The Intelligence Community's IT Dilemma: How to Upgrade Legacy TDM networks

In the face of mounting demands and dwindling IT budgets, circuit-to-packet technology offers IC officials a way to maintain and modernize aging technologies.

BY FEDSCOOP STAFF

Cloud computing's relentless impact on enterprise IT is putting growing pressure on government CXOs to migrate their agencies' IT infrastructure, data and applications to cloud's virtual promised land of lower costs, greater agility and stronger security.

But it's also creating a dilemma for the Intelligence Community and the other agencies that still depend on legacy computing systems to manage specialized workloads and sensitive information. Not all of them would benefit from a move to the cloud.

The dilemma: How best to maintain and modernize systems that rely on outdated, hard-wired, time division multiplexing (TDM) technology that's reaching the end of its service life and becoming increasingly expensive to keep running.

Engineered decades ago to deliver reliable, end-to-end network service for data and voice, TDM networking has been broadly abandoned by the nation's telecom carriers and technology suppliers in favor of faster, higher-capacity packet-based Ethernet and internet protocol (IP) technologies. As a result, replacement parts are harder and more costly to acquire, as is finding IT specialists with the skills to maintain TDM systems.

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> **HANK O'ROURKE**
> DIRECTOR OF JUNIPER NETWORKS' NATIONAL SECURITY GROUP

Potentially more worrisome, say federal networking experts, are concerns that the pendulum of federal IT spending may swing too far in favor of cloud services, shortchanging investments needed to keep critical TDM systems operating. While federal IT budgets—projected to total $88.8 billion in fiscal 2020—have historically earmarked 80 percent of IT funds for operations and maintenance, the pressure to shift to less costly platforms has grown more intense.

For intelligence analysts, military commanders, national security policy makers, law enforcement teams and others who depend on these legacy systems to support their missions, that's more than an incidental concern. A growing number of them are confronting declines in IT budgets and staff support at a time when pressure is only increasing to deliver more timely and comprehensive reports to an expanding number of intelligence consumers.

"Not enough attention is being paid to what is still required to keep these legacy systems up and running to support these needs," says Hank O'Rourke, director of Juniper Networks' National Security Group.

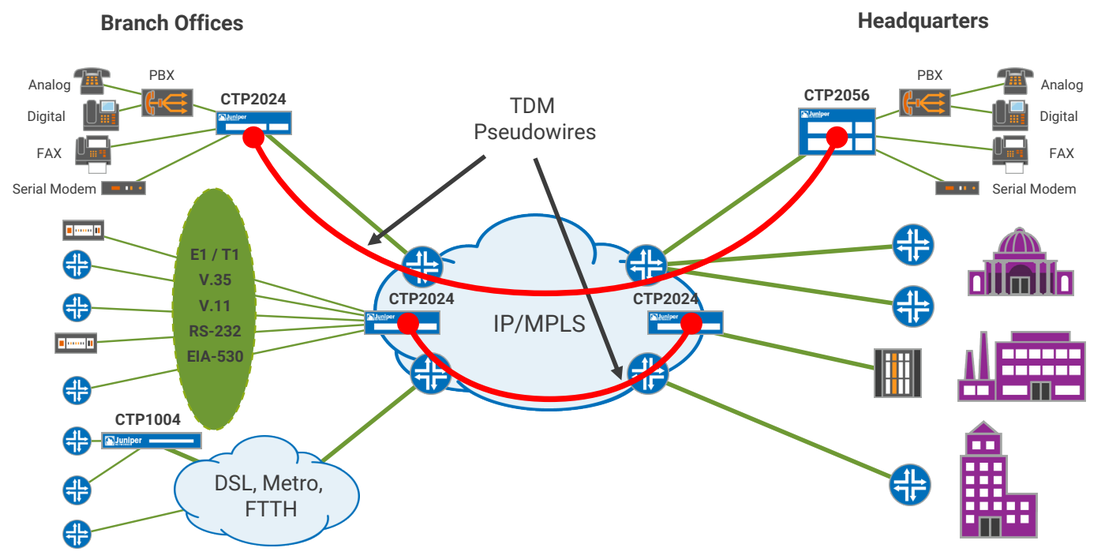
What's keeping TDM alive?

