Evaluation of the Emblaze-VCON VCBPro Video Bridge

Wainhouse Research

EVALUATION

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Table of Contents

List of Figures

Executive Summary

In Q1 and Q2 2008, Wainhouse Research (WR) conducted an evaluation of the Emblaze-VCON VCBPro video bridge. Specific areas of focus during the evaluation included the following:

- System Installation / Configuration
- User Interface / Usability
- Call Creation and Launch
- Connectivity
- Conference Management
- Overall Conference Experience
- Items (Software) Included
- Cost Per Port
- Integration Options

Throughout the evaluation, the Emblaze-VCON VCBPro met or exceeded WR's performance expectations.

To facilitate the testing, WR (with the support of Emblaze-VCON) deployed an Emblaze-VCON VCBPro video bridge within our Atlanta test lab. The Emblaze-VCON VCBPro, like the other devices and endpoints from numerous vendors within our lab, was assigned a public IP address within the same network subnet, so all video traffic remained local within our facility. The test team then placed dozens of calls between the VCBPro and the installed video endpoints at various connection rates.

Throughout the evaluation, the Emblaze-VCON VCBPro video bridge met or exceeded our performance expectations. Based on the rating system described below, the Emblaze-VCON VCBPro earned an overall weighted rating of 3.5 out of 5. In performance related areas, the Emblaze-VCON VCBPro earned a weighted rating of 3.6. Specific areas of strength included strong video and audio protocol support, solid connectivity and interoperability, support for transcoding for all supported video resolutions, and a broad range of included items. Current weaknesses include the lack of integrated ISDN capability (an external gateway is required[1]) and the lack of support for incoming calls from endpoints that are not registered with the MXM (or a neighboring) gatekeeper...

This document provides detailed information about the testing methodology and results of this evaluation.

Important Notes:

1) Within this document, the terms MCU (multipoint control unit) and video bridge are used interchangeably and have the same meaning.

2) Please refer to Appendix A (Video Bridge Basics) for detailed information about the features, functions, and capabilities of video bridges / MCUs.

3) This evaluation was sponsored by Emblaze-VCON.

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[1] Although optional integrated ISDN support would be a welcomed addition to the VCBPro, Emblaze-VCON offers an external 3rd party gateway for use with this MCU. This arrangement provides an organization with the flexibility to deploy the video bridge and gateway in different locations.

Evaluation Results

Based on our testing and evaluation, WR gave the evaluated video bridge a rating from one to five (where five is the best possible score in each category) as shown below.

Recognizing that each enterprise will have different priorities, we have included a weighting factor that WR believes represents the needs of many enterprises. WR recommends that enterprises considering an MCU investment recalculate the averages below using weighting factors appropriate for their environment.

Ratings: **Higher = Better**	**WR Weighting Factor**	**Emblaze-VCON VCBPro**
Performance Related Areas		
Install / Configure	1	4
MCU User Interface	4	4
Call Creation / Launch	5	2.5
Connectivity – SD	5	4
Connectivity – HD	4	3
Conference Management	4	3.5
Conference Experience	5	4
Non-Performance Related Areas		
Items Included	2	4.5
Cost Per Port / Connection	4	3
Integration Options	4	2

Figure 1: Evaluation Results - By Category

Ratings: **Higher = Better**	**Emblaze-VCON VCBPro**
Overall Ratings	
Un-weighted Average	3.5
Weighted Average	3.4
Rating – Performance Areas	
Un-weighted Average	3.6
Weighted Average	3.5
Rating – Non-Performance Areas	
Un-weighted Average	3.2
Weighted Average	2.9

Figure 2: Evaluation Results - Summary

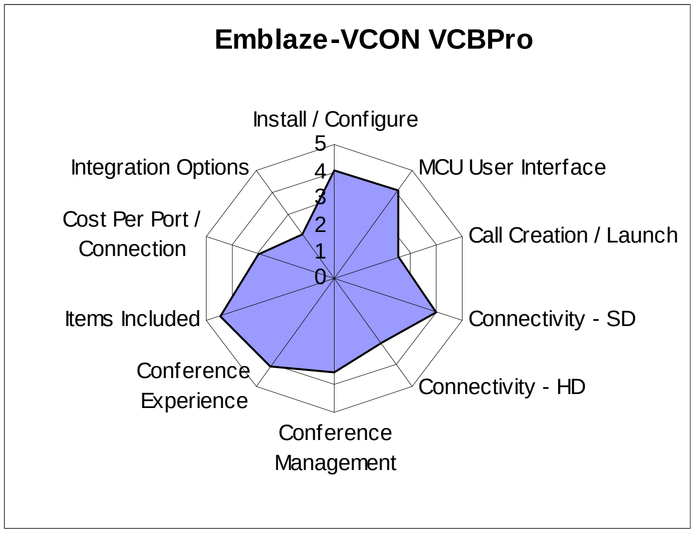

Figure 3: Evaluation Results - Radar Chart

Install / Configure – Reflects a variety of install / configuration related items including the time required, overall difficulty and complexity, and the need for additional software or specialized technical knowledge. Note that a typical MCU should require no more than an hour or two to install and configure.

MCU User Interface – Reflects WR's opinion of the system user interface including the UI's organization and structure, responsiveness, general utility and usability, and our assessment of the learning curve associated with using the UI.

Call Creation and Launch – Based on the number of call connection options (as described in the prior section) supported by the MCU. A rating of 5 indicates that the MCU supported all options.

Connectivity – For the purposes of this report, "connectivity" is an indication of how well the MCU connected to each of the test endpoints. In other words, this reflects whether we noted any significant interoperability issues, or whether the MCU forced connection compromises (e.g. lower than optimal connection speeds, less than ideal protocols, etc.) in specific situations. Such connection compromises are typically related to the MCU's decoding and encoding capabilities, transcoding ability, support for interim resolutions (e.g. 288p, 400p, etc.), AES / encryption support, and/or H.239 performance.

Conference Management – Highlights the production / conference management capabilities of the MCU including whether conference settings can be changed on the fly, ease of access to connection / call statistics, and the ability to quickly mute / un-mute sites and change layouts.

Conference Experience – This rating highlights WR's opinion of the conference experience provided by the MCU. For the most part, all current MCUs provide solid audio and video quality during conferences. The most notable differences relate to protocols and resolutions supported, motion handling capabilities, and MCU-generated latency.

Items Included – A high rating in this category indicates that the MCU ships with a variety of additional software and components. For example, some MCUs include web and client / server interfaces, H.323 gatekeepers, scheduling and management systems, reporting systems (or at least the ability to export usage data) at no additional cost.

List Price Per Port / Connection – For this category, MCUs are given a rating based on its list price per port / connection as evaluated at 384 kbps using the following breakdown:

List price Per Port @ 384 kbps	Rating (1 to 5)
< $1,000	5
$1,000 - $1,500	4
$1,501 - $2,000	3
$2,001 to $2,500	2
> $2,500	1

Figure 4: List Price per Port - Rating Criteria

For MCUs with variable capacity (based on video resolution, etc.), the cost / port is calculated for a single connection using CIF video resolution in transcoded mode.

Integration Options – Provides an indication of the available options for integrating this MCU with other systems including scheduling / management systems, groupware clients (Outlook / Notes), enterprise directory systems (LDAP, Active Directory), UC clients (OCS, Sametime) and external reporting / chargeback systems. The rating for this category is based on the following criteria:

Integration Options	Rating (1 to 5)
Integrates with no other systems (operates independently)	1
Integrates with systems from same vendor only	2
Integrates with at least one 3rd party system	3
Integrates with several 3rd party systems	4
Integrates with a wide variety of 3rd party systems	5

Figure 5: Integration Options - Rating Criteria

The Emblaze-VCON VCBPro

The Emblaze-VCON VCBPro is the first MCU from Emblaze-VCON to support both video and audio transcoding. In fact, all meetings on the VCBPro are transcoded, regardless of the screen layout used.

In addition, as far as we know, the VCBPro is one of only two currently available video bridges (the other being the Tandberg Codian MCU-4500) that can decode and encode HD signals during transcoded conferences, albeit based on our testing it appears that the VCBPro's HD encode is limited to 15 – 18 fps.

System Specifications	
Video Bridge / MCU	Emblaze-VCON VCBPro
Initial Release	October 2007
SW Revision Evaluated	6.0.M01.D13.Y08.VCB2500
System Type	Appliance
System Architecture	Fixed Configuration
Networks Supported Natively (for video)	IP (H.323 and SIP) [1]
Maximum Bandwidth Per Connection (IP)	4 Mbps
Capacity - IP @ 2 Mbps - Maximum Configuration	36 ports / connections
Capacity - IP @ 4 Mbps - Maximum Configuration	36 ports / connections
System As Evaluated	
Capacity - IP @ 2 Mbps - As Evaluated	24 ports / connections
Capacity - IP @ 4 Mbps - As Evaluated	24 ports / connections
Cost (List Price in US $) - As Evaluated	$37,995

1. SIP support via the MXM gatekeeper (included with the VCBPro) which acts as a SIP server and a SIP / H.323 gateway.

Figure 6: Basic Product Information

The Emblaze-VCON VCBPro is a relatively new release from the first company to release a product supporting videoconferencing over IP. The VCBPro is available in 6, 12, 24, and 36 port versions, and can support connections of up to 4 Mbps per port with H.263 and H.264.

Figure 7: The Emblaze-VCON VCBPro Video Bridge

For this evaluation, Emblaze-VCON provided a VCBPro supporting 24 video participants.

