

**Debbie Leitka, CPSM, C.P.M.**

Sandia Contracting Representative
Fax: (505) 284-6504
E-mail: [Corporate IT Services](#)

P.O. Box 5800, MS 1484
Albuquerque, NM 87185-1022

Chris Slater

Sandia Contracting Representative
Fax: (505) 284-6504
E-mail: [Corporate IT Services](#)

May 24, 2010

Subject: Request for Information (RFI) for Corporate Information Technology (IT) Services

To Whom It May Concern:

This is a Request for Information (RFI) to identify methodologies for providing IT services and potential sources to supply these services to Sandia National Laboratories (Sandia) located in Albuquerque, New Mexico. **All information supplied in this RFI shall not be used or disclosed for any purpose other than to provide information under this RFI.** Information received in response to this RFI will be used for planning purposes. Sandia will not return any information packages.

This is an inquiry only; at this time Sandia does not have a firm requirement or budget for the services requested herein. **THIS DOCUMENT IS NOT A REQUEST FOR QUOTATION (RFQ).** This request for information does not commit Sandia to contract for any supply or service whatsoever. Further, Sandia is not at this time seeking proposals and will not accept unsolicited proposals. Contractors are advised that Sandia will not pay for any information or administrative costs incurred in response to this RFI; all costs associated with responding to this RFI will be solely at the interested party's expense. Not responding to this RFI does not preclude participation in any future RFQ, if any is issued. In addition, responding to this RFI does not guarantee respondent will be considered for the RFQ process. Sandia may eliminate suppliers from the RFQ bidders list if they are deemed not qualified to meet the mandatory criteria in the RFI.

This RFI and any related information will be synopsized on [Sandia's Procurement website](#), [Sandia's Opportunities Website](#), and the [Federal Business Opportunities](#) (FedBizOpps) website under solicitation # _____.

Attachment A to this document titled "Sandia National Laboratories IT Environment" gives a detailed description of the services a contractor would perform if a subsequent contract were issued. Attachment A is to be used to enable the contractor to provide capability and pricing information. Contractors are advised that Attachment A contains an overview of Sandia National Laboratories, corporate IT at Sandia, principles that guide corporate IT, and a description of the IT structure and environment. Please note that this information will be revised prior to the issuance of any RFQ.

The objective of this effort is to find methodologies, contract vehicles, and qualified suppliers to provide services for the areas detailed in Attachment A which will result in a **fully integrated solution** compliant with the environment and principles of Sandia.

If you are interested in performing the work described, please submit a written discussion of how you could provide all or a portion of the service(s), specifically addressing the capabilities you have, the methodologies to

deliver these service(s) keeping in mind the principles outlined in Attachment A, the recommended contracting method, and the pricing models.

