

Telia Carrier Elevates Network with Infinera's Technology Innovations

CUSTOMER
Telia Carrier

CHALLENGE

Maximize fiber utilization while paving the way for next-generation, high-capacity, higher-baud-rate wavelengths

Minimize transport costs by reducing the number of regens in the network

Increase network capacity to enhance competitive edge and broaden addressable market

SOLUTION

Infinera's ICE4-powered XT and XTC Series platforms, part of the DTN-X Family, increase network capacity and maximize spectrum utilization

Infinera Instant Bandwidth accelerates service turn-up, closely aligning to incoming customer revenue

Infinera FlexILS ensures interoperability between legacy and new platforms, maximizing ROI while paving the way for the new era of multi-terabit networking

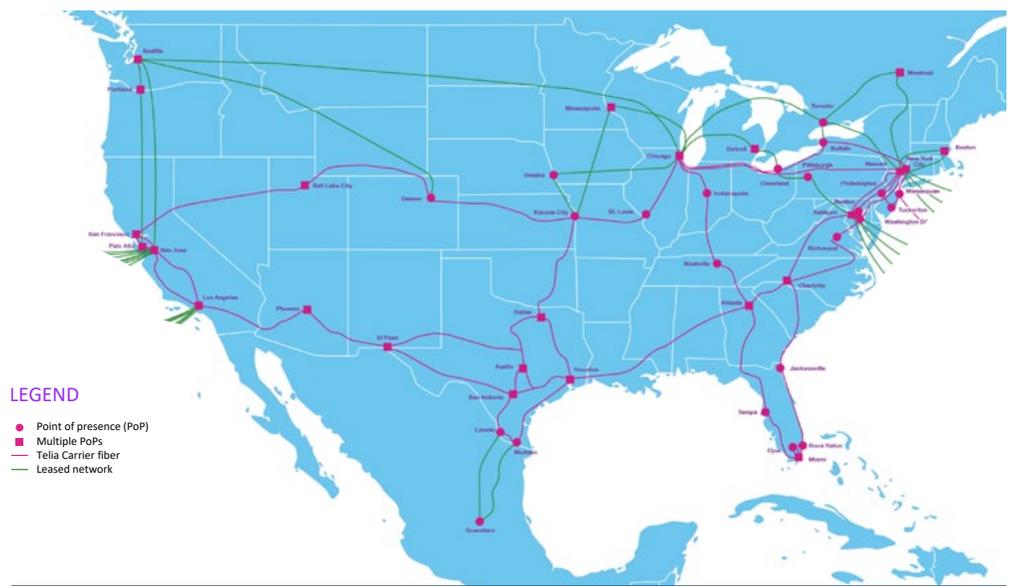
RESULTS

An open, future-proof network that paves the way for the seamless deployment of next-generation services

An additional 33 percent of capacity and a reduction in regens that lowers operating costs while simplifying network architecture and enhancing service reliability and velocity

Fast, automated service activation that leads to faster time to revenue and reduces operating costs by eliminating truck rolls and on-site provisioning

TELIA CARRIER needed to meet urgent demand to continue to fuel its positive market momentum by increasing network capacity, enhancing optical performance and streamlining operations. Infinera's solutions allow Telia Carrier to reach an unprecedented level of flexibility, performance and agility through dynamic service set-up and activation, a significant reduction in operating costs and a new level of scalability to meet the constant demand for bandwidth.



Introduction

Telia Carrier, a fully owned subsidiary of Telia Company, is a provider of global connectivity and cloud connect services. Since the 1990s, Telia Carrier has served the world's largest operators, content providers and enterprises with access to an ever-expanding global network footprint. Its state-

Figure 1: Telia Carrier's Network in North America

of-the-art IP network AS1299 has just celebrated its 25th anniversary. Telia Carrier transports 10 billion minutes of voice per year and offers voice and data "like-home" roaming services on its global IPX backbone. It also connects high-volume, business-critical content and applications to media-hungry customers globally

"The ability to increase capacity by 33 percent and evolve our network to ICE4 and beyond is a game-changer as it allows us to reach a new level of scalability, service flexibility and network agility."

—Mattias Fridström, Vice President and Chief Evangelist, Telia Carrier

“In such a fast-paced and competitive landscape, we have to make sure we streamline our operations to provide fast service turn-up where time is revenue, and offer unparalleled network and service agility for our customers’ dynamic business needs. Infinera’s technology innovations allow us to fuel our growth and positive marketing momentum by reducing the cost of operations and enhancing our competitive edge while paving the way for the future.”

—*Mattias Fridström, Vice President and Chief Evangelist, Telia Carrier*

with high-capacity IP services, wavelengths and even fully managed networks to connect data centers across customers’ own backbone networks. Its fiber network now stretches 65,000 kilometers, linking more than 265 points of presence in the U.S. (Figure 1), Europe (including Russia) and Asia, and carries more than 3 exabytes of data every month. Any Telia Carrier customers plugged into its global backbone can connect directly to more than 1,800 wholesale customers in more than 110 countries. Telia Carrier has always been highly ranked among the internet backbones of the world, and in recent years it has held the top spot.