The VCBPro is a software-based MCU hosted on a dedicated PC appliance running a Windows XP kernel. However, the fact that this MCU uses a Windows operating system is essentially transparent to the system administrator and totally transparent to videoconferencing users.

The VCBPro ships with a wide range of software including a version Emblaze-VCON's MXM / Media Xchange Manager software (a longstanding client/server based management system), a gatekeeper, and the web-based Conference Moderator system.

Capacity and Cost

Emblaze-VCON offers two different video bridging products; the VCBPro (the focus of this document / evaluation) and the VCB6. These two video bridges are 100% identical with one exception; the VCBPro supports HD720p connections, while the VCB6 does not. The table below highlights the cost per port for the two video bridges. As shown, the cost per port – in many cases - depends upon the bridge capacity.

Number of Ports	VCBPro US $ List Price	VCBPro Cost per Port	VCB6 US $ List Price	VCB6 Cost per Port
6	$14,995	$2,499	N/A	N/A
12	$21,995	$1,833	$15,995	$1,333
24	$37,995	$1,583	$19,995	$833
36	$55,995	$1,555	$29,995	$833
48	N/A	N/A	$39,995	$833

Figure 8: VCBPro and VCB6 - Cost - Overall and Per Port

Basic Capabilities

The Emblaze-VCON VCBPro boasts support for the following features:

- Constant (flat) capacity – regardless of bandwidth, video resolution, etc.
- Data rates up to 4 Mbps per participant
- Narrow band (G.722, G.722.1, G.728, etc.) and wide-band (AAC-LD, G.722.1C / Siren14) audio H.264, H.263, H.263+, H.263++, and H.261 video protocols
- Video resolutions ranging from CIF to HD720p during transcoded conferences
- Audio protocol, video protocol, video resolution, and frame rate transcoding
- Numerous continuous presence layouts - including "auto" layout mode
- H.239 and AES encryption
- Support for mixed H.323 and SIP conferences
- Integrated streaming support (allows PC users to view conferences)[2]

[2] While WR was finalizing this evaluation document, Emblaze-VCON announced that the next version of the VCBPro software (version 7.0 slated for release in July 2008) will include the ability to record / archive conferences for immediate or on-demand playback. Note that this pending feature was NOT tested by WR as a part of this evaluation project.

The tables below highlight the features, functions, and capabilities of the video bridge evaluated.

Features / Functionality / Capabilities	Emblaze-VCON VCBPro
Web Interface	Y
Client/Server Interface	Y [1]
Integrated scheduling	Y
Integrated address book	N [2]
# of Video Encodes (per conference)	Unlimited
Allows setting changes during conferences	N
Ability to hide local image from CP view	N

1 Emblaze-VCON's management system (MXM), which can also be used to manage certain functions within the VCBPro, is a client server / application. However, the primary UI for the VCBPro is web-based.

2 Although the VCBPro UI does not include a traditional address book, it does provide users with access to a list of endpoints that are currently (or have previously) registered to the MXM gatekeeper (included FREE with the MCU)

Figure 9: Features / Functionality / Capabilities

Call Creation / Connection Methods	Emblaze-VCON VCBPro
1) Ad-Hoc via MCU UI	Y
2) Ad-Hoc via Dial-In to Meeting Room	Y
3) Ad-Hoc via Dial-In to New ID / E.164	Y [1]
4) Ad-Hoc via Dial-In to Lobby / Create Conference	N
5) Ad-Hoc via Dial-In to Lobby / Conference Select	N
6) Ad-Hoc via Endpoint Activated Blast Dial	N
7) Scheduled via MCU UI	Y

1 The VCBPro's ad-hoc support is actually the ability to expand point-to-point (direct) conferences into multi-point conferences (hosted on the VCBPro) by allowing participating users to invite additional participants.

Figure 10: Conference Creation / Connection Methods Supported

For detailed information about the various call creation / connection methods, please refer to Appendix B (Call Connection Methods).

Installation and Configuration

The basic installation of the VCBPro took less than an hour to complete. The system's network settings can be configured in three different ways;

1) Using the Existing IP Address (or DHCP to Obtain an IP Address)
   Retrieve (via the front panel controls and display) the systems current IP address on a particular Ethernet port (this may require activating DHCP on a particular Ethernet port), set a PC to an IP address on the same subnet, and then use the system's web UI to set the Ethernet port to be used for video traffic to the desired static IP address.

2) Using the Admin Port (Ethernet Port Gb0)
   Connect a network cable between a PC and Ethernet port 0 on the device (the admin port), set the PC to the admin subnet (10.10.10.x), and use the system's web UI to set the Ethernet port to be used for video traffic to the desired static IP address.

3) Using the Serial Port
   Connect a serial cable (not provided but available from Emblaze-VCON) between a PC and the serial port on the device, and use a terminal program to set the Ethernet port to be used for video traffic to the desired static IP address.

We configured the VCBPro using option 1 above and connected the "production" Ethernet port (we chose Gb2 for our testing) to the network in the test lab; a process which took less than 10 minutes to complete.

IMPORTANT NOTES:

1) Multiple User Interfaces
Previous versions of the VCB (e.g. VCB5 and VCB6) required the use of two user interfaces to control / manage the MCU; the MXM client / server application for certain admin functions, and the web UI for conference scheduling, management, and other functions. With the VCBPro, Emblaze-VCON has enhanced the web UI to include <u>almost</u> all of the functions necessary to configure and manage the bridge.

During our testing, we used the web UI to create and manage the majority of the test calls. The only exception was when we needed to connect specific endpoints at specific call speeds (different from the default call speed set in the call / service profile). In this case, we used the web UI to define and launch the conference, and the MXM client / server application to make the endpoint connections.

2) MXM Gatekeeper Requirement
At this time, the VCBPro (like its predecessor, the VCB) is inherently tied to the MXM gatekeeper as follows:

- The MXM gatekeeper (included free with the VCBPro purchase and hosted / running within the VCBPro appliance itself) must be running in order to use the VCBPro.

- The VCBPro can receive incoming calls only from video systems that are registered to the MXM gatekeeper (although not tested by WR, according to Emblaze-VCON, registering endpoints to a neighbored gatekeeper apparently resolves this issue).
- In a multi-gatekeeper / multi-zone environment, the VCBPro is unable to dial-out to endpoints that are not registered to the MXM gatekeeper. Emblaze-VCON expects to resolve this issue in an upcoming software release.

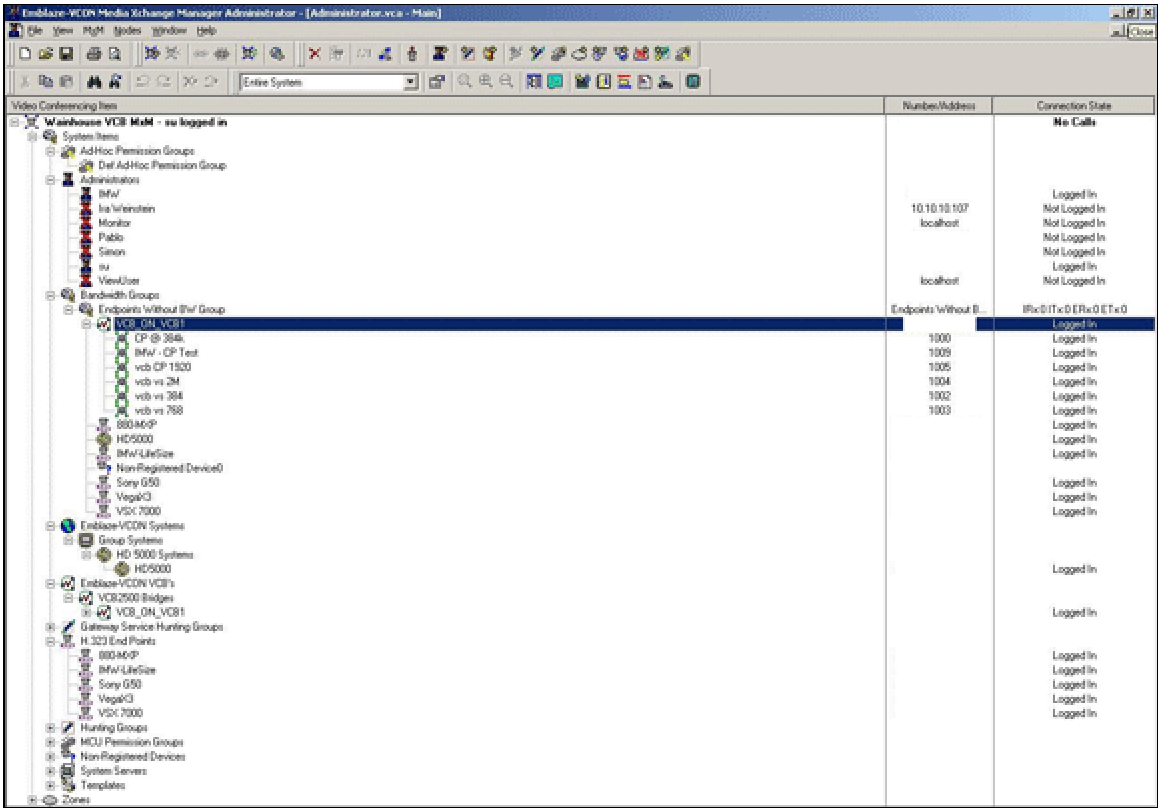

Figure 11: Emblaze-VCON - Media Xchange Manager (MXM) - Main Page

User Interface

The provided web interface includes three parts; EVC Conference Moderator, EVC Admin, and EVC Reports. Overall, the web UI is well designed and responsive (especially from systems on the same subnet), although the programming is somewhat primitive by today's web programming standards. For example, as far as we can tell, there are no right mouse click options within the interface. Instead, all navigation and control involves either clicking on hyperlinks, selecting check boxes or drop-downs, and then clicking submit. In addition, the UI permits users to change screens without saving setting changes; a weakness that could potentially cause issues for new users or those operating in fast-paced environments. Some form of warning like "Do you wish to save your setting changes?" would be a welcome addition.

