The University of New Hampshire InterOperability Laboratory

Lab Overview

www.iol.unh.edu
Presentation Overview

• The Laboratory
  • Member Involvement
• Organizational Structure
  • Consortium Model
• Industry Involvement
• Technology Testing Areas
• Membership Pricing
• Contact Information
The Laboratory

- Industry leading 3rd-party test facility for data, telecom and storage networking technology & consumer electronics
- 100% funded by commercial industry
  - 150+ companies
- 32,000 sq. ft lab facility – Boston, USA Metro Area
- 7,200 sq. ft pre-wired space dedicated to Plugfests
- Satellite Office - San Jose, CA
Member Involvement
(150+ Companies)
Where Technology and Education Are One

Providing Quality Testing Services

- Detailed test procedures and documentation reduce R&D cycles
- Reduced time to market
- Thorough review process ensures concise and accurate results
- Reduced costs via student employment

Developing Future Engineers

- Students engage in strong mentor system; staff members provide detailed training
- After several years of employment, students are extremely competent
- Confidentiality training and NDA for all employees
- Strong emphasis on professionalism and industry reputation
Global Presence

• The majority of our member companies located >1000km from our site
• Partner with local companies and distribution channels to expand access to lab services
• Provide remote access to enable troubleshooting
• Engineers not required to be present during testing, saving travel time and money
The Consortium Model

- Focused, collaborative Conformance and Interoperability effort established/based at UNH-IOL
- Funded and guided by vendor community in a neutral, not-for-profit environment
  - Develops testing technology
  - Maintains knowledge center (online)
  - Coordinates interoperability demonstrations
  - Provides testing services
  - Can operate independently, or serve as “technical arm” for an industry body
- Offers 25 years of helping industry bring “interoperable” technology to market
Industry Involvement

- Provide guidance on certification testing programs
- Active participation in standards providing feedback from a testing perspective
- Provide guidance and insight into new technology areas with testing needs
- Provide training opportunities
- Promote early adoption through collaborative group testing (Plugfests)
Industry Involvement
Technology Testing Areas

- **IP**
  - Routing
  - USGv6 Testing
  - IPv6 Ready Logo
  - IPv6
  - SIP+Unified Communications
- **Storage**
  - SAS
  - SATA
  - Fibre Channel
  - Fibre Channel over Ethernet
  - iSCSI
  - NVMe: NonVolatile Memory Express
  - PCIe
- **Wireless LAN**
  - 802.11 a,b,g,n
- **MIPI**
  - Camera
  - Display
  - Battery Interface
- **OpenFabrics**
  - Infiniband (10-54Gbps)
  - iWARP (RDMA over TCP)
  - RoCