



## ***QuadFusion<sup>™</sup> Technology: Integrating Next Generation Technology at the Core***

### **Abstract**

There are four telecommunications protocols that dominate the business telephone system industry: SIP, H.323, VoIP and TDM. Unfortunately, no telecommunications manufacturer is able to provide a single, turn key solution to integrate these standards into a single autonomous unit.

In 2005, Iwatsu Voice Networks released the Enterprise-CS, a Multimedia Protocol Gateway using QuadFusion<sup>™</sup> Technology. QuadFusion<sup>™</sup> was designed to capitalize on the benefits of all four voice technologies. If desired, SIP, H.323, VoIP and TDM can run exclusively on the Enterprise-CS or they can be mixed and matched as dictated by the application. And because each call control application runs at the core, each protocol runs as fast as the next.

This white paper explains the benefit of a single Multimedia Protocol Gateway that supports SIP, H.323, VoIP and TDM. This white paper further explains the underlying QuadFusion<sup>™</sup> Technology—exploring the many flexible multimedia applications along the way.



## **QuadFusion™ Technology**

When designing the application software for the Enterprise-CS, developers used an open architecture model that leverages current and future call control vehicles. The hand picked design team spanned three continents and had the combined goal of designing a single system that is not only flexible, but also capable of becoming the market segment leader. After many months of research and design, QuadFusion™ Technology was born.

### **QuadFusion™ Technology Explained**

At the core, the Enterprise-CS is a Multimedia Protocol Gateway (MPG) that was designed around the QuadFusion™ Technology. This is a key factor because it allows customers to leverage the best solution at a given time; yet Enterprise-CS MPG is flexible enough to upgrade to a completely different technology at a later time.

### **What is QuadFusion™ Technology?**

Simply put, Enterprise-CS MPG synergizes four disparate telecommunications standards: Session Initiated Protocol (SIP), H.323, Voice over Internet Protocol (VoIP) and Time Division Multiplexing (TDM). Each standard has its own strengths and weaknesses. The Enterprise-CS MPG with QuadFusion™ Technology embraces each standard's strength. What emerges is an entirely new paradigm of flexible voice communications.

### **QuadFusion™ Technology and SIP**

Session Initiated Protocol is a stateless, client-server protocol used to establish communication rules on a case-by-case basis for users. It allows packet-based networks to carry voice, video and data. As a protocol, SIP can establish sessions for features such as audio/videoconferencing and interactive gaming and call forwarding, allowing flexible deployment over IP networks.

Because SIP is an open standard, SIP applications can be rapidly developed and deployed—lowering overall cost. Additionally, any vendor's SIP application can use the Enterprise-CS MPG for session control.



SIP trunks are currently changing the business model of telephone companies. Before SIP, a customer would order trunks from the telephone company. The telephone company, in turn, would run copper to the customer site and charge accordingly. This creates a long term, fixed relationship between the telephone company and the customer: if the customer wants telephone service, it must be ordered through the telephone company.

SIP trunks, however, remove the inflexible relationship between the telephone company and the customer. With SIP, customers are free to choose their broadband service (i.e., xDSL, cable or VPN) and purchase their trunks from a variety of SIP trunk providers. This eliminates the single-source provider, and gives customer the freedom to choose the service providers that best suit their business needs.

## **QuadFusion Technology™ and H.323**

Like SIP, the H.323 protocol is used for on-demand conversations. Whereas SIP's primary design was open source communication amongst dissimilar applications, H.323 was designed for real-time voice and video conferencing. Much narrower in scope, the H.323 stack places an emphasis on voice quality first, followed by video quality.

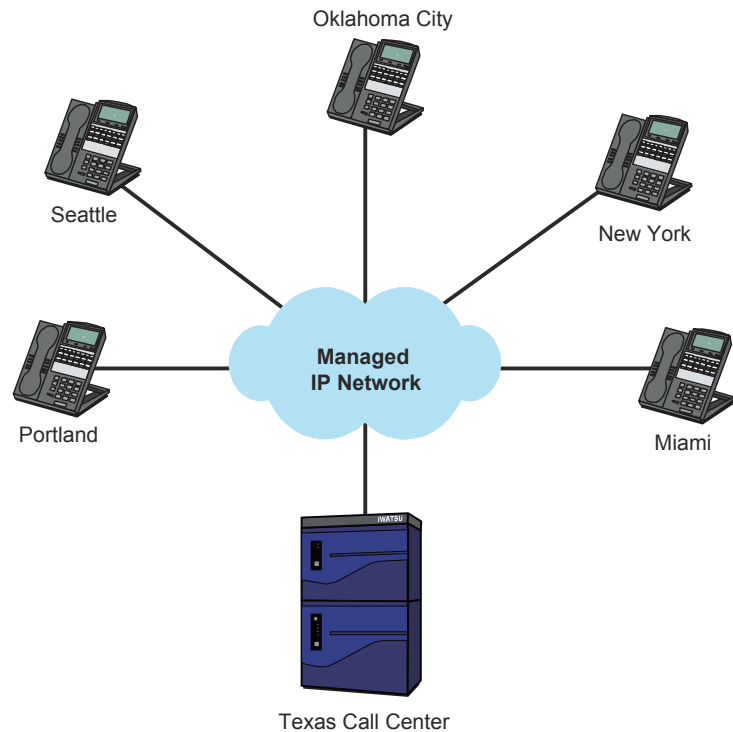
H.323 is an open standard and enjoys the benefit of a large development network. Software developers such as Microsoft developed thin, powerful H.323 clients. Microsoft NetMeeting is an example that deploys real time video conversation over an IP medium. The ability to videoconference multiple parties using a non QoS network (i.e., the Internet) is H.323s primary strength.



## **QuadFusion Technology™ and VoIP**

The Enterprise-CS Multimedia Protocol Gateway also provides a VoIP stack to deliver TDM-quality voice applications. The unique ability of the Enterprise-CS is the full feature set available to VoIP users. Every feature available to the TDM user is available to the VoIP user—including automated attendant and ACD.

Using QuadFusion™ Technology, VoIP users can literally be located anywhere in the world. To the end user, this feature offers tremendous savings. Call centers, for example, can be centrally located with remote agents spanning the country. Agents simply use a VPN connection to access the Enterprise-CS MPG.





## ***QuadFusion Technology™ and TDM***

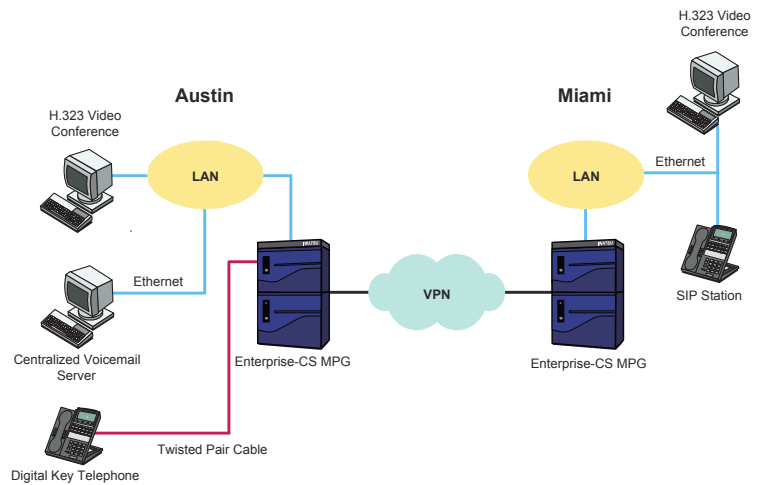
Time Division Multiplexing has enjoyed over 20 years of development and refinement. TDM's stability and feature set are well understood. However, it is important to understand that QuadFusion™ Technology provides a bridge between the IP-based protocols and the TDM features. The conversion from IP to TDM and back is seamless within the Enterprise-CS MPG. This ability allows VoIP applications to communicate with TDM resources with no degradation in voice quality.

The ability to support IP telephony features is key to users with existing TDM systems, allowing them to leverage their current infrastructure and still use IP-based applications. Often, TDM users give up some features when they make the switch to an IP-based protocol. With QuadFusion™ Technology, this is simply not the case.

## ***How can QuadFusion Technology™ Help Me?***

The Enterprise-CS MPG provides the ability for end users to purchase the most appropriate solution—with the flexibility of moving to an entirely new technology at any time. Because the Enterprise-CS Multimedia Protocol Gateway integrates four protocols at its core, each provides a robust, stable feature set. Moreover, any of the four protocols can be mixed and matched.

