

OIF

OIF Common Management Interface Specification (CMIS) Live Interoperability Demo

OFC 2022

March 8-10 – San Diego CA



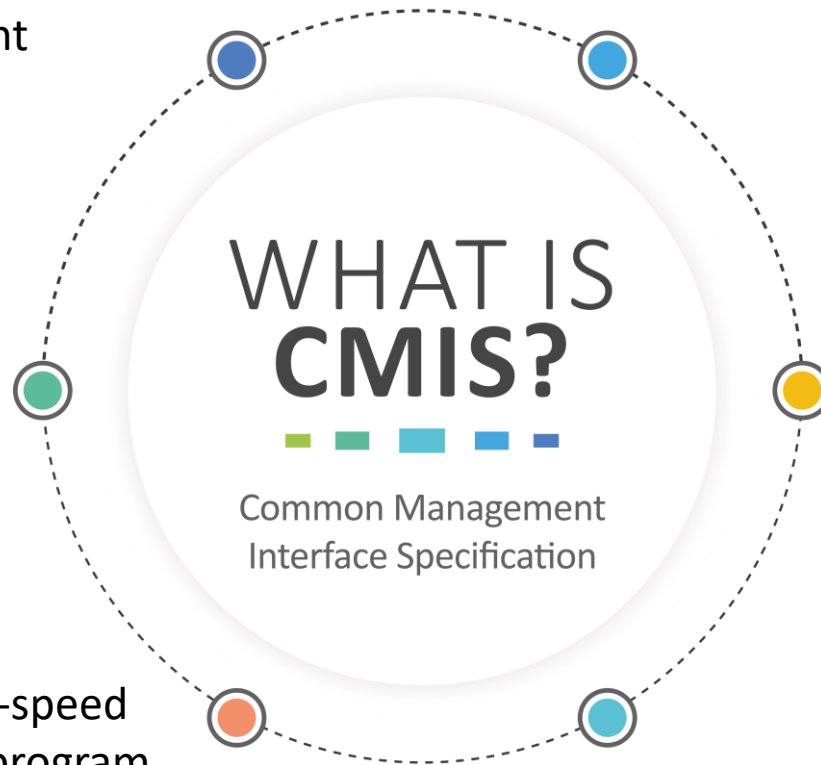
Why was CMIS started?

- CMIS was originally conceived to address industry pain points in module management :
 - Management of multiple form factors
 - Module initialization
 - Breakout – managing multiple different services
- The industry has embraced CMIS leading to continued efforts to evolve CMIS with the addition of support for:
 - Coherent modules
 - Multiplexing modules
 - Fibre channel



Eliminating Complexity for Pluggable Modules

- Unites a wide range of transceiver classes under one management protocol.
- Fully form factor agnostic: CMIS implementation is consistent and interchangeable between OSFP, QSFP-DD and QSFP112 modules and more.
- CMIS gives access to the low-speed I2C interface to control and program the module.

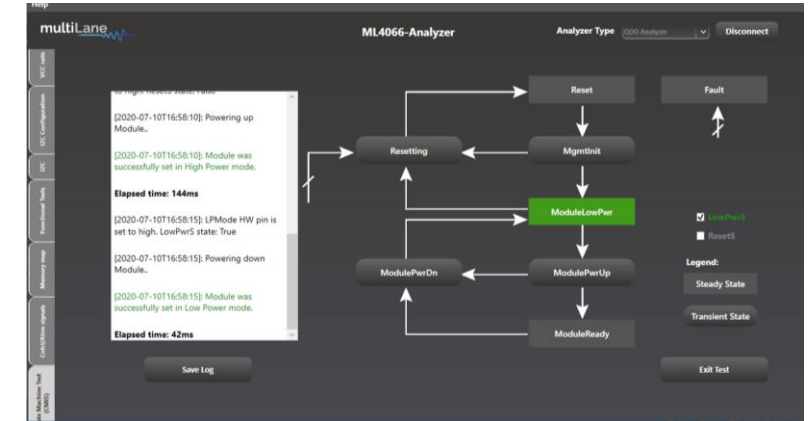


- Supports module types ranging including:
 - Passive Copper Cables
 - Active Cable Assemblies
 - Optical Transceivers
 - Coherent DWDM modules
- Provides communication between all compliant optical modules, switches, and server Network Interface Cards
- Enables interoperability between module and host and is used to test and debug the module

