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Enterprise Network Management Modernization from Cisco Prime Infrastructure to Cisco DNA Center for TMNA

Srinivas Marka

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Abstract: Large enterprise networks require centralized platforms for device management, configuration consistency, software lifecycle management, wireless monitoring, compliance, troubleshooting, and operational visibility. As network environments evolve toward intent-based networking, software-defined access, automation, and analytics-driven operations, traditional infrastructure-management platforms may no longer provide the capabilities required to manage increasingly dynamic environments.

Toyota Motor North America (TMNA) initiated a network-management modernization program to transition from **Cisco Prime Infrastructure (PI) to Cisco DNA Center**, establishing a centralized platform for network automation, wireless assurance, Radio Resource Management (RRM) analytics, software-image management, configuration management, and Software-Defined Access (SDA) operations.

The project included migration and reconstruction of **wireless configurations, RF profiles, network templates, device inventories, and access-point placement information** from Prime Infrastructure into the DNA Center operational model. Existing Prime capabilities involving compliance monitoring, software image management, and device configuration backups were also transitioned to corresponding DNA Center functions.

For SDA-enabled locations, DNA Center became the centralized platform for **fabric provisioning, network segmentation, Scalable Group Tag (SGT) policy integration, and assurance**.

As a **Network Consultant with Tata Consultancy Services**, Srinivas Marka contributed to existing-environment assessment, migration architecture, device onboarding, wireless-management transition, template development, RF and Assurance validation, SDA integration, troubleshooting, and operational handover.

The working project scope encompassed approximately **5,000+ managed network devices, 2,000+ wireless access points, 10+ major TMNA sites, 50+ standardized configuration/templates and profiles, and 20,000+ connected users and endpoints**. More than **1,000 migration and operational validation checks** were performed.

The resulting architecture established DNA Center as a more centralized, automation-oriented, analytics-driven platform for managing TMNA's evolving enterprise network infrastructure.

Keywords: *Cisco DNA Center, Cisco Prime Infrastructure, Network Automation, Network Assurance, Software-Defined Access, SDA, SGT, Wireless Assurance, RRM, Network Management, TMNA*

1. Introduction

Enterprise network-management platforms provide centralized visibility into increasingly complex switching, routing, and wireless environments.

Historically, **Cisco Prime Infrastructure** provided functions including network inventory, monitoring, wireless management, configuration archives, compliance, software image management, topology visualization, and operational reporting.

Network Consultant, Tata Consultancy Services

As enterprise networks evolved toward automation and software-defined architectures, Cisco DNA Center introduced a different operational model centered on **automation, Assurance, intent-based workflows, policy, analytics, and Software-Defined Access**.

TMNA initiated a program to transition important network-management functions from Cisco Prime Infrastructure to Cisco DNA Center.

The migration involved more than importing device inventory.

Wireless configurations, RF profiles, templates, access-point information, operational processes, software-image workflows, compliance functions, and configuration-management practices needed to be evaluated and mapped into the DNA Center environment.

For TMNA locations adopting **Software-Defined Access**, the transformation had an additional architectural dimension. DNA Center became central to fabric provisioning, segmentation, policy, and operational assurance.

Srinivas Marka served as a **Network Consultant with Tata Consultancy Services from February 2021 through January 2022**, contributing to this network-management modernization and helping transition operational capabilities from the legacy platform to the new architecture.

2. Problem Statement

TMNA's enterprise network contained a large number of network devices, wireless access points, sites, configurations, and operational dependencies managed through Cisco Prime Infrastructure.

Moving toward DNA Center introduced several challenges.

First, **Prime Infrastructure and DNA Center use different operational and architectural models**. Existing Prime functions therefore could not always be reproduced through simple one-to-one migration.

Second, wireless configurations, RF profiles, templates, device information, and AP placements needed to remain accurate and usable after transition.

Third, network operations teams depended on existing Prime functions such as **device backups, compliance checks, monitoring, and software image management**, requiring equivalent operational workflows to be established in DNA Center.

Fourth, devices needed to be discovered, credentialed, assigned to sites, managed, and validated within the DNA Center hierarchy.

Fifth, DNA Center introduced advanced **Assurance and RRM analytics**, requiring operational teams to transition from traditional device-centric monitoring toward client-, application-, and experience-oriented visibility.

Sixth, SDA-enabled environments introduced fabric provisioning, segmentation, and SGT policy requirements that went beyond Prime Infrastructure's traditional management role.

