White Paper

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Media Gateway 2.0:

The Intelligent Edge for Service Providers

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Media Gateway 2.0: The Intelligent Edge for Service Providers

Overview

Media gateways have long been a core element of nextgen networks. Their traditional role has been well defined, but as networks evolve towards a world of 2.0-style communications, gateways have not generally kept pace. Not only does this limit the growth prospects of gateway vendors, but it hampers the ability of service providers to remain competitive.

This White Paper discusses the concept of Media Gateway 2.0, and outlines the various ways in which gateways can add intelligence and remain relevant for service providers. TelcoBridges is presented as a vendor on the forefront of Media Gateway 2.0, not just for their offerings, but for the company itself.

Challenges Facing Service Providers

In many ways, there has never been a better time to be a service provider. The barriers to entry for the telecom industry are much lower today, making it easier to become a service provider, as well as easier to address new markets. Options for new services and revenue streams are unlimited, and the silicon economics of IP translate into high margins.

Conversely, no service provider is immune to competition, innovation is constant, and your customers have most of the leverage in controlling the business relationship. This translates into a complex, inter-related set of challenges for service providers, all of which collectively define the realities for staying competitive. To help simplify the complexity of these challenges, we see three distinct categories.

Challenges Facing Your Customers

- Businesses of all types face unprecedented challenges with the current economic environment, especially SMBs – small and medium businesses. Many of these are impacted by communications technologies – both directly and indirectly – and service providers must help address those challenges to remain relevant. Our research has identified several such communications-based challenges, with the most important ones being as follows:

- Responsiveness: businesses have become 24/7 operations and their customers have higher service delivery expectations, not just for being accessible at all times, but also to respond quickly and effectively

- Competition: customer alternatives are limitless, and SMBs need every edge possible to remain nimble and efficient, including lower-cost communications services

- Managing mobility: with the rise of mobile broadband, SMBs need the right communications solutions to keep employees productive on the road

- Virtualization: SMBs increasingly rely on outsourced resources to serve new markets and scale the business cost-effectively, including their communications infrastructure

- Talent recruitment and retention: new hires are more Internet-savvy, and are adept at using multimedia communications tools to be productive

- Work-life balance: our digital lifestyle is a reality, and managing it requires the right communications tools

Challenges Facing Your Business

The competitive environment facing service providers is just as challenging, if not more, than those faced by your customers. With the advent of IP networks, every type of service provider can be a competitor, and geography has become a non-factor. Consider the following in terms of how the environment around you is changing, and why they pose a challenge to you.

- Legacy services are in decline and carriers are caught between falling revenues and rising operating costs: they must find a way to migrate to IP networks while maintaining the existing business base before they lose them to competitors

- Some competitors differentiate on innovation and distinctive offerings: to match this you need a nextgen network that enables and delivers new services efficiently

- Some competitors differentiate on price: to match this, you need a cost effective network

- Time to market is critical for staying competitive: and this requires an agile network that can quickly adapt to changing market conditions, customer demands or network environments

- Capex and Opex spending is down: carriers need to invest strategically at a time when their future depends heavily on transitioning from circuit to packet as well as developing converged service offerings that work seamlessly across various networks, standards and protocols

Challenges Facing Your Network

Telephony networks are evolving into communications networks, but the vast majority of operators do not yet have true end-to-end IP. As such, the migration from circuit to packet is a work in progress, and the job is never done. Most operators can meet customer needs for TDM and even VoIP, but providing even basic converged communications is a challenge, let alone staying ahead to deliver tomorrow's services. The following are some key technology trends that service providers need to address for their networks in order to remain competitive.

- Convergence is necessary but complex: carriers need to address voice, data and video, traverse fixed, mobile and IP networks, support legacy and next gen protocols, and support multiple endpoints and devices

- IP makes multi-vendor networks feasible, but only if interoperability can be managed: otherwise, carriers will go broke supporting best-of-breed deployments or concede vendor lock-in and revert to the single vendor solution at great expense and loss of flexibility

- As carriers migrate to IP, these new networks will need to scale and perform at the same level or higher as legacy networks: but preferably without the linear cost increases that are the norm in the TDM world

- TDM has many years of life left despite being expensive to provide and steadily losing ground to IP and wireless alternatives: carriers need to balance this against emerging priorities to invest resources that leverage the IP networks which will eventually replace TDM

- People communicate more with IP, and operators must increasingly outsource network resources to meet this demand: but also find ways to make it cost-effective

- Green IT: both businesses and carriers face increasing scrutiny to be green, particularly in data centers which have intensive energy requirements

- Networks must be designed to address both current and future needs: this requires a cost effective architecture that supports both service delivery and service creation in a world where innovation is constant, and ARPU will often be lower than TDM

Media Gateways – The Foundation for Being Competitive

Aside from being highly varied, the challenges discussed above are often interconnected and need to be thoughtfully addressed regardless of how far along the IP migration path a service provider has gone. There is no simple solution for staying competitive, but at the heart of any next gen network lays the media gateway. The media gateway remains a core building block for IP networks, but has also evolved in some important ways beyond its original function from the early days of VoIP.

