White Paper

Media Xchange Manager™

A Management Server for Rich Media Conferencing Services

A Service Provider's Perspective

VCON

Table of Contents

Gordon Daugherty
Chief Marketing Officer
July 2004

Introducing Rich Media

The term “rich media” is used in a variety of ways. In the design of websites it is used to denote dynamic motion of elements on a web page. In the advertising arena it is used to describe the use of animated graphics and multimedia. For the purposes of this white paper, the term rich media shall take on the definition adopted by Christine Perey, President of Perey Research and Consulting. Perey defines rich media as "the experience produced by a suite of converging digital audio and visual technologies including videoconferencing, streaming media, static imagery and text. In addition to the flexible composition of rich media, its other virtue is derived from the convenience it offers multimedia-enabled participants due to the independence of physical proximity and temporal constraints. In other words, provided the necessary network components are there to support it, the rich media experience can be easily stored, searched, navigated and reproduced." This definition follows most closely to the evolution and convergence of the conferencing (audio, video, text, data) and streaming video industries.

With VCON's legacy growing from the videoconferencing industry, its center of origin for rich media is based on applications that employ visual communications. Videoconferencing is not a new high-tech business tool. In fact, it has been used since the early 1980s by a growing number of companies in a variety of industries. However, it has yet to reach the mass deployment stage. Part of the reason for this can be attributed to product price points and complex functionality. But the real barrier to wide-scale deployment of videoconferencing has been network topology. Until recently, videoconferencing has been delivered almost exclusively over ISDN networks. Not only has this made device management difficult, it also goes against the current convergence trend that calls for aggregating voice, video, and data applications onto one common IP network infrastructure.

While this paper will use the familiar terms "videoconferencing" and "video over IP" in places, probably "visual communications" and "rich media conferencing" are better descriptors of the overall environment supported by the MXM. They imply more than simple two-way interactive video. They include streaming video, video telephony, collaboration, text messaging and advanced video-enabled applications. They also include video-enabled communications whereby the visual component is embedded as an intuitive value-add to some other form of communication. Examples include voice communications or instant messaging implemented in such a way that adding video is as simple as the push of a button.

Until the late 1990s, the technology to effectively and efficiently migrate video-based applications to the IP network did not exist. Before video could converge with voice and data on one IP network, critical supporting functionality had to be developed including:

Centralized management and administration
Allow remote network control of a significant number of video endpoints and resources.

QoS and policy services
Centrally control the who, what and how questions for both users and services.

Common "telephony" features
Making videoconferencing as easy to use and as functional as the telephone.

Applications
Convert the underlying feature set into real added value and integrated applications.

Multi-vendor platform management
Extend as much of the above functionality as possible to a multi-vendor environment.

In order to deliver a fully integrated, network-centric solution, VCON developed a client/server architecture for IP conferencing applications. At the center of this solution is the VCON Media Xchange Manager (MXM). Introduced in early 2001, the MXM is a suite of integrated client/server applications and services that gives IP-based carriers and service providers the opportunity to truly maximize the revenue-enhancing potential of real-time, interactive rich media conferencing across their growing client base. Using the MXM, service providers will be able to centrally manage, administer, and monitor the deployment all the way from the infrastructure

devices installed at the network operation center (NOC) to the endpoint devices and applications installed at the client's location. And end users will have access to functionality and ease-of-use never before available. This new world of IP-based rich media will deliver the ease-of-use and advanced management capabilities that will finally allow for mass deployment by carriers and service providers.

As has been proven in the past decade, the distance-bridging communication power of visual communications helps institutions gain several important benefits - including improved employee productivity, accelerated business processes, and reduced costs of interacting in real-time. As visual communications evolves into rich media communications, there is an opportunity to multiply these advantages. According to Perey, "The real value that rich media provides is the ability to greatly expand and improve communications, while significantly reducing both the transmission costs and the cost of doing business overall. The lower cost and expanded access of real-time, interactive communications over IP will create immense opportunities for those companies that exploit it." Service providers of all types are well positioned to take advantage of this opportunity.

This paper will describe the MXM's robust capabilities and explain how service providers can exploit it to multiply the revenue-enhancing value of a rich media conferencing service network.

The Market Opportunity for Managed Rich Media Conferencing Services

As consumers, home office workers, small businesses, corporations and government institutions look to reap the rewards of rich media conferencing applications, many of them will investigate the possibility of outsourcing the applications as a managed service. They will do this because they lack the necessary skills in-house, they want to reduce or eliminate the capital infrastructure costs associated with deploying the application, or because they need to complete the deployment rapidly. Usually any of these reasons lead to a bigger objective of reducing risk. And since the conferencing applications they are looking to utilize are virtually all IP-based, these customers will commonly look to providers of IP bandwidth (carriers, network service providers and ISPs) or application service providers (ASPs) for the outsourced solution. If these customers have existing relationships with IP-based carriers or xSPs, they will likely pursue them first. If not, they will go on a search.

