

## CISCO BUSINESS READY DATA CENTER

*Intelligent Networks That Protect, Optimize, and Grow Your Business*

### EXECUTIVE SUMMARY

The Cisco Business Ready Data Center helps enterprises protect, optimize, and grow their business with an intelligent network architecture that help align data center resources with business priorities. It supports immediate data center demands such as consolidation, business continuance, and security, while laying the foundation for emerging service-oriented and on-demand IT strategies. Cisco offers a cohesive architectural approach to data center networking that includes data and storage networking, data center interconnect, network system intelligence, and embedded application and storage services.

- **Protect**—The Cisco Business Ready Data Center helps to protect valuable resources and services and helps to ensure maximum application availability and helps to ensure regulatory compliance by providing a resilient network infrastructure that supports security and business continuance goals
- **Optimize**—The Cisco Business Ready Data Center optimizes IT productivity and resource utilization with an extensible architecture and proven integrated reference designs that reduce total cost of ownership (TCO), help consolidate disparate systems and streamline operations.
- **Grow**—Based on an intelligent network foundation, the Cisco Business Ready Data Center supports growth with a scalable and adaptive network infrastructure that enables business agility and supports emerging technology adoption.

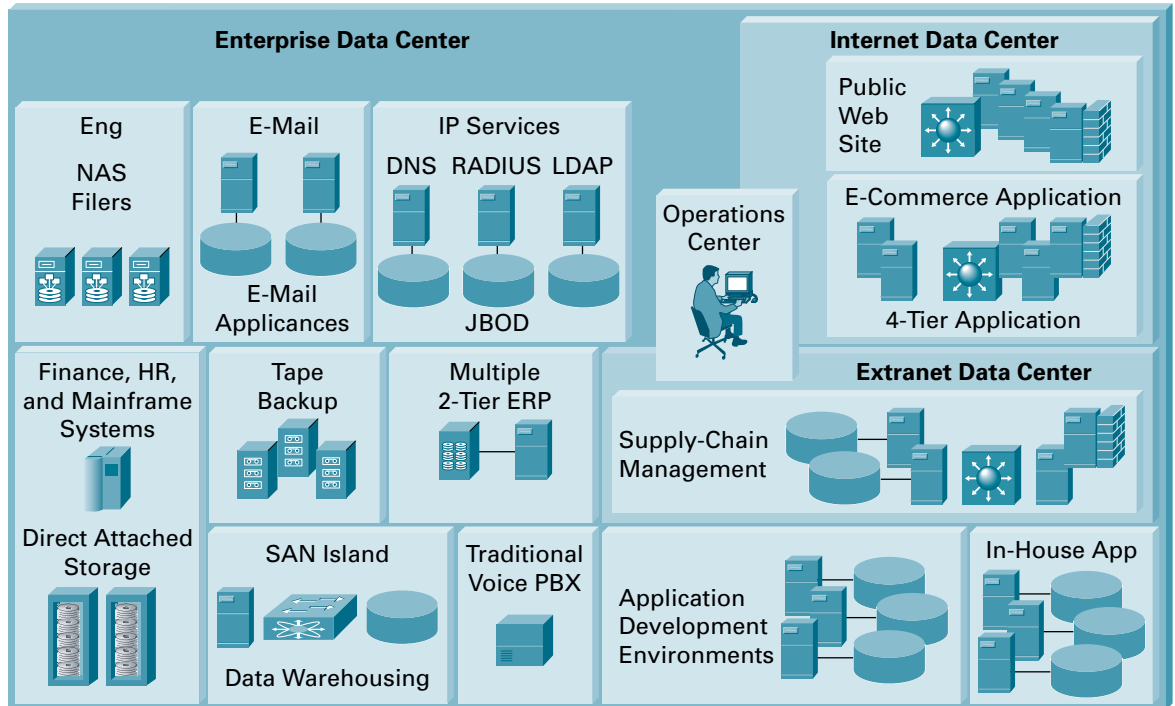
### DATA CENTER CHALLENGES

The heartbeat of any organization is in the data center. Employees, partners, and customers rely on data center services to effectively create, collaborate, and interact. Over the last decade, the rise of Internet and Web-based technologies has made the data center more strategic than ever, improving productivity, enhancing business processes, and accelerating change. Data centers are the strategic focus of IT efforts to protect, optimize, and grow the business.

Data center managers face several challenges in fulfilling these goals. Most enterprise data centers grew rapidly to meet the explosive economic growth of the previous decade. Consequently, applications commonly stand alone in underutilized, isolated environments. Each application is optimized for performance, and a typical data center supports several operating systems, computing platforms, and storage systems. The disparate infrastructures supporting different application “islands” are difficult to change and expensive to manage, integrate, secure, and back up (Figure 1).

According to industry estimates more than 70 percent of IT budgets are dedicated to sustaining existing application environments. Therefore, IT organizations must improve operational efficiency, optimize utilization of data center resources, and release funds for innovative new IT projects that help generate revenue. Data center managers need a resilient infrastructure that consistently protects diverse applications and services against disruptions and security attacks. The ultimate goal is an agile infrastructure that can incorporate ongoing improvements in compute, storage and application technologies, while empowering the enterprise to support changing business processes. There are widespread trends to improve data center operational efficiencies through data center, server, and storage consolidation. Another trend is virtualization of computing and storage resources from monolithic systems into standardized components that can be grouped, assigned, and accessed through an intelligent network. These trends provide the basis for emerging IT strategies, such as service oriented architectures and automation.

