White Paper

Collaborating in the Cloud

Why It Is Important, and What to Look for When Evaluating a Cloud-Based Collaboration Solution

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Introduction

A New Way of Working

It is easy to overlook the extent to which collaboration is changing the way we work.

Increasingly, we are bringing our mobile phones and tablets to work, and expect to be as connected and productive on the road or at home as in the office. We are meeting face-to-face with customers, suppliers, and entire project teams without leaving our desks. And we are building working relationships and solving problems with people we have never met, located halfway round the world.

The right collaboration technology can have a dramatic impact on the business. Companies of all sizes and industries are seeing improved productivity and teamwork, simplified decision making, and more efficient use of resources through its unique ability to empower and engage your most valuable competitive asset - your people.

The new collaboration approach can even improve your hiring power. The incoming generation of tech-savvy workers has grown up with smart devices and electronic interaction, and view work as less of a place than as 'something you do.' In a recent survey, two out of five Generation Y workers said they would take a lower paying job that offered device and location flexibility[(1)].

The Post-PC Era: Clouds and Mobility

Clearly, traditional 'office software' approaches are insufficient in this post-PC world, where the ability to reach out and collaborate anywhere, anytime becomes an inherent part of daily activity rather than a siloed function performed at the desktop. However, two major technology shifts have enabled an alternative approach that supports the new workstyle: **cloud-based applications**, and smart **mobile devices**.

Cloud-based services are already a familiar principle in the consumer world with music, storage, and social media - and increasingly in the business world with customer relationship management (CRM) and other transactional applications. The software-as-a-service (SaaS) model offers well known benefits to IT, such as rapid deployment on a pay-as-you-go basis, flexibility to meet changes in demand, and the ability to shift costs from capital to a predictable operating expense. At the same time, SaaS provides an 'always on' service for users, available anytime, anywhere.

In parallel, the availability of powerful mobile devices such as laptops, smartphones, and tablets is the perfect complement to cloud-based services. Now users can have consistent access to information from different devices and locations as they move through their working day. Examples include checking email from a tablet at home, joining a conference call from a smartphone on the road, and a videoconference on their laptop or a desktop PC in the office.

Together, these two approaches can promote significantly greater productivity and the sharing of collective intelligence. They free the user from worrying less about 'finding documents' and instead shifting the focus to 'finding answers' that promote innovation - a significant new source of competitive advantage. Distributed project teams can now work together with all the available information and expertise 24 hours a day, companies can make business-to-business (B2B) connections as needed, mobile workers can feel as connected as they are in the office, and individuals and small businesses can join with almost no IT investment beyond a web browser.

So it would seem that cloud-based collaboration is an ideal fit for the new 'work your way' style. However, there is an important caveat.

The cloud solution must be capable of making online collaboration as seamless, natural, and intuitive as in-person interaction. At the same time, it should deliver the full range of tools and interaction styles. This includes real-time communication such as video, voice, instant messaging (IM), and web conferencing to asynchronous interactions such as activity streams, file sharing, and integration with email - to potentially thousands of users simultaneously on a global basis.

This is a very different technical challenge in a SaaS environment than simply providing transactional access to a cloud-hosted business application or one-way streaming of fixed content, and has a direct bearing on the benefit to the business.

Collaboration Means Business

We have all experienced the temptation to disengage during a web conference when we cannot clearly see or hear what is being discussed, due to grainy video, garbled audio, or the inability to see who is talking or read a shared document clearly. These are not simply inconveniences in a work setting; they decrease productivity and can mean a lost business opportunity.

The personnel cost of a one-hour conference can run to thousands of dollars, so even one bad experience can detract from the effectiveness and value of the meeting. And if people start to opt out due to a poor online experience, the return on investment (ROI) of the entire project is potentially jeopardized.

This is one reason why consumer-grade, or pure Internet-based, approaches are not sufficiently robust for enterprise-class collaboration. The public Internet is notoriously unpredictable and difficult to control. Traffic congestion, lost packets, dropped connections and security holes are commonplace. A best-effort service level may be acceptable for casual conversation but cannot offer the predictability, security, or quality of experience required for a business interaction.

