Solution Overview

Cisco's Borderless Campus 1.0 Architecture establishes a framework that securely, reliably and seamlessly. connects anyone, anywhere, anytime using any device to any resource. This framework empowers all employees with advanced services, taking advantage of an intelligent, enterprise-wide network to increase revenue, productivity, and customer satisfaction while reducing operational inefficiencies across the business. The Borderless Campus 1.0 Architecture combines a core network infrastructure with integration of productivity-enhancing advanced technologies, including IP Communications, mobility, security, video, and collaboration services. This combination helps enterprises implement a resilient, highly-available network that allows them to adapt more quickly to changing requirements, rapidly and securely enable new and emerging services, and streamline processes through optimized access to information and communications that increases employee effectiveness.

In the traditional client-server environment, the campus network was simply used for connectivity. However today's campus network has become a critical component of business success—enabling new applications, enhancing productivity, and providing a multitude of services to customers. Real-time collaborative applications and communications tools (such as IP telephony, video, and WebEx) and technologies that expand the scope of a network (such as wireless LANs [WLANS]) offer an opportunity for enterprises to increase the productivity of their employees.

As enterprises take steps to transform the network into a tool that enables employees to be more productive, they must find ways to protect the network and the data that traverses it and ensure the availability of the network and its resources, while simultaneously reducing expenses.

Today's Campus Network Must Support Current and Future Requirements

Although it is important that the network be equipped to support the dramatic changes that are expected in the near future, the network must also meet today's requirements. The primary requirements for the campus network are:

- Business Resilience
  - Ensure high availability of business-critical data and applications with redundant and secure infrastructure design
  - Protect information and assets by securing the network from potential attacks launched from outside or inside your organization through integrating security at every level of the campus network
  - Maintain compliance with evolving industry standards and regulations with inherent data separation and security
- Services Enablement
  - Enable rapid and effortless deployment of advanced services, such as IP telephony, mobility, video, and collaboration applications

- Reduce deployment times for future services rollout with a proven, stable network
- Support network expansion due to growth, acquisitions, and partnerships
- Enable any device, anywhere, anytime access to network services to ensure employee productivity and enhance the end user experience
- Operating Expenses Reduction
  - Simplify network operations with comprehensive management applications
  - Reduce network complexity and cost
  - Streamline maintenance and training