For all its limitations, TDM technology still sets the standard for network reliability. Its ability to react to a network failure in milliseconds and also protect end-users' applications are just some of the reasons network operators put their trust in the technology. For systems that also depend on precise relay timing—for example, when a data transmission is handed off from one cell site to another or when a utility activates a power relay—TDM's timing accuracy is crucial.

However, as federal IT departments continue to virtualize servers and applications to keep up with massive storage, compute and application demands, legacy network architectures are straining under the new requirements for high performance and agility.

Agencies are also contending with the need to integrate physical and virtual layers on their networks. And agencies need newer solutions to move data at 100 gigabit Ethernet transmission speeds or more to keep up with the sheer volume of data.

SOLUTION: CIRCUIT TO PACKET DEVICES *Source: Juniper Networks*



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Circuit-to-packet to the rescue

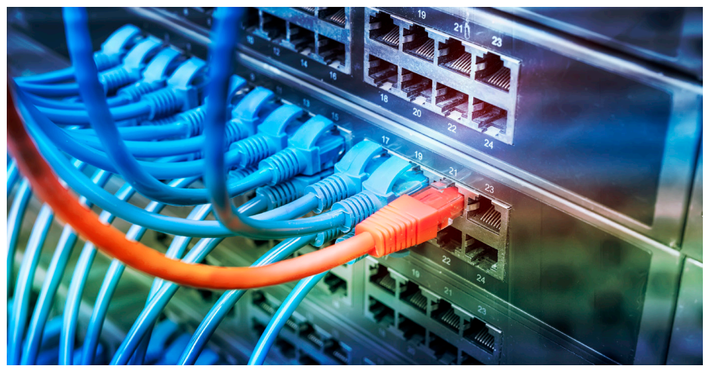
Fortunately, the technology to create digital bridges between TDM networks and higher-capacity, software-defined IP networks has evolved significantly in recent years. Advances in pseudowire technology that emulates TDM services, and a new generation of support platforms, are able to make TDM and IP networks work more seamless than ever. That offers senior agency leaders a cost-effective way to both maintain and modernize their legacy systems.

Legacy applications in common use at federal data centers require pervasive Layer 2 connectivity. That's the data-link layer that sets up links across the physical network—putting packets of information into network frames—and manages the traffic flow and protocols needed to successfully deliver data across a physical medium.

That's where advanced circuit-to-packet (CTP) platforms can come to the rescue.

CTP provides reliable transport between TDM systems and across IP networks, giving enterprises the ability to:

- Support physical TDM switching gear and services, without changing the functionality of existing equipment.
- Manage advanced clocking and buffering options to control end-to-end delivery timing and deal with packet jitter—packet pileups and delays—across IP networks.
- Connect and converge all digital and analog applications onto one IP/MPLS (Multiprotocol Label Switching) network.
- Reduce wide area network infrastructure costs by eliminating point-to-point circuits.
- Enable radio-over-IP solutions capable of handling critical communications across different networks.



Advanced capabilities, lower costs

The ability to fuse IP capabilities into older TDM systems can translate into a number of benefits for intelligence community system administrators and end users.

"The Intelligence Community is confronting many of the same challenges other federal agencies face in needing to rationalize their applications and decide where the cloud makes sense," says O'Rourke. "They have to make the hard call whether to kill an app, put it on life support, or re-engineer it. CTP adds life to an existing solution, so IC agencies have more time to get the best mix of legacy and cloud capabilities."