The web UI does provide standard (index based) and context sensitive help in most areas.

The MXM client / server interface, however, is quite different. With a plethora of options and capabilities, MXM is more than ready to support environments and administrators in need of advanced management functionality. Notable MXM features described in the product's 400+ page manual include remote configuration of Emblaze-VCON endpoints and MCUs, advanced gatekeeper functionality (endpoint and MCU registration, call routing policies, etc.), monitoring of device status and connection states, creation and administration of user groups and policies, bandwidth management, call initiation and termination, and more. Basically, MXM is a power-tool designed for system administrators.

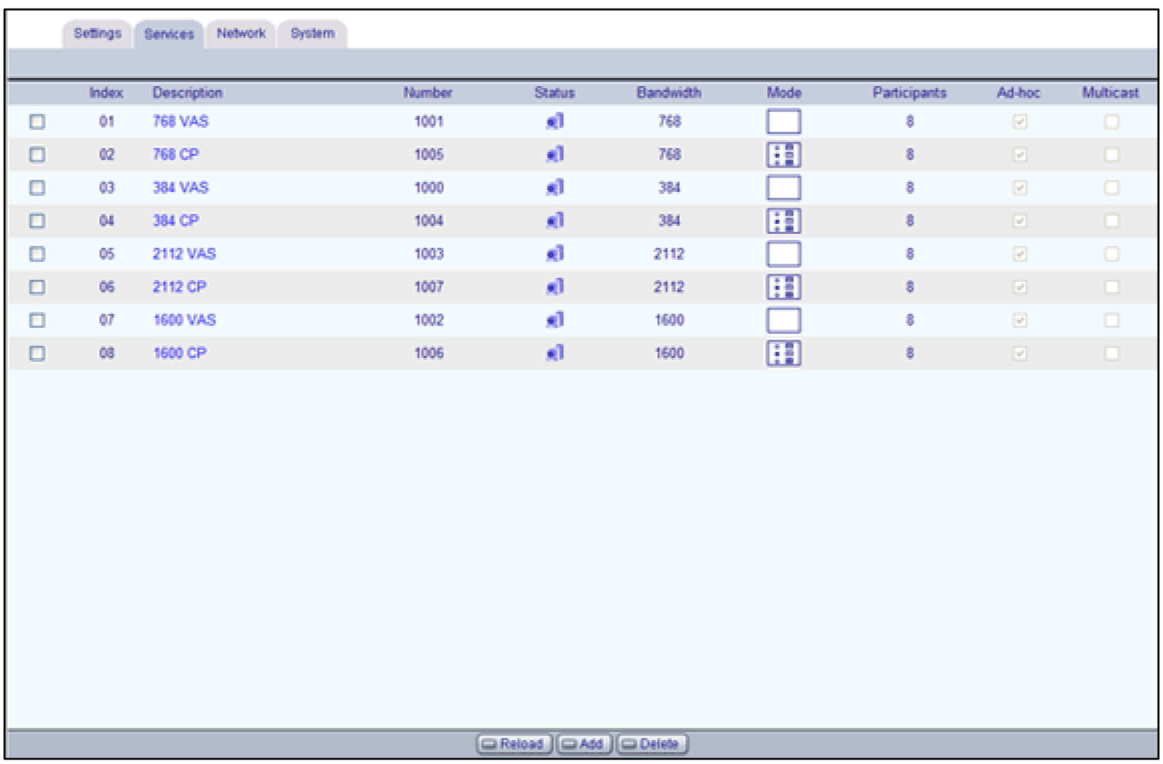

Figure 12: Emblaze-VCON VCBPro - Services List

VCBPro conferences are based on services (see the screenshot above for the list of services that WR used during our testing), which can be created using the VCBPro's web interface or the MXM client / server interface. To create a service, one must define a variety of basic settings including the E.164 number for the service, the maximum number of participants, whether ad-hoc calls are supported, the screen layouts, audio protocols supported, the video format and size supported, the video bandwidth maximums, the encryption methods to use, and the H.239 options.

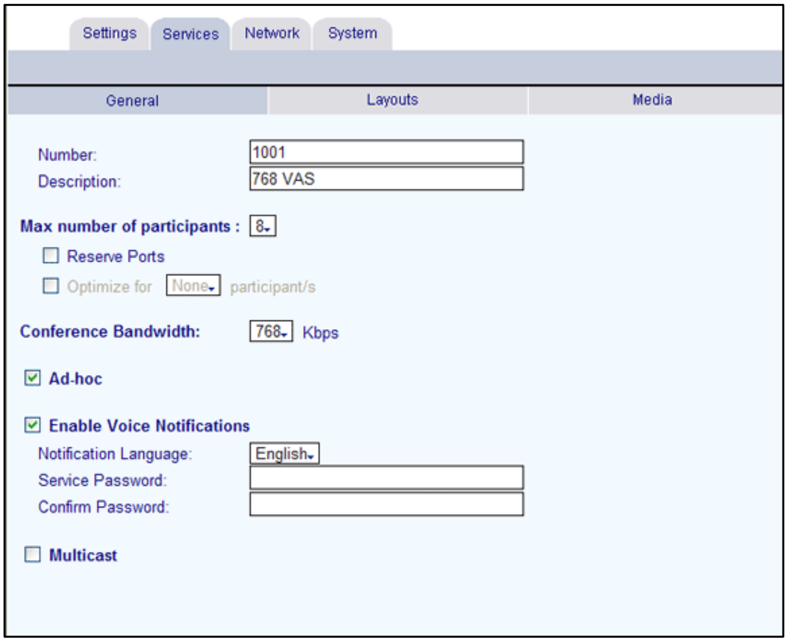

Figure 13: Emblaze-VCON VCBPro - Services - General Settings

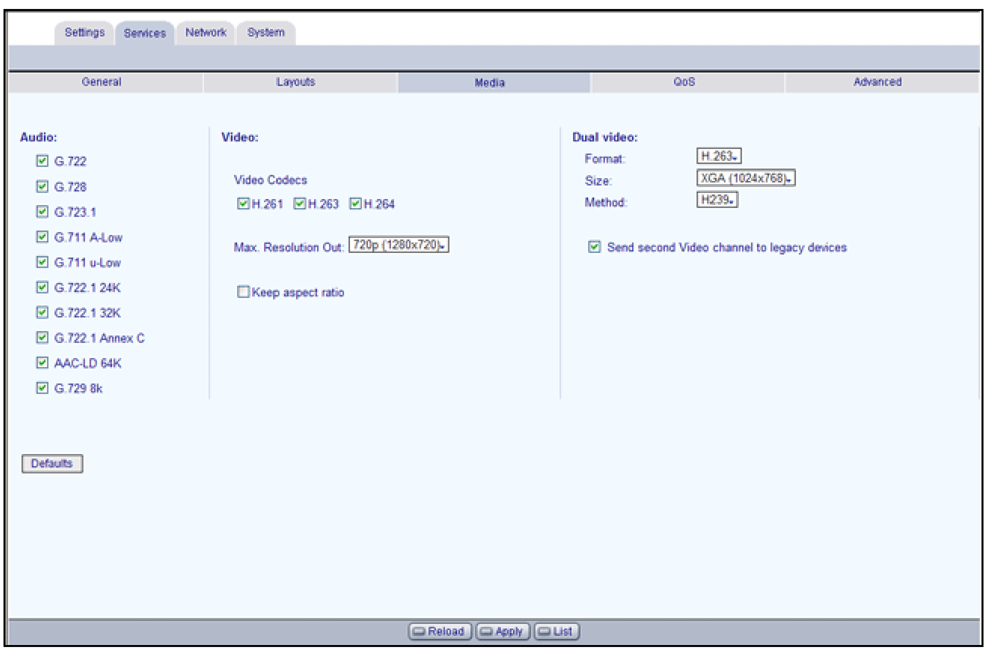

Figure 14: Emblaze-VCON VCBPro - Services - Media Settings

The VCBPro supports a number of video screen layout options including voice activated / full screen (transcoded), quad-screen continuous presence, a combined (auto layout) mode under which the display changes based on the number of participants, and a pre-defined setting under which users see the same layout at all times. Available pre-defined settings include 1+1 (side-by-side view of 2 users / locations), 2+1 (three sites on screen with two above one), 2x2 (a.k.a. quad-screen continuous presence), 1+5 (one large window and five small windows), 4x4 (four rows of four users), etc.