1. RESPONSE INSTRUCTIONS

- If you are interested in performing any or all of the work described in the Attachment A, please submit the following information to the undersigned by **5:00 p.m. MST on June 14, 2010**. Responses may be sent by mail, facsimile, or e-mail. Please provide 3 copies of the information if submitted other than electronically.
- Interested parties are requested to respond to this RFI with a written type response. Responses shall be no more than 20 standard (8 ½ x 11, 12 font) pages in length including marketing materials and brochures. Sandia will not accept any documents marked as Company Proprietary.
- Questions regarding this RFI shall be submitted in writing by e-mail to the Sandia Contracting Representative (SCR) listed below. Questions will be answered by posting questions and answers on the Sandia corporate IT services RFI website ([insert link here](#)). Questions shall not contain proprietary or classified information. Sandia does not guarantee that questions received after June 11, 2010 will be answered.
- Respondents should directly address the Mandatory Criteria in their submissions.
- Respondents interested in receiving any follow-on RFQ should include a statement of interest in receiving any subsequent RFQ.
- Recommended methodology(ies), contracting strategy(ies), pricing models, and labor models/categories should be included.
- Please furnish the name, title and phone number of the person(s) authorized by your company to provide the requested information on behalf of your company.
- Provide descriptions of your three (3) largest contracts of a similar nature including customer name and address, period of performance, and reference contact's name and phone number.
- Provide examples of efficiencies, incentives/penalties, and cost savings models either utilized by your company or as a proposed strategy in this RFI.
- Comment on whether or not your company has ever been Foreign Ownership, Control and Influence (FOCI) approved or is capable of being approved by the Department of Energy (DOE) or Department of Defense (DOD). Information can be found [here](#) regarding FOCI and Sandia's requirements. Note: This information will be used for planning purposes only and will not be used as a determining factor in the development of a list of potential offerors if a subsequent RFQ is issued.
- ITIL®: Provide information on whether your company uses ITIL® best practices for IT Service Management (ITSM), other IT best practices used, or applicable certifications awarded to your company by national or international IT standards based institutions (i.e. ISO). ITIL® is a set of best practices for managing IT services. ITIL® is a registered Trade Mark of the Office of Government in the United Kingdom and other countries.
- ISupplier is Sandia National Laboratories supplier database. To learn more and register visit [Sandia's ISupplier website](#).
- SOCIO-ECONOMIC INFORMATION -- It is Sandia National Laboratories' policy to provide Small Businesses (SB), Small Dis-advantaged Businesses (SDB), Woman-owned Small Businesses (WOSB), HUB Zone businesses (HUBZone), Veteran-owned Small Businesses (VOSB), and Service Disabled Veteran-owned Small Businesses (SDVOSB) the maximum opportunity to participate in the award of contracts and purchase orders.
 - Comment on your current socio-economic status and your ability to partner with SB, SDB, WOSB, HUBZone, VOSB, and SDVOSB's.

- Business type (large, small, small-disadvantaged, etc.) including North American Industry Classification System (NAICS) code applicability should also be included. It is anticipated the following NAICS codes will apply: 493110 General Warehousing and Storage, 511210 Software Publishers, 517110 Wired Telecommunications Carriers, 517210 Wireless Telecommunications Carriers, 518210 Data Processing, Hosting, and Related Services, 519130, Internet Publishing and Broadcasting and Web Search Portals, 541330, Engineering Services, 541511 Custom Computer Programming Services, 541512 Computer Systems Design Services, 541513 Computer Facilities Management Services, 541519 Other Computer Related Services, and 541618 Other Management Consulting Services.
- Include your ideas on how to partner with small businesses in an effort to provide the services listed in Attachment A. Additionally, provide information regarding any similar partnership arrangements you are currently participating in or have participated in the past with socio-economic groups listed above. Sandia may elect to deem a portion of the RFQ and resulting award as a small business set aside.

Once again, information provided in Attachment A is only for informational purposes for this RFI. Sandia makes no guarantees regarding any numbers or historical information and Sandia will not be bound under any circumstances to these numbers in the event of issuance of an RFQ and any resulting contracts.

2. MANDATORY CRITERIA

- FOCI - Respondent must be able to meet FOCI determination.
- NAICS codes applicability – Respondent must be listed as a qualified supplier under at least one of the listed NAICS codes for services in which they provide a response.
- Experience – Respondent must have at least five years experience handling related IT services (or be able to partner with a company with this experience) detailed in Attachment A and related NAICS codes for comparable customers to Sandia.

Please Note: This is only a request for information. Should Sandia wish to procure these services a separate Request for Quotation may be issued.

Regards,

Debbie Leitka, CPSM, C.P.M.
Sandia Contracting Representative

Chris Slater
Sandia Contracting Representative

Attachment A - Sandia National Laboratories IT Environment

Overview of Sandia National Laboratories

Sandia National Laboratories (subsequently referred to as SNL or Sandia) is a multi-program engineering and science laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the US Department of Energy's National Nuclear Security Administration (NNSA). Through science and technology, people, infrastructure, and partnerships, Sandia's mission is to meet national needs in four areas: Nuclear Weapons; Energy, Resources, and Nonproliferation; Defense Systems and Assessments; and Homeland Security and Defense.

