Backward Compatibility

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Upgrade Methodologies

For next-generation systems, the following functionalities would be required:

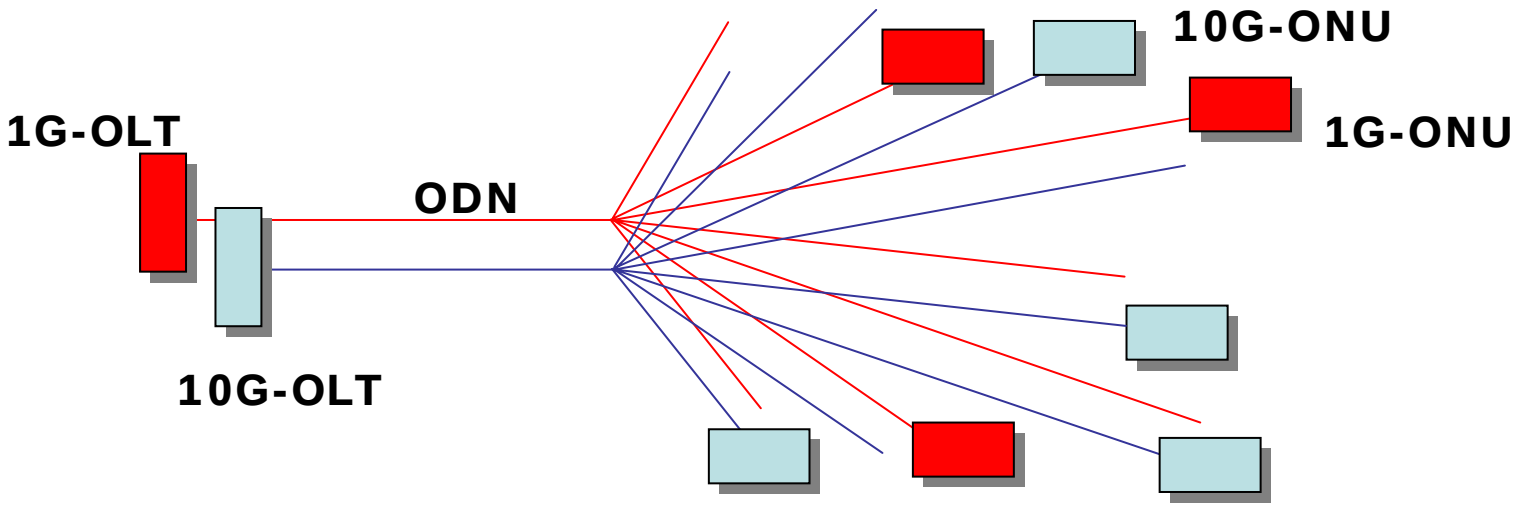
- Co-existence with the current systems,
- Seamless upgrade methodologies achieving the interoperability with the current systems.

As upgrade scenarios satisfying the above functionalities, the following methodologies are considered:

(1) ODN-overlay
(2) WDM-overlay
(3) TDM-overlay

ODN-Overlay

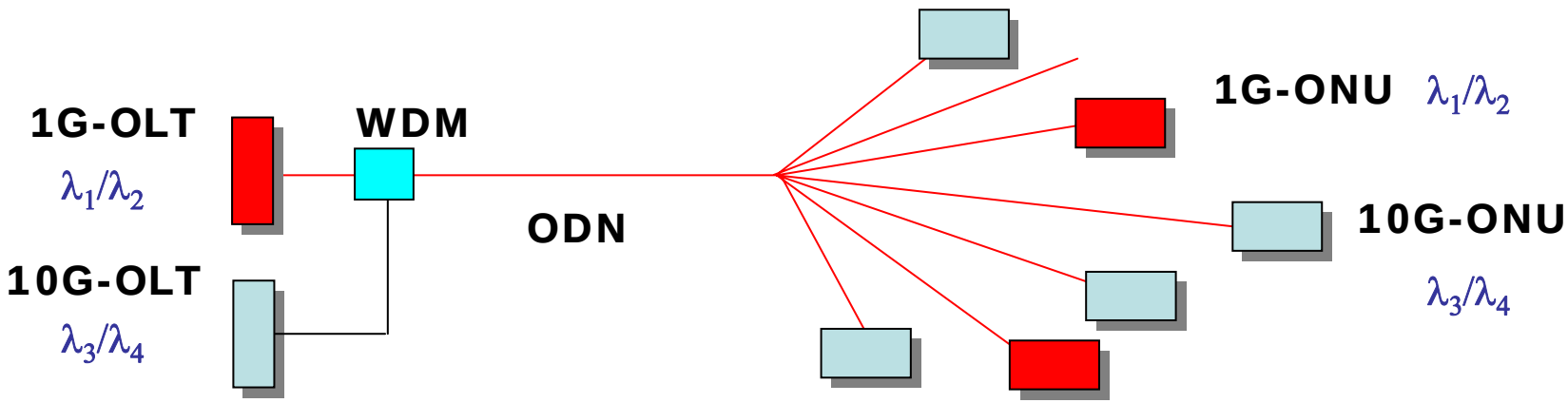
- Applicable to all kinds of system upgrades
- Simple but too expensive and time-consuming
- Old ODN can be reserved for other system use, for example, further next upgrades



Constructing new ODNs is not economical.

