


Competitive Intelligence Report: **Alcatel-Lucent Announces 100GigE Interfaces for Its Edge Router Portfolio – Challenging Core Routers for Dominance**

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Market: Carrier Infrastructure

Current Perspective: 

## Standard View

### Summary

#### Event Summary

July 16, 2009 - Alcatel-Lucent introduced a 100 GigE service routing interface for the “edge,” where it claims service providers need it most. The interface uses its FP2 silicon to deliver the bandwidth needed to support high scale services and improvements in power efficiency with on-chip power management. Expanding capacity at the edge enables service providers to reduce the cost per bit while delivering more high value services. Canadian service provider TELUS has endorsed the solution.

#### Analytical Summary

- **Current Perspective:** Very positive on Alcatel-Lucent’s announced performance enhancements for its high end IP router portfolio, because it logically expands their ability to meet the growing requirements for greater service router capacity at the edge, metro and core of the service provider’s network. The solution brings Alcatel-Lucent’s customers new line cards that support growing applications requiring greater numbers of 10GigE ports as well as emerging 100GigE interfaces, while retaining the service-aware capabilities of its edge service router. Endorsing the announcement, service provider Telus noted that with the new line cards they could continue to introduce sophisticated services and meet the needs of customers now and well into the future.
- **Vendor Importance:** High to Alcatel-Lucent’s IP division, because the move continues the stream of new capabilities and enhancements that it has introduced to its Service Router and Ethernet Services Switch product families since their inception in 2004. The announcement leverages the earlier introduction of the company’s FP2 silicon, which set the stage for 100G/slot capacity on the 7750 SR and 7450 ESS platforms. The move also capitalizes on Alcatel-Lucent’s strategic and costly silicon development, which yields a time to market advantage over off-the-shelf devices. The move also enables the company to tout its chip-level power management capabilities which only consumes around 4 Watts/Gigabit of traffic per 100 Gigabit Ethernet interface module.
- **Market Impact:** High on the carrier infrastructure market, especially the multiservice and Ethernet services edge router market segments, which continue to grow to meet the demands being brought on by requirements for increased per-subscriber bandwidth, service sophistication, growth in the number and type of users and a trend to converge multiple networks. Alcatel-Lucent can highlight that the new silicon has been in the field (since July 2008) and tested delivering 50G/slot capacity for the past year. The announced advances also give Alcatel-Lucent much higher 10GigE densities (10 X 10GigE ports per slot/100 X 10GigE ports/chassis), which service providers can leverage to meet growing connectivity needs while positioning them for 100GigE support.

#### Target Markets

MSOs, IOCs, ISPs, CLECs, ILECs, Global Carriers, Mobile Wireless Operators

### Perspective

Current Perspective 

We are taking a very positive stance on Alcatel-Lucent’s newly announced 100 GigE interfaces for its IP

router/switch portfolio, consisting of the 7750 Service Router (SR) and the 7450 Ethernet Services Switch (ESS), because it addresses the challenges service providers are faced with in terms of supporting increased subscriber density, per-subscriber capacity and service sophistication. Alcatel-Lucent is leveraging its in-house developed network processor complex, FP2, to provide full line rate 100GigE interface support on its edge platforms. The two platforms will be able to provide up to ten line rate 100GigE interfaces per chassis to meet the scale requirements of the most demanding edge requirements. In addition, it is also offering a new 10 X 10GigE interface that raises the total number of 10GigE interfaces per chassis to 100 – giving it one of the highest metrics in the edge/core router market. The announcement also included an endorsement from TELUS citing the technology as enabling them to continue to introduce sophisticated services and meet the needs of their customers now and far into the future.

Alcatel-Lucent's announcement is a logical follow-on from last year's FP2 silicon advancements, which enabled the 7750SR and 7450ESS to support up to 50G/slot, yielding a line rate 10GigE density of 50 ports per chassis (it could also support up to 80 oversubscribed ports per chassis). Significant in this announcement is the fact that the FP2 silicon has been in production since last July, eliminating much of the uncertainty related to its stability, and Alcatel-Lucent's ability to deliver the chips needed for the solution to meet mass deployments by mid 2010. The new 100GigE line card will be available for consumption at the same time that the IEEE will ratify the P802.3ba 100/40G standard, and the expected availability of production quantities of the new pluggable optics (CFP). Also of significance is that all of the service router edge features are available for use with the 100GigE interfaces, giving service providers considerable flexibility in how they build their networks and segment functionality between the edge, core and metro.

Alcatel-Lucent's competitors are also active in the 100G market segment. Juniper has announced similar availability of 100GigE interfaces for its IP core router, the T1600, driven by requirements such as increasing network traffic (video and data), wireless services and emerging trends such as cloud computing within the IP core network that will soon require a new generation of scale. 100G Ethernet interfaces will provide an order of magnitude increase over current solutions that are available today, such as link aggregation (LAG). Cisco has also been active in the space with activities such as its June 2008 100G Ethernet demonstrations with Comcast. Cisco's 100G interface is consistent with the emerging IEEE 802.3ba standard, and will enable service providers to take advantage of economies of scale, flexibility and QoS. The testing at Comcast validates the use of 100GigE IPoDWDM over Comcast's 10G optical production network, which also leverages Cisco's compression capabilities to better utilize the transport bandwidth; however, Cisco has not offered a delivery date for a 100GigE interface on the CRS-1 core router platform. Neither vendor has announced plans to add 100G support to their respective edge platforms (Juniper's MX Series and Cisco's ASR 9000), which tout 100G/slot or greater capabilities. Huawei has also made progress with 100G optical transport capabilities, as announced in October 2008, with a successful development of a 100 GigE router interface and active participation in the development of the 100GE standard efforts. Force10's new ExaScale E-Series supports 140 ports of 10GigE line rate ports per chassis, but has not announced the availability of a higher speed interface at this time. Vendors such as Brocade and Extreme also have platforms capable of 100G/slot or greater, but have not announced 40 or 100GigE interfaces at this time – but have noted they are roadmap items.

The announcement will have a high impact on the carrier infrastructure market, especially the multiservice and Ethernet services edge router segments, which continue to grow to meet the demands driven by increased per-subscriber bandwidth, service sophistication, growth in the number and type of users, and the trend to converge multiple networks. Alcatel-Lucent's ability to deliver very high 10GigE densities (10 X 10GigE ports per slot/100 X 10GigE ports/chassis), which service providers can leverage to meet growing connectivity needs while positioning them for future 100GigE support, will drive significant market interest by customers and competitors. And the fact that the new silicon has been field tested lends the announcement additional weight.

## Positives and Concerns

### Competitive Positives

- Against a backdrop of Alcatel-Lucent's continued success in the multiservice and Ethernet services markets, demonstrated by having over 270 customers in 100 countries (representing 22 of the top 30 SPs), the new announcement represents a strengthening of the company's overall competitive positioning by addressing service providers' capacity and service delivery challenges. The new capabilities not only raise the bar for Ethernet speed and density, but do so while retaining the service sophistication needed to enable delivery of high value services.

- Key to the announcement is Alcatel-Lucent's FP2 silicon, which has been deployed since July 2008, giving the solution a higher level of credibility than it would if it had only been released along with the new line card modules. The FP2 is currently used to deliver 50G/slot using existing line cards. By leveraging its in-house silicon development, Alcatel-Lucent was able to introduce the 100G-capable FP2 about 18 months ahead of merchant silicon, which is expected to be available at the end of 2009 or the beginning of 2010.
- The announcement gives the 7750 SR and 7450 ESS class-leading 10 GigE port densities that service providers can leverage to meet increased connectivity demands in the edge and metro networks. New 10 X 10GigE line cards will support a maximum per chassis density of 100 line rate interfaces. The demand for greater 10GigE density is being driven by growth in applications such as IPTV, business L2/L3 VPN services and the ever increasing adoption of real-time video applications.
- The announcement gives Alcatel-Lucent a first mover advantage by announcing 100GigE support on its edge and metro Ethernet routers and switches ahead of its competition. Although products such as the 7750 SR are primarily focused on edge applications, Alcatel-Lucent's customers can also leverage the portfolio's Terabit performance (launched in March 2008), leading 10/100GigE port densities, and rich service capabilities for core applications. This model provides a simplified edge/metro/core architecture including common features and operating environment.
- The increase in 10GigE density, and the addition of 100GigE capability for the edge of the network, supports a growing trend to meet additional routing and traffic demands placed on the edge/metro/aggregation network to accommodate applications such as video content distribution and sophisticated management of services. Published industry data, from multiple sources, has shown that the edge market is expected to grow at least 2:1 over the size of the core network.
- The availability of the 100GigE line card is well timed to enter commercial availability around the time that the IEEE's P802.3ba task force will ratify the standard for both 100G and 40G Ethernet as well as the expected availability of new CFP optics to support widespread deployments. Although both 40G and 100G standards are being addressed, the focus on Alcatel-Lucent's announcement is on the higher-speed version. However, based on availability, customer demand and economics, 40G interfaces will also be supported.

