Fixed–mobile Convergence: Structural convergence

Preliminary results

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This ongoing work receives funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 317762 "COMBO project"

Technology comparison: Backhaul Example: Main CO Urban FTTH area

Backhaul, urban		Reference	NG-PON2	WR-WDM-PON	WS-WDM-PON
System elements per service area	∑ OLT shelves	n/a	3	3	4
	∑ Interfaces (3 Gb/s)	1076	1122	1122	1122
	∑ Passive optics	68	172	89	118
	∑ Amplifiers	0	1	0	9
	Total Latency [µs]	~10	~10	~10	~10
Fibres per service area	Total count (length)	825 (743 km)	661 (562 km)	789 (692 km)	800 (696 km)

- WDM overlay NG-PON2 requires more shelf space and additional amplifiers due to high power split for residential customers
- CWDM, WR and WS WDM additional infrastructure required

Technology comparison: Fronthaul Example: Main CO Urban FTTH area

Fronthaul, urban		Reference	NG-PON2	WR-WDM-PON	WS-WDM-PON
System elements per service area	∑ OLT shelves	n/a	6	3	6
	∑ Interfaces (3 Gb/s & 10 Gb/s)	1490	2180	2180	2180
	∑ Passive optics	112	206	115	121
	∑ Amplifiers	0	20	0	12
	Total Latency [µs]	~0.01	~0.02	~0.02	~0.02
Fibres per service area	Total count (length)	847 (785 km)	666 (572 km)	800 (696 km)	802 (700 km)

- WDM overlay NG-PON2 requires more shelf space and additional amplifiers due to high power split for residential customers
- CWDM, WR and WS WDM additional infrastructure required

Observation: Can't put the BBU hostel further form the Main CO

Summary – Preliminary qualitative assessment of coordination architectures for Backhaul and Fronthaul

Per service area (urban)	Reference	NG-PON2	WR-WDM-PON	WS-WDM-PON
Reduction in fibre count and length	●	●●●	●●	●●
Reduction in number of interfaces	●●●	●●	●●	●●
Reduction in passive optics	●●●	●	●●●	●●
Reduction in amplifiers (reach)	●●●	●	●●	●
Potential of structural convergence		●●●	●	●
Number of wavelengths per fibre	●	●	●●●	●●
Bitrate per wavelength	●●	●●	●●	●●
Low latency (system level)	●●	●●	●●	●●
Simple to operate (colourless)		●●●	●●●	●●●
Reduction in active shelves in Main CO	●●●		●	
Ethernet aggregation in Main CO		●	●	●
Legacy compatibility with fixed net.		●●●		
Re-use network infrastructure	●●	●●●	●	●●

If low transport delay is realized backhaul + CoMP could deliver almost equal performance compared to fronthaul over existing backhaul infrastructure

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