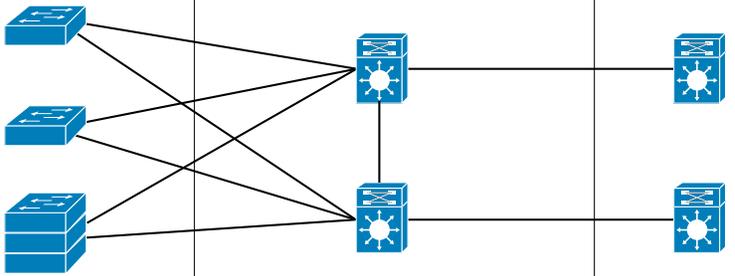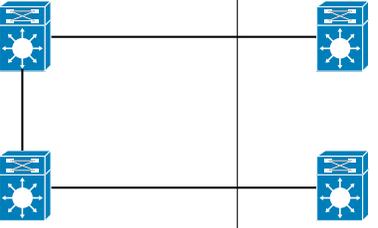**Figure 1**   Borderless Campus 1.0 Architecture
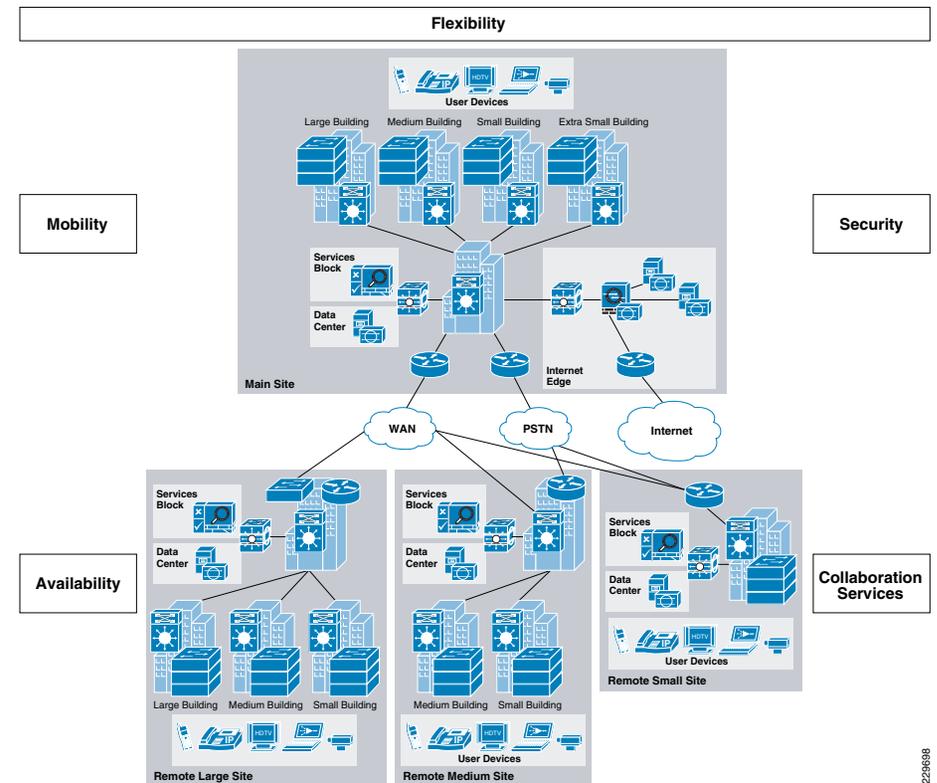
Cisco's Borderless Campus 1.0 Architecture

Cisco's Borderless Campus 1.0 Architecture is well-positioned for the future while addressing current critical business requirements:

- Comprehensive Approach to Business Resilience
  - Reinforced network infrastructure
  - Real-world, highly-available network design
  - Integrated security
  - Real-time collaboration applications

The Cisco Borderless Campus 1.0 Architecture delivers high availability and security across the campus using the hierarchal approach to network design with these functional divisions or layers: access, distribution, and core.

**Figure 2** Borderless Campus—Integrated, System-Level Approach

Access	Distribution	Core
Problem: - Rogue Device Prevention - Redundant Links - Loop Prevention	Problem: - Loop Detection - Redundant Default Gateway - Load Balancing, Topology and Reachability - Redundant Links	Problem: - Efficient Load Balancing - Network Reachability - High Speed Connectivity - Redundant Links
Solution: - AutoSmart Ports Macro* - BPDU/Root Guard - Dual Modular Components - StackWise - Stateful Switchover (SSO) - Cisco Etherchannel - Adv. Spanning Tree	Solution: - VSS: Dual Supervisor or Single Supervisor * - Adv. Spanning Tree - Gateway Load Balancing Protocol (GLBP) - EIGRP or OSPF - Cisco Etherchannel - NSF/SSO	Solution: - EIGRP or OSPF - Cisco Etherchannel - GbE and 10 GbE - NSF/SSO

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- Design Topology

The Borderless Campus 1.0 Architecture is a network foundation with embedded services designed and validated to support enterprise customers. A modular design is represented by sites and buildings of various sizes interconnected through WAN connections. Sites are made up of one or more buildings, depending on the size profile; buildings are sized by the number of users or connections to the network as well as physical size. It is assumed half the network can be accessed via wireless.