## Competitive Concerns

- Until now, 100GigE was considered by many as just emerging within the IP core network, primarily to address the physical complexities of using solutions such as LAG where greater than 10GigE of capacity was needed, and to better leverage high volume flows into and out of the optical transport network. Launching a 10X increase in capacity at the edge network could potentially cause service providers to pause and rethink their overall edge-core architectures, and postpone certain deployments.
- The announcement from Alcatel-Lucent is focused on addressing the higher capacity requirements from the IP routing and switching perspective; however, the vendor has not provided visibility into how it will more effectively link its IP and optical products moving forward. Since Alcatel-Lucent is a strong player in both environments, visibility into how it will provide a closer integration would be valuable to service providers.
- The announcement did not provide any pricing guidance, which would be useful for service providers who are actively engaged in network design and planning activities. Since the 100GigE will require new optics (such as CFP pluggable optics), there is a level of uncertainty related to the overall cost effectiveness of 100GigE versus N X 10GigE connectivity.
- Although perhaps the lowest issue on the list, the IEEE will not finalize its P802.3ba specification until mid-2010, leaving some level of uncertainty that could delay ratification. Participating vendors, however, have a level of confidence now to proceed with their development efforts given little or no significant changes between now and ratification.
- With respect to IP core applications, although the 7750 SR and 7450ESS will deliver leading 100GigE densities on a per chassis basis, for those applications that require multi-terabit performance, Alcatel-Lucent has not offered a hint at a multi-chassis version of its service router. Competitors Cisco, Juniper and Huawei offer the ability to scale beyond a single chassis to reach up to 92 Tbps, 25 Tbps and 10 Tbps respectively with their IP core router solutions.

## Recommended Actions

### Recommended Vendor Actions

- Alcatel-Lucent should engage with one of its premier service provider customers, such as Telus, to do trials and testing of the higher capacity edge capabilities to demonstrate how the 10 X 20GigE and the 100GigE interfaces address their growing edge/metro requirements.
- Alcatel-Lucent should outline its optical – IP integration roadmap to provide visibility into its overall transport and service delivery architecture related to the two domains. In addition, with its emphasis on network convergence, it should also extend its model toward the access layer and demonstrate a common, service-aware model for all layers and technologies present in the network – including a common management environment.
- Alcatel-Lucent should consider releasing the 10 X 10GigE line cards as soon as possible, rather than wait and tie the availability directly to the 100G interface release --- this could begin addressing higher density (>10GigE) requirements that exist today without resorting to LAG models.
- Alcatel-Lucent should begin to elevate its messaging around using 7750 SR for IP core applications that require the new densities provided by the new line cards. With the 10GigE and 100GigE densities currently leading the publicly announced capabilities of traditional IP core router platforms, this could elevate its position in the edge, metro and core of the network.
- Alcatel-Lucent should provide additional technical information, given the level of traffic traversing a 100G interface, and issue a best practices note describing how to provide link, node and network resiliency using its service router portfolio. The best practices could address how to backup a single 100GigE link with another standby link, the use of N X 10GigE LAG and other models that will yield the most cost effective means for balancing capacity against cost.

