OpenFabrics Alliance Interoperability Program

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Agenda

- OFA Interoperability Program Goals & Benefits
- OFA Clusters and Equipment at UNH-IOL
- December 2012 Logo Validation Event
  - Test coverage
  - IB and iWARP Topology
- Logo Validation Results
  - Explanation of Out-of-the-Box testing
- Problems noted during the event
- OFILP Program Summary
- OFILP plans for the future
- OFA member call to action

OFA Interoperability Working Group Charter

- The OFA-IWG defines & maintains the OFA Interoperability Logo Program (OFILP)

- Develop a suite of tests for evaluating interoperability between OFA Software and RDMA products using a variety of operating systems.

- Create new tests when features are added to OFA Software.

- Validate OFA Software during EWG development process and Distro GA release.

- Host interoperability events in conjunction with the University of New Hampshire Interoperability Lab (UNH-IOL).

  - Validate the interoperability of products using the OpenFabrics software stack.

  - The OFA Interoperability Logo is granted to those products which pass all of the mandatory tests.

Interoperability Logo Program - Benefits

- Validate OFED & Distro releases in a diversified & heterogeneous cluster.
- Enable vendors to test new hardware, firmware and software using the latest products available from all vendors.
  - VPN access to the cluster 24*7
- Rapid redeployment of cluster topology (< 30 minutes)
  - CentOS, RedHat, Scientific Linux, SUSE, W2K8 HPC
  - OFED 1.4.x.x, 1.5.x.x, 3.2 and WinOFED 3.0

- Enable **end users** to access the Logo List that identifies RDMA HW & SW and Distros that have demonstrated interoperability.

- Enable **vendors** to demonstrate interoperability by using the OFA Tested Logo on their products and marketing materials.

New additions in 2011 to OFILP

- Added Testing for RHEL Distributions
- Added Testing for SUSE Distributions
- Added Testing of Scientific Linux
- Added OFED version interoperability
- Added RDMA Interoperability between Distros
- Added Testing for Windows W2K8 & WinOFED

OFA Clusters at the UNH-IOL

- Clusters
  - Linux
    - iWARP
    - InfiniBand
  - Windows
    - InfiniBand

- Server Donations
  - 12 AMD Servers
  - 19 Intel Servers
  - 6 HP Servers
  - 6 OFA Servers

- Resources
  - 32,000 Square Feet
  - 100+ staff & students

OFILG Equipment at the UNH-IOL
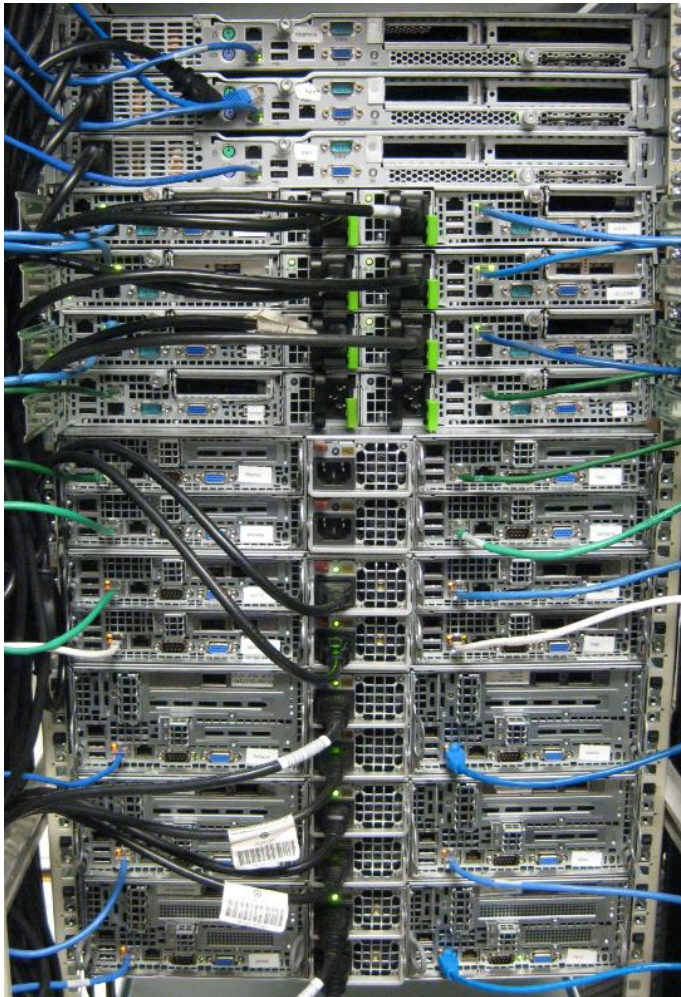
- **iWARP Hardware Available**
  - 4 Chelsio RNICs (CX4 & SFP+)
  - 1 Fujitsu 10 GbE Switch
  - 4 Intel RNICs
- **InfiniBand Hardware Available**
  - 2 DDN SRP targets
    - 1 DDR, 1 QDR
  - 6 Intel (QLogic) QDR HCAs
  - 2 Intel (QLogic) QDR IB Switches
  - 18 Mellanox HCAs
    - 9 DDR, 7 QDR, 2 FDR
  - 4 Mellanox Switches
    - 2 QDR, 2 FDR
  - 1 Mellanox Ethernet Gateway
  - 2 NetApp SRP Targets
    - 1 DDR, 1 QDR
  - 2 Range Extenders

