

## Cisco Data Center Networking Architecture and Operations Assessment

Enterprise data centers are crucial assets and are evolving to architectures where networks, computer systems, and storage devices act in unison. Data centers of the future will rely heavily upon an architecture in which a comprehensive system provides performance and cost advantage. As IT organizations migrate from fragmented, older data centers to more cost-effective and agile ones, they will need to consider the requirements for data center consolidation, business continuance, branch consolidation, virtualization, and application optimization. Next-generation data centers will require a sound architecture as a building block and mandate that this architecture reduce the total cost of ownership and deliver easy manageability.

### Service Overview

The Cisco® Data Center Networking (DCN) Architecture and Operations Assessment analyzes a customer's existing data center environment, accounting for specific customer business and technical requirements. Deliverables include findings and recommendations. The assessment also delivers a more long-term data center architecture blueprint and presents the next steps in this evolution. The assessment covers topics such as DCN architecture and best practices, DCN IP infrastructure, storage, data center operations (the IT Infrastructure Library [ITIL]), data center security, application optimization, business continuity, operations excellence, virtualization, and service-oriented architecture.

### Leading Cisco Data Center Networking Expertise

Cisco data center architects have direct experience in all phases of the planning, design, implementation, operation, and optimization of the infrastructure of large data centers. They hold several industry certifications and have a broad range of experience in helping run data center operations for many global Fortune 500 companies. They are well qualified to partner with a customer to deliver recommendations on a broad range of topics.

Table 1 summarizes the topics and potential benefits of the Cisco DCN Architecture and Operations Assessment.

Table 1. Assessment Topics and Benefits

Cisco DCN Architecture and Operations Assessment Topics	Potential Benefits
<b>Data center architecture</b>	
<ul style="list-style-type: none"> <li>• Service-oriented data center <ul style="list-style-type: none"> <li>◦ Business factors and alignment of DCN infrastructure to them (for instance, promote business agility)</li> <li>◦ Maturity of IT services</li> <li>◦ Migration from a fragmented application and server approach to a service-oriented architecture (SOA)</li> </ul> </li> <li>• Evolution of data center architecture <ul style="list-style-type: none"> <li>◦ Data center consolidation <ul style="list-style-type: none"> <li>◦ Reduced number of data centers</li> <li>◦ Storage consolidation</li> <li>◦ Server and application consolidation</li> <li>◦ Integration of services on the Cisco Catalyst® platform</li> </ul> </li> </ul> </li> <li>• Data center high availability <ul style="list-style-type: none"> <li>◦ Server high availability</li> <li>◦ Fault tolerance in the data center</li> <li>◦ Cisco IOS® Software High Availability features (nonstop forwarding [NSF] and stateful switchover [SSO])</li> </ul> </li> <li>• Other data center architecture topics <ul style="list-style-type: none"> <li>◦ Data center enterprise edge</li> <li>◦ Unsecured network area design concerns</li> <li>◦ Teleworker, extranet, and VPN architecture</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Align the data center infrastructure to business needs (for example, increased business agility).</li> <li>• Move toward a service-oriented data center infrastructure.</li> <li>• Align the IT operations with IT services and related processes (ITIL).</li> <li>• Improve the use of data center resources.</li> <li>• Achieve cost savings through data center consolidation.</li> <li>• Improve the performance of the current data center infrastructure.</li> <li>• Increase the resiliency of the data center.</li> <li>• Use Cisco IOS Software High Availability features.</li> <li>• Increase performance of the VPN remote-access service.</li> </ul>
<b>Data center operations</b>	
<ul style="list-style-type: none"> <li>• Capacity management (ITIL assessment)</li> <li>• Change management (ITIL assessment)</li> <li>• Release management (ITIL assessment)</li> </ul>	<ul style="list-style-type: none"> <li>• Improve the capacity planning process for data center resources.</li> <li>• Avoid data center downtime through proper change management procedures.</li> <li>• Implement new hardware and software releases through proper procedures in the data center.</li> </ul>
<b>Data center IP infrastructure</b>	
<ul style="list-style-type: none"> <li>• Data center server farm architecture <ul style="list-style-type: none"> <li>◦ Shared application and security services</li> <li>◦ Server-to-server communications</li> <li>◦ Clustered servers</li> <li>◦ Network interface card (NIC) teaming requirements</li> <li>◦ Blade server connectivity</li> </ul> </li> <li>• Data center server farm design <ul style="list-style-type: none"> <li>◦ DCN Layer 2 and Layer 3 design</li> <li>◦ DCN access, aggregation, and core design</li> </ul> </li> <li>• Spanning-tree design and scalability <ul style="list-style-type: none"> <li>◦ Selection of Spanning Tree Protocol</li> </ul> </li> <li>• Routing, cabinet design, cabling, and density considerations <ul style="list-style-type: none"> <li>◦ Server farm cabinet layout</li> <li>◦ Cabling topics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Increase the availability of the data center IP infrastructure.</li> <li>• Improve the resiliency of the data center IP infrastructure.</li> <li>• Efficiently use cabling and rack resources.</li> <li>• Avoid outages caused by spanning tree design problems.</li> <li>• Select the appropriate spanning tree protocols.</li> </ul>
<b>Storage</b>	