Demo #1: CMIS Diagnostics and Module State Machine in Action

EXFO Tester:

- Built-in display for module identifiers and CMIS compliant support.
- Real time depiction of module diagnostics (TX/RX power, etc.) and link state
- Validation of I2C, electrical and optical module specifications



MultiLane CMIS Analyzer:

- I2C packet capture between module and host
- Interactive State Machine monitors module power-up

Molex 400G Module:

- Reports ID and Diagnostic Data
- CMIS 4.0 Compliant

Demo #2: CMIS Service Awareness

App. Code	Electr. Code [Hex]	Application Name	Host LC	Lane Ass. [Hex]	Media Code [Hex]	Application Name	Media LC
1	0011	400GAUI-8 C2M	8	0001	001C	400GBASE-DR4	4
2	000D	100GAUI-2 C2M	2	0055	0014	100GBASE-DR	1
3	00FF	End of List	0	0000	0000	Undefined	0
4	0000	Undefined	0	0000	0000	Undefined	0

Advertised Transponder Capabilities

Staged Control Set 0				Staged Control Set 1				Active Control Set			
Lane #	App. Code	D.-Path Code	Explc. Cntrl	Tx Adapt. Eq. Ena.	Tx Adapt. Eq. Recall.	Tx Fixed Eq. Control	Tx CDR	Rx CDR	Rx Eq. Pre-Tap	Rx Eq. Post-Tap	
0	2	0	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
1	2	0	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
2	2	2	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
3	2	2	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
4	2	4	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
5	2	4	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
6	2	6	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	
7	2	6	OFF	ON	00b (Do not recall)	0011b (3 dB)	ON	ON	0010b (1.0 dB)	0000b (N)	

Currently Active Settings (Active Control Set)



Cisco 400GBASE-DR4 QSFP-DD Module

Viavi QSFP-DD Tester

Data Path Enable:

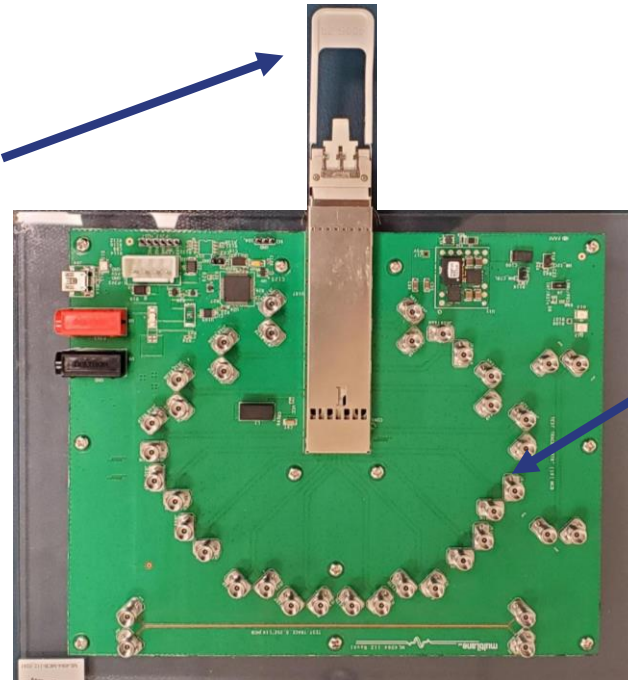
Lane	Data Path State	Data Path Conf. Validity
0	4 'Data Path Activated'	1 'Config accepted'
1	4 'Data Path Activated'	1 'Config accepted'
2	4 'Data Path Activated'	1 'Config accepted'
3	4 'Data Path Activated'	1 'Config accepted'
4	4 'Data Path Activated'	1 'Config accepted'
5	4 'Data Path Activated'	1 'Config accepted'
6	1 'Data Path Deact.'	1 'Config accepted'
7	1 'Data Path Deact.'	1 'Config accepted'

Active Data Path Management

Demo #3: Extending CMIS Features with FW Upgrade via Common Data Block

NeoPhotonics 400ZR Module:

- Reports ID, State Status, and Link/DDM/VDM Diagnostic Data
- CMIS 4.0/5.0 Compliant
- CDB Firmware Upgrades supported



The screenshot shows the MultiLane MCB CMIS GUI. The main window is titled 'Common Management Interface Kit' and displays 'CMIS Version: 5.0'. The 'CDB' tab is active, showing 'CDB Firmware Download Commands'. A 'Success' dialog box is open, displaying a warning icon and the message: 'Firmware Successfully Upgraded. Please use Run command to switch to the new firmware. Use commit firmware command only if the new image is working properly.' The dialog has an 'OK' button.

