operations burden, cost and complexity because all aspects of capacity management, application platform management, security management, release management and patching are provided as part of the managed application platform.

- Reduced application certification and accreditation costs because Comprehensive Hosting customers leverage a NIST 800-53 compliant security control framework for all aspects of their production application beyond controls within the application development context.

The Comprehensive Hosting Service is best suited for customers who have applications developed for EPA standard platforms. Comprehensive Hosting provides customers with the most cost-effective and least complex option for application hosting.

Comprehensive Hosting Service Description

- A shared application hosting environment providing all software license and capacity necessary to meet defined service levels for platform availability, performance and recovery.
- A standardized application platform managed in compliance with EPA configuration standards and including technical labor for installation configuration, maintenance and patching.
- A uniform monthly service rate for hosting services.
- Customer application deployment and operations coordination services billed at a uniform monthly rate to support initial application deployment and change management coordination.
- Access to utility storage services billed at a uniform monthly rate based on requested storage quantity and storage features (performance tier, backup type, replication, encryption).
- Access to optional technical consulting services for project management, coordination, application security evaluation and integration support.
- Access to optional services for off-site recovery or failover.
- Access to a service delivery and performance management dashboard providing visibility into service request status, platform and application performance.
- 7x24 response to infrastructure, platform or application failures.
- Inclusion of the server in an NCC General Support System managed with NIST 800-53 compliant controls appropriate to the customer's sensitivity classification of the application supported by the server (low, medium, high). Controls are provided for all aspects of production application controls beyond controls specific to the application development context.
- Documentation describing the NIST 800-53 controls implemented for applicable general support systems and proof that the controls have been independently audited.

Comprehensive Hosting Service customers will be responsible for developing and supporting custom content or applications delivered by this hosting service as well as application-specific user administration.

Customer application code must be reviewed for compatibility with shared platform coding standards and certified to be free of vulnerabilities using EPA approved tools before placement in the shared environments.

High Performance Computing Hosting

In addition to the three hosting environments described above, the NCC provides a specialized HPC environment to support scientists and researchers who require this highly specialized compute and storage environment to meet their research goals. As part of the future direction of the NCC, external services will be evaluated and where cost beneficial to the Agency will be integrated into the current environment supported by the Scientific Computing Service.

APPENDIX B: MANAGED DEVELOPMENT SERVICES

The following sections provide a description of the current and target state of NCC's Managed Development Services.

Current State of Managed Development Services

The NCC currently offers only preproduction staging environments within the NCC hosted services context. These staging environments are limited in capacity and are designed to support application code review and preproduction configuration only. The following issues result from this lack of the NCC hosted development environments:

- Initial deployments of new applications often require significant re-work because of variations between the contractor-hosted development environments and the NCC production environments.
- The NCC's current staging environments cannot duplicate the communications restrictions placed on production applications resulting in required and/or unauthorized communications being discovered only after deployment to production.
- EPA's total cost of ownership for application development platforms is higher because many isolated development environments are provisioned at government expense within development contractor facilities.

Target State of Managed Development Services

In the target state, the NCC will offer Managed Development Services supporting application development that

- Are flexible and agile enough to accommodate the rapid pace of configuration change required for efficient software development.
- Mirror the target platform configuration including server, application platform, network zoning and firewalled communications.
- Support development and testing of specialized and emerging technologies.
- Provide sufficient access for developers to easily test applications and for application owners to review applications in development.
- Deliver these services at a cost that is significantly lower than platform provisioning under the development contract.

Some of the technologies that will be employed to develop this service are

- NCC managed development server for Agency-approved standard technologies (e.g., ColdFusion, Oracle Application Server, Oracle Database, Domino).
- NCC managed virtual desktops for application development for a select suite of development products.