Overview of Corporate IT at Sandia

Because Sandia is a national laboratory whose primary purpose is to serve the national interest with regard to security, its information technology (IT) requirements have broad, diverse, and often conflicting drivers and requirements. SNL's focus on national security means that IT products and integrated solutions that it develops or adopts must be highly security conscious. SNL's nature as a research and development institution creates a need for IT products and services that are innovative, efficient, and leading edge. Successful R&D also requires a myriad of collaboration and partnerships. SNL collaborates and partners with organizations and institutions ranging from domestic corporations and universities, to foreign countries, to sensitive and/or classified work with other national labs and federal, state, and local government agencies. Finally, SNL's character as a large corporation with an onsite workforce of approximately 12,000 people (employees and contractors) requires traditional IT attributes such as highly reliable networking and voice communication capabilities, production-level corporate applications and systems, and standardized desktops and office suites.

Within these diverse IT drivers and requirements, the objective of corporate IT is to provide users with a highly integrated range of IT services, including information management and distribution, an effective and highly reliable/available IT infrastructure, and a centralized model for support and services. Sandia's corporate IT management intends for this system to provide a differentiating advantage to SNL, one that allows innovative solutions to new, complex, large-scale, and high-risk problems in a minimum of time and at reduced cost. As part of its services, corporate IT management strives to provide individualized access to information for every member of the Sandia workforce no matter where located, to allow group access to information so that collaboration is enabled and fostered, and to enable virtual organizational structures to be developed that can respond quickly to programmatic changes and opportunities. To achieve the goal of an integrated infrastructure, Sandia relies on staffing that comprises both Sandia employees and supplemental (contractor based) staff. This RFI specifically seeks ideas, methodologies, and solution sets to effectively utilize supplemental IT staffing.

Sandia has derived several principles considered to be key to the success of this contracting endeavor. Responses to the RFI need to address and provide examples/evidence on how these principles can be implemented by your organization. Sandia's principles are as follows:

1. Efficiencies
 - a. Incentivize cost efficiencies
 - b. Remove traditional IT "stovepipes"; achieve integrated IT Service Management with all functional groups within corporate IT
2. Agility

- a. Accommodate rapidly evolving IT technology (technical agility)
- b. Be able to secure/rotate staff as needed (task agility)
- 3. Flexibility
 - a. Use contract vehicle type and pricing models based on delivery of services and/or competencies
 - b. Use Customer/Supplier relationship management models
- 4. Innovation
 - a. Adopt external solutions/methodologies that meet the needs of Sandia
 - b. Make use of innovative technology (e.g., new industry practices, architectures, standards, paradigms, etc.)
 - c. Continually improve IT processes for satisfactory business outcomes
 - d. Develop or adopt innovative methodologies
 - e. Develop or adopt innovative tools
- 5. Quality Management
 - a. Optimize customer satisfaction within overall IT goals and resources
 - b. Develop or adopt methodologies to measure performance
 - c. Commit to continuous improvement
 - d. Commit to quality standards (e.g., ITIL®, ISO9000, etc.)
- 6. Commitment to community
 - a. Provide opportunity for local and small businesses
 - b. Provide opportunity for small disadvantaged and women-owned business
- 7. Staffing
 - a. Standardize the qualifications of personnel
 - b. Attract and retain high quality personnel
 - c. Maintain an agile workforce that responds to fluctuating needs
 - d. Ensure the staff is effectively trained, including maintenance of skills and competencies
 - e. Integrate seamlessly with Sandia IT staff

The following descriptions of the functional groups within Corporate IT at Sandia are for informational purposes and meant to assist you in responding to this RFI. These activities cover the general Sandia IT environment and are currently being performed by a mixture of Contractor personnel and Sandia professional IT staff. Not all of these activities would necessarily be included in a future RFQ.

Cyber Enterprise Management

Cyber Enterprise Management (CEM) monitors Sandia's IT resources, contributing to the assurance of the security and health of Sandia's computing infrastructure by detecting and responding to conditions that affect security and service. The CEM vision is to be the center of situational awareness of the Sandia cyber environment at all times.

