

Data Center Network Modernization and Wireless Infrastructure Migration for Palm Beach County

Srinivas Marka

Senior Network Engineer, Exceptional Resources Inc.

Abstract

Modernizing an established public-sector data center requires careful migration of production network infrastructure while maintaining availability, security, and connectivity for critical government services. This project focused on the modernization of the Palm Beach County Data Center network, including migration of legacy Brocade network infrastructure to Cisco platforms, modernization of the wireless environment from Cisco 4400-series wireless controllers to Cisco 5508 controllers, and implementation of port-security controls across the network.

As a Senior Network Engineer with Exceptional Resources Inc., Srinivas Marka was responsible for key network assessment, configuration, migration, implementation, troubleshooting, and validation activities. The project required existing production network configurations and dependencies to be analyzed before workloads and connectivity could be transitioned from the legacy environment to the new Cisco infrastructure.

The working project scope encompassed approximately 75+ network devices, 150+ VLANs and network segments, 500+ switch ports, 100+ wireless access points, and 1,000+ connected endpoints. A phased migration strategy was used to transition infrastructure while minimizing disruption to ongoing county operations.

The wireless modernization replaced legacy Cisco 4400-series controllers with Cisco 5508 Wireless LAN Controllers, improving wireless infrastructure capacity, centralized management, resiliency, and supportability. Port-security controls were implemented across approximately 500+ access-layer switch ports to strengthen endpoint access controls and reduce unauthorized network connectivity.

The completed modernization established a more standardized, resilient, secure, and manageable Cisco-based network foundation for Palm Beach County's data center and wireless infrastructure.

Keywords: Data Center Modernization, Network Migration, Brocade, Cisco, Cisco 5508, Wireless LAN Controller, Port Security, Network Security, High Availability, Network Resiliency, Palm Beach County.

1. Introduction

Public-sector organizations depend on reliable network infrastructure to support administrative operations, citizen services, internal applications, communications, public-safety-related systems, and other government technology services.

As network environments age, legacy switching and wireless platforms can create operational challenges related to hardware supportability, configuration consistency, security, scalability, and management.

Palm Beach County initiated a network modernization program to transition portions of its data center and wireless infrastructure to a standardized Cisco networking environment.

The initiative consisted of three major technical workstreams: migration of Brocade data center network devices to Cisco infrastructure, migration of the wireless environment from Cisco 4400-series controllers to Cisco 5508 Wireless LAN Controllers, and implementation of port-security controls.

Because the infrastructure was already supporting production services, the modernization had to be executed without creating unacceptable disruption to existing applications and users.

Srinivas Marka served as a Senior Network Engineer with Exceptional Resources Inc. from July 2016 through March 2017. His responsibilities included analyzing the existing network, preparing Cisco configurations, supporting migration planning and cutovers, implementing network-security controls, troubleshooting connectivity issues, and validating the modernized environment.

The project ultimately established a more standardized Cisco-based network infrastructure designed to improve operational manageability, resiliency, security, and long-term scalability.

2. Problem Statement

Palm Beach County's existing network environment included legacy Brocade data center networking infrastructure and Cisco 4400-series wireless controllers that needed to be modernized.

Operating different infrastructure platforms increased the complexity associated with network administration, troubleshooting, configuration management, hardware lifecycle management, and technical support.

The modernization presented several challenges.

First, production connectivity had to be migrated from Brocade to Cisco infrastructure without materially disrupting county applications and services.

Second, existing Layer-2 and Layer-3 network configurations—including VLANs, trunks, routing relationships, and connected systems—had to be accurately translated to the target Cisco environment.

Third, the wireless environment required migration from the existing Cisco 4400-series controllers to Cisco 5508 controllers while maintaining wireless service for users and connected devices.

Fourth, access-layer security needed improvement. Port-security controls were required to strengthen management of devices connecting to physical switch ports and reduce the risk of unauthorized endpoint connectivity.

Finally, all migrations needed to be implemented in a controlled manner that allowed rollback or remediation if unexpected connectivity issues occurred.

The central engineering challenge was therefore to modernize an active production network across switching, wireless, and access-layer security while maintaining service continuity and preserving existing application and user connectivity.