APPENDIX C: SECURITY

Current State of Security

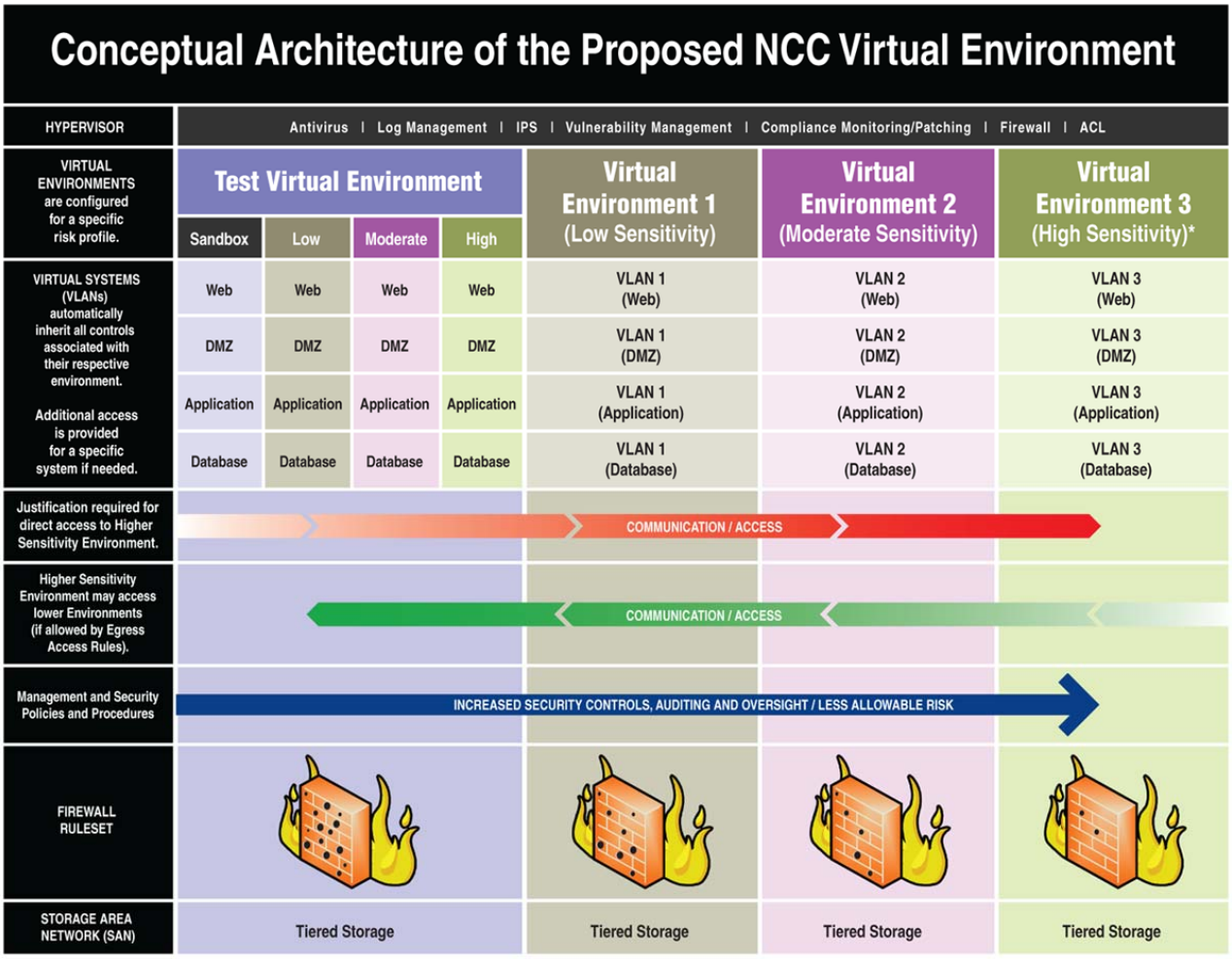
The NCC's current network security model focuses on the quantification and mitigation of risks associated with a specific system or application and any potential harm it may bring to the WAN or Local Area Network (LAN). The evaluation of risks and corresponding mitigation strategy is developed for each system on a case-by-case basis. The security infrastructure affords general purpose protection and more refined security protection as required by the system. This is achieved via host or application controls, processes and system/application management functions. This methodology has been effective in maintaining the NCC's desired security posture and adhering to federal regulations. However, it continues to hamper the NCC's ability to deploy applications in an efficient manner