### Recommended Competitor Actions

- Cisco should highlight its 100G Ethernet initiatives, such as its June 2008 100G Ethernet demonstrations at Comcast, and update its product roadmap timeline, noting that its 100G interface for the CRS-1 will be consistent with the emerging IEEE 802.3ba standard. Cisco should also update its messaging around its next generation edge platform, the ASR 9000, with respect to planned support for 100GigE interfaces and greater per slot densities for broadband traffic.
- Juniper should note its June 2009 announcement of a 100 Gigabit Ethernet router interface card for the T1600 IP Core Router. Driven by factors such as increasing video traffic, converged wireless services and emerging trends such as cloud computing, core networks will require greater scale and 100G Ethernet interfaces will provide an order of magnitude increase over current solutions that are currently available. Juniper should provide a roadmap and positioning of its MX Series with respect to 100 GigE support.
- Ericsson should update its positioning with respect to the need to increase interface density and scale of its SmartEdge and SM480 platforms in response to Alcatel-Lucent's announcement. Although the SmartEdge and SM480 are a highly capable multiservice edge and Ethernet services routers respectively, their 10 GigE densities are significantly less than that offered by Alcatel-Lucent. Ericsson should also point out that although its physical port metrics are less, it provides a high level of subscriber support for each port as well as a rich set of service enabling edge functions.
- Huawei should update its positioning on its next round of interface and capacity upgrades for its NE5000E and NE80E/40E as well as its CX600 metro Ethernet switch with respect to helping its service provider customers meet the challenges of network growth and service enablement. Huawei should tout its leadership position in the industry and standards organizations with respect to the emerging 100/40G standards and its unified model for access, IP and optical portfolio.
- Nokia Siemens Networks, which leverages Juniper's edge, core and metro platforms (M Series, T Series and MX Series), should weigh in on the need to beef up the service provider edge with 100GigE and expanded N X 10GigE interfaces. NSN should highlight its broad network experience in professional services and network construction for major service providers with regard to how best to deal with the on-going capacity and

subscriber explosion.

- Vendors such as Brocade (XMR/MLX series), Force10 (ExaScale E-Series), and Extreme (BlackDiamond 20808), should evaluate their customers' need for greater 10 GigE density and/or 100GigE interfaces for their edge and core platforms. All should stress their respective networking heritage and strengths, and leverage their overall technology capabilities to address Alcatel-Lucent's new metrics. All should suggest that 100GigE solutions are still somewhat off in the future, stressing their platforms' unique abilities and their willingness to meet the needs of their respective customers.

#### **Recommended End User / Customer Actions**

- Tier 1 service providers should evaluate the capabilities offered by Alcatel-Lucent's new 10 X 10GigE and 100GigE interface along with the service routing capabilities of the 7750 SR and 7745 ESS. Although the addition of the new interfaces are key enablers to support higher speeds and densities, the combination of the service enabling and network convergence capabilities of the overall solution should be taken into account.
- Service providers who need higher speed Ethernet connectivity and who are using LAG technology should evaluate the merits of leveraging a single high speed interface in lieu of configuring multiple 10GigE interfaces to achieve increased capacity. Although LAG technologies are commonly used and supported by all vendors, there is a level of physical complexity that can be minimized by using fewer but faster interfaces.
- Service providers using equipment from other vendors, and who have a projected need for greater than 10GigE density interfaces, should press their suppliers for a delivery roadmap for their expanded 10GigE and 100G solutions. Service providers should also look to their suppliers to offer seamless integration between their IP edge/metro/core router-based networks and their optical transport networks to gain additional network simplicity, visibility and resiliency.
- Service providers should press their suppliers to push the cost points of their solutions downward aggressively in order to enable them to leverage the more capable 100G solutions in the 2010-2011+ timeframe following the ratification of the IEEE P802.3ba standard. Higher density/capacity interfaces and more cost effective solutions will enable carriers to adopt and support converged wireline and wireless network models to meet the needs of future applications.
- Service providers should evaluate their overall network architectures with respect to the roles of their core, edge and metro networks. Platforms that support service sophistication as well as deliver the required scale may provide a more streamlined model that helps to reduce complexity and overall TCO.

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