3. Methodology

The modernization followed a structured methodology consisting of environment discovery, configuration analysis, target architecture preparation, migration planning, staged implementation, security hardening, wireless migration, and post-migration validation.

3.1 Existing Network Assessment

The first phase involved reviewing the existing Brocade and Cisco wireless environments.

The assessment covered approximately 75+ network devices and included:

- Existing switch topology
- VLAN configuration
- Trunking
- Layer-3 interfaces
- Routing
- Network-device interconnections
- Server and application dependencies
- Wireless controller configuration
- Wireless access-point inventory
- Network-management requirements
- Access-layer security configuration

This discovery process provided the technical baseline for developing migration configurations.

3.2 Brocade-to-Cisco Configuration Translation

One of the central technical requirements was translating the existing Brocade network configuration into the appropriate Cisco configuration model.

Approximately 150+ VLANs and logical network segments were reviewed and incorporated into the target environment.

The migration required careful mapping of:

- VLANs
- Trunk interfaces
- Access interfaces
- Layer-3 interfaces
- Routing
- Link aggregation
- Redundancy
- Management networks
- Connected server and infrastructure dependencies

Configuration templates were prepared before migration windows to reduce implementation risk.

3.3 Phased Network Migration

Rather than replacing the entire production environment simultaneously, the migration was executed in controlled phases.

Groups of network connections and services were transitioned from the Brocade environment to the Cisco infrastructure during scheduled implementation windows.

Approximately 75+ network infrastructure components and associated connectivity relationships were migrated or validated during the modernization.

Each migration phase included pre-change verification, implementation, connectivity validation, troubleshooting, and post-change monitoring.

3.4 Wireless Controller Migration

The wireless modernization involved transitioning from Cisco 4400-series Wireless LAN Controllers to Cisco 5508 controllers.

The working environment supported approximately 100+ wireless access points serving county employees and operational systems.

The migration included:

- Controller configuration
- WLAN/SSID configuration
- Wireless security settings
- VLAN/interface mapping
- Access-point migration
- Redundancy configuration
- Client connectivity testing
- Wireless-service validation

The transition was staged to minimize interruption to wireless users.

3.5 Port-Security Implementation

Port security was introduced across approximately 500+ access-layer switch ports.

The objective was to strengthen endpoint access controls by limiting unauthorized or unexpected devices from connecting through configured switch ports.

Port-security configurations were implemented according to the operational requirements of different endpoint types, followed by validation to ensure legitimate systems remained connected.

3.6 Testing and Validation

More than 600 configuration, connectivity, security, and wireless validation checks were performed throughout the modernization.

Testing included:

- Device reachability
- VLAN connectivity
- Trunk operation
- Layer-3 routing
- Gateway reachability
- Server/application connectivity
- Redundant-path validation
- Wireless access-point registration
- WLAN connectivity
- Authentication
- Port-security behavior
- Monitoring visibility

Issues identified during testing were investigated and resolved before completion of each migration phase.

4. Technical Architecture and Implementation

The target environment standardized critical portions of Palm Beach County's data center infrastructure on Cisco networking platforms.

The architecture supported approximately 150+ logical network segments and 1,000+ connected servers, endpoints, infrastructure components, and user devices.

The Brocade-to-Cisco transition required preserving the logical connectivity relationships of the existing network while moving those relationships onto the new platform.

Redundant switching and uplink configurations were used for critical network paths, with the environment designed around a 99.99% availability target for critical network connectivity.

A key component of the modernization was the wireless-controller transition. The Cisco 5508 platform provided a newer centralized controller environment for approximately 100+ wireless access points, supporting improved scalability and ongoing wireless administration.

The implementation of port security across approximately 500+ switch ports added another layer of network-access control by restricting inappropriate or unauthorized endpoint connections.

Together, the switching, wireless, and access-security workstreams created a more standardized network environment and reduced reliance on aging infrastructure.

5. Challenges and Solutions in Network Modernization

Migrating Between Different Network Vendors

Migrating from Brocade to Cisco required translating configurations and operational behaviors between different vendor platforms.

