Air Force Provides Any Service, Anytime, Anywhere, Securely

Customer Case Study

Royal Saudi Air Force consolidates IT infrastructure with new Cisco network to improve operations, reduce cost, and easily and quickly launch new services

EXECUTIVE SUMMARY

Customer Name: Royal Saudi Air Force

Industry: Defense

Location: Kingdom of Saudi Arabia

Number of Employees: 20,000

Challenge

- Maintain critical communications links
- Reduce organizational complexity and cost
- Deliver new support services

Solution

- Service Oriented Architecture featuring private self-managed MPLS intelligent infrastructure based on Cisco IP NGN and Borderless Network design
- Cisco Network Strategy and Architecture Services for workshops and network design services

Results

- Service provisioning times cut from months to minutes
- Downtime reduced from days to seconds
- New network has near permanent stability due to almost zero routing updates
- Trouble tickets down by 80 percent, and power consumption lowered by 40 percent

Challenge

The Royal Saudi Air Force (RSAF) protects the skies over the Kingdom of Saudi Arabia (KSA), providing the first line of defense and supporting military forces. As one of the largest air forces in the region, it plays a major role in the Middle East and is renowned as the leader in technology innovation within the Ministry of Defence.

In 2007, the RSAF embarked upon a journey to realign its technology with next-generation warfare strategy. Prior to this, IT services had evolved organically over time, which had led to the creation of multiple infrastructures and diverse technical teams with overlapping skills and responsibilities.

These siloed networks lacked the features, scalability, and integration capabilities to support new IP-based systems. This fragmented IT approach compounded the situation by forcing the RSAF to build more physically separated infrastructures adjacent to each other to support individual projects or applications. Moreover, these limitations resulted in a significant challenge for RSAF operations and national security. If a site went down, it could result in the loss of vital feeds and other communications, in turn prompting the RSAF to initiate unnecessary IT and business operations that could last for days.

As the RSAF grew and started to move everything to IP, new projects and systems were unable to utilize any of the existing IT environments. This situation led to:

- A lack of collaboration and integration
- Redundant and under-utilized systems with duplicated functions in multiple silos
- Duplicated staff and administration for each silo
- Inability to standardize
- Inefficient utilization of space, cooling, power, and service provider capabilities

It was clear to the RSAF that consolidating its communications infrastructure by using virtualization concepts to build an intelligent self-managed MPLS infrastructure would deliver significant benefits in terms of improved national security, not to mention easier administration, quicker fault resolution, lower costs, and the ability to roll out new services.

Solution

The solution had to be flexible and follow an architectural approach that supported next-generation technologies to address the new upcoming IT directorate scope as a result of the huge changes happening in IT with everything over IP. The RSAF also had a number of technical requirements including ensuring path isolation with leading levels of security and service enablement, while minimizing the amount of hardware, cooling, and space required now and for the next 10 years.

The Director of the Directorate of Communication and Information Technology (DCIT) launched an initiative to develop a new infrastructure model; one that eliminated the existing problems while also catering for future needs by encompassing a Service Oriented Architecture (SOA) concept. In addition, the new model had to provide:

- A cost effective approach that could accommodate any unforeseen requirements through soft configuration or the addition of an inexpensive expansion module
- Maximum manageability and control with minimum operating expense and staff
- Minimum power, cooling, and space requirements
- Minimum provisioning deployment time for new services
- Maximum scalability

This list of technical requirements presented the RSAF with a conundrum: how best to find a solution that maximized all the network characteristics it wanted and minimized those it did not.

To ascertain which architectures and vendors could best meet its needs, the RSAF carried out a thorough market research exercise, which included workshops with Cisco, one of its existing vendors. The final analysis revealed a range of reasons for selecting Cisco for the upgrade. RSAF has investigated available solutions in the market but chose to go with Cisco because Cisco products are very stable, have a lot of features, and come with very good technical support.

The RSAF led the network design for the project, with support from Cisco Services engineers in fine-tuning the specification and ratifying the plans. The two teams sat down and came up with a holistic approach for consolidating infrastructure. Rather than keep buying dedicated infrastructure for each project, RSAF chose one common multi-service platform that will accommodate projects now and in the future. The Cisco workshops helped RSAF envision that next-generation blueprint. Once the roadmap had been agreed, RSAF embarked on a proof-of-concept that led to a full network deployment in 2012.

The solution implemented by RSAF is a unified, intelligent Cisco IP Next-Generation Network (IP NGN) built on a Service Oriented Architecture (SOA). Based on an underlying self-managed Multi-protocol Label Switching (MPLS) infrastructure, the new Cisco IP NGN and Borderless Network design connects RSAF sites in a cloud configuration, allowing any-site-to-any-site connectivity for any service.

The MPLS backbone delivers 10Gbps performance and is made up of 14 Cisco ASR 9010 Series Routers, while 40 Cisco ASR 1002 Series Routers provide branch connectivity. The RSAF still has an analog voice system with private branch exchanges (PBXs) connected to the MPLS network via 14 Cisco 3945 Series Integrated Services Routers and 34 Cisco 2921 Series Integrated Services Routers.

