



Making ultra-broadband transformation simple

White paper

A holistic approach supported by proven tools, methodologies and expertise helps service providers simplify the transition to ultra-broadband access technologies while ensuring predictable outcomes relative to return on investment, time to market and quality.

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Introduction

Demand for bandwidth is growing as more people stream HD video, share content, connect on social media and play online games. Expectations are also growing relative to broadband service capabilities, with consumers, businesses and governments all pushing for higher bit rates, more complete coverage and better experiences. The onus is on service providers to meet the demands and expectations of the ultra-connected society.

To satisfy their customers, service providers need networks that can extend high-speed connectivity to the home, the office and all points in between. These networks must be agile and efficient so that they can keep pace with rapid service evolution. They must provide fast, easy connections to everything, all the time and everywhere. And they must deliver rich experiences, regardless of whether users are watching mobile video, using cloud-based business applications or connecting with a health care professional from a remote village.

Service providers are facing escalating bandwidth demand, fierce competition and ambitious government broadband targets. Many are transforming or upgrading their access networks by increasing the high-speed capabilities of their copper loops and bringing fiber closer to end users. But upgrades are expensive and come with risk, particularly when they involve the outside plant. Service providers need solutions that will help them evolve their broadband networks quickly and cost effectively, be more predictable in aligning market announcements with service availability, and get closer to delivering the gigabit speeds users want.

What drives broadband evolution?

Several factors are prompting service providers to consider transitioning to ultra-broadband and gigabit access technologies. The most important drivers for broadband evolution are:

- **User demand:** Users of all types want more bandwidth to support new data and video services.
- **Competition:** Service providers want to differentiate, and perhaps claim a first-mover advantage, with gigabit service. High-bandwidth services can help providers protect and increase both market share and revenue.
- **Disruptive forces:** Non-traditional players such as Google Fiber are now offering gigabit service. These players give users more options and compel service providers to keep offering more bandwidth.
- **Government broadband targets:** Governments and regulators want to create a positive economic impact by mandating universal access to broadband service. In some countries, offers of government funding help service providers increase capacity and coverage.
- **Mobile goes fixed:** Some service providers are seeking to differentiate by combining mobile and fixed assets. The combination allows them to provide a more converged experience to an increasingly nomadic user base by connecting small cells to the network and support mobile backhaul capabilities. In this scenario, mobile networks become extensions of fixed networks.

Challenges for service providers

Broadband access technologies evolve continuously, fueled by research ingenuity, changing consumer and business expectations, diverse new applications, and political and economic interests. Today, the question is no longer whether there is a market for 1 Gbps or 10 Gbps services, but rather when these services will actually reach the market.

Service providers have a central role to play in the evolution of ultra-broadband and gigabit technologies. To succeed in this role, they need to find an efficient way to adopt these technologies. More importantly, they need to prove that they can deliver the full benefits of these technologies to their customers and partners.

Committing to evolution

The first challenge for any aspiring gigabit service provider is to commit to deploying higher-bit rate technology. This commitment is a barrier for many providers because it represents a decision to embrace new forms of complexity, business-spanning change and a large capital outlay for new equipment. Decisions about broadband evolution programs need to be made and managed at the CxO and board level of the service provider's organization. There are many variables to consider and control. A service provider requires strong governance that extends beyond operations to drive the program toward its goal and reap its intended benefits.

Choosing the right technology

A service provider can choose from myriad next-generation copper, fiber and wireless access technologies to fulfill its unique broadband evolution journey.

Each provider's context and pace of evolution will influence its choice of technology. A provider may choose a given technology based on customer-specific drivers, market context and history, or its planned evolution path. For example, providers will make different choices based on whether they plan to deploy fiber, upgrade existing copper, install small cells or reduce legacy costs. Funding also plays a key role in technology choices: CAPEX is a significant barrier and influencer for most broadband projects.

The choice is made more difficult by the fact that there is typically no one-size-fits-all technology. A wide range of parameters—for example, population density, existing assets, competitive pressure and expected average revenue per user (ARPU)—drive the technology choice for different parts of a service provider's network. Choosing an ultra-broadband technology can be a daunting task for a service provider. A good choice sets the provider on the right path from the beginning. It can have a positive impact on the business case and time to market for the new broadband deployment.

Defining the right strategy

After a service provider chooses an ultra-broadband technology, its focus shifts to making the technology and business case work. This is a multifaceted challenge that requires the provider to manage multiple stakeholders, multiple generations of technology and equipment from multiple vendors. At this stage, the goal is to define a strategy that leverages input from all stakeholders to introduce the technology with maximum efficiency and use it as the basis for launching successful new services.

Technology choice and strategy definition are not just about making the right decisions for today. Technology and market dynamics evolve over time. Service providers must consider whether today's choices and decisions will still give them a competitive edge two, three or five-plus years from now. Network rollouts typically take many years. Today's decisions and planning have a big impact over the long term. It is critical for service providers to make the planning cycle an iterative process that can accommodate changing market environments and technology evolution, both of which can have an impact on rollout decisions and planning.

For example, the market environment could change if a service provider's competitor launches a new higher-speed internet offer in a certain region. The presence of this new competing offer could force the service provider to change its original plan for the region. This may mean prioritizing a higher-speed service rollout in this region to match or improve on the competing offer and fight churn. By making the planning cycle iterative, a service provider can accommodate changes to the market environment and adapt its deployment plans accordingly.

Making rollouts predictable and cost efficient

New broadband products and services need to be rolled out and scaled in the field. This is an often-underestimated endeavor that has serious implications relative to cost, time to market and customer experience. There are also hidden costs associated with cost of non-quality and inefficient scaling.

Cost of non-quality is about errors, typically human, introduced in deploying end-to-end network connections. When a service provider drives fiber deeper into the network, it has to consider and integrate the passive and active build of the network and the home connection. Service providers typically use multiple internal and external teams that work on different parts of the network. Each team uses its own workforce, data and support tools to build its part of the network. This type of scenario introduces more complexities and opportunities for errors.

Rolling out a region-wide or multi-region network is another challenge for service providers, particularly once rollout and service availability targets are announced to the market. To scale successfully, a provider needs a repeatable process for delivering end-to-end network connections.

Service providers typically rely on the processes they use for daily moves, adds and changes. This approach might work for limited rollouts such as marketing trials. But once the pressure is on to achieve ambitious rollout targets, in-house processes and tools can become a bottleneck for mass scaling and put the project on a critical path.

Tasks such as managing supply chains, securing permits for outside plant, extending fiber into the home and activating end-user service make scaling even more difficult and costly when they are managed inefficiently. Scaling in a suboptimal way hinders a service provider's rollout and service activation capabilities, ultimately leading to longer deployment times. Customers may become frustrated if delivery targets are not met, or the service provider may lose ground to the competition.

Managing the network lifecycle

Most service providers already have networks that need to provide excellent service. These networks must be managed and optimized for current operations. The introduction of features to support new products and services on the existing network infrastructure could be the first step of a broadband evolution program.

Service providers need to plan and execute upgrades carefully to avoid disturbing end-user service. The challenge grows when a large portion of the network—or the whole network—needs to be upgraded in a reasonable amount of time. Service providers' current tools and processes might be limiting factors that keep them from achieving fast and first-time-right upgrades.

To deliver a rich service experience to their customers, service providers must be assured their network is performing well. It is important for them to have a good understanding of how the network is performing at all times. Ideally, providers will detect issues before service degrades and the help desk becomes flooded with customer complaints. This demands detailed inspection of network element performance and the ability to mine large data sets to pinpoint the cause of potential problems.