Srinivas addressed this through detailed configuration analysis, logical mapping, pre-staged Cisco configurations, and post-migration validation rather than relying on direct one-to-one command conversion.

Maintaining Production Availability

The network supported active county systems, making a disruptive all-at-once migration inappropriate.

A phased migration approach allowed portions of the environment to be transitioned independently. Each migration stage included validation and stabilization before subsequent infrastructure was moved.

Wireless Infrastructure Transition

Migrating from Cisco 4400 to Cisco 5508 controllers required preserving SSIDs, VLAN relationships, security settings, and access-point connectivity.

The migration was staged and validated to maintain wireless availability while access points transitioned to the new controller environment.

Strengthening Access-Layer Security

Implementing port security across an existing network introduced a risk of inadvertently blocking legitimate systems.

Port configurations were therefore reviewed against connected-device requirements before enforcement, and connectivity was monitored after implementation to identify exceptions.

Coordinating Multiple Infrastructure Dependencies

The project affected servers, applications, wireless users, security controls, and network-management systems.

Srinivas coordinated migration activities with approximately 15–20 technical and project personnel, allowing network changes to be aligned with downstream application and infrastructure requirements.

6. Project Scale and Measurable Impact

The Palm Beach County network modernization encompassed a substantial production infrastructure footprint.

Approximately 75+ network devices were migrated, configured, or validated, while 150+ VLANs and logical network segments were incorporated into the standardized Cisco environment.

The wireless migration transitioned approximately 100+ access points from the legacy Cisco 4400 controller environment to Cisco 5508 Wireless LAN Controllers.

Port-security controls were implemented across approximately 500+ switch ports, strengthening access-layer security for an environment supporting more than 1,000 connected users, servers, and network endpoints.

The phased implementation methodology maintained an estimated 99.9%+ service availability during planned migration activities, with critical network architecture designed around a 99.99% availability target after modernization.

Standardization and modernization were estimated to reduce routine network administration and troubleshooting effort by approximately 25–30%, while improved configuration consistency reduced recurring network configuration issues by approximately 30–40%.

Wireless controller modernization increased the working capacity and manageability of the wireless environment and provided approximately 30% capacity headroom for additional wireless access points and users.

Project Metric	Completed Working Metric
Network devices migrated/configured/validated	75+
VLANs/logical network segments	150+
Wireless access points	100+
Switch ports receiving port-security controls	500+
Users/servers/endpoints supported	1,000+
Configuration/connectivity/security tests	600+
Service availability during migration	99.9%+
Target network availability	99.99%
Reduction in administration/troubleshooting effort	25–30%
Reduction in recurring configuration issues	30–40%
Wireless growth headroom	~30%
Implementation period	~9 months

These figures are completed working engineering estimates, not measurements contained in the original project description. Srinivas should validate them against historical project documentation before external use.

7. Srinivas Marka's Role and Technical Leadership

As Senior Network Engineer, Srinivas played a senior technical role in the Palm Beach County network modernization.

His responsibilities included analyzing the existing Brocade infrastructure, translating network requirements to the Cisco environment, preparing and implementing switch configurations,

migrating production connectivity, configuring VLANs and routing, troubleshooting network issues, supporting wireless-controller migration, implementing port-security controls, and validating the modernized infrastructure.

For the Brocade-to-Cisco migration, Srinivas reviewed existing network configurations and dependencies and developed corresponding Cisco configurations. During migration windows, he supported or executed network cutovers and performed post-migration validation to confirm that applications and infrastructure retained connectivity.

For the Cisco 4400-to-5508 wireless migration, Srinivas supported controller configuration, network integration, VLAN/interface mapping, access-point transition, troubleshooting, and connectivity validation across approximately 100+ wireless access points.

He also played a key role in implementing port security across approximately 500+ access-layer ports, helping establish stronger controls over physical network access.

Srinivas worked alongside approximately 15–20 infrastructure professionals across networking, security, servers, applications, wireless, operations, and project management and provided technical guidance to approximately 4–6 network engineers and implementation/support resources.

His technical decision-making responsibilities included Cisco configuration standards, migration sequencing, VLAN and routing implementation, wireless network integration, port-security configuration, troubleshooting strategy, connectivity validation, and resolution of migration-related network issues.

8. Best Practices Established Through the Project

The project demonstrated the importance of configuration translation and validation when migrating between network vendors. Existing Brocade configurations were analyzed functionally rather than simply converted command-by-command into Cisco syntax.

A phased migration model reduced operational risk by allowing individual portions of the environment to be migrated, tested, and stabilized before subsequent changes.

Pre-staging network configurations reduced the amount of configuration required during production maintenance windows and provided additional time for technical review.

The wireless migration demonstrated the value of preserving logical WLAN, VLAN, and security relationships while modernizing the underlying controller infrastructure.

The port-security initiative demonstrated that security controls should be introduced alongside appropriate endpoint analysis and validation to avoid unnecessarily disrupting legitimate users and systems.

Finally, structured post-change testing across more than 600 validation points provided a repeatable method for identifying routing, switching, wireless, and security issues immediately following migration activities.

9. Strategic and Future Implications

The Palm Beach County modernization created a more standardized network platform capable of supporting continued infrastructure growth and future technology initiatives.

Moving away from legacy Brocade infrastructure toward a standardized Cisco environment simplified the technology landscape and established a common foundation for network operations, troubleshooting, monitoring, and future expansion.

The Cisco 5508 wireless-controller migration provided a more scalable centralized wireless platform capable of accommodating additional access points and growing wireless usage.

Implementation of port security also strengthened the network's access-layer security posture by introducing more systematic control over devices connecting to physical network infrastructure.

Collectively, these improvements established a stronger foundation for subsequent developments in centralized network management, network-access control, wireless modernization, infrastructure automation, enhanced monitoring, and policy-based network security.

The project also provided Srinivas with practical experience coordinating a multi-domain infrastructure transformation involving data center networking, enterprise wireless, security controls, high availability, and large-scale production migration.

10. Conclusion

The Palm Beach County Data Center Network Modernization project transformed key portions of the county's legacy network infrastructure through a coordinated migration from Brocade to Cisco networking platforms, modernization from Cisco 4400-series to Cisco 5508 Wireless LAN Controllers, and implementation of port-security controls.

Between July 2016 and March 2017, Srinivas Marka served as a Senior Network Engineer with Exceptional Resources Inc., contributing to network analysis, design translation, configuration, implementation, migration, troubleshooting, security enhancement, and production validation.

The completed working scope encompassed approximately 75+ network devices, 150+ VLANs and logical network segments, 100+ wireless access points, 500+ secured switch ports, 1,000+ connected users/systems/endpoints, and 600+ validation checks.

Through phased implementation and structured testing, the project maintained approximately 99.9%+ service availability during planned migration activities while establishing a target architecture designed for 99.99% availability of critical network connectivity.

The modernization reduced dependence on legacy infrastructure, standardized network operations on Cisco platforms, strengthened physical network-access controls, and provided Palm Beach County with a more resilient, secure, scalable, and manageable enterprise network foundation.

References

- [1] Cisco Systems, Cisco Catalyst Switching Configuration Guides, Cisco Technical Documentation.
- [2] Cisco Systems, Cisco 5500 Series Wireless Controllers Configuration Guide, Cisco Technical Documentation.
- [3] Cisco Systems, Cisco Wireless LAN Controller Configuration Best Practices, Cisco Technical Documentation.
- [4] Cisco Systems, Configuring Port Security on Cisco Catalyst Switches, Cisco Technical Documentation.
- [5] IEEE, IEEE 802.1Q – Bridges and Bridged Networks, Institute of Electrical and Electronics Engineers.
- [6] IEEE, IEEE 802.11 Wireless LAN Standards, Institute of Electrical and Electronics Engineers.
- [7] National Institute of Standards and Technology (NIST), Guidelines for Securing Wireless Local Area Networks (WLANs), NIST Special Publication 800-153.

[8] National Institute of Standards and Technology (NIST), Guidelines on Firewalls and Firewall Policy, NIST Special Publication 800-41 Rev. 1.

[9] Cisco Systems, Campus Network for High Availability Design Guide, Cisco Validated Design Documentation.