From the perspective of the carrier or service provider, there is a different motivation to pursue rich media conferencing services. Typically, a service provider has one of three high-level strategies for growing revenue. One is to offer additional value add services to the existing client base while another is to recruit new clients with the existing suite of services. Of course, the third possibility is to pursue both of these strategies together.

For providers of IP bandwidth, the name of the game is filling up the network capacity with as many revenue-generating applications as possible. And the more demanding the application is from a bandwidth or complexity perspective, typically the more can be charged for it. For this reason, conferencing applications like videoconferencing, streaming video and web-based data conferencing are ideal. They have fairly strict network demands that the service provider can fairly easily provide via bandwidth availability and management tools, and they have high-perceived value in the eyes of the client - especially if they are integrated to create a rich media conferencing experience as described previously. Often times, providers of pure IP bandwidth are not interested in delivering real applications. Rather, they want to optimize revenue from basic access and utilization of the network infrastructure they have built, while still capitalizing on some opportunity to deliver managed services. From the table below, the most logical revenue-enhancing services for such bandwidth and access providers are broadband/WAN access, remote administration of premise-based conferencing devices, VPN services and QoS services.

For ASPs or bandwidth providers that do want to deliver managed applications, the name of the game is outsourcing the management of applications of all sorts. The cost justification for the client is based on reduced costs and reduced risks. Often times, an ASP will offer a complementary suite of applications. A client that enters into a service for one application is a prime target for others in the future. For example, a client may start with a managed videoconferencing application service and then later add multipoint conferencing and streaming video

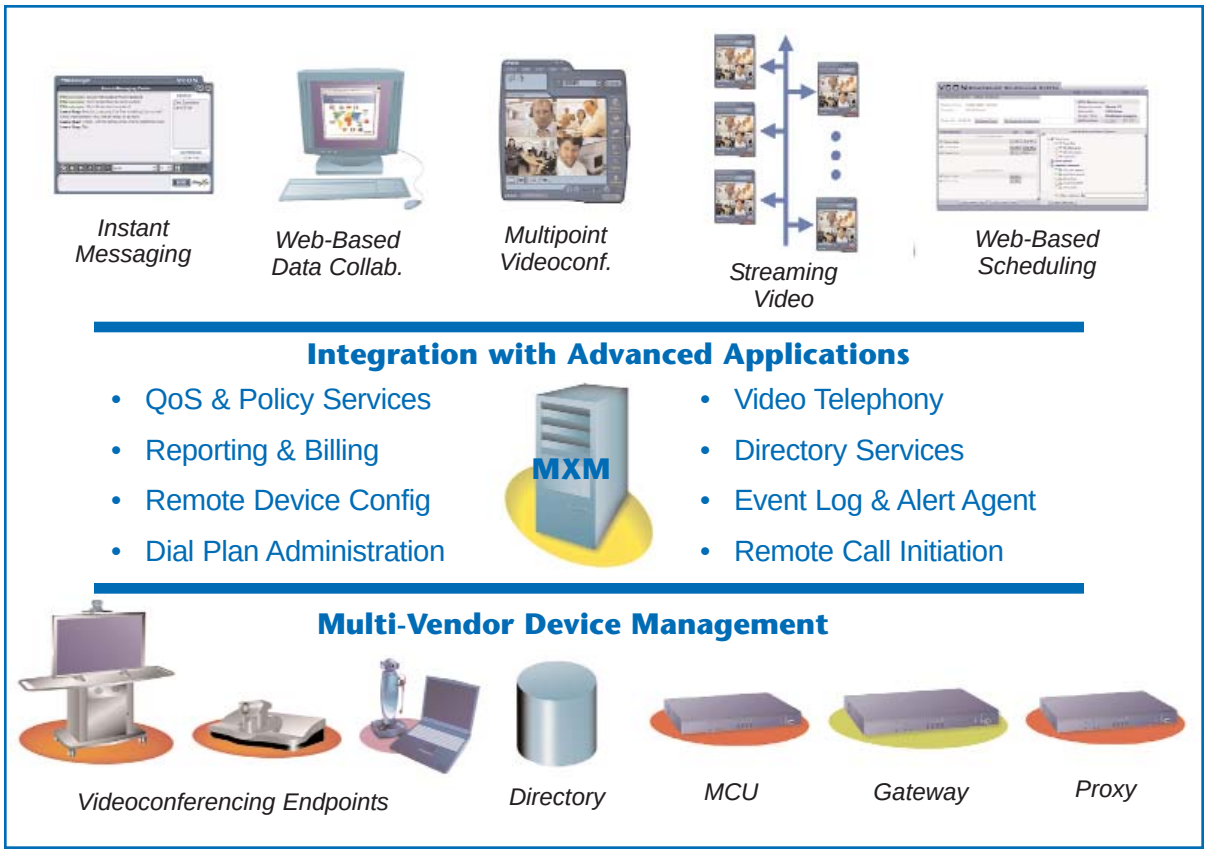
services. Rich media conferencing applications can be complementary to virtually any other application. See the table below for some examples, many of which offer usage-based revenue enhancement. Another pricing approach for service providers is to bundle certain services and capabilities into a single monthly rate, similar to the cell phone pricing model.

In summary, carriers and service providers are in an ideal position to deploy managed rich media conferencing services for either revenue enhancement and/or competitive advantage with little to no incremental infrastructure investment. Additionally, it is well known that the defection rate of customers that subscribe to two or more services is significantly lower than those subscribing to a single service from whichever service provider offers the best price at the time.

Diverse Suite of Revenue-Enhancing Services		
	Monthly Billing	**Usage-Based Billing**
Network Access, Management & QoS Services	✔	
Remote Device Administration	✔	
Instant Messaging	✔	
Conference Bridging Service		✔
ISDN Gateway Service		✔
Live Streaming of Conferences		✔
Conference Storage		✔
Video-on-Demand Streaming of Stored Conferences		✔
Web-Based Data Conferencing		✔
Web-Based Scheduling		✔
Video-Enabled Call Center Services	custom pricing	

An Integrated Server for Rich Media

The architecture of the MXM makes it effectively multiple products in one. There are products in the market that just address the management aspect of IP-based conferencing. And there are other products that offer one or more rich media applications. But the MXM integrates many aspects of a rich media conferencing deployment into a single server-based architecture. The diagram below graphically depicts the relationship the MXM has with the various endpoint and infrastructure devices versus the integration it has with advanced conferencing applications.



Interfaces

The MXM supports multiple interfaces to the physical devices that need access to rich media services. These devices include standards-based H.323 or SIP endpoints as well as network infrastructure products like multipoint control units (MCU), gateways, directories and proxies. Since these interfaces are built using industry standards, the MXM is able to offer virtually all of its services to a mixture of VCON and non-VCON devices. Additionally, the MXM allows for a mixture of H.323 and SIP devices to be deployed across the same rich media conferencing network. This level of flexibility is unprecedented in the industry. Finally, there are multiple application programming interfaces (API) that allow the MXM to be integrated with external provisioning, billing, management and control systems.

Management and Administration

A primary concern for most carriers and service providers is the deployment and management of new applications, while ensuring the robust performance of the entire network infrastructure. The result of wide-scale implementation of rich media conferencing by a service provider typically involves the deployment of thousands, or even tens of thousands, across the service provider network. A logical question from the service provider's network administration staff is: How will all of these geographically distributed endpoints be efficiently installed, configured, managed, maintained, upgraded, and monitored?

A second mission of the service provider is ensuring that every user has a high-quality experience. The network requirements for various applications running on the network can differ greatly. For example, it does not matter if an email message is delivered in four seconds or 24 seconds, but it makes a dramatic difference if an audio packet is delivered in 200 milliseconds versus even two seconds. A network that behaves the same for email as it does for interactive rich media conferencing applications will not achieve the necessary results for a high-quality experience.

There are several questions the service provider must ask, and answer, before offering a suite of managed rich media conferencing applications:

- Will all clients require, or be offered, the same service level (i.e. - bandwidth, jitter and latency for videoconferences)?
- What metrics should be used to define the service level(s) offered?
- How much bandwidth will be consumed across various segments of the network at any given time for conferencing applications? How can this be managed?
- Which conferencing resources (MCUs, gateways, directories, etc) should be accessible by which clients?
- What dial plan standard should be established and how should users initiate a conference (direc tories, dial plan numbers, alias names, personal buddy lists, etc)?
- What deployment and connectivity inhibitors might commonly be faced at the client locations (ie - firewalls and NAT servers)?
- How should clients be charged/billed for the rich media conferencing services they utilize?

The MXM has a full suite of tools for centrally managing and administering the rich media conferencing network. Many of these tools allow for policy-based decisions by the administrator, which naturally follows the thought process outlined by the questions above. These tools can be used for fine-tuning the policy management decisions and for making necessary adjustments to the physical network topology itself. For example, the bandwidth limits set for a given network zone may later be determined to cause 20% of user-based conference requests to be rejected during peak hours. Understanding this, the administrator can either choose to raise the zone bandwidth limit, reduce the bandwidth allowed for each conference (thereby allowing more of them), or upgrade the physical network bandwidth in the zone.

For physical device administration, the MXM administrator has complete access to the configuration settings for every VCON endpoint and resource on the network, right down to the users' preferences. With this access, they can pre-configure the endpoints' settings or change them according to policy changes - even when users' endpoints are not actively logged on. For example, if the network policy committee decides on a change that affects the QoS prioritization of interactive video applications, the MXM administrator could globally apply this change at any time. For many non-VCON devices, the MXM also has an integrated link to the device's embedded web management utility. Right from the MXM console, these non-VCON devices can also be easily administered.