Figure 3 PoD Design Topology
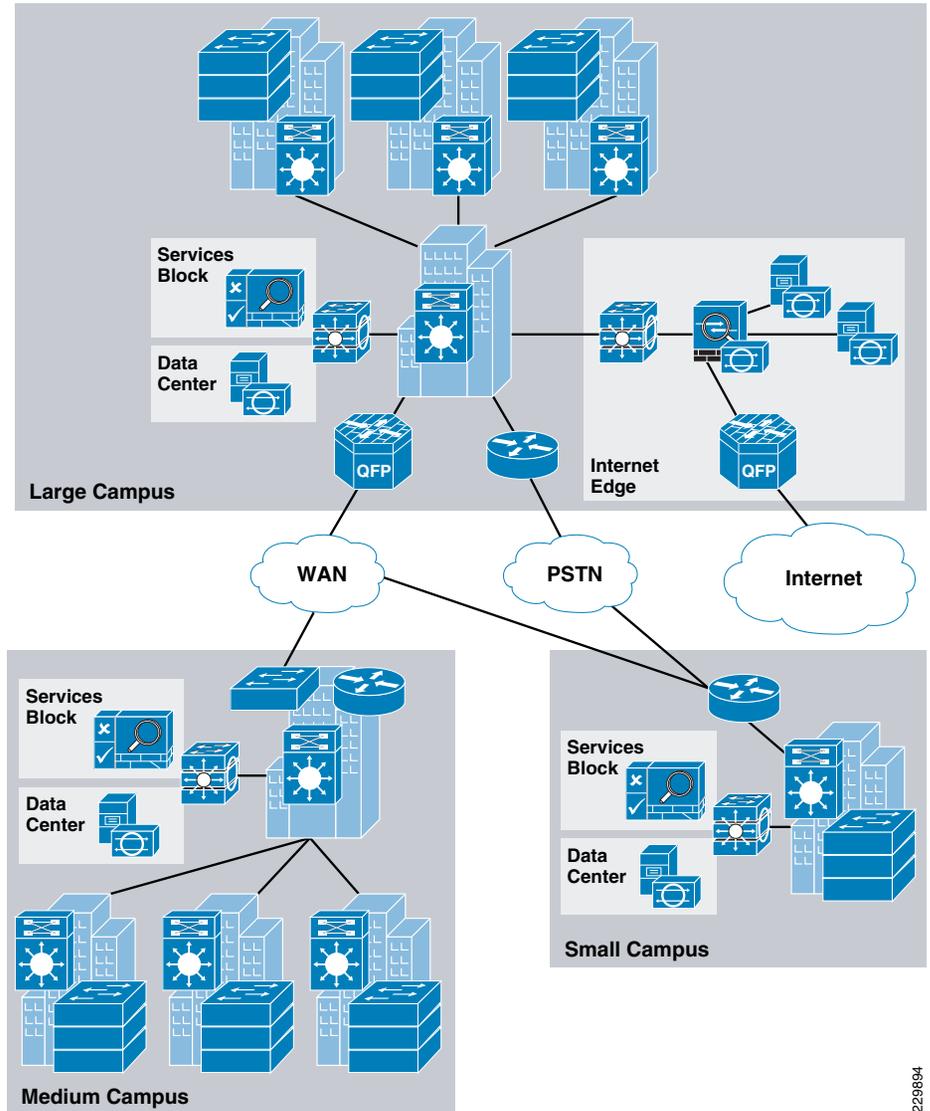
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- Large Campus
  - Each site consists of six buildings ranging in size from large to extra small
  - Buildings connect back to a resilient core via multiple 10Gb Ethernet links
  - The core connects to a data center and service block for both sites
  - Large Campus contains an Internet Edge that connects to the Internet
- Medium Campus
  - Consists of approximately three buildings ranging in size from medium to small
  - Buildings connect to the Medium Campus core via multiple 10GB links

- – Core connects to a small data center and service block
- – Medium Campus connects to the Large Campus via 100Mb Metro link
- Small Campus
  - – Consists of one building
  - – Core and Distribution networks are collapsed into one
  - – Small Campus connects to Large Campus via a fractional DS3 with a 20Mb bandwidth rating

