



State of the Art Packet and
Optical Networking



How to Monetize Your Fiber Investment

Opportunities for Wholesalers and Independent
Network Operators

It seems the world cannot lay optical fiber in the ground fast enough. New techniques and specialized tools have sped up the deployment process. The once-distant dream of every home and office being connected to the fiber network is becoming a reality. And unsurprisingly, everyone – from independent network operators to fiber network wholesalers to governments to municipalities to local authorities – want a piece of the action.

Before this race to put fiber in the ground, independent network operators (INOs) were laying fiber and building basic networks for personal use rather than as a potential money spinner. However, with advances in network technology in recent years, various trends like packet ubiquity, cloudification, and video are fuelling demand for capacity – and today's optical fibers are affordable enough to allow INOs to lay more capacity than they'll ever need. So by laying extra fiber bundles, INOs will have plenty of spare capacity to sell on to wholesalers, service providers, traditional network operators or anyone else who might want to take advantage of someone else's fiber-laying investment.

This is already happening in the market as illustrated by Three UK and O2 signing an agreement with SSE Enterprise Telecoms (part of energy provider SSE Group). This deal allows the two mobile operators to use SSE Enterprise's Telecom's fiber ring around London to significantly enhance their backhaul capabilities and lay the groundwork for future 4G and 5G deployments by connecting cell sites and masts.

And there will be many more agreements like these as high-capacity fiber is absolutely essential to a whole range of services such as:



Residential services – more and more consumers are interested in consuming ever-increasing data at an ever-growing pace. Faster than regular wifi or home ICT connectivity, fiber-to-the-home (FTTH) has the potential to improve the quality of residential connectivity, hugely. And rest assured, consumers will be happy to pay.



Smart cities – this includes projects like smart lighting and smart buildings, CCTV to law enforcement, fully-integrated transport/parking/shopping and fully-integrated cities with real-time IoT connectivity. This requires a new, secure, agile, scalable communications network to connect tens of thousands of sensors and devices.



Next-generation business services – a new generation of business services is evolving, based on cloud services. These require new high-capacity, highly-reliable connectivity from the enterprise to its cloud-based data center and back again.



5G – a huge variety of new services (think 4K video anywhere, virtual and augmented reality, even autonomous vehicles to name a few), new users, and many more connected devices are set to add even more pressure to today's networks. Add to this the fact that each of these services has different connectivity requirements, the result is transport connectivity that's even more agile and flexible.

Getting In on the Act

It's not just forward-thinking infrastructure organisations like road and rail companies, investing in laying fiber while they lay tarmac and track. It's governments keen to improve their own country-wide telecoms infrastructure. It's municipalities and local authorities who want to become smart cities or make themselves more competitive and attractive. It's utility networks and oil and gas companies transitioning to 'smart' environments. And of course, it's internet service providers such as G.Network and Gigaclear in the UK. Together, there are a lot of players keen to get in on the act, investing a lot of money laying fiber.

In fact, some have suggested that as ultra-fast 5G mobile and fiber-to-the-home (FTTH) and fiber-to-the-premises (FTTP) become more widespread, they'll reach a "symbiotic relationship" where "they are driving each other's business case".

The Path to Monetization...

However, laying the fiber is only half the story. The other, and arguably more important half, is how INOs can monetize their fiber investment by leasing it to connectivity wholesalers or directly to service providers. To do that means allowing wholesalers to connect to their fiber in as many ways as possible, to offer the widest range of new and existing services as possible to the market. Dark fiber services, dim fiber services and lit fiber services mean these players have various business models to play with. More on that later.

...Means Knowing That Different Service Types Have Different Requirements...

The obvious catalyst is 5G. It's going to need a huge amount of connectivity and capacity to connect all the base stations. There's also connectivity for all those existing IoT devices, which, at the moment, is done over the existing 4G network or over the non-license spectrum, for example, through Zigbee or LoRA. And lest we forget, there's a whole bunch of legacy business services such as Ethernet VPNs or managed WANs, which are nowhere near end-of-life, that need connecting.

And each service will have different requirements that could need anything from super-fast broadband to massive machine connectivity to ultra-low latency to ultra-high reliability to hyper-flexible bandwidth – and many of these will be business or mission critical. Examples could include autonomous cars, intelligent transport systems, and remote surgery.

The point to make here is that when investing in the network, look beyond access. Look for a solution or offering that can do both the access and the programmable transport needed to connect that access back to applications. This might be the time to think about partnering with transport vendors who can help INO's leverage their fiber network to create a more compelling proposition that goes beyond just fixed or wireless access.

Choosing the Right Business Model

INOs have a choice to make about which business model to adopt – dark, lit or dim:



Dark

If they choose to offer dark fiber services, they just offer a fiber connection between two points and have almost no responsibility for the end customer traffic. Typically, dark fiber services appeal to very large customers with the bandwidth demands and expertise to run their own optical network, but who don't want the added expense of owning their own fiber.



