

## TANDBERG – Cisco Video Telephony Solution

As video over IP has become accepted technology, there has become a need for ease-of-use, productivity-enhancing services such as hold, transfer, conferencing and directory services. These features have only been readily available in the telephony domain.

Cisco® Systems, Inc. offers a mature IP telephony technology. Cisco CallManager has been widely deployed, with over 2.3 million Cisco IP phones installed by the end of 2003. TANDBERG is the technology leader in business-quality video over IP with a broad and complete product line, from the meeting room to the desktop. TANDBERG and Cisco have partnered to bring the first IP-based solutions to market that make video communication as simple as a phone call.

This white paper describes how Cisco CallManager 4.0 and TANDBERG video endpoints work together to provide video users with the full functionality of IP telephony.

### Components of the TANDBERG and Cisco solution

- Call Control
  - Cisco CallManager 4.0 – software based call processing agent running on a Windows server. CallManager is the core of the TANDBERG and Cisco solution. CallManager runs multiple protocols such as SCCP, SIP and H.323, but the full power of CallManager can only be exploited by endpoints running the SCCP protocol.
- SCCP Video endpoints
  - TANDBERG 1000 for Cisco CallManager – a fully integrated video endpoint designed for executive offices and small meeting rooms, featuring a 12” LCD screen and a high performance full duplex handsfree audio system. The 1000 runs the SCCP protocol.
  - TANDBERG 550 for Cisco CallManager – a set-top video endpoint designed for offices and small meeting rooms, featuring a controllable pan/tilt/zoom camera. The 550 connects to any standard NTSC/PAL monitor. The 550 runs the SCCP protocol.
- Cisco VoIP telephones
  - A series of Voice-over-IP telephones running the SCCP protocol
- Infrastructure devices
  - Cisco IP/VC MCU – Multipoint Conferencing Unit – a standalone hardware device that provides meet-me and ad-hoc video conferences
  - Cisco IP/VC Gateway – a standalone hardware device that provides access to the public ISDN network for interoperability with H.320 video endpoints
  - Cisco MCM Gatekeeper – a software option for Cisco routers that provides interoperability with H.323 video-over-IP endpoints

## Architectural diagrams of TANDBERG and Cisco solution

The TANDBERG and Cisco solution may be implemented in a variety of ways, depending on the needs of the customer. This section will outline a few possible architectures, with increasing degree of complexity.

### Basic configuration



The setup shown allows for video and audio calls within the enterprise. A TANDBERG video endpoint may be used to place either audio or video calls. The end-user does not need to know what type of call to place, if the called party has a Cisco 7960 phone, the result will be a voice call, and the TANDBERG video endpoint will function as an excellent speakerphone. If the called party is a video endpoint, the result is a video call.

### Multi-party conferencing

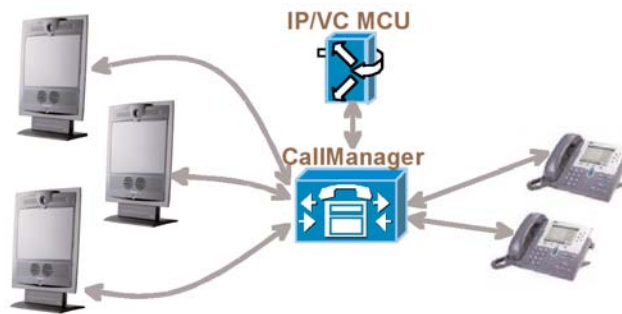
One compelling feature that Cisco CallManager enables is ad-hoc conferencing. While engaged in a point-to-point video call, a third (and a fourth) party may be added to the call, creating a multi-party conference. The user interaction is exactly the same as when using a Cisco 7960 phone: When in a call (voice or video), hit the CONFERENCE softkey, dial the number of the third party, and hit CONFERENCE again.

This is what happens in more detail:

- Video endpoints A and B are connected in a point-to-point call
- They decide they need to consult a third party, and A therefore hits the CONFERENCE softkey
- At this point, endpoint B is placed on hold. When on hold, CallManager will close the media channels going from A to B, so endpoint B will at this time receive no audio or video from A, but instead, will hear music on hold (if the CallManager is configured to play music on hold)
- Endpoint A then dials the number of Endpoint C.
- Endpoint A and C will connect as a point-to-point call

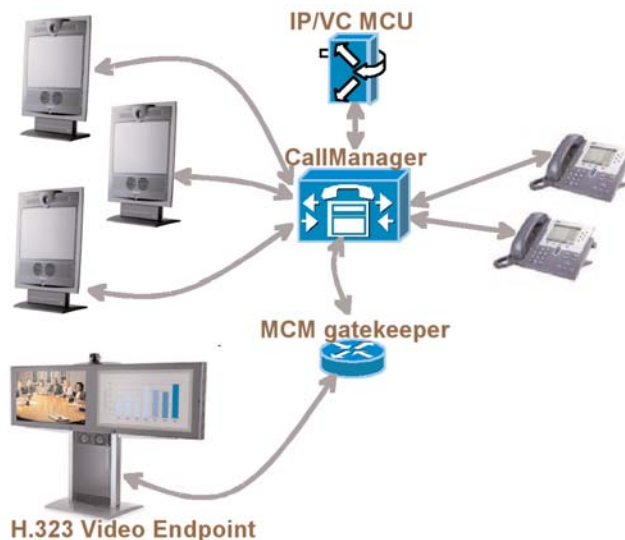
- When Endpoint A hits CONFERENCE again, several things happen:
  - The media channels from Endpoint A to C are closed
  - A three-way conference is created on an available Cisco IP/VC MCU
  - Endpoints A, B and C are transferred to the conference on the MCU
- The MCU will operate in a voice-switched mode, i.e. the current loudest talker will be visible to all participants

The architectural diagram for the above option looks like this:



**Interoperability with H.323**

Standards compliant H.323 video endpoints can easily interoperate in the TANDBERG and Cisco solution. H.323 and SCCP uses the exact same media codecs (H.261, H.263) and transport protocol (RTP). CallManager is able to terminate H.323 calls, and can therefore act as a signaling gateway between SCCP and H.323. The H.323 endpoints register with an H.323 gatekeeper, and the gatekeeper routes all calls to the CallManager. A typical gatekeeper would be a Cisco 3600 or 7200 router with the MCM feature set.



Some H.323 endpoints such as all TANDBERG H.323 endpoints running software versions B8.0, E3.0 and later can actually route call setup directly to CallManager, obviating the need for a Gatekeeper. In this case, the TANDBERG H.323 endpoints do not use RAS (the CallManager is not a Gatekeeper), but skip directly to call setup.