Another approach is to allow SaaS access to a hosted version of office productivity software. While this approach is aimed more at the traditional knowledge worker, it is still important to evaluate the extent to which it supports the flexible ‘work your way’ style needed in today’s business world. For instance, support for mobile devices may be limited. The infrastructure may not be optimized to deliver intensive workloads such as high-quality video at scale, the number of hosting locations and access points may be limited, and so on.

By contrast, Cisco designed its cloud-based collaboration service to meet the new business needs from the outset, optimized for real-time or asynchronous interaction on a global scale, and offering the user a productive, highly secure experience anytime, anywhere, with any device.

The Cisco Approach

The Cisco® solution is based on the Cisco WebEx® Cloud, a proven SaaS service delivery platform that supports nearly two billion meeting minutes per month, between 30 million participants in 231 countries. It is the second largest business SaaS operation in the world.

The underlying architecture, infrastructure, and even operational procedures were all designed from the outset to deliver a business-class collaboration service at scale, tuned to support the ‘work your way’ style and honed in practice with the expertise of SaaS industry experts.

A detailed checklist of capabilities appears in the second half of this paper. Below is an overview of some of the more prominent design features that contribute to the success of the Cisco WebEx Cloud.

Designed for the Enterprise

High-quality interactions: Many of the critical characteristics that contribute to a high ROI, such as performance, reliability, and availability, are facilitated by a dedicated overlay network designed to carry real-time or asynchronous traffic in an optimized manner while minimizing exposure to the public Internet. This network is composed of high-speed, low-latency multimedia switches specially tuned to handle video, audio, and data at enterprise scale.

Global coverage: The Cisco network contains multiple Internet points of presence (iPoPs) and data centers throughout the world to minimize delay and increase performance - many more than other SaaS operations typically offer. This allows high-quality business interactions to be extended to more employees, partners, customers, and experts who may be distributed around the globe with differing levels of local IT support.

'Always on' availability: Another benefit of this intelligent network design is continuous service availability. All traffic is globally load balanced between servers and switches throughout the cloud, and automatically replicated to a physically separate backup node in a geographically distant data center using global site backup. These measures help ensure resources are always available, whether for scheduled or unplanned usage, at any time of day or night.

Comprehensive security: The Cisco WebEx Cloud employs the most stringent measures into every layer of its architecture, from locked-down data center operations, to end-to-end data encryption, to user authentication and highly granular administrator policy control. Annual third-party audits validate these measures for compliance with rigorous industry standards.

Designed for the User

Productive experience: The Cisco WebEx Cloud service provides a highly intuitive user interface designed to support multiple styles of interaction in a productive manner - from real-time video conferencing to desktop and file sharing, IM and Presence, voice, social media, and email integration - using a choice of devices. There is also a unique capability for participants to interact offline in shared workspaces, and the option to record meetings for offline playback by people who could not attend the live session.

Native mobility: The 'work your way' approach requires more than token support for smartphones and tablets as hardware devices. The Cisco solution offers the mobile user full participation in the experience, including the ability to view shared presentations, and see who else has joined the meeting. The mobile user can also transition between social networking and real-time IM, web conferencing, or voice calls directly from within their mobile application, or have the system automatically call them back in the event of a dropped connection.

Designed for IT and Developers

Low impact integration: The Cisco WebEx Cloud was designed to integrate into existing environments so as to minimize disruption and preserve IT investment. This philosophy extends from flexible audio integration with your telephone systems to support for standard interfaces, protocols, and codecs, to tight integration with Microsoft Office applications and a comprehensive developer interface library for custom integration applications.

Operational control: Administrators have access to a wide range of real-time monitoring, diagnostics, and reporting tools to keep the service running smoothly. These include automatic scanning, adjustment of utilization and quality levels, customized alerts and notifications, and comprehensive reports and statistics.

