100G SR4
CABLE LENGTH

WHITE PAPER
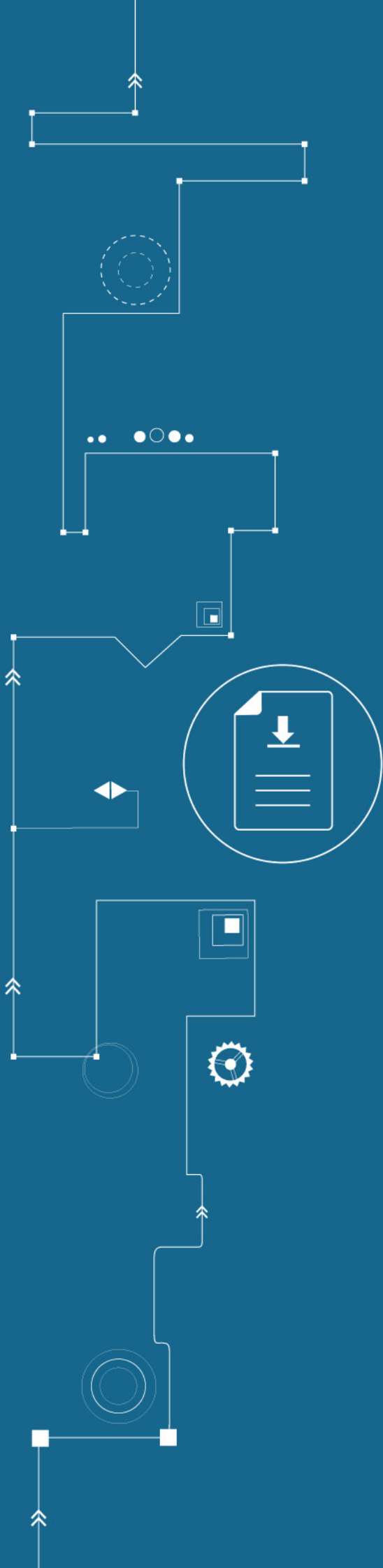
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Introduction

100G SR4 is based on multimode transmission via MTP cables. Every pair of fibers carries 25Gbit/s and by using four pairs 100Gbit/s is achieved in each direction.
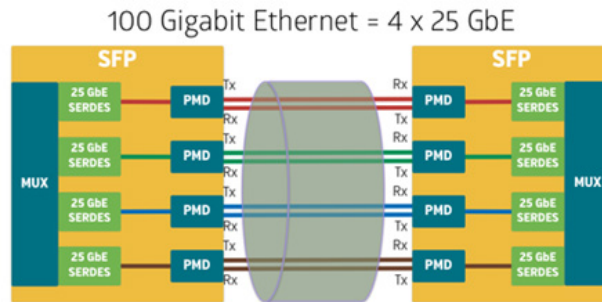
100G SR4 cable length specifications

100G SR4 is "specified" for max. 70m cable distance over MM OM3 fiber and max. 100m over MM OM4 fiber. These distances serve as guideline only and of course does not consider any tapping! For the maximum cable length we need to consider a few items.

Available Optical Budget: depends on insertion loss of the fiber, plus tapping, and also depends how strong the TX Laser is.
Please be aware that 100G SR4 transceivers are specified as follows:

TX Power in dBm per lane	max.	2,4
	min.	-8,4
	typ.	0
(Sensitivity) RX Power in dBm per lane	min.	-10,3

As indicated, the TX power variation is huge and TX Power is a key factor for the optical budget calculation.

