Medianet Solution Architecture with the WebEx Node

At-A-Glance

Medianet Overview

A medianet is an intelligent network optimized for rich media—the evolution to a network where video is the predominant traffic. By infusing new capabilities into all aspects of the network infrastructure, it enhances the ability of the network to send, deliver, and optimize rich media. It automatically optimizes the experience and efficiency in the delivery of multimedia experiences. It expands the capability of the network to deliver new services. A medianet uses the network intelligence to help simplify network complexity and accelerate deployment of rich media solutions, and is the driver behind the Cisco video strategy.

What Problems Does it Solve?

Video consumes significantly more bandwidth than voice, so over-provisioning in the network to avoid potential problems is not a viable option. Also, the requirement is not simply about the bandwidth. It is also about rich service capabilities that must be enabled in the network; for example, how to protect multimedia sessions in-progress against the risk of quality impairment due to intermittent extreme network conditions, and how to efficiently deliver one-to-many interactions.

The emerging collaborative video applications are engaging in multistream interactions where a session consists of multiple video, audio, and data streams combined to deliver the immersive experience. These different streams may need to be synchronized and handled as one in order to ensure the quality-of-experience (QoE).

The growing use of video requires a change in how networks are built, operated, and in how they function. The network must be aware of and respond to the needs of a range of media and network applications. As applications require ever-more-demanding use of network resources, the best-effort delivery model becomes feasible only insofar as the enterprise can upgrade infrastructure; keeping one step ahead of the demand. Network applications need to become more aware of (and use) the services the network offers, not only to simplify application management, but also to provide context-realizable experiences that are more social, visual, and personal.

Enterprise customers are challenged to deliver more rich media services to drive user productivity and gain a competitive advantage. However, adding new video services radically changes the demands on the network. This coupled with the complexity around video applications and endpoints makes deploying rich-media services challenging. A media-aware network can reduce complexity and administrative overhead to accelerate deployment of rich media services.

Benefits of a Medianet

The benefits of a medianet are in three distinct areas:

- Experience
- Efficiency
- Expandability and Velocity

Experience

A medianet is about not only enabling more effective interactive real-time sessions, but also enabling other types of media by increasing the availability, depth, and quality of the sensory experience. The experience is also not limited to the media (or the session) itself, but to the ease of using, configuring, and sharing media with many audiences.

Efficiency

Efficient use of network resources includes proper use of existing network transmission technologies such as multicast, content distribution networks (CDNs), and WAN optimization. These technologies can help efficiently deliver the same content across the network topology by eliminating duplication of transmission. Other transmission efficiency techniques include the opportunistic use of backup links and primary links simultaneously to spread the network load and maximize resource usage. The desire for efficiency can be extended to environmental benefits as well. A medianet can enable high-quality remote conferencing that can reduce the need for costly and time-consuming travel. Through maximization of available network resources, a medianet can be the guardian of good user experience for new video applications without the need for costly over provisioning.

Expandability and Velocity

Part of being endpoint-aware is closing the gap between the application and the network infrastructure. Currently, many applications send their data through the network to remote endpoints on the other side of the network. These applications do not really inform or communicate with the network infrastructure itself. With the application communicating its service queries and capabilities with the network, the network can automatically configure the right polices for the application, eliminating the administrative overhead. The network can also help the application self-configure, relaying alerts to both application administrator and the network administrator, allowing the business to scale the rollout and support a greater number of applications with a limited number of resources.

Cisco WebEx Collaboration Cloud

The Cisco WebEx Collaboration Cloud (previously known as the MediaTone network) is a private global network, created with a carrier-class information-switching architecture. Only WebEx traffic flows over the private Cisco WebEx Collaboration Cloud. All collaboration data flows through this secure, high performance network with the lowest delay possible. During an online meeting, the WebEx service in use, for example Meeting Center, manages the session data the Cisco WebEx Collaboration Cloud carries.

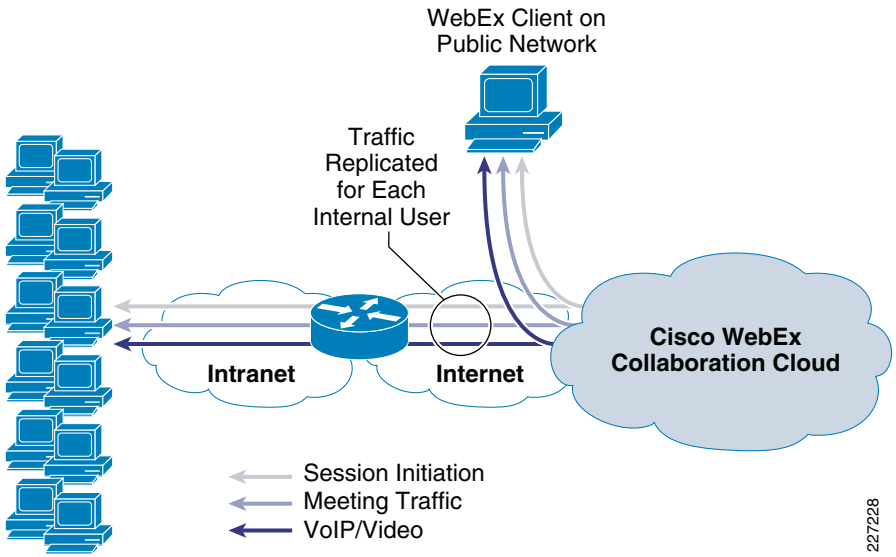
WebEx Node Overview

The WebEx Node for ASR 1000 is an on-premise extension of the Cisco WebEx Collaboration Cloud. The WebEx Node provides local switching of WebEx data, VoIP, and video sessions resulting in improved response times and significantly reduced bandwidth consumption for WebEx traffic. The WebEx Node is not a standalone WebEx switch but an integral part of the Cisco WebEx Collaboration Cloud and is fully cascaded into the WebEx-hosted service. Attendees joining WebEx sessions will, depending on their location, connect to the Collaboration Cloud or to the WebEx Node. The decision about which ingress point to connect to is determined automatically by the WebEx client. This is based on round-trip delay times between the client and access points on the Cloud and Node(s) that the client is aware of. No intervention is required by the user or the WebEx site administrator to manage where users connect. The entire WebEx experience including pre-meeting, in-meeting, and post-meeting functions remain unchanged with the addition of the Node. Failover and overflow between the Node and the Cloud are automatic and seamless to the user. Typically, in an enterprise deployment of the Node, all internal users (up to the maximum capacity of the Node) will tend to connect to the Node as this will exhibit the lowest round-trip latency. External users will always connect to the Cloud as the internal IP address of the WebEx Node is generally hidden and also the Cloud will tend to exhibit the lowest round-trip delay time. If the internal Node reaches its maximum capacity, then sessions can overflow to

either an alternate Node within the network or to the Cloud. This means that a customer only has to deploy as many Nodes as required to cope with the *base load* collaboration traffic and any peaks in usage can be absorbed by the Cloud. There is no restriction on the number of Nodes that may be deployed into an enterprise network. If a Node fails, then all the clients connected to that Node will reconnect to another Node within the network or to the WebEx Cloud, This process is automatic and transparent to the users of the service.

It is important to note that like most Software as a Service (SaaS) data flows, WebEx data flows are highly asymmetric with a great deal more data travelling in the down-stream direction from the Cloud (many attendees viewing content) than data flowing up to the Cloud (few presenters presenting content). The Node is designed to substantially reduce bandwidth consumption in the down-stream direction as this represents by far the largest bandwidth consumption for WebEx sessions and also for many other enterprise applications that are consuming Internet bandwidth. The bandwidth savings achieved by using the WebEx Node are dependant on the mix of internal versus external attendees, presenters, and the types of services being used. Typical bandwidth savings for web conferencing traffic can be up to 90 percent (when 75 percent of the attendees are internal and connected to the WebEx Node). 75 percent internal versus external attendees is highly typical of the usage profile that WebEx sees for large enterprises. The meeting size does not make a difference to the percentage of bandwidth savings, although for large meetings the absolute numbers become significant especially on a capacity constrained network.

Figure 1 WebEx Flow without the WebEx Node



WebEx Flow without WebEx Node

The typical enterprise user will connect to the WebEx Collaboration Cloud interacting with web pages to set up, start the conference, play recordings, etc. This session may be up to 100k and does not cause much impact on network resources. If video is used, a session will be established with a server again in the WebEx Collaboration Cloud. This stream usually consumes around 250k. For individual users within an enterprise, this has minimal impact on network resources. If the number of users attending a WebEx meeting within an enterprise suddenly expands to hundreds or thousands of participants, this now places a significant load on the enterprise's Internet connection, proxy server, and firewall infrastructure. Figure 1 shows the typical streams associated with a WebEx session without the WebEx Node.

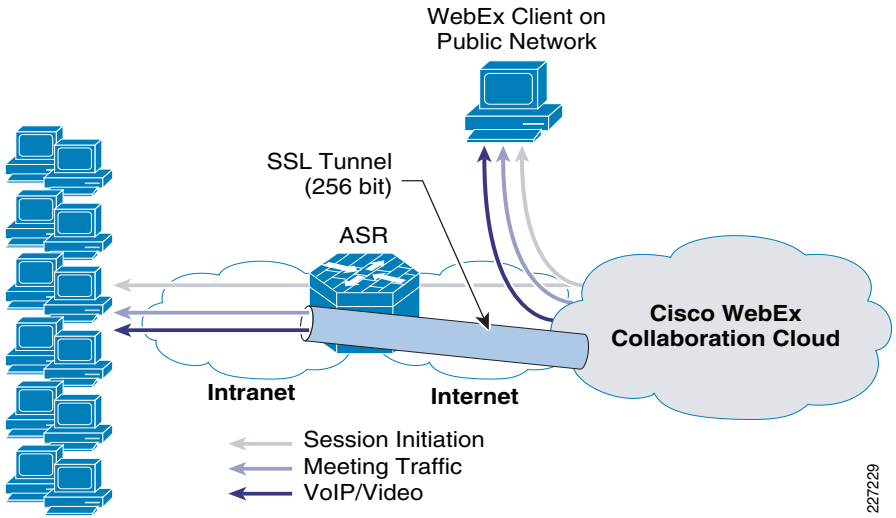
WebEx Flow with WebEx Node

With the WebEx Node installed on a local ASR (Figure 2), all meeting participants within the enterprise connect to the local WebEx Node, then only one set of meeting and VoIP/video streams are sent to the WebEx Collaboration Cloud for each meeting. This is accomplished by creating an instance of the collaboration bridge on the WebEx Node. Instead of many streams traversing the Internet connection, there is one low-bandwidth stream. All switching of presenters and all the attendees is performed locally. All content is in essence turned back around to the local users. This results in improved response times and latency.

The WebEx Node uses an SSL tunnel in connecting back to the WebEx Collaboration Cloud since the local Node is on the WebEx global distributed meeting architecture. The WebEx Node is managed and monitored by the same tools that are used to monitor the production servers within the WebEx Collaboration Cloud. This provides not an isolated version of WebEx, but a cascaded meeting solution. Therefore, the instance of WebEx software that lives in the ASR is part of the bigger WebEx Collaboration Cloud.

If the WebEx Node blade within the ASR fails, the clients will automatically failover to another Node within the enterprise network or the Cloud if no other Nodes exist. If the Node is overloaded, clients will overflow to the Cloud, completely transparently to the users.

Figure 2 WebEx Flow with the WebEx Node



Summary

The Cisco WebEx Node is a shared port adapter (SPA) for the Cisco ASR 1000 Series. It provides enhanced performance and reduced bandwidth consumption for WebEx web, VoIP, and video sessions in a large enterprise. This is achieved by extending the hosted Cisco WebEx Collaboration Cloud into a large enterprise.