Software upgrades often require a visit to the physical device that needs to be upgraded. The MXM allows for VCON's vPoint HD desktop clients, HD3000 settop appliances, or HD5000 group conferencing systems to be remotely upgraded or re-installed with a new software image. Just imagine the productivity savings and user satisfaction resulting from this in a network with hundreds or thousands of endpoints dispersed across several locations.

The MXM also offers the administrator a real-time monitoring tool as well as a comprehensive reporting and billing tool. The tool has a comprehensive list of standard reports that an administrator can use to determine call usage, peak usage, total bandwidth consumption, what audio/video protocols are being used, average call length and more. These reports allow the administrator to do real network planning, in addition to being able to bill-back departments and/or individuals for video usage. Additionally, the administrator can create his/her own custom reports.

For a more detailed explanation of select MXM management and administration tools, see the Sample Scenarios appendix at the end of this white paper.

Video Telephony

Today the user paradigm for communication has been established by the telephone. Any communication medium that does not deliver the same ease-of-use and operational functionality will not be as readily adapted into the day-to-day business infrastructure - especially at the desktop. As a result, the widespread use of desktop videoconferencing has been slowed partly by its lack of telephony functionality. The MXM removes this inhibitor by providing end users with an extensive set of call establishment and redirection features, which are commonly found in traditional telephony PBXs. These video telephony services greatly enhance productivity and ease-of-use, and further bring visual communications into a revolutionary new world of usability.

The MXM can serve as a "video PBX," providing end users with common telephony features like video call forward, video call transfer, and ad hoc conferencing. Users can automatically forward incoming calls to another video user, their phone handset, or even their mobile phone. The ad hoc conferencing feature works just like the "conference" button on your telephone. During a point-to-point call, a third or more participants can be invited into the conference with the push of a button. And since multipoint conferencing is likely to be a usage-based billable service offering, it is in the service provider's best interested to make it as easy to use as possible for the client. MXM's ad hoc conferencing capability is ideal.

To make video calls between IP and ISDN networks requires dialing through a video gateway. Dialing through a gateway often requires users to know strings of prefixes and suffixes composed of numbers and symbols. This step increases the complexity of making off-net video calls. The MXM takes the complexity out of dialing through a video gateway via its simplified gateway dialing features. Instead of requiring end users to memorize unique prefixes and suffixes for various types of calls, they simply dial a single number (9, for example) to designate an off-net call. The MXM handles the rest. The service provider can also configure gateway service hunting groups and gateway service policies to allow service hunting, line hunting and up-speeding/down-speeding rules - all to increase the odds of successful off-net call completion. The least cost routing feature of the MXM will automatically route the call across the IP network to the nearest ISDN gateway, minimizing toll charges for the service provider. And since ISDN gateway usage is likely to be a usage-based billable service offering, it is in the service provider's best interested to make it as easy to use as possible for the client. MXM's simplified gateway dialing is ideal.

Once a given client deploys even a dozen or more videoconferencing endpoints, the function provided by an online directory takes on a critical role in delivering efficient communications between users. Without access to a centralized directory, each end user would have to create and maintain their own personal directory. In a large client deployment this could mean entering dozens or hundreds of entries in individualized address books. To simplify and streamline address book access, the MXM includes an LDAP proxy that automatically maintains a directory on behalf of all registered endpoints and resources (MCUs, gateways, etc). When users are ready to initiate a conference, they simply access the online directory with a mouse click. The MXM does the rest. Managing and maintaining a unique video directory for a client is another opportunity for a billable service.

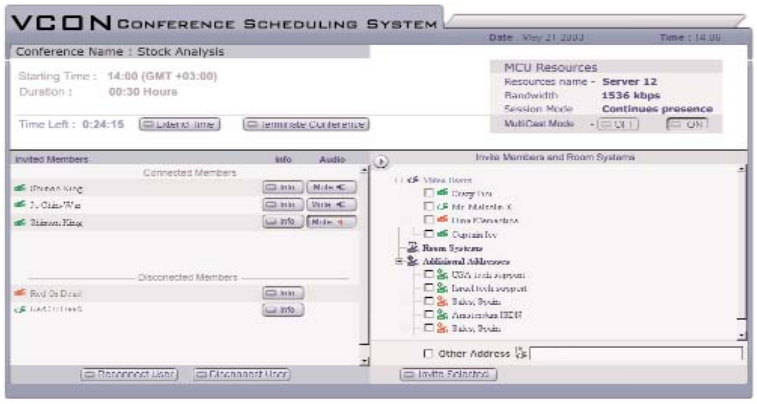
For a more detailed explanation of select MXM video telephony features, see the Sample Scenarios appendix at the end of this white paper.