Lit

If they choose to offer lit fiber services, they provide an interface on a piece of hardware at the customer location and then manage the optical part of the network completely. Customers (typically enterprises, which need large point-to-point bandwidth but don't have or want in-house optical expertise) pay for transport of their service over the network. They just focus on ensuring the network connection at the end points works. That these customers prefer to let their local carrier manage all of their networking needs for them.



Dim

If they choose to offer a dim service, they're giving customers a half-way house. The INO provides an open port at a specific wavelength to the end customer and provides only amplification and passive dispersion management of the link. There's no optical/electrical/optical regeneration and no other electronics involved, just a port on a WDM multiplexer. As long as the service meets the desired specifications, customers can put any service they want on that wavelength.

...And Building True Flexibility into the Aggregation Network

In other words, the fiber network needs to have the flexibility to support whatever services a carrier might want to offer, whether fiber-to-premise, backhaul support, offloading legacy or business services, or deploying smart city types of applications or a mix of these. That means investing in an IP packet and optical network, ideally latest generation, that's dynamic and programmable and enables huge amounts of data to move flexibly around various access networks, so people and businesses can access anytime, anywhere.

And once you have your network, you need to make it as attractive to possible. Putting in a multi-access aggregation device right at the edge of where the access network joins the metro, makes good sense. Why? Because then your network can take any sort of access technology or access network coming in, then aggregate that data and pass it to the applications in the core of the network – whether that's 5G, 4G, wifi, Zigbee, LoRA, GPON, or DSL. By putting a multi-service aggregation device instead of a bespoke device INOs can enter all sorts of new markets – while offering their fiber capacity to support the needs of multiple access technologies required by different services.

Making Sure You Lay the Golden Egg

If you're planning to invest in laying fiber, what steps do you need to take to make sure you can actually monetize it? At Ribbon, we think you need to bear in mind three things:

1

A little more investment goes a long way - if you've already invested a sizeable chunk in laying fiber, it makes good financial sense to find some extra cash to invest in building a proper aggregation network to support and aggregate multiple services. In other words, don't just install a gigabit passive optical network (GPON) system. That way, you can increase potential earning capacity of any fiber investment by extending its flexibility, and therefore appeal, to service providers.

2

Avoid going bespoke - rather than just putting a bespoke network in, for example, at the end add a multi-service aggregation box. This will allow you to enter all sorts of markets and support the service needs of all the different access technologies that those services require.

3

Be as flexible as possible - INOs need the flexibility to connect that transport to wherever it needs to go in the network. That requires a flexible IP and optical metro transport network to connect a customer's premise equipment, wherever that is in the network.

How to Build Your Aggregation Network:

At Ribbon, we think that to 'move up the value chain' and offer multiple premium services, you need to build out your fiber investment by adding proper IP and optical transport network capabilities. However, as we've mentioned, not all aggregation is created equal, it's about much more than just transporting bits. So here's what you should be looking for:



Agile multi-service aggregation equipment – look for equipment you use to transport a variety of services, all in one box. And remember, it's not just new services. Carriers offer various services from legacy to 5G – and they're likely to search for solutions that meet a wide range of needs. Investing in a good multi-service platform ensures you can serve any need, with the minimum investment.



Scalable equipment – today, solutions can offer true pay-as-you-grow capabilities. So you can pay a minimal amount on day one, and upgrade as needs and demand rise. This will stagger your investment and ensure ROI.



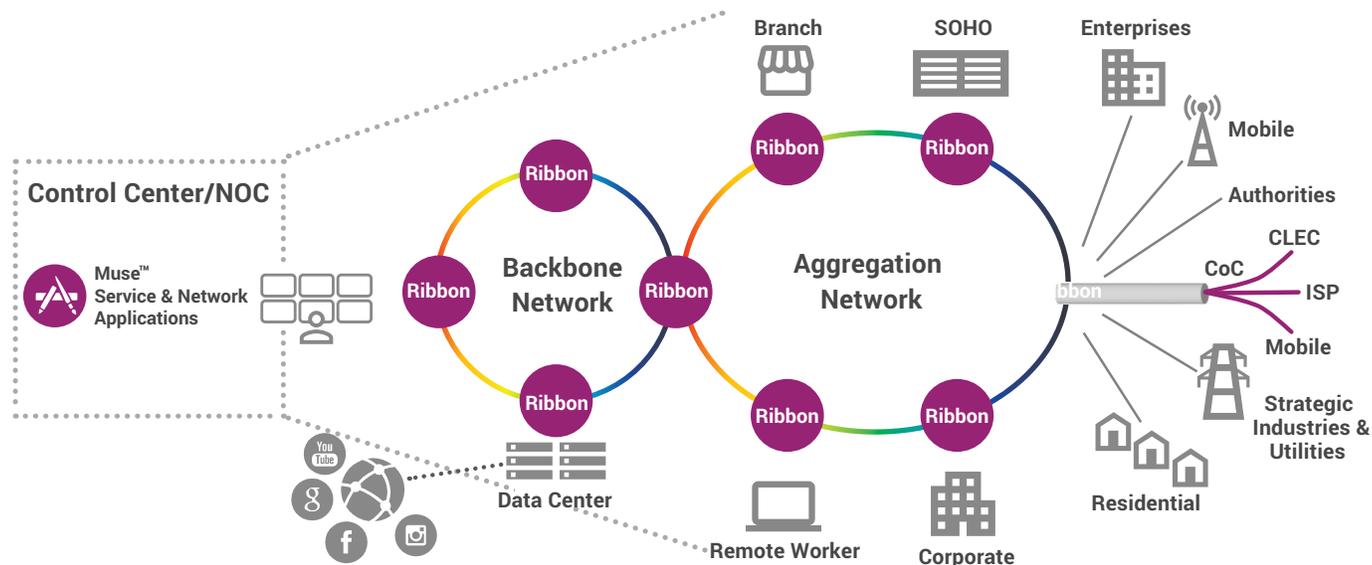
Easy to manage – we understand you didn't go into this business to manage a network, so will likely have lean networking resources. So look for equipment that's easy to manage, and an infrastructure partner who can make your network operations as intuitive as possible. Today, there are network management systems that are as simple as point and click, and a network expert can help you set up the system and provide any training.