Target State of Security

The target state of security focuses on delivering an IT security architecture framework that is capable of quickly accommodating customer needs, while maintaining EPA's current security posture. This is accomplished through the creation and management of zones. Each zone will employ the required security controls to provision acceptable risk for systems within the zone. Communications via standard and normal ports, protocols and services that are required for system functionality will be applied to all systems within the zone. Any additional communication requirements will be documented and authorized on an exception basis and, if approved, applied to that specific system. The primary areas of focus for this architecture are discussed below.

Figure C-1 depicts the virtual infrastructure security architecture necessary to deliver the NCC's Hosting Services. In the target state, the NCC's hosting environment will utilize virtual technologies to the maximum extent possible. Physical and dedicated systems will be reserved for organizations with strong justifications.

Figure C-1: Conceptual Architecture of the Proposed NCC Virtual Environment



Virtual Environments

Under the new architecture, three virtual environments will be characterized by the sensitivity of the hosted data – Virtual Environment 1 (Low Sensitivity), Virtual Environment 2 (Moderate Sensitivity), and Virtual Environment 3 (High Sensitivity). Applications will be required to be hosted in the virtual environment that has the level of sensitivity needed for the data hosted. A Test Virtual Environment will also be used, which is described in more detailed below.

The target architecture will contain four Virtual Local Area Networks (VLANS) within each Virtual Environment—Web, DMZ, Application and Database. The VLANs will automatically inherit all security controls and firewall access rules associated with their respective environments. Additional access will be provided for each specific system, as needed pending justification.

Under this model, predefined security plans and common configurations will be defined for each virtual environment. Any application utilizing the standard configuration being deployed to a virtual environment will automatically inherit the base security plan and configuration for that environment, including firewall rules and access. Any modification to the firewall rules for a standard configuration will require a Firewall Rule Request (FRR) addendum, assuming the configuration is standard and uses standard ports. Custom configurations may require a full system plan and FRR.

Test Virtual Environment

The Test Virtual Environment will contain a staging environment for each production environment (Web, DMZ, Application and Database), allowing for deployment testing that mimics the production virtual environment in which the application will be hosted once it is deployed. Any changes to the application or firewall access rules will be made in the testing environment before it is deployed to the production environment.

The Test Virtual Environment also contains a "sandbox" area that can be used as a test and development environment for specialized and emerging technologies and for applications that are being migrated from an external environment to the NCC environment or applications that need to be tested before the security rules are put in place in the other test environments. The "sandbox" environment will allow developers to test applications in an environment that is less restricted internally. These applications will not be allowed to access environments outside of the "sandbox," and outside applications will not be allowed to access applications within the "sandbox." The applications within the "sandbox" will be able to communicate with other applications within the "sandbox" test environments. After testing of an application within the "sandbox," the application can be moved to the low, moderate or high test virtual environment that corresponds with the production virtual environment in which it will be hosted after deployment.

Data Sensitivity

The NCC will obtain the level of data sensitivity during the ordering process to align the hosting solution with the appropriate firewall zone. High data sensitivity applications will be flagged for a follow-up call to verify the data's level of sensitivity within the system. Additionally, security and vulnerability testing commensurate with the sensitivity level of the data will be established and performed regularly.

Communication within Environments

Figure C-1 also depicts the reduced communication access from the lower sensitivity environments to the higher sensitivity environments. Increased sensitivity results in reduced communications and access from lower sensitivity applications. By default, a higher sensitivity environment will have access to a lower sensitivity environment, but a lower sensitivity environment must have firewall rules and justification in place to communicate with a higher sensitivity environment.

Firewall

The NCC will redesign the firewall topology to utilize strengths of virtualization technology and will adopt a data-centric methodology for firewall rules and access. Zones will be aligned to correlate with the data sensitivity of applications housed at the NCC and VLANs will be incorporated within the zones to implement additional security measures.

Firewall Rule Request

The NCC will define industry standard ports and protocols to ensure supported application technologies operate effectively. The NCC will maintain up-to-date, allowable ports and standard configurations by proactively researching emerging application technologies.

Use of the FRR Lite process will be expanded to minimize the amount of information needed to open communications for a supported application technology (e.g., source and destination IP addresses). The NCC will also streamline the current FRR Addendum process to allow quick and efficient handling of minor changes for standard applications.

Value-Added Security Services

The NCC will provide value-added security services as part of hosting services:

- **Antivirus**: Software to prevent, detect and remove malware including computer viruses, worms and trojans. Such programs may also prevent and remove adware, spyware and other forms of malware.

- **Log Management**: The management and analysis of computer-generated log messages to ensure security of operations and compliance with Agency standards.
- **Intrusion Prevention System (IPS)**: A network security device that monitors network and/or system activities for malicious or unwanted behavior and can react in real time to block or prevent those activities.
- **Vulnerability Management**: The structured approach to maintaining an appropriate security state for the hosting environment, including determining the Agency's overall risk to both internal and external attacks and identifying exposures and risks associated with any of the organization's network attached resources such as servers, routers switches and specialized network support devices. Vulnerability management will also be done for the application prior to deployment or after any major change.
- **Compliance Monitoring/Patching**: The system will be routinely scanned to verify compliance with applicable standard configuration documentation and that the system has the minimum required patches based on the operating system and version.

APPENDIX D: FAILOVER AND DISASTER RECOVERY

The NCC's target hosting environment will consist of virtual servers with a standard configuration. As the CRSSM Initiative is implemented, three additional EPA computer centers will host similarly configured virtual servers. These computer centers will also have SAN storage compatible with the NCC. Failover and DR will be available using remote EPA computer centers as recovery sites. By backing up application servers and application data to the remote computer centers, restoring them to operation at the remote site will be a straightforward task. The NCC will

- Deliver DR/failover solutions through the CRSSM internal "cloud."
- Have a defined set of requirements for DR solutions to ensure EPA's information assets are adequately protected and managed.
- Establish memoranda of understanding (MOU) to ensure clear communications with customers to understand each party's responsibilities and the solutions to be delivered in the event of a disaster.

To offer DR services, the NCC will

- Develop the hosting and storage standards, policies and procedures described in this Plan.
- Develop a MOU that outlines the roles and responsibilities agreements with each EPA remote computer center and each DR customer.
- Develop a DR procedure for establishing, monitoring and managing DR implementations. In addition, develop criteria for declaring and recovering from a disaster, including periodically testing the recovery process.
- Analyze the WAN impact of DR backup and determine the resources necessary to minimize WAN traffic.
- Develop DR service cost model.

APPENDIX E: COMMUNICATIONS

During the implementation of the NCC's Operations Plan, the NCC will develop a communication plan that addresses the communication needs of the NCC's internal and external audiences in the first quarter of FY2010. The plan will address both transition communications and regular communications after the full implementation of the Plan. In FY10, the NCC will hold a series of video conferences as one mechanism to communicate with Program Offices and Regions to inform them about the NCC Operations Plan and how it will benefit them.

The following sections articulate the goals and information needs for communications to internal and external audiences.

Internal Communications with Staff and Managers

The NCC will ensure a disciplined and consistent approach to internal operational communications that will enable its staff and management to execute the steps and activities necessary to deliver and manage services contained in the service enhancement plan. The communications plan will address the following goals and internal information needs.

