Intelligence Report: Infinera Announces the DTN-X, Giving Its 500G PIC a Home

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Service: Hot Topics, Service Provider Infrastructure
Market: Cloud Services, Data Center, Transport and Routing

Quick Take

Competitive Positives

- Delivers 500 Gbps superchannels (future 1 Tb/s); switches 5 Tb/s per chassis (future 10 Tb/s)
- Drives 100 Gbps wavelength over 1,732 km of fiber; demonstrated at SEACOM
- Converges DWDM and OTN switching on the same platform, plus an intelligent control plane
- Received market validation from three service provider endorsements: Verizon, XO and Interoute
- Venerable DTN also upgraded; receives 40G coherent/6.4 Tb/s per fiber, plus 40GbE/100GbE interfaces
- Release 1 of the DTN-X will be available in H1 2012, in time to upgrade existing DTN customers

Competitive Concerns

- Infinera superchannels are unique to the company
- MPLS switching is on roadmap
- Platform's large scale only practical in core locations
- The legacy DTN still does not provide Layer 2 (Ethernet) switching
- Infinera has yet to announce any DTN-X trials

Event Summary

September 15, 2011 - Infinera unveiled the DTN-X, a multi-terabit packet-optical transport platform designed for service providers needing to upgrade their networks to 100 Gbps and higher-speed optical transmission to support growth in video, mobile and cloud services. The DTN-X is based on Infinera's 500 Gbps PICs and custom switching ASICS to deliver 5 Tb/s per chassis initially, and it extends the ease of use and reliability of the DTN. The move has received three service provider endorsements.

Analytical Summary

Perspective

- Very positive on Infinera's announcement of the DTN-X converged optical transport system, because it offers a converged DWDM and OTN switching solution capable of providing the scale and flexibility necessary to enable service providers to keep pace with the continued scaling demands driven by new multimedia services. The system leverages the company's new 500G PIC, which supports 5x100 Gbps of transport capacity, and 5 Tbps switching ASIC, which provides the system's 5 Tbps of OTN switching capacity. The OTN switching of the platform enables an operator to utilize the 100G capacity of the wavelengths effectively. As evidence of market need and acceptance, the announcement included endorsements from Verizon, XO and Interoute.

Vendor Importance

- Very high to Infinera, because the company has staked its future on the success of the 500G PIC and needs the capabilities offered to propel it into the 100G coherent transport market with compelling metrics in high scale and flexibility, low price and low power consumption. When Infinera diverted its 400G PIC development to focus on the 500G PIC last year, it lost the ability to bring a 40G system to the market early; however, the added capacity delivered by the DTN-X enables it to declare leadership in photonic integration as well as deliver a system capable of disrupting the status quo with respect to cost, automation and scale. Upgrading the existing DTN system also helps the
Competitive Weaknesses

Competitive Concerns

- Though the DTN-X introduction mentioned a future MPLS capability, Infinera provided no details for the enhancement of its product with this capability, or a delivery time frame. If future services become overwhelmingly packet-based, a switching product must ultimately provide packet switching. In addition, Cisco and Juniper appear to be planning for an MPLS transport layer with their flexible packet transport and converged supercore, respectively. Forward-looking operators are likely to limit their consideration of core solutions to those in which they have confidence of layer 2 (MPLS) switching capability.

- The large scale of the DTN-X appears to make it practical in only core locations. Even its half-rack version provides 2 Tbps of OTN switching, and the smallest client connection it supports is 10 Gbps. Other transport (and packet-optical transport) platforms will aggregate a metro’s traffic for connection to the DTN-X. Thus, regardless of its many features that could be used throughout the metro, operators will probably only use it at metro hub locations.

- In this announcement, Infinera did not add Layer 2 (Ethernet) switching to its portfolio capabilities. The vendor claims that it will equip the DTN-X with MPLS, someday, but other platforms will need to aggregate all of the client connections. Since most packet-based services will use Ethernet connections, and Infinera has yet to mention an Ethernet switching capability for the DTN, the vendor risks losing business for its DTN to competitor packet-optical transport system (P-OTS) products that provide Ethernet switching.

- Infinera stated that it will conduct trials of the DTN-X in early 2012, but has not identified any operators who will be conducting the upcoming trials, nor has it announced any “pre-availability” trials of the DTN-X. Infinera has publicized several preliminary trials of its 500G PIC to communicate to the market its progress in the development of that critical component. Now that the vendor has described the platform that will employ its 500G PIC, the market will require some product trials to build its confidence in the DTN-X.

Competitive Strengths

Competitive Positives

- Infinera delivers a multi-terabit switching/transport platform with massive scale – 500 Gbps superchannel (to be upgraded to 1 Tbps) and 5 Tbps OTN switch (to be upgraded to 10 Tbps, plus a multichassis configuration supporting 100 Tbps). This scale, which is significantly greater than the per-chassis transport or OTN switching capacity of competitors’ core optical switching platforms, will enable operators to keep pace with the continued traffic demands driven by emerging multimedia content and new cloud services.

- The DTN-X is designed to place 100 Gbps on a fiber of up to 1,732 km, as demonstrated at SEACOM (please see Infinera Conducts 5x100G Trial in Africa, a Crucial Step in Its Race to Early 2012 500G PIC Delivery, August 2, 2011). 100 Gbps transport has become a table stakes technology to provide transport in the network’s core that is seeing massive bandwidth growth and demand for 100G connections between data centers and between backbone routers. Infinera has now demonstrated the transmission and receipt of five 100G signals in the same PIC, a crucial step in delivering its market-disruptive DTN-X product in early 2012.

- The DTN-X supports converged DWDM and OTN switching on the same platform and employs an intelligent control plane to minimize CapEx and OpEx, while providing maximum network control and resilience. The converged DWDM and OTN switching eliminates the redundant operating systems and cost of interconnection (CapEx) of separate platforms as well as eliminating the need to manage connections between the platforms. The intelligent control plane speeds connection provisioning across the network to essentially “point-and-click,” and provides rich recovery capabilities for multiple network failures.

- Infinera received market validation for the DTN-X via endorsements from three service providers - Verizon, XO and Interoute. All three of these operators are in ideal position to use the DTN-X in their core networks due to the physical size of, and broadband connections carried by, their networks. The Verizon endorsement is particularly valuable because the vendor had yet to gain traction in either of the two largest North American operators, AT&T and Verizon.

- Infinera also announced that it has upgraded its venerable DTN with 40G coherent optics and 40GbE/100GbE interfaces, likely extending the life of that product. The 40G DWDM optics provides the DTN a capacity of 6.4 Tbps per fiber, nearly as great as that of 100G DWDM systems (whose fiber capacities are generally 8.0 Tbps or 8.8 Tbps). The platform’s 40GbE and 100GbE interfaces enable it to support Ethernet connections between routers and switches.

- Release 1 of the DTN-X will be available in H1 2012, in time to upgrade existing DTN customers and to participate in the acceleration of the 100G market. The 100G transport market is in its infancy, with many of the announced wins for these systems hardly more than field trials. Most market studies forecast major 100G demand not occurring until 2012-2013. Thus, Infinera has the chance to introduce an economically disruptive product just as the mass market takes off. In addition, the vendor has maintained the H1 2012 delivery target for the DTN-X throughout the product’s development, fostering market confidence in Infinera’s ability to deliver.

Market Impact

- High on the optical transport and switching markets, because 100G transport is becoming table stakes for all players in all domains (i.e., both metro and long haul), and the new DTN-X sets new benchmarks: 500G super channels, convergence of DWDM and OTN switching, 5 Tbps OTN and future MPLS switching capacity, and an intelligent GMPLS-based control plane to automate bandwidth management and significantly reduce TCO. Infinera is not alone with a converged DWDM and OTN optical transport platform, and several competitors have also placed MPLS switching on their roadmaps; however, Infinera’s ability to deliver massive scale at much lower cost points will be cause for competitor concern when it demonstrates market traction.

- Competitive Positives

- Infinera superchannels are unique to the company, creating a planning scale that is new to operators who are unused to the vendor’s PIC technology. Specifically, the DTN-X 500G DWDM module creates five separate 100G channels, but they are planned and activated as a single entity; this is unlike all other 40G and 100G transponders, which are planned and activated one optical channel at a time. In addition, many operators will only need to activate one such channel for a significant period of time, so the superchannel may be overkill in many instances.

- Infinera stated that it will conduct trials of the DTN-X in early 2012, but has not identified any operators who will be conducting the upcoming trials, nor has it announced any “pre-availability” trials of the DTN-X. Infinera has publicized several preliminary trials of its 500G PIC to communicate to the market its progress in the development of that critical component. Now that the vendor has described the platform that will employ its 500G PIC, the market will require some product trials to build its confidence in the DTN-X.
**Response & Recommendations**

- Infinera needs to articulate a strategy for equipping the DTN-X with MPLS, rather than simply state that in subsequent releases the product will be upgradeable to MPLS. If future services become overwhelmingly packet-based, the DTN-X will eventually need to provide packet switching. Forward-looking operators are likely to limit their consideration of core solutions to those in which they have confidence of layer 2 (MPLS) switching capability.