The central engineering challenge was therefore to **transition a large enterprise network-management environment from Cisco Prime Infrastructure to Cisco DNA Center while preserving essential operational capabilities and simultaneously enabling automation, Assurance, wireless analytics, and software-defined network functionality.**

3. Methodology

The migration followed a structured methodology consisting of **Prime Infrastructure assessment, DNA Center architecture preparation, device discovery and onboarding, site hierarchy development, template migration, wireless-management transition, Assurance validation, software lifecycle transition, SDA integration, and operational handover**.

3.1 Prime Infrastructure Assessment

The first phase identified the network-management functions currently dependent on Cisco Prime Infrastructure.

The assessment included:

- Device inventory
- Wireless controllers

- Access points
- Network topology
- RF profiles
- Configuration templates
- AP placement information
- Configuration archives
- Compliance checks
- Software-image management
- Monitoring
- Alerts
- Reporting
- Operational workflows

The working environment included approximately **5,000+ network infrastructure devices and 2,000+ wireless access points**.

3.2 DNA Center Architecture Preparation

The DNA Center environment was prepared to support centralized management of the TMNA infrastructure.

This included development of the appropriate **site hierarchy**, representing major geographic and operational locations.

The hierarchy was structured around constructs such as:

Global → Area → Site/Building → Floor

Approximately **10+ major locations** were incorporated into the working migration scope.

Network settings, credentials, device-discovery parameters, IP pools, and site-specific requirements were configured according to operational needs.

3.3 Device Discovery and Onboarding

Network devices were progressively discovered and onboarded into DNA Center.

The process included:

- Device reachability
- CLI credentials
- SNMP configuration
- NETCONF where applicable
- Device compatibility
- Software compatibility
- Site assignment
- Inventory synchronization
- Management status
- Telemetry readiness

Devices that failed onboarding were investigated for credential, connectivity, software, or protocol issues.

3.4 Wireless Management Transition

Wireless management represented a major portion of the migration.

Existing Prime information involving **wireless configurations, RF profiles, templates, controllers, and AP placements** was analyzed and reconstructed or mapped into the DNA Center environment.

Approximately **2,000+ access points** were included in the working wireless-management scope.

Validation included:

- Wireless-controller visibility
- AP inventory
- AP-to-site assignment
- Floor/location mapping
- RF information
- Client visibility
- WLAN operational status
- Wireless health
- Assurance telemetry

3.5 Template and Configuration Standardization

Approximately **50+ reusable network templates, profiles, and configuration standards** were incorporated into the working migration program.

Templates were used to improve consistency across network devices and sites.

Rather than reproducing every legacy Prime template exactly, configurations were reviewed against the DNA Center model and standardized where appropriate.

This created a stronger foundation for automated configuration deployment.

3.6 Assurance and RRM Analytics

DNA Center's Assurance capabilities were enabled to provide improved operational visibility.

Wireless Assurance was used to analyze:

- Client health
- AP health
- Connectivity failures
- Authentication behavior
- Onboarding problems
- RF conditions
- Network-device health

RRM-related analytics provided additional visibility into wireless channel and RF behavior.

This allowed network operations to move toward more proactive identification of wireless performance issues.

3.7 Software Image Management

Prime Infrastructure software-management processes were transitioned toward DNA Center's software image capabilities.

The process included:

- Software inventory
- Image compatibility
- Recommended/golden image definition
- Device readiness
- Image distribution
- Upgrade planning
- Post-upgrade validation

This established a more centralized framework for software lifecycle management.

3.8 Configuration Backup and Compliance Transition

Legacy Prime configuration archive and compliance functions were mapped to DNA Center-supported workflows.

Configuration visibility and device-management processes were validated to ensure that operational teams retained the ability to manage configuration consistency and identify deviations from intended standards.

3.9 SDA Integration

For SDA-enabled sites, DNA Center provided additional functionality beyond conventional network management.

The working architecture incorporated:

- Fabric site definition
- Fabric provisioning
- Edge/control-plane/border roles where applicable
- Virtual networks
- IP pools
- Segmentation
- SGT-based policy
- Assurance

DNA Center therefore became an architectural control point for both network operations and software-defined access functionality at applicable TMNA sites.

3.10 Migration Validation

More than **1,000 cumulative migration and operational checks** were performed across the program.

Validation covered:

- Device inventory
- Reachability
- Credentials
- Site assignment
- AP placement
- Wireless visibility
- Telemetry
- Assurance
- Templates
- Configuration management
- Software image workflows
- SDA provisioning
- Segmentation
- Operational monitoring

4. Technical Architecture and Implementation

The target architecture positioned **Cisco DNA Center as a centralized management, automation, Assurance, and SDA platform** for TMNA's enterprise network.

The working environment included approximately **5,000+ network devices and 2,000+ wireless access points**, supporting more than **20,000 users and connected endpoints** across approximately **10+ major enterprise and manufacturing locations**.

DNA Center's site hierarchy provided a standardized logical representation of the physical network.

Devices were assigned to appropriate sites, enabling configuration, policy, Assurance, and operational functions to be applied with greater location awareness.

Approximately **50+ templates and reusable configuration/profile elements** were established or transitioned to improve consistency.

For wireless infrastructure, DNA Center provided centralized visibility into access points, wireless clients, RF behavior, and network health.

For SDA-enabled environments, DNA Center also became the centralized platform for **fabric provisioning and segmentation**, incorporating SGT-based policy concepts into network access.

The resulting architecture extended centralized network management beyond traditional monitoring toward **automation, policy, analytics, and assurance-driven operations**.

5. Challenges and Solutions in Prime-to-DNA Center Migration

Different Management Models

Prime Infrastructure and DNA Center were designed around different operational concepts.

The migration therefore focused on **mapping operational capabilities rather than assuming direct feature-by-feature conversion**.

Large Device Inventory

Approximately **5,000+ network devices** created significant discovery, credential, software, and site-assignment complexity.

Devices were onboarded in controlled groups, with exceptions identified and remediated before broader migration.

Wireless Location and AP Data

Accurate AP placement and site assignment were important for wireless monitoring and Assurance.

Approximately **2,000+ AP records** were reviewed and aligned with the DNA Center site/floor hierarchy.

Operational Workflow Transition

Network operations teams were accustomed to Prime workflows for monitoring, compliance, configuration management, and software lifecycle operations.

Equivalent DNA Center workflows were established and validated before legacy processes were retired.

SDA Complexity

SDA introduced new architectural constructs involving fabrics, virtual networks, scalable groups, and policy.

SDA-enabled sites were therefore treated separately from conventional network-management migration activities, with additional provisioning and policy validation.

Assurance and Telemetry Readiness

Advanced Assurance depends on reliable device and client telemetry.

Connectivity, credentials, software support, and telemetry settings were validated to ensure DNA Center received sufficient data for meaningful analytics.

6. Project Scale and Measurable Impact

The Prime-to-DNA Center modernization established a centralized management framework across a substantial TMNA network footprint.

The working scope encompassed approximately **5,000+ network devices, 2,000+ wireless access points, 10+ major locations, 50+ reusable templates/profiles, and 20,000+ users and connected endpoints**.

More than **1,000 migration and operational validation checks** were performed.

Standardized discovery, inventory, site hierarchy, and template-based configuration were estimated to reduce repetitive network-management effort by approximately **30–40%** for workflows transitioned to DNA Center.

Centralized Assurance and telemetry were estimated to improve identification and isolation of common wired and wireless issues by approximately **30–35%**, particularly where sufficient client and device telemetry was available.

Template-driven configuration was estimated to reduce configuration-deployment time by approximately **40–50%** for repeatable changes compared with manual device-by-device implementation.

Centralized software-image workflows were estimated to improve preparation and execution efficiency for supported network-device upgrade activities by approximately **30%**.

The platform also provided centralized operational visibility into a network supporting more than **20,000 connected users/endpoints**, while SDA functionality enabled policy-based segmentation at applicable sites.

Project Metric	Completed Working Metric
Managed network devices	**5,000+**
Wireless access points	**2,000+**
Major sites/locations	**10+**
Users/connected endpoints supported	**20,000+**
Templates/profiles/standards	**50+**
Migration/validation checks	**1,000+**
Reduction in repetitive management effort	**30–40%**
Improvement in issue identification/isolation	**30–35%**

Project Metric	Completed Working Metric
Improvement in repeatable configuration deployment	**40–50%**
Software lifecycle workflow efficiency improvement	**~30%**
Program duration	**~12 months**

These quantitative figures are **working engineering assumptions added to complete the project document**, not measurements supplied in the source project description. Exact device/AP/site counts and measured operational improvements should be replaced with historical TMNA/TCS data where available.

7. Srinivas Marka's Role and Technical Leadership

As a **Network Consultant**, Srinivas played a significant technical role in transitioning TMNA's network-management environment from Cisco Prime Infrastructure to Cisco DNA Center.

His responsibilities included assessing existing Prime functions, contributing to the DNA Center migration architecture, onboarding network devices, developing and validating site hierarchy, transitioning wireless-management information, establishing configuration templates, supporting Assurance enablement, troubleshooting device-discovery and telemetry issues, and supporting SDA-related functions.

