Government Ministry Builds Powerful Storage Platform to Extend Learning Across the Country

Customer Case Study

India's National Knowledge Network builds an expansive, future-proof storage platform using Cisco® MDS Multiservice Fabric Switches.

EXECUTIVE SUMMARY

Customer Name:
Ministry of Communications & IT, Government of India

Location: New Delhi, India

Business Challenge:

- Deliver high volumes of static content to more than 1500 locations across the country
- Support up to 30 million users with high performance and reliability
- Enable migration to SDN for data center automation

Network Solution:

- Cisco MDS 9250i Multiservice Fabric Switch
- Cisco Nexus 5596UP Switch
- Cisco UCS C240 Rack Server
- Cisco UCS B-Series Blade Server

Business Results:

- Supports Fibre Channel, FCoE, and FCIP connectivity to preserve existing investment while enabling maximum flexibility
- Reduced cabling requirements by two-thirds
- Simplified and accelerated deployment for rapid expansion
- Future-proofed move to open APIs and open source solutions

Business Challenge

India's National Knowledge Network (NKN) is designed to help the country become a leading "knowledge society" and provide new opportunities for learning and economic growth. When completed, it will interconnect 1500 higher-learning and research institutions with a high-speed network that supports knowledge sharing and collaborative research in areas including agriculture, education, health, e-governance, and high-performance computing.

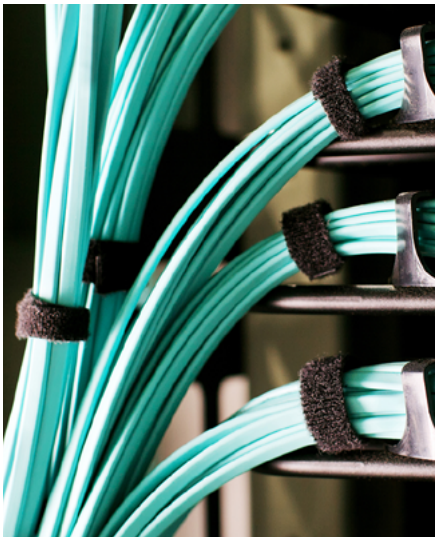
Under the supervision of India's Ministry of Communications & IT, the NKN will provide a single platform that delivers massive online course offerings and services over the web. The ministry envisioned a cloud platform that allows users to authenticate and access services locally through a single sign-on system.

The ministry has a long history with Cisco® solutions, deploying Cisco UCS® B-Series Blade Servers in 2013. For the NKN, it planned to build a heterogeneous storage infrastructure with dual Fibre Channel and Fibre Channel over Ethernet (FCoE) and IP storage connectivity to support non-transactional IP traffic while simplifying infrastructure and cabling. The ministry also supports several clouds that are currently operating as separate infrastructures. With a mandate to develop and deliver services through open APIs, the ministry plans to use OpenStack Neutron to build infrastructure-as-a-service (IaaS) networks for service delivery between the clouds.

The NKN infrastructure also must be highly scalable. The ministry's storage network houses 380 terabytes (TBs) of storage, but it expects to quickly scale to more than 500 TBs as new courses and users come online. And the network has to provide an excellent user experience to 30 million users, regardless of where they are located.

"We're pleased that we gained the ability to move more easily to open systems in the future. With the OpenStack Neutron driver in the Cisco Nexus switches, we're in a good position to migrate more easily to open APIs and manage everything from one place."

–Shounak Acharya
Data Center Lead, National Knowledge Network



Network Solution

"We again turned to Cisco to help us build a SAN that meets our needs today while offering an open source path to the future," says Shounak Acharya, data center lead for the NKN. "With the rapid growth that we anticipate, we needed a flexible solution that remained as simple as possible to deploy and manage."

The new NKN storage platform is based on proven Cisco SAN and switching solutions. The ministry selected the Cisco MDS 9250i Multiservice Fabric Switch for Fibre Channel connectivity to the Cisco Nexus® 5596UP Switch and for storage replication through FCIP between two data centers.