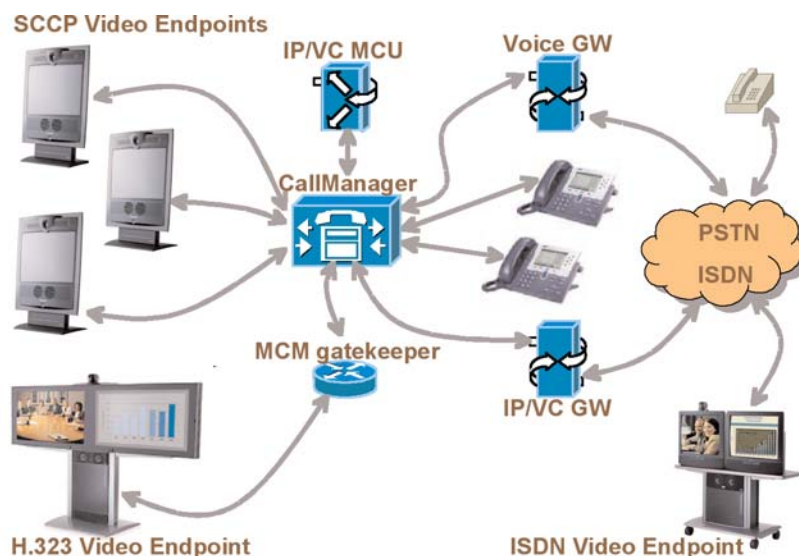


Note that when H.323 endpoints connect directly to CallManager (i.e. gatekeeperless operation), or when using a gatekeeper and the gatekeeper is configured to route H.245 to CallManager, some advanced H.323 features will be disabled. This is due to the fact that a CallManager interprets the capability sets from all connected endpoints, and discards any capabilities it does not have support for. Examples of such advanced features are H.235 encryption, H.264 video codecs, and multiple video streams.

Some H.323 endpoints such as all TANDBERG H.323 endpoints running software versions B8.0, E3.0 and later have support for Empty Capability Set (ECS). ECS allows an endpoint to close media channels during a call, and reopen them to a different IP address. This allows an H.323 endpoint to be placed on hold, to be transferred etc. So, in a Cisco CallManager 4.0 environment, even H.323 endpoints benefit to a limited degree from the IP telephony features. A scenario could be: A standards based TANDBERG H.323 room system (supporting ECS) places a call to a TANDBERG 1000 running SCCP. Once the call is connected, the 1000 may then put the room system on hold, and conference in another participant. Or, the 1000 may transfer the call to a different destination. It is important to note that the room system itself cannot invoke any IP telephony features (hold, transfer).

## Connecting to the outside world

For connecting to legacy video endpoints in the outside world, a gateway is required. Legacy endpoints are video endpoints running the H.320 protocol, using ISDN networks. The Cisco IP/VC H.323-to-H.320 gateway should be used:



For voice calls, separate voice-only gateways are typically used. Cisco has a range of voice gateways available, from standalone devices to blades in Catalyst routers.

## TANDBERG User Interface

The user interface on the TANDBERG systems are driven by CallManager. I.e., CallManager knows what state the endpoint is in, and directs the endpoint to display softkeys that are appropriate for the context.

The result is a user dialog that is identical to that of a Cisco VoIP phone, with a few minor exceptions: The TANDBERG endpoints do not have VOICEMAIL and SERVICES buttons, so they are mapped into the main menu – accessible by pressing the MENU button.

## XML-based Information Services

The TANDBERG endpoints support the same XML based services as the Cisco 7960 VoIP phone. In CallManager, a phone is configured with a set of URL's – for Directory, Services, Messages and so forth. During power-up, the endpoints receive a configuration file from the CallManager, containing among other things these URL's. The URL's point to a web-server – that web server could be the same server as the CallManager, but the web server typically sits on a dedicated machine.

When an endpoint accesses an XML service, the XML object is retrieved from the web server and interpreted. In fact, the CORPORATE DIRECTORY feature accesses an XML service.

## Conclusion

Using the TANDBERG and Cisco solution, some of the benefits immediately available to the enterprise are:

- True ease of use
  - Same user interface for both phones and video systems
  - Same numbering plan for phones and video systems
  - Access to online, searchable directory from any endpoint
  - Both video and audio endpoints can execute XML-based information services
- Management, configuration benefits
  - Installation – all configuration and provisioning is done within CallManager. Installing an H.323 endpoint involves configuring the endpoint on-site, using the menu system in the endpoint itself for basic configuration. All SCCP endpoints (whether audio or video) are configured remotely from the CallManager. Once the endpoint has been registered in CallManager, it receives its configuration when powered on.
  - Management – moves, adds and changes are done using the CallManager for both audio and video endpoints.

Unlike other protocols for video over IP, SCCP is the only mature protocol today that brings true telephony features to IP video communications, and is the only platform that enables true convergence of voice and video over IP.

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