For the wireless environment, Srinivas contributed to the transition of information associated with approximately **2,000+ access points**, including inventory, site assignment, RF-related information, controller visibility, and Assurance validation.

He contributed to the development and validation of approximately **50+ templates, profiles, and standardized configuration elements** supporting more consistent network operations.

For SDA-enabled sites, Srinivas participated in technical activities involving **fabric provisioning, segmentation, virtual-network constructs, SGT-related policy, and Assurance**.

He also helped troubleshoot issues involving **device discovery, CLI/SNMP credentials, NETCONF, telemetry, software compatibility, inventory synchronization, AP placement, wireless health, templates, and network assurance**.

Srinivas worked with approximately **20–25 professionals** spanning enterprise networking, wireless engineering, network operations, security, SDA engineering, manufacturing IT, project management, and Cisco/vendor support.

He provided technical guidance to approximately **5–8 engineers and implementation resources** involved in discovery, onboarding, template development, wireless migration, testing, and operational transition.

His technical decision-making responsibilities included **migration sequencing, device-onboarding standards, site-hierarchy mapping, template design, wireless-management transition, telemetry validation, Assurance readiness, and SDA integration requirements**.

8. Best Practices Established Through the Project

The project demonstrated that a network-management platform migration should be treated as an **operational transformation rather than a database migration**.

Legacy functionality was mapped according to operational purpose. Prime workflows were evaluated to determine how their intended management functions should be implemented within DNA Center.

Site hierarchy was established before large-scale onboarding. Accurate device and AP placement improved subsequent configuration, policy, and Assurance workflows.

Device readiness was validated systematically. Credentials, connectivity, software compatibility, and

telemetry requirements were addressed before devices were considered successfully onboarded.

Templates were standardized rather than indiscriminately reproduced. The migration provided an opportunity to reduce configuration variation and establish reusable deployment practices.

Wireless Assurance required accurate infrastructure context. AP placement, controller visibility, telemetry, and client data were treated as important dependencies for meaningful analytics.

SDA sites were managed as an architectural workstream rather than ordinary device-management migrations, because fabric provisioning and segmentation introduced additional policy dependencies.

Finally, **operational acceptance was included in the migration**, ensuring that the new platform supported day-to-day network-management workflows before Prime functionality was retired.

9. Strategic and Future Implications

The transition from Cisco Prime Infrastructure to Cisco DNA Center represented a shift from primarily **device-centric network management toward automation-, policy-, and assurance-oriented operations**.

Centralized templates created a foundation for repeatable network changes, while Assurance provided increased visibility into device, client, and wireless health.

SDA capabilities extended this evolution further by enabling network segmentation and policy to be expressed through centralized fabric-management constructs.

The architecture also created a foundation for greater use of **network telemetry, analytics, automated provisioning, configuration standardization, software lifecycle automation, policy-driven segmentation, and proactive troubleshooting**.

For a manufacturing enterprise such as TMNA, these capabilities are particularly relevant as plant networks support increasing numbers of wireless devices, connected manufacturing systems, mobile endpoints, and operational technologies.

The project therefore represented an important transition toward **intent-based and increasingly automated enterprise network operations**.

For Srinivas, it expanded his experience beyond traditional network and wireless architecture into **network automation, assurance, software-defined access, policy-based segmentation, telemetry, and centralized infrastructure lifecycle management**.

10. Conclusion

The TMNA Cisco Prime Infrastructure-to-DNA Center migration modernized the organization's approach to centralized network management and established a foundation for automation, Assurance, wireless analytics, and Software-Defined Access.

Between **February 2021 and January 2022**, Srinivas Marka served as a **Network Consultant with Tata Consultancy Services**, contributing to Prime assessment, DNA Center architecture, network-device onboarding, wireless-management transition, template development, Assurance validation, SDA integration, troubleshooting, and operational transition.

The completed working scope encompassed approximately **5,000+ network devices, 2,000+ wireless access points, 10+ major locations, 50+ reusable configuration/templates and profiles, 20,000+ connected users/endpoints, and 1,000+ validation checks**.

The project transitioned important Prime functions involving **wireless management, RF information, configuration templates, AP placement, compliance, software image management, and device configuration management** toward modern DNA Center workflows.

For SDA-enabled environments, DNA Center additionally provided centralized capabilities for **fabric provisioning, segmentation, SGT-related policy, and Assurance**.

The resulting architecture moved TMNA toward a more centralized, standardized, analytics-driven, and automation-oriented network-management model

capable of supporting continued enterprise and manufacturing-network modernization.

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