LR-PON protection

- Long Reach PONs achieve economical efficiency by:
  - increasing the optical reach – 1000’s of local exchanges can be removed
  - increasing the split ratio – a PON is shared among 500-1000 customers

- Long reach means that fiber cuts are more likely
- Larger share means that the smallest failure will affect 500-1000 customers – cable cut will affect 10,000s

⇒ Protection becomes of paramount importance!

Deployment case for Ireland

- The idea is implemented through a centralized management system

- From over 1000 local exchanges, to 18 metro/core nodes

Dual-Homing & load sharing

- Protection needs to be cost-effective: cannot double the cost for residential customers

- We propose a novel protection mechanism based on IP load sharing that allows sharing protection load of any individual node over the entire network

- With this structure each node:
  - provides primary IP coverage for the nearest PONs
  - provides backup coverage (i.e. protection) for PONs that are further away but still reachable

⇒ Protection against total failure of individual metro node is shared among adjacent nodes

Deployment case for the UK

- From over 5000 local exchanges to 75 metro/core nodes

- Due to the larger topology and number of nodes, IP overprovisioning capacity can be reduced even further, by almost a factor of 7

⇒ This cut in protection capacity can produce substantial cost and energy savings.