A welcome side effect of network performance management is gaining a detailed understanding of the utilization of network resources. Awareness of underutilized capacity in a part of the network can incentivize marketing departments to promote customer products in that area of the network. These promotions contribute directly to the service provider's top line. Detailed views of network element performance and behavior are typically not readily available from a provider's own build tools or from commercial off-the-shelf network and element management tools. This represents a gap in the service provider's service and capacity management tool set.

Eventually service providers need to migrate life subscribers and traffic from the legacy network to the new or upgraded network. Being able to scale the migration efficiently is a key concern for service providers, as is avoiding help desk calls from frustrated customers who are experiencing service interruptions. Providers need capabilities and tools that can:

- Minimize the time it takes to migrate large numbers of nodes and subscribers
- Minimize errors and achieve first-time-right migration
- Migrate nodes and subscribers cost efficiently

Service providers' current tools and processes might be able to handle migration of a limited number of nodes and subscribers. However, they are likely to fall short when migration needs to be scaled.

Three steps for simpler ultra-broadband evolution

Service providers need specialized expertise, services and tools to achieve their quality, cost and time to market targets for broadband evolution projects. Providers can attempt to develop these skills and capabilities themselves. But most will find it more effective to team with a partner for which transformation projects are everyday business.

In 2016, Ovum conducted an industry survey on challenges relative to wireline access transformation.¹ It found that service providers want and need to work with partners to plan, implement, operate and manage access network transformation. Ovum recommends that service providers seriously consider working with partners in areas such as:

- Technology choices and their impact on future upgrades
- Support for faster network builds and rollouts
- Solutions that enable faster service and customer activation
- Tools that support network optimization
- Support for high-quality network software upgrades
- Improvements to tools and models for quality of experience (QoE) monitoring

Nokia has developed a set of services and solutions that can help service providers ensure predictable outcomes relative to quality, cost and time to market for broadband evolution projects. With Gigabit Smart Build, Nokia combines real-world experience with expertise and tools developed in working with service providers on network transformation projects. Its aim is to use this combination of capabilities to help service providers succeed with broadband evolution projects.

Intellectual property-based automation is at the heart of Gigabit Smart Build. Automation technologies eliminate labor-intensive manual tasks and reduce the potential for errors that slow time to market. By making more extensive use of automation, service providers can scale more efficiently and achieve fast, first-time-right technology deployments.

Gigabit Smart Build offers a holistic approach that supports service providers at every key stage of broadband evolution, from business case development through deployment, management, upgrades and optimization. This support can be adapted to suit the challenges, needs and market context of different service providers, enabling them to manage wide-reaching change and avoid costly errors as they transition to new ultra-broadband technologies.

Gigabit Smart Build provides a framework and methodology that divide broadband evolution into three phases: prepare, deploy and operationalize.

¹ Kunstler, J. "Transformation of wireline access networks requires smarter solutions." Ovum. September 2016. <<https://www.ovum.com/analyst-white-paper-transformation-wireline-access-networks-requires-smarter-solutions/>>

Prepare: Get ready for gigabit

Service providers need to prepare thoroughly before they can begin deploying ultra-broadband or gigabit technologies. A key focus of the preparation stage is to build a viable, accurate business case. This process requires service providers to understand the available technologies, select the technology that provides the best potential return on investment (ROI), and develop a strategy for turning the technology into services that deliver on this potential.

Gigabit Smart Build provides support that enables service providers to maximize ROI by deploying ultra-broadband technologies at the right times and locations. This support focuses on helping service providers manage the complexity and cost associated with the adoption of ultra-broadband technologies such as fiber and virtualization. Its key components include:

- **Innovation partnership:** A flexible innovation management framework allows Nokia technology and service experts to work with customer teams to accelerate the definition and implementation of a network evolution roadmap. With effective innovation management, service providers can quickly introduce new technologies and acquire critical technology-specific knowledge.
- **Business and technology modeling capabilities:** A business case framework that combines technology and rollout costs, modeling of new services and the ARPU derived from them. Accurate, patented total cost of ownership (TCO) models with migration and evolution steps provide insights that can help service providers choose the best possible technology investment strategy.