Cisco DCN Architecture and Operations Assessment Topics	Potential Benefits
<ul style="list-style-type: none"> <li>• Storage area network (SAN) consolidation               <ul style="list-style-type: none"> <li>◦ Performance and scalability</li> <li>◦ Migration topics</li> <li>◦ SAN island consolidation</li> </ul> </li> <li>• SAN security               <ul style="list-style-type: none"> <li>◦ Data integrity and encryption</li> <li>◦ Device authorization and traffic isolation</li> </ul> </li> <li>• SAN management               <ul style="list-style-type: none"> <li>◦ Management of changes</li> <li>◦ SAN performance optimization</li> </ul> </li> <li>• SAN extension               <ul style="list-style-type: none"> <li>◦ IP SAN</li> </ul> </li> <li>• Intelligent SAN services</li> </ul>	<ul style="list-style-type: none"> <li>• Consolidate SAN islands to decrease costs.</li> <li>• Increase use of the SAN infrastructure.</li> <li>• Reduce costs with the latest IP SAN technologies.</li> <li>• Define a clear SAN architecture plan and verify the implementation steps.</li> <li>• Analyze SAN security and plan steps to enhance it.</li> <li>• Improve SAN management and optimize SAN performance.</li> <li>• Use intelligent SAN services to reduce costs.</li> </ul>
<b>Data center security</b>	
<ul style="list-style-type: none"> <li>• Virus protection and denial-of-service (DoS) attack prevention</li> <li>• User access to data</li> <li>• VPN, IP Security (IPsec), and Secure Sockets Layer (SSL)</li> <li>• Internal and external security</li> <li>• Data integrity</li> <li>• Role-based access control (RBAC)</li> </ul>	<ul style="list-style-type: none"> <li>• Increase data integrity.</li> <li>• Avoid security breaches.</li> <li>• Proactively enhance data center security.</li> <li>• Use RBAC to conform to ITIL change management processes.</li> </ul>
<b>File services and branch consolidation</b>	
<ul style="list-style-type: none"> <li>• Branch consolidation               <ul style="list-style-type: none"> <li>◦ Centralization of branch data, currently on file server, in a secure data center</li> <li>◦ WAN bandwidth and application performance acceleration</li> </ul> </li> <li>• Consolidation of file services</li> <li>• Multimedia application support for branches</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce operating costs (less security patching and fewer backup and restore operations) and increase manageability.</li> <li>• Increase application performance and security.</li> </ul>
<b>Application optimization</b>	
<ul style="list-style-type: none"> <li>• Essential enterprise services (Domain Name System [DNS] and Dynamic Host Configuration Protocol [DHCP])</li> <li>• Server and application load balancing</li> <li>• Server resource offloading</li> <li>• SSL offloading and application acceleration</li> <li>• Application security</li> <li>• File and software distribution</li> </ul>	<ul style="list-style-type: none"> <li>• Improve application performance.</li> <li>• Enhance end-user application response times.</li> <li>• Increase availability through server and application load balancing.</li> </ul>
<b>Business continuance</b>	
<ul style="list-style-type: none"> <li>• IT services essential to the business               <ul style="list-style-type: none"> <li>◦ Understanding of crucial IT services and applications, especially the following:                   <ul style="list-style-type: none"> <li>◦ Recovery point objective (RPO)</li> <li>◦ Recovery time objective (RTO)</li> <li>◦ Recovery access objective (RAO)</li> </ul> </li> </ul> </li> <li>• Increased data center resiliency               <ul style="list-style-type: none"> <li>◦ Data center resiliency (Cisco IOS Software High Availability features)</li> <li>◦ Spanning-tree scalability</li> </ul> </li> <li>• Disaster recovery capabilities               <ul style="list-style-type: none"> <li>◦ Data center interconnect and distributed data center</li> <li>◦ Cluster design and server high-availability design</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Increase the availability of the data center environment.</li> <li>• Improve the resiliency of the data center infrastructure.</li> <li>• Analyze business continuity requirements and plan the necessary steps.</li> <li>• Optimize the use of Cisco IOS Software High Availability features.</li> </ul>
<b>Virtualization</b>	
<ul style="list-style-type: none"> <li>• VSAN and storage virtualization</li> <li>• IT service virtualization and service-oriented data center</li> <li>• Server virtualization and data center automation (VFrame)</li> </ul>	<ul style="list-style-type: none"> <li>• Use a virtualized SAN infrastructure for lower TCO.</li> <li>• Improve the service levels of IT service.</li> <li>• Use server virtualization for lower TCO.</li> </ul>
<b>SOA</b>	