**Figure 1**  
Isolated Application Environments Result in Operational Inefficiencies



The evolving consolidation and virtualization of data center resources requires a highly scalable, resilient, and secure data center network foundation. The network is the fabric that provides secure user access to data center services and an infrastructure for the deployment and interconnection of data center components as required, including applications, servers, mainframe computers, appliances, and storage. A properly planned data center network protects application and data integrity, optimizes application availability and performance, and enables responsiveness to ever-changing market conditions, business priorities, and technological advances.

### THE BUSINESS READY DATA CENTER

Cisco Systems® offers the technologies, expertise, architecture, and vision for intelligent, integrated networks to help enterprises meet business needs. The Cisco® Business Ready Data Center is a cohesive, adaptive network architecture that supports an IT organization's immediate data center demands for consolidation, business continuance, and security, while enabling emerging service-oriented architectures, virtualization, and on-demand computing technologies. The Business Ready Data Center allows IT managers to deploy technologies that best support their business goals and enables efficient implementation of future services and applications. Cisco helps IT managers adopt this architecture to reduce risk, time, and investment with tested and validated reference architectures, proven design best practices, and both generic and partner-specific configuration templates.

The Business Ready Data Center network architecture allows enterprises to protect critical applications and confidential data, enhance data center operational efficiencies, and rapidly create new secure application environments to support new business processes. The Business Ready Data Center allows businesses to invest more resources in IT initiatives that fuel growth through a consistent network foundation that enables substantial cost reductions in sustaining existing infrastructure.

The Business Ready Data Center provides a scalable, resilient foundation that allows data centers to host a variety of legacy and emerging systems and technologies on a consolidated network architecture. Among these technologies are the following:

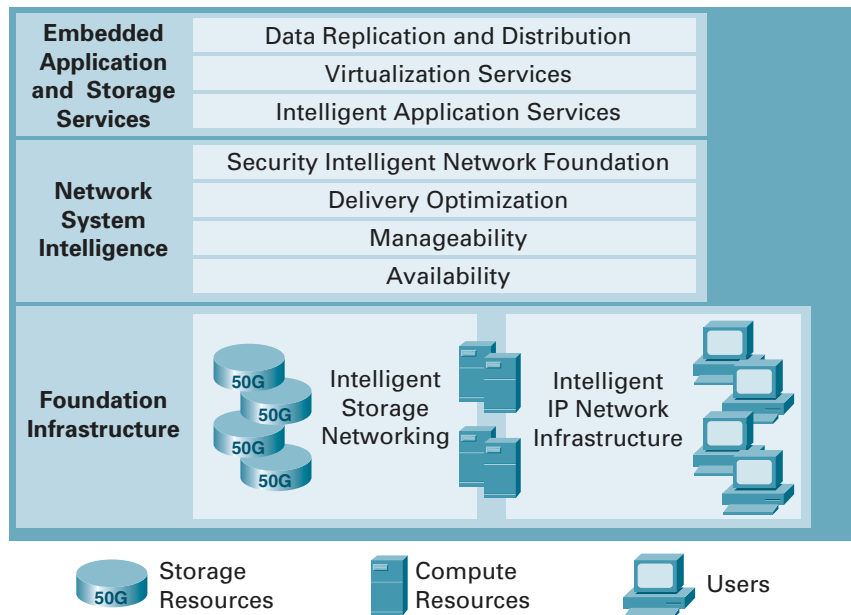
- *N-tier applications*—Secure network zones support two, three, or n-tier application environments with techniques that optimize application availability and server and storage utilization.
- *Blade Servers*—The Business Ready Data Center helps reduce risks associated with blade server deployment by providing an intelligent network foundation and deployment guidance that help optimize their availability, security, and performance.
- *IP Communications*—IP Communications are applications with unique network requirements, including delivery optimization, availability, security, and support for local and remote clustering.
- *Mainframe computing*—Cisco offers a comprehensive set of technologies supporting Systems Network Architecture (SNA), SNA-to-IP migration, and native IP mainframe services.

### THE BUSINESS READY DATA CENTER ARCHITECTURE

The Cisco Business Ready Data Center network has a three-tiered architecture based on an intelligent network foundation (Figure 2):

- *Foundation infrastructure* includes the intelligent IP network infrastructure, intelligent storage network, and data center interconnections
- *Network system intelligence* includes security, delivery optimization, manageability, and availability
- *Embedded application and storage services* include virtualization, data replication and distribution, and intelligent application services

