

Objectives for Next Generation 100GbE Optical Interfaces

Pete Anslow, Ciena

Steve Trowbridge, Alcatel-Lucent

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Introduction

One of the key outputs of the *Next Generation 100GbE Optical Interfaces* Study Group is the set of objectives.

This contribution discusses what the possible objectives might be in order to understand what questions need to be answered by the Study Group before a suitable set of objectives can be agreed.

Note – * in the top right corner of the slide indicates slide has changed from previous version of this presentation

Adopted objectives

The following objectives have been adopted by the Study Group:

- Support full-duplex operation only
- Preserve the IEEE 802.3 / Ethernet frame format utilizing the IEEE 802.3 MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support a BER better than or equal to 10^{-12} at the MAC/PLS service interface

OTN compatibility

P802.3ba (40 & 100 Gb Ethernet) adopted an objective for OTN compatibility because of concerns that the rates and formats of 40 & 100 Gb Ethernet should be chosen in a way that allowed them to be carried by the OTN.

FEC is being considered as one of the techniques that may be employed by the Task Force to enhance reach and thereby improve Broad Market Potential. If FEC is used, then in order to minimise its impact on symbol rate and latency, it may be desirable to change some aspects of the coding and striping of 100Gb Ethernet. In this case, care should be taken to ensure that none of the adopted changes prevents efficient carriage of 100Gb Ethernet over OTN.

The corresponding objective could be:

- Provide appropriate support for OTN

Since this objective helped to encourage a useful dialogue between 802.3 and the ITU-T for the P802.3ba project, it seems reasonable to set the same objective for the next generation 100GbE optical interfaces.

100G over Multimode fibre

One of the expected elements of this project is a new 4-lane multimode PMD.

The corresponding objective could be:

- Define a 4-lane 100 Gb/s PHY for operation over OM~~X~~ MMF with lengths up to at least ~~Y~~ m

Questions that need to be answered by the study group:

- Technical and economic feasibility of transmitters and receivers – confirm that this 4-lane interface is lower cost than 100GBASE-SR10
- Can this interface be realized un-retimed, half re-timed, or is full re-timing needed for realistic host board trace length / material?
- Does the inclusion of EDC and/or FEC improve the broad market potential?
- Does OM4 provide a significant improvement in range? Should the objective be for OM3 or OM4?
- Given answers to the above, what should the value of ~~X~~ and ~~Y~~ be?

100G over Single-mode fibre

There is a strong desire to improve the size, power and cost of a 100G single mode interface. Some improvement in these metrics (at least for the module) can be realised by defining a 4-lane electrical interface (see next slide).

Some options for an improved SM module may not be capable of supporting the 100GBASE-LR4 spec. In that case a possible objective could be:

- Define a 100 Gb/s PHY for operation over at least **Z** km of SMF

Questions that need to be answered by the study group:

- Technical and economic feasibility of transmitters and receivers – what makes this interface significantly cheaper than 100GBASE-LR4 with no gearbox in the module?
- Can this interface be realized un-retimed, half re-timed, or is full re-timing needed for realistic host board trace length / material?
- What is the market need for reaches capable of being met by the identified technology?
- Given answers to the above, **should there be a 100G SM objective?** If so, what should the value of **Z** be?

Electrical interfaces

Neither P802.3ba (40 & 100 Gb Ethernet) or P802.3bj (100 Gb/s Backplane and Copper Cable) set any objectives for “internal” electrical interfaces as they were part of the “PHY” covered by other objectives.

However, since this project depends upon the electrical interface being available it **may** be appropriate to include objective(s) for it/them.

Since there is no established precedent for this type of objective it would be advantageous to avoid including the distance in the objective.

If the study group feels that an objective is needed, a possible objective might be:

- Define a 4-lane 100G chip-to-module interface

Questions that need to be answered by the study group:

- Technical feasibility of 25G electrical lanes over reasonable distances
- For un-retimed, technical and economic feasibility of end-to-end optical link
- How should the work on these electrical interfaces be coordinated with P802.3bj?

Thanks!