Applications

The "icing on the cake" from a user benefit perspective lies in the rich media applications managed by the MXM. After all, end users don't care about technology. They care about the benefits derived from real applications. The ever-expanding suite of rich media conferencing applications integrated with the MXM is designed to integrate in such a way that the user cannot tell where one application ends and another one begins. A second key objective of MXM's integration with VCON's rich media conferencing applications is to integrate visual communications into other applications as an added value feature. With this, users can start with one form of communication and seamlessly switch to another if it adds value. Examples are below.

Multipoint Conferencing and Streaming Video: The VCON Conference Bridge (VCB) is VCON's application solution for multipoint videoconferencing and streaming video. With the VCB, multipoint conferences involving fully interactive participants can be simultaneously streamed to hundreds or thousands of other users that are passively participating in the conference. This integration of interactive and streaming video offers significant advantages of scalability and bandwidth efficiency. VCON even offers a no-charge Broadcast Viewer for the passive participants. Combined with an instant messaging solution, these passive participants could even engage in interactive text messaging with the other participants and could view the data being shared as part of a web-based data conference.

Web-Based Scheduling: The VCON Conference Moderator is VCON's application solution for web-based scheduling, multipoint conference moderation and data conferencing. Using a web-browser, end users can schedule point-to-point or multipoint conferences, including recurring events. During a conference, with the click of a button, users can share data with all other participants. Via integration with the MXM, conference resource conflicts and participant conflicts can be avoided. Additionally, at the appointed time the MXM initiates the conference, and is able to automatically retry users that are busy or unavailable.



VCON Conference Moderator

Data Conferencing: There are two VCON applications that integrate data conferencing with other rich media applications. With IPNexus, users can seamlessly add data conferencing to any instant message session. With the VCON Conference Moderator, users can seamlessly add data conferencing to a multipoint or point-to-point videoconferencing session. Data sharing can be launched straight from the Conference Moderator using VCON's WebShare application, or for users who prefer a hosted model, through WebEx. When data conferencing, using either IPNexus or the Conference Moderator, users can share their desktop or a specific document with the other conference participants.

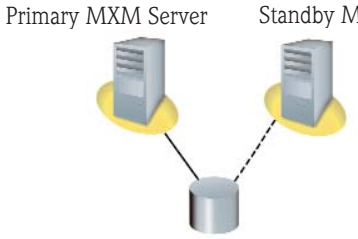
Instant Messaging: IPNexus is VCON's application solution for instant messaging. With IPNexus, users can engage in secure instant messaging sessions and then add rich media as appropriate. One option is to seamlessly integrate data conferencing into the session (for example, screen sharing or file transfer). Another option is to click a button to automatically initiate a videoconference with the other participants of the chat session. This seamless migration from one form of communication to another is so intuitive that all the users need to think about is whether rich media adds value at some point in the session.

High Availability

A client that decides to outsource applications and services to a service provider will expect, if not demand, overall robustness and high availability. They expect that the service provider has in place the necessary controls, procedures and technology to deliver on this. For this reason, service providers are highly experienced in designing high availability into their services from the ground up.

It probably goes without saying that any mission-critical application server should first take advantage of hardware-based redundancy and high availability features such as RAID-based storage and uninterruptible power. Beyond this, the MXM has several features for rapid recovery and minimal downtime. First is integration with the embedded services watchdog in Windows Server. Should one of the MXM's underlying services stop for any reason, it will automatically be restarted. Second is support for a clustered server configuration. With this, the processing logic in the server is separated from the application and user data. In the event that the primary MXM server fails, the standby server can quickly take over. See the diagram below for an illustration of a clustered server configuration.

The high availability feature set of the MXM is an area in which VCON plans to deliver regular enhancements and new offerings.



MXM Clustered Server Configuration

Investment Protection

Deploying high technology of any sort carries built-in risks of investment protection. With more mature or commoditized technology, like personal computers, the expected life cycle and replacement cycle is usually identified up front. However, with more innovative technologies the expected life cycle and migration path can be completely unknown. For this reason, VCON has placed a high priority on the flexibility and investment protection that can be offered via the MXM.

As new standards emerge and existing standards evolve, companies are often put into the very difficult position of predicting the future. However, this is like trying to shoot at a moving target. Sometimes one standard eclipses the other. Sometimes two or more standards converge into a more encompassing standard. Again, it is very difficult to predict the path and speed the market will take. This certainly applies to the overlapping and somewhat competing SIP and H.323 protocols.

VCON clearly recognizes this need and is responding with an architecture that provides SIP/H.323 protocol co-existence. A suite of MXM-based rich media services can be safely deployed today based on H.323 and migrated if appropriate to SIP. Or for service providers that have already identified SIP-based devices and applications, the MXM can bring a rich set of management and administration features that don't commonly exist in the market. In either case, an unprecedented degree of investment protection and flexibility can be achieved, including a full mixture of H.323 and SIP devices on the same managed network. For more information on MXM's SIP support, see the VCON white paper titled "Delivering SIP-H.323 Convergence & Co-Existence".

Ease of upgradability is another key aspect of investment protection. The question typically asked by service providers is: How can I start with a pilot rollout and then expand as the demand for rich media services grows? VCON clearly understands this need. Within a given server image (zone), upgrading for more users or enabling

various MXM optional modules is as easy as importing a new license key. In most cases, the MXM server does not even need to be rebooted in order to be upgraded. For a further description of MXM's scalability, see the next section.

The final aspect of MXM's investment protection promise relates to its multi-vendor support. One reality of today's rapid advancements in technology is that customers are increasingly making "best of breed" purchase decisions in various product categories. For this reason, many service providers don't want to be locked into a single vendor for all aspects of their rich media service deployment. It's one thing to make a single-vendor or majority-vendor deployment decision based on added value. But it's another thing to do so based on proprietary features or "vendor lock". While VCON is able to offer specific value add enhancements when multiple VCON components are included in the deployment, probably 80% or more of the MXM feature set is extended to any H.323 or SIP-based device.

Scalability and Network Topology Options

True scalability means being able to start small if necessary and not worry about the ability to grow as the needs of the business evolve. With the MXM, a rich media conferencing network can start as small as 10 users in a single zone and grow to as many as 750,000 users across 150 distributed zones. Each zone can handle up to 5000 users and 500 concurrent calls. That's scalability.

From a network topology standpoint, the MXM can be centralized with all devices registering to it from wherever they reside on the network. This architecture is ideal when many of the clients are small businesses with no IT support staff or home office workers with VPN broadband connections. The MXM also supports a distributed environment, whereby multiple MXM servers are distributed throughout the client base and "neighbored" together in partially-meshed, fully-meshed or hierarchical fashion. In this case, each customer becomes a "zone" on the network. Certain MXM services like ad hoc conferencing and directory services can be locally configured at each zone while other services like off-net calling via ISDN gateways can be centralized. Additionally, overflow resources can be defined so that if local zone services are exhausted the requests can automatically be redirected to resources in the NOC. For an example of a managed rich media conferencing network based on the MXM, see the diagram in Appendix B.

Firewall Traversal and Encrypted Communications

Firewalls and NAT servers create numerous connectivity challenges for IP-based conferencing applications. And most clients are going to have these network devices installed at the edge of their network. Additionally, there are often requirements to have fully encrypted communications across a public or private network. To address these needs, VCON has the SecureConnect family of products. SecureConnect includes various components for secure firewall traversal and encrypted communications. The ALG Proxy overcomes the connectivity problems associated with firewalls and NAT servers without threatening network security. One key benefit of the ALG Proxy architecture is that external devices never connect directly to the private network and internal devices never connect directly to the public network.

The Advanced Encryption Server offers DES, 3DES or AES encryption of all media streams associated with videoconferences. The Advanced Encryption Server and the ALG Proxy can be configured together for complete firewall traversal and secure communications, all managed and administered via the MXM. For more information about the SecureConnect family of products, see the VCON white paper titled "Traversing Firewalls with Video over IP: Issues and Solutions".

Conclusion

The explosion of rich media conferencing is fundamentally changing the way business is done. Even before IP convergence became the hottest topic in communications delivery, VCON recognized the potential and the opportunity that IP had to offer - and focused much of its development expertise on this area. As such, VCON

took the leadership role in developing advanced technology that would enable IP-based rich media conferencing. Leading the industry into the next generation of this revolutionary new communications process, the MXM is giving carriers and service providers the power to overcome inhibitors and reap the maximum revenue-producing potential from delivering rich media applications to their client base.

The MXM, combined with a network of multimedia-enabled clients and network devices, gives service providers everything they need to exploit the full potential of face-to-face, interactive communication over distances. Today, for the first time, service providers can deploy to users by the many thousands at a very low cost. As a result, clients can now have easy access to exciting new applications that will enhance their productivity and competitive-edge like never before. And they can access this technology through an environment that is amazingly similar to the telephony paradigm to which they are already accustomed. Plus, the rich media-enabled network can be centrally managed and administered to ensure both high quality and high availability for the clients. In fact, as a result of this advanced functionality and control, VCON fully expects service providers of all types to welcome these new applications into their suite of value-added service offerings.

Appendix A: Sample Scenarios

Help Desk Scenario

An end user calls the internal help desk reporting that they are currently in a conference but cannot hear the remote party. They have checked the connection of their multimedia speakers and even tried moving to the headset, but neither worked. The MXM administrator, looking at the endpoint preference settings on the console, notices that two things are causing the problem. First, the user has the volume turned all the way down on the endpoint application. Secondly, the speaker mute has been selected. The administrator takes corrective action and the end user acknowledges that everything is working fine. This example could just as easily relate to settings for auto-answer, camera selection, lip sync control, and much more.