**Figure 2**  
Cisco Business Ready Data Center Architecture

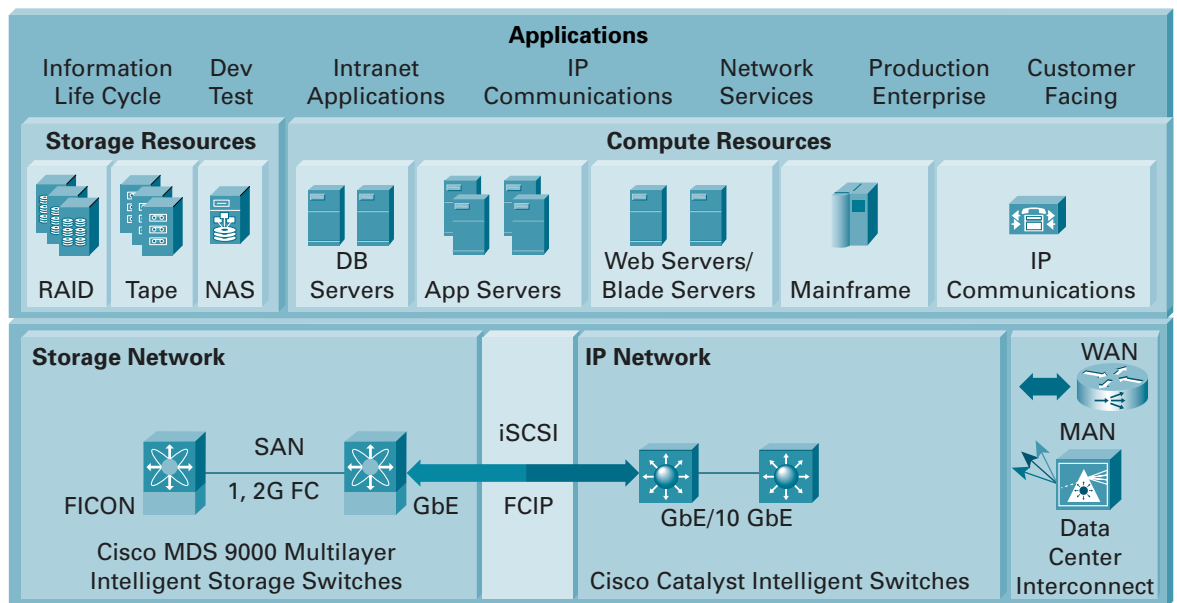


### Tier 1—Data Center Foundation Infrastructure

The foundation of the Business Ready Data Center is the network infrastructure, which has three components: the intelligent IP network, the intelligent storage network, and the data center interconnect network. These networks are built with highly resilient, scalable platforms that integrate intelligent services directly into the network fabric. The Cisco foundation infrastructure is designed with availability, scalability, and flexibility in mind, ensuring an enduring infrastructure with investment protection that readily accommodates emerging technologies and mission-critical applications.

This foundation offers both high bandwidth and high port densities to support rapid growth. Both IP and storage networks share common services and operational tools to streamline operations and reduce administrative overhead. As multilayer platforms, Cisco foundation infrastructure components offer a selection of local, metro and WAN interfaces, broad protocol support, and network system intelligence including security, delivery optimization, manageability, and availability. In addition to traditional storage protocols, such as Fibre Channel and Fiber Connection (FICON), these platforms support interaction between IP and storage networks with support for IP-based storage services. Cisco multiservice metro-optical and routing platforms provide cost-effective interconnect capabilities and optimize the network services between multiple data center sites.

**Figure 3**  
Foundation Infrastructure: Highly Resilient, Scalable, Intelligent Storage and IP Network Platforms



### Foundation Infrastructure: Intelligent IP Network

The intelligent IP network infrastructure delivers user access to the broad range of applications and services in the data center and enables high-speed communications between server tiers, clustered computing resources and applications. Cisco offers data center managers an IP network infrastructure with the intelligent switching capabilities of its proven, award-winning family of Cisco Catalyst® switches. Cisco continues to enhance these platforms with innovations such as 10-Gigabit Ethernet, high-density Gigabit Ethernet, integrated services modules,

and Cisco IOS® Software. These platforms enable consolidation and meet today's rigorous demands for flexibility, availability, and performance, yet their modular design permits upgrades to support future technologies and services with minimal disruption and expense.

The ability to integrate vital intelligent services—such as security, delivery optimization, manageability, and availability—directly into the network fabric requires a new approach to data center design. Cisco design guides offer a “services layer” that resides between the traditional aggregation and core layers of the data center network. This centralized tier manages and controls intelligent services across all application and server environments and releases data center architects from specific computing platforms, because services are virtualized and shared throughout the data center.

### **Foundation Infrastructure: Intelligent Storage Network**

Storage requirements are always growing. The industry transition from direct-attached storage (DAS) and isolated Storage Area Network (SAN) islands to scalable, intelligent storage networking is underway. This trend delivers substantial cost of ownership and business resilience benefits, enabling efficient storage pooling and utilization and consistent data replication and mirroring for business continuance. Storage networking is the software and hardware that enables storage consolidation, sharing, access, replication, and management over a shared network infrastructure.

Cisco storage networking solutions help storage managers to reduce TCO and improve business continuance over DAS and first-generation SAN solutions. Cisco delivers next-generation storage networking with Cisco MDS 9000 Series multilayer switches. Cisco has applied its advanced data networking experience to the storage environment, changing the landscape of storage networking. For example, Cisco has adapted VLANs and IPSec technologies to the storage network as Virtual SANs (VSANs) and Fibre Channel Security Protocol respectively.