Developer friendly: The Cisco WebEx Cloud platform is built on a modular architecture that allows mash-ups of different applications - such as IM, audio, video, voicemail, browser widgets, etc. - into a custom client. In addition, there are programmatic interfaces to allow custom development in the areas of audio integration, user provisioning, and user authentication.

The second half of this paper provides a more detailed checklist of eight areas to consider when evaluating a cloud collaboration solution, together with a brief explanation on how Cisco addresses those requirements. For further detail on any of these areas, please see the accompanying technical white papers and other resources at http://www.cisco.com/go/meetings_docs.

Part 2: Eight Areas to Consider When Evaluating Cloud Collaboration

While every situation is different, Cisco believes the following considerations should be considered when evaluating a cloud-based collaboration solution for your business:

1. **High availability and resilience.** Users should be able to initiate or join a collaboration session on demand at any time, 24 hours a day, without a prior appointment, with no manual software download.
2. **Scalability.** The system should be able to scale from a single account to thousands of simultaneous users, and respond to spikes in demand automatically so that no interruption or degradation is noticed.
3. **Performance.** All users should be able to participate fully in the interaction with clear audio, high-quality video, and the ability to see each other as well as shared documents, optimized for their particular device and location.
4. **Security.** Security should be built into every layer of the solution, from the user authentication through encryption of data in flight, to multi-tenant isolation and the physical data center, with granular policy control.
5. **User productivity.** Since a user's collaboration needs vary throughout the day depending on their role, location, and participation, they should be able to invoke multiple capabilities as desired in a productive environment without swapping tools, from a choice of mobile or desktop devices.
6. **Offline productivity.** Users should be able to interact offline and work on shared documents outside the live session, and non-attendees should be able to view a high-quality recording, extending productivity and value to as many people as possible.
7. **Investment protection.** The solution should not disrupt normal operations and should integrate into the existing IT infrastructure at multiple levels, such as office systems, business applications, telephony, networking, identity and security policies, and more.
8. **Vendor maturity and vision.** Collaboration should be viewed as a competitive business asset, so it requires careful evaluation of the supplier's ability to invest in maintaining an industry-leading portfolio, worldwide support, and commitment to your success.

Let's take a look at how the Cisco WebEx Cloud collaboration solution compares against these requirements.

The Cisco WebEx Cloud

1. High Availability

- **Multiple redundancy.** Multiple data centers are distributed around the globe, each designed to provide complete redundancy of all major components (servers, network switches, firewalls, audio ports, etc.) to eliminate any single point of failure. If any component fails, its twin takes over without interruption, even during system maintenance, transparently to the end user.
- **Account backup.** Each user's account is held in two places: the primary site and a backup copy at a remote data center. In the unlikely event the primary site goes down, the global site backup (GSB) takes over automatically and transparently, moving all activity to the alternate site without the user even noticing.
- **Unplanned availability.** Some cloud services carefully limit unscheduled access for fear of overloading the system, but with the Cisco WebEx Cloud, unplanned conferences or calls can be initiated at any time with no pre-scheduling, and with no software to manually download.
- **IT operations.** In a business-critical collaboration environment, the service cannot be brought down, even for routine maintenance or backup. The IT operations team at Cisco has accumulated considerable firsthand experience in non-stop operations from running the WebEx Cloud and from other large-scale SaaS operations, and applies rigorous change control procedures based on Information Technology Information Library (ITIL) standards to allow continuous operation.

