# Next Generation Optical Access
## The Open Lambda Initiative (OLI)

**Open spectrum sharing architecture** that creates a cohesive framework to allow fast and flexible introduction of new technologies and services.

### Technology coexistence

One of the major challenges the telecom industry faces today is in the design of future metro-access network architectures capable of supporting the coexistence of technologies while offering an acceptable migration path for further innovation.

Many optical access technologies have been proposed with little consideration on how these can coexist on the same physical infrastructure without disrupting each other. OLI aims to define a new open spectrum sharing architecture permitting such an introduction on the same fibre.

### OLI objectives

The OLI was formed in 2010 with the objective to outline and propose an open architecture framework to address the above issues in optical metro-access networks, as well as to create industry awareness of emerging technologies. Its scope is focused on providing a comprehensive set of whitepapers as output which will consequently be brought into the relevant standards organisations.

Several different stakeholder groups are addressed by the initiative, each of them for different reasons. For example, incumbent operators are striving for a seamless migration to higher data rates when introducing new technologies. At the same time, they require a high flexibility in their choice of technology and associated management platform. Alternative operators are seeking for an unhindered method of unbundled access to existing metro-access infrastructures with their own independent technology platforms so that they can negotiate Service Level Agreements directly with subscribers. Component and equipment vendors would like to reduce the complexity and cost of migration of their respective equipment introduction cycles. In doing so, they can create market opportunities and innovation whilst still allowing for coexistence of alternative technologies.

Consumers are seeking alternative choices for broadband services as well as the ability to flexibly choose service parameters, preferably all in real time. Last but not least, regulatory authorities are trying to foster competition on the same metro-access fibre infrastructure in order to reduce the substantial costs of nationwide rollouts. Unhindered structural access to the fibre medium will ensure fairness and a maximum of flexibility in introducing new and innovative services.

### Scope of the OLI

- Provide a collective agreement amongst stakeholders to facilitate optimised optical bandwidth utilisation
- Provide: a definition of an OLI system; deployment scenarios and reference configurations & an OLI compliant network architectures

### Spectral unbundling

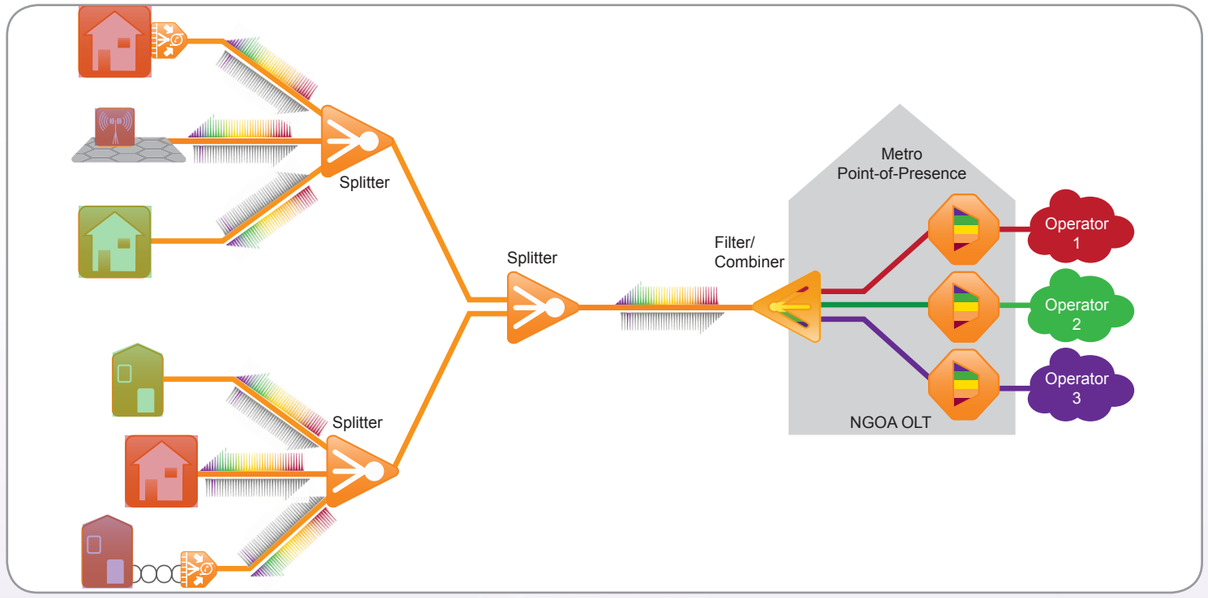
The proposed open environment will enable service and connectivity unbundling at the physical layer, creating a highly competitive landscape in the technology and service areas. In a single physical network, several different spectral bands may be occupied by different operators and service providers all at the same time.

Providers are able to offer differentiated services to their customers whilst customers can switch operators at the physical level by automatic wavelength re-tuning, without manual intervention. The shared nature of such a network stimulates competition, reduces deployment costs and risks, and removes the need for a regulator to impose costly infrastructure changes to enforce competition. This is the essence of a virtualised network in that the physical infrastructure is transparent to the providers and customers.

### Control authority

Several different service providers may share the same fibre infrastructure using the same technology. Equally, different access technologies may share the same fibre. Given such a coexistence environment, a neutral authority must be introduced to control the necessary spectrum assignment. This mandates the requirement for a set of regulatory rules somewhat comparable to those for free space radio transmission. All available wavelengths generated in a given fibre system would be represented in a ‘wavelength pool’, which amounts to an electronic database. The actual wavelength assignment function would be referred to as the ‘wavelength hotel’ since the wavelengths are being added or removed from the overall pool of available wavelengths as and when required by an operator for his service delivery.

In addition, until such rules are commonly implemented in all metro-access equipment, legacy technologies would still need to be taken into account with special treatment to ease the migration complexity and associated cost from existing PON deployments.




### Objectives of the OLI

- Define the different functional entities of new metro-access architectures
- Define spectrum management rules to handle multiple dynamic wavelengths
- Enable an efficient usage of the complete optical spectrum
- Enable the coexistence of different technologies on the same physical medium
- Outline a clear migration strategy for technologies
- Allow for a fast and flexible introduction of new compliant technologies
- Enable infrastructure service and connectivity unbundling on the physical layer
- Outline regulatory aspects of infrastructure unbundling
- Foster a highly competitive landscape in technology and services

### Moving forward

The OLI is tightly connected to the future availability of next generation photonic technologies. These technologies are key for the future implementation of affordable metro-access solutions. Future global availability of ‘OLI compliant systems’ will provide a unique and inter-operable management framework endorsed by the metro-access industry.

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