The flagship storage platform is the Cisco MDS 9500 Multilayer Director. It elevates the standard for director-class switches with intelligent services that enhance availability, security, delivery optimization, and manageability. The Cisco MDS 9500 Series facilitates large-scale SAN deployment with low TCO. Layering a rich set of intelligent services onto a high-performance, protocol-agnostic switch, the Cisco MDS 9500 Series addresses the stringent security and availability requirements for consolidating multiple SAN islands onto one physical SAN infrastructure. VSAN technology provides reliable, secure SAN consolidation across a single physical network. The Cisco MDS 9500 Series supports popular storage networking protocols, including Fibre Channel, FICON, Internet Small Computer Systems Interface (iSCSI), Fibre Channel over IP (FCIP), and Gigabit Ethernet. The solution extends SAN coverage to all systems at appropriate price and performance levels.

### **Foundation Infrastructure: Data Center Interconnect network**

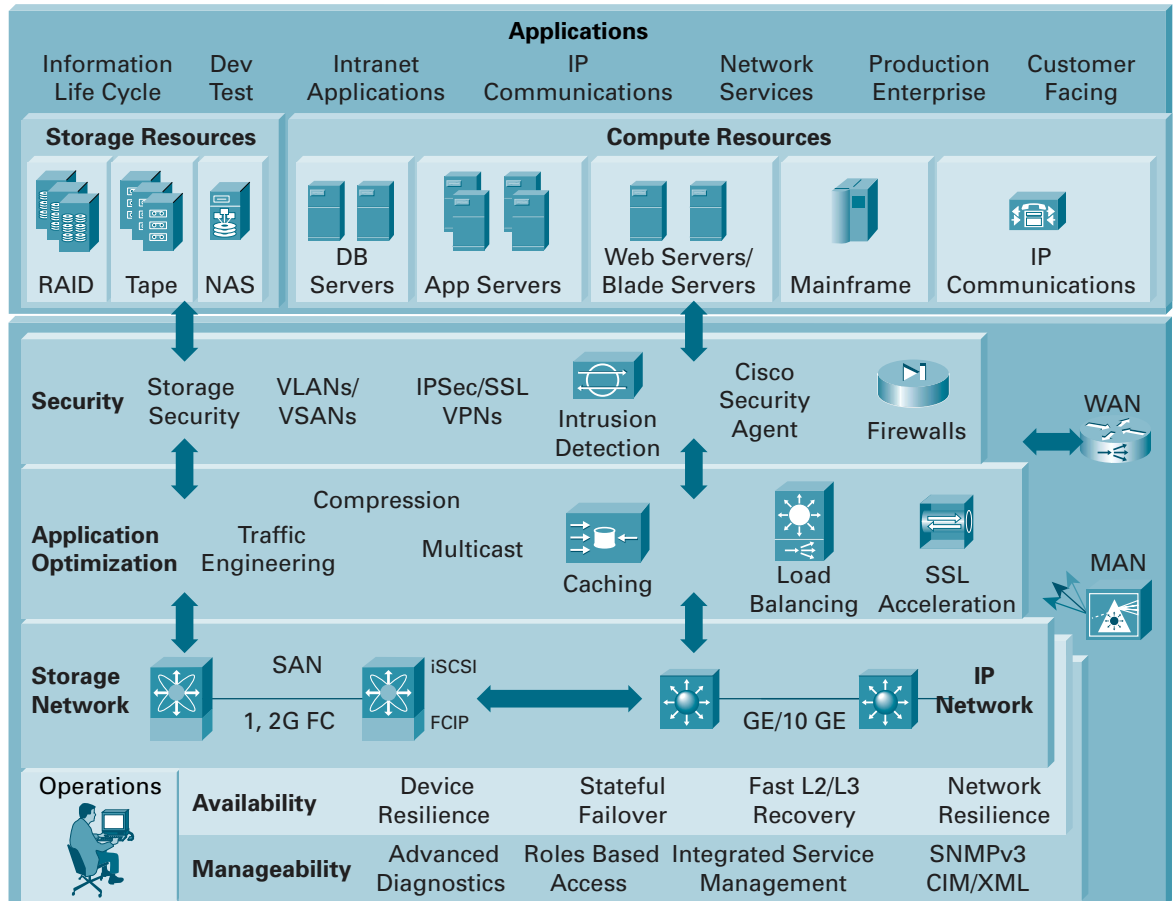
Data center interconnections include campus, metro optical or WAN infrastructures. The ability to provide high-speed, low-latency data center interconnections is critical to business continuance as enterprises consolidate smaller data centers into larger ones. Cisco flexible data center interconnection solutions include the Cisco ONS 15000 family of multiservice optical platforms. These platforms support dense wave-division multiplexing (DWDM) and Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) services, and storage protocols such as FICON, ESCON, Fibre Channel, and Fibre Channel over IP (FCIP), and data services including Gigabit and 10-Gigabit Ethernet. These platforms enable consolidation and cost control, giving data center and network managers the ability to retire redundant, inefficient networks in favor of a single infrastructure that supports storage, data, and voice applications.

## Tier 2—Data Center Networking: Network System Intelligence

Data center managers can deploy applications quickly, securely, and reliably with a network infrastructure that displays system-level intelligence, such as advanced network recovery, in depth security, and enhanced application optimization. The Business Ready Data Center architecture exhibits network system intelligence through a combination of intelligent services integrated into the foundation infrastructure platforms, complementary services offered on appliances, storage systems, server hosts, network design, and best practices.

