



Introduction

Revised: December 21, 2017

The Preferred Architecture (PA) for Cisco Spark Hybrid Services is a Cisco Validated Design (CVD) that was created as a supplement to the PA for Cisco Collaboration Enterprise on-premises deployments. It requires many of the same products and infrastructure components as well as the architecture and planning incorporated in the PA for on-premises deployments. Therefore we expect you to follow and implement the latest version of the *Preferred Architecture for Cisco Collaboration Enterprise On-Premises Deployments*, available at <https://www.cisco.com/go/pa>, prior to deploying the PA for Cisco Spark Hybrid Services.

As part of implementing the PA for Cisco Spark Hybrid Services, there are a number of products and integrations covered in the latest version of the [Preferred Architecture for Cisco Collaboration Enterprise On-Premises Deployments](#) that overlap with, and thus are not part of, the PA for Cisco Spark Hybrid Services. The areas of overlap include Cisco Meeting Server, Cisco Unified Communications Manager IM and Presence Service, and Cisco Jabber. This does not mean that these products and services cannot be deployed in an environment with Cisco Spark Hybrid Services, but that this PA for Cisco Spark Hybrid Services will not discuss or treat any design considerations around these on-premises products and services when they overlap with those included in the Cisco Spark Hybrid Services solution.

Architectural Overview

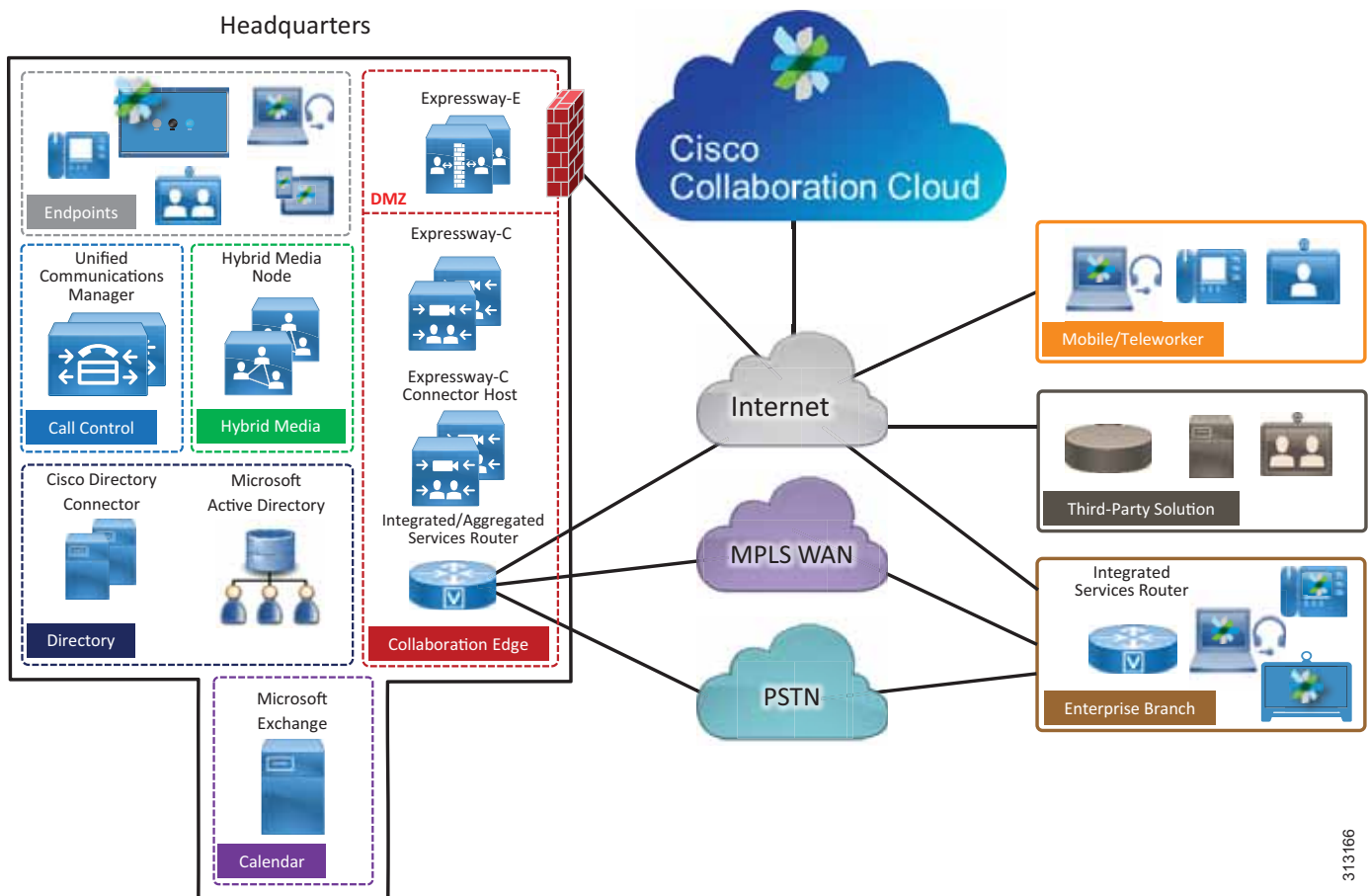
The PA for Cisco Spark Hybrid Services provides end-to-end collaboration targeted for deployments where a collaboration solution based on Cisco Unified Communications Manager has been deployed. This architecture incorporates high availability for critical applications. The consistent user experience provided by the overall architecture facilitates quick user adoption. Additionally, the architecture supports an advanced set of collaboration services that extend to mobile workers, partners, and customers through the following key services:

- Voice communications
- Messaging
- High-definition video and content sharing
- Rich media conferencing
- Services for mobile and remote workers
- Business-to-business voice and video communications

Because of the adaptable nature of Cisco endpoints and their support for IP networks, this architecture enables an organization to use its current data network and the Internet to support both voice and video calls. The preferred architecture provides a holistic approach to bandwidth management, incorporating an end-to-end QoS architecture and video rate adaptation and resiliency mechanisms to ensure the best possible user experience for deploying pervasive video over managed and unmanaged networks.

The PA for Cisco Spark Hybrid Services, shown in Figure 1-1, provides highly available and centralized on-premises and cloud services. These services extend easily to remote offices and mobile workers, providing availability of critical services even if communication to headquarters is lost. Centralized on-premises and cloud-based services also simplify management and administration of an organization's collaboration deployment.

Figure 1-1 Preferred Architecture for Cisco Spark Hybrid Services



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Table 1-1 lists the components in this architecture. For simplicity, the components are grouped into modules to help categorize and define their roles. The content in this guide is organized in the same modules.

Table 1-1 *Components of the Preferred Architecture for Cisco Spark Hybrid Services*

Module	Component	Description
Collaboration Endpoints	Cisco IP Phones, Cisco Video Room Systems, and Cisco Spark	Enable real-time message, meeting, and voice/video communications for users
Cisco Collaboration Cloud Core Services	Cisco Spark Control Hub	Web portal that enables provisioning and management of enterprise Cisco Spark users and services, endpoint and client registration to the Cisco Collaboration Cloud, registration of the Expressway-C Connector Host to the Cisco Collaboration Cloud, and Expressway Connector upgrades.
	Cisco Spark Messaging	Provides persistent messaging and content sharing in 1:1 and group-based spaces.
	Cisco Spark Meetings	Provides audio/video meetings with content sharing.
	Cisco WebEx	Provides audio/video and web conferencing capabilities for meetings.
	Cisco Expressway-C Connector Host Management Connector	Enables connectors hosted on Expressway-C to be managed by the Cisco Collaboration Cloud.
Cisco Spark Hybrid Directory Service	Cisco Directory Connector	Provides user synchronization between Microsoft Active Directory and the Cisco Collaboration Cloud.
	Microsoft Active Directory	Provides the full list of corporate users and their attributes.
Cisco Spark Hybrid Calendar Service	Cisco Expressway-C Connector Host Calendar Connector	Provides integration between the enterprise calendaring application and Cisco Collaboration Cloud.
	Microsoft Exchange	Provides corporate calendaring services.
Cisco Spark Hybrid Media Service	Cisco Spark Hybrid Media Node	Provides on-premises media processing capabilities for Cisco Spark meetings. This includes voice, video, and desktop sharing.
Cisco Spark Hybrid Call Service	Cisco Unified Communications Manager (Unified CM)	Provides endpoint registration, call processing, and media resource management.
	Cisco Expressway-C Connector Host Call Connector	Provides integration between on-premises call processing services and Cisco Collaboration Cloud.
	Cisco Expressway-C and Expressway-E	Enables interoperability and firewall traversal with the Cisco Collaboration Cloud.