Deploy: Achieve fast, first-time-right evolution

The focus of the deployment phase is to roll out ultra-broadband technologies quickly and effectively. With ultra-broadband, time equals revenue. A fast, error-free transition to higher-bit rate technologies can help service providers increase revenue and capture market share. Today, users have more freedom and more choices. If service providers miss publicly announced availability dates or are slow to meet demand for ultra-broadband services, will lose subscribers, revenue and market share.

Gigabit Smart Build can help service providers reduce time to market by ensuring that they apply the right skills, tools and methodologies to the deployment process. It offers deployment support in several important areas, including:

- **Customer self-installation:** Technologies that enable customers to self-install their optical network terminals (ONTs) allow service providers to avoid the cost of sending field technicians to customers' homes.
- **Network build control management:** A framework that combines end-to-end planning, optimized integration and subcontractor performance management can ensure fast and accurate rollouts while sustaining expected quality levels.

Operationalize: Control and optimize upgrades and migration

After deploying its chosen ultra-broadband technology, a service provider can concentrate on putting it to work in the field. To succeed at this stage of network evolution, a provider needs the ability to efficiently operationalize, scale, optimize and maintain the new technology. A provider also needs to ensure that its investments will have a positive impact on ROI and keep its network competitive for years to come.

Gigabit Smart Build offers support that can help service providers operationalize ultra-broadband deployments and turn them into revenue-generating services. This support focuses on enabling service providers to migrate services flawlessly, execute smooth upgrades and leverage analysis to keep the network in shape. The service offers service providers several optimization options, including:

- **Legacy broadband migration:** Proven methodologies and tools for migrating equipment and data can enable service providers to scale the migration rate while minimizing cost and customer impact.
- **Network software upgrades:** A systematic upgrade methodology and toolset can help service providers reduce costs by shortening the upgrade process and increasing the upgrade success rate.
- **Network assessments and health checks:** A comprehensive set of analysis tools allows service providers to view current network status, assess performance and understand potential problems.

How simpler evolution benefits service providers

With Gigabit Smart Build, Nokia uses its end-to-end expertise, deep network migration experience, and access technology leadership to help service providers make a smooth transition toward gigabit networks. The service offers a holistic approach that supports service providers at every step of the evolution lifecycle. It empowers them to understand and overcome the challenges presented by ultra-broadband technologies so they can make the evolution business case work.

Gigabit Smart Build makes building gigabit networks predictable, thereby delivering three key business benefits to service providers:

- **Assured quality:** The service reduces rollout errors by a factor of three. First-time-right deployment and migration help service providers save money and avoid disruptions that can drive users toward competitors.
- **Fastest time to market:** The service cuts time to market in half by minimizing preparation time, accelerating rollouts and increasing rollout volume. It also removes barriers to fast migration by eliminating the learning curve associated with lifecycle management.
- **Maximum ROI:** The service increases ROI with end-to-end support that enables service providers to choose the best evolution path, optimize rollouts and lifecycle management, and reduce legacy migration costs. By promoting a holistic approach to evolution, it improves service providers' ability to get to market quickly and start generating new revenue.

Conclusion

Service providers are in a race to transition to gigabit technologies, driven by factors such as user demand, competitive pressure and government targets. Many providers want to seize the opportunities that broadband evolution will bring. But just as many are concerned about whether they can deploy technologies that will allow them to generate a meaningful ROI, launch services quickly and sustain the quality that users demand.

Nokia Gigabit Smart Build makes gigabit service feasible for service providers. It combines proven expertise with a simple evolution methodology and innovative tools to help service providers put gigabit access technology in the field in an efficient, cost-effective way. Offering a holistic approach to migration and support at every step, Gigabit Smart Build empowers service providers to evolve to higher-bit rate technologies in a way that maximizes ROI, reduces time to market and assures premium quality.

To learn more about the Gigabit Smart Build service, visit <https://networks.nokia.com/solutions/gigabit-smart-build>.

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Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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