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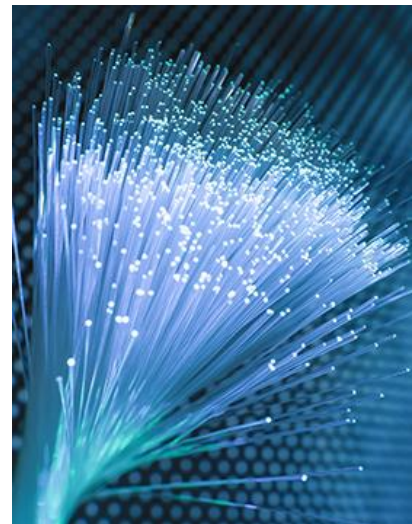
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Fretting Over Fiber for Next-Gen Wireless Services

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If you knew what you knew now and could start again, what would you do differently? It's a question we've all pondered at times. As an industry known for always looking to the next challenge, do we really need to make time for that?

If you could start from scratch building a new network for the future, how would you design it? Investment and budget are obviously always going to be a key consideration when thinking about this. In a perfect world and with unlimited money, you would most likely build fibers everywhere for maximum diversity and full control over the network. With a more limited budget, you would probably lease everything from the network owners that had built it, and you would be 'almost fine' as well.



Just ten years ago, data growth and the location of the next traffic hotspot were fairly predictable. But today, networks need to be more flexible than ever before. Fibers are not that flexible unless you already have lots of them. With enough fibers, you have flexibility in your network and still achieve low-cost advantages because of the volume and speed of traffic you can carry.

Getting flexible and modular

The reality of today's customer requirements means that low-latency, high-bandwidth and high-speed networks with optimized routes are needed everywhere—and for everything from the home to the most demanding data centers and online service providers.

It's a very unpredictable world and today all operators need to build with flexibility at the core of every network decision. More fiber in the ground still matters, but most important is that the network layer sitting on top of the fiber is as flexible as it can be. Today, this translates as modularity in everything you do, from the network right up to the packages offered to customers, supporting pay as you grow models.

This is true on a hardware level, too. Not that long ago, network operators would be focused on trying to acquire the most powerful routers (read BIG) they could afford and placing them at all core network and city nodes, serving all traffic from those points. But today, just a few years later, a much more modular approach makes sense.

At Telia Carrier, we're certainly moving to a model in which smaller routers are placed at multiple locations within core cities. This approach affords not only greater flexibility on the network when it comes to routing but also means routers are closer to where end customers need to connect to the network. In prior days, if you still need loads of traffic at one point, you simply stuck many routers on top of each other to achieve greater density. Additional benefits include lowered production costs and the ability to control the traffic flow and engineer a better experience the sooner the customer is inside the network.

What about the optical layer?

The same thinking can be applied to the optical layer. A more de-coupled approach through open-line systems allows a network operator to mix and match components from different vendors. This means an operator can always select the best and latest gear from both a pricing and performance view, while also avoiding proprietary hardware and vendor lock-in, which can impact competitiveness.

Open-line systems also mean a network can change relatively fast if suddenly another part of the world, region or city needs to support an increase in traffic, or indeed if there is a decline. More generic transponders will be much more movable and therefore able to relocate to where they need to support new traffic growth and surges. With this open thinking, you also limit the risk of getting stuck in proprietary systems and limiting your competitiveness.

Let's look at an example to illustrate. When a new customer arrives in a data center, you suddenly need to support additional traffic. As a carrier, you want to be connected to absolutely every data center there is; with small and flexible equipment, this dream can become reality. You can obviously serve several data centers from one location through local access lines, but it is only when you get your gear into a data center that you reach the desired cost points.

Get your head in the clouds

Put simply, the cloud has transformed connectivity. More and more, enterprises are willing to make use of cloud-based services for everything from web hosting to email, databases and software-as-a-service applications. Where traditionally companies would have sought to build

and use their own WANs, or use MPLS circuits and services, the public Internet and cloud services are an architectural certainty that businesses are moving toward.

We should also take a moment to acknowledge the increasingly important role that the public Internet plays in enabling enterprises to reach different services, such as those in the cloud, or in other parts of the Internet ecosystem. A network built today would need to consider its role in maintaining traffic flows for these services towards the public Internet even though most of them would be outside of each operator's control. It should be mentioned, though, that an operator's part of the public Internet (AS Network) should not be underestimated when it comes to delivering quality network services in the future.

Is leasing the leveler?

Many carriers have made a successful business out of leasing connectivity to build their networks and respond to demand. While on the surface this could seem like a great way to build a network, in today's market it presents challenges, including long-term sustainability and serving customers.

One of the biggest challenges is the simple economics of cost and price. The market price per Mb, which is decreasing, makes it harder for networks built on pure leasing models to make a profit once their operational costs are taken into account. They really need to negotiate hard every year to keep their cost lower than the market price per Mb. This is particularly challenging when some of the other operational costs such as colocation fees and power costs remain static or even increase, rather than decline.

For both lease operators and their customers there is a bigger problem: how network problems and outages are handled and resolved. This extends to who in the supply chain is responsible and how quickly resolution can take place. Ultimately, only a fiber owner that has full control of a repair has all relevant knowledge about the possible down time for a fault. In a world where outages have an increased impact on businesses, this is a key consideration for all parties.

It should be noted that a leased network operator can without question achieve a very flexible set-up by virtue of its ability to build its network from different suppliers. A fiber being built to the wrong location will have a much more negative impact than a one-year lease to the wrong site. But this requires a delicate balancing act: a comprehensive procurement management program with strong operator relationships around the world. The bigger a leased operator becomes, the harder it is to manage those supplier relationships and maintain consistent quality.

Building a fiber future

Ultimately, when you own the fiber on the right routes, you are only limited by the equipment that connects those fibers and—more commonly today—the software services that run on them and keep the network running.

The future will demand more transparency in networks, and indeed with customers. It will undoubtedly favor fiber owners and help them offer a host of additional services to customers. Operators are only just starting to use their own data to better model their networks so they, for example, can predict where the next fault will occur or route traffic more optimally. Internal data enables operators to ensure a more robust network ready for the future.

The more transparent any operator can be, the easier it will be for a customer to take advantage of the services provided. APIs are even making it possible for customers to procure, integrate and configure services directly, as well as review traffic data for their own purposes. While leased network operators obviously can offer the same form of access to their own systems through APIs, they will find it harder to provide the same network-wide level of insight and transparency.

If Telia Carrier were starting again today, our plan would be the same: to build the best Tier 1 network based on the best technology. We would without question build or procure fibers; while an expensive undertaking, it is ultimately the best investment an operator can make in the long term. Where the business case does not stack up for fiber, we would start with a lease to satisfy customer need, but the ultimate goal over time would always be to own the network to maximize performance and cost.