	Cisco Integrated Services Router (ISR)	Provides Survivable Remote Site Telephony (SRST) functionality as well as public switched telephone network (PSTN) or Cisco Unified Border Element (CUBE) connectivity.

High Availability

The PA for Cisco Spark Hybrid Services provides high availability for all deployed on-premises applications by means of the underlying clustering mechanism present in all Cisco Unified Communications applications. Clustering replicates the administration and configuration of deployed applications to backup instances of those applications. Likewise, cloud services are natively redundant by virtue of elastic compute and highly available service distribution within the cloud platform.

If an instance of an application or services fails, Cisco on-premises and cloud-based services such as endpoint registration, call processing, messaging, and many others continue to operate on the remaining instance(s) of the application or service. This failover process is transparent to the users. In addition to clustering, the PA for Cisco Spark Hybrid Services provides high availability through the use of redundant power, network connectivity, and elastic storage.

Sizing Considerations

Sizing a deployment can become complex for large enterprises with sophisticated requirements. The PA for Cisco Spark Hybrid Services presents some examples that simplify the sizing process.

Licensing

Details about the individual licenses for the endpoints and infrastructure components in the PA for Cisco Spark Hybrid Services are beyond the scope of this document. Information about Cisco Spark Flex Plan licensing is available at

<https://www.cisco.com/c/en/us/products/unified-communications/spark-flex-plan/index.html>

Collaboration Endpoints

The recommendations within this Preferred Architecture assume a deployment of Cisco voice and video endpoints, including the Cisco Spark application. Some of the endpoint use SIP to register to Cisco Unified Communications Manager (Unified CM) on-premises, while others use HTTPS to connect to the Cisco Spark services in the Cisco Collaboration Cloud. Table 2 lists the preferred endpoints for optimal features, functionality, and user experience.

Table 1-2 Cisco Collaboration Endpoints

Product	Description
Mobile: <ul style="list-style-type: none"> • Cisco Spark for Android • Cisco Spark for iPhone and iPad Desktop: <ul style="list-style-type: none"> • Cisco Spark for Mac • Cisco Spark for Windows Web browser: <ul style="list-style-type: none"> • Cisco Spark web client 	Application with cloud-based integrated voice/video meeting, calling, messaging, and content sharing for mobile devices, personal computers, and web browsers
Cisco IP Phone 8800 Series	General office use, multiple-line audio and video phones
Cisco IP Phone 8832	IP conference phone
Cisco DX70 and DX80	Personal TelePresence endpoint for the desktop
Cisco MX Series	TelePresence multipurpose room endpoint
Cisco SX Series	Integrator series TelePresence endpoint
Cisco Spark Room Series	TelePresence multipurpose and integrator room endpoints
Cisco Spark Board	All-in-one presentation, white board, and audio/video multipurpose room endpoint

Cisco Collaboration Cloud Core Services

The PA for Cisco Spark Hybrid Services includes the following foundational components and services that underlie the entire Cisco Spark Hybrid Services solution. All of these services and components are relevant for the deployment of the PA for Cisco Spark Hybrid Services, and they are referenced as appropriate in the remainder of this document.