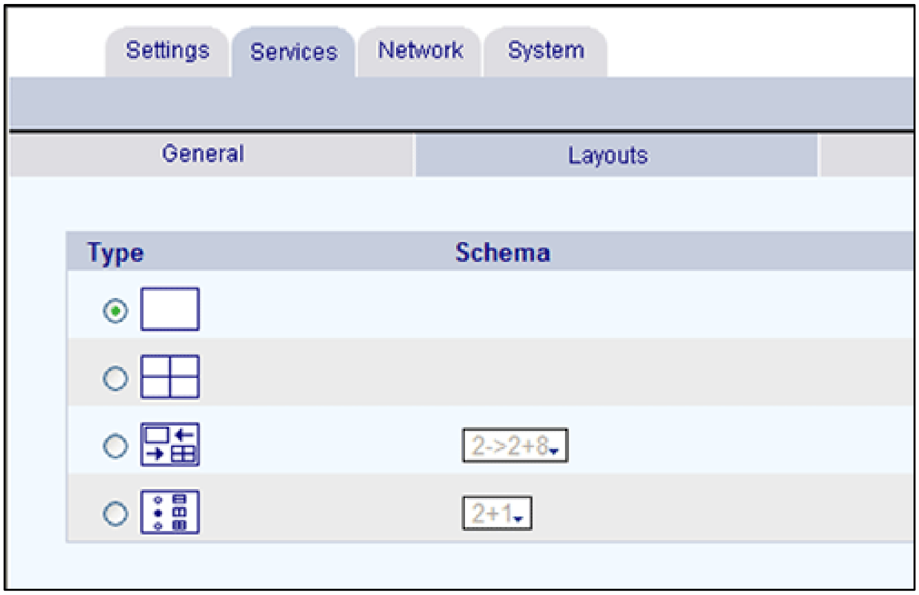

Figure 15: Emblaze-VCON VCBPro - Services - Layout Settings

System Address Book

There is no true address book function in either user interface (web interface or MXM). However, MXM integrates with enterprise directory systems (LDAP, etc.), which allows users to view the directory of video systems from within Conference Moderator.

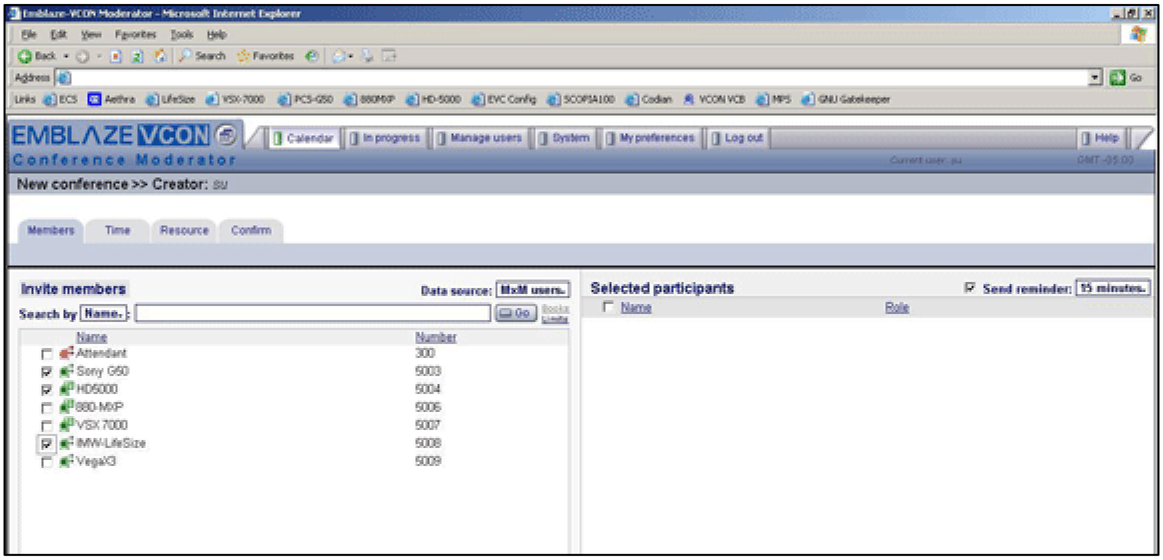

Figure 16: Emblaze-VCON - Conference Moderator - New Conference Creation Page

As shown above, the Conference Moderator user interface provides users with access to a list of endpoints that are currently (or have previously) registered to the MXM gatekeeper.

Call Creation & Launch

The VCBPro supports ad-hoc conferences created on-the-fly by system administrators, scheduled conferences created using Conference Moderator, and a somewhat unique form of ad-hoc conferencing in which a point-to-point call is expanded into a multi-point conference by having one of the participating users invite one or more additional participants. As of this writing, the VCBPro does not include a lobby function, standing meeting rooms, or support for endpoint activated blast dial.

Administrators can create conferences from either Conference Moderator or MXM. Using Conference Moderator, call creation involves the following steps:

1) Clicking the New Conference button
2) Selecting the endpoints to include in the session a) from the list of systems currently registered (or previously registered) with MXM, b) using an external data source like Active Directory, or c) by entering in the IP / E.164 address of an external endpoint
3) Selecting the start date and time (with an option to start now or schedule a recurring session)
4) Selecting a pre-defined conference service (which defines the overall call settings for the conference)
5) Defining encryption settings
6) Selecting “Finish” from the Confirm screen

Initially we were planning to use Conference Moderator to create all of our test calls. However, in Conference Moderator, call settings (call speeds, encryption settings, etc.) across all participating endpoints are defined using one of the pre-defined conference services; a method which greatly simplifies call creation. For this reason, when creating conferences using Conference Moderator, we were unable to define connection speeds on a per-endpoint basis. Hence, when our test calls required the connection of endpoints at specific (different) speeds, we had no option but to launch those test calls using the MXM interface. Nevertheless, readers should note that Conference Moderator should be more than adequate to schedule and manage conferences in the typical enterprise environment.

Although powerful, the MXM administrator interface makes call creation very inconvenient. To create a call, administrators must right click on the service definition required and direct it launch a point-to-point call between the MCU and each participating endpoint. There is no “quick meeting creation” option or multipoint session creation wizard, so creating the multi-speed test calls (which had to be launched via MXM) involved dozens of mouse clicks per call.

Connectivity

The VCBPro receives solid marks for its ability to connect to the various endpoints within our test environment, with the following encoding-related caveats:

1) Outgoing video resolutions from the VCBPro were limited to CIF, 4CIF, and HD720p.
2) Outgoing HD720 resolution signals were limited to 15 – 18 fps, which means that technically this MCU does not support the accepted definition of HD720p (1280x720 pixels at a minimum of 24 fps). According to Emblaze-VCON, with the current version of software, frame rate drops when more than two HD endpoints are connected. The company expects to support 30 fps for any combination of SD and HD endpoints in a future release.
3) In a few cases, the video resolution sent by the VCBPro to a given endpoint at a given speed was less than expected (based on WR's experience testing other video bridges). For example, this MCU should have sent more than CIF resolution to the Tandberg 6000MXP at 768 kbps and above.

Unlike some video bridges, the VCBPro does not offer a setting for prioritizing motion or sharpness. Instead, the bridge automatically selects what it deems to be a suitable balance between those parameters.

1) Endpoints Connected at Different Speeds

This part of the testing involved four test calls (calls 1 through 4 in the call results) with each endpoint using one of four different call speeds (384 kbps, 768 kbps, 1600 kbps, and 2112 kbps).[3] For these calls, a 3 x 3 continuous presence layout was used.

As described above, in order to connect each endpoint at a specific speed (other than the speed set within the conference service), we had two options;

i. a) dial out to the endpoint via the MXM
ii. b) dial into the conference from the endpoint

The VCBPro made a wide range of connections to systems from six different manufacturers with no significant interoperability issues.

As shown in the call results, the connections varied widely and included:

- Several video protocols (H.263 and H.264 for the video channel, H.263 and H.263+ for the content channel)
- Numerous incoming video resolutions (CIF, SIF, w288p, 400p, 4SIF, HD720p, etc.)
- Both 4:3 and 16:9 aspect ratios
- Multiple narrow and wide-band audio protocols (G.722, G.722.1C / Siren14, and AAC-LD)

[3] Unlike most (if not all) of the MCUs WR has used and evaluated in the past, the VCBPro's list of supported / selectable call speeds are not always even multiples of 64 (a throwback to the ISDN 64 kbps per channel days). For example, the list of available call speeds did not include old favorites like 1472 and 1920 kbps. Instead, the list included speeds such as 1088 kbps, 1600 kbps, and 2112 kbps. While true that in the IP world there is no need for video systems or bridges to use only n x 64 kbps call speeds, we found this unusual.

The VCBPro made a wide range of connections to the endpoints within our test lab with no significant interoperability issues. This is a notable improvement over prior Emblaze-VCON video bridges. The only connectivity issue noted during this part of the testing was some minor image clipping / cropping related to conversions between 4:3 and 16:9 aspect ratio (see the test call results for detailed information).

2) Endpoints Connected at Same Speeds

This part of the testing involved four test calls (calls 5 through 8 in the call results), created using the Conference Moderator and the appropriate pre-configured conference service, with each endpoint connected at the same call speed. For these calls, a 3 x 3 continuous presence layout was used. Although the same call speeds were used for these test calls, these conferences were transcoded.

The connection between the VCBPro and each endpoint at a particular speed was the same as in section 1, confirming that the use of speed-matching does not impact connectivity in any way. Although this is what we would expect to see from a bridge that supports audio, video, and call speed transcoding, there are transcoding bridges on the market today for which this is not the case.

3) H.239 Calls

As was the case with prior MCU evaluations conducted by WR, the H.239 testing was conducted as add-ons to other test calls. In this case, call #6 (768 kbps) and call #7 (1600 kbps), were used.

For the majority of the H.239 testing, WR utilized an IBM X40 ThinkPad (providing an XGA / 1024x768 signal with a 4:3 aspect ratio) connected to a Tandberg 6000 MXP video system as the signal source. In addition, WR conducted a few quick tests using the Polycom HDX 9004 as the H.239 signal source.

The H.239 testing proceeded as one might expect with the VCBPro able to negotiate successful H.239 connections in all cases.