The Business Ready Data Center meets the demanding requirements of ever-changing networks with a combination of multiple network and non-network devices into an intelligent system that reacts to anomalies, disruptions, or changing application requirements. The Business Ready Data Center presents network system intelligence in four categories: security, delivery optimization, manageability, and availability (Figure 4).

**Figure 4**  
Network System Intelligence: Security, Delivery Optimization, Manageability, and Availability



## Network System Intelligence: Security

As data center managers consolidate data center resources onto a common network infrastructure, security requirements change. However, managers tasked with securing the disparate systems assembled quickly during the economic boom of the last decade inherited vulnerabilities that require individual attention. The result is often inconsistent policy enforcement and severe burdens on security staff. Also, in the past managers relied on physical application isolation or perimeter defense for security. These methods are inadequate to defend resources and applications from sophisticated and dangerous attacks. Consistent protection of consolidated data centers is challenging, because attacks can spread unchecked among all systems on a single infrastructure. The network provides in-depth, integrated security that protects servers and applications within secure zones.

The Business Ready Data Center offers security strategies, technologies, and products designed to prevent or contain attacks from both within and without the enterprise. These strategies are based on the principle of defense in depth, which delivers multilayer security throughout the IP, storage, and interconnection networks. Cisco enables consistent security policy enforcement with comprehensive security solutions spanning trust and identity control, secure access, and threat defense. Integrated security service modules for the Cisco Catalyst 6500 Series platform provide virtualized, hardware-based firewall capabilities between virtual LANs (VLANs), intrusion detection, Secure Sockets Layer (SSL) services, and VPN termination. Rounding out the security portfolio is an extensive list of Cisco IOS Software features and end-point host protection solutions that can provide day-zero protection.

On the storage network, VSANs provide secure environments for various applications and standards-based host authentication to ensure data confidentiality. The Cisco Self-Defending Network vision takes integrated in-depth security to the next level with systems-based security solutions that advance infrastructure security policy enforcement, responds faster to threats, and reduces manual interaction through automation.

## Network System Intelligence: Delivery Optimization

Data centers typically support various business-critical applications on many server and mainframe platforms, operating systems, and protocols. Data centers also support IP Communications applications that integrate data, voice, and video packets onto a single wire. Delivery optimization services are available on Cisco IP and storage networking platforms, appliances such as network caches, and server-based agents. It uses specialty hardware to increase control of latency-sensitive applications.

Working together as a system, delivery optimization services can transparently respond to changing application loads or service disruptions. Its intelligence protects user sessions during planned and unplanned downtime. It optimizes server resources through load balancing and offloading routine functions, preserving valuable server cycles for dynamic, complex transaction processing. It supports business growth through smooth application and server farm scalability.

The Cisco Business Ready Data Center includes load balancing, SSL offloading, cache, and management functions. In the Cisco Catalyst 6500 Series platform, the content switching module load balances user sessions across server farms for optimal server utilization. The SSL Offload module secures user sessions to preserve server processing for transactions. Advanced multicast support and quality-of-service (QoS) mechanisms protect application performance as traffic leaves the bandwidth-rich data center for lower-speed connections to users.

The storage network optimizes applications with advanced traffic engineering mechanisms between servers and storage. As with IP QoS, the storage network provides service differentiation that prioritizes delay-sensitive transactions to less sensitive operations. It also supports advanced services such as per-flow traffic shaping that optimize data replication and backup.

The data center interconnect infrastructure ensures that delay-sensitive applications such as synchronous mirroring receive low latency delivery to minimize performance impact on applications.

### Network System Intelligence: Manageability

Manageability across IP, storage, and interconnect infrastructures simplifies configuration, monitoring, and change control with advanced common management and diagnostic tools, resulting in lower administration overhead, consistent procedures, and effective collaboration between data center groups. Manageability functions provide information about traffic and interfaces in network devices to management applications, giving operations staff real time and historical visibility of network status. They allow staff to configure, monitor, and troubleshoot the network using Cisco or third-party management tools.

The Business Ready Data Center provides advanced common management interfaces, capabilities, and tools to substantially enhance operational efficiency of data center administration, reducing complexity and learning cycles, leading to improved service levels and faster problem resolution. Role-Based Access Control allows administrators to allocate management control of designated resources to specialized personnel.

The Business Ready Data Center network has five manageability areas:

- *Simple Network Management Protocol (SNMP) Version 3*—Supports common MIB format across IP switched and routed, storage, and optical networks, assisting configuration, inventory, and change management
- *Embedded management agents simplify manageability*—Enables adaptive policy-based management, rapid response to issues before they escalate into problems, and simplified service implementation. For example, the new CiscoView Device Manager agent for the Cisco Catalyst 6500 Series facilitates end-to-end, policy-based configuration
- *Similar Cisco IOS Software and SAN OS command-line interface*—Provide consistent communication between managers and devices
- *Standard Common Information Model and Extensible Markup Language (XML) management APIs*—Simplify implementation of third-party systems management in the storage network
- *Common advanced diagnostics capabilities*—Ease real-time monitoring, historical statistics collection, and reporting

### Network System Intelligence: Availability

Business operations today require data centers to have maximum uptime. The Internet-driven shift to a worldwide economy has extended “normal” operations from an eight-hour day to a 24-hour day. This always-on enterprise requires a network that ensures nonstop application and data access.