OFA Interop Event Overview

- **Most Recent Event**
  - December 2011 -– GA Logo Validation Event - OFED 1.5.4
  - [OpenFabrics Alliance Logo List](#)
- **Vendor participation**
  - AMD, Chelsio, DataDirect Networks, Intel, Mellanox, Microsoft, NetApp, QLogic, RedHat, SUSE
- **Upcoming OFA IWG Interop Events**
  - April 23 ➔ April 27 2012 – [Interop Debug Event](#)
  - May 2012 – Logo GA Validation Event - OFED 1.5.4.1
  - This will be the 12th OFA-IWG Interop event
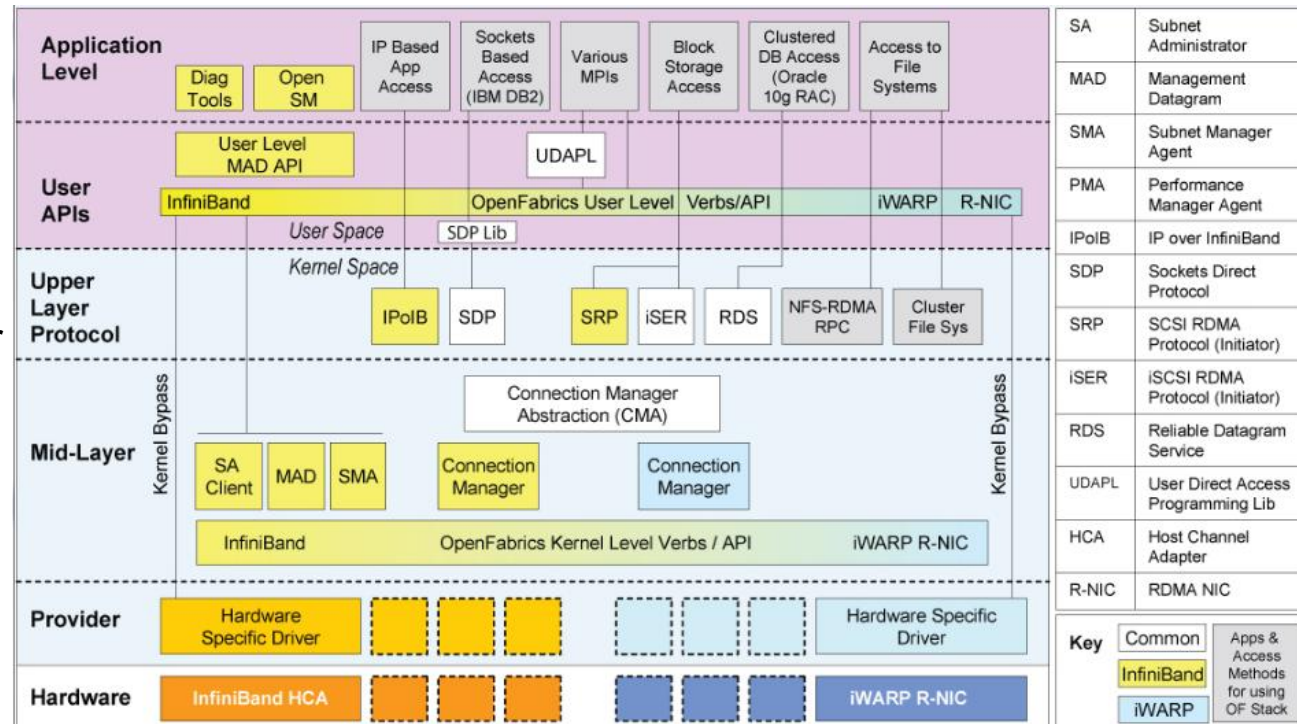- **Hosted by University of NH Interoperability Lab ([UNH-IOL](#))**

OFA Software Test Coverage
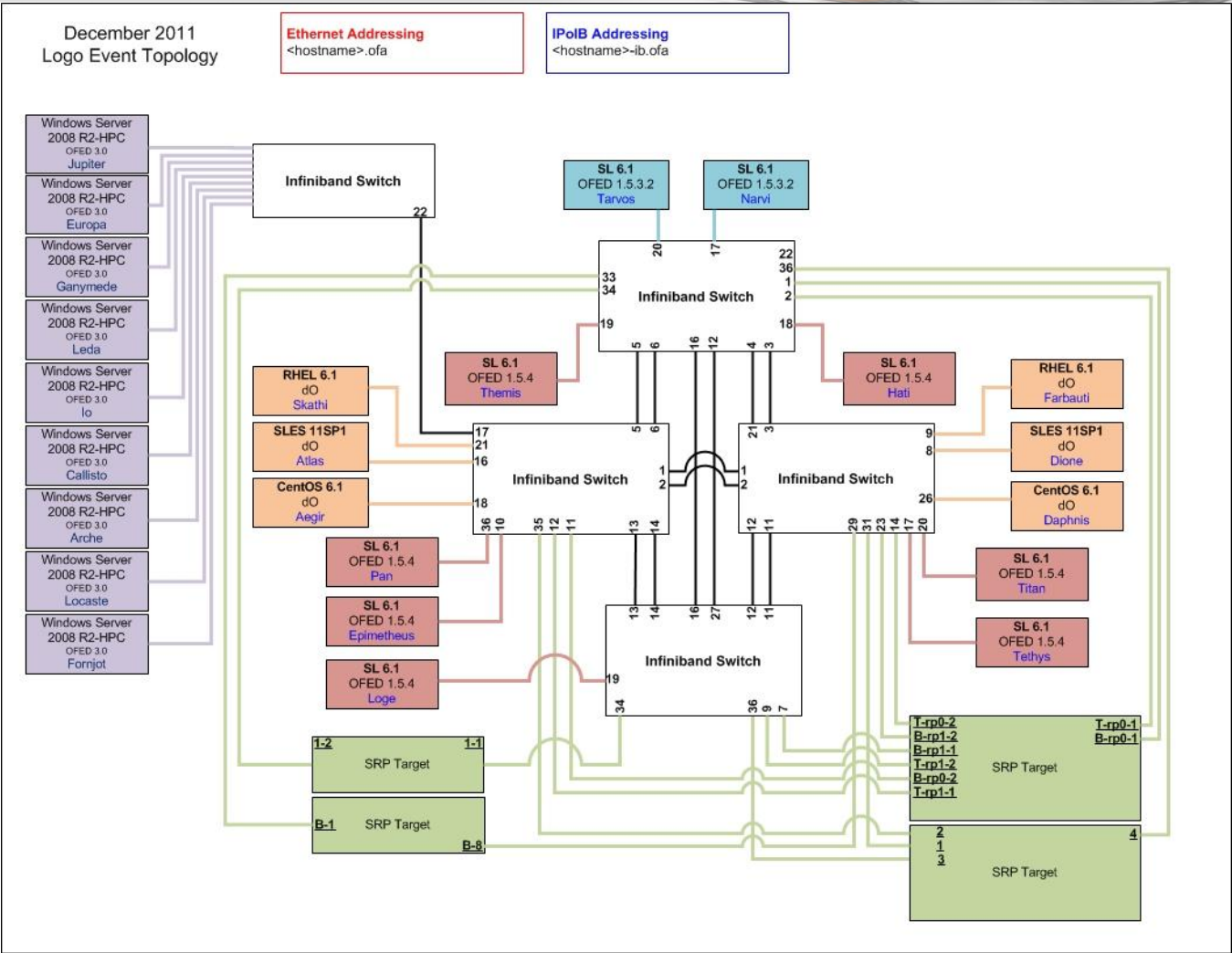
- InfiniBand
  - Link Init & Fabric Init
  - IPoIB CM and UD
  - Open MPI
  - RDMA Interop
  - RDS
  - NFS/RDMA
  - SDP
  - SM Failover/Handover
  - SRP
  - uDAPL

- iWARP
  - Link Init & Fabric Init
  - iWARP Connectivity
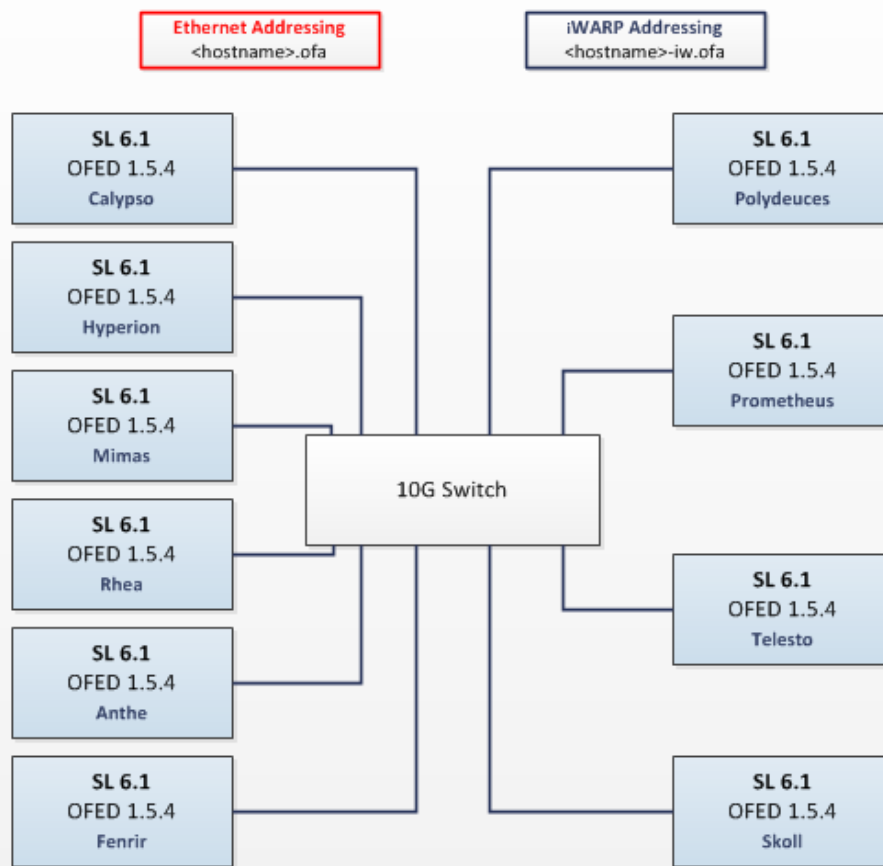 - Open MPI
  - RDMA Interop
  - uDAPL

IB Cluster Topology

iWARP Cluster Topology

December 2011
iWARP Logo Event Topology

Out-of-the Box versus OFED

- OFA EWG is now pushing all development work into the kernel

- OFED contains all RPMs needed to deploy complete functionality

- OFA wants to deliver via the Distros

- Need to ensure end user experience out of the box is equivalent to OFED

Logo GA Validation Results

InfiniBand Test procedures	IB-SL 6.1 OFED 1.5.4	IB-SL 6.1 OFED 1.5.3.2	IB-CentOS 6.1 Out-of-Box	IB-RHEL 6.1 Out-of-Box	IB-SLES 11 SP1	W2K8-R2 WinOFED 3.0
IB Link Initialization	FAIL	N/T	N/T	N/T	N/T	N/T
IB Fabric Initialization	PASS	PASS	PASS	PASS	PASS	PASS
IPoIB Connected Mode	PASS	PASS	FAIL	FAIL	FAIL	N/A
IPoIB Datagram Mode	PASS	PASS	PASS	PASS	PASS	N/T
SM Failover and Handover	PASS	PASS	PASS	PASS	PASS	PASS
SCSI Remote Protocol (SRP)	PASS	PASS	PASS	PASS	PASS	N/T
NFS over RDMA	PASS	FAIL	PASS	PASS	FAIL	N/A
RDS	PASS	PASS	FAIL	FAIL	FAIL	N/A
SDP	PASS	PASS	FAIL	FAIL	FAIL	N/A
uDAPL	Pass	PASS	PASS	FAIL	FAIL	N/T
RDMA Basic Interoperability	PASS	PASS	FAIL	FAIL	FAIL	N/A
RDMA Stress	PASS	PASS	FAIL	FAIL	FAIL	N/A
Open MPI	PASS	PASS	FAIL	FAIL	FAIL	N/A
MVAPICH	PASS	PASS	FAIL	FAIL	FAIL	N/A

iWARP Test procedures	IW-SL 6.1 OFED 1.5.4
Ethernet Link Initialize	PASS
Ethernet Fabric Initialize	PASS
iWARP Connectivity	PASS
uDAPL	PASS
RDMA Basic Interoperability	PASS
Open MPI	PASS
MVAPICH	PASS

This is a high level summary and the details are available in the Master Report available for review on request.

Legend	Description	Comment
N/A	Not Applicable	
N/T	Not Tested	
IB-SL 6.1 OFED 1.5.4	InifiniBand using Scientific Linux 6.1 - OFED 1.5.4	
IB-SL 6.1 OFED 1.5.3.2	InifiniBand using Scientific Linux 6.1 - OFED 1.5.3.2	
IB-CentOS 6.1 Out-of-Box	InifiniBand using SLES 11 SP1	ISO Installation Only
IB-RHEL 6.1 Out-of-Box	InifiniBand using RHEL 6.1	ISO Installation Only
IB-SLES 11 SP1 Out-of-Box	InifiniBand using CentOS 6.1	ISO Installation Only
W2K8-R2 WinOFED 3.0	InifiniBand using W2K8-R2 WinOFED 3.0	
IW-SL 6.1 OFED 1.5.4	iWARP using Scientific Linux 6.1 - OFED 1.5.4	

Problems Noted – December 2012

- Issues using OFED
  - Link Init Issue
    - Incorrect link speed during auto-negotiation
  - OFED Utilities
    - ibstat and ibstatus return wrong speeds
    - ibdiagnet wont read previously written topology file
- Issues using Out-of-Box Distros (CentOS, RHEL, SUSE)
  - General Setup Issues
    - ISO installations incomplete – don't install required OFA packages by default
    - Requires use of the Repositories to get all components required to support RDMA ULPs.
    - Configuration is different from OFED – for example IPoIB
    - Some ULPs not supported (NFSoRDMA, RDS, SDP)
  - IPoIB
    - Packet loss when running IPoIB in connected mode using packet sizes >= 8192
  - NFSoRDMA
    - RPC program not registered and cannot insert kernel modules on legacy OFED
    - Uses different port from upstream port
  - RDS
    - Did not work on any Out-of-the Box Distro
    - Big difference between upstream version and Oracle
  - SDP – Failures due to technical issues and licensing issues
  - uDAPL
    - Not working on some Distros others require installation of dapltest utilities not included on ISO

2012 Program Summary

- Automated Test Suites
  - All OFILP test scripts can now be run over VPN
- Cluster Availability
  - VPN access is granted to all OFILG Members.
  - Week long testing slots are available
- Complete heterogeneous cluster environment
  - Complete selection of IB and iWARP hardware available
  - Setup your cluster requirements in less than 30 minutes
- Distro testing as well as OFED testing available
- Support for both Windows and Linux
- Superb resources available at the UNH-IOL
  - Ethernet as well as RDMA testing available
  - Home for the OFA Training Program
  - Resident RDMA Verbs expert – Dr Robert Russell

OFA Program Details

- OFA Logo Grants: http://iol.unh.edu/ofilglist
- OFA Logo Program: http://iol.unh.edu/ofilp
- OFA Test Plan: http://www.iol.unh.edu/services/testing/ofa/testsuites/
- UNH-IOL: http://www.iol.unh.edu/services/testing/ofa/
- OFA Training Programs: https://www.openfabrics.org/resources/training/training-offerings.html

Future Logo Program updates

- Distro Testing using repository updates
- RoCE Validation
  - Emulex, Mellanox, QLogic, System Fabric Works
- Interoperability testing at scale
  - 1000 nodes using Hyperion at LLNL
- OEM Interoperability validation
  - Validate new silicon and firmware releases
- IPv6 testing

OFA Logo Group
We need your support

- Planned Interop Events for 2012
  - Spring and Fall
    - Two Interop Debug events based on RC
    - Two Logo Validation events based on GA
  - Summer
    - Interop Debug Event for OFED 3.2

- The OpenFabrics Interoperability Logo Group (OFILG) needs more members
  - Just like National Public Radio

- Logo Program needs more marketing & promotion

Open Fabrics Interoperability Logo Group