4) Encryption

The VCBPro was able to make encrypted connections to all of the test endpoints. In addition, the VCBPro allows the user to set system-wide encryption defaults that can be modified on a per-conference basis. This video bridge also supports a function that WR believes should be (but is still not) available on all MCUs; encrypt if possible, but connect nevertheless.

Participant Experience

From a meeting participant perspective, the VCBPro provided a solid meeting experience at all times. Video images were on par with or better than other MCUs we've tested, and the system's support for wide-band audio provided solid audio performance throughout the testing.

The MCU-generated latency (delay) was measured to be ~ 90 ms[4]; a figure that was better (lower) than expected considering the system's use of standard PC components instead of dedicated DSPs and the fact that all calls are transcoded.

When using a full screen (voice-activated) layout, the system's switching was crisp and clean. When using continuous presence layouts (2x2, 3x3, etc.), the experience was also as expected. However, although the latency generated by the VCBPro was reasonably low, the inability to remove the local site from the screen layout during continuous presence calls (a feature available from most other MCUs) highlighted the call latency and detracted from the CP meeting experience.

Finally, we also noted some minor image clipping during mixed 4:3 and 16:9 calls; a problem also found on other MCUs WR has evaluated.

Overall, thanks to improved connectivity and newly added transcoding capabilities, the call experience provided by the VCBPro was significantly better than that provided by prior Emblaze-VCON video bridges (and basically on-par with other leading MCUs).

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[4] To enable fair, apples-to-apples, comparison of the MCU generated latency of different video bridges, whenever possible WR conducts its latency measurements at 384 kbps and using CIF / SIF video resolution.

Conference Management

The VCBPro provides a standard set of meeting management functions including the ability to extend the time of a conference (for scheduled sessions), update layouts on the fly, mute audio and video (on a per-site or all-site basis), and invite additional participants.

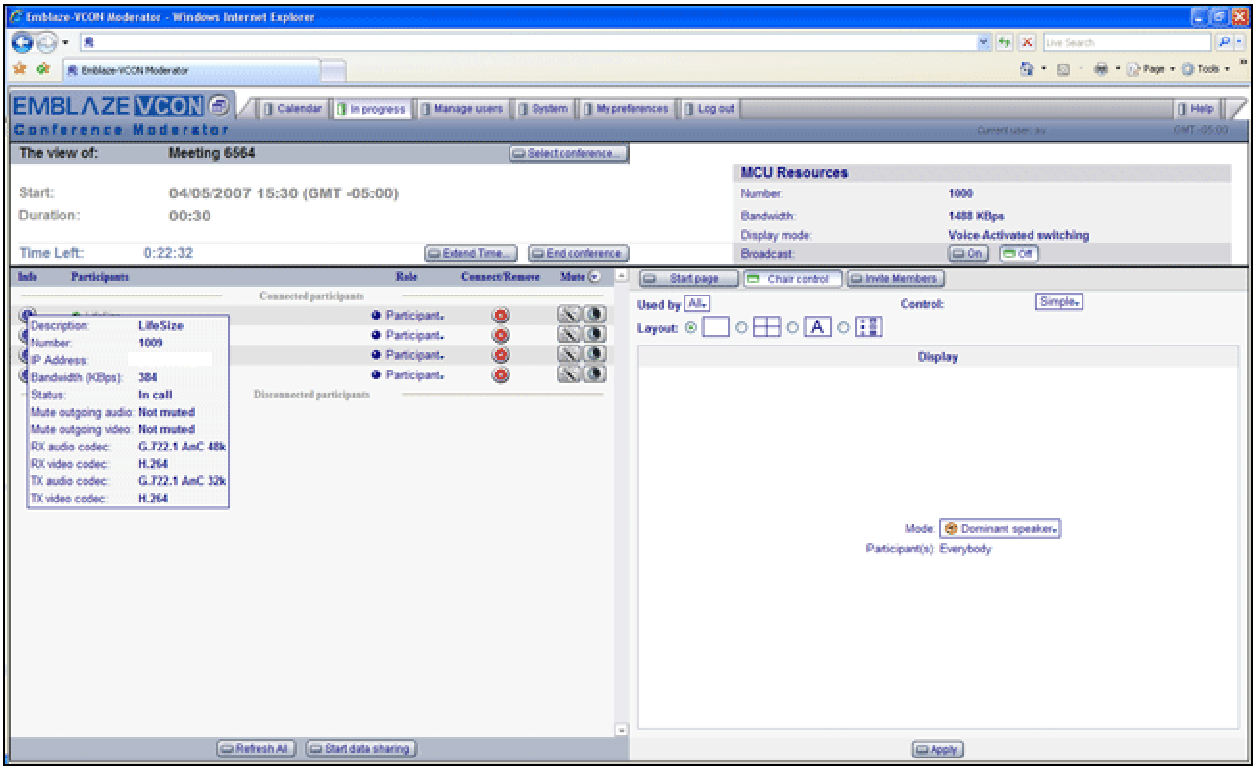

Figure 17: Emblaze-VCON - Conference Moderator Meeting Management Screen

As shown above, Conference Moderator provides limited call statistics including bandwidth used, and audio and video codec used. The same information is available from MXM via the Node Status view. Specifically lacking was information about the video resolution, video frame rate, and H.239 connection status. For detailed connection information, we referenced the call connection statistics on the participating endpoints.

Summary

With the release of the VCBPro, Emblaze-VCON has finally become a worthy competitor – at least in terms of product performance - in the video bridging space.

Prior Emblaze-VCON bridging products suffered from two primary issues; lack of transcoding and lack of support for interim / enhanced resolutions. These issues have been resolved in the VCBPro.

Overall, WR was pleased with the performance of this video bridge. In short, the combination of ease of use, relatively low cost, and solid performance makes the Emblaze-VCBPro well suited to meet the bridging requirements of almost any enterprise.

PROs / Strengths

- Simple, straight-forward web-based user interface with crisp screen refreshes
- Support for up to 4 Mbps per connection
- Flat capacity regardless of video resolution or call speed used
- Strong video and audio (narrow and wide-band) protocol support
- Solid connectivity and interoperability
- Support for 4:3 and 16:9 aspect ratios
- Support for transcoding for all supported resolutions (CIF to HD720p)
- Support for universal encoding (creates an outgoing video signal per endpoint)
- Reasonably low latency (~90 ms) during transcoded conferences
- Includes both system-wide and context-sensitive help screens
- Innovative feature allowing users to expand point-to-point calls into multipoint sessions without have to hang up and call the MCU
- Wide range of software included with the system at no extra charge (MXM Management system, MXM gatekeeper, Conference Moderator, etc.)
- Includes integrated reporting engine with ability to export CDR data

CONs / Weaknesses

- Inability to use the MCU without the MXM gatekeeper
- Lack of support for advanced web features (multi-select, drag and drop, right click, etc.) in the web interface. This makes the web UI functional on various browsers / platforms, but makes controlling the MCU less convenient.
- No integrated ISDN capability (requires external gateway)
- Limited ability to connect to systems unknown to the MXM gatekeeper
- Certain functions accessible only via client / server application (and not via web interface)
- Lack of a true address book function
- Limited call statistics (on a per-endpoint basis)
- Limited HD720p resolution support (outgoing HD resolution signals from the VCBPro were limited to 15 -= 18 fps during our testing)
- Occasional connectivity compromises (using lower video resolution than expected)
- No integration with 3rd party conferencing management systems

About Wainhouse Research

Wainhouse Research (www.wainhouse.com) is an independent market research firm that focuses on critical issues in rich media communications and conferencing. The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as speaker presentations at industry group meetings. Wainhouse Research publishes Conferencing Markets & Strategies, a three-volume study that details the current market trends and major vendor strategies in the multimedia networking infrastructure, endpoints, and services markets, as well as a variety of segment reports, the free newsletter The Wainhouse Research Bulletin, and the PLATINUM (www.wrplatinum.com) content website.

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About Emblaze-VCON

Emblaze-VCON, a subsidiary of ZONE-IP Ltd., is a world leader in the development and deployment of Video over-IP Conferencing Solutions, enabling enterprises of all sizes to optimize their productivity and efficiency through enhanced interaction and communication. The Company designs, develops, manufactures and markets high-performance, feature-rich desktop and group videoconferencing systems designed for a variety of networks, including those based on the Internet Protocol as well as infrastructure servers to manage the video network and services.

More information is available at www.emblaze-vcon.com.

Appendix A – Video Bridge Basics

Video bridges / MCUs come in a various shapes and sizes, and support a variety of features and functions as described below:

Type of System – MCUs are available in either appliance (dedicated hardware) or PC-based architectures. The primary advantage of an appliance solution is that the system's processing power and reliability are not limited by / dependent upon the host PC. The primary advantage of a PC-based solution is cost-effectiveness.

System Architecture – MCUs are available in either fixed or modular (customizable using blades / cards) configurations. In some cases, the same MCU platform can be purchased in either configuration (ex. Tandberg's Codian MCU 4500 is a fixed configuration MCU, while Polycom's MGC and RMX are modular systems). Fixed configurations are typically (but not always) more cost-effective, while modular offerings offer greater flexibility and expansion capability.

Networks and Protocols Supported – Today's videoconferencing traffic runs on either IP or ISDN networks. Some MCUs, most commonly the fixed configuration systems, support only IP network traffic directly and require an external or 3rd party gateway to host ISDN calls. Other MCUs support IP and ISDN networks directly.