Optical dispersion: this is a non-linear effect that broadens light pulses so that RX can not correctly decode binary 0s and 1s and thus causing transmission errors.
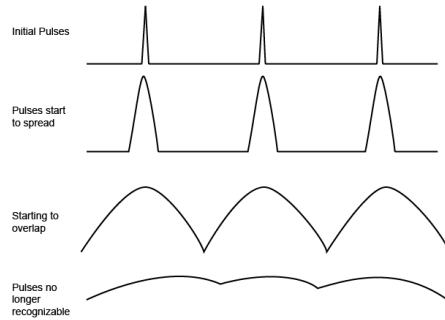

Tapping 100G SR4

For tapping 100G SR4 links we have our superior MTP TAP which has a 50:50 splitting ratio. Insertion Loss of the MTP TAP is typically around 4dB on the live link, as well as on the monitoring links. When total insertion loss (tapping, ODFs, fiber loss, …) becomes too great, side B of the live network will not get enough optical power, and thus errors are detected and/or the link cannot be established. The same problem is, of course, also applicable to the monitoring ports.

Design Guidelines

100G SR4 is available in native mode and FEC. FEC stands for Forward Error Correction and is used to extend the range of the signal by correcting errors in transmission. Today most of the 100G SR4 system work with FEC but there are still non-FEC 100G SR4 system out there. Our EX(A)48600/32100 cover both – FEC and non-FEC. The use of FEC has a dramatic influence on the cable length.
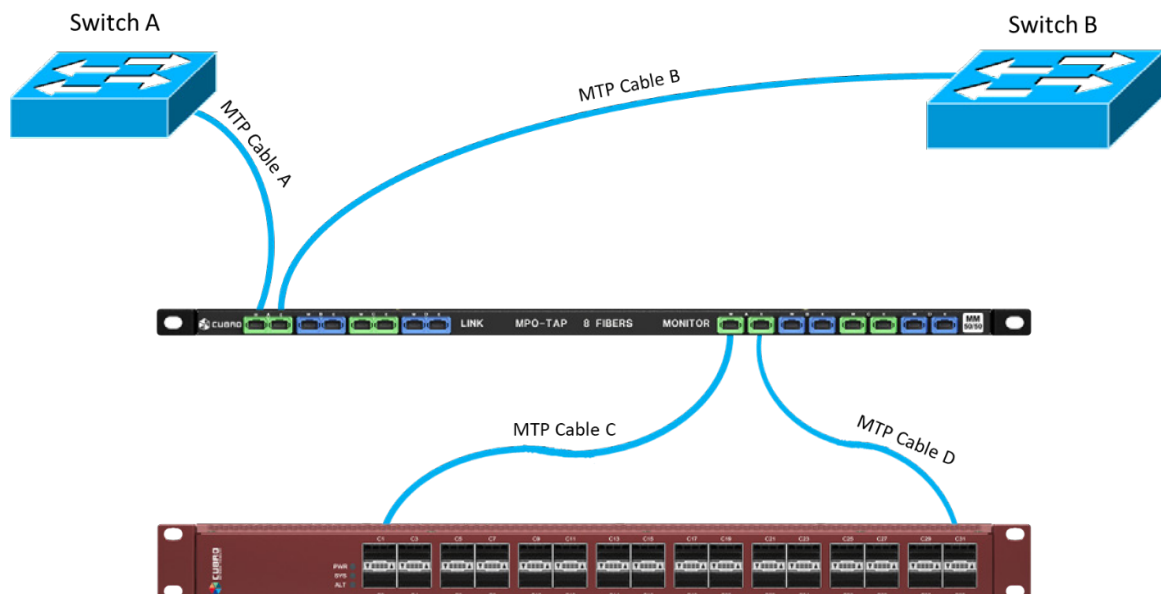
Non FEC Mode:

Cable A + Cable B: max. 20m
Cable A + Cable C: max. 20m
Cable B + Cable D: max. 20m

FEC Mode:

Cable A + Cable B: max. 40m
Cable A + Cable C: max. 40m
Cable B + Cable D: max. 40m

Note: Above design guidelines assume a TX power level of 0dBm. If a lower transmit power transceiver is used the cable lengths are less!

Summary:

• Actual transceiver specifications have an influence on the maximum achievable distance.
• Whenever possible enable FEC – it greatly enhances the maximum transmit distance.