

10GEPON Co-Existence Alternatives

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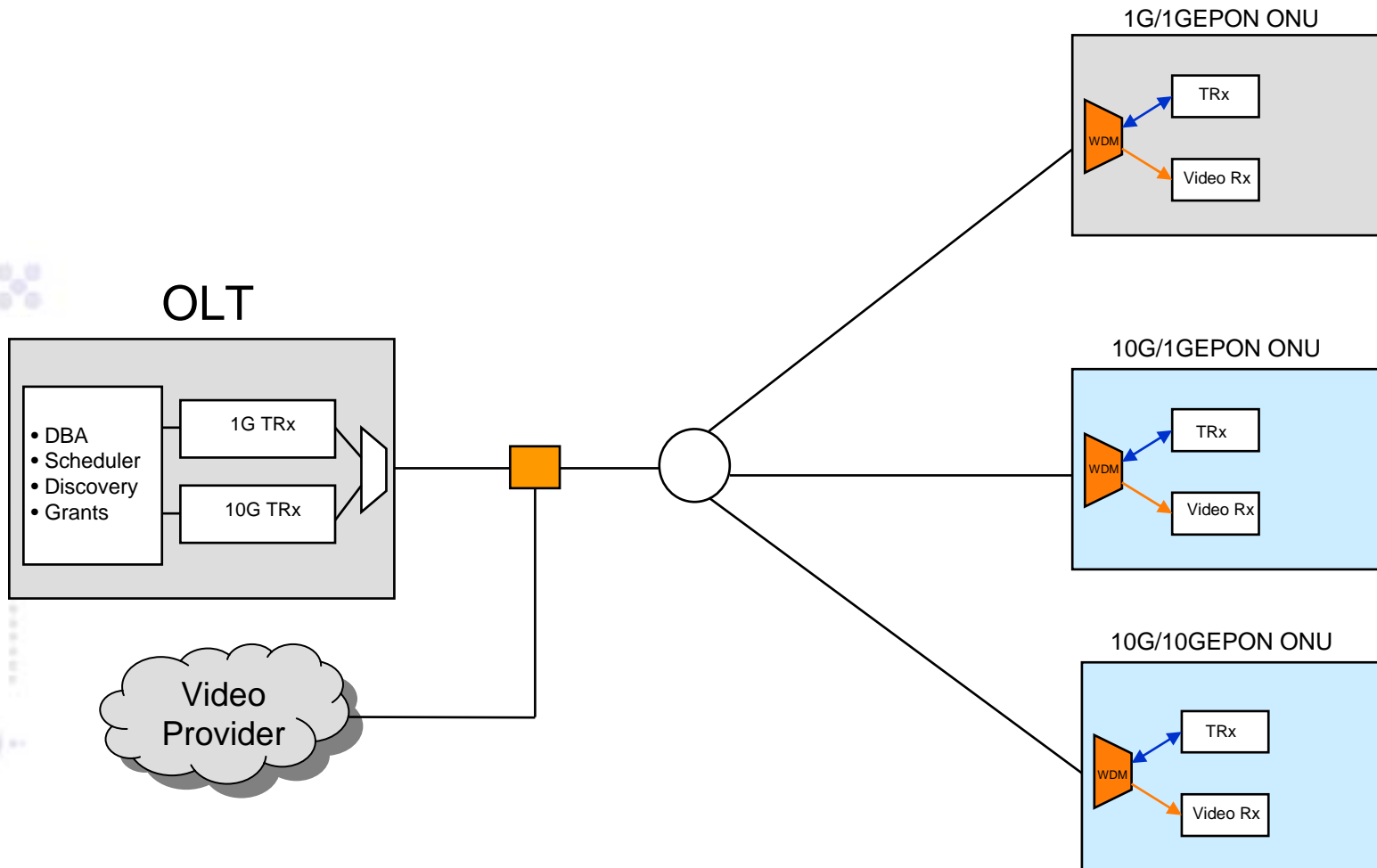
Issues

- Assumptions
- US Alternatives
- DS Alternatives
- Further Study

Assumptions

- Coexistence of 10GEPON with current GEPON ONUs is a fundamental requirement
- Use the same fiber optic cable (SMF G.652)
- Allow Overlay RF Video
- Bandwidth efficiency – targeted to be the same as GEPON
- 2 new ONUs
 - Asymmetric 10GEPON (10G DS / 1G US)
 - Symmetric 10GEPON (10G DS / 10G US)

Mixed PON Network Architecture



Options for upstream wavelength plan

	1G / 1G	10G / 1G	10G / 10G
Full TDM	1310nm	1310nm	1310nm
Full WDM	1310nm	1λ	2λ
1G / 10G WDM	1310nm	1310nm	2λ

Full TDM Upstream option - observations

- Need only a single Transceiver at the OLT
- Receiver needs to operate at multiple rates
 - Further study
 - Increase Guard Time in between Bursts
- Need full synchronization between the DBA that manage 1G and the DBA for 10G

Full WDM Upstream option – Observations

- Need 3 different transceivers at the OLT
 - Separate transceiver for each lambda
- Need a WDM splitter at OLT to distribute signal to transceivers
 - 0.3db penalty
- No need for synchronized DBA

TDM Upstream for 1G / WDM for 10G - Observations

- Need dual (single-rate) Transceivers at OLT
 - Single Transceiver for 1G/1G and 10G/1G
 - Dedicated Transceiver for 10G/10G