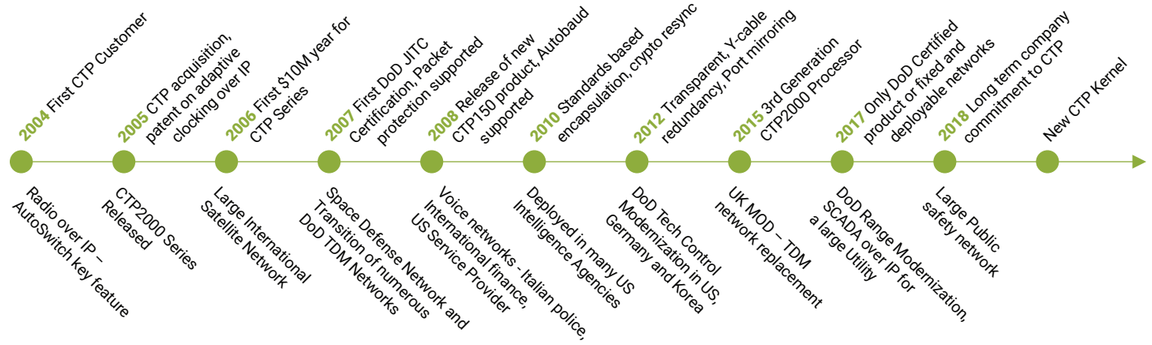
CTP not only extends the life of legacy systems; it also makes it possible to reduce total operating and support costs, for instance, by eliminating redundant point-to-point circuit connections. And because applications at the receiving end don't need to detect IP, it also saves software and hardware upgrade costs.

Using advanced features like IP Fabric services, agencies can also reduce system costs by utilizing Layer 2 and the network layer (Layer 3) more effectively. IT departments, for instance, can move virtual machines between servers, or dynamically allocate resources within or between data centers, using separate Layer 2 domains, resulting in greater agility and productivity for end-users, according to O'Rourke.

Today's CTP platforms can also streamline network management and improve performance. Network experts recommend agencies look for platforms that offer:

- **Software circuit provisioning** – Network operators can quickly fulfill new and changing end-user requirements without deploying excess hardware.
- **Scalable product family** – Network designers can control costs by selecting the CTP platforms and options most suitable for their operation and future growth.
- **Network Management System** – Managers can quickly deploy circuits and services while proactively monitoring the network performance, jitter, delay and packet loss—and have the tools to troubleshoot unforeseen issues.
- **Multiple system and circuit clocking solutions** – Improves circuit reliability by having precise, yet flexible clocking and buffering solutions to configure ports and system tolerances most appropriate for the particular application.
- **Auto switch** – Increases network and circuit reliability by automatically restoring the system to alternate locations and equipment in the event of an equipment, site or network failure.
- **Packet protector** – Increases circuit quality and reliability when IP connections experience significant packet loss caused by bit errors.
- **Autobaud** – Provides flexible rate agility that enables immediate and automatic provisioning changes.
- **Layer 2 Serial-to Ethernet IP aggregation** – Offers the ability to aggregate Layer 2 traffic from multiple serial interfaces, reducing the router interfaces and costs associated with low-speed IP aggregation.

JUNIPER TDM-TO-IP COTS HISTORY *Source: Juniper Networks*



- **14+ Years COTS Product Line**
- **7 Major releases, 2-3 minor releases a year + security and bug patches**
- **Dedicated software engineering, system test, FPGA engineering, and JTAC support**

Juniper Networks has been pioneering the application of TDM-to-IP technologies since 2004.

Partner with proven leaders

While CTP simplifies the process of modernizing legacy TDM systems, preserving network reliability also requires teaming up with networking experts with proven experience working at the scale and complexity unique to federal agencies.

Juniper Networks' steady evolution around CTP-based solutions over the past 15 years is just one reason why it was designated again in 2019 as a "Leader" in Gartner's Magic Quadrant for Data Center Networking. But Juniper Networks also earned top marks in Gartner's latest Peer Insights Customers' Choice ratings for data center networking.

"To us, this means that it isn't just the observations of analysts, but the experiences of practitioners that is garnering attention," says Juniper Networks Executive Vice President and Chief Product Officer Manoj Leelaniva. "Our solutions simplify operations across heterogeneous environments, focusing on infrastructure orchestration, automation, programmability, ease of management, visibility and analytics." ■

Learn more about the Juniper National Security Group and how its large team of experienced professionals — including Top Secret / Sensitive Compartmental Information business development, program management, systems engineering, and consulting specialists — can modernize your legacy systems.