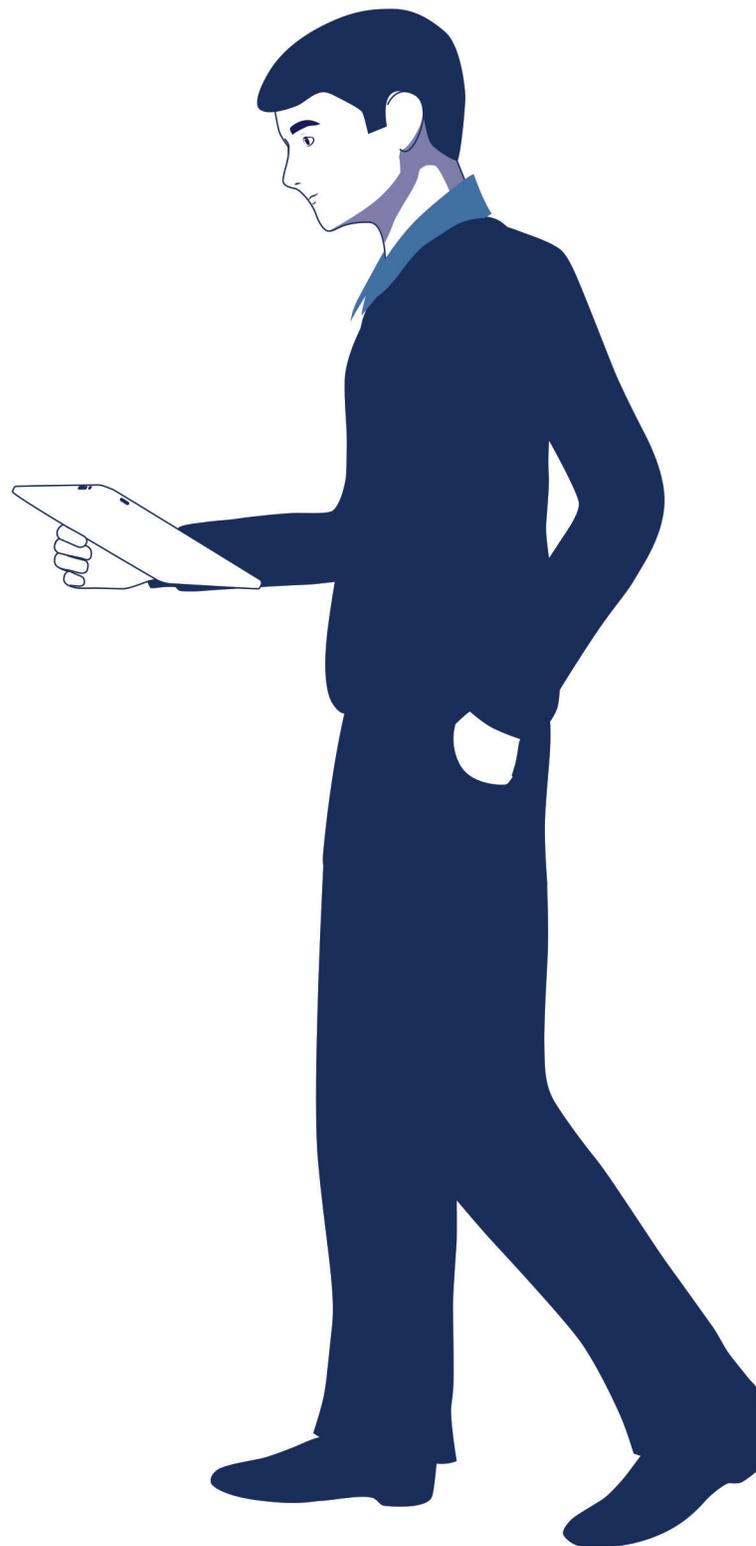


Time Division Multiplexing to
Internet Protocol



Executive Summary

Businesses looking to secure a foothold as a competitive leader in their industries are turning to IP-based network solutions, and phasing out Time Division Multiplexing (TDM). In the past, TDM leveraged optimal solutions for business telephony needs; however, today's demand for seamless integration of text, video and voice require that businesses adopt Internet Protocol (IP)- and Voice over Internet Protocol (VoIP)-based technology. The key to a successful migration from TDM to IP requires careful planning to ensure convergence and seamless integration of telecommunications' technologies in the future.