CEM monitors several distinct networks using a variety of technologies. Analysts staff the Systems Operations Center 24 hours a day, 7 days a week. The analysts perform several essential tasks, including intrusion detection, facility stewardship, response to events, notification of customers, and job scheduling on multiple networks.

The CEM system comprises commercial, open source, and in-house developed software. The core of the architecture is based on IBM's Tivoli software. Other substantial components are provided by Hewlett Packard.

Cyber Security

Sandia's cyber security defensive operations include a diverse set of people, tools, and architectures to protect SNL information. The goal is to provide effective cyber security while accommodating the flexibility necessary to enable the work that constitutes Sandia's mission. Cyber Security continuously reevaluates SNL's security architecture and makes improvements to both address the latest attacks and take advantage of technology changes in Sandia's cyber environment. Sandia's defensive approach encompasses four phases: prevention, detection, response, and resolution/recovery.

The Sandia environment requires 24/7 intrusion detection analysis and response. Cyber Security analyzes the data from several commercial, open-source, and in-house developed tools that use filters and rules to generate alerts. Analysis of the alerts determines if they are of concern or are false positives. Knowledge of network traffic data, Sandia's policies, and the overall cyber environment are important elements in accurate intrusion detection analysis. False positives are recorded with an explanation of the analysis that led to the conclusion. Actual intrusions are responded to, often by escalating to the Sandia staff for deeper analysis and resolution. Software application tool engineers and system administrators support the cyber security production tools team. This team is responsible for managing the infrastructure used to support the defensive operations. Activities include software application tool management from cradle to grave and extensive evaluation to assess cost/benefit as changes are needed and/or made to the infrastructure.

Desktop Computing Environment

Sandia provides desktop computing support to its diverse internal user base of approximately 12,000 employees and contractors who are employed in technical, managerial, and administrative capacities. This customer base uses more than 35,000 computing devices and is located primarily in New Mexico; however, smaller numbers of customers exist in California and other sites such as Washington, D.C., and Nevada. The term "desktop computing" refers inclusively to desktop systems (including virtual systems), laptops, BlackBerrys and PDAs, thin client computing systems, and servers. The SNL computing environment is heterogeneous, consisting primarily of Wintel based PCs running Microsoft Windows (~28,000) but also including Macintosh (~2,000) and Linux machines (~5,000). Most types of mobile devices are subject to special requirements and restrictions such as encryption and disabling of certain features (i.e., internal microphones), in addition to presenting the inherent support complexities of laptop computers. (There is a separate high-performance computing environment not included in the Desktop Computing Environment. It is described later in this document.)

Sandia has a desktop common operating environment (COE) for the Windows, Macintosh and Linux platforms, providing enterprise-wide standardization. The Common System Platform (CSP) defines the computers that are eligible for support by the desktop support organization under the COE. The Common Software Environment (CSE) is divided into the following sections: 1) Collaborative Core Environment, which defines the applications and the configurations for applications installed onto all classes of desktop computers and most classes of mobile computers. Because it ensures the ability of customers to collaborate with each other, applications are (to the extent possible) changed simultaneously corporation-wide. 2) Desktop Core Environment, which includes CSE components that are directly related to the operating system. Updates to these components are on an "as needed" basis to maintain the integrity of the operating system. 3) Security Core Environment, including components of the CSE that maintain the security of the desktop by protecting against malware and unauthorized access. Additions and updates to this area are driven by Cyber Security requirements, coordinated with the desktop support organization, and deployed to systems as needed.

The networking environments are segmented into a Restricted, a Classified, and an Open environment, with most desktop machines operating in the restricted environment. Most desktop machines are managed by the desktop support organization; however, there are some groups of machines managed by local support. In addition to COE software, users are permitted to install other software, as needed for their particular work. This situation is typically user-supported unless support agreements are negotiated with the desktop support organization or paid for on an hourly-billed basis.

