

Optics

*Update to
Joint Proposal of
May, 1995*

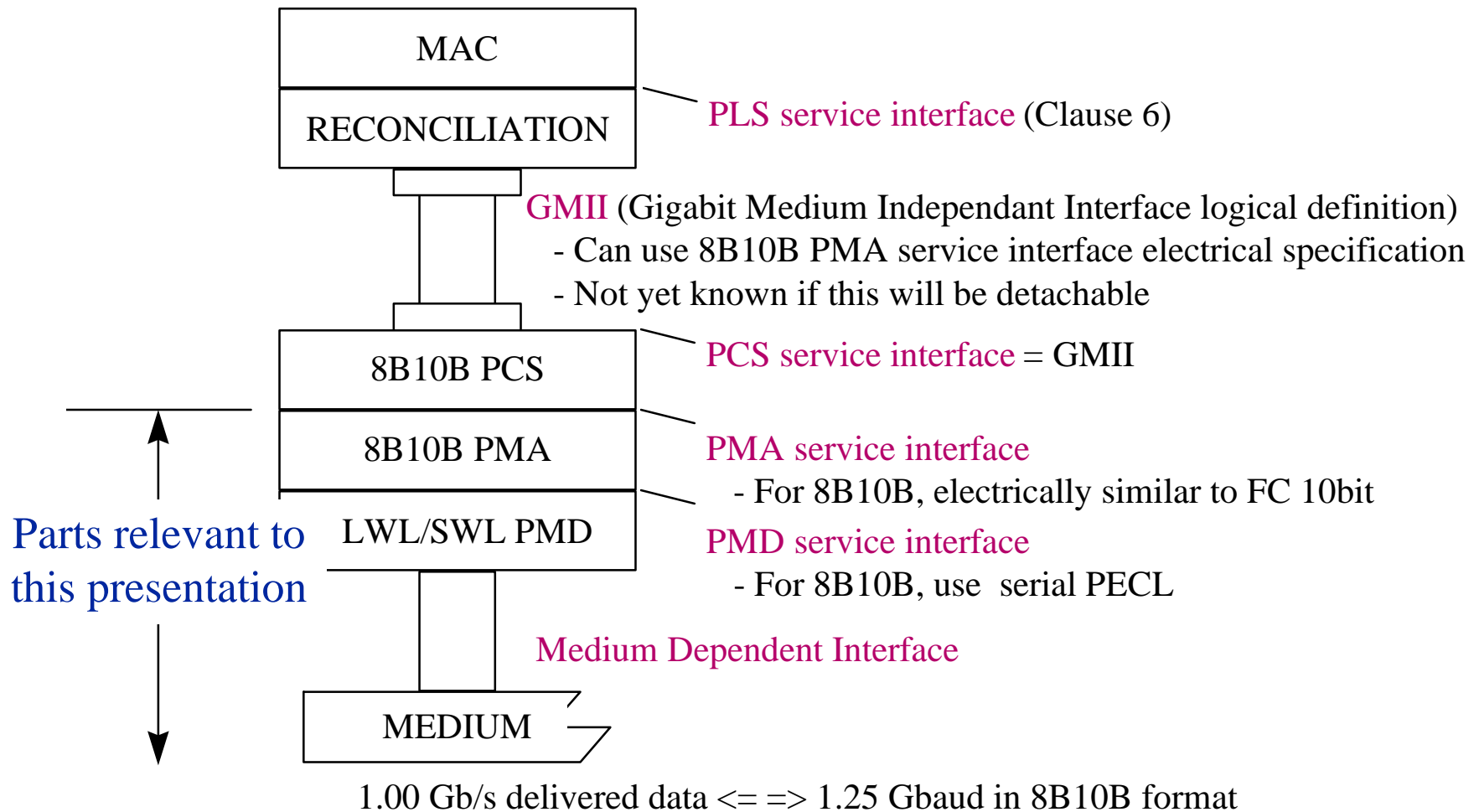
- ❖ Overview of approach
- ❖ Applications coverage
- ❖ Details (white paper)

The following companies have indicated their support for the concepts outlined in this proposal (in alphabetical order):

Del Hanson, HP (408) 435-6246
Jonathan Thatcher, IBM (507) 253-2867
Stan Swirhun, VIXEL (303) 460-0700 x17

H.P.
IBM
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Optical Adapter Architecture



PMA Layer: Serializer

- ❖ Assumes 8B10B coding is done by PCS layer
- ❖ Uses same 8B10B PMA Layer for all optical devices
 - PMA service interface is 10-bit interface specification @ 125 MHz
 - Use style of jitter specification per ANSI Jitter Study Group
 - Scale interface timing for 125 MHz operation
- ❖ Interface to PMD is serial PECL

PMA Sublayer: Data Rate

Table—Data Rate Specifications

Description	Unit	Value
Unencoded Serial Bit Rate	Mbaud	1000
Encoded Serial Bit Rate	Mbaud	1250
Baud Rate Tolerance	PPM	100

PMD Layer: Two Transceivers

❖ Short-wavelength laser (SWL)

Multimode fiber

- ◆ Lowest-cost option that easily covers horizontal desktop distances, and some building backbone distances, on either 50 or 62.5 um MMF (per ISO 11801)

❖ Long-wavelength laser (LWL)