Internal Communication Goals

The following are the internal communication goals of the NCC:

- Effective internal staff and management communication.
- Transparency into business processes.
- Continuity, knowledge transfer and retention among the staff and management.
- Ability of staff to communicate consistently and accurately with their customers.

Internal Information Needs

The following are the information needs that will be addressed in the internal communication approaches for the NCC:

- Goals, objectives and future direction of the NCC.
- Transition timeline.
- Process changes.
- Program performance.
- Customer and stakeholder expectations of and satisfaction with NCC services.
- Scheduled activity, maintenance, changes or initiatives that may affect the normal operation of the services.
- Outstanding problems or incidents and the actions taken to address them.

The communication approaches will be implemented on three levels:

- The program level, which addresses strategic objectives of the NCC.
- The service level, which addresses the communications needs of each service and cross-functional areas.
- The operations and maintenance level, which covers standard operating procedures.

External Communications with Customers and Stakeholders

Communication with customers and stakeholders is important to ensure customer satisfaction. The focus of the communication with customers and stakeholders will highlight the NCC's actions in meeting the external business requirements and goals.

External Communication Goals

The following are the external communication goals of the NCC:

- Educate key audiences about the EPA's NCC.
- Educate customers about the NCC's services.
- Setup and maintain two-way communication mechanisms to understand the NCC service needs of customers.

External Information Needs

The following are the information needs that will be addressed in the external communication approaches for the NCC:

- Goals, objectives and future direction of the NCC.
- Program performance.
- Service and ordering process changes.
- Incidents and their status.
- Scheduled activities and maintenance and how they will affect customers.
- Customer satisfaction and how concerns will be addressed.

External Communication Methods

The following communication methods will be used to communicate with customers and stakeholders:

- Briefings.
- Memoranda.
- Web conferences.
- Participation in customer forums (e.g., conferences, trade shows, meetings).

APPENDIX F: INTERNAL NCC OPERATIONS TRANSITION TIMELINE DETAIL FY2010-FY2011

The table below highlights supplemental steps and activities to support the high-level activities listed in the transition timeline included in *Section 3: Transition Plan.*

Table F-1 NCC Operations Transition Timeline Detail FY2010 - FY2011

Number	Activity	Start Date	End Date
	SERVICE DELIVERY PROCESSES		
1.0	Streamline ADC process	October 2009	June 2010
1.1	Identify the goals of a streamlined ADC process (metrics)		
1.2	Define the current NCC/customer deployment transition points		
1.3	Outline and design a revised ADC process		
1.4	Implement		
1.5	Measure		
2.0	Offer Web-based ordering	October 2010	January 2011
2.1	Define the requirements (Relationship with eBusiness)		
2.2	Design		
2.3	Customer focus groups/feedback/testing		
2.4	Revise the process		
2.5	Test		
2.6	Implement		
2.7	Feedback		
	HOSTING PLATFORM		
3.0	Offer Dedicated Hosting on X86 Virtual Infrastructure	October 2009	March 2010
3.1	Establish VM infrastructure		
3.2	Develop standards for VM sizing and resource allocation		
3.3	Develop methods for VM resource accounting and billing		
3.4	Analyze costs and develop pricing		
3.5	Offer virtualized server service (under UH)		
3.6	Offer three hosting service options		
4.0	Migrate shared hosting platforms to virtual infrastructure	April 2010	September 2010
4.1	Identify which shared platforms are appropriate for VM Hosting		
4.2	Test platforms in the VM context		
4.3	Identify VM capacity for individual platforms		
4.4	Develop configuration standard for platforms on VM		