Desktop Support Computing Organization

The organization currently providing desktop support to SNL is an ISO9001:2008 certified organization committed to providing Sandia's workforce with a robust, secure, and reliable desktop computing environment. This is accomplished by providing enterprise-class products and services, developing good customer relationships, maintaining highly qualified staff, and continually improving processes in order to enable Sandia's mission success. In addition to being ISO9000 certified, improvement efforts using the ITIL® best practice for IT Service Management are being explored and implemented/integrated into day-to-day operations.

Sandia has a Corporate Computing Help Desk (CCHD) and desk-side operations, along with several other functional components of IT technical operations and applications management. Therefore, IT resources are required to design, build, transition, operate, and improve the technology required to deliver and support IT services, as well as support the development, implementation, operation, and improvement of the application environment to meet the needs of the business at SNL.

The help desk is the entry point for computing support and services for all Sandia employees and contractors. The help desk's annual call volume is approximately 125,000 calls. Of the answered calls, 96,000 "unique support tickets" are generated. The help desk also receives requests via email, voicemail and web submittals, which generate another 24,000 tickets per year.

The desk-side support technicians handle approximately 60,000 – 70,000 tickets per year. These tickets are either escalated by the help desk or created by desk-side technicians. The desk-side technicians support customer hardware and software on all platform types and in all networked and standalone environments, as well as distributed servers and printers. Typical support categories are break/fix, installation, moves, video conference setup and support, and upgrades. In addition, some of the desk-side technicians provide systems administration support and specialized (tailored) information technology solutions and support for Sandia line organizations.

The COE, CSP, and CSE are managed and maintained by a Technology Development Group. They also provide escalation support, oversee support contracts (such as MS Premier Support and Apple Support), and evaluate new technology for the Sandia desktop computing environment.

Similar to the Technology Development Group, Sandia has a Tools Group that mainly provides application management of specialized toolsets utilized by both the desktop support organization and other various members within the line organizations. Examples include Sandia's support ticket tracking system, a database to register computing assets, and toolsets to provide inventory, remote access/assistance to machines, and software distribution.

Sandia also provides IT Training to the Sandia workforce. Instructional designers provide traditional classroom training and labs, online courses, streamed videos and movies, job aids, online help systems, and other learning products for IT-related needs.

Infrastructure Computing Services/Systems

The Infrastructure Computing Services/Systems organizations provide enterprise server management, storage infrastructure management of over a petabyte of data on several enterprise-class fiber channel and SATA storage area network arrays, management of centralized backup and recovery services on large tape silos located in the Corporate Computing Facility (CCF), directory services administration, home directory hosting, management of application servers (Oracle and PeopleSoft), management of the email infrastructure and service, management of the web infrastructure and services, management of the collaboration architecture and infrastructure which includes SharePoint, LiveMeeting, SharePoint Reporting Services, Project Server, Search, etc., and management of the need-to-know infrastructure on Sandia's classified networks.

The server computing environment at Sandia is diverse. The operating system environment includes most versions of Windows Server as well as most flavors of Linux and UNIX operating systems, including HPUX and Solaris. The hardware also runs the gamut from small standalone Wintel-based servers to 64-node server clusters, and from small standalone Linux servers to 256-node Linux clusters to Itanium-based enterprise class UNIX systems on which Oracle and PeopleSoft reside.

Infrastructure Computing Services/Systems also manages the Corporate Computing Facility (CCF), which houses the enterprise computing infrastructure of Sandia National Laboratories. Activities include power management and distribution, rack management, capacity planning, space management of the facility, and access management.

Enterprise Database Administration

Enterprise Database Administration provides a wide variety of data/database related services to any Sandia organization. Database infrastructure (e.g., hardware, software, procedures, monitoring, and automation) and database development/support services are offered. This group interfaces closely with other corporate IT organizations to supply database support for database applications. Additionally, database administration services can be provided by this group to customers outside the bounds of corporate IT for organizations that build and maintain their own applications.

Some of the duties of this group are to provide Database Management System (DBMS) installations, configurations, and upgrades; data/database modeling, design, and change management; creating and managing development, quality assurance, and production database environments; data integration and data access; performance monitoring and tuning; data integrity; data security; backup recovery (including disaster recovery); and consulting services for non-standard databases and servers.