Table 1   Components of the Cisco Borderless Campus 1.0 Architecture

Feature	Components
Network	• Cisco Catalyst 2900 E Series • Cisco Catalyst 3500 E Series • Cisco Catalyst 3700 E Series • Cisco Catalyst 3700 ME Series • Cisco Catalyst 4500 E / E+ Series – Sup6E and Sup6E-L • Cisco Catalyst 6500 Series – Sup720-10GE • Nexus 7000 • ASR 1004 • ISR (28xx/38xx series) • ISRG2 (29xx/39xx series)
Security	• Cisco C650 series • Cisco NAC 3350 • Cisco NAC 3350 Manager • ASA 5540 • AIP SSM20 • Cisco Secure ACS
Mobility	• Aironet 1140 • Aironet 1250 • Aironet 1520 • WLC • WCS • Cisco CT-5508

Table 1   Components of the Cisco Borderless Campus 1.0 Architecture

Unified Communications	• CUCM • SRST • Cisco 79xx IP Phones • Cisco 89xx IP Phones • Cisco 99xx IP Phones
Collaboration Services	• Digital Media Player 4305G and 4400G • IP Video Surveillance 2000 Domes, 2500SD, 4500HD • TelePresence CTS 3000, 1000, and 500

Customer Benefits

Integrated Architecture for Improved Services

Lower costs through converged network with a consistent set of features and services:
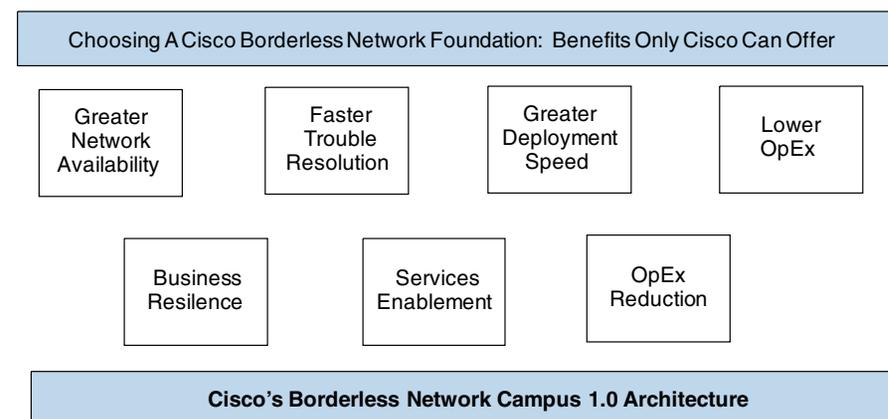
- Faster delivery of key new applications and services
- Predictable performance of key applications and services across the entire enterprise
- Adaptive to easily meet future business needs

Systems Design for OpEx and Complexity Reduction

- Simplification through central administration of updates and upgrades, reducing necessary downtime
- Integration, enabling control of multiple services through a common management interface
- Automation to accommodate business needs through scheduled tasks

Why Cisco—A Systems Approach

Figure 4   Systems Approach

Choosing A Cisco Borderless Network Foundation: Benefits Only Cisco Can Offer

Greater Network Availability | Faster Trouble Resolution | Greater Deployment Speed | Lower OpEx

Business Resilence | Services Enablement | OpEx Reduction

Cisco's Borderless Network Campus 1.0 Architecture

A properly implemented campus solution can help an enterprise establish a network that serves its needs now and in the future. This means integrating switching, routing, security, voice, mobility, and application services together so that processes become more automated and more intelligent. Cisco Systems is the best choice to provide that campus solution because the company:

- Provides a system-level, tightly integrated, flexible, and secure Borderless Campus Architecture
- Can offer solutions to meet all of your networking needs
- Provides the flexibility to implement combinations of features and solutions to achieve all of your goals
- Has a strong history of innovation, leadership, and customer success

For More Information

http://www.cisco.com/en/US/netsol/ns742/networking_solutions_program_category_home.html