2. Scalability

- **Proven in operation.** The Cisco WebEx Cloud currently supports nearly two billion meeting minutes per month between 30 million participants in over 231 countries. This level of performance and scale is unique in the industry for a real-time collaboration cloud service, and has placed Cisco in the top tier of SaaS providers in the world for over 17 years.
- **Large meetings.** Up to 500 participants can join a single meeting in high-definition video, up to 1000 attendees can join a web meeting, and as many as 3000 can be accommodated in the event-based application that allows remote audiences to join and experience a large corporate conference. A margin of idle capacity is always maintained to allow for unforeseen spikes in demand.
- **Global load balancing.** All traffic in the cloud is continuously load balanced across the global network between multiple data centers and hubs around the world, minimizing congestion and network hops, to maintain capacity in line with usage levels at all times. The cloud infrastructure finds the least congested switch and diverts traffic there to minimize delay.
- **Efficient routing.** The dedicated overlay network places switches at crucial peering points to handle high-capacity traffic, and maintains high-bandwidth peering arrangements through telecom carriers with other web points of presence as required. Switching takes place over the least number of router hops, allowing further savings in capacity and latency.
- **Core and edge separation.** Core locations are designed to handle intensive functions such as databases, storage, and recording, while edge locations handle static and dynamic caching, document shares, and proxy functions for last-mile connectivity. This separation reduces congestion and allows for greater scale.

3. Performance

- **High-speed network.** The Cisco WebEx Cloud is built on a dedicated overlay network of carrier-class, high-speed multimedia switches optimized for real-time communication. They are capable of handling multiple streams of video, audio, and data with low latency and high quality of service.
- **Optimized switching.** No data is stored in the cloud itself, so that delays from the forwarding of large files to other participants are eliminated. A representation of the content is simply switched in real time between participants instead, and full use of caching is employed to minimize refresh needs.
- **Scalable video.** Video resolution can be automatically reduced or increased to meet available resources and bandwidth, so participants can be assured of the best possible experience at all times - up to and including full high-definition (HD) quality video for customers with the latest hardware and ample bandwidth.
- **Minimized bandwidth use.** Data is routed across the high-speed backbone in a patented format (UCF) that evaluates and compresses files, converts images to vector graphics, and sends only incremental changes to the original document once it is shared. This drastically reduces payloads by eliminating redundant information.
- **Local connection.** Users need only make a local connection to their nearest edge iPoP before being covered by the WebEx Cloud's reliable, high-speed network. This not only minimizes exposure to the public Internet, but it also reduces latency and switching delays.

4. Security

- **Multilayer security model.** At every layer of the WebEx Cloud, Cisco has incorporated the strongest possible security standards, technologies, and operational practices - from the physical infrastructure to encryption of traffic, password controls, and policy management:
  - At the **physical layer**, security extends from strongly secured and hardened equipment, through to the buildings themselves, which feature video surveillance, trust zones, and two-factor access control, including biometric identification. All data centers are owned and operated by Cisco.
  - At the **data layer**, traffic can optionally be encrypted end-to-end between participants using the 256-bit Advanced Encryption Standard (AES). Unlike SSL which is terminated in the cloud, the AES mechanism employs a randomly generated key on the host's computer and the public key infrastructure to help ensure information remains encrypted end to end throughout the entire communication. Every connection must authenticate properly prior to establishing a collaboration session using a unique per-client, per session cookie coupled with session parameters generated by the WebEx Cloud.
  - At the **transport layer**, all data is transported using 128-bit SSLv3 and firewall port 443 for HTTPS traffic rather than port 80. There is no peer-to-peer connection between any attendees' computers during a WebEx session.
  - At the **application layer**, in addition to password controls and granular restriction of access by the host or site admin, the cloud service automatically downloads and installs a client application to each attendee's computer, containing digitally signed certificates authenticating Cisco.
  - At the **administrator level**, overall security policies can be set for the site to control the ability to transfer files or share desktop information, authentication requirements, or in-meeting restrictions. Further refinements can be made if needed, such as using a branded portal with a unique URL, desktop lockdown, and disabling of recording.