MCUs that support IP video calls will most likely support both of the most common IP videoconferencing protocols, H.323 (an ITU recommendation / standard for IP-based videoconferencing) and Session Initiation Protocol / SIP (an IP telephony signaling protocol developed by the IETF commonly used for audio / VoIP calls, but also able to support video). Some MCUs also support connections to 3G (mobile wireless) devices. Finally, MCUs that support ISDN will use the H.320 ITU standard for ISDN videoconferencing.

Connection Rates Supported – In the videoconferencing world, a higher connection rate or call bandwidth typically provides a superior call experience. Today's MCUs support video connection rates ranging from 64 kbps to 4 Mbps or more. Connection rates of 384 kbps, 512 kbps and 768 kbps are most common today, but the introduction of HD-capable video systems has resulted in a great need for higher (1 Mbps+) connection rates.

Capacity – In the MCU world, capacity typically refers to the number of connections to systems / devices the bridge can support simultaneously and is often quoted in terms of ports (1 port = 1 connection). Fixed MCU capacities range from 6 to 64 ports, while modular MCUs can be configured to support hundreds of connections.

Depending upon the MCU, port capacity may depend upon a number of factors:

1) Type of Connection - Some MCUs offer much greater capacity when hosting audio-only (H.323 or SIP) calls.
2) Network Type - Depending upon the MCU, port capacity for IP calls may be different from that provided for ISDN.
3) Connection Rate - For some MCUs, the port capacity depends upon the connection rate utilized. For example, the Radvision Scopia-100-12 MCU supports 12 connections at 768 kbps or 18 connections at 384 kbps.
4) Additional Factors - Depending upon the MCU, there may be other items that impact or limit capacity. For example, some MCUs lose capacity when certain features (H.239, encryption, etc.) or higher resolution video signals (4CIF, HD) are used.

For these reasons, with some MCUs it is easy to determine the exact port capacity, while with others the actual capacity may vary depending upon the active calls at the time.

Audio Quality – The audio quality of a multipoint video call depends upon several factors including the audio standards (G.711, G.722, G.722.1, G.722.1C, Siren14, G.728, MPEG4-AAC, etc.) used and supported by the participating endpoints and the MCU, the MCU's ability to process the audio, the delay (a.k.a. latency) associated with the video call, and the synchronization between the video and the audio (called lip sync). Although audio performance was not specifically evaluated as a part of this initiative, the test call results do indicate the audio protocols used.

Video Quality – The video quality of a multipoint video call depends upon a number of items including:

- the video standards (H.264, H.263, H.261, etc.) and video resolution (CIF, 4CIF, HD / 720p, etc.) used and supported by the participating endpoints and the MCU
- the MCU's support for video transcoding
- the MCU's processing power, which impacts its ability to process the signals and provide full motion (30 frames per second (fps) for NTSC, 25 fps for PAL) images to the participating systems

User Interface – There are two basic types of user interfaces (UIs); web-based and client-server based. Web-based UIs offer the advantage of accessibility (no download is required since a browser is used), while client / server interfaces require the user to install a program on his PC, but typically offer better performance, immediate status updates and additional functionality.

Transcoding – Videoconferencing systems support a variety of networks (IP, ISDN), protocols (H.323, SIP, H.320), connection rates, video (H.264, H.263, H.261, etc.) and audio (G.722, MPEG4-AAC, etc.) protocols, and video resolutions (CIF, 400/448p, 4CIF, HD720p, etc.). In order to support a variety of networks, rates, protocols, and resolution in a single conference, an MCU must be able to convert (or transcode) between the various signals. For example, an MCU that supports video transcoding will allow video systems using different video protocols, H.263 and H.264 for example, to participate in the same conference. Without transcoding, an MCU would force all endpoints to use the same protocols and to connect at the same speeds.

The advantage of transcoding is connection flexibility, and in the ideal world all sessions would support full transcoding. However, transcoding requires additional processing power and can also cause additional call latency (delay). Depending upon the MCU and the operating mode (see below), transcoding support varies from very limited (perhaps connection rate only) to advanced.

Screen Layouts – MCUs typically support three different screen layout modes; full screen, continuous presence, and a combination of the two. In full-screen mode (often called voice activated switching or VAS), the MCU sends a full-screen view of the video image from the currently speaking system to all participating sites. In continuous presence mode (also called CP or quad-screen mode), the MCU combines the incoming video signals together to create a new signal that includes video images from multiple locations. The result is that several (or perhaps all) of the participating sites are on screen (or present) continuously. Finally, hybrid mode involves adding voice activated switching to a single window within a continuous presence layout.

It is worth pointing out that full screen conferences can either be non-transcoded or transcoded, but continuous presence sessions are typically transcoded.

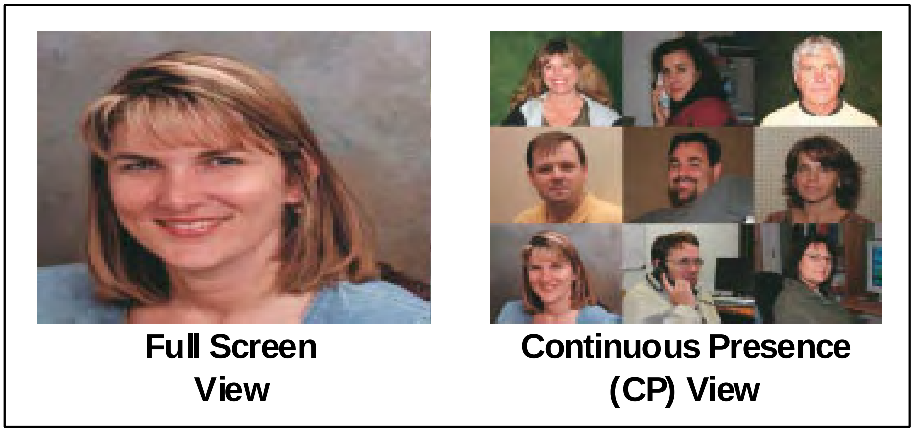

Figure 18: Comparison of Full Screen and Continuous Presence Layouts

Number of Encodes Supported – In order to host a multipoint video call, an MCU must i) receive (or decode) the incoming video signals, and ii) create (or encode) the signal (or signals) to be sent to the participating sites, and iii) transmit the newly created (encoded) signals. The number of encodes an MCU can provide determines the number of different signals that can be sent to the participating endpoints.

For example, a single-encode MCU is able to create only one output signal per conference, and thus ALL participating endpoints will receive the same exact video image (typically at the same speed, using the same protocol) from the bridge. Such a situation forces the participating endpoints to use the same connection speed and/or protocols – regardless of whether or not that represents the best possible connection profile for each system. On the other hand, an MCU that supports universal encoding is able to create an individual signal (encode) that is best suited for each participating system.

Call Profiles / Services - In order to simplify and expedite conference creation, most video bridges utilize pre-configured templates (a.k.a. call profiles, services, meeting rooms, etc.). For example, one might create a template called VAS-768-Open referring to a pre-defined, non-encrypted VAS conference that supports connection speeds up to 768 kbps. Typically the MCUs allow a user to create a conference based on a template and then to modify the settings as required.

Change Settings On The Fly – Some MCUs allow users / administrators to change some or all of the call settings while the call is in progress and without having to disconnect the users. The benefit afforded by this capability ranges from limited (perhaps allowing one to improve call quality by selecting a different protocol) to dramatic (allowing one to save a failed conference by activating a required feature).

Integrated Scheduling Capability – Many MCUs allow users (or admins) to schedule conferences in advance using the MCU's graphical user interface (GUI). Those that do not include integrated scheduling within the UI typically provide scheduling capabilities via a separate scheduling / management application. The ability to schedule conferences in advance is a key part of automating the conferencing environment.

Address Books – To simplify call creation, most MCUs include some form of address book for video systems. In some cases the address book entries must be typed in manually, while in others the list is based on external databases, enterprise directory systems (LDAP / AD), or system gatekeepers.

Encryption Support – The use of encryption during video calls provides a degree of security for the audio, video, and data content. Support for AES (and in some cases DES) encryption is now standard on the leading MCUs. However, interoperability issues related to encryption remain common, and some MCUs are not able to make encrypted connections to certain video systems.

H.239 Support – Over the years the inclusion of a second source of content, in addition to the primary video image, has become commonplace during videoconferences. For example, a video conference might include camera signals and a PC-based PowerPoint presentation. The ITU recommendation / standard for dual-stream conferencing is H.239. Although almost all MCUs available today support H.239, interoperability issues remain.

Latency / Delay – In the videoconferencing world, latency refers to the time delay between when a person speaks and when his voice is heard by participants at the remote site(s). Latency can have a significant negative impact on the call / conference experience, and depending upon the video bridge, the MCU-generated latency can range from limited (less than 100 ms) to significant (200 ms or more).

Error Resiliency - As more video traffic is hosted over "imperfect" networks (like the public Internet), the ability of an MCU to tolerate and compensate for network errors and packet loss becomes increasingly important. In the ideal world, an MCU would mask out all error-related artifacts and protect the call experience. In reality, different MCUs provide different degrees of error protection / resiliency.

Call Connection Methods – There are many different ways to launch / connect a multipoint video call. For example, an administrator could create a call using the MCU UI and then dial out to all participating endpoints. Alternatively, all participating systems could dial in to the MCU using a pre-defined conference ID / E.164 address. Depending upon the MCU, the support for the various call connection methods varies.

Cost Per Port – One way to compare the cost of different MCUs is to calculate the cost per port or connection, which is based on the purchase price and the number of connections supported. If the MCU's port capacity changes based on call speed, video resolution, protocols, use of specific features, etc., the cost per port would also change.

Appendix B – Call Connection Methods

The text below provides descriptions of some of the common conference creation / connection methods supported on leading video bridges.

