Architectural Strategies For Unified Communications: Accelerate Collaborative Transformation

Overview

With the myriad of approaches available, selecting a unified communications architecture can prove overwhelming. Enterprise organizations must operate within the parameters of limited IT budgets and unique methodologies and goals. The best unified communications options are open and extensible, enabling new, media-rich and Web-rich applications, flexible implementation options, and integration into existing business applications and processes.

Cisco® Unified Communications solutions with built-in network awareness and optimization are considered "network-centric." Network-centric platforms resolve issues that other types of unified communications solutions often overlook including performance, scalability, reliability, security, and extensibility.

Intelligently architected, such solutions can be delivered in multiple ways: as software only on third-party, off-the-shelf servers; as software only on Cisco servers; as a combined software and hardware package; or in appliance form with multiple applications combined onto a single platform.

This paper explains how your organization can easily adopt a unified communications solution to the extent desired, and then expand the system incrementally over time. You will learn how the open environment of the Cisco Unified Communications platform:

- Integrates with existing enterprise resources
- Supports third-party devices, applications, and platforms
- Easily scales to synchronize with organizational growth

With versatile tools for both internal and industry developers, the platform also facilitates the creation of Web 2.0 and rich media applications, allowing partners, customers, and developers to easily and quickly create custom applications using open APIs such as SIP/SIMPLE, XML, HTTP, and SOAP.

The Unified Communications Landscape

Identifying Key Advantages and Limitations

The most visible vendors in the unified communications environment today are those that have already established a firm foothold in their respective markets due to the recognized quality of their products, services and support. Most of these vendors seek to give customers a cost-effective unified communications option by leveraging their installed hardware and software systems and building on successful technologies to produce new platforms, products, and services. A few newer companies are also attempting to make inroads in unified communications markets. Current offerings tend to fall into a few distinct categories. By clearly understanding the advantages and limitations of each of these approaches, organizations can make better decisions regarding both short-term and long-term unified communications strategies.

Software-Only Options

Software-only solutions for integrated business communications tend to provide affordable, easily implemented options with substantial short-term cost benefits and valuable business improvements. However, for the most part they lack long-term guarantees, fail to address the limitations of dated infrastructure components, and take minimal advantage of the communications network. At best these solutions ignore the network, and at worst leave organizations vulnerable to serious network-related problems. Issues can range from excessive network maintenance requirements to scalability limits and performance degradation. Today's software-only business communications solutions include:

Peer-to-Peer (P2P)

The P2P approach minimizes capital outlay and offers a fast path to enhanced unified communications capabilities. This approach generally relies on a proprietary software client to perform basic unified communications functions such as voice calling and voice conferencing. An attractive advantage to P2P is that no additional hardware investment is required onsite. The drawback is that the P2P approach presents extreme administrative difficulties. The IT team can never hope to exert full control over network usage, security, performance, and the availability of people and applications across the network environment. In addition, the "black box" approach to establishing connectivity constantly puts obstacles in the path of administrators when new applications must be integrated into the system or when existing applications require updates and upgrades.

Device or Provider-Hosted

Telecommunications and Internet service providers offer a range of business communications packages that can temporarily reduce administrative requirements, costs, and personnel time. With this approach, organizations can select and purchase best-in-class devices or endpoints for on-premises use without the need for additional telephony equipment. Providers generally include a Web-based portal for system management and access to services. The tradeoff, however, is that the organization must give up control over many key business operations. The arrangement greatly restricts the organization's ability to easily provision new users or dialing plans, integrate new communications capabilities and other business applications, and revise business strategies. As a result, long-term administrative costs may eventually exceed short-term savings.

Media-Based, Open Source

Open source unified communications solutions centralize core functions into one or more servers, combining call processing, operational features, media management, Network Address Translation (NAT), firewall traversal, SIP registration, SIP proxy, presence support, accounting, authorization, and security. Since the software is either free or very low cost through online sources, it offers an economically attractive option to commercial unified communications solutions.

