FY18 Network Modernization & Convergence Plan for Migrating Legacy TDM Circuits to IP-Based Packet Networks

Background

The purpose of this whitepaper is to introduce Component MILDEP base communication managers to the joint TDM-to-Packet solution offered by Ciena Government Solutions, Inc. and Cornet Technology. The proposed solution was specifically created to address the DOD CIO's directed elimination of all Low Speed Time Division Multiplexing (LSTDM) transport technologies by the end of FY18.

It is our understanding that if MILDEPs that do not successfully migrate their LSTDM services to packet based solutions that they will be charged an elevated transport fee based on newly implemented tariffs for circuit based services. It is also our understanding that most of the original equipment manufacturers (OEMs) have terminated maintenance and technical support for end-of-life TDM equipment. Thus, MILDEPs are exposed to potential TDM equipment failures resulting in significant negative mission impacts.

As trusted DOD industry partners, Ciena and Cornet Technology thought it would be best to proactively tackle this significant issues with the MILDEPs, and co-develop a Modernization & Convergence Plan for migrating legacy TDM circuits to IP-based packet networks.

The first step in our journey is the introduction and examination of the technical capability and feasibility of the Ciena-Cornet TDM-to-Packet solution.

Selecting a Legacy Circuit to Packet Platform

Numerous DOD networks operating on circuit based transports still exist today (TDM multiplexers, PBXs, as well as Promina 800 and NX1000 and SONET-SDH platforms). These legacy elements all utilize deterministic connection based technologies; hence, end users have relied on these platforms for transport delivery that is predictive and precise. To meet these challenge, industry standards such as CESoP (Circuit Emulation Services over Packet) and SAToP (Structured Agnostic TDM over Packet) have been employed to transport these classic circuits over packet networks.

DOD network planners must investments in a technology that can extend near end of life critical legacy missions with a well thought out migration strategy that considers some of the following evaluation criteria:

    a.   Field proven APL Listed / JITC certified Fixed Network Element

    b.   1/10 GE Transport up-link to ensure future networking connectivity

    c.   Multiple Timing Options (Adaptive, BITS, RS/422 Station, 1588, Sync-E)

    d.   Wide range of customer facing interfaces to support legacy DOD connectivity requirements

    e.   Platform that support standards based interoperability (CESoP and SAToP)

    f.   Scalable platform that provide Five-nines survivability

g. All critical component can be redundant and are hot-swappable (Controllers, Power Supplies, Port Cards)

h. Software configurable transmission options : IP, MPLS, VLAN and Ethernet protocols

i. Port Cards with "self-healing" operation to minimize circuit interruption if a failure occurs

j. Capable of interfacing and transporting circuits to analog radios and IP SATCOM modems

k. Performance Management system that provides trending information to help operators observe potential problems before events happen

l. Support SNMP V3 / IPV6, FIPS 140-2 and SSH

m. Future proofed design with integrated SDN Orchestration - TODAY

A platform that provide all of the functionality above would enable network planners with a future-proof solution that undoubtedly would deliver the greatest ROI to the government.

Next-Generation Networking

For over a decade, network service planners and operators have migrated their core infrastructure to packet backbones that provide dynamic service provision and greater service reliability. With the advancement in SDN (Software Defined Networking), network operators can now capture real-time statistical data for their customers and do in over a "single pane of glass".

An ideal solution for DOD network planners would be a platform that offered the versatility of provisioning nearly any legacy interface, over packet network (IP, MPLS or VLAN) that was SDN capable. The solution would be designed to support next generation networking functionality such as NFV (Network Function Virtualization), providing a complete future-proofed solution.