For example, a small, 12-person startup business begins in Austin Texas and needs a basic business telephone system. For cost reasons, the business uses the Enterprise-CS MPG as a TDM voice telephone system. A year later, the business flourishes and now has 30 employees at the Austin office and another 6 in the new Miami location. Leveraging the initial cost of the TDM resources, the business decides to keep TDM applications in the Austin office. The Miami location uses SIP stations and ties the Miami office to the Austin office using VoIP over a VPN circuit. Each day, the two offices conduct a videoconference using H.323.

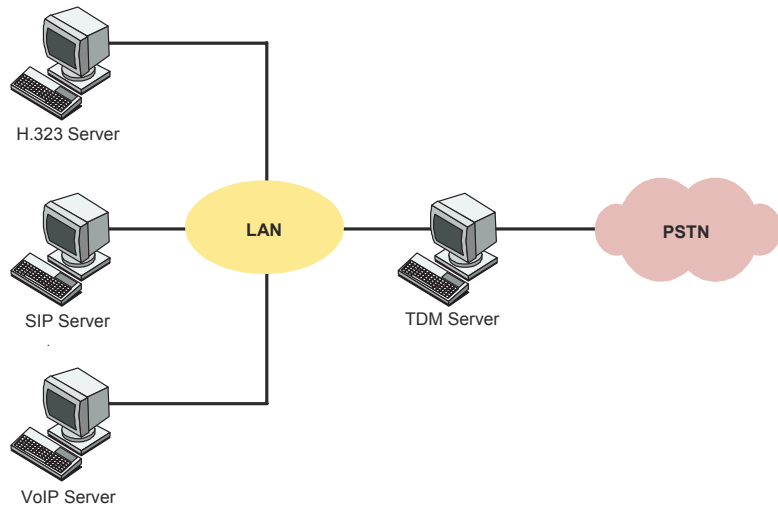


The above example illustrates the Enterprise-CS MPG using QuadFusion™ Technology. The voice quality and speed of system functions is undetectable between each of the disparate technologies. This is only possible because QuadFusion™ Technology was designed, optimized and implemented at the core of the Multimedia Protocol Gateway.

***Right, But Can't  
Any Provider Do  
This?***

Many voice system providers make use of TDM, VoIP, SIP and H.323; that is true. However, to do so forces users to implement multiple external servers. For example, a voice system provider can provide a converged TDM and VoIP solution. But both SIP and H.323 often require two separate external servers. The conversion going from SIP / H.323 to TDM slows the call process and increases maintenance cost. Furthermore, the external SIP / H.323 servers may not communicate well with the converged TDM solution.

The above example is also true of the inverse. Some voice system providers make use of the VoIP, SIP and H.323 technologies very well—though again, often not in the same solution. Within the IP network, communication moves smoothly. The trouble appears when a connection to the PSTN is required. To move the voice packets onto the PSTN an external server is required for TDM conversion.



Neither of these examples is efficient from a cost standpoint. Both require multiple external servers, which in turn increase hardware cost. Additionally, multiple external servers increase the load on the network. Both the external servers themselves and the network they are implemented on require constant maintenance.

**Is QuadFusion Technology™  
Right for Me?**

When making purchasing decisions, it is difficult to determine if a single call control application is right for the business. By using open source call control applications, QuadFusion™ Technology eliminates the need to implement a single call control application. As a purchaser, QuadFusion™ Technology allows the unique ability to make a purchasing decision on the fly and implement the appropriate call control application where needed.



## Conclusion

The Enterprise-CS Multimedia Protocol Gateway with QuadFusion™ Technology allows the end user the flexibility and power to choose the application most suited for their business. The Enterprise-CS MPG grows with the business and has the unique ability to add individual features such as video conferencing or SIP trunks on an application-specific basis.

The overall objective is to provide end users with options. The Enterprise-CS MPG is the only single box solution in the industry that merges four disparate technologies, creating a true multimedia gateway. The ability to use SIP, H.323 VoIP and TDM protocols is only made possible by QuadFusion™ Technology.

For additional information on QuadFusion™ Technology and the Enterprise-CS Multimedia Protocol Gateway, contact Iwatsu Voice Networks at the following address:

**Iwatsu Voice Networks**  
8001 Jetstar Dr  
Irving TX 75063  
info@iwatsu.com  
1.800.866.6342