Cisco DCN Architecture and Operations Assessment Topics	Potential Benefits
<ul style="list-style-type: none"> <li>• Data center optimization for SOA (policy, quality of service [QoS], and flexibility)</li> <li>• Migration from fragmented applications to shared, virtual, service-oriented architecture</li> <li>• SSL, TCP, and Extensible Markup Language (XML) termination</li> </ul>	<ul style="list-style-type: none"> <li>• Adapt the data center architecture to the needs of SOA.</li> <li>• Use SSL termination to increase security.</li> <li>• Use XML to reduce costs.</li> <li>• Improve transaction processing.</li> </ul>
<b>Data center operations</b>	
<ul style="list-style-type: none"> <li>• Capacity management (ITIL assessment)</li> <li>• Change management (ITIL assessment)</li> <li>• Release management (ITIL assessment)</li> </ul>	<ul style="list-style-type: none"> <li>• Improve the capacity planning process for data center resources.</li> <li>• Avoid data center downtime through proper change management procedures.</li> <li>• Implement new hardware and software releases through proper procedures in the data center.</li> </ul>

## Assessment Delivery Process

The Cisco DCN Architecture and Operations Assessment is delivered in the following phases:

1. **Data collection**—Cisco sends the customer a questionnaire to collect baseline data about the customer's data center infrastructure. The collected data helps Cisco assess what the customer requires and provide an assessment that is very specific and focused on the customer's needs. The high-level data collected provides information about the range of applications and storage, server, and other data center networking devices. Baseline data related to business continuance, security, and virtualization is collected as well.
2. **Data center architecture and operations workshop**—In this workshop, conducted at the customer site, the Cisco data center architect and customer IT team jointly review input from the questionnaire and collect data to determine the status of the data center infrastructure to outline requirements, constraints, processes, and future deployment strategies.
3. **Analysis**—The Cisco data center architect analyzes the collected information and develops an initial draft of the Cisco DCN Architecture and Operations Assessment report. The initial draft is created by the Cisco data center team in conjunction with several members of the customer IT team. The intent of this report is to solicit feedback from the customer as to whether the draft recommendation meets the customer's general requirements.
4. **Completion of the report**—The Cisco data center architect evaluates and incorporates the feedback from the customer and Cisco data center architect team and continues to finalize the report. The final Cisco DCN Architecture and Operations Assessment report has the following structure:
  - I. Executive Summary
  - II. Current Status of Data Center Infrastructure
  - III. Customer Requirements Analysis
  - IV. Assessment Findings
  - V. New Data Center Networking Architecture and Operations Proposal
  - VI. Data Center Networking Architecture and Operations Evolution
  - VII. Conclusions
5. **Review and final presentation**—Electronic copies of the Cisco DCN Architecture and Operations Assessment report are sent to the customer for review prior to presentation of the report, in person, to the customer's management at the customer's location.

## Availability

The Cisco DCN Architecture and Operations Assessment is available in all Theaters.

## Summary

The Cisco DCN Architecture and Operations Assessment supports customers in various technology areas with advanced data center expertise from Cisco Advanced Services. It facilitates the transition from fragmented, older data centers to a more cost effective and agile architecture that is services oriented. Cisco engineers focus on recommending next-generation architectures that are scalable and can serve as platforms for advanced technologies in the future while at the same time ascertaining that the existing technologies are cost-optimized and that the architecture is resilient, providing a sound basis for the highest level of business continuity.

## Ordering

The Cisco DCN Architecture and Operations Assessment is a custom service offering and is ordered through a statement of work and purchase order.

## For More Information

For more information about the Cisco DCN Architecture and Operations Assessment, contact your Cisco Systems® representative.



**Americas Headquarters**  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
[www.cisco.com](http://www.cisco.com)  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

**Asia Pacific Headquarters**  
Cisco Systems, Inc.  
168 Robinson Road  
#28-01 Capital Tower  
Singapore 068912  
[www.cisco.com](http://www.cisco.com)  
Tel: +65 6317 7777  
Fax: +65 6317 7799

**Europe Headquarters**  
Cisco Systems International BV  
Haarlerbergpark  
Haarlerbergweg 13-19  
1101 CH Amsterdam  
The Netherlands  
[www-europe.cisco.com](http://www-europe.cisco.com)  
Tel: +31 0 800 020 0791  
Fax: +31 0 20 357 1100

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

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