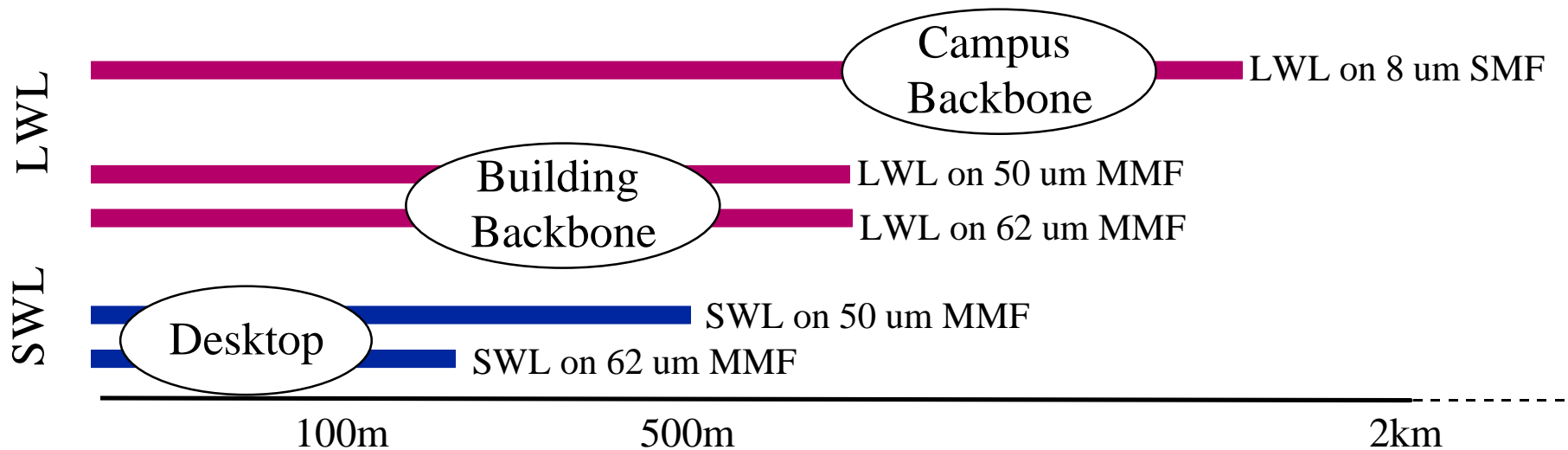
Single mode fiber

- ◆ goes at least 2 km on SMF

Multimode fiber

- ◆ extends reach on MMF to longer building backbone distances

Application Coverage



- ❖ This plan meets or exceeds study group objectives
- ❖ Based on available parts
- ❖ Not dependent on controlled mode launch assumptions

Each transceiver will be characterized over its full operating range on each type of fiber

8B10B PMD: SWL Optics

Table—Operating Distance for Each Fiber Type (meters)

Optical Source	62.5 micron MMF	50 micron MMF	SMF
Shortwave Laser	200	450	N/A

Table—SWL transmit characteristics

Description	Unit	Value	Status
Bit Rate	Mbaud/s	1250 +/- 100 ppm	agreed
Transmitter type		laser	agreed
Wavelength	nm	770-860	agreed
Spectral width	nm, RMS	4	see note 1
Max. launch power @ 770 nm	dBm, avg.	-5	agreed
Max. launch power @ 860 nm	dBm, avg.	-4	agreed
Min. launch power	dBm, avg.	-10	agreed
Extinction ratio	dB	9	?
RIN (max)	dB/Hz	-117	see note 2
Eye opening			see note 3

Media for SWL operation (850 nm)

Table—Media characteristics for use with SWL

Description	Unit	Value			Status
		62.5 um MMF	50 um MMF	SMF	
Guaranteed operating distance	m	200	450	n/a	
Max. attenuation	dB/km @ 850 nm	4	3.5	n/a	(needs work)
Min. modal bandwidth (overfilled launch) at 850 nm	MHZ*km @ 850 nm	160	400	n/a	(needs work)
Dispersion slope	ps/km*nm ²	0.093	0.105	n/a	(note 1)
Min. dispersion point	um	1.36	1.33	n/a	(note 1)

8B10B PMD: LWL Optics

Table—Operating Distance for Each Fiber Type (meters)

Optical source	62.5 micron MMF	50 micron MMF	SMF
Longwave Laser	> 550 (perhaps as much as 850m)	> 550 (perhaps as much as 850m)	2,000 (or more)

Table—LWL transmit characteristics

Description	Unit	Value	Status
Bit Rate	Mbaud/s	1250 +/- 100 ppm	agreed
Transmitter type		laser	agreed
Wavelength	nm	1270-1355	agreed
Spectral width	nm, FWHM	14	note 1
Max. launch power	dBm, avg.	-3	agreed
Min. launch power	dBm, avg.	-13	note 2
Extinction ratio	dB	9	?
RIN (max)	dB/Hz	-116	? see note 3
Eye opening			see note 4

Media for LWL operation (1300 nm)

Table—Media characteristics for use with LWL

Description	Unit	Value			Status
		62.5 um MMF	50 um MMF	SMF	
Guaranteed operating distance	m	550-850	550-850	2000+	T.B.D. note 1
Max. attenuation	dB/km @ 1300 nm	1	1	< 1 (needs work)	note 1
Min. modal bandwidth (overfilled launch) (see note 2)	MHZ*km @ 1300 nm	500	500	n/a	(needs work: at 500 MHz-km you can get 850m on 50 um)
Dispersion slope	ps/km*nm ²	0.093	0.105		note 1
Min. dispersion point	um	1.36	1.33		note 1
Dispersion (up to max. distance)	ps/nm, RMS			12	note 1