- WDM splitter
 - 0.3db penalty

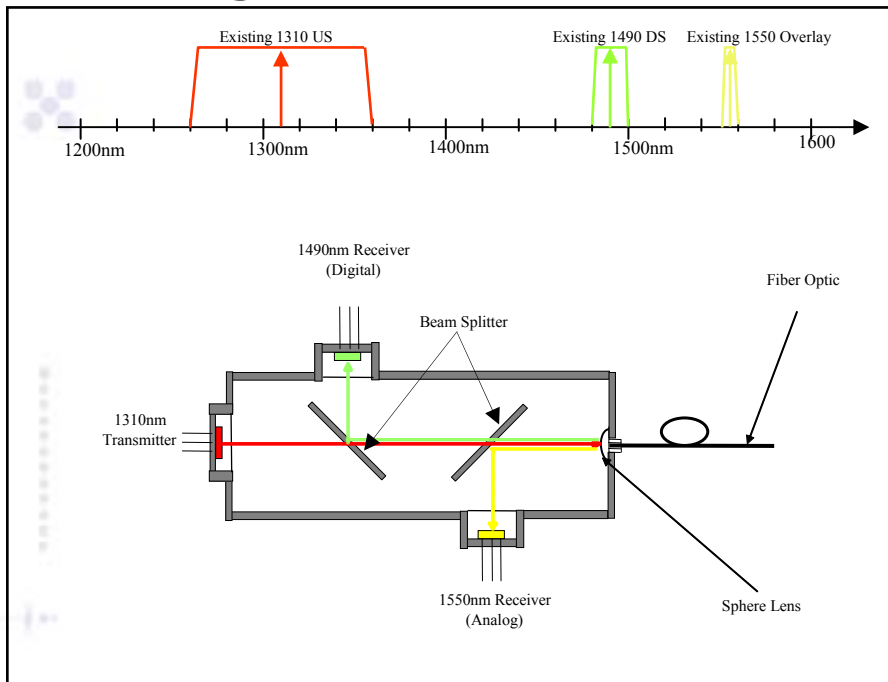
- Need Synchronized DBA

Observations – WDM DS

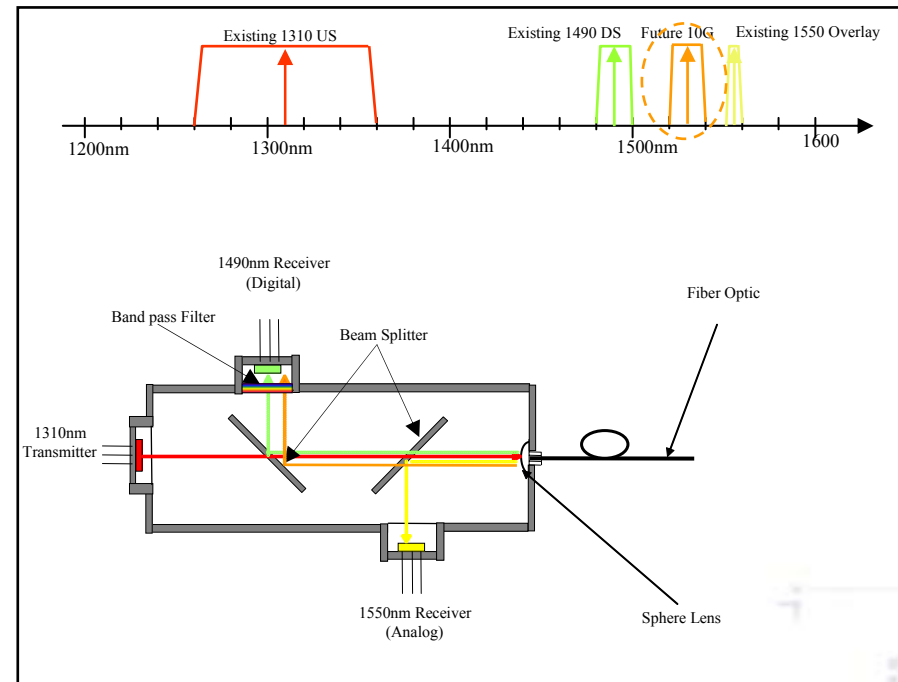
- **Observation 1:** Only WDM DS is possible
 - Additional Band-pass filter needed
 - Existing ONUs may need an external filter
 - Looks like a ***deal breaker*** for coexistence
 - Cost

BiDi Module Architecture

Existing GEPON Architecture



10GEPON Architecture



Conclusion

	PRO	CON
Full TDM	<ul style="list-style-type: none"> • Single TRx 	<ul style="list-style-type: none"> • Multi Rate OLT • Increase Guard Time • Full DBA Sync • Low DBA efficiency
Full WDM	<ul style="list-style-type: none"> • No DBA • Single rate OLT RX 	<ul style="list-style-type: none"> • 3 types of OLT TRx
1G / 10G WDM	<ul style="list-style-type: none"> • Dual rate OLT RX 	<ul style="list-style-type: none"> • 2 types of OLT TRx

Further study

- Single Rate OLT Transceiver
- 10G US & DS wavelengths allocation
 - O-band, E-band, S-band, C-band or L-band
- ONU optical Band pass filter