Number	Activity	Start Date	End Date
4.5	Develop a plan for migration (with customer communication and buy off)		
4.6	Implement/migrate platforms		
5.0	Offer Specialized HPC Hosting	October 2010	February 2011
5.1	Develop plan with goals, requirements, and options		
5.2	Management approval to proceed		
5.3	Presentation to WCF Board & Board approval to proceed		
5.4	Implement contracts or MOUs to support services, perform outreach to potential customers, and prepare service for FY11 implementation		
6.0	Offer Application Development Environments	October 2010	November 2011
6.1	Define the requirements for application development (e.g., security, change management, interoperability with staging and production)		
6.2	Design		
6.3	Implement		
	STORAGE		
7.0	Refresh NCC Midrange Storage Infrastructure	January 2010	May 2011
7.1	Identify NCC tiers and required volumes (e.g., tiered storage performance requirements)		
7.2	Design storage tiering method		
7.3	Plan acquisition strategy		
7.4	Implement tiered storage platforms		
	FACILITIES		
8.0	NCC Facility Modernization	April 2010	September 2011
8.1	Implement Green IT in NCC		
8.1.1	Agree on the goal of Green IT for NCC		
8.1.2	Document measures to date		
8.1.3	Identify path forward		
8.2	Re-architect NCC power, cooling and server placement		
	NETWORK		
9.0	Refresh NCC Network Infrastructure	April 2010	September 2010
9.1	Describe current infrastructure		
9.2	Identify refresh requirements		
9.3	Establish WCF funding to support refresh		
9.4	Design and implement the refresh		
	PERFORMANCE MONITORING AND CAPACITY PLANNING		
10.0	Establish operational awareness infrastructure	October 2009	April 2010

Number	Activity	Start Date	End Date
10.1	Define the goals		
10.2	Define the requirements		
10.3	Evaluate options		
10.4	Design		
10.5	Implement		
10.6	Test		
10.7	Deploy		
11.0	Establish infrastructure capacity planning	June 2010	November 2010
11.1	Define the goals		
11.2	Define the requirements		
11.3	Evaluate options		
11.4	Design		
11.5	Implement		
11.6	Test		
11.7	Deploy		
	SECURITY		
12.0	NCC security zone re-design	October 2009	June 2010
12.1	Define NCC security zone re-design goals (e.g., streamline firewall rule documentation and implementation process)		
12.2	Analyze firewall rules		
12.3	Document requirements for varying levels of protection (zone architecture)		
12.4	Design rules to accommodate communication within the zones		
12.5	Quality the technology and the process to Test/verify that zones are operating as designed		
12.6	Establish processes for modifying/implementing rules		
12.7	Obtain prerequisite approval (TISS)		
	DISASTER RECOVERY AND FAILOVER		
13.0	Offer low-cost streamlined DR service	June 2010	August 2011
13.1	Requirements		
13.2	Evaluate options		
13.3	Design solutions		
13.4	Implement		
13.5	Measure		
	SERVICE TRACKING		
14.0	Offer Customer Application Dashboard (performance monitoring and tracking)	November 2009	March 2011

Number	Activity	Start Date	End Date
14.1	Define the goals		
14.2	Define the requirements		
14.3	Evaluate options		
14.4	Design		
14.5	Implement		
14.6	Test		
14.7	Deploy		

APPENDIX G: ACRONYMS

ADC	Application Deployment Checklist
COOP	Continuity of Operations
CRSSM	Computer Room, Server and Storage Management
DR	Disaster Recovery
EPA	Environmental Protection Agency
FRR	Firewall Rule Request
GIS	Geographic Information System
HPC	High Performance Computing
IPS	Intrusion Prevention System
IT	Information Technology
ITIL	Information Technology Infrastructure Library
ITS	Information Technology Solutions
LAN	Local Area Network
LEED	Leadership in Energy and Environmental Design
MOU	Memoranda of Understanding
NCC	National Computer Center
OEI	Office of Environmental Information
OTOP	Office of Technology Operations and Planning
RPO	Recovery Point Objectives
RTO	Recovery Time Objectives
SAN	Storage Area Network
SWOT	Strengths, Weaknesses, Opportunities and Threats
VLANS	Virtual Local Area Networks
WAN	Wide Area Network
WCF	Working Capital Fund