



Ensuring scalability for your video network: Selecting a Multipoint Control Unit.

The TANDBERG MPS Multipoint Control Unit

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I. Executive Summary

Multipoint control units (MCUs) are an essential component in today's enterprise-wide video communication solutions. An MCU is sometimes referred to as a "bridge" because it connects multiple video and audio participants into a single conference — each participant connecting through what is commonly called a "port." Selecting the right MCU for your requirements is critical in order to effectively deploy and manage your video network and provide users with the optimal communication experience.

This white paper will introduce the functions of an MCU that enable video/audio/data conferencing. The paper will also discuss the key attributes that define the performance of MCUs in a video communication solution. These attributes include:

- Reliability
- Scalability
- Non-blocking design
- Secure communications
- Standards-based technology
- Quality of experience
- Advanced video feature set

This paper will introduce TANDBERG's MPS multipoint control units, and show how these innovative bridging devices are specifically designed to address these key issues in order to satisfy an organization's bridging needs.

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II. Introduction

Today, companies and organizations are using video communications at an increasing pace. Two main events are propelling this increase: a wider recognition of the rapid, highly effective manner in which critical tasks can be accomplished by using video communication; and, the readiness of the infrastructure to support today's vastly improved video technology.

The surge in growth of IP networks; the convergence of voice, video, and data; the proliferation of video to the desktop and throughout every job function; and the ability to communicate easily and securely within and across organizations are driving large-scale adoption of video within enterprises. Face-to-face collaboration and communication are now the viable, cost-effective means by which to more quickly accomplish tasks and attain business objectives.

The infrastructure that supports visual communication is as important as the endpoints themselves. One such infrastructure component is a bridging device known as the multipoint control unit, or MCU. MCUs are essential for enabling multiple parties to participate in any conference, and as with any essential infrastructure component, MCUs must offer key features and functionalities in order to best support the multipoint conferencing needs of the organization.

Understanding the key issues that differentiate MCU performance will help decision makers select the right device to meet their requirements.

III. Multipoint Control Units (MCUs) — Key Features & Functionality

Most MCUs will meet standard criteria, including compatibility with installed base or legacy systems, and compatibility with multiple network protocols, in order to enable effective multipoint communications. However, to excel as an effective solution, an MCU should also include the following key features and offer expanded functionality, especially as it handles larger-scale demands:

- Reliability
- Scalability
- Non-blocking design
- Security
- Standards-based technology
- Quality of experience
- Advanced feature set
 - H.264
 - AAC-LC
 - H.239
 - AES
 - Custom Formats (XGA)

Call Reliability

Historically, the single hardest event to accomplish in video has been to connect and sustain a conference of multiple participants. The typical hurdles leading to unreliability include mixes of older and newer equipment, different network protocols, different audio and video compression algorithms, endpoints connecting at different speeds, as well as feature set compatibility issues.

Once a call is connected, sustaining that call is essential. Transcoding and rate matching technologies are effective solutions to the challenges involved in initiating and sustaining a video conference. Transcoding and rate matching dramatically improve the overall call experience and call reliability. Transcoding allows different video and audio protocols (algorithms) to come into the same conference. Rate matching allows different speeds to join the same conference. These features allow people to connect — so that users with older systems can participate right along with those with the newest systems, across all manner of networks, allowing the best resolution possible for each participant, with no “drag down” to the lowest common denominator.

In addition, MCUs should have built-in fault tolerance. Very often, an unstable or “lossy” network (one in which packets are lost in transmission) severely affects video call reliability in both ISDN and IP environments. The MCU should incorporate intelligent packet loss recovery (IPLR) technology, be able to tolerate and accommodate lossy networks, sustain calls, and proactively recover quality in this kind of environment.

Scalability

The ideal MCU should be scalable, able to meet your organization’s current requirements and be able to cost-effectively grow as your needs evolve over time.

Users should not be made to choose between desired features and available space allocation in their choice of an MCU. Rather, the MCU should accommodate upgrades with maximum ease and a minimum of additional space required.

The MCU should also be able to support future protocols. This means having processing, feature and port count capability beyond the available technology's current requirements. The MCU must be able to support future technologies as they are released and as your needs demand. More importantly, the MCU capacity should not reduce port counts when certain features, such as AES encryption or transcoding are utilized (see the discussion of non-blocking design, below).

Non-blocking Design

In some MCU configurations, opting for certain features such as AES encryption can reduce the port count of the MCU — that is, the number of video and/or audio systems the MCU can sustain in a conference. In fact, with some MCUs users can experience up to 50% reduction in port count when AES is used. This makes it very difficult to know the capacity of the MCU at any one time, if that MCU port count changes dynamically depending upon which feature sets are enabled. In addition, some MCUs require advanced scheduling in order to use all available features.

A non-blocking design, on the other hand, ensures that all features are available on all ports, at all times. This enables users to always know their available port counts, greatly simplifying scheduling and making conference implementation much easier.