Method 1: Ad-Hoc via MCU UI
The administrator (or user) creates a conference on the fly using the system's UI and has the MCU dial-out to / accept inbound calls from participating systems.

Method 2: Ad-Hoc via Dial-In to Meeting Room
The participating systems / users dial directly into a pre-configured meeting room using the pre-defined meeting ID (requires gatekeeper).

Method 3: Ad-Hoc via Dial-In to New ID / E.164
The participating systems / users dial directly into the MCU using a non-existent conference ID / E.164 address, and the system creates a new conference automatically.

Method 4: Ad-Hoc via Dial-In to Lobby / Create Conference
The participating systems / users dial directly into the MCU's lobby / waiting room / entry queue and select the "create a new conference" option using IVR / DTMF / far end camera control.

Method 5: Ad-Hoc via Dial-In to Lobby / Conference Select
The participating systems / users dial directly into the MCU's lobby / waiting room / entry queue and select the pre-defined / existing conference using IVR / DTMF / far-end camera control.

Method 6: Ad-Hoc via Endpoint Activated Blast Dial
The participating systems / users dial directly into a pre-configured conference ID (directly or via some form of lobby), at which point the MCU blast dials to a pre-defined list of participants. This is commonly used in disaster recover (DR) situations.

Method 7: Scheduled via MCU UI
The administrator (or user) creates a conference to be launched at a future date / time using the MCU's user interface, and the MCU launches the conference at a defined start time and either dials out to or accepts inbound calls from participating systems.

Appendix C – Test Environment & Testing Notes

Videoconferencing Endpoints

As a part of this testing, the following video endpoints were used.

Manufacturer	Model	Software Version
Aethra	Vega X3	10.02.0014
Emblaze-VCON	xPoint	SW Release: 7500062-1.1.0.14 - Firmware Version 04
LifeSize	Room	LS_RM1_3.5.0(17)
Polycom	HDX-9004	RC - 2.0.2-2461
Polycom	VSX-7000	8.7
Sony	G-50	Host: 2.5 / DSP: 03.56
Tandberg	880MXP	F6.0
Tandberg	6000MXP	F6.1

Figure 19: Endpoints Used Within the Testing Environment

Network Environment

1) To avoid the complexities and costs of ISDN, WR used only IP connections for this evaluation.

2) To avoid potential network issues and transport latency, all call traffic was hosted on our local area network. No wide area network was used.

3) To avoid NAT related complications and to facilitate remote support from the participating vendors, all systems / devices (MCUs, endpoints, gatekeepers, etc.) were assigned publicly accessible IP addresses on the same subnet.

Gatekeepers / Dial-Plans

For this evaluation, WR disabled the Radvision ECS gatekeeper deployed within our test environment, and instead utilized Emblaze-VCON's MXM gatekeeper.

System / Device Settings

Unless otherwise stated, the default settings were used for all devices (MCUs, endpoints, etc.) within the environment.

Test Calls

1) Protocols - Unless otherwise noted, the audio and video protocols selections were set to AUTO on all MCUs and endpoints.

2) Connection Method - Although inbound dialing capabilities were tested, the majority of the test calls / connections were placed outbound from the MCUs to the endpoints.

Testing Notes

Connection Rate Maximums - One of the test endpoints, the Tandberg 880MXP, has a maximum connection rate of 1152 kbps. As a result, some of the call connection rates were automatically decreased to 1152 kbps during the testing.

Appendix D – Test Call Documentation

The pages that follow include the results of the test calls conducted using the Emblaze-VCON VCBPro.

Emblaze-VCON VCBPro

SW Release: 6.0.M01.D13.Y08.VCB2500

Notes: Unless otherwise stated, all endpoints were set to favor motion over sharpness.
The connection rate between the Tandberg 880MXP and the Emblaze-VCON VCB was limited by the Tandberg 880MXP's bandwidth limitation of 1152 kbps.
Since neither the VCBPro nor the Tandberg systems provide call frame rate information, we were unable to record frame rate information for VCBPro to Tandberg connections.
As shown, the frame rate of the VCBPro's outgoing HD resolution signals was limited to 15 - 18 fps.

Endpoints Connected at Different Speeds

Mode: Transcoded
Layout: 3x3
Quality: This bridge has no motion / sharpness settings
Encrypt: Yes
H.239: No

Requested Call Configuration				Call Results		Actual Outgoing Stats (from MCU / to the Endpoint)				Actual Incoming Stats (from Endpoint / to the MCU)			
Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
1	Aethra Vega X3	384	Y	384	Y	H.264	CIF (352x288)	30	AAC-LD 64k	H.264	SIF (352x240)	30	AAC-LD 64k
1	Emblaze-VCON xPoint	768	Y	721	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	4SIF (704x480)	30	AAC-LD 64k
1	LifeSize Room	1600	Y	1600	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
1	Polycom HDX 9004	2112	Y	2112	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
1	Polycom VSX 7000	384	Y	384	Y	H.263	4CIF (704x576)	15	G.722.1 AnC 48k	H.264	SIF (352x240)	30	G.722.1 AnC 48k
1	Sony G-50	768	Y	832	Y	H.264	CIF (352x288)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
1	Tandberg 6000 MXP	1600	Y	1600	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	HD720p (1280x720)		AAC-LD 64k
1	Tandberg 880 MXP	2112	Y	1152	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
2	Aethra Vega X3	768	Y	768	Y	H.264	CIF (352x288)	30	AAC-LD 64k	H.264	SIF (352x240)	30	AAC-LD 64k
2	Emblaze-VCON xPoint	1600	Y	1504	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	VGA (640x480)	25	AAC-LD 64k
2	LifeSize Room	2112	Y	2112	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
2	Polycom HDX 9004	384	Y	384	Y	H.264	4CIF (704x576)	25	G.722.1 AnC 48k	H.264	SIF (352x240)	30	G.722.1 AnC 48k
2	Polycom VSX 7000	768	Y	768	Y	H.264	CIF (352x288)	30	G.722.1 AnC 48k	H.263	SIF (352x240)	30	G.722.1 AnC 48k
2	Sony G-50	1600	Y	1664	Y	H.263	4CIF (704x576)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
2	Tandberg 6000 MXP	2112	Y	2112	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	HD720p (1280x720)		AAC-LD 64k
2	Tandberg 880 MXP	384	Y	384	Y	H.264	4CIF (704x576)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Polycom HDX 9004 and Tandberg 6000 MXP's images were cropped (top and bottom) within the continuous presence window.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
3	Aethra Vega X3	1600	Y	1600	Y	H.263	CIF (352x288)	30	AAC-LD 64k	H.263	CIF (352x288)	30	AAC-LD 64k
3	Emblaze-VCON xPoint	2112	Y	1985	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	VGA (640x480)	25	AAC-LD 64k
3	LifeSize Room	384	Y	384	Y	H.264	4CIF (704x576)	25	G.722.1 AnC 48k	H.264	768x432	30	G.722.1 AnC 32k
3	Polycom HDX 9004	768	Y	768	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	2SIF (704x240)	30	G.722.1 AnC 48k
3	Polycom VSX 7000	1600	Y	1600	Y	H.263	CIF (352x288)	30	G.722.1 AnC 48k	H.263	CIF (352x288)	30	G.722.1 AnC 48k
3	Sony G-50	2112	Y	2112	Y	H.263	4CIF (704x576)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
3	Tandberg 6000 MXP	384	Y	384	Y	H.264	4CIF (704x576)		AAC-LD 64k	H.264	w288p (512x288)		AAC-LD 64k
3	Tandberg 880 MXP	768	Y	768	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
4	Aethra Vega X3	2112	Y	1920	Y	H.263	CIF (352x288)	30	AAC-LD 64k	H.263	CIF (352x288)	30	AAC-LD 64k
4	Emblaze-VCON xPoint	384	Y	360	Y	H.264	4CIF (704x576)	25	AAC-LD 64k	H.264	4SIF (704x480)	30	AAC-LD 64k
4	LifeSize Room	768	Y	768	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	1120x624	25	G.722.1 AnC 48k
4	Polycom HDX 9004	1600	Y	1600	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	4SIF (704x480)	30	G.722.1 AnC 48k
4	Polycom VSX 7000	2112	Y	1920	Y	H.263	CIF (352x288)	30	G.722.1 AnC 48k	H.263	CIF (352x288)	30	G.722.1 AnC 48k
4	Sony G-50	384	Y	448	Y	H.264	CIF (352x288)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
4	Tandberg 6000 MXP	768	Y	768	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	w448p (768x448)		AAC-LD 64k
4	Tandberg 880 MXP	1600	Y	1152	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.

Emblaze-VCON VCBPro

SW Release: 6.0.M01.D13.Y08.VCB2500

Notes: Unless otherwise stated, all endpoints were set to favor motion over sharpness.
The connection rate between the Tandberg 880MXP and the Emblaze-VCON VCB was limited by the Tandberg 880MXP's bandwidth limitation of 1152 kbps.
Since neither the VCBPro nor the Tandberg systems provide call frame rate information, we were unable to record frame rate information for VCBPro to Tandberg connections.
As shown, the frame rate of the VCBPro's outgoing HD resolution signals was limited to 15 - 18 fps.