- **No real-time data is held.** All real-time information passed between participants is transient. Documents and files are temporarily uploaded for sharing, but the transfer across the network is encrypted, and it is erased from the share afterwards. Video is not transmitted at all, but rather a representation of it is sent to desktops for display, again erased after the session.
- **Multi-tenant isolation.** With a shared infrastructure it is imperative to keep each user's data not only secure but isolated. Cisco has developed a sophisticated mechanism to help ensure that no customer's data will be mixed with another customer's or hacked, even in the event that recordings have been made for offline review.
- **Separation of duties.** Every piece of data flowing through the system is tagged with a series of metadata tags that have no predictable relationship. The system, storage, and database administrators do not have access to each other's domains, nor do they have the technology to reassemble any of the data streams. In this way the likelihood of any data ever being compromised is vanishingly small.
- **Third-party audits and credentials.** Beyond its own stringent internal procedures, the WebEx Office of Security engages independent third parties to conduct rigorous audits against internal policies, procedures, and applications, designed to validate mission-critical security requirements for both commercial and government applications. In addition to an annual SSAE16 audit by PriceWaterhouse Coopers LLC and ISO-27001/2 standard conformance, Cisco has successfully obtained Safe Harbor Certification for customer and partner data.

5. User Productivity

- **Intuitive interface.** The Cisco WebEx Cloud web conferencing service has a highly intuitive user interface designed to support a productive, immersive experience, including high-definition video, picture-in-picture, active speaker switching, participant thumbnails, audio, IM chat, and document and file sharing. If the meeting includes participants using Cisco TelePresence® or Cisco IP phones, further simplification of interaction (e.g. meeting initiation and control) is possible since it uses shared underlying infrastructure.
- **Full mobile experience**. The Cisco solution offers the mobile user full participation in the experience, including the ability to view shared presentations, to see who else has joined the meeting, or to have the system automatically call them back in the event of a dropped connection.
- **Choice of devices.** Collaboration clients are available for Windows, Mac OS, iPhone, iPad, Nokia, Android, and BlackBerry platforms, and are engineered to conform to the particular client's native behavior so that users can be productive quickly. These native clients are developed, tested, and supported by Cisco, not through a third party, allowing IT to offer flexibility of choice to users without fear of incompatibility or jeopardizing vendor support.
- **Enterprise social networking.** The Cisco WebEx Cloud also supports a powerful enterprise-class social networking solution integrated with real-time collaboration functions as well as content and document management, calendaring, instant messaging, presence, and unified communications, in a highly intuitive user interface. Users can quickly identify subject matter experts, gather group feedback, and find relevant content and communities to complete projects and tasks much more efficiently in virtual teams, and to speed decision making and problem resolution.

- **Minimal imposition on the user.** The Cisco cloud-based meeting service (WebEx Meetings) does not require recipients to have an account. Hosts can simply send a “join my meeting” request to an invitee through email or IM, or they can check someone’s availability and ‘click-to-conference’ directly from within an application or browser at any time. Once accepted, all participants are automatically joined to the meeting from their nearest access point. The client software is either checked or downloaded, audio options are offered, and the meeting can proceed immediately - all with just one click from the invitee.

6. Offline Productivity

- **Shared workspaces.** The Cisco WebEx Meetings solution allows attendees to collaborate before, during, and after the real-time meeting itself in dedicated **Meeting Spaces** that considerably extend the reach and value of the interaction:
  - Prior to the meeting, organizers can post agendas, documents to be reviewed, or begin a discussion thread allowing people to comment or collect questions.
  - Attendees arrive much more prepared and productive and interact during the meeting, potentially shortening the meeting and hence reducing the cost.
  - Afterwards, all relevant documents, notes, actions, and recordings are stored in the same accessible place in the cloud, allowing follow-up discussions to take place offline or to allow non-attendees to be apprised of what transpired.

    In this way, all participants are informed and aware, content is always available, and the ROI of a business meeting can be maximized.
- **Recordings.** Another way of expanding the reach and value of collaboration is to make a high-quality recording of the live interaction available on demand. The Cisco solution allows for recording of complete meeting contents, including data, audio, and high-quality video, which can be played back either by streaming or download to a local device. Transcription of the audio can be provided as an option.

