

ASK THE EXPERT

A Network for Generations



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Design and deploy a converged access network now to meet the needs of the coming decades

The networks that service providers install today need to last for generations. But with the pace of technology development and demand, these networks must be able to address customer needs and applications we haven't even imagined yet.

A converged access network can meet these needs and provide expandability to provide future capacity, flexibility to adapt to any type of demand, and accessibility so technicians can add network elements and devices easily and without disruption.

Joshua Simer, market strategy and information manager at fiber and equipment solution provider AFL, offers his perspective on what this converged access network needs to look like.

Q1: Why is a converged access network so important?

A: A converged access network is designed to carry all the types of traffic we have today, as well as traffic from services that will be on that network in five, 10, or 20 years. A friend of mine involved in a recent fiber construction project told me the copper wire they replaced had been in the ground 90 years, based on the markings on the wire. They couldn't have imagined, in 1932, the types of services we have now, and we can't really know what will come in our future. The network must be designed to last a long time and handle whatever traffic comes along. That's the key to achieving the best ROI on your investment.

Q2: What are the key elements of a converged access network?

A: Definitely fiber as the core, to last one or more human generations and multiple technology generations. Wireless is there for the final few meters or kilometers to connect to end devices, but the rest is fiber. That offers immense potential to handle more bandwidth. But even more important is how you design the network to provide expandability, flexibility, and accessibility.

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Q3: Why are those important?

A: Expandability allows you the bandwidth you need when you design the network with an ample number of fibers. Investing wisely in capacity will pay off later. Flexibility in network design enables more connections — where and when you need them — for the proliferating number of devices you will be adding to the network. It also enables you to implement the newest optical technologies, whether that is XGS PON, 25G PON, or even Terabit PON in the future. Accessibility ensures your technicians can readily make additions and changes to the network without disrupting existing traffic.

Q4: What are the most important elements of a future-ready converged access network?

A: When you build a new access network or upgrade an existing one, it isn't the materials that make the project costly. It's the labor, the paths and rights of way, and all the time involved in permitting. The well-designed converged access network maximizes the number of fibers because it's the best investment you can make. Considering the total network project cost, even doubling the number of fibers — 864 instead of 432, for instance — you really only increase the project cost by 1-5%. Even if much of that fiber remains dark for years, it still pays off in the long run. This gives you maximum expandability and flexibility. As for accessibility, that is where your network design and equipment choices come in.

Q5: In what way?

A: Take splice closures, for example. Some manufacturers are good about building accessibility into their products. But with a splice closure, you splice a certain number of fibers on initial installation. Then, in the future, when you get new customers or a new use case, you need to be sure that as you make new splices those fibers are managed well inside the closure and that the closure re-seals correctly every time. Otherwise, you risk incorrect splicing or the risk of water or corrosive chemicals seeping in. There are similar considerations with fiber distribution hubs, so that making changes doesn't involve a lot of complicated tasks or create risks.

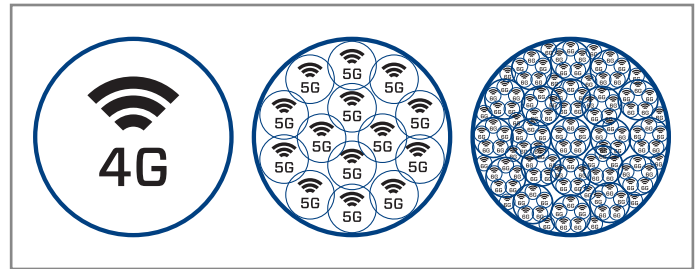


Figure 1: 4G-5G-6G

Q6: After fiber-to-the-home networks are largely built up and 5G deployments are largely complete, what will be the next challenges for converged access networks?

A: The applications that require very low latency. Self-driving automobiles in managed traffic systems or remote surgery are two prime examples of life-critical applications that absolutely require the lowest possible latency. So we will move from centralized data centers to pushing computing capability toward the edge, closest to the need. The ability to easily connect new things to the access network will be essential. And then there's 6G. What will we need in the way of nodes or connections to ensure good coverage? The network must be able to accommodate all this.

Q7: What are the primary network design and engineering considerations for providers as they plan these networks?

A: The most important is that to get the best ROI, you need the network to last a long time without extensive upgrades. Capacity is the wisest investment, so compromises to save CAPEX are certain to cut into long-term ROI. Be sure you or the partner you work with is excellent at recordkeeping and that they install equipment to resist damage or disruption yet make repairs easier if needed. Again, the keys are expandability as far as capacity, flexibility in the design and equipment choices, and accessibility to minimize future technician costs.

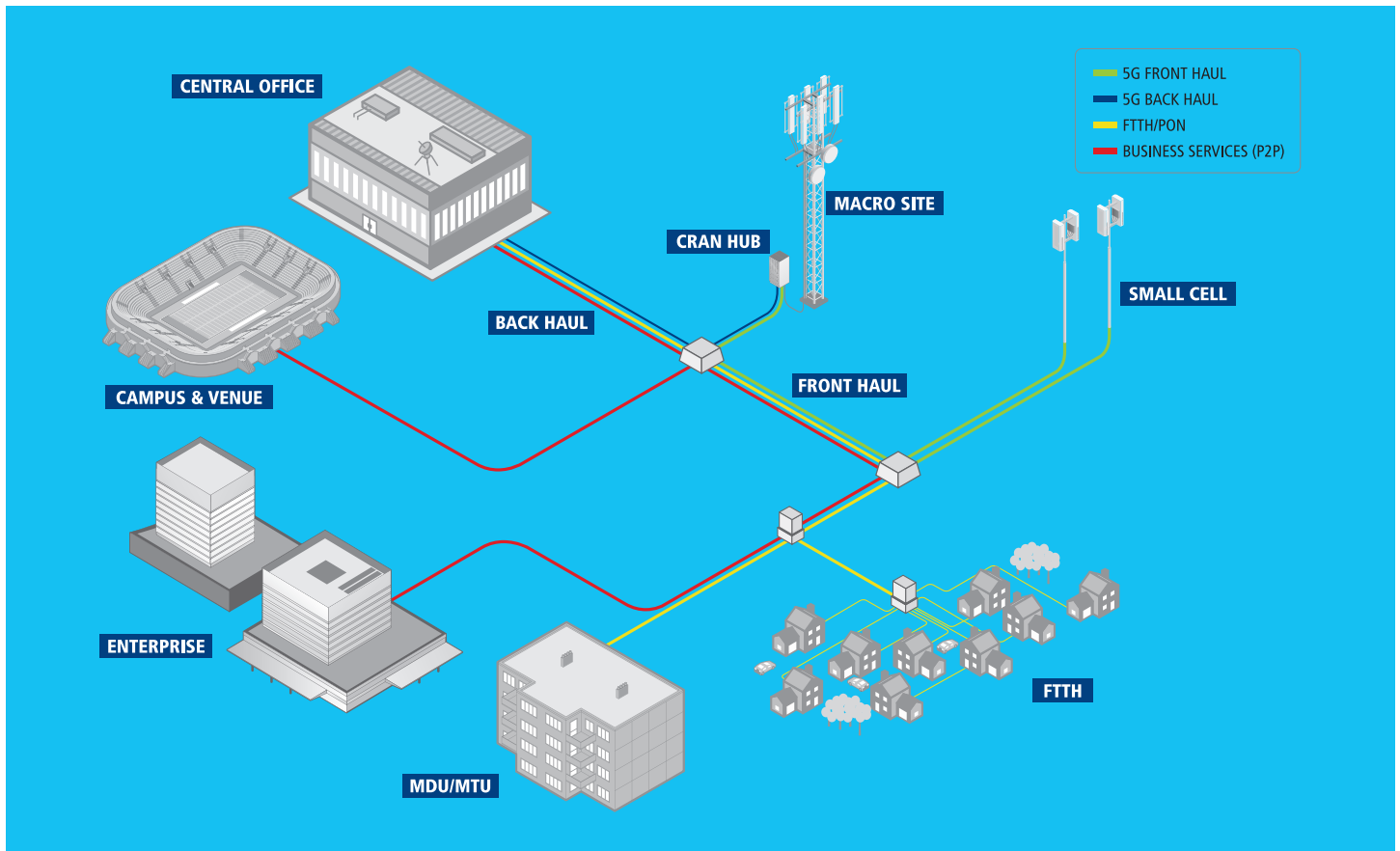


Figure 2: 3 Characteristics of a Converged Access Network

Q8: For most providers, is there sufficient in-house expertise to accomplish this? When do they need to look to outside expertise?

A: Smaller providers with limited staff are most likely to need outside expertise. But even the largest providers, with their big technical staff, may not have what they need for a specific project. It may be in a different part of the country where they don't have experience working, or where they aren't familiar with specific legal and regulatory considerations. Or it may be a different type of project for them. That's where an established, proven, and experienced partner is essential.