The RSAF also uses a Cisco ONS 15454 SONET Multiservice Provisioning Platform, supporting common interfaces such as DS-1, DS-3, and EC-1. In addition, the RSAF operates MPLS Traffic Engineering and its Fast Reroute Link Protection feature to improve resilience and maintain quality of service by routing traffic along the least congested links.

In the campus networks, RSAF built three layers: core, distribution, and access. The design incorporates MPLS software running on the core and distribution layers to support PE and PE-Aggregation (PE-Agg) layers functionalities. Each PE-Agg or PE consists of two Cisco Catalyst 6509E Series Switches configured as a Virtual Switching System (VSS) and forming eight PE-Agg and 50 PE systems in total, in addition to 38 PEs routers for remote sites around KSA. The access layer comprises Cisco Catalyst 3750E and 3750X Series Switches, ensuring direct Layer 2 logical connections from PEs and providing the network with almost permanent stability and convergence through the elimination of cloud routing table updates.

The equipment is managed using a Cisco Prime LAN Management Solution, in addition to other third-party products. The network upgrade covers 30 RSAF sites and spans across the KSA with connections to organizations such as the army and navy, other forces in the Gulf region, and even large suppliers such as BAE Systems. Traffic is segmented using VLANs and in some cases also VPNs, partly for security reasons and partly to provide quality of service.

Results

The RSAF has met its main objectives and goals and eliminated its challenges. The Cisco solution has allowed the RSAF to realize optimum value from its network investment in a way that protects against technology obsolescence and responds to planned and unforeseen future IT requirements. At the current time, the RSAF believes that no other model in the market could have addressed these challenges, enabled the new features it needed, and performed so well.

Scalability and flexibility can be achieved with a few line commands or by adding small inexpensive module cards, without compromising RSAF security policy. At the same time, security, manageability, and control have been maximized thanks to built-in hardware security and manageability tools.

Unlike before, the number of engineers required to manage cloud services has become fixed and will not change irrespective of whether new customers or services are added. Power consumption, cooling, and space requirements have dramatically reduced and, similarly, are almost fixed independent of future expansions.

The RSAF is better placed to serve various internal departments with a service provider model and customer-centric approach. The Cisco network's access layer provides direct Layer 2 logical connections which almost completely negate the need to make routing changes and updates, in turn improving stability and convergence. This new operational model includes a built-in selective reachability mechanism for security between MPLS-based VPNs. This important new feature improves routing processing security and is traditionally only found in public service providers networks.

By centralizing and standardizing IT operations on a single Cisco network foundation, the RSAF is benefiting from reduced costs and administration effort, as well as having simpler supplier and contract arrangements. Voice communications now have full redundancy between sites, enabling the RSAF to cut costs and management complexity with a single point of management.

The RSAF has maximum management control with minimum staff and operating expense. For example, it can now easily set up Layer 1 and Layer 2 VPNs, and has been able to reduce the number of external encryption devices that it needs at each site, from more than 20 to just two. The user experience has been enhanced thanks to improved network performance, enabling information exchange across the RSAF, while downtime has been vastly reduced with improved automation.

Previously it could take days to locate and repair faults on the network. Now, RSAF has five-nines availability and the reassurance that faults can be located and solved within minutes. Most of the time, however, faults are resolved automatically in seconds, and only show up after the event on device logs. As a result, the number of trouble tickets has dropped by about 80 percent.

Because there are fewer devices now, each device gets higher utilization, improving overall return on investment while power, cooling, and space requirements are reduced. Although the network has doubled in capacity, a 40 percent saving on power is estimated. Moreover, the RSAF can add new services without any appreciable increase in consumption for the foreseeable future. And that means benefits in terms of cost, operations, management, sustainability, and even security.

The RSAF can deliver, in minutes, services that would have previously been difficult or nearly impossible to provision. Before there were activities that the RSAF could not do, or that would take many weeks to complete. Now these tasks get done in five to 10 minutes. For example, the RSAF can use Cisco routers and switches to implement new services such as Layer 2 connectivity to remote sites.

Next Steps

The network upgrade is the first in a number of projects, including a phased migration of legacy PBX systems to IP telephony. Some sites have already begun this process by installing Cisco Unified Communications Manager. The RSAF intends to extend the virtualization concept to end users' desktops via virtual desktop infrastructure solutions. Finally, plans are in place to deliver IT and communications services across the organization from within a private cloud, supported by VCE Vblock™ Systems located at each major RSAF site. This technology roadmap will help the RSAF become a service provider and offer IT services to other armed forces in the country and the region.

For More Information

To learn more about the Cisco architectures and solutions featured in this case study, please go to:

www.cisco.com/go/asr, www.cisco.com/go/isr and www.cisco.com/go/prime

For more information on RSAF, please email: CaseStudy@rsaf.gov.sa

Product List

Routing and Switching

- Cisco ASR 1002 and 9010 Aggregation Services Routers
- Cisco ONS 15454 SONET Multiservice Provisioning Platform
- Cisco 2921 and 3945 Integrated Services Router
- Cisco 3750 and 6500 Catalyst Series Switches

Network Management

- Cisco Prime LAN Management Solution

Voice

- Cisco Unified Communications Manager

Services

- Network Strategy and Architecture Services

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