Name	Address	Value	Description
CDB Status	25	01	Command completed successfully
CDB Complete Flag	08	00	CDB Complete Flag Assertion

MultiLane MCB CMIS GUI:

- CDB command advertisement -> Full CMIS commands supported
- Live EPL/LPL FW download/update via CDB dashboard

Demo #4: Versatile Diagnostic Monitoring



NeoPhotonics
400ZR QSFP-DD

Ciena Evaluation
Board



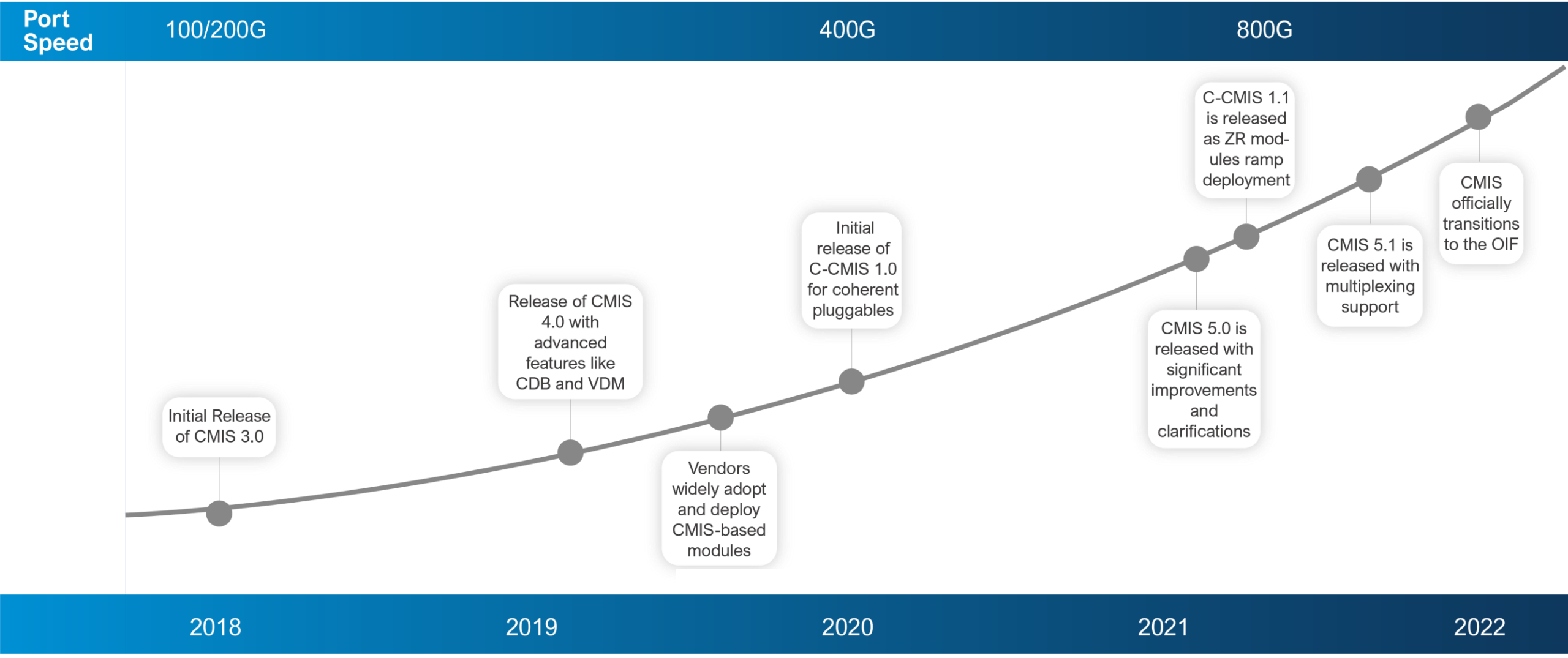
- Real time monitoring of VDM observables
- Hosts can write one VDM manager for all vendors and module types.
- Modules can organize the specific VDMs for their module.

Page 2Xh (VDM)

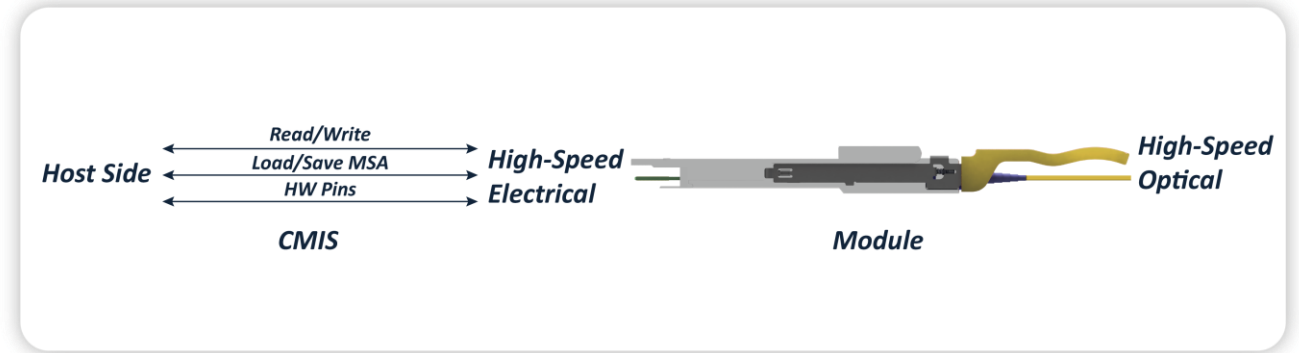
VDM Summary

	Value	High Alarm Threshold	High Warn Threshold	Low Warn Threshold	Low Alarm Threshold
Laser Age (0% at BOL, 100% EOL)	0 %	99	95	0	0
Laser Frequency Error (Media Lane)	0 MHz	3700	3400	-3400	-3700
Laser Temperature (Media Lane)	52.76 C	80.00	75.00	0.00	-5.00
eSNR (Media Lane)	16.74 dB	256.00	256.00	14.05	13.55
Pre-FEC BER Current Value Media	7.930e-04	1.250e-02	9.070e-03	0.000e+00	0.000e+00
Pre-FEC BER Current Value Host Lane 1	0.000e+00	2.390e-04	4.380e-05	0.000e+00	0.000e+00
FERC Current Value Media	0.000e+00	5.000e-01	5.000e-01	0.000e+00	0.000e+00
FERC Current Value Host Lane 1	0.000e+00	5.000e-01	5.000e-01	0.000e+00	0.000e+00
Modulator Bias X/I	4.98 %	100.00	98.00	0.00	0.00
Modulator Bias X/Q	4.26 %	100.00	98.00	0.00	0.00
Modulator Bias Y/I	29.58 %	100.00	98.00	0.00	0.00
Modulator Bias Y/Q	24.36 %	100.00	98.00	0.00	0.00
Modulator Bias X_Phase	2.58 %	100.00	98.00	0.00	0.00
Modulator Bias Y_Phase	1.98 %	100.00	98.00	0.00	0.00
CD (High Granularity, Short Link)	1 ps/nm	2800	2500	-2500	-2800
CD (Low Granularity, Long Link)	0 ps/nm	2800	2500	-2500	-2800

CMIS Evolution Timeline



CMIS Values



- **Common:** Standardized rule book for all MSA vendors -> all modules seamlessly plug and play into your host
- **Flexible:** CMIS is defined to support variety of modules with different speeds, form factors, link ratings, use cases, etc.
- **Extendable:** CMIS is futureproofed for tomorrow's pluggable innovations.

CMIS Demo – Participating Members

Amphenol

ciena


CISCO

EXFO

JUNIPER
NETWORKS

molex

multiLane 

NeoPhotonics

VI.AVI
VI.AVI Solutions



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