Some of the current capabilities and competencies are in either (or both) Oracle 10g or above, or Microsoft SQL Server 9 or above. Other competencies include data modeling using a standard methodology (such as ER or ORM); logical and physical database design; object change management; referential integrity concepts and implementation; Oracle and/or SQL Server installation and configuration; third-party administration tools (e.g., DBArtisan, ER Studio, BMC's SQL Backtrack, etc.); enterprise applications (such as PeopleSoft, Oracle E-Business Suite, IBM FileNet, etc.); job scheduling and scripting; software process engineering frameworks (e.g., CMMI, ITIL®, etc.) and iterative/agile methodologies (i.e., RUP); and UNIX, Linux, and/or Windows System Administration.

Telecommunication Operations

Telecommunication Operations manages and operates the telecommunications network and telephone equipment, the wired and wireless communications infrastructure, and the management applications necessary to distribute telecommunication services to all Sandia work locations. The scope of Telecommunications includes Sandia's telecommunications network and telephone infrastructure that resides on Kirtland AFB as well as support for remote work sites such as the Sandia Science and Technology Park and Sandia's many other remote offices.

The telephone services include operation and management of Sandia's Alcatel/Lucent (A/L) 5ESS switch, various A/L remote switch modules, and day-to-day operational support for approximately 25,000 user desktop phones. The desktop phones are approximately 60% ISDN, 30% analog, and 10% voice-over-IP (VoIP). Although the VoIP deployment is currently small, there are plans to expand VoIP technology as industry support for the TDM-based 5ESS switch declines. Support is also required for the day-to-day operations and maintenance of Sandia's Net Versant/CallXpress system which provides approximately 10,000 voicemail boxes to Sandia's workforce.

Network infrastructure supports Sandia's three Class-B address spaces, which consist of approximately 500 network devices that deliver network connectivity to approximately 30,000 user host devices. Support for Sandia's network environments includes classified and unclassified infrastructures as well as support for many other small networks used by specialized programs. Activities include low-level network design, equipment deployment and implementation, and all trouble resolution activities. Infrastructure includes commercial router and switch technologies from Cisco, Brocade, and Juniper. There is also a limited deployment of 802.11 wireless infrastructures to approximately 20 buildings. New to the network infrastructure environment is a plan to move most of the network customers to a Gigabit-Passive-Optical-Network (GPON). The GPON deployment started in 2010.

Telephone and network services are provided for customer Moves, Adds, & Changes (MACs). The number of MAC activities ranges from 5,000 to 10,000 individual service requests annually.

A Telecommunications Warehouse is maintained and supported to enable the activities within telecommunications. This warehouse is 8,500 square feet, and contains approximately 1500 item types (ranging from network equipment chassis to small consumable stock items) and a total inventory of 20,000 items. This warehouse also provides all material and property support services to Sandia's network, telephone, and infrastructure operations teams.

The Cabling Infrastructure system includes copper and fiber optic wiring distribution systems for internal (building) and external telecommunications. Support is provided for all wired infrastructure design (Infrastructure Engineering Group) and operational cable maintenance and troubleshooting support (Field Operations). An Outside Plant team is responsible for basic maintenance and inspection of Sandia's telecommunications manhole infrastructure. To a limited degree, this support includes cable installation in an external building ductbank system. External cabling is typically distributed in a ductbank but also includes aerial and direct buried cables. This support does not include structural maintenance of the external ductbank system. Because Sandia is located on Kirtland AFB, some of the conduit infrastructure is shared between Sandia and the Kirtland AFB telecommunications group.

The Wireless system at Sandia includes day-to-day operations support for the Sandia two-way radio trunking system, all maintenance support for approximately 2,000 two-way radios, local one-way pager support services, RF trunking infrastructure system support, and all remote RF-site operations and maintenance support. (Note:

This support does not include cellular or BlackBerry support. Support for these areas is provided within the Infrastructure Computing and Desktop Support areas.)