Business Challenges

Telia Carrier’s positive market momentum and constantly growing customer base have created urgent demand to increase network capacity and further enhance optical performance. More specifically, internet content providers (ICPs) have raised service requirements to a new level of capacity/bit rate, low latency/jitter and high reliability to meet the ever-increasing demand for content and the stringent requirements for inter-data center connectivity. Moreover, the carrier market is a very competitive environment with significant year-over-year price erosion, market differentiators that are directly related to network performance and agility

(such as service availability, speed of service turn-up, etc.) and a constant demand for bandwidth that far exceeds the rate of revenue growth. In such a fast-paced and competitive landscape, Telia Carrier must decrease recurring costs and increase network capacity and service agility to maintain and further accelerate its market momentum.

Strategy and Execution

In order to achieve the goals mentioned earlier, Telia Carrier set its network evolution strategy in three parts:

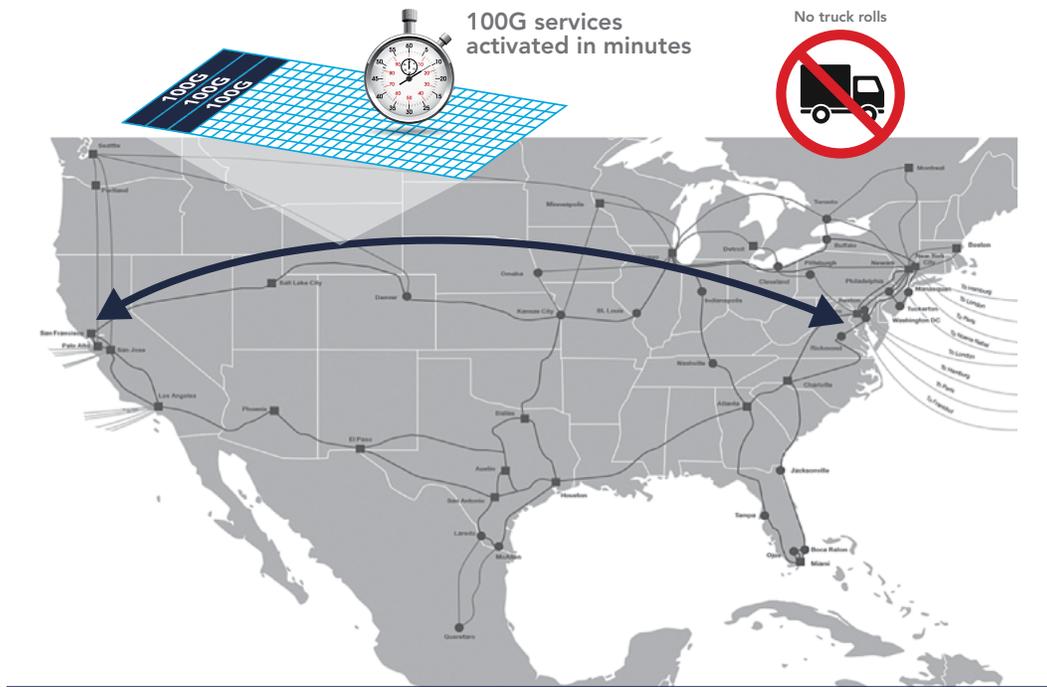
Part 1: Maximize fiber utilization by evolving the optical photonic line to flexible grid. New fiber pairs are expensive to acquire, especially on routes with heavy traffic, so moving to flexible grid allows Telia Carrier to maximize spectrum utilization and increase network capacity while paving the way for next-generation, high-capacity, higher-baud-rate wavelengths such as 600 gigabits per second (Gb/s) and beyond. Such an evolution will translate to a positive impact on both the top and bottom lines by increasing the ability to add new customers while maximizing current network assets.

Part 2: Minimize the cost of transport through lower capital expenditure (CapEx)/operational expenditure (OpEx) and a significant reduction in regenerators (regens). The massive reduction in regens allows Telia Carrier to reduce operating costs, including the cost of footprint and power consumption, sparing and license costs, etc., that directly

impact bottom line. As a matter of fact, Telia Carrier’s vision is to support zero regenerations for regional wavelengths and circuits connecting adjacent IP backbone routers, and single regeneration for coast-to-coast circuits.

Part 3: Increase network capacity by deploying Infinera’s fourth-generation Infinite Capacity Engine (ICE4)-powered platforms like the XT-3300 and XT-3600, and by seamlessly upgrading the XTC-10 installed base while in service to multiple terabits of capacity (e.g. 12 terabits per second [Tb/s]), a process also enabled by ICE4. Elevating network capacity to a new level allows Telia Carrier to broaden its services portfolio and tap into a new addressable market of bandwidth-hungry applications.

Telia Carrier took a phased-rollout approach by initially focusing the upgrade to flexible grid on core links with high traffic growth so all new services can be delivered on next-generation platforms. Throughout this process, circuit packs and equipment that had been removed from the core links were used as spare or deferred links, thus further maximizing return on investment (ROI). Simultaneously, Telia Carrier started the deployment of Infinera’s ICE4-powered XT-3300 to bring lower operating costs in terms of space and power, higher capacity and faster service activation by



leveraging its 1.2 Tb/s super-channel and Instant Bandwidth solutions. Reducing the number of regens is also a key part of this project, and therefore Telia Carrier actively conducted several projects on the East and West Coasts, in the Midwest and across the U.S. that led to the elimination of numerous regens in key spans.

Benefits

Upgrading to flexible grid has enabled Telia Carrier to fuel its positive market momentum by reducing operating costs through the elimination of regens and increasing network capacity with ICE4, leading to numerous business and operations benefits. Some of these benefits are described in detail below:

- **A future-proof network:** By upgrading its optical line systems to Infinera’s FlexILS line system, Telia Carrier paved the way for future capacity upgrade. The FlexILS line system is designed to be scalable, flexible and open to multiple generations of transponders from Infinera or any vendor, so it can support Telia Carrier’s current and future services while minimizing service disruptions and operational complexity. In particular, FlexILS is designed to enable smooth and seamless deployment of new generations of transponders delivering higher bandwidth per wavelength (600, 800 or even 1,000 Gb/s), based on modulations up to 64 quadrature amplitude modulation (64QAM) and higher baud rates (66 to 100 gigabaud and beyond) and enabling new services like 400 Gigabit Ethernet (GbE).

- **Reduced operating costs:** In addition to reducing operating costs such as power and footprint, the elimination of numerous regens throughout the network simplifies network architecture and enhances service reliability and velocity by reducing touchpoints and sources of failure. This reduces OpEx and translates into a positive impact on the bottom line, and as a result, it allows Telia Carrier to overcome price erosion and win in such a fierce and highly competitive market. More specifically, production costs can be reduced by 40 to 75 percent as routes are upgraded, enabling Telia Carrier to achieve a better cost structure and leaner operating model. Furthermore, leveraging Infinera’s Instant Bandwidth and Instant Network solutions translates into positive benefits to Telia Carrier’s top and bottom lines. Faster service activation leads to the earlier collection of service revenue, and hence an increase to the top line with faster time to market. The automated aspect of service activation allows Telia Carrier to significantly reduce operating costs by eliminating truck rolls and on-site provisioning visits.

- **Accelerated service turn-up:** Traditionally, activating a service required a cumbersome process of forecasting traffic demands, calculating the spectral allocation and expansion potential of deployed systems,

purchasing new equipment, installing and testing the new gear and finally activating the new capacity. Such a process is complicated, requires truck rolls, is prone to human error and takes months and months to complete. Telia Carrier leverages Infinera's technology innovation of super-channels and its Instant Bandwidth and Instant Network solutions to automate this process and reduce its length from weeks to minutes. This is a game-changer for Telia Carrier's business and operations. Super-channels provide "service-ready" capacity that can be activated instantly and without sending trucks to each site, compared to conventional methods where a pair of transponders has to be deployed and manually provisioned at each end of the circuit. Super-channels allow Telia Carrier to reduce turn-up time and accelerate time to revenue. It's also important to note that the service-ready capacity enabled by super-channels does not require a massive influx of CapEx, as Infinera has designed and built the

Instant Bandwidth and Instant Network software solutions so that network operators can add, activate and pay for additional bandwidth on existing network hardware in real time by making few clicks in a software application. This speeds up service activation from weeks to minutes and defers any capital investment to meet future growth.

- **A broader addressable market:** Deploying Infinera's ICE4 enables Telia Carrier to unleash an additional 33 percent of capacity and reach a new level of network flexibility and performance, resulting in enhanced competitive edge and a broader addressable market. Telia Carrier can now target customers that require higher bit rates, enhanced network agility and stringent service requirements, such as ICPs, Fortune 500 companies, government entities and many others.
- **Maximized ROI with FlexILS** open line system: Infinera's FlexILS open line system allows Telia Carrier to deploy alien wavelengths on its photonic line with ease, and as a result, defer any CapEx and

network disruption associated with interoperability between legacy and new platforms from different optical vendors. Ensuring smooth and seamless interoperability maximizes ROI and positively impacts Telia Carrier's bottom line.

Summary

Infinera's technology innovations were the driving force behind Telia Carrier's quest to maintain and fuel its positive market momentum by allowing seamless upgrade to flexible grid, reducing operating costs by enabling the elimination of regens and increasing network capacity with ICE4, all while paving the way for next-generation services and architectures.