Data center managers cannot achieve availability through simple redundancy or resilience features. Availability is the result of a life-cycle approach to the network infrastructure. Human error is the most common cause of downtime; therefore, it is vital to implement best practices in network operations and management to realize business continuance.

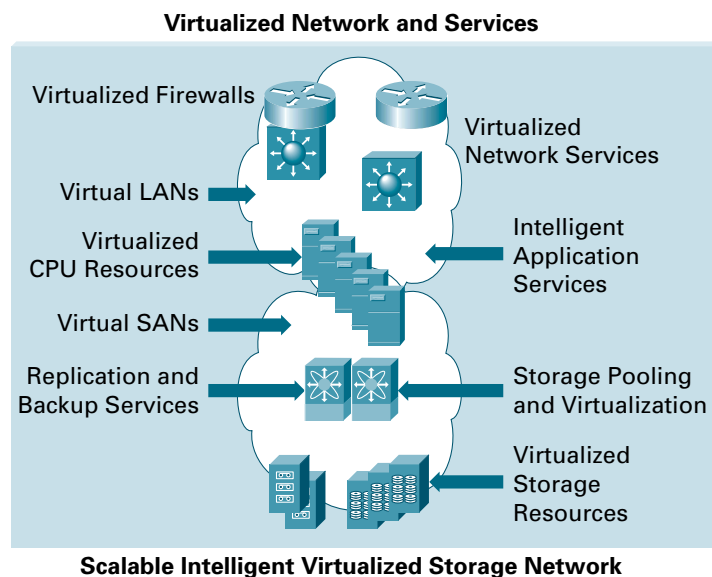
The Business Ready Data Center takes a network-centric approach to availability networking with the following features:

- *Reinforced network infrastructure*—Cisco delivers highly reliable switches and routers with advanced resiliency features that connect users to applications in the event of component, module, device, circuit, or power failure. From critical redundancy of all hardware elements to rapid, stateful failover for mission-critical applications, Cisco IP, storage, and optical switches meet strict service-level agreements and reduce management and operational costs.
- *Real-world network design*—Drawing from more than 15 years experience with customers worldwide, Cisco provides proven high availability design guidelines for data center networking. Cisco offers enterprises large-scale, proof-of-concept laboratories that allow data center managers to stage designs before implementing them.
- *Realigned network operations*—Network availability is limited by change, configuration, and fault management. Cisco high-availability networking engineers can make assessments against 30 industry benchmarks and recommend best practices that measurably improve network availability.
- *Expertise, service, and support*—Access to Cisco knowledge bases and experts is critical to quickly troubleshooting issues and rapidly restoring service. The award-winning Cisco Technical Assistance Center Web site routinely solves more than 70 percent of cases without requiring escalation.

### Tier 3—Embedded Application and Storage Services

The Business Ready Data Center foundation provides IT architects the opportunity to embed high performance centralized services formerly served on disparate storage and server devices. In collaboration with industry partners, Cisco enhances the data center network architecture with innovative technologies including virtualization, data replication and distribution, and intelligent application services.

**Figure 5**  
Network Virtualization and Network-Enabled Virtualization of Computing and Storage Resources



## **Embedded Application and Storage Services: Data Replication and Distribution**

In conjunction with storage partners, Cisco eases the overhead associated with data replication and distribution. In Cisco MDS 9000 Series switches, the Advanced Services Module (ASM) or Caching Services Module deliver hardware-based, multilayer innovations that improve the scalability, availability, security, and manageability of data replication, backup and business continuance solutions. This approach provides consistent replication across different storage environments, improved uptime, and lower TCO. The solutions support both replication and snapshot applications.

## **Embedded Application and Storage Services: Virtualization**

The step beyond consolidation is virtualization, which allows data center managers to closely align physical resources with changing application requirements. Virtualization in the Business Ready Data Center is the creation of one logical entity from multiple physical entities or, alternatively, the creation of many logical entities from one physical entity. An entity can be computing, storage, network, or application resources.

Familiar in IP networking are virtualization technologies such as VLANs, Frame Relay/Asynchronous Transfer Mode, Permanent Virtual Circuits, and VPN. The next phase of virtualization enhances the ability to build an agile and efficient infrastructure, reducing both capital and operational expenditures. For example, virtual firewalls allow a single physical firewall to act as multiple physical firewalls. This helps enterprises optimize utilization and protection with minimal investment.

Cisco is accelerating virtualization technology in the SAN. Storage virtualization combines multiple physical devices into a single logical one. It can also segment large storage devices into multiple logical units. Virtualization allows managers to add or remove devices from the SAN without system or application downtime, redirect requests to alternative devices in case of device failure, mix hard drives of different sizes and speeds and easily create, delete, or expand a virtual drive to optimize resource utilization.

Working with partners, Cisco deploys advanced storage virtualization technologies integrated onto the Intelligent Services Module for Cisco MDS 9000 platforms. This solution provides a central point of volume management for provisioning, especially in heterogeneous storage environments. It reduces the cost of storage for backups and data warehousing with improved utilization.

## **Application and Storage Services—Intelligent Application Services**

Cisco has introduced technologies that effectively serve applications needs in the data center environment. These technologies include functions such as load balancing, caching, storage intelligence, and comprehensive security. As Cisco technology develops, these and other features will expand to provide intelligent application services that are directly oriented toward the needs of applications in the data center. These solutions will facilitate application communications, simplify application deployment, and enhance application performance and security.

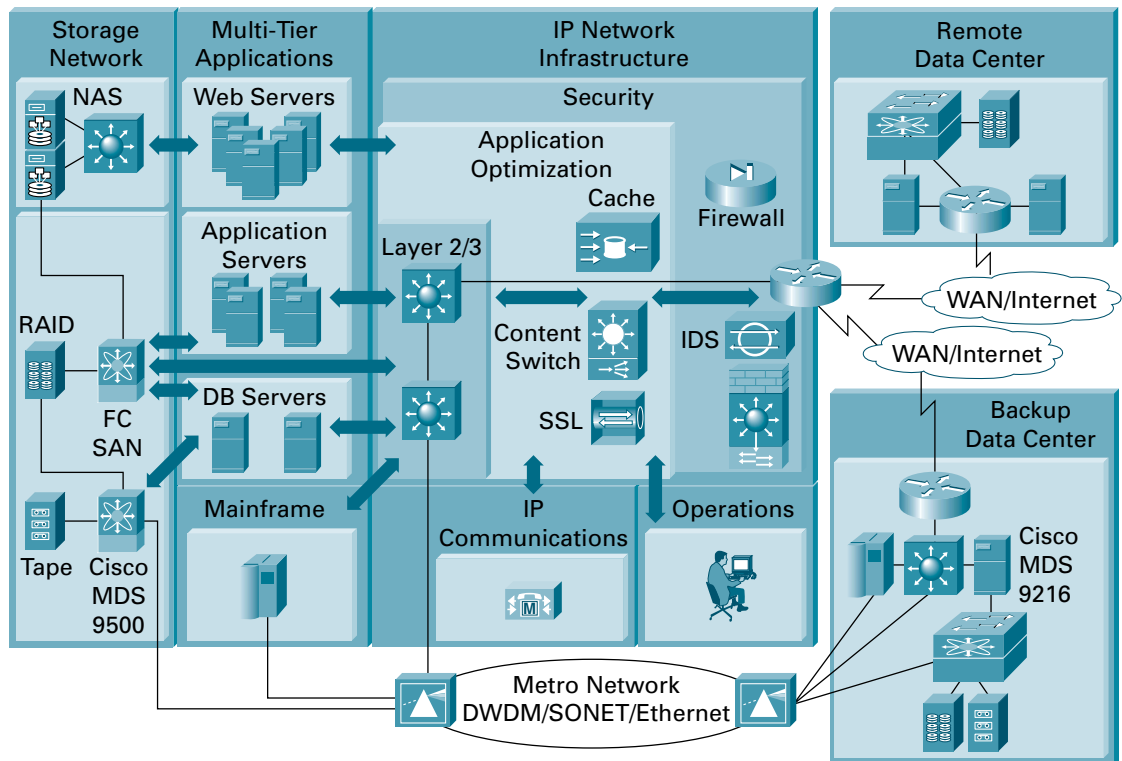
## **ACHIEVING HIGH AVAILABILITY AND BUSINESS CONTINUANCE**

Business continuance is critical in data center consolidation, because no enterprise can afford application downtime. Because disruptions can destroy a business, enterprises frequently deploy secondary data centers that take over should the primary data center fail. This has become an even higher priority, given the trend toward data center consolidation and emerging regulatory requirements. Although it is desirable to maintain uninterrupted access to all data center applications, the economics of business continuance require managers to prioritize applications according to business criticality. Therefore, data centers need a range of business continuance systems from simple tape backup and remote replication to synchronous mirroring and mirrored distributed data centers.

Enterprises require a resilient, integrated business continuance network infrastructure to protect data, rapidly recover applications, and ensure continuous user access in the event of a disruption. The Business Ready Data Center supports a comprehensive business continuance strategy with multiple user access technologies and cost-effective communications between data center and recovery sites. Cisco business continuance networking solutions use a range of technologies to meet application recovery requirements (Figure 6). These include:

- *Highly resilient foundation IP and storage network infrastructure*—Providing automatic failover within the data center
- *High-capacity, low-latency data center, MAN and WAN data center interconnections*—Based on Cisco storage, optical, and wide-area networking solutions, these high-bandwidth, low-latency solutions enable zero-data-loss data mirroring to protect user sessions, prevent transaction loss, and support automatic failovers between mirrored sites
- *Data replication services*—Provide highly reliable copy services as previously described
- *Resilient, flexible user access*—Cisco offers many options for deploying multiple user access methods, including VPN for security and global site selection for automatically redirecting users to the most available resource

**Figure 6**  
Cisco Business Continuance Networking



## **OPERATIONAL EFFICIENCY THROUGH NETWORK MANAGEMENT**

In the Business Ready Data Center, Cisco and its partners take advantage of the extensive manageability capabilities of network devices with advanced network management system tool sets. Network operators and architects can use these tools to gather information offered by the network, and apply controls that configure, monitor, and tune the network. Cisco network management solutions allow administrators to simplify operations and increase productivity, thereby reducing TCO throughout the data center life cycle.