Remote Software Upgrade Scenario

For vPoint HD, HD3000 and HD5000 users, the MXM administrator simply posts new software images to a server. Then, from the MXM console the administrator selects the users that should be upgraded. The administrator has the choice of forcing the upgrade or prompting the user first. Seamlessly, the software image for these users is upgraded. This scenario also works well with service pack releases and reinstalls.

QoS or Policy Change Scenario

The network administration staff has decided on a new set of QoS policies that require a change to every videoconferencing user's endpoint configuration. Rather than visit every user location to make the change or email a set of complicated instructions for the end user to follow, the MXM administrator makes all of the changes remotely from the MXM console. Using the MXM's administrative group feature, all members of a group can have QoS or policy changes applied in one operation. Users that are online will automatically be provisioned with the change. Users that are offline will automatically be provisioned with the change the next time they login.

Ad Hoc Conferencing Scenario

A user is in the middle of a conference and realizes that a third participant needs to be added on the fly. Rather than terminate the call and try to locate or schedule an available MCU service, the user simply enters the number of the desired third party and hits the "Invite" button on the VCON HD system's user interface. Automatically, the MXM hunts through its ad hoc conference hunting group for an available MCU service, connects the third participant and then redirects the original two participants. If the third participant is not available, the conference is not interrupted.

Another simple way to initiate an ad hoc conference with VCON's vPoint HD or HD5000 is to bring up the online directory during the call, right-click on the desired participant, and select "Invite". Using this method, users don't even need to know the video dial plan number for the remote participant. As many additional users as needed can be invited into this ad hoc conference, up to the limit of the MCU session configured. Finally, a mixture of MCU sessions from multiple vendors can be configured into the ad hoc conference hunting group. The VCON conference bridge makes for an ideal ad hoc conferencing resource because of its low cost and software-only installation.

Ad Hoc Conferencing Overflow Scenario

A user initiates an ad hoc conference using the Invite button on the vPoint HD or HD5000 application. However, all available MCU resources in the local zone happen to be busy. Using the MXM's remote resource (gateway and MCU services) provisioning feature, MCU resources from elsewhere in the network domain can be added to the local zone's ad hoc conferencing hunting group. If the MXM finds that all local MCU resources are busy, it will automatically attempt to service the ad hoc conferencing request using a MCU resource from a neighbor zone. These neighbor zone resources become possible "overflow" resources rather than being forced to reject the user's request.

The ability to sort the MXM's ad hoc conference hunting group is also valuable for seeking less expensive MCU services first (such as VCON's software-based conference bridge) before using expensive high-end MCU services. In this way, the high-end MCU services become "overflow" resources.

Mobility Scenario

A user travels to a remote office where he needs to work for a few days, including having access to the video network. Using the vPoint HD client, the user logs into his/her home MXM server for authentication. Now the MXM knows the location and capabilities of this user. Anyone that dials this user at their normal dial plan number will be connected with them, even though they are physically at a remote location. Items such as call detail records, QoS settings, least cost gateway routing tables, etc. are all preserved. An alternative, if there is a local MXM in this remote location, is for the user to login to the remote zone to be provisioned with a new set of capabilities. In this case, the user can simply set the call forwarding on his/her home profile to the newly assigned number so that all calls will be automatically routed.

Remote Call Initiation Scenario

A client has an executive conference room that is commonly used for senior management meetings. Often times, the videoconferencing system in the conference room is also used. Rather than ask the participants to setup the videoconference as they walk into the room, the customer pays the service provider for scheduling and remote call initiation services. The service provider has some number of operators that are able to remotely initiate videoconferences between two systems. Fifteen minutes prior to the weekly senior management meeting, the service provider selects the desired sites from the MXM console and remotely starts the conference at any data rate desired. The conversation monitor shows if the call establishment is successful. If not, there is still time to contact the help desk for further assistance. When the conference is complete, the service provider can terminate the call as well. These procedures can also be further automated via integration between the MXM and external systems.