Illustration of Rate Matching

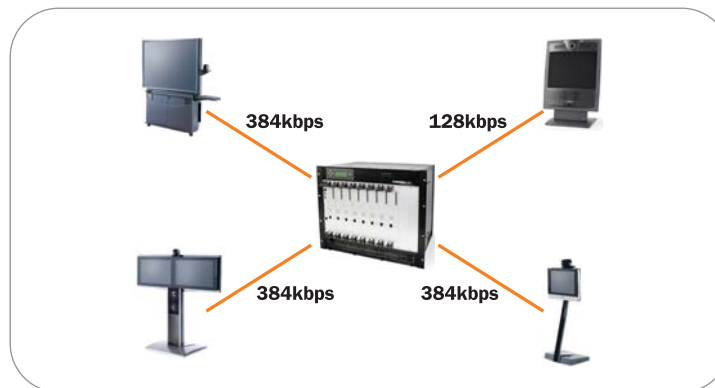
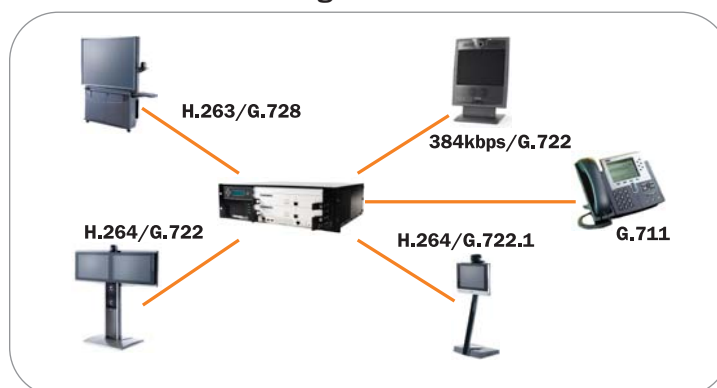


Illustration of Transcoding



Standards-based MCUs future-proof your visual communication investment and ready you for tomorrow's requirements.

Secure Communications

MCUs should offer two types of communication security:

- **Content security** – This is the MCUs ability to encrypt voice, audio and data transmissions, so you know your content is secure.
- **Access security** – MCUs should support mechanisms for secure management of the devices (controlling who has access to the devices, protocol security, etc.).

MCUs need to have the ability to easily secure both content and usage access, deliver high levels of content security, and be flexible enough to offer levels of security that can be enabled or disabled at the user's or administrator's discretion.

Standards-based Technology

A key requirement for effective multipoint communications is universal connectivity — that is, the ability for any device on any network using any dialing scheme or protocol to be able to connect to any other device. Adherence to standards is essential for universal connectivity. Proprietary technologies by nature are manufacturer-specific, requiring specialized hardware and software. Not only does this limit interoperability and make universal connectivity expensive or impossible to achieve, it can drastically shorten the usable life of the device, reducing return on investment.

MCUs designed using standards-based technologies protect against dead-end technology and lowered return on investment. For example: standards-based solutions developed in 1993 can still be used and be communicated with today, whereas a system that is just a few years old but developed using a proprietary design becomes a limiting factor in a deployed network.

Quality of Experience

Bridging systems need to be easy to use in terms of administration, configuration, modification and maintenance. The ideal MCUs are compact and modular in design, in order to take up minimal real estate within rack configurations. They should be flexible, easy to configure and control, with ports to accommodate all variations of network types, devices and protocols.

Your MCU should easily integrate with the other components of your video architecture, providing a consistent feature set that will ultimately deliver highest quality of performance and experience to users and administrators alike. Look for a centralized web-based management approach — providing you with simple, universal administration tools that will allow any administrator to connect and manage the MCU without specialized software.

Advanced Feature Set

Any MCU should be able to deliver the benefits of the latest features sets, incorporated into the design of the MCU itself and not available only as costly add-ons.

- **H.264** – this latest video encoding algorithm is a compression standard that enables organizations to communicate over both ISDN and IP networks with twice the video quality and clarity as compared to older standards — without any increase in network costs

- **AAC-LD** – this standard delivers CD quality audio for maximum clarity and understanding
- **H.239** – standards based dual stream algorithm enables data sharing, whereby PC desktop graphics are converted into a separate media stream and transmitted in parallel with the video stream
- **AES** – This type of content encryption enables superior security ensuring confidentiality of your video calls
- **Custom Formats (XGA)** – Support for custom formats allows easy configuration and clear presentations

IV. The TANDBERG MPS Series

The Media Processing System (MPS) platform includes TANDBERG's highly scalable MCUs, designed to serve the multipoint bridging requirements of medium to large enterprises as well as carrier-class service providers. The MPS platform offers a design that distinguishes it from most other MCUs, providing innovative solutions to the requirements of large organizations with increasing visual communication needs.