Among the network management solutions that Cisco offers is CiscoWorks, which support IP, storage, delivery optimization, security, wide area and optical network management. CiscoWorks is a comprehensive suite of tools with Web-based GUIs. Network administrators can trust the workflow automation capabilities of the many CiscoWorks tools, which use a Web interface to create scripts and perform complex tasks in a normalized automated process. CiscoWorks includes powerful applications for centralized, automated provisioning, change management, monitoring, and troubleshooting of data center networks. It delivers full configuration, performance, monitoring, and troubleshooting capabilities within an easy-to-use, integrated framework. It enables role-based services tailored to the operational domains of the data center, such as security, storage, network infrastructure, and capacity planning. Its standards-based interfaces allow integration with third-party applications.

CiscoView Device Manager for the Cisco Catalyst 6500 Series Switch resides in the switch and manages several Layer 2 and Layer 3 features for a single chassis. A task-based tool, CiscoView Device Manager eases the initial setup and deployment of end-to-end services across modules by offering configuration templates based on recommended practices. It further enhances the user friendliness of the Cisco Catalyst 6500 Series through graphical representation of the VLAN and by providing a single launch point for multiple module managers.

## **DATA CENTER PARTNERSHIPS**

The Cisco Business Ready Data Center forms the robust foundation that lets enterprises transform data centers into strategic assets. Cisco intelligent networking technologies provide the foundation of integrated offerings by leading data center vendors to offer customers complete compute, storage, and application environments. These partners include market leaders such as EMC, IBM, Hewlett Packard, HDS, Microsoft, and Veritas. Cisco collaborates with industry leaders in a variety of disciplines to facilitate smooth, integrated delivery of data center infrastructures that enterprises can tailor to their unique requirements today and easily adjust as requirements grow and change. These partnerships give data center managers the resources they need to design, deploy, and maintain agile data centers that effectively support their business goals.

## **ACCELERATE SUCCESS WITH CISCO EXPERTISE, SERVICE, AND SUPPORT**

Only smoothly integrated network architecture with focused engineering support consistently delivers application optimization, availability, and security—all necessary for supporting the applications that today's businesses demand. Cisco Technical Support Services and Advanced Services provide 24-hour access to data center network technology engineering expertise, real-world tested processes and procedures, innovative support tools, and a network of specialized partners ready to help data center managers meet demanding requirements.

Cisco services help data center and network managers optimize network investments by providing expert planning assistance specifically for data center environments. This expertise helps maximize network uptime and performance by designing in network resiliency, availability, and security, and by measuring and optimizing network capacity and performance levels on an ongoing basis. Cisco services provide data center network planning, design, and implementation best practices along with skilled, experienced engineers to deploy robust data center networks that enable customers to efficiently deploy applications and accelerate improved business performance.

## **ONGOING INNOVATION IN THE BUSINESS READY DATA CENTER**

The Business Ready Data Center offers strategies that respond to industry trends and prepare for the future. Cisco helps its customers take a strategic approach to data center networking to realize the promises of protection, efficiencies, and business agility through technology. The Business Ready Data Center addresses both near- and medium-term demands while laying a solid foundation for the future. Cisco understands customer requirements as they change and offers a vision for how technologies develop to address customer demands. Enterprises that invest in a Cisco network today also prepare for the future, because Cisco cultivates industry partnerships that assure integration of network, server, and storage systems, and application frameworks. Data center managers gain more solution options, giving them more flexibility to tailor systems to meet particular business needs.

Cisco is developing data center networking technologies and solutions along four parallel tracks:

- *Architecture*—An adaptable, deterministic, and predictable network architecture as described in this document
- *Integration*—Integration of shared, intelligent network, application, and storage services into foundation infrastructure platforms to enhance scalability, manageability, reduce complexity, and enable solutions that otherwise would be technically unfeasible
- *Virtualization*—Network-enabled virtualization of application, computing, and storage resources, and virtualization of the network and intelligent network services to increase utilization and adaptability while reducing costs
- *Automation*—The dynamic, demand-driven, automated execution of provisioning, monitoring, and self-defending tasks, and simplified integration into emerging data center frameworks increase application uptime and performance while minimizing manual intervention

## WHY CISCO?

Cisco helps data center managers transform their data centers into strategic assets that protect, optimize, and grow their business. The Cisco Business Ready Data Center architecture delivers the most integrated, end-to-end data center networking solutions, empowering enterprises to gain the greatest level of control when aligning data center resources with business needs.

The Business Ready Data Center helps enterprises centralize control, simplify management, increase security, gain operational efficiencies, reduce TCO, and speed application rollout and time to market. It accommodates emerging technologies with scalable, flexible designs. With Cisco as primary networking vendor, managers can consolidate management, training, sparring, and support costs to reduce operational costs, speeding both problem resolution and application deployment. Backed by expert professional services, world-class service and support, reference designs, and valuable partner relationships, the Cisco Business Ready Data Center offers a complete networking solution to real-world data center demands.

## FOR MORE INFORMATION

For more information about the Cisco Business Ready Data Center, go to:

<http://www.cisco.com/go/datacenter>



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