Introduction

For decades, time division multiplexing (TDM)-based platforms have been the gold standard in telecommunications. A system that connects telephony communications among interdependent external and internal telephone stations and requires manual switching, TDM can no longer keep up with technological innovations. What was once the leader in technology, TDM can't adapt to respond to consumer demands for video, text and voice, unable to seamlessly interface with these relatively new platforms.

As TDM nears the end of its useful lifecycle, businesses are turning to Internet Protocol (IP)-based solutions for voice, text, e-mail and video data transfer, and Voice over Internet Protocol (VoIP).¹ However, businesses in search of better telecommunications solutions face a dilemma. By investing in new technology, they risk their existing investment in TDM solutions. The issue of adopting a new and better infrastructure that will expand services into the future, however, puts the question of the value of phasing out old technologies to rest.

In the process, management must determine the best options in terms of converging the old and new network infrastructures, ensuring a seamless transition while fading

out TDM and implementing IP-based solutions—without sacrificing productivity, customer service, revenue or ROI.

The benefits of IP-based telecommunications solutions and its resolute adoption as the go-to standard in the 21st century, however, are too great to ignore. An IP infrastructure offers businesses greater flexibility, optimal control, and significant savings by accessing increased bandwidth without greatly increasing costs.

¹ <http://www.telecomengine.com/article/switch-tdm-ip-why-it-taking-so-long>

A Brief History

Enterprise businesses have depended on a Private Branch Exchange (PBX) TDM for decades. In essence, the infrastructure allowed the use of one path to carry multiple signals; however, the operation was limited to single cables connected to each “line,” with manual switching at central control. IP-based technology is set to make TDM a thing of the past, as it is able to send data packets from computer to computer. Routers read and send information between locations over the internet, allowing multiple connections or locations to act as a single unit or system, with the “switching” taking place seamlessly and without manual action.

Why TDM is No Longer Leading The Way

With today’s businesses requiring a higher level of bandwidth availability and streamlined telephony services, a TDM infrastructure limits operations in a number of ways.¹

- **Reliability and availability**—IP-based networks offer the same level, and often increasingly higher levels, of no-delay, always-available telephony.
- **Cost**—IP packet-based networks are generally priced several thousands of dollars less than TDM equipment, which ranges in the mid \$5,000s.
- **Scalability**—Increasing TDM equipment requires repeated investments in equipment.
- **Limited use**—TDM isn’t optimized for technologies other than data telephony. Options exist to adapt TDM for data; however, these solutions are less than ideal.² IP offers superior performance and suitability for combined text, voice, video, and more.

A new breed of technology services

As IP made its debut, gaining ground in the early 2000s,

early adopters showcased its benefits, putting to rest concerns about its usefulness and performance. No more did businesses wonder if the new technology would offer the Quality of Service (QoS) without delays and availability that TDM offered. By mid-decade, the shift toward IP adoption was evident, as more and more enterprises were set to develop or were already implementing a TDM to IP migration strategy. These businesses were already counting on IP’s proven perks, such as real-time telecommunications, lower costs, a unified telecommunications systems, an increase in productivity, and a higher level of customer service.

Industries It Serves

Regardless of industry, enterprise businesses are set to benefit from migrating TDM to IP through a scalable plan that delivers a convergence of infrastructure needs, present and future.

- **Utility companies** employ IP-based networks for real-time management of remote locations and better control over monitoring data.
- **Agencies that serve the public** depend on IP communications during disasters to ensure they can access a consistently available network with extensive bandwidth and video surveillance opportunities.
- **Railroad systems** turn to IP solutions for streamlined, accurate, remote-controlled communications and management.
- **Educational institutions** aren’t exempt from the perks IP offers. As educational offerings increasingly include long-distance learning opportunities, IP delivers video and computer needs to fully function outside the realm of the brick-and-mortar institution.