Although smaller organizations may find open source solutions temporarily suitable, they will face several major business and operational problems over time. For example, these solutions lack robustness, and were never intended to deliver enterprise-grade reliability, availability and performance. In addition, extensibility is highly problematic. New features, services and related applications require in-house development, expanded IT budgets for third-party development or product purchases, and reliance on the open source community to deliver new functionality at its own pace.

Desktop

Desktop unified communications solutions consolidate a range of functions onto a single server. The server delivers presence, voice, and other functionality while managing quality of service (QoS) and security. In this thick-client, thin-network model, the client not only provides service access but also takes on a fair amount of duties that in a more conventional architecture are handled strictly by the server itself. The primary advantage of desktop unified communications solutions is that they leverage popular desktop applications in a fairly straightforward way.

Although relatively simple to implement and use, desktop solutions pose an extreme risk by centralizing all communications functionality on one server. In home audio, this would be analogous to using an integrated all-in-one stereo system rather than a component-based setup. By merging and isolating presence and messaging, signaling, media, applications, security, QoS, and media management in one location, the system presents an extremely vulnerable single point of failure. If any one element of the system fails, the entire system goes down, producing an Out of Service (OOS) condition whereby dialtone and all other applications are unavailable. Desktop-based unified communications systems are also susceptible to frequent, time-consuming patches and service pack updates at both server and client levels, further compromising service availability.

Hardware-Based Alternatives
To minimize costs, organizations often seek to use their existing equipment and communications infrastructure as the foundation for a broader unified communications implementation. Typically this process consists of deploying VoIP cards and processing modules within an older TDM-based PBX system. In some systems, a media gateway is used to provide ongoing TDM/IP conversion as traffic moves back and forth between older and newer communications systems. Although initially cost-effective in terms of maximizing current investments, the hardware augmentation approach typically presents several major drawbacks, including:

- Restricted functionality: Older PBX systems in general lack the ability to support media-rich unified communications services and applications, which means that the augmentation process will have built-in limitations. The augmentation approach also tends to create separate classes of users: typically, new users have access to IP-based services while existing users are relegated to rudimentary voice and dual-tone multifrequency (DTMF)-based functionality. In addition to making it difficult to fully integrate the enterprise, this approach also complicates system management, adding undesirable time and costs to IT budgets and workloads. This approach is similar to computer telephony integration (CTI) methodologies, which are now obsolete due to similar drawbacks.
- Caps on size and extensibility: The nodal approach of TDM-based PBX systems results in scalability and diversification challenges; IT teams will likely find it difficult and costly to grow, enhance, or otherwise revise the infrastructure to accommodate new applications, users, services, and business strategies.
- Network limitations: Organizations commonly underestimate the network resources and bandwidth associated with migrating to VoIP, and wrongly assume that existing routers and switches are adequate to the change in voice and data traffic. Aging network equipment may also lack functionality specific to VoIP and unified communications.

Network-Centric Solutions
The answer to the challenges posed by software-only and hardware augmentation-based approaches is to seek out unified communications solutions that reside within the enterprise edge, and then to unify these solutions with network-based resources. At its core, any effective unified

communications topology requires intelligent network equipment (LAN switches, wireless access points, routers, firewalls, and session border controllers), an IP PBX or call processing system, and IP phones (wired, wireless, soft). This infrastructure must also be tightly coupled with network-aware applications for presence, instant messaging, video, conferencing, unified messaging, unified clients, and mobility. An effective network-centric unified communications solution can transform the enterprise by fully leveraging this sophisticated environment to simplify interactions among people, streamline management and administration, reduce risk, and maximize hardware and software investments. When delivered on open standards, it can also serve as a platform for cost-effective migration to advanced Web-rich and media-rich services. In addition, this solution supports and blends with Business Process Management/Business Process Integration (BPM/BPI) platforms and strategies, helping organizations move forward according to their own preferred timetables, financial parameters, and technology requirements.

The Cisco Unified Communications System is a comprehensive, network-centric architecture that truly unifies the workspace. Supporting open standards and partnerships with many leading vendors of enterprise and mobile applications and services, this architecture allows organizations of any size to begin reaping the business benefits of unified communications immediately. Its flexible approach to deployment also allows enterprises to migrate at their own pace, either building on an existing network infrastructure, regardless of vendor, or using a Cisco network to achieve additional power and functionality.