The TANDBERG MPS 800 and MPS 200



The TANDBERG MPS is able to scale cost-effectively from small to large port counts with very high feature density sets. The MPS 200, an excellent choice for medium sized enterprises, connects from 16 to 32 ports of video. The larger capacity MPS 800 can connect up to 128 ports of video and 48 audio sites in one or more conferences. In both units, each port offers the following capabilities simultaneously:

- Transcoding
- Rate-matching
- H.264 Video
- AES
- H.239 Dual Stream
- XGA
- Continuous Presence

The MPS platform offers the following functionality:

- **Reliability** – By default, every port in the MPS Series supports TANDBERG IPLR (intelligent packet loss recovery) to increase connection reliability and call persistence. Every port supports transcoding and rate matching, and every port supports ISDN and IP downspeeding, for maximum call quality and sustained connections.
- **Scalability** – Beginning with a minimum of 16 ports, the MPS units allow easy and affordable scalability. The MPS 200 allows you to grow from 16 to 32 ports of video (plus up to 32 ports of audio), and the larger MPS 800 grows to up to 128 ports of video (plus 48 ports of audio). TANDBERG's MPS units support ISDN, IP and serial networks. And, the MPS Series units have robust processing power, and will easily embrace expected advances and enhancements for years to come.
- **Non-blocking Design** – every port by default is a transcoded port, enabling all advanced features to be available on all ports at all times. Users are not penalized for feature usage and enjoy much easier scheduling. All ports support rate-matching to allow for any combination of video rates.

How does the MPS Series handle today's requirements? How are they designed to handle the advances and demands of tomorrow?

“We needed a reliable system built on open standards to allow for connectivity to any endpoint, and MPS provides that. We also needed upgradeable software, a system easy to manage from a central point and support for a global directory. MPS is a hub for video communication, which is becoming critical for our business, supporting new product rollouts, expanding sales training and strengthening professional relationships through face-to-face interaction.”

Chris Russell

Manager of Technical
Operations

Tahitian Noni International
Makers of TAHITIAN NONI®
Juice

- **Secure Communications** – The TANDBERG MPS Series MCUs support AES and are compatible with Type 1 encryption on every port, and conferences can be set up to be password protected. The MCUs themselves support secure protocols, including HTTPS, MD5 (secure Telnet) and SCP (secure copy). These protocols allow for both content security and secure management of your visual communication solution. The MPS also allows you to disable or enable protocols as needed (such as HTTP, SNMP, FTP).
- **Standards-based Technology** – The standards-based TANDBERG MPS Series ensures your technology will work with legacy equipment, in today’s heterogeneous environments, and embrace the advances of tomorrow. Gone are the “forklift” scenarios where taking advantage of technology advances meant scrapping your previous investment. MPS’s standards-based technology delivers an MCU solution that ensures low life cycle costs and maximum returns on your visual communication investment.
- **Quality of Experience** – The MPS units have embedded web management, so there is no need for a third party management application. In addition, the TANDBERG Management Suite (TMS) is a robust video conferencing management software application that makes it easy to schedule calls on the MPS Series units. All these attributes contribute to the MPS Series’ overall ease of use and highest quality experience for administrators and users.
- **Advanced Feature Set** – The MPS multipoint control units incorporate all the latest advanced feature sets, including:
 - H.264 – latest video encoding algorithm for superior ISDN and IP video clarity
 - AAC-LD – for CD quality audio
 - H.239 – standards based dual stream algorithm for easy data sharing
 - AES – Content encryption for the security you require
 - Custom Formats (XGA) support – for easy configurations and clear presentations

V. Summary

Multipoint control units are essential components in any visual communication solution. Technology decision makers can ensure they reap the maximum benefit and continued performance from their visual communication solution by choosing an MCU that satisfies the key requirements of:

- Reliability
- Scalability
- Non-blocking design
- Secure communications
- Standards-based technology
- Quality of experience
- Advanced feature set

Especially for medium and large scale enterprise requirements, the TANDBERG MPS Series units incorporate all the features and functionality required of truly flexible, high quality multipoint control units. With the TANDBERG MPS Series MCUs, users can enjoy powerful, high capacity, easy-to-use and manage visual communications for years to come. **T**

For more information on TANDBERG'S Multipoint Control Unit platform, contact:

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Glossary of Terminology

- AES – Advanced Encryption Standard, the highest level of non-DOD encryption. Replaces aging DES standard.
- Continuous presence – the ability to see more than one site at a time during an MCU call, often referred to as 'Hollywood' squares.
- IPLR – Intelligent Packet Loss Recovery, a TANDBERG developed technology that compensates for lost packets during a video call. This feature is on all TANDBERG hardware products and works in both the send and receive directions in addition to working with non-TANDBERG devices. IPLR works for both H.323 and H.320 networks.
- MCU – Multipoint Control Unit, a 'bridge' that allows for video/audio/data conference calling.
- Non-blocking – A device that allows all features to be used at the same time with no degradation of port count.
- Rate matching – the ability of a device to allow endpoints connecting at different speeds in the same call.
- Transcoding – the ability of a device to connect all different encoding algorithms in the same call.