WDM-Overlay (1)

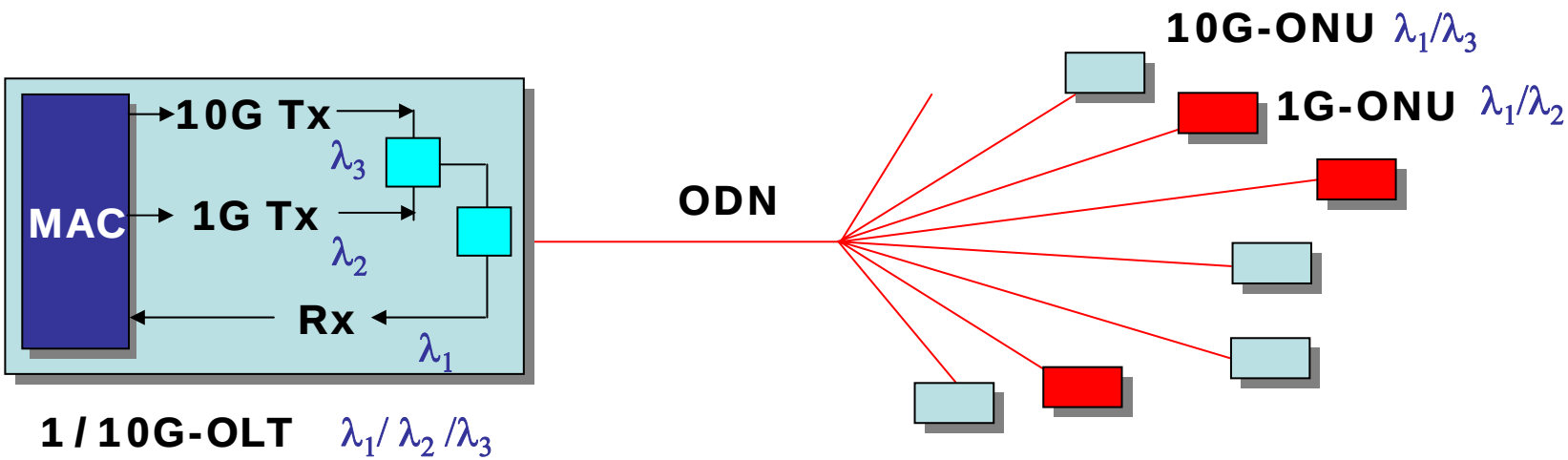
- Applicable to all kinds of system upgrades
- Simple but double OLT footprint
- Incompatible between two kinds of ONUs
- Old wavelengths can be reserved for other system use, for example, further next upgrade



Doubling OLT footprint is a main drawback.

WDM-Overlay (2)

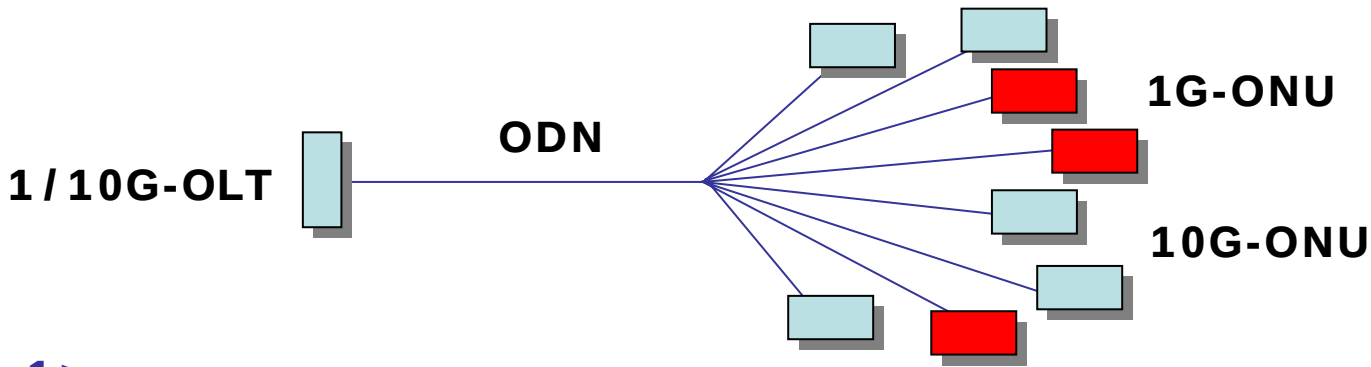
- Applicable to downstream system upgrade only
- Simple and practical
- Incompatible between two kinds of ONUs
- Old wavelengths can be reserved for other system use, for example, further next upgrade, but hard to compatible with WDM-overlay method (1).



This simple and practical method is applicable only for downstream system upgrade.

TDM-Overlay

- 10G-ONUs can be used as 1G-ONUs under any conditions.
- 10G-OLT can be used as 1G-OLT under any conditions.
- 10G-ONUs can receive both 10G-frames and 1G-multicast frames under any conditions.
- 10G-OLT can support both hybrid/pure-10G operation modes.



<Mode-1>
10G-OLT/ONUs are operated at 1G-mode if the system contains 1G-ONUs.

<Mode-2>
10G and 1G speeds are adopted to 10G-ONU and 1G-ONU, respectively, where multicast frames may have to be delivered by 1Gbps to all the ONUs.

Variety of operation modes can be considered.

What's needed ?

- Identical ODN to the current system, E-PON:
  - Split ratio > 16,
  - Standard SMF.
- Identical optical transceiver performance to E-PON:
  - Loss budget,
  - Transmission penalty.
- Deliberate selection of overlay methodology
- Wavelength allocation, if necessary
- Low-cost solution