The MDS 9250i combined with the Cisco Nexus 5596UP Switch extends Ethernet to the SAN network for high performance, distributed intelligent fabric services, and cost-effective multiprotocol connectivity. The Cisco MDS 9250i features forty 16-Gbps Fibre Channel ports, two 1/10 Gigabit Ethernet IP storage services ports, and eight 10-Gigabit FCoE ports in a fixed two-rack-unit (2RU) form factor.

The Cisco Nexus 5596UP Switch delivers flexibility for use in traditional, virtualized, unified, and high-performance computing environments while simplifying infrastructure. The NKN also uses Cisco FabricPath, a feature of the Cisco NX-OS network operating system. With Cisco FabricPath, the ministry can create a highly scalable Layer 2 multipath network without the Spanning Tree Protocol (STP) for greater reliability.

The Cisco UCS C240 M3 Rack Server provides a flexible, high-performance access layer for high performance and expandability in a compact, 2RU form factor. The enterprise-class Cisco UCS C240 M3 reduces the number of network adapters needed in the data center while allowing the ministry to provide versatile connectivity over one cable.

The Cisco UCS C240 M3 Rack Server is uplinked to Cisco Nexus 5000 Series Switches using 20-Gbps FCoE connections. Cisco Nexus 5000 Series Switches offer a wide range of connectivity support while supporting comprehensive Layer 2 and Layer 3 features for LAN and SAN traffic. The Cisco Nexus switches also offer a driver for OpenStack Neutron, which allows the ministry to easily build its IaaS network with familiar manageability.

Business Results

"The converged infrastructure greatly simplifies our deployment," said Acharya. "If we had to keep the networks separate, it would have tripled the amount of cabling needed. We were able to reduce cabling requirements from six connections to two. Simplification also resulted in cost savings."

And with Ethernet in the SAN environment, the ministry can deploy new Ethernet storage devices right next to existing Fibre Channel legacy storage. This approach protects its investment in Fibre Channel and allows it to experiment with new technology–without requiring a forklift upgrade.

"The flexibility to define classes of service for LAN traffic enables us to maximize its performance," says Acharya. "When we define class-of-service features and combine those with load balancing, our 8-Gbps LAN delivers performance equivalent to a network with much higher bandwidth."

PRODUCT LIST

- Cisco MDS 9250i Multiservice Fabric Switch
- Cisco Nexus 5000 Series Switch
- Cisco Nexus 5596UP Switch
- Cisco UCS C240 M3 Rack Server

The Cisco converged architecture was fast and easy for the IT team deploy. They were able to deploy 550 devices in just a few weeks. With FCoE connectivity, fewer racks, and less cabling, the team can also deploy high-density computing and storage capabilities in small and remote locations more easily. And as the network expands to accommodate millions of new users, the simplified architecture and minimal cabling requirements will speed deployments of new servers. The new SAN infrastructure also delivers high power and cooling efficiency in spite of supporting high density.

"We're pleased that we gained the ability to move more easily to open systems in the future," says Acharya. "With the OpenStack Neutron driver in the Cisco Nexus switches, we're in a good position to migrate more easily to open APIs and manage everything from one place."

Next Steps

The NKN is already connecting a number of institutions and serving millions of users in India's urban areas. As it expands across the country, Acharya says that it will eventually enable 30 million users to access course materials, conduct research, and collaborate more effectively. And the network itself will migrate to 40-Gbps and even 100-Gbps speeds.

"Extending learning to even the smallest villages in India will empower millions of people who otherwise would not have had the opportunity to advance their skills and education," says Acharya. "We're pleased that our new storage infrastructure can advance that effort and accommodate whatever the future brings."

For More Information

To find out more about Cisco Multilayer Director Switches, visit http://www.cisco.com/en/US/products/ps5990/index.html.

For more information about the Ministry of Communications & IT, visit http://deity.gov.in.

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