Cisco Unified Communications

An Architecture that Spans from the Network Core to the Workspace

Cisco Unified Communications Solutions provide multiple points of entry for organizations that wish to take advantage of media-rich unified communications functionality. Each aspect of the total unified communications architecture provides opportunities for enhancing links within the enterprise community. Functionality includes IP telephony, unified client software, presence, instant messaging for business, unified messaging, rich-media conferencing, mobility solutions, and application development.

- *IP telephony:* At the foundation of the Cisco Unified Communications Solution is its proven, industry-leading call processing system, Cisco Unified Communications Manager. This highly available, enterprise-class system delivers call processing, video, mobility, and presence services to IP phones, media processing devices, VoIP gateways, mobile devices, and multimedia applications. The system can scale to one million users across 1000 sites or more, or 60,000 users within a single clustered system. Built-in redundancy keeps service reliable. Cisco also offers several unified communications platforms for small businesses. All of these standards-based systems work with an array of third-party phones and dual-mode devices. The systems also provide integration with existing desktop applications such as calendar solutions, e-mail, enterprise resource planning (ERP) systems, and customer relationship management (CRM) software. Cisco unified communications capabilities can also be extended to a variety of mobile phones, including those that run Symbian, Blackberry, and Windows Mobile operating systems.

- *Unified client software:* Cisco offers several rich-media client applications that improve user productivity and simplify business processes. Available on Microsoft Windows and Mac OS environments as well as mobile operating systems, these clients support a range of applications, including voice, presence/messaging, unified messaging, video, and conferencing. Communications functionality has also been unified with applications from

industry partners. For example, call control and presence can be launched and managed from within Microsoft Outlook through a Cisco Unified Personal Communicator widget or toolbar.

- *Presence and instant messaging:* Cisco presence solutions based on Session Initiation Protocol (SIP) or (SIMPLE) provide SIP presence and proxy services to deliver IM and click-to-call features. Through the presentation of dynamic presence information, presence solutions allow users to check the availability of colleagues in real time, reducing "phone tag" and improving productivity. Cisco presence and instant messaging solutions work in conjunction with Cisco Unified Communications Manager and support Cisco Unified Personal Communicator, Cisco IP phones, Cisco IP Phone Messenger, IBM Sametime clients, and Microsoft clients.

- *Unified messaging:* Cisco unified messaging solutions easily integrate with existing environments and provide flexible deployment options to meet each organization's individual needs. The broad range of easy-to-manage solutions includes products tailored for small, medium-sized, and very large organizations, with feature-rich functionality aligned intelligently with business requirements.

- *Rich-media conferencing:* Cisco conferencing solutions help remote workers and teams communicate more effectively to save time and reduce costs. Integrated voice, video, and Web conferences can be set up and attended in a single step from IP phones, instant messaging clients, Web browsers, and Microsoft Outlook and IBM Lotus Notes calendars.

- *Mobility solutions:* Cisco Unified Communications extends rich call control and collaboration services to facilitate easy collaboration among mobile workers on campus or on the move. By anchoring business communications in the network, Cisco Mobile Unified Communications solutions connect different mobile worker types and workspaces, provide a consistent collaboration experience regardless of location, maintain business continuity and compliance, and take advantage of least-cost routing of mobile communications over the corporate network. Cisco Mobile Unified Communications solutions support a wide range of popular handheld platforms, enabling workers to communicate quickly and easily using their familiar mobile equipment.

- *Application development:* Many organizations operate in business-unique environments or industrial markets that require specialized applications. To meet these needs, Cisco provides a versatile service creation platform, enabling customers and partners to rapidly and easily develop and deliver innovative media-rich and Web-rich applications. The platform also allows organizations to easily blend unified communications capabilities with existing business process systems.