7. Investment Protection

- **Open standards support.** The Cisco WebEx Cloud platform is based on an **open architecture** that supports industry-standard protocols, codecs, and interfaces, allowing the widest possible degree of compatibility with existing enviroments. For example, Cisco supports multiple media compression standards and codecs, including H.264, H.323, G.711, G.722 and G.729 as built-in features of its voice and video solutions rather than through bolt-on modules or gateways that increase complexity and cost.
- **Cisco WebEx Cloud Connected Audio.** The Cisco WebEx Cloud is enabled by Session Initiation Protocol (SIP) at the edge, allowing integration with your existing telephony or other audio services providers. In this configuration, all audio is IP/SIP, resulting in no toll charges. If you have Cisco IP phones already installed, they can be used to initiate conferences and join audio without the need for passcodes.
- **Voice over IP (VoIP).** The Cisco WebEx Cloud has built-in support for VoIP, dramatically reducing, or even eliminating, the cost of audio conferencing (where permitted by service providers), and obviating the need for third-party telephony devices or programs.
- **Office applications.** The Cisco collaboration solution interoperates closely with Microsoft Office tools to provide voice, video, and conferencing accessible from right-click menus or through the Office ribbon, or scheduling a conference call that shows up in their native calendars. During a live session, users can share a PowerPoint presentation, an Excel spreadsheet, or Word document with one click.

- **Low cost of entry.** Deployment of the WebEx Cloud service presents minimal disruption to the existing IT landscape, both technically and financially. There is not even a requirement to pay to start using the Cisco WebEx Cloud service. Access to the conferencing software is free of charge for invitees, and a no-cost 1-3 user license is available for hosting your own meetings. This makes state-of-the-art collaboration available to everyone, including individuals, small businesses, and low-tech environments that would otherwise be excluded.

8. Vendor Maturity and Vision

The Cisco WebEx Cloud service powers the industry's leading web collaboration solution and the second largest business SaaS offering in the industry. Unique contributions to the category include provision for offline productivity (through shared workspaces and recordings), support for real-time conferencing, social, IM and Presence, and file sharing services from a single unified architecture, and a full immersive mobile experience from a choice of devices to help enable the 'work your way' style.

Today, more than 85 percent of Fortune 500 companies use Cisco Unified Communications, and Cisco is one of the Gartner Magic Quadrant market leaders in several important categories, including IP telephony, unified communications, conferencing, telepresence, and customer care.

Cisco collaboration solutions offer the following advantages:

- A market-leading portfolio of communications and collaboration solutions designed for the new workspace, including conferencing, messaging, telepresence, enterprise social software, and IP telephony.
- A consistent productive end-user experience across multiple devices, including support for Windows, Mac, iPhone, iPad, Android, Nokia, Blackberry, and Samsung devices.
- Sophisticated network-based services and protocols for handling real-time media workloads to enable a higher quality experience for participants and better resource utilization for IT.
- Integrated enterprise-class social infrastructure, including contextual search, simplified information sharing, dynamic communities, and pre-integration with voice, video, and enterprise applications to increase group knowledge and wide interaction.
- Proven integrations with Microsoft's Office suite for user productivity, plus the ability to embed Cisco collaboration functions into any web browser or application environment.

Summary

The post-PC era and the transition from the corporate desktop to a mobile, social, visual, and virtual workspace are having a profound effect on the way we work.

The network and the cloud are in a unique position to host these infrastructure services, and to make them available consistently to all connected applications and devices, rather than in multiple separate silos dedicated to a single purpose. Many business-critical collaboration capabilities - such as the ability to ensure high-quality mobile interactions, apply security policies, or provide high-quality real-time video and audio content on any device - are also inherently well suited to a network- and cloud-based architectural approach.

The Cisco WebEx Cloud and its associated collaboration solutions provide a proven, accessible, and affordable means to accelerate business results through online collaboration and build competitive advantage based on the expertise and creativity of your people. Cisco stands ready and willing to help you get there, starting today.

For More Information

For more information about Cisco Collaboration Applications, visit http://www.cisco.com/go/collabapps or contact your local Cisco account representative.

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Printed in USA C11-720970-00 11/12