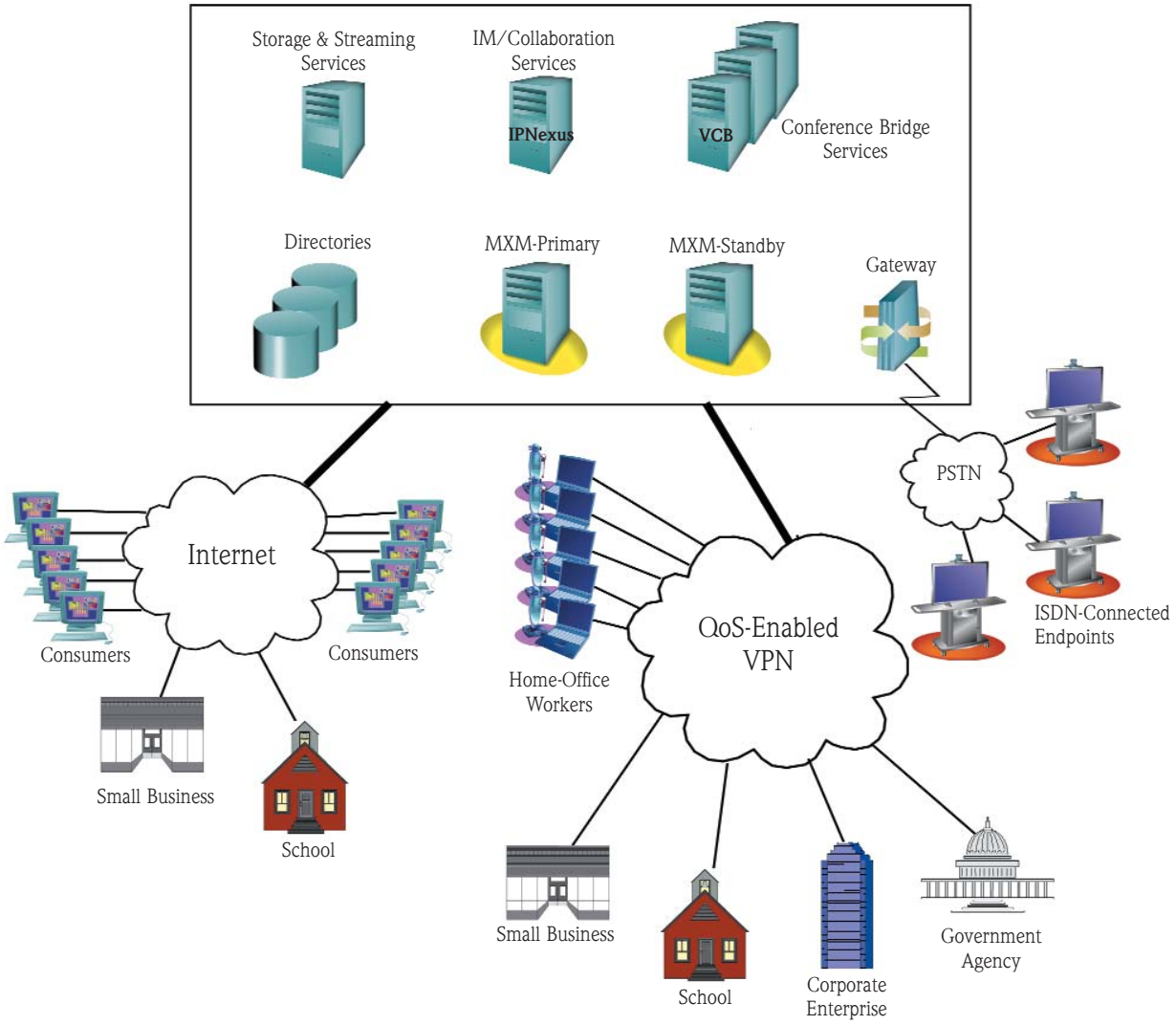
The remote call initiation function is also a very helpful troubleshooting tool for the service provider's network administration staff. Calls can be placed between users and MCU services, streaming services, or recording services - all from the MXM console. Done in off hours, various tests can be performed to ensure the rich media network is operating as designed.

Simplified Gateway Dialing Scenario

A user needs to place an off-net videoconference to a business partner via ISDN (the business partner provided an ISDN video number to call). Using the MXM's simplified gateway dialing feature, the user simply enters a 9+ISDN dial string into the manual dialer on their videoconferencing system (VCON or non-VCON). The MXM sees this dial string and immediately recognizes it as a simplified gateway call. It then confirms the gateway dialing policies for this user and hunts for an available gateway service that matches the bandwidth request.

Using the gateway service hunting group feature, the MXM administrator can segment users and associate them with specific gateway resources that only they can use. These gateway resources can come from multiple physical gateways, including gateways in neighbor zones. If the requested services does not happen to be available (all are busy, non are configured, etc), the gateway up-speeding/down-speeding feature of the MXM to make a policy decision and either increase or decrease the bandwidth requested in order to match an available gateway resource. If the ISDN number dialed happens to match a pre-defined least cost route, the MXM will route the call to a specific gateway in order to save long distance ISDN toll charges. All of the MXM's simplified gateway dialing features are in place to make gateway dialing easy to use with the highest odds of call completion at the lowest possible cost.

Appendix B: Service Provider Network Operations Center



VCON

VCON Headquarters
Ph: +972-9-959-0059
Fx: +972-9-956-7244

VCON Americas
Ph: +1-512-583-7700
Fx: +1-512-583-7701

VCON Europe
Ph: +49-89-614-57-0
Fx: +49-89-614-57-399

VCON China
Ph: +86-10-65269791
Fx: +86-10-65269790

www.vcon.com