¹ <http://www.telecomengine.com/article/switch-tdm-ip-why-it-taking-so-long>

² <http://www.publiccom-usa.com/writing/encore.pdf>



- **The convergence of hospitals** into a single network depends on the seamless integration of telecommunications infrastructure, which IP-based solutions afford.
- **Global, national and local businesses** that serve multiple locations gain advantages from employing an IP-based network. Dependent upon high data transfer rates, TDM isn't able to deliver the technology to increase services, drive revenue and stay competitive. IP, however, allows for real-time monitoring of employee productivity in factories for example, video, text and voice communications for support staff, and so on.

For businesses, migrating to IP just makes sense, as it delivers two key factors upon which they're dependent: a larger capacity for data and system control, and the scalability and reliability of a packet-based protocol.

Benefits of IP

The bottom line for most businesses takes precedence when adopting new technologies, and IP is no different. Cost-savings generally motivate enterprises to converge wire-line and wireless networks, and gradually adopt an all-IP-based infrastructure. Savings are realized due to IP's ability to deliver¹:

- **Independence from location.** Remote agents, employees and the like can easily transition their tasks from the workplace to home. Call centers optimize business operations in the same way.
- **Single-network deployment and maintenance.** Bypassing the need to invest capital in multiple TDM networks, the reduced overhead costs of deploying and maintaining a single IP network are evident. Additionally, the single network's benefits extend beyond reduced purchasing and operating costs. They also allow an enterprise to develop policies that streamline operations that ultimately benefit the customer, leveraging the services that IP-based networks offer.
- **Improved customer support.** Regardless of the enterprise, IP-based networks allow improved interaction with

¹ http://www.cisco.com/en/US/products/sw/custcosw/ps1844/products_white_paper09186a00801ac0af.shtml#wp42155

customers, as well as clients and vendors. Businesses limit their growth by offering voice-only connections, as customers now expect to choose from multiple formats like e-mail, video or text chat. It's possible to add these layers on top of an IP-based open packet network, in consideration of scalability in the future as business operations expand and capital investment allows for the gradual inclusion of additional telecommunications services.

- **Reduced investment in capital equipment.** TDM requires that businesses invest heavily on equipment to serve the network; IP-based networks cost less to purchase, and allow for the easy integration of additional services as the company grows its services.
- **Larger bandwidth accessibility.** Businesses can increase their access to bandwidth only as the need arises, without the large-scale investment required in overhead for TDM equipment.
- **Consolidation.** The architecture of the IP network is such that it allows the enterprise to combine all systems into a single gateway site, lowering expenses for telecommunications services, increasing purchasing power, and offering improved monitoring and control over activity on the network.
- **Rapid response.** On an IP network, businesses can respond in real-time to telecommunications needs, allocating bandwidth where it's currently needed, as an increase arises in data needs versus text, or vice versa.² This flexibility gives businesses full control over the areas of the business that require real-time availability and reliability, on-demand.

² <http://www.networkworld.com/news/tech/2013/091113-contact-center-sip-trunking-273762.html>



Migration Strategy

In the past, businesses wanting to adopt IP solutions could only resort to a rip-and-replace approach, a methodology that often pre-empted the feasibility of the project due to cost restrictions or service delays.¹ Today, technologies exist to allow for the convergence of the two infrastructures, so that businesses can now pursue a gradual approach of migrating away from TDM, with the intent to fully endorse and adopt an all-IP infrastructure for the enterprises' future needs.

Many enterprise businesses, and in particular telecommunications organizations, have invested tremendous amounts of money over the years in software and hardware for TDM; a flash migration to IP-based solutions wouldn't make economic sense, and it could potentially disrupt operations so that the business couldn't continue daily operations as usual. A gradual migration to eventual convergence of infrastructure and a full-fledged adoption of IP offers the best of both worlds.²

Ideally, the optimal migration strategy should therefore support the new state-of-the-art telephony communications infrastructure while simultaneously syncing with existing TDM-based solutions.