Endpoints Connected at Same Speed

Mode: Transcoded
Layout: 3x3
Quality This bridge has no motion / sharpness settings
Encrypt: Yes
H.239: No

Requested Call Configuration				Call Results		Actual Outgoing Stats (from MCU / to the Endpoint)				Actual Incoming Stats (from Endpoint / to the MCU)			
Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
5	Aethra Vega X3	384	Y	384	Y	H.264	CIF (352x288)	30	AAC-LD 64k	H.264	SIF (352x240)	30	AAC-LD 64k
5	Emblaze-VCON xPoint	384	Y	360	Y	H.264	4CIF (704x576)	25	AAC-LD 64k	H.264	4SIF (704x480)	30	AAC-LD 64k
5	LifeSize Room	384	Y	384	Y	H.264	4CIF (704x576)	25	G.722.1 AnC 48k	H.264	768x432	30	G.722.1 AnC 32k
5	Polycom HDX 9004	384	Y	384	Y	H.264	4CIF (704x576)	25	G.722.1 AnC 48k	H.264	SIF (352x240)	30	G.722.1 AnC 48k
5	Polycom VSX 7000	384	Y	384	Y	H.263	4CIF (704x576)	15	G.722.1 AnC 48k	H.264	SIF (352x240)	30	G.722.1 AnC 48k
5	Sony G-50	384	Y	448	Y	H.264	CIF (352x288)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
5	Tandberg 6000 MXP	384	Y	384	Y	H.264	4CIF (704x576)		AAC-LD 64k	H.264	w288p (512x288)		AAC-LD 64k
5	Tandberg 880 MXP	384	Y	384	Y	H.264	4CIF (704x576)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Polycom HDX 9004 and Tandberg 6000 MXP's images were cropped (top and bottom) within the continuous presence window.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
6	Aethra Vega X3	768	Y	768	Y	H.264	CIF (352x288)	30	AAC-LD 64k	H.264	SIF (352x240)	30	AAC-LD 64k
6	Emblaze-VCON xPoint	768	Y	721	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	4SIF (704x480)	30	AAC-LD 64k
6	LifeSize Room	768	Y	768	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	1120x624	25	G.722.1 AnC 48k
6	Polycom HDX 9004	768	Y	768	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	2SIF (704x240)	30	G.722.1 AnC 48k
6	Polycom VSX 7000	768	Y	768	Y	H.264	CIF (352x288)	30	G.722.1 AnC 48k	H.263	SIF (352x240)	30	G.722.1 AnC 48k
6	Sony G-50	768	Y	832	Y	H.264	CIF (352x288)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
6	Tandberg 6000 MXP	768	Y	768	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	w448p (768x448)		AAC-LD 64k
6	Tandberg 880 MXP	768	Y	768	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.
As shown above, the Tandberg endpoints received 4CIF from the MCU at 384 kbps (call #5) and CIF at higher calling speeds. This appears to be an interop issue.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
7	Aethra Vega X3	1600	Y	1600	Y	H.263	CIF (352x288)	30	AAC-LD 64k	H.263	CIF (352x288)	30	AAC-LD 64k
7	Emblaze-VCON xPoint	1600	Y	1504	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	VGA (640x480)	25	AAC-LD 64k
7	LifeSize Room	1600	Y	1600	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
7	Polycom HDX 9004	1600	Y	1600	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	4SIF (704x480)	30	G.722.1 AnC 48k
7	Polycom VSX 7000	1600	Y	1600	Y	H.263	CIF (352x288)	30	G.722.1 AnC 48k	H.263	CIF (352x288)	30	G.722.1 AnC 48k
7	Sony G-50	1600	Y	1664	Y	H.263	4CIF (704x576)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
7	Tandberg 6000 MXP	1600	Y	1600	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	HD720p (1280x720)		AAC-LD 64k
7	Tandberg 880 MXP	1600	Y	1152	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.

Call#	EP	BW	Encrypt	BW	Encrypt	V Protocol	Resol	FPS	A Protocol	V Protocol	Resol	FPS	A Protocol
8	Aethra Vega X3	2112	Y	1920	Y	H.263	CIF (352x288)	30	AAC-LD 64k	H.263	CIF (352x288)	30	AAC-LD 64k
8	Emblaze-VCON xPoint	2112	Y	1985	Y	H.264	HD720p (1280x720)	15	AAC-LD 64k	H.264	VGA (640x480)	25	AAC-LD 64k
8	LifeSize Room	2112	Y	2112	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
8	Polycom HDX 9004	2112	Y	2112	Y	H.264	HD720p (1280x720)	15	G.722.1 AnC 48k	H.264	HD720p (1280x720)	30	G.722.1 AnC 48k
8	Polycom VSX 7000	2112	Y	1920	Y	H.263	CIF (352x288)	30	G.722.1 AnC 48k	H.263	CIF (352x288)	30	G.722.1 AnC 48k
8	Sony G-50	2112	Y	2112	Y	H.263	4CIF (704x576)	30	G.722 64k	H.264	CIF (352x288)	30	G.722 64k
8	Tandberg 6000 MXP	2112	Y	2112	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	HD720p (1280x720)		AAC-LD 64k
8	Tandberg 880 MXP	2112	Y	1152	Y	H.264	CIF (352x288)		AAC-LD 64k	H.264	400p (528x400)		AAC-LD 64k

Notes: The Tandberg 6000 MXP's image was cropped (top and bottom) within the continuous presence window.

Emblaze-VCON VCBPro

SW Release: 6.0.M01.D13.Y08.VCB2500

Notes: Unless otherwise stated, all endpoints were set to favor motion over sharpness.
The connection rate between the Tandberg 880MXP and the Emblaze-VCON VCB was limited by the Tandberg 880MXP's bandwidth limitation of 1152 kbps.
Since neither the VCBPro nor the Tandberg systems provide call frame rate information, we were unable to record frame rate information for VCBPro to Tandberg connections.
As shown, the frame rate of the VCBPro's outgoing HD resolution signals was limited to 15 - 18 fps.

H.239 (Dual Stream) Testing

Mode: Transcoded
Layout: 3x3
Quality This bridge has no motion / sharpness settings
Encrypt: Yes
H.239: Yes

Testing H.239 capability by adding H.239 content signal to test call # 6 above.

Call Configuration						H.239 Connection Statistics					
Call#	**EP**					**H.239**	**Success**	**Call Rate**	**D Protocol**	**FPS**	**Resol**
6a	Aethra Vega X3	768	Y	768	Y	Rx	Y	260-300	H.263+	5	XGA (1024x768)
6a	Emblaze-VCON xPoint	768	Y	721	Y	Rx	Y	260-300	H.263	5	XGA (1024x768)
6a	LifeSize Room	768	Y	768	Y	Rx	Y	260-300	H.263+		XGA (1024x768)
6a	Polycom HDX 9004	768	Y	768	Y	Rx	Y	260-300	H.263	7	XGA (1024x768)
6a	Polycom VSX 7000	768	Y	768	Y	Rx	Y	260-300	H.263	7	XGA (1024x768)
6a	Sony G-50	768	Y	832	Y	Rx	Y	260-300	H.263		XGA (1024x768)
6a	Tandberg 6000 MXP	768	Y	768	Y	**Tx**	Y	260-300	H.263		XGA (1024x768)
6a	Tandberg 880 MXP	768	Y	768	Y	Rx	Y	260-300	H.263		XGA (1024x768)

Notes:

Testing H.239 capability by adding H.239 content signal to test call # 6 above.

Call Configuration						H.239 Connection Statistics					
Call#	**EP**					**H.239**	**Success**	**Call Rate**	**D Protocol**	**FPS**	**Resol**
6b	Aethra Vega X3	768	Y	768	Y	Rx	Y	200-256	H.263+	7	XGA (1024x768)
6b	Emblaze-VCON xPoint	768	Y	721	Y	Rx	Y	200-256	H.263	5	XGA (1024x768)
6b	LifeSize Room	768	Y	768	Y	Rx	Y	200-256	H.263+		XGA (1024x768)
6b	Polycom HDX 9004	768	Y	768	Y	**Tx**	Y	200-256	H.263	7	XGA (1024x768)
6b	Polycom VSX 7000	768	Y	768	Y	Rx	Y	200-256	H.263	7	XGA (1024x768)
6b	Sony G-50	768	Y	832	Y	Rx	Y	200-256	H.263		XGA (1024x768)
6b	Tandberg 6000 MXP	768	Y	768	Y	Rx	Y	200-256	H.263		XGA (1024x768)
6b	Tandberg 880 MXP	768	Y	768	Y	Rx	Y	200-256	H.263		XGA (1024x768)

Notes:

Testing H.239 capability by adding H.239 content signal to test call # 7 above.

Call Configuration						H.239 Connection Statistics					
Call#	**EP**					**H.239**	**Success**	**Call Rate**	**D Protocol**	**FPS**	**Resol**
7a	Aethra Vega X3	1600	Y	1600	Y	Rx	Y	350-450	H.263+	7	XGA (1024x768)
7a	Emblaze-VCON xPoint	1600	Y	1504	Y	Rx	Y	350-450	H.263	5	XGA (1024x768)
7a	LifeSize Room	1600	Y	1600	Y	Rx	Y	350-450	H.263+		XGA (1024x768)
7a	Polycom HDX 9004	1600	Y	1600	Y	Rx	Y	350-450	H.263	7	XGA (1024x768)
7a	Polycom VSX 7000	1600	Y	1600	Y	Rx	Y	350-450	H.263	7	XGA (1024x768)
7a	Sony G-50	1600	Y	1664	Y	Rx	Y	350-450	H.263		XGA (1024x768)
7a	Tandberg 6000 MXP	1600	Y	1600	Y	**Tx**	Y	350-450	H.263		XGA (1024x768)
7a	Tandberg 880 MXP	1600	Y	1152	Y	Rx	Y	350-450	H.263		XGA (1024x768)

Notes: