Open ROADM overview

openroadm.org Multi-Source Agreement

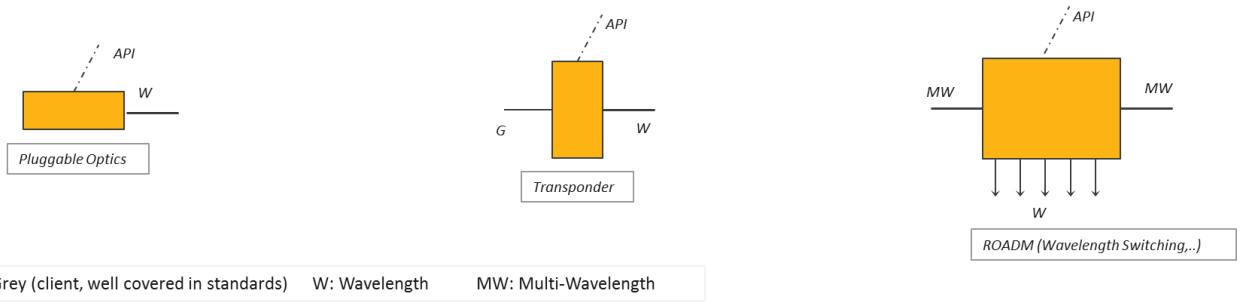
The goals of the Open ROADM Multi-Source Agreement are (1) the disaggregation and opening up of traditionally proprietary ROADM systems and (2) the SDN-enablement of traditionally fixed ROADMs.

The Open ROADM team's goal has been to focus on simplicity, concentrating on lower performance metro systems in the first release. We are trying to open this up to as many suppliers as possible, not limiting the solution but fostering the interoperability required for a healthy supplier marketplace and to accommodate flexible networks where any-to-any is mandatory.

There are many ways to disaggregate ROADM systems, e.g. hardware disaggregation (e.g. defining a common shelf) or functional disaggregation (less about hardware, more about function). Due to the complexity of common shelves, the Open ROADM MSA chose the functional disaggregation first. We defined three optical functions: pluggable optics, transponder and ROADM (the optical switch part with amplifiers, couplers, WSS, etc.). Common shelves can be introduced at a later point for some functions, like transponders, if they make sense as an extension of the models.

All of the three disaggregated functions (pluggable optics, transponder and ROADM) are controllable through an open standards-based API (written in the data modeling language YANG) that can be accessed through an SDN Controller using NETCONF. Our plan is to use the NETCONF interface for provisioning, as well as PM, alarms, etc.

There are two optical specifications, one called Single-Wave (or W) to define how pluggable optics or transponders interoperate and the other called Multi-Wave (or MW) to define how ROADMs interoperate with each other.



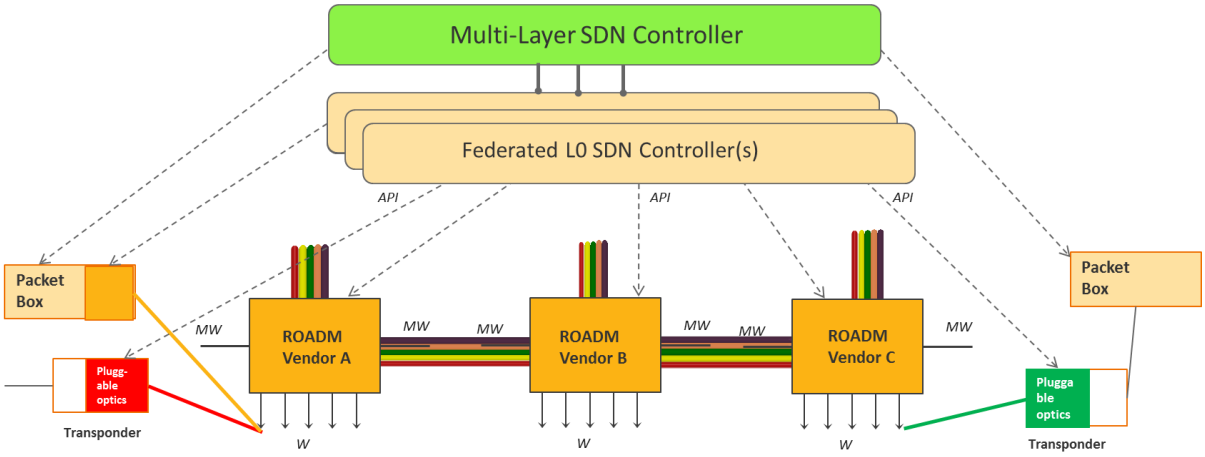
The W specification for the initial release is 100G only with Cortina HD-FEC, we are hoping as new members sign on to get a consensus on 200G and 400G with better performance.

The MW specification abstracts a lot of the previously proprietary ROADM to ROADM control loops into the SDN controller to simplify the interaction. The OSC is a Gigabit Ethernet channel for short spans, 100 Megabit for long spans. In the first release, the specification is for fixed grid 50 GHz, 96 wavelengths for simplicity, with flexgrid support planned for the second release or earlier, if other members want it.

The YANG data models provided contain a network abstraction, as well as Service Remote Procedure calls (RPCs) and Device template. Every network provider can chose their own network abstraction, we just included ours as an example on how device and network layer tie together, the same goes for the

Service RPC calls. The Device template would be filled in by every hardware supplier with their device-specific information.

So for the overall architecture the diagram is below on how to glue it all together.



Since the whole network is supposed to be SDN-controlled, the assumption is that the ROADMs are flexible, software-controlled ROADMs with colorless-directionless (CD) or colorless-directionless-contentionless (CDC), we think the models are built so either option will work.

During a plugfest demo, we had three vendor's ROADMs with different vendor's transponders talking to each other. While this was not running live traffic and was only a lab environment, we feel comfortable we can get this to work in a field.