Planning

It almost goes without saying, planning for the migration from TDM to IP requires strategic input from all involved parties, from management to IT staff to employees affected by the changes. A systematic plan highlights key priorities of the migration, and the resulting impact for business activities

across the board. Careful analysis and evaluation of critical areas ensures a smooth transition, as the business moves from the existing TDM network to a hybrid solution that combines both, to the end-product, full-IP network.

The Hybrid Phase

A hybrid implementation of TDM to IP optimizes the investment on the back-end while profiting from the perks of IP.³ Such an approach mitigates a measure of risk that comes with the transition. Namely, businesses can count on securing maximum value from their existing resources in terms of infrastructure and investment, while delivering key telecommunications solutions that their customers demand and their businesses need. As such, the enterprise doesn't have to immediately sacrifice the investment in TDM, while taking advantage of the perks that a packet-based platform offers.

For instance, a business can drive the convergence of infrastructures without having to invest in additional IT maintenance or hardware, and count on the seamless interaction that the single packet platform delivers including control over multichannel operations, call recordings, and high-tech routing methodologies.

Choosing a provider

The process of transitioning from TDM to IP includes strategic planning, consideration of what it takes to ensure seamless integration during the hybrid phase, and choosing a provider with whom to work. From the initial planning stages, the IP provider should conduct a comprehensive evaluation of the existing network infrastructure, and work

¹ http://www.verizonenterprise.com/resources/whitepapers/wp_the-smart-path-to-enterprise-ip-migration_en_xg.pdf

² http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=7&ad=rja&ved=0CGEQFjAG&url=http%3A%2F%2Fwww.alcatel-lucent.com%2Fwps%2FDocumentStreamerServlet%3FMSG_CABINET%3DDocs_and_Resource_Ctr%26LMSG_CONTENT_FILE%3DWhite_Papers%2FMigrating_Legacy_to_IPNetwork_White_paper.pdf&ei=sUMzUvDSi6iU2gXyplCwBA&usg=AFQjCNHciDU8Whr0t0L_6mQzakri54d9Rw&sig2=uexteqaRg1Jzy2YHnsl0qA&bvm=bv.52164340,d.b2l

³ <http://www.tmcnet.com/ngnmag/0710/tdm-migration-and-the-path-toward-unified-networks.htm>

with the transition team to plan for budgetary, staffing and IP needs.

A key step during the planning phase should also include discussing implementation and real-world applications for back-end systems affected by the transition, such as billing and reporting departments. Management should lead the cross-department team in an evaluation of the transition plan, ensuring that every department provides input into how the phased migration will impact the business as a whole.

The network provider and vendors who will assist the business in the migration process play a key role in the success or failure of the IP deployment. Their expertise should range from a solid understanding of network infrastructure convergence, TDM, experience in IP scalability—as well as VoIP—and knowledge of how to incorporate VoIP data into the infrastructure.

Conclusion

The future of IP-based network solutions is firmly entrenched as a viable business solution. Packet-based networks are now the only go-to infrastructure that makes sense for today's quick-paced, ever-changing telecommunications needs,

Regardless of when businesses plan the migration, it's clear that the planning stages should begin now. Both in terms of technology and economy, IP-based networks are the future, and businesses can't afford to ignore the significant benefits that a well-planned, phased migration delivers. Clearly, adapting the business' telecommunications infrastructure

offers an unparalleled competitive edge, securing an innovative technology that advances brand, improves customer relationships and ultimately increases revenue.

Ideally, the best TDM to IP migration plan for enterprises is one that considers flexibility, cost reduction and reducing inefficiencies within the company. IP proves scalable, reliable and cost effective, allowing businesses to create a strategic plan for telecommunications that will serve them well into the future.

To find out what Frontier can do for your business, contact:

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