The Path to Greener Connectivity

In addition to reducing costs, service providers increasingly focus on reducing emissions related to increasing energy use.

By KT Mishra / *ADTRAN*

Energy use and costs for telecom operators have traditionally been high and are expected to continue to increase. This growth is predominantly a result of the exponential increase in traffic demands and broadband needs of consumers.

Reducing costs should be an obvious goal for telecom operators. However, reducing emissions related to increasing energy use is also becoming essential for many. The impact of not being viewed as an environmentally conscious organization, the possibility of stricter regulation, the inability to offset emissions with expensive carbon credits, and the changing appetite of institutional investors to focus on green companies could make succeeding difficult for non-environmentally conscious companies.

FIBER IS GREEN

Green House Gas (GHG) Protocol published by the nonprofit organization CDP classifies a company's GHG emissions into three Scopes – 1, 2, and 3. Scope 1 and 2 emissions typically account for between 15 to 30 percent of total emissions attributed to an organization and represent about 5 percent of an operator's overall operating expenditures. However, the figure can be as high as 15 percent for operators focused on mobile services, which are more energy intensive.

Scope 2 emissions are within an organization's control. They are expected to be controlled, monitored and prioritized ahead of other emissions. A large percentage of Scope 2 emissions is from the generation of purchased energy used to power access and aggregation networks. The ability to reduce Scope 2 emissions rests entirely on how energy- and emission-efficient these networks are.

Fiber-based solutions, relative to copper and hybrid fiber coaxial (HFC) solutions, are best suited to meet the growing bandwidth needs of consumers. They also consume the least power and have a much smaller carbon footprint in emissions released.

In a recent study, Prysmian compared the power consumption at the access network across VDSL2 vectoring, HFC, and fiber-to-the-home (FTTH) technologies. The study showed that the power consumption of the HFC and VDSL2 vectoring access networks is 7.5 times that of the FTTH gigabit passive optical network (GPON) access network.

Even among PON technologies, there is a significant variance in the amount of power consumed. For example, combo PON, an integrated solution that enables operators to launch GPON and XGS-PON simultaneously

Reducing emissions related to increasing energy use is becoming essential for many telecom operators. Fiber-based solutions have a much smaller carbon footprint than copper and hybrid fiber coaxial solutions.

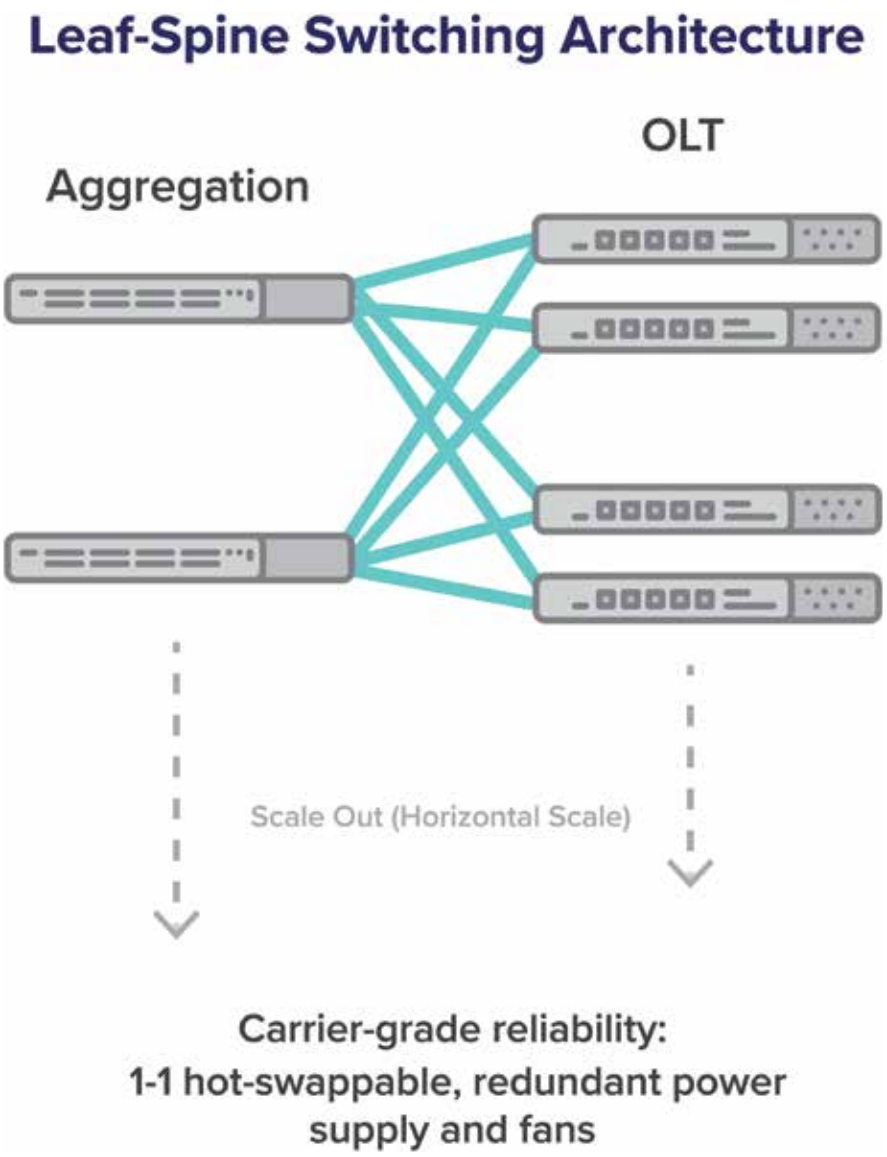

Figure 1: Software-defined access networks

from a single active port, is 50 percent greener than a comparative disaggregated GPON and XGS-PON–based solution.

OPEN, DISAGGREGATED SOLUTIONS

A significant struggle the telecommunications industry faces is becoming a green company with an existing product footprint. Replacing an entire network each time a new, greener product enters the market results in costly overhead quickly. It is time to transition the typical architecture to a new one that allows for consistent improvement in an efficient and manageable way.

Rather than replacing an entire network, the path to greener connectivity looks like a reimagined portfolio that breaks a solution into different components, reducing the heavy interdependency between network elements.

Traditional chassis-based systems are limited by a monolithic architecture that prevents the adoption of power-efficient chipsets. Many are still stuck using a 45 nanometer (nm) technology. In comparison, disaggregated systems leverage power-efficient technologies with 28nm and 16nm chipset technology. Despite the headwinds that Moore's Law faces, significant efficiency gains are available in future chipsets. Every jump in technology results in magnitudes of increase in power savings. What operators need is an architecture flexible enough to take advantage of power-efficient chipsets.

Modern hardware platforms designed around open and disaggregated architectures are specifically built using intelligent, power-efficient components to help drive improvements in the overall power consumption per megabit despite the growing demands on fiber-to-the-premises technology. With Ethernet as the only network element interdependency, chipset and transceiver advancements can be quickly integrated to achieve efficiency targets. In this modern structure, a network can be upgraded independently as more efficient, greener solutions become available.

For service providers, investing in a low-cost, low-emissions technology should be an obvious choice. Though there are many levers to pull to lower energy costs and reduce carbon footprint, one that provides sustainable long-term benefits to telecom operators is in structural and architectural transformation. It begins with operators deploying as much of their network as feasibly possible with FTTH-based PON solutions. Telecom operators should also consider breaking through the limitations and dependencies of monolithic architecture and transition to modern disaggregated solutions that offer more power-efficient deployment models. ❖

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