IEEE 802.3 HSE Consensus Ad Hoc

OTN Evolution Above 100Gbps Input from ITU-T SG15

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Geneva, Switzerland, 23 September 2012

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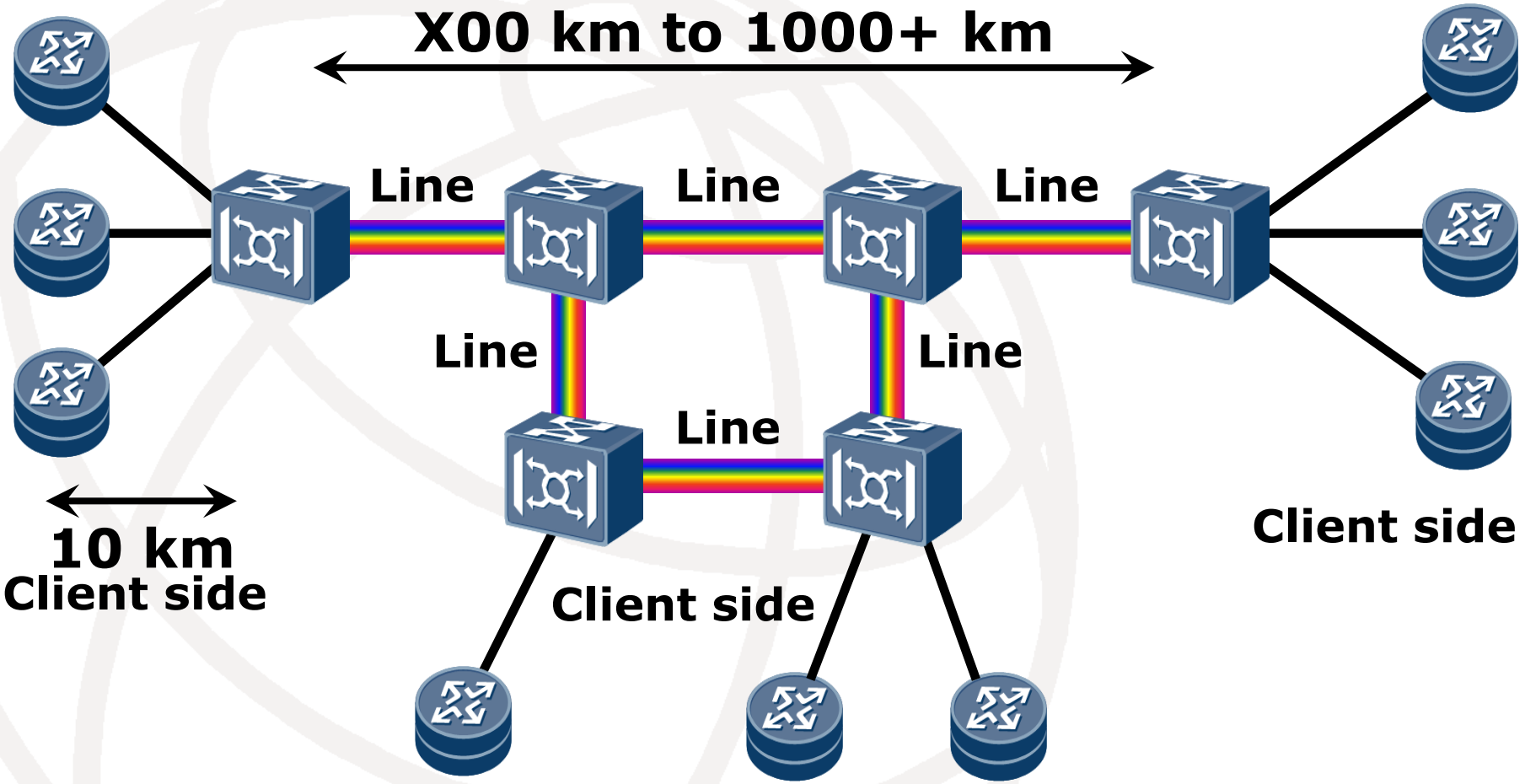
Network reference diagram
OTN Client and Line side



Previous talks and conclusions

- Previous joint SG15 & IEEE 802.3 workshop on 28 May 2010, by Pete Anslow (Ciena):

  "Optical line technologies for rates above 100G"

- ECOC 2011, Geneva, Sept 2011, Sunday workshop, by Peter Stassar (Huawei):

  "OTN Evolution Above 100Gbps"

Joint SG15 & IEEE 802.3 workshop on 28 May 2010

Summary

To achieve 400G or 1T channels for long distance transport with acceptable reach and spectral efficiency, advanced modulation formats are required that involve combinations of:

- complex constellations
- high symbol rate
- multiple sub-carriers

Experimental results that demonstrate feasibility of 400G and 1T channels is emerging.

1 T channels will require multi-carrier technology and may not show significantly better spectral efficiency than 400G channels depending on reach. If this proves to be the case then the benefit of going to 1T is less compelling.

Courtesy of Pete Anslow, Ciena

ECOC 2011 Workshop, Geneva, Sept 2011

Summary

- Market will require OTN speeds beyond 100Gbps
- Next rate choice 400Gbps or 1Tbps for both client optics and line side optics
- First experimental results available
- Need improved SE for “useful” 1Tbps
- Current favourite : 400Gbps

Did anything change since ECOC 2011?

NO

OTN Client side

- *Next OTN client rate expected to be coordinated with IEEE to be compatible*
- *It is regarded essential for next OTN rate client optics to have optimized reuse from Ethernet applications for lowest cost*

OTN Line side

- *Many proposals for next OTN rate beyond 100G to SG15 September '12*
- *Spectral efficiency does not improve for reasonable transmission distances between 400Gbit/s and 1Tbit/s*
- *Thus fibre capacity will not increase beyond 400Gbit/s*
- *Opens up possibility to do things differently when going from 400Gbit/s to 1Tbit/s*

Wait until fibre capacity is saturated?

- *May be smart not to wait until 1Tbit/s*
- *Consider doing things differently already at earlier stage*
- *Do this NOW?*
- *Several options proposed:*
  - *Fixed rate ODU5/OTU5*
  - *Flexible rate instead of ODU5/OTU5*
    - *N*100Gbit/s*
    - *N*200Gbit/s*
    - *Inverse multiplexing*

Outcome of SG15 meeting

- *All proposals were presented and discussed*
- *No decisions were taken*
- *A new Q.11/15 living list was created specifically for "G.709 Beyond 100G"*
- *This will serve as support for discussions and potential decisions towards next SG15 Plenary meeting in July 2013*

SUMMARY

- *OTN client side specs for next rate >100G likely to be compatible with next Ethernet PMDs >100G*
- *OTN line side specs for >100G possibly defined differently from "fixed" rate*
- *Further discussions and potential decisions after September 2012*

THANK YOU