Future-proof – new requirements are due, so when investing in a system, make sure it's built to last. Look for a partner that understands your focus. One who'll provide you with a solution that's ready to support your future strategy. One who provides simple capacity upgrades, is ready for network slicing, and enables software defined networking.



Open and interoperable – as you'll only be providing connectivity in a certain part of the overall network, you need to ensure you can incorporate your 'subnetwork' into the grander scheme of things. Carriers, with sight of the bigger picture, will be looking to incorporate your network into their end-to-end orchestration and under their domain controllers. To do so, the industry has defined APIs and standard interoperability measures to help. And ensuring your equipment follows open, standard APIs like NetConf interfaces and Yang models will ensure you are attractive.



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Moreover, with 5G around the corner it's important to build capabilities with an eye on the requirements just down the line. So what are the attributes of a 5G capable aggregation network?

We think there are three key requirements:



Dynamic

For dynamic services and the proliferation of 'smart' devices, with changing and dynamic usage.



Deterministic

For mission and business critical services such as remote surgery and even connected vehicles, where ultra-high reliability and low deterministic latency are mandatory.



Assured

To meet customer expectations all of the time, because, as we all know, customers have a nasty habit of upping their expectations all the time.

To achieve the above, Ribbon thinks network slicing will be a prerequisite. Network slicing is an architectural concept that allows the cutting of one physical infrastructure into multiple virtual networks. Each slice is then customized to meet the specific needs of the applications, services and resources that need to run over it. And while it is beyond the scope of this paper, we believe you should invest in equipment which supports network slicing today.

The Current State Of Play

Mobile network operators (MNOs) are looking to expand their coverage, while keeping investment to a minimum. One way to do so would be to lease connectivity services from others. But given the area a typical MNO needs to cover, that's a lot of ground. MNOs are used to using wholesalers for connectivity, but they'd prefer not to line the pockets of their competitors for connectivity if they can help it – so they're more likely to go to a wholesaler who doesn't compete directly with them. They might choose a rail or road operator's fiber or a local authority. Put simply, if an INO's network can do this for them, they'd prefer to use that than fill a competitor's coffers to achieve the same connectivity.

We think MNOs would welcome a really flexible transport network that can provide the SLAs required by a new generation of services – and so will be happy to lease this connectivity from INOs or wholesalers.

Final Thoughts

Up until recently, INOs have been laying fiber and building basic networks for personal use rather than as a revenue source. However, today's optical fibers are affordable enough to allow INOs to lay more capacity than they'll ever need. Now INOs have plenty of spare capacity to sell on to others who might want to take advantage of someone else's fiber-laying investment.

5G is set to up the demand for connectivity, and may open additional revenue opportunities for INOs. Beyond the basic connectivity services, Ribbon thinks a small additional investment in a proper multi-service aggregation network can open the door to a flood of new opportunities and revenues. So look for a vendor who can help you build out your infrastructure (and 'move up the value chain'), yet keep everything manageable for you.

Ready to Monetize Your Fiber Investment?

Ready to choose a network solutions provider who really understands how to help INOs capitalise on their fiber investment and the wholesale connectivity market? For more information contact Ribbon today.

Contact us for more information about how Ribbon can help you monetize your fiber investment at rbbn.com

About Ribbon

Ribbon Communications (Nasdaq: RBBN), which recently merged with ECI Telecom Group, delivers global communications software and network solutions to service providers, enterprises and critical infrastructure sectors. We engage deeply with our customers, helping them modernize their networks for improved competitive positioning and business outcomes in today's smart, always-on and data-hungry world. Our innovative, end-to-end solutions portfolio delivers unparalleled scale, performance, and agility, including core to edge IP solutions, UCaaS/ CPaaS cloud offers, leading-edge software security and analytics tools, as well as packet and optical networking leveraging ECI's Elastic Network technology.