The Cisco Network

Building Intelligence into Enterprise Communications

The Cisco network embodies the principals of the Cisco Service-Oriented Network Architecture (SONA), providing a robust, open, secure, and scalable environment in which any workspace throughout a distributed enterprise can draw on shared services such as video, presence, mobility, policy, voice applications, and other communications capabilities. It combines complete, network-aware software systems with end-to-end, application-aware network hardware components, delivering built-in intelligence that magnifies, strengthens, and secures connections among people and places. Some examples of the ways in which the Cisco network contributes to efficiency and profitability include:

- *Scalability:* Identity, policy, presence, and other related capabilities are handled at the network level and virtualized, allowing organizations to unify the systems in place currently, easily add new features and services whenever desired, and expand to accommodate new users as needed.

- *Security:* Vulnerability at any single point in a unified communications infrastructure can completely negate the benefits of strong controls elsewhere. Unified communications solutions that focus on software and ignore the network portion of the solution can leave organizations open to serious security breaches. By contrast, the Cisco network provides security-specific intelligence throughout the SONA stack, providing some of the most advanced and thorough protections available today.

- *Open environment:* The Cisco network unifies applications from vendors as diverse as IBM, Microsoft, RIM, Symbian, WebEx, Salesforce.com, Oracle, and SAP. It also provides a versatile platform for innovative collaboration solutions and business applications from the developer community at large, both today and over the long term.

- *Robustness:* Video and other forms of rich media require a network that can handle significantly increased data, voice, and video traffic. Older networks may be adequate temporarily, but will likely fail over time to support the full scope of unified communications functionality.

- In addition to comprehensive security intelligence, the Cisco network delivers the power, application-delivery assurances, non-stop communications, unified network services, and management ease of use necessary for an effective unified communications architecture. For example, it allows voice communications to be operable even when desktops are unavailable during denial-of-service attacks and other traffic disruptions. Some other examples of built-in hardware capabilities include:

  ◦ Ethernet switches use Power over Ethernet (PoE), which provides greater flexibility and scale than traditional wall sockets.

  ◦ Intelligence is built into smart ports to recognize the device being connected, automatically configure it to provide the appropriate class of service, and provision the required amount of power.

  ◦ Wireless devices are connected through access points, also supported by PoE, which in turn are supported by wireless controllers and services.

  ◦ QoS policies uphold service level agreements (SLAs) by prioritizing traffic and supporting multiple queues, thus minimizing latency for sensitive communications.

  ◦ The Cisco integrated services routers at branch office locations and service aggregation routers at the WAN edge support both traditional PSTN connectivity as well as IP communications; this maintains optimal voice quality over the WAN by allowing the network to accept or reject calls based on bandwidth or policy considerations.

  ◦ Non-stop communications are maintained through redundancy in links, paths, and critical components; non-stop forwarding and stateful switchover provide sub-second convergence to allow packets to be delivered even in case of network failures.

The flexibility of the Cisco Unified Communications Solution and the Cisco network permits organizations to implement individual software or hardware components, or groups of components, independently. An organization that is just starting with a basic unified communications solution can simply build on an existing enterprise communications infrastructure to quickly and significantly enhance business communications among its distributed workforce. At any stage along the path to unified communications, organizations can easily integrate Cisco solutions with third-party

communications platforms, using preferred servers, applications, networks and telephony equipment. Those organizations that wish to take full advantage of unified communications can plan to replace aging communications platforms with a complete Cisco Unified Communications Solution on a Cisco network – with deployment customized to specific technical and financial requirements.

Summary

Virtually any organization, regardless of size or current communications infrastructure, can quickly begin using unified communications to simplify business operations and increase profitability. Software-only approaches and hardware augmentation schemes may provide short-term economic benefits. However, the long-term view favors establishing an efficient migration path to a network-centric architecture, which can also be delivered as pure software, with the power and intelligence to support sophisticated unified communications capabilities. As a complete network-centric unified communications solution which spans from network core to the workspace, the Cisco Unified Communications Solution provides a standards-based environment that is open, inclusive, extensible, and optimized for a Cisco network. The solution offers strategic business advantages and financial value, along with superior technological stability and power. The Cisco Unified Communications Solution can enhance business communications at any level, and to any extent desired, with versatile options for tailoring a unified communications architecture to suit each organization's specific business needs.