Cornet IPGate®: Legacy to IP conversions
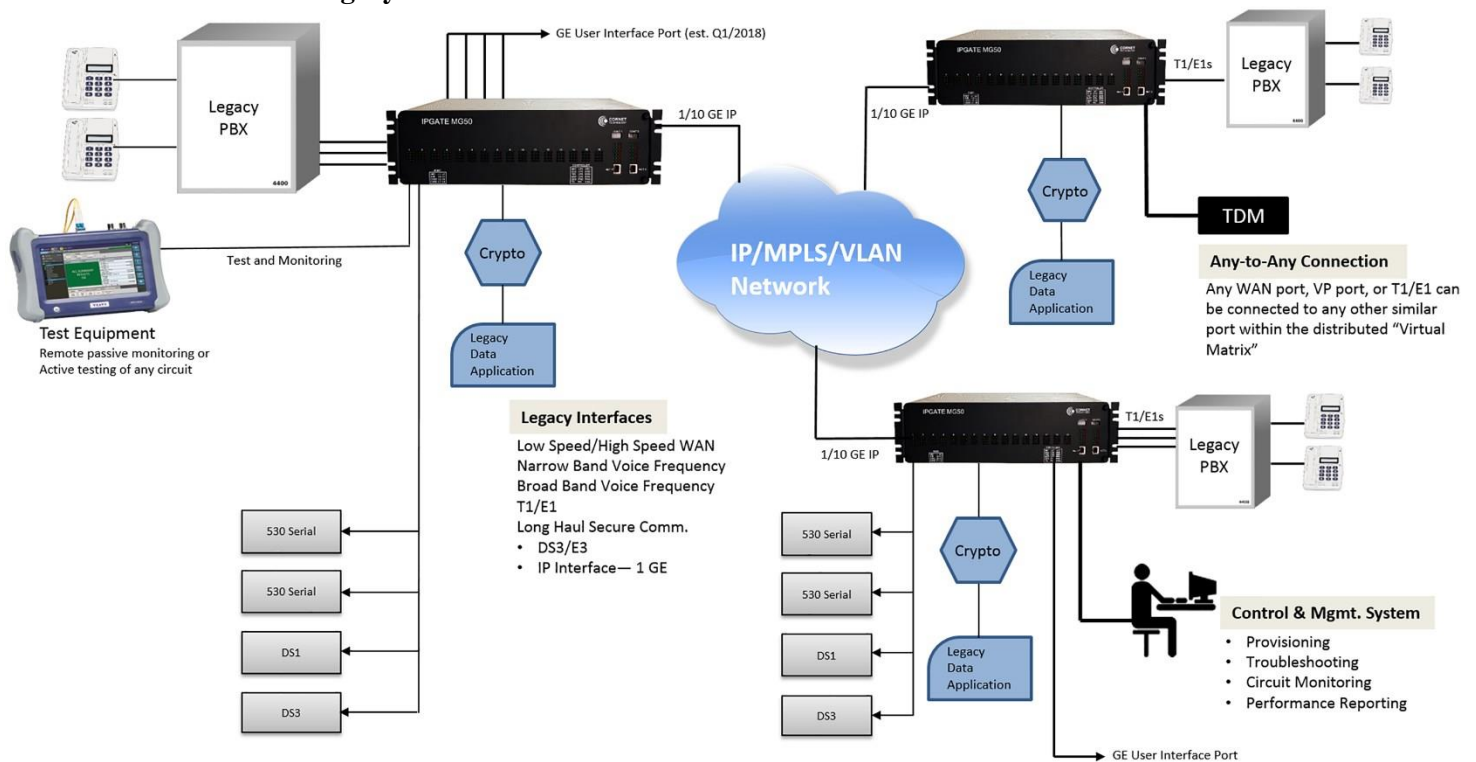
Cornet Technology, Inc. (CTI) IPGate circuit-to-packet gateway, provides the flexibility to transition mission critical TDM services over packet based (IP/MPLS or VLAN) networks. IPGate uses hot-swappable interface cards, and supports T1/E1, DS3/E3, RS-232, RS-422, RS-449, RS-530, V.35, and X.21, analog voice (E&M & FXS/FXO) plain-and-secure radio over IP, Wide Band, Narrowband, and Condition Di-phase (CDI). IPGate provides interface connectivity to customer services at rates from 50 bps up to 52 Mbps and can transport service over a 1/10 GE IP/MPLS or VLAN copper or fiber Trunk (NNI) interface.

CTI's IPGate coupled with Ciena's Blue Planet Multi-Domain Service Orchestration (MDSO) provides a single dashboard for visualizing circuit connectivity from the edge through the core to ensure maximum network survivability and end to end visibility. Blue Planet's extensible architecture supports a wide variety of use cases to help address network operator challenges and accelerate network transformation.

Our solutions are easy to deploy in an open environment, helping to incorporate best-in-class capabilities customized to your unique business needs. Blue Planet helps you serve both residential and enterprise customers across a wide range of industry segments like healthcare, financial, manufacturing, and more.

Blue Planet provides the speed, efficiency, and scale to build intelligent networks, address your customers' service needs, and power the digital age.

Conclusion

Leveraging the combined power of Ciena Blue Planet and Cornet IPGate allows operators to bridge the divide between legacy TDM equipment and a modern packet-based networking. Using the automation capabilities of Blue Planet allows for a simplified provisioning and management solution through a modern user interface that speeds the process of end to end provisioning of the combined network.

In March 2018, Cornet Technology's IPGate was chosen by DISA to provide the first elements to displace EOL TDM Promina within the DISN. IPGate is the most effective platform to meet the current and future adaptation of transport services for the U.S. DOD. IPGate ensures non-disruptive operation for end user services while providing network planners with the more cost-effective migration strategy.

IPGate provides the functionality to meet future network capabilities in the current hardware platform, saving CAPEX. Life cycle (OPEX) operations costs are significantly reduced because the IPGate provides for a simpler network implementation with fewer components to manage and maintain. As legacy elements and missions are phased out over time SDN and NFV will assuring a future proofed platform that will deliver long term ROI.