Sprint’s Approach to Managed Network Service (MNS)

Sprint MNS takes a consultative approach in supporting both new and existing customer networks. We take into consideration that new networks require comprehensive design and engineering planning for network and equipment implementations and existing customer networks typically require analysis and base-lining to ensure the network is capable of being managed by Sprint. If an existing Agency network is not “management-ready”, MNS works with the Government and invokes the necessary elements of design and engineering functions to enable Sprint network management to be implemented. Both new and existing networks are readied for monitoring and/or management through the management initialization process. During the design phase of the managed network process we take into account other considerations as described below.

Network Design, Engineering, and Validation

- **Requirements Determination.** The Sprint team identifies Agency requirements through the review of an RFP Statement of Work or if a contract is in place, through Agency meetings. The purpose of this activity is to identify the essential Government applications, such as the Agency’s communities of interest, application requirements, business continuity issues, current net-working environment, and any known performance issues or security requirements for all users of the Agency network. We also capture and document Agency requirements for delay, availability, throughput, system and/or network recovery times, and CoS/Quality of Service (QoS) prioritization. We then incorporate an Agency’s existing traffic policy, routing policy, and security policy requirements into the system design. The network availability and performance requirements are then compared to the calculated availability and performance attributes of the network topology and equipment selections to ensure that the requirements are satisfied.

- **Network Infrastructure Design.** Sprint Engineers determine the placement of the network resources (routers, LAN switches, servers, databases, and applications) for the services at the 25 Agency locations. The development of the topology includes network services to be used to interconnect locations, including FRS, ATMS, IPS, and IP-VPN. The LAN and WAN equipment configurations are based on the networking requirements and the review of the standard configurations. Standard configurations are used so that the network deployment and management scheme is cost-effective.

- **Network Feature Selection.** The network equipment Service Enabling Device (SED) features and functions are selected to complete the overall network architecture. These features and functions include the selection of a routing scheme, IP addressing plan (leveraging the Agency’s existing IP addressing plan), and protocol support. The architecture also includes Network Services, Network Topology, Customer Premises Equipment (CPE), and Network Features that are used to meet the Agency networking requirements.
- **Network Services Identification.** We identify network services used on a per site basis. This includes the specific service vendors, service bandwidth requirements (i.e., Frame Relay ports and PVCs), back-up requirements, etc. on a per site basis.

- **Site-Specific CPE and Software Design.** We develop the site-specific hardware, software, and cable configurations for each location in the Agency’s network. The site types that were developed in the network design phase of the project are applied to the actual Agency locations. Next, we develop the site-specific software configuration files for the router, LAN Switch, and Data Communications Equipment (DCE).

- **Existing Network Impact Analysis.** Changes and impacts to other network sites that are connected to sites undergoing deployment or upgrade are identified.

- **Sprint NOC Transition Planning.** For existing networks, MNS works with the Government and gathers Agency contact information, server location, server configuration, network device (e.g., routers, switches, and hubs), and configuration information. The information-gathering phase of this project is critical in the successful migration of the servers, and/or the network devices into the Sprint NOC. As noted previously, it includes Agency contact information, notification matrix, servers to be managed, server Operating System (OS) platform and version levels by server and by customer location, and an inventory of the WAN and LAN components to enable network management connectivity. Topology diagrams, IP address plans, Internetworking Operating System (IOS) configuration files, IOS versions, and hardware for all network devices to be managed are collected. An accurate count of the devices (by type) and the IP addresses that are required are documented.

- **Server and Network Design Review.** For existing networks, the server and network design review is required to ensure that the MNS engineering and operations teams understand the Agency’s server and networking environment prior to the assumption of management responsibility. It includes a review and analysis of the Agency’s protocol addressing plan, review, and identification of the network features, such as dial back-up, that are used in the network, and identification of the server configurations, including hardware and the software operating system level. A similar review is completed for all network devices to be monitored.

- **Network Management Connection Design.** The network management connection involves the deployment of a router to the customer’s location, new service orders (e.g., Management of Permanent Virtual Circuit [PVC]), and the configuration of the management center infrastructure (e.g., frame relay ports and local router configuration). This includes the design to perform address translation from the Agency’s IP address plan to the NOC IP address plan. This step also includes verification that all orders have been placed for the required carrier services and equipment. Upon validation of the network and server environment, the MNS Engineers design and order the NOC management connection, typically a Frame Relay PVC into the customer network.
The design also includes the logical changes required in each managed server, customer network equipment, and any additional equipment that is required to establish management connectivity between the NOC and the customer’s network and servers. The additional SED is typically a low-end router, out-of-band modem, and cabling.

- **Network Design Guideline Creation.** This document captures the current network and server infrastructure for the Agency. It includes the design requirements, the architecture and technology deployed, applications, the application performance requirements, and an overview of the address and routing policies deployed in an Agency’s network.

**Network Implementation**

- **Project Management.** The overall project management of the network deployment is addressed by the Project Manager assigned to each Agency as part of the service. This includes the following functions:

- **Vendor Tracking and Escalation Management.** The project management team tracks the various service, equipment, and implementation vendors.

- **Day-of-Implementation Management.** This includes the management of the service connection, equipment configuration, testing, and turn-up tracking, and declaration of the site as officially implemented.

- **Site Status Tracking.** The project management team provides on-going site status tracking and reporting.

- **Conducts Project Meetings.** Conducts project meetings to resolve issues, identify implementation problems, and solve escalations.

- **Equipment Staging and Shipping.** Site-specific equipment configurations are pre-configured and the equipment shipped as a single unit to the Agency’s location; this helps to ensure a timely and accurate implementation.

- **Remote Configuration Capability.** We provide remote configuration capability for LAN and DCE equipment. Router configuration files are also loaded remotely by the MNS service delivery personnel at the time of test and turn-up. This is completed for those networks where a seed file is installed in the router at the time of staging.

- **Site Implementation.** Installation of all LAN, WAN, and DCE equipment as specified in the design is managed by our MNS team. In addition, we connect the newly installed equipment to the network
services such as the Frame Relay ports, Integrated Switched Digital Network (ISDN) lines, and remote access analog lines.

- **Device Management Implementation.** For existing networks, each server requires an approved Server Management Agent. The Agent must be configured according to the specific MNS guidelines. For managing network devices, each location in the customer’s network requires some change to enable management of the devices. This includes the definition of SNMP statements and the deployment of loopback addresses in the equipment to be managed. These activities, coupled with test and turn-up procedures, result in the management of the equipment by the Network Operations Center.

- **Test and Turn-up Activities.** The NOC and our installation team are responsible for test and turn-up activities (as defined in the design phase of the engagement). These test procedures ensure that the site’s configuration is completed as designed and is functional (including connectivity between the customer’s network and the management center).

**Management Initialization**

The Management Initialization phase results in the physical connection of the customer’s network to the NOC and the initiation of monitoring services by the NOC. This includes the capturing of all customer logical and physical assets into Sprint management systems and the test and turn-up of all customer locations in the network management, configuration/change management and performance reporting platforms to enable management and monitoring of the network.

**Performance Reporting**

Once service is activated, KPI and other performance measurements are gathered and presented via our Web portal.