Cisco Spark Control Hub

The web-hosted online Cisco Spark Control Hub, available at <https://admin.ciscospark.com/>, is used to administer and manage an organization's Cisco Collaboration Cloud services.

After logging into the control hub, the administrator is presented with the overview screen, which provides a one-screen snapshot of the organization and the status and utilization of cloud services. Clickable tiles on the overview screen allow quick drill-down to more information and configuration for various features and services.

The left-hand navigation menu of the Cisco Spark Control Hub provides links to various management and provisioning areas within the web-based portal, including:

- Users — Area for managing users and provisioning them for cloud services.
- Services — Area for managing and configuring cloud services, including Cisco Spark Hybrid Services.
- Devices — Area for managing and provisioning cloud-registered room systems and Cisco Spark Boards.
- Reports — Area for viewing diagnostics and reports and reviewing and analyzing cloud and hybrid service metrics, including service and device utilization, call quality, and other statistics.
- Support — Area for finding documentation and other support resources.
- Settings — Area for managing base global organizational settings.

Cisco Spark Messaging

One of the key features of the Cisco Spark application and the Cisco Cloud platform is one-to-one and group messaging with file sharing. This feature delivers persistent instant messaging with Cisco Spark spaces, where users can message and share files. Spaces are manually or dynamically created based on user work flows, and spaces can be grouped into teams to provide team-focused spaces across organizations.

Cisco Spark Meetings

Another key feature of the Cisco Cloud platform utilized by Cisco Spark applications and endpoints is meetings. Cisco Spark Meetings provides voice and video conferencing along with screen sharing by leveraging the Cisco Collaboration Cloud conferencing service. Cisco Spark Meetings builds upon and leverages the messaging and file sharing capabilities of Cisco Spark Messaging.

Cisco WebEx Meetings

Organizations may also leverage Cisco WebEx Meetings for cloud audio/video conferencing and screen sharing functionality with a user experience similar to Cisco Spark Meetings. Cisco WebEx Meetings also enables permanent Personal Meeting Rooms (PMR) to provide users with a personalized permanent voice and video meeting space.

Cisco Expressway-C Connector Host Management Connector

The Cisco Expressway-C Connector Host is a standard Cisco Expressway-C server deployed within the customer's organization to provide an integration point between the on-premises and cloud collaboration services. The integration between the Cisco Expressway-C server and Cisco Collaboration Cloud is facilitated via micro-services installed and managed on the Expressway-C Connector Host by the Cisco Collaboration Cloud. These micro-services enable Cisco Spark Hybrid Services integration.

The Management Connector is included in the Expressway-C base software and is used by the administrator to register Expressway to the Cisco Collaboration Cloud and to link the Expressway interface with the Cisco Collaboration Cloud management interfaces.

The Management Connector plays an important role as the coordinator of all connectors running on the Expressway server or cluster. It provides the administrator with a single point of control for connector activities. The Management Connector enables Cisco Collaboration Cloud-based management of the on-premises connectors, handles initial registration with the Cisco Collaboration Cloud, manages the connector software life cycle, and provides status and alarms.

The Management Connector requires that certificates of the Certification Authorities (CA) that signed the certificates in use by the Cisco Collaboration Cloud must be in the trusted list of the Expressway-C connector host, so that the HTTPS connection can be established. The administrator can decide to allow the Cisco Collaboration Cloud to upload CA certificates to the Expressway-C trust store. Or, in cases where security policies prevent the Cisco Collaboration Cloud from uploading trusted CA certificates on Expressway-C, the administrator may upload them manually.