- For the interim period prior to equipping the DTN-X with MPLS switching, Infinera should develop, with a major core router vendor, a strategy for integrating the transport functions of the DTN-X with core routers that it interconnects, and demonstrate that functionality. Operators will want to take advantage of a 100GbE connection between a core router and an adjacent DTN-X, but support IP connections or label switched paths (LSPs) to multiple far-end routers over that 100GbE physical connection. Competitors Alcatel-Lucent and Huawei have stated strategies for steering VLANs from the router over OTN connections initiated in their switches.

- Infinera needs to provide evidence that it is making progress towards delivery by identifying one or more major operators who are trialing the DTN-X.

- Infinera needs to consider providing packet switching capabilities for its DTN DWDM platform to provide Ethernet switching capability, demand for which is growing among operators. Though the product offers OTN switching capability, and the DTN-X will eventually be equipped with MPLS switching capability, provisioning of Ethernet services over a network of DTNs and DTN-Xs will handicapped because the DTNs at the network’s edge will not recognize VLANs or LSPs. So far, the demand for packet switching on the DTN has been driven by operator desire to deploy carrier Ethernet services. The opportunity to provide 4G backhaul may make packet switching capability “table stakes.”

- Alcatel-Lucent and Ciena need to demonstrate 100G DWDM transport optics on their core optical switches, the 1830 PSS-64 and 5430 RSS, respectively, to maintain their claim on core transport technical leadership. Both vendors were among the first to deliver 100G DWDM transport and both offer core optical switching, but neither has demonstrated switching integrated with the 100G transport. In addition, both will need to consider bolstering the 100G DWDM port density of their platforms as the DTN-X will lead the pack in 100G DWDM port density.

- Cisco should conduct and announce a trial of its 100G transport system to indicate that it is also a player in the 100G DWDM transport market. It also needs to develop a strategy to offset its lack of a core optical switch. Most of the other major DWDM vendors have announced 100G trials, and Infinera appears to be on the doorstep of introducing an economically disruptive product. Cisco has announced its acquisition of CoreOptics, giving it the technology necessary to develop such transport capability, but has been silent since. The vendor risks tier 1 operator business without core optical (OTN) switching.

- Now that it has released its 100G transport product, NSN should document 100G transport in its hiT 7300 (and, even better, the hiT 7100) with a customer trial to validate this capability. Several vendors have already completed 100G trials, Alcatel-Lucent and Ciena have commercially available products, and now Infinera threatens to impact the market’s margins negatively by introducing the economically disruptive DTN-X. NSN needs to gain mind share in prospects who are in the planning process with public 100G customer announcements prior to being squeezed out by market predecessors on one hand and Infinera on the other.

- Vendors such as Ericsson, Huawei, Tellabs and ZTE should announce availability dates for their 100G products as soon as possible. These vendors have completed 100G trials, but are not publicly projecting availability dates for their products. Not only have numerous competitors committed to 100G transport delivery dates, but Infinera promises to raise the bar (or is that lower the cost bar?) with its H1 2012 delivery of the DTN-X. Vendors cannot afford to be considered slow in their delivery of 100G transport by not committing to availability dates; they need to engage their customers in the planning process with firm 100G product roadmaps.

**Buyer Actions**

- Tier 1 carriers should seek to bring Infinera’s DTN-X into their labs for thorough testing. The new product promises to provide unparalleled transport and switching capacity – capacity that these carriers have demanded to address a tsunami of core traffic driven by multiplying end users of HD video content and, soon, cloud services. The ability to switch and transport massive amounts of this traffic economically and effectively will be a strategic, and competitive, requirement of operators in a rapidly approaching future.

- Operators should press Infinera for its strategy for providing efficient packet transport. The vendor claims it has planned for an MPLS capability for the DTN-X, but does not specify a road to that capability, and has not issued any plans for equipping the DTN with packet switching. Because the DTN-X supports interfaces at 10 Gbps and higher, packet-based services such as Ethernet will need to be aggregated by packet-aware equipment prior to being connected to the DTN-X even after it is upgraded to support MPLS. Any operators who wish to provide carrier Ethernet will need to learn Infinera’s plans to support that service.

- Modestly sized operators should inquire of Infinera how to cost justify provisioning at an increment of 500 Gbps per route. The vendor does offer the half-rack version (2 Tbps OTN switching capacity) of its DTN-X, which may provide appropriate switching scale for those operators. However, it is doubtful that an operator who currently supports, for example, ten 10G wavelengths per fiber route will need the 50 x 10G wavelength capacity of the DTN-X anytime soon.