AVAILABLE FOR PILOTS NOW

TODAY'S PILOT UNIT · LATENCY-FIRST OPTICAL TERMINAL

A1 Metro: the sub-microsecond terminal.

A latency-first optical terminal for metro fibre, 0.5 to 80 km. Measured on today's unit: 0.65 µs one way per link from Ethernet in to Ethernet out (0.60 µs overclocked), error-free with no error correction, every 16 GB file copy identical.



0.65 µs
one way per link, measured through the 100G port

0.60 µs
at the overclocked setting, measured the same way

43 Gb/s
per unit on two wavelengths, no error correction, 0 bit errors

0.78–0.88 µs
at a constant 55.3 Gb/s on the line, to 40 km, with error correction

0.5–80 km
of metro fibre: 40 km without an amplifier, 80 km with one

Ways to run it, measured

One mode at a time, set per link from the dashboard. Every number is measured on today's unit.

MODE	PER WAVELENGTH	PER UNIT, 2 λ	ONE-WAY DELAY
Latency-first No error correction; the unit picks the highest rate that stays error-free over the reach.	21.5 Gb/s 17.2 at 60–80 km	41.9 Gb/s of file data	**0.65 µs**
Latency-first, overclocked The same link at the overclocked setting: the lowest delay.	21.49 Gb/s 17.19 at 60–80 km	41.9 Gb/s of file data	**0.60 µs**
Constant 55 Gb/s 55.3 Gb/s held on the line to 40 km, with error correction.	27.65 Gb/s to 40 km	up to 49.7 Gb/s of file data	**0.78–0.88 µs**

Capacity and delay by fibre distance

16 GB of files through both links at each distance, every copy identical; delay from hardware timestamps. No amplifier to 40 km; one at 60 and 80 km. At 2, 5 and 15 km the unit stepped down to 17.2 Gb/s per wavelength to stay error-free.

FIBRE	PER WAVELENGTH	PER UNIT, 2 λ	DELAY, ONE WAY	OVERCLOCKED DELAY
0.5 km	21.5 Gb/s	43 Gb/s	**0.65 µs**	0.59 µs
10 km	21.5 Gb/s	43 Gb/s	**0.65 µs**	0.61 µs
20 km	21.5 Gb/s	43 Gb/s	**0.65 µs**	0.60 µs
30 km	21.5 Gb/s	43 Gb/s	**0.65 µs**	–
40 km	21.5 Gb/s	43 Gb/s	**0.65–0.67 µs**	0.60 µs
60 km	17.2 Gb/s	34.4 Gb/s	**0.69 µs**	0.64 µs
80 km	17.2 Gb/s	34.4 Gb/s	**0.69 µs**	0.63 µs

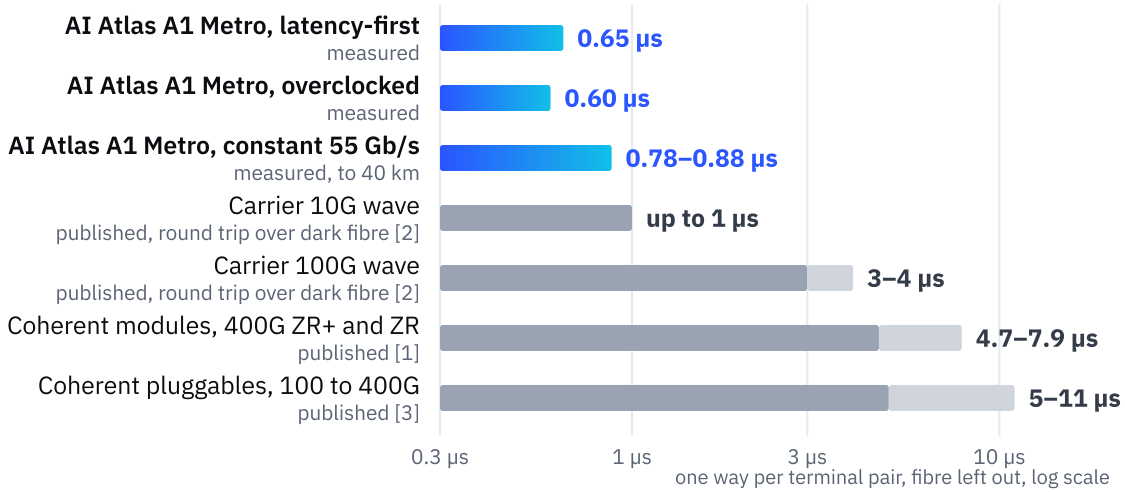
Interfaces and unit

Client	100GbE (QSFP28)
Line	2 wavelengths, duplex LC; passive mux
Reach	0.5 to 40 km without amplifier; 60 to 80 km with one

Form	19-inch chassis, 2U
Management	RJ45; dashboard with delay, errors, power, temperature and timestamps; mode set per link
Guards	Temperature guard; self-check of every link at power-up

The hop that still adds microseconds.

Between data centres and exchanges in a metro, every link passes through a pair of terminals. Today those terminals add up to 1 µs (10G waves) and 3 to 11 µs (100G waves and coherent pluggables). The A1 Metro adds 0.65 µs, measured.



WHERE	TODAY	WITH THE A1 METRO, MEASURED
Metro waves between data centres and exchanges, under 80 km	up to 1 µs (10G) or 3 to 4 µs (100G) per link [2]	up to **1.5×** and **4.6 to 6.2×** faster, with twice the capacity of a 10G wave per wavelength
Data-centre interconnect on coherent pluggables	4.7 to 11 µs per link [1, 3]	**7.2 to 16.9×** faster
Not our hop	Cross-connects inside the hall (nanoseconds) and microwave (the fastest path, little capacity)	

204 m of route for every microsecond saved: light in fibre covers 1 km in 4.9 µs. Saving 2.4 to 3.4 µs against a 100G wave is like moving the two ends 0.5 to 0.7 km closer.

HOW A PILOT WORKS · ONE OR TWO ATTENDED DAYS ON YOUR ROUTE

1
Install
One window per site, 2 to 3 hours, your staff and ours.

2
Measure
One tester, both waves, the same clock: the difference is the terminals.

3
Remove or keep
Out in the same window, or a priced soak under contract.

4
First wave
The measured wave becomes the first paid wave.

Sources: [1] Cisco 400G Digital Coherent Optics QSFP-DD data sheet, round-trip latency at 400GE (cisco.com, datasheet c78-744377) · [2] carrier round-trip latency tables, New Jersey metro: a wave against dark fibre, one way per link is half the difference (zayo.com, NJ Triangle route overview) · [3] Smartoptics TQD013-TUNC-SO 400G ZR/ZR+ data sheet (smartoptics.com). Live test videos at www.aiatlasinc.ca.

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