

How to choose the right IP gateway for your VoIP migration strategy

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Issue 1

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Overview

The purpose of this document is to understand the role a TDM to IP gateway has in providing a migration strategy to VoIP. In addition, it will identify the various scenarios in which a gateway appliance can be deployed to help leverage existing equipment, take advantage of new IP-based services and lower the total cost of ownership of deploying and maintaining a communications system.

Why is a VoIP migration strategy necessary?

Given today's economic climate, the dated strategy of rip and replace to move into new technologies is no longer viable for a number of reasons. Customers don't have the resources or budget to experiment with new technologies; they need to show a firm return on the investment. The end users are wary of new technologies and have more say in what happens and acceptance sign-off.

There are also many examples of poor implementations of UC and VoIP where a migration strategy would have helped smooth the transition and allow a more controlled, and ultimately more successful, move into VoIP.

What is now recommended by vendors, consultants and project managers alike is a migration strategy to allow companies to move into new technologies using proven products but without discarding the considerable investment they've already made previously with their existing PBX and telecoms network.

What advantages does a migration strategy to VoIP offer?

There are many advantages to a migration strategy. There is a considerable investment in existing PBXs within most organisations which can't be ignored and, in some cases, are still under lease or some other form of long term financial agreement. It's not viable for someone procuring IT to suggest a complete change in direction and outlay of money, time and resources – the forklift upgrade. There may be a payback with cost savings but it's not without risk and any Board of Directors would be sure to question this approach heavily.

The benefits of VoIP are well documented but a controlled migration plan will allow the project to be managed from both a financial and technical perspective and make the benefits more obvious instead of being lost in a sea of issues.

From a technical point of view, a more gradual implementation plan allows for more integration testing and a more gradual pace to switchover. This is a preferable alternative to someone pulling the plug on existing PBXs which are, probably, doing their existing job extremely reliably and effectively.

From a financial perspective, the introduction of VoIP alongside existing TDM services and equipment means that it's far easier to see the financial benefits and payback potential. Equally, existing equipment continues to provide its own payback and ensure the best possible return on its own investment the longer it is used.

End user acceptance is vitally important in any implementation; a controlled migration strategy allows newer technology to be used alongside older technology allowing a more balanced comparison. Major issues with an individual or small group can be overcome without significant disruption and problems.

It's an almost inevitable movement towards voice being carried as SIP between offices and locations. In fact, many larger corporate companies, such as financial institutions, already have large data networks in place. A gateway allows them to connect their existing PBXs into an IP-based data network so there is no separate voice and data network required. The advantage of the gateway is that it allows for a gradual migration and means that the PBX, and all its associated functionality, remains for the users.

What role does an IP gateway appliance play?

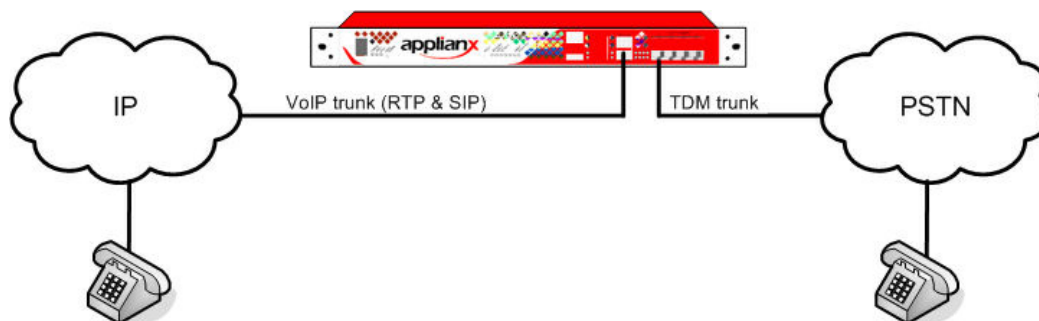


Figure 1: The role of an IP gateway

A gateway appliance is a 'boxed', single purpose device, tasked with connecting a TDM network to an IP network (private or public).

Figure 1 shows the typical architectural use of an IP gateway appliance. The gateway acts as a bridge between an IP network and a TDM network – allowing voice traffic to flow from one to the other. Calls arriving on one side of the gateway are forwarded to the other side after having been subject to various types of conversion:

- TDM G.711 A-law or μ -law media converted to RTP, using a codec negotiated and agreed between the called and calling IP end points
- TDM call control is converted to IP call control (usually SIP), and vice-versa
- Often, some manner of address translation is applied to maintain consistency within the called domain

What advantages can an IP gateway appliance bring?

For solution providers targeting the enterprise market, an IP gateway appliance is an ideal way to satisfy their objectives and needs. Today enterprise customers are looking to gain greater benefits from their communications infrastructure and they want to be able to take advantage from the latest technology, applications and services. But they want to achieve this whilst protecting their investment in existing equipment, for low incremental setup fees and ongoing maintenance costs.

Benefit from new services and leverage existing infrastructure investment

For enterprises that have made significant investments in their voice communication network, the ability to leverage this investment and benefit from new IP services with minimal additional CAPEX is an attractive prospect.

A gateway appliance allows enterprises to enjoy the best of both worlds because it can connect existing TDM components with new IP ones, in a simple and easy to manage format. Enterprises can therefore leverage the investment made in their existing voice communications infrastructure and allow advantage to be taken from new IP-based applications and services.

Faster roll-out of services

From the solution provider’s perspective a gateway appliance provides a means to ease the sale of new IP-based solutions. It is quick to install, cost effective and, critically, is deployment-ready with all the necessary enabling technology having already been installed and configured along with the embedded gateway application. Solution providers can therefore concentrate on the development of ‘next generation’ applications and services rather than burden themselves with the low-level programming and development of a gateway application.

Ease the migration to VoIP with a controlled strategy

A gateway appliance allows an enterprise to migrate to a complete IP solution as slowly or as quickly as desired. If and when customers require increased solution density it is simply a question of adding another ‘box’; it is very easy to scale. When they do decide to make the full switch they can do so with the confidence that all the IP-based solutions and services they have purchased will still work – provided they are open standards-based.

Deployment scenarios for a gateway appliance

Deploying a gateway appliance allows an enterprise to take full advantage from a range of new IP-based services and applications. And by interfacing enterprise VoIP telecoms to the PSTN, PBXs or private networks enable a transitional strategy from TDM to VoIP.

Integrating next generation VoIP equipment into existing TDM infrastructure opens up a wealth of possibilities. IP-based call centres can utilise both centralised and/or distributed agents; telephony access points can be gained for multi-tenanted managed facilities; and PSTN access points for corporate IP wide-area VoIP networks. These are just a few examples of opportunities for enterprises to improve productivity and gain greater cost efficiencies.

TDM to VoIP transitional strategy

Figure 2 shows how simple it can be to move towards a VoIP infrastructure. The gateway forms the bridge between new IP-based components, such as IP phones, soft phones and IP applications and the existing TDM-based PBX.

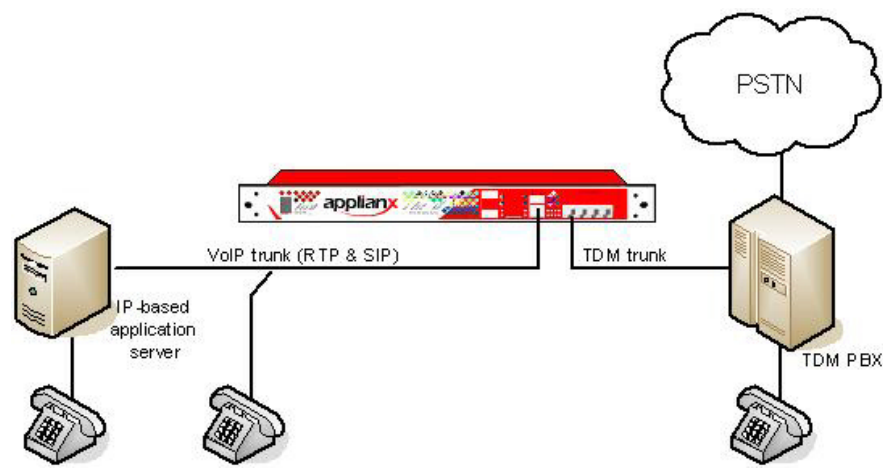


Figure 2: TDM to VoIP transitional strategy

Distributed contact centre

To achieve a distributed network strategy, the gateway needs to be deployed as shown in figure 3. The gateway enables remote agents to handle calls transferred to them from the centralised application at head office. The remote agents can become available to answer calls by connecting their IP phone or soft phone to the WAN on which the calls are carried.

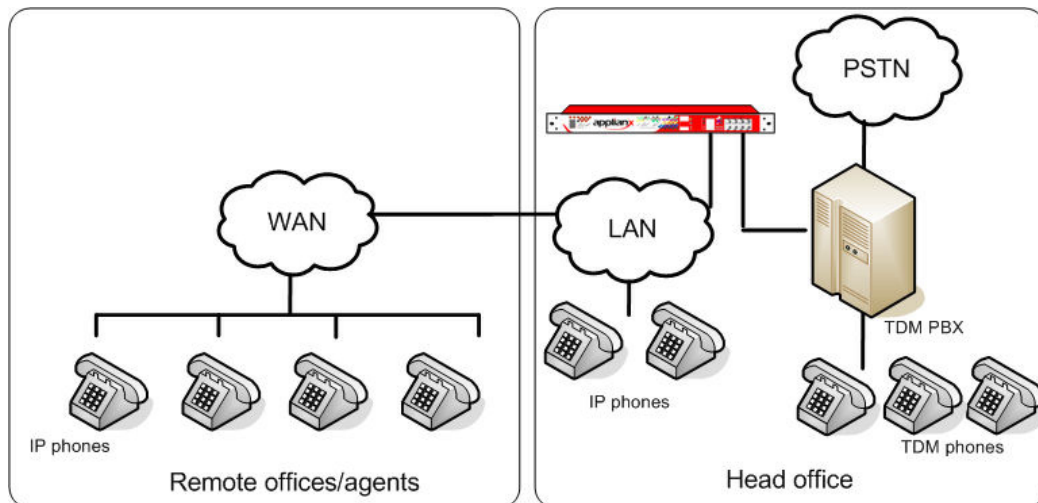


Figure 3: Distributed contact centre

Converged voice communications architecture

This final example shows how remote offices can benefit from a centralised application located at the head office. Not only does the arrangement allow for cost savings through toll bypass but it also allows the investment in one solution to be shared with remote offices, significantly reducing the total cost of ownership – see figure 4.

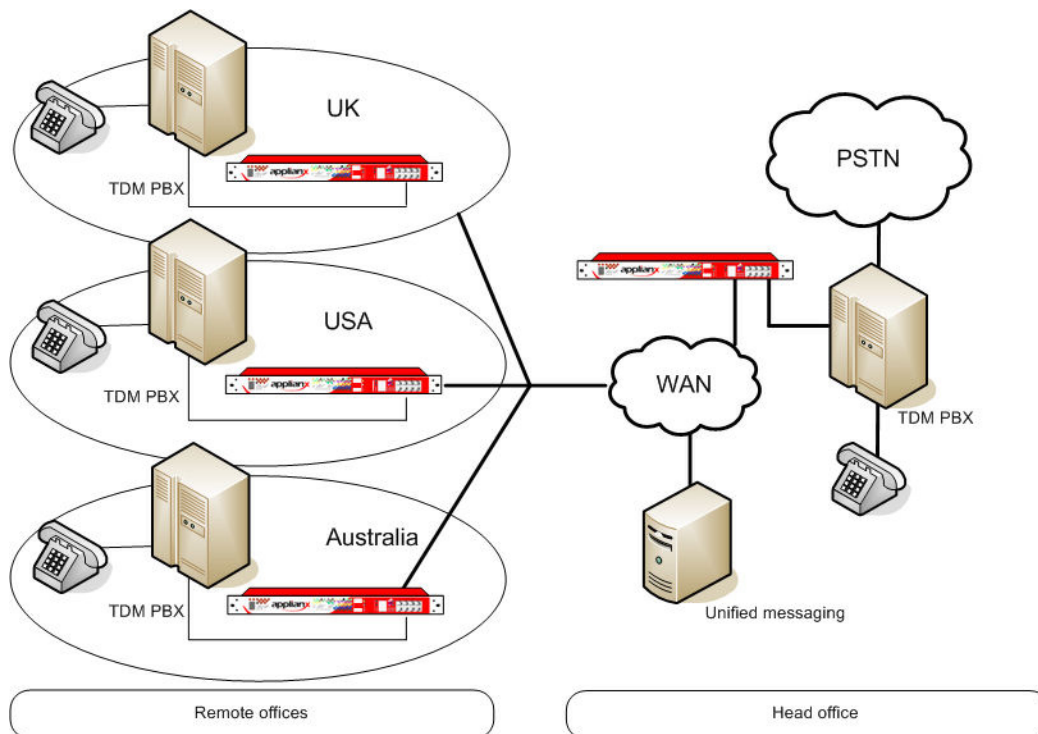


Figure 4: Converged voice communications architecture

What to look for in a gateway appliance

There are many gateways available on the market to suit a diverse range of market needs and sectors. If you are looking for a 'plug and play' device, the following guidelines will help ensure you avoid making a costly choice. Essential criteria include: ease of use, ease of integration within existing infrastructure, low total cost of ownership, audio quality, security and resilience.

Quick and easy to install and maintain

A single purpose device shouldn't have numerous different configuration files to search through and select for your particular deployment. Select a gateway that has been designed to meet the specific challenge of bridging between TDM and IP networks, in breadth and in depth – not a 'jack of all trades' that simply adds complexity, confusion and probably cost to the deployment of the device.

Ensure your gateway device comes with an intuitive configuration, installation and management tool, which utilises familiar interface tools such as an HTML web browser and support for SNMP to allow gateway activity to be monitored.

Ease of integration with new and existing network components

Ensuring that the gateway can connect with existing and new network components is critical. For the gateway to be compatible with a particular PBX, endpoint device and IP solution it must support the required protocol and features.

In addition you need to be sure that the gateway can be installed within your network, wherever in the world. Check that the gateway has comprehensive support for worldwide protocols and approvals.

Audio quality

Depending on the IP end points deployed, a range of different voice codecs will need to be supported by the gateway. Make sure the gateway supports a range of common codecs to make sure your requirements are met now and in the future. In addition, check that the channel count is guaranteed regardless of the codec used.

Just because the call is being handled over IP, instead of or in addition to TDM, doesn't mean the voice quality should be in any way inferior to what employees or potentially customers are used to. Make sure the gateway has built in features capable of handling and minimising the affects of network related issues such as delay and echo, for example, an adaptive jitter buffer and echo canceller.

Security and encryption

Moving to a VoIP infrastructure raises new security issues as VoIP traffic is easier to intercept than TDM. It is critical that the chosen gateway is able to encrypt the voice call to ensure that hackers and eavesdroppers are unable to listen in to what is being said. Features such as TLS, SIPS and SecureRTP are typically used to address this issue.

Resilience

As there is always a concern about reliability, especially when a system starts to grow in size, make sure you select a gateway that has resilience built in. Does it have dual IP ports for SIP signalling and RTP traffic as standard, so if one Ethernet switch fails (or some interconnect wiring fails), the system can fall back to the alternate link? Is the routing engine powerful enough yet easy to administer to automatically re-route when necessary?

Gateway check list

<p>Interoperability with PBXs: is the gateway interoperable with your PBX – does it support the required PBX inter-working protocol?</p>
<p>Protocol support: can the gateway be deployed in your country’s network – does the gateway support the required network protocol?</p>
<p>Network approvals: is the gateway certified to work in your country’s network – does the gateway have the required homologation?</p>
<p>End point device codecs: does the gateway support the same voice codec used by your IP end points?</p>
<p>End point device features: does the gateway support the end point device features required, such as call transfer?</p>
<p>Good voice quality: can your gateway handle network issues that could impair the voice quality, such as echo and delay?</p>
<p>Ease of deployment and use: is the gateway easy to install, configure and manage – can you get the system up and running quickly?</p>
<p>Bandwidth efficient codecs: does the gateway support codecs that provide good voice quality when bandwidth is low, which may be essential for remote workers?</p>
<p>Security: can the gateway prevent eavesdroppers listening in on calls, does it support security and encryption features?</p>

ApplianX IP Gateway

ApplianX IP Gateway is an easy to deploy, standards-based SIP-to-TDM gateway, often installed within an enterprise or service centre. It can be used to bridge between an internal VoIP or packet-switched telecoms network and the external PSTN, a PBX or a private circuit switched network – helping reduce operational costs, extend the life of existing TDM-based equipment and take advantage of new IP-based services and endpoints.

On the PSTN side, ApplianX IP Gateway provides 1, 2 or 4 universal T1/E1 interfaces (USA, Japan, Europe and worldwide), with a wide range of per-circuit selectable signalling protocols, including PRI/ISDN types, T1 robbed bit and E1 CAS, R1 and R2, plus many PBX inter-working protocols, such as Q.SIG and DPNSS.

On the IP side, ApplianX IP Gateway provides dual-redundant traffic interfaces for SIP signalling with RTP voice. Within the RTP stream there is support for G.711 and G.729AB codecs with security features such as SIPS, TLS and SRTP.

Conclusion

Migrating to VoIP does not need to be a complicated, costly affair. Selecting a deployment ready gateway appliance can help enterprises to, cost effectively, start enjoying a range of IP centric applications as they transition to an all IP-based infrastructure – whenever they choose and in a controlled manner at their own pace.

The ApplianX IP Gateway incorporates a number of important features to allow enterprises to do just that:

- Single purpose device – easy to use and tuned for the task
- Web-based tools – easy to install, configure and maintain
- Open standards-based – ensures interoperability with other SIP components
- Protocol support – ensures connection to a wide range of networks and components