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Interop Challenge: Wedge100 vs the World

David Woolf/Senior Engineer Datacenter/UNH-IOL

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University of New Hampshire
InterOperability
Laboratory

The University of New Hampshire InterOperability Laboratory (UNH-IOL)

Interop Challenge: Wedge100 vs. the World

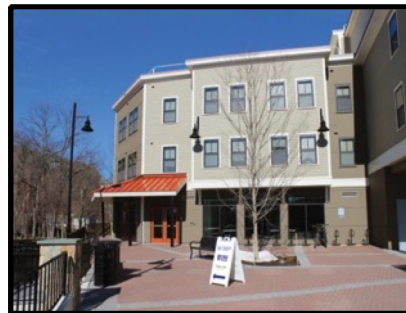
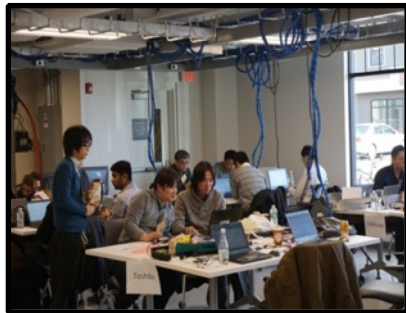
www.iol.unh.edu

Who We Are



University of New Hampshire
InterOperability
Laboratory

- A neutral and independent lab that tests networking and data communications products for businesses across the globe.
- Started in 1988 on the University of New Hampshire Durham, NH campus.
- Non-profit organization and 100% funded by commercial industry with over 150+ member companies.
- State of the art facility with 28,000+ sq. ft. (1 hour outside Boston, USA).
- 21 full time staff and 120 part time grad and undergrad UNH students
- Open Networking testing service has 3 staff and 4 undergrad students



UNH-IOL and Open Networking

- UNH-IOL began working with the Open Networking group in 2015
- UNH-IOL maintains Open Networking Integrator's List
- Over 140+ tested combinations posted to the Integrator's List
- Several 'private' interop projects ongoing as well.
- 5 Open Networking Plugfests held at UNH-IOL

Open Networking Integrators List

This Integrator's List (IL) community effort listing Open Networking configurations demonstrated to be interoperable according to a community created test plan. In this list you will find information about Open Networking Products that UNH-IOL has performed interoperability and conformance testing on. Successful completion of such conformance tests when combined with satisfactory operation in UNH-IOL's interoperability tests provides a reasonable level of confidence that the Product Under Test will function properly in many Open Networking environments.

Information on the test procedures used can be found on our [Test Suites](#) page

Products listed here have met the requirements of the [Open Networking Integrator's List Policy](#).

To see recent changes to the policy document please see the [Redline Version of Open Networking Integrator's List Policy](#).

NOS	Host/Switch	Module/Cable	Test Plan Revision	Date Listed	Further Info
Flexswitch	Facebook Wedge100	Nexans QSFP100GBECW4NV QSFP28	36	6/26/17	
Flexswitch	Facebook Wedge100	Finisar FTLC1152RGPL6 QSFP28	36	6/26/17	
Flexswitch	Facebook Wedge100	Finisar FTLC1152RGPL QSFP28	36	6/26/17	
Flexswitch	Facebook Wedge100	Lumentum LQ210CR-CAA1_QSFP28	36	6/26/17	
Cumulus 3.3 OS	Facebook Wedge100	Wavesplitter WST-QS28-4ML-C QSFP28	36	6/26/17	
Cumulus 3.3 OS	Facebook Wedge100	Wavesplitter WST-QS28-CM4-C QSFP28	36	6/26/17	
Cumulus 3.3 OS	Facebook Wedge100	Nexans QSFP100GBECW4NV QSFP28	36	6/26/17	
Cumulus 3.3 OS	Facebook Wedge100	Finisar FTLC1152RGPL6 QSFP28	36	6/26/17	

<https://www.iol.unh.edu/registry/opennetworking>

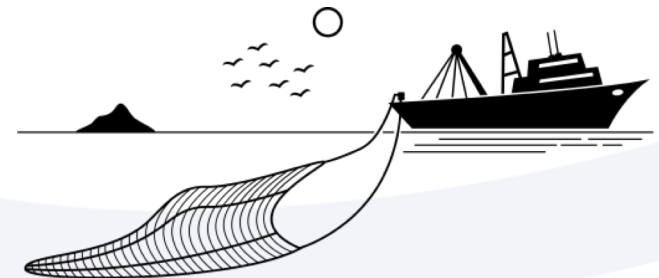
Plugfest

PROS	CONS
Engineers in one room	Limited to what equipment is available
Buzz!	Limited number of products allowed into plugfest (especially affects module and cable companies)
Big step forward, short period of time	Finite time for debugging, debug turnaround time can have huge impact on productivity
Good mix of Switch HW + NOS SW combos	Traveling
Opportunity to refine and optimize test process	May not align with release schedules

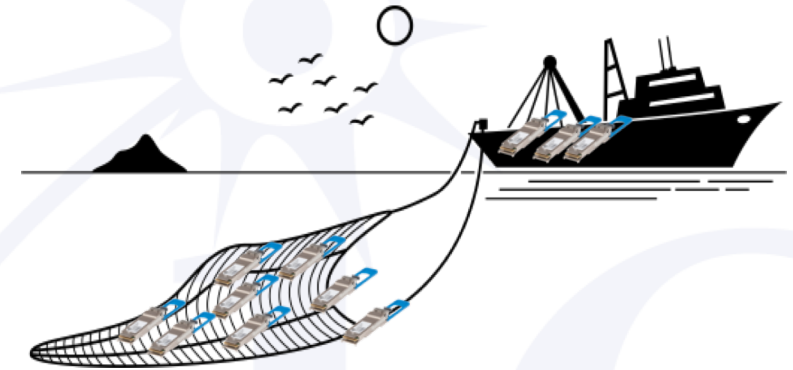
- In a successful interop program, the plugfest is a kickoff or milestone that is part of an ongoing focused effort.
- In 2017 our CWDM4 plugfest was a kick off for a focused interop project on Facebook Wedge100.

Wedge100 Interop Challenge

- A single (or at least limited) combination of switch HW (Wedge100) and NOS (Cumulus 3.5) validated against as many optics/cables as possible.
- Casting a wide “interop net” with many combinations on one HW platform truly distinguishes it
- Facebook Wedge100 projects offered opportunity to do this



Casting a Line vs. Casting a Net



PLUGFEST

Targets identified ahead of time

Target a relatively small number of fish (combos)

Relatively small temporal area (a week)

Refine test methods, customize, learn

INTEROP CHALLENGE

Door open to adding new targets as project goes on

Target as many fish (combos) as possible

Larger temporal area (months)

Optimize Optimize Optimize

Test Optimization

- Transitioned from a eye based electrical characterization to a BER based DOA style test with Viavi T-BERD
- We did find products that failed the BER



Interop Partners



Connectivity Types

- AOC – 10 SKUs
- DAC – 8 SKUs
- Optical Modules – 27 SKUs
 - CWDM4 - 5 SKUs



Casting the Net: The Catch

- OCP does not mean fully integrated
- 5-6 parties just to check switch interop
- Adopters need to prepare for this, or be prepared to work with an integrator
- Incorrect EEPROM programming
- Fail BER 'DOA' test
- EEPROM read by switch, but module not turned on
- NOS / HW issues + ONIE support

Casting the Net: The Catch

- 45 SKUs from 10 individual module and cable companies tested with Facebook's Wedge100 Switch and added to Integrators List
- Additional SKUs expected
- More cable and optics companies invited to participate



Lessons: Assume Nothing

- “It worked on the previous version so it should be fine”
 - NOS Release may not support every HW iteration
- “X uses the same silicon as Y, we should be good”
 - EEPROM programming incorrect, same model, EEPROM different
- “Same model #, same thing, right?”
 - ONIE Support

Lessons: Successes

- Opportunity to distinguish a given HW/SW combo with wide interop
- Still inviting module/DAC/AOC vendors to participate
- Demonstrated wide interop at 100G
- **Other end users following suit**
- Big opportunity for OCP



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