Having monitored this evolution since 2001, our view is that media gateways fall into two basic categories, best labelled 1.0 and 2.0, as per the convention of how voice services have evolved. Each has a role to play for service providers, and the differences largely reflect the transition of voice from TDM to IP-based networks.

Media Gateways 1.0 – Working Hard

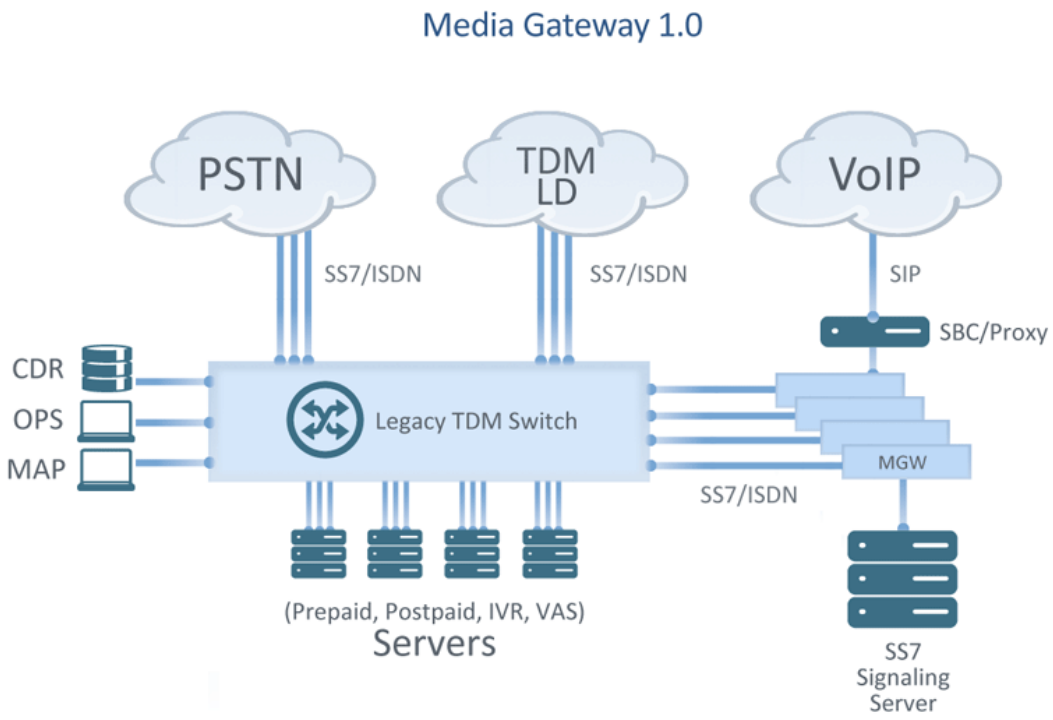
From the time service providers started routing calls over the Internet, they have needed media gateways. Initially, the rationale was simple – lower costs due largely to toll bypass savings. Internet-based calls helped incumbents lower their transport costs, but this also gave rise to competitors who could now enter the market without the need for a capital intensive physical infrastructure of their own. All they really needed was carriage arrangements with Internet providers and media gateways to connect back to TDM at each end of the call.

While incumbents were using VoIP to lower their operating costs, competitors were doing the same to lower prices in order to capture business for themselves. VoIP essentially began as an arbitrage play, and media gateways played a central role as the transfer point between circuit and packet telephony. Regardless of the type of service provider, media gateways were the starting point for moving into VoIP.

The role of the media gateway has always been straightforward; to facilitate the traversal of calls between different network types and protocols. This usually meant handing off calls from the PSTN to the public Internet and vice versa. Early on, however, the task was less complex as there were only a few protocols and network types to deal with. As VoIP has evolved, the various permutations have multiplied with the rise of SIP (and subsequent decline of H.323), wideband codecs, multimedia and mobile broadband. Not only are there more handoff scenarios to manage, but many variants exist within most protocols, especially where global standards are not in place yet.

Figure 1 below illustrates our view of Media Gateway 1.0. The key feature to note here is how the gateway connects to several other network elements, but most of the intelligence is routed through the switch.

Figure 1 – Media Gateway 1.0



All told, as networks have evolved, media gateways have had to work harder, especially as expectations of VoIP rise among those looking for it to replace PSTN service. Lower prices for telephony drove early adoption of VoIP, and as it moves into the mainstream, the value proposition becomes focused more on quality especially for the business market. This raises the bar for media gateways to ensure voice quality, leading the vendors to increase processing power with more DSPs.

The end result is a more powerful gateway serving the same basic function, but one that lacks intelligence. In our view, these media gateways are very good for their intended function, but are essentially a 1.0 version in terms of how the IP communications world has evolved.

Media Gateways 2.0 – Working Smart

A 2.0-style gateway is built more on its intelligence capabilities and how the media gateway fits into today's network environment. In addition to working harder and faster, 2.0 gateways work smarter and more efficiently. To further illustrate, the following summarizes four key elements that can make media gateways intelligent, and distinguish them from their 1.0 predecessors.

Protocol support: most service providers handle a mix of TDM and IP calls, and the varying set of signaling protocols is extensive. SS7 and H.323 are still widely used, but the momentum is with SIP. However, being a newer protocol, SIP has many variants globally, and the gateway needs more intelligence to effectively support all of them, both inter and intra. Add to this a fragmented range of voice codecs, some of which are licensed, and some of which are royalty-free. On the data front, T.38 support is needed for fax, especially in the business market. Furthermore, service providers are increasingly moving beyond voice into multimedia services, requiring them to handle video, which has its own set of protocols and codecs.

Network support: VoIP has moved beyond the PSTN, and must now be supported over a wide range of networks, all of which have their own characteristics. Aside from wireline PSTN, VoIP calls now need to interconnect with cable networks, fiber, WiFi, and all flavors of wireless – 2G, 3G, 4G, LTE, CDMA, GSM, etc. On the IP side, it should also be noted that gateways must interface with the public Internet as well as private IP networks and VPNs. Each has its own variants on both security and prioritization for voice within the overall flow of media streams.

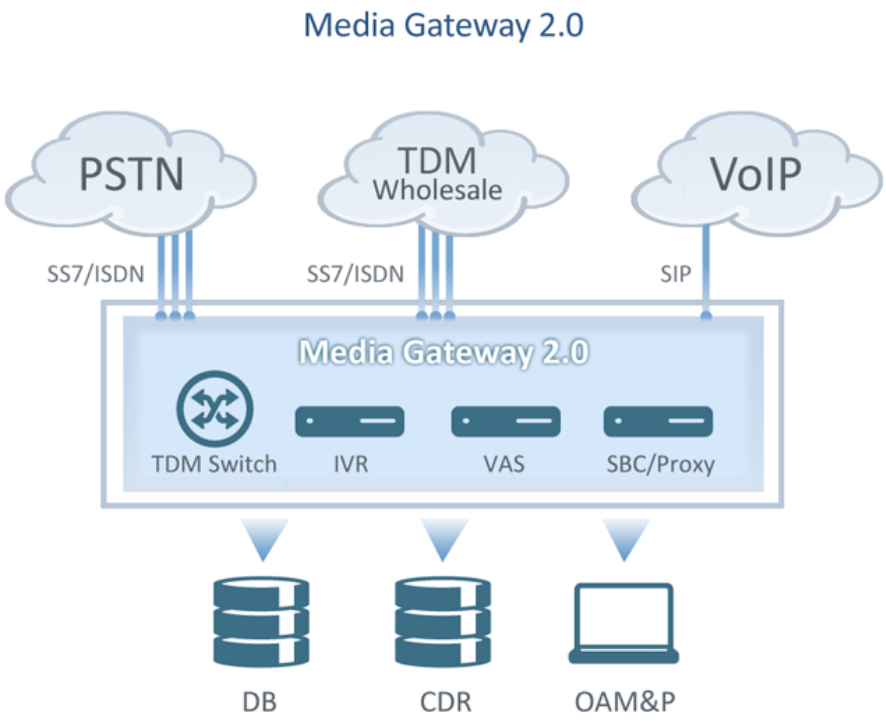
Scalability: service providers are increasingly migrating traffic over IP networks, and to maintain carrier-grade quality and reliability, media gateways must scale accordingly. This is not just a matter of horsepower – it is equally dependent on intelligent design. Media gateways are a capital expense and real estate either onsite or in a data center is at a premium. Buying more gateways is simply not practical, and the solution lies in an intelligent design to get the maximum performance from these technologies. In our view, a 2.0 media gateway addresses scalability in two ways – high port density and low power consumption. Density is critical not just for scaling, but to enable the gateway to have a smaller physical footprint. Power consumption is equally important, not just because energy costs are rising, but also to align with the trend towards green IT, which can serve as a differentiator for service providers.

Applications: this is the element that truly makes media gateways intelligent. VoIP's long term value to service providers lies more in new services rather than lower prices for their customers. The DSPs onboard provide enough processing capability for intelligent media gateways to support basic voice applications such as ringtones and calling card services. These capabilities can be of great value to service providers, by enabling them to quickly and cost-

effectively introduce new services that can generate revenues. In addition, these applications can reside at the network edge, eliminating the need to expose the rest of the network to customers when they access these services.

These elements tell a different story from Media Gateway 1.0, and Figure 2.0 below illustrates how the gateway changes in terms of both its capabilities, and having a more central role in a nextgen network environment.

Figure 2.0 – Media Gateway 2.0



TelcoBridges – Setting the Standard for Media Gateway 2.0

As service providers move further down the path to IP, their ability to address the challenges discussed earlier in this paper becomes more difficult with a 1.0 product set. Not only must the network have a 2.0-based infrastructure, but the services must get beyond TDM, and in fact, beyond voice. In our view, this means that media gateways must not only work hard but smart as well.

To this point, the analysis has focused on the media gateway's role to enable this transition and allow service providers to remain competitive. Media gateways come in many varieties, and in our view, TelcoBridges is as well positioned as any vendor to deliver on this complex set of needs and challenges. We have looked beyond their gateways, and see two elements that collectively support this conclusion about TelcoBridges – the product and the company.

The Product

TelcoBridges offers a full family of intelligent media gateways in its Tmedia product set. The TMG800 is an entry level gateway targeted more at smaller carriers, enterprise networks, or service providers looking to expand their network to new geographical locations, while the TMG3200 is targeted at carriers looking to take advantage of network convergence. They are also introducing two advanced models that go beyond the TMG3200 – the TMG5800 and the full rack TMG7800, both of which add significantly more performance and scalability, and which can host 3rd party softswitch or session border controller solutions locally. In our view, the following attributes characterize the 2.0 capabilities of their media gateway offerings.

High density: this is one of the features most strongly associated with TelcoBridges in our research. By the numbers, the TMG3200 can support up to 64 T1s or 3 DS3s in a single chassis. The newer TMG7800, being a full rack solution, can support the equivalent of 16 TMG3200s. More importantly, this translates into a smaller space footprint, which in turn reduces real estate costs as well power and cooling costs. This also makes scaling up more economical as carriers begin to route more traffic over IP.

Low power consumption: the TMG3200 only requires 150 watts, making it a very green solution. This also reduces Opex as energy costs continue to rise and become a more significant cost factor for carriers. A related element is their componentry, specifically the use of FPGA circuits – Field Programmable Gate Array. These are designed in-house, making them optimized for telephony, with the end result being more efficient data processing, which in turn reduces the need for power.

Versatility: extensive support for legacy and nextgen protocols and interfaces makes the Tmedia gateways enablers of a wide range of services. As noted, to compete in the 2.0 world, carriers need to get beyond VoIP, and this level of versatility is essential, particularly for the business market where offerings such as FMC or hosted services or Unified Communications are now gaining traction. This versatility is particularly evident in the TMG7800, which can support a wide range of E1, DS-3 or STM-1 configurations, as well as mix among these interfaces, making it easy for service providers to address virtually all customer growth scenarios. Signaling is another strong suit for their gateways, which support concurrent switching across all major protocols – SIP, SS7, SIGTRAN and ISDN. Finally, all of their gateways switch between TDM and IP networks as well between Class 4 and Class 5 services.

Echo cancellation: this is one of Tmedia's more distinctive features in terms adding intelligence to their gateways. While this is a standard media gateway feature, TelcoBridges departs from convention by using VoIP processors for the vocoding and echo cancellation instead of DSPs. This allows them to manage more simultaneous VoIP channels with echo cancellation, maintain performance of 128ms, irrespective of the voice codec being used, and at the same time, reduce the need for costly DSPs.

Integrated media gateway controller: With each of its Tmedia products, TelcoBridges offers an integrated media gateway controller called TB Media Gateway. It handles the complexities of switching, including hairpinning between and within TDM and VOIP networks, and managing transcoding between TDM and VOIP media, with the ability to select preferred codecs for bandwidth/cost optimization. With a call routing engine based on the Ruby scripting language, TB Media Gateway also brings a level of intelligence to media gateways normally found in a softswitch. Of particular interest with this routing engine is that it allows for easy importing of route tables from an external route table database, as well as the ability to edit existing routes from a text editor such as Microsoft Word. This should greatly simplify regularly recurring tasks associated with updating and maintaining call routing tables, an important capability in maintaining and increasing profitability for many carriers.

The Company

Despite a challenging economy, TelcoBridges remains a high growth company, which we view as an important barometer of success in a market that has seen its share of consolidation. This has been recently validated by Deloitte in two distinct industry rankings. First, within its home market, TelcoBridges was ranked #21 in Deloitte's Canadian Technology Fast 50 in October 2009. TelcoBridges was also ranked #175 in their broader North American Technology Fast 500, posting a 777% growth in revenue from 2004-2008. Being a private company, these metrics are important proof points that reflect their continued success in the media gateway market.

TelcoBridges also has a very customer-centric culture, and we believe this is a key element in their overall value proposition. In particular, we see three areas that show how strongly they stand behind their product.

Integrated OAM&P: Operation, Administration, Maintenance and Provisioning is a long way of saying that carriers have a great deal of flexibility for configuring TelcoBridges's gateways. They understand the need to have minimal disruption when gateways are being configured or upgraded. High availability is a hallmark for any service provider, and one way they do this is to allow carriers to pre-provision new devices, so they will automatically be detected by the gateway when added to their network. Another example is the ability to perform a live software upgrade without the need for any downtime. It is also worth noting that this Toolpack is included with their gateways at no cost, whereas other vendors usually offer this as an add-on under the banner of an Element Management System.

Tmedia warranty: the norm for gateways is 12 months or less, but for TelcoBridges, the standard term is 18 months, and this includes free software upgrades as well as technical support. Other vendors typically require a maintenance contract that covers tech support, and in some cases only basic support is included. More extensive support is on a cost-plus basis over and above the cost of the maintenance contract. Recognizing the fact that customers like having support and upgrades included in the warranty, TelcoBridges offers the option to extend the base warranty on an annual basis. TelcoBridges also provides support outside the 9am – 5pm window by having two support centers – one in North America and one in Hong Kong. This reflects the global nature of their customer base but also allows them to offer support at almost any time.

TelcoBridges Wiki: as befits a 2.0 product set, the company recently launched a wiki for registered customers, in addition to online support forums. At a basic level, the wiki serves as a centralized portal for product documentation, as well as more technical resources such as SS7 configuration manuals or SIP user guides. Aside being a convenient way to access information, the wiki supports dynamic content creation, meaning that partners can contribute their own materials as well as provide input on existing content. Furthermore, the content is indexed with hyperlinks, so whether entering to join a user forum or to learn more about a specific topic, the entire wiki can be searched and explored on a user-defined basis. We see this as a distinct value-add, and a forward-thinking way to position TelcoBridges as a leading edge vendor.

Conclusion

Service providers face a myriad of challenges to stay competitive, and these will only increase as their customers increase the adoption of VoIP and the broader range of IP-based communications services. Media gateways will remain the cornerstone of nextgen networks, but only if they can evolve to meet these changing needs. There are a number of ways they can do this, and we believe that vendors who follow this path will have the best chances for long term survival, as well as be best positioned for growth in the emerging 2.0 world.

In our view, intelligent media gateways are the best investment a service provider can make to support their customers in the transition from TDM to IP. Not only do they enable widespread adoption of VoIP, but also the 2.0 services that operators will need to generate new revenues as TDM continues to decline.

This paper has highlighted reasons and examples to support our conclusion that TelcoBridges exemplifies Media Gateway 2.0, and provides the kind of intelligence that service providers need today. This paper speaks to the higher vision and capabilities around what makes their media gateways intelligent, and to further investigate the specifics, we suggest contacting TelcoBridges directly.

J Arnold & Associates, an independent telecom consultancy, produced this White Paper. The contents herein reflect our conclusions drawn from ongoing research about media gateways, IP networks and VoIP. For more information please contact us by email: jon@jarnoldasscociates.com.