Software Application Development

Enterprise Information Systems develops and maintains enterprise software for Sandia. The customer base consists of the Sandia workforce of approximately 12,000 employees and contractors. Sandia's portfolio includes over 400 applications ranging from web pages, to complex custom web applications, to custom Java applications, to complex commercial systems such as PeopleSoft, Oracle E-Business Suite, Maximo, and many other COTS applications. Subject areas include corporate accounting and budgeting, human resources, security and access control, facilities management, safeguards and security, environmental health and safety, and business process management. Enterprise Information Systems partners with and relies upon the Enterprise Database and Infrastructure Computing organizations to provide foundational database and hardware/networking support for enterprise applications. This support ranges from dedicated staff assigned to the large Enterprise Resource Planning (ERP) systems to matrixed support for other COTS and custom applications.

High Performance Computing Environment

Sandia relies upon a comprehensive environment of high performance networks, computers, file systems, and long term storage systems to accomplish many of the most critical missions of the laboratory business units. The traditional engineering and science simulation and modeling disciplines have been expanded recently to include informatics, algorithm development, data mining, and cyber security, all requiring support from personnel and computer systems which comprise Sandia's Scientific and Engineering Computing environment. These systems are present on three Sandia network environments (Open, Restricted, and Classified). Automated tools move small data sets between these environments, and systems support extensive data transfer within a given network both internally and to collaborative partners within the DOE complex. Sandia contracts with Qwest to provide high speed network connectivity among the NNSA laboratories.

The scientific computing environment relies heavily upon the Infrastructure support projects for authentication, networking, computing facilities and cyber security environments. The basic computing environment is Linux (or other UNIX variants). The capacity computer systems use an NNSA-developed common computing environment software stack (TOSS) based on Red Hat Enterprise Linux, the Moab resource manager, and the Lustre file system. Cray computer systems use the Sandia-developed Catamount lightweight kernel and the Cray Linux Environment. Computer operations are a 24x7 activity with 2 hour maintenance/repair response times required.

Recently, an initiative called Common Engineering Environment (CEE) has gained momentum which provides a common software environment with major engineering and mathematics libraries and licenses for use by staff on desktops and centralized virtual systems. Both Linux and Windows environments are provided, as is a parallel Matlab cluster.

Long term hierarchical data storage is provided on each network. This is basically an HSM service which is available to customers from desktop, to department, corporate capacity and capability level computers. Data storage capacity ranges up to 10 petabytes on each system. These systems utilize the High Performance Storage Software (HPSS) developed by the IBM/NNSA labs consortium.

High performance parallel file systems, mainly Lustre based, support capacity and capability computing. Data capacity is in the single petabyte range. Visualization platforms render images from the gigabytes of simulated output produced on each of the many computing platforms. Visualization software such as Ensight, Paraview and VisIt are augmented by hardware rendering accelerators in some cases.

The customer base for these services extends beyond Sandia to much of the Nuclear Weapons complex. Researchers from academia and other open science laboratories have access to unclassified resources maintained and operated by Sandia. Total customer base is approximately 450 spread throughout the country with the bulk being local to Sandia. Standard protocols such as FTP and SSH are used to access computing remotely, protected by CryptoCard two-factor authentication and data transmission encryption. User support personnel, in concert with systems analysts and vendor support teams, provide porting, optimizing, and debugging assistance to various code teams or individual code developers. Several commercial codes are employed both on the cluster environment as well as the capability systems (e.g., VASP, NASTRAN, LAMMPS, etc.), but the vast majority of codes are customer developed and supported (Sandia, Los Alamos and Lawrence Livermore provide the majority of the integrated code development effort).

User support services are provided by a combination of technical staff, system administrators, and training personnel. Support ranges from debugging application codes and third party libraries to porting and optimizing applications to new platforms. System Administration tasks include account provisioning and system software updates and patches. Multiple versions of compilers and communications middleware such as OpenMPI and MVAPICH create a complex software environment which requires expert support personnel with a background in engineering and science applications. Customers include local and remote users, ranging from novice to highly experienced.