The Benefits of Video Compositing

By AVI-SPL and Cisco

Video compositing is the ability to use a high-definition screen to show more than one camera or source, within windows that can be placed anywhere on the screen. Just as you can arrange application windows on a Windows computer or a Mac, video compositing allows you to place windows containing video streams of cameras, presentation sources, and computers anywhere on the screen. In the following graphic, you see a dual screen Cisco TelePresence system located in New York. The screen on the left displays four windows – two cameras stitched together side-by-side, and two more single-camera images from other locations. The screen on the right shows the presentation material being shared.

The Cisco Video Compositing API

Cisco C Series endpoints have a rich API (Application Programming Interface) that is used to generate windows for any local monitor or for any connected far end site. The Video Layout command set is used for this, and allows for the following functionality:

* Each local monitor displays an individual layout of up to five windows (called Frames in the API)

* Each connected far end can receive an individualized layout of up to four windows.

Video compositing is built into Cisco C60 and C90 codecs, allowing for the flexible display of multiple video sources in the local conference room and any connected far end, regardless of the manufacturer of the endpoint. The number of unique video sources on a C90 is nine, including five locally connected devices (cameras, computers, document camera, DVD player, etc.). The number of potential destinations is eight – four local high-definition displays, three far ends, and the presentation channel.
addition to the five locally connected devices, there are eight more video inputs, so that 13 video devices can be connected as inputs, five simultaneously. With nine sources and eight destinations, the C90 functions not only as a windowing processor but also as a presentation switcher.

In a typical boardroom scenario, the C90 or C60 can be used for both local presentation and TelePresence, replacing the customary external video matrix switcher.

By having compositing capabilities within the codec itself, you can send multiple windows to any connected far-end system, with control over what each far end sees. This cannot be done with an external video compositing device.

**Application Example: C90 with four screens hosting three other sites**

In the example below, the C90 is hosting a multipoint conference – three other sites in addition to itself – using the MultiSite option. The local C90 has four high definition screens directly attached to the codec. Monitor 1 shows the camera in New York; monitor 2 shows the camera in Sydney; monitor 3 shows the camera in London, and monitor 4 shows the shared presentation material.

In each of the far end locations, regardless of the type of endpoint in use, the participants are seeing individually customized windows containing all of the other locations and the presentation material. The local C90 uses video compositing to send individual views to each far end. It is also using the video compositing engine to display a full-screen view of each connected endpoint on its own monitor, with the shared presentation on a fourth monitor. It doesn't matter which site is sharing the presentation – all sites will see it.

**C60 Capabilities**

The total number of local video inputs on a Cisco TelePresence Codec C90 hosts a multipoint conference using the MultiSite option.
With nine sources and eight destinations, the C90 functions not only as a windowing processor but also as a presentation switcher.

C60 is five, and of these, three can be used simultaneously. The following graphic shows a typical compositing scenario for a C60 with two monitors in a call with one other site.

As you can see, the windows can be placed anywhere on the screen, and be of any size, including full screen which is not illustrated. “Source 1” refers to the camera or other video device connected to input 1 on the C60, “Source 2” refers to input 2, and so on. “Frame 4” and “Frame 5” can contain any local video device, the far end video, or the presentation channel.

There are no special requirements for the far end systems to receive a windowed video stream. The C60 and C90 use compositing to join multiple windows together into a single 1080p high-definition video image that is compliant with interoperable H.264 standards. If one of the far end systems is older and doesn’t support H.264, then the C Series will send H.263 or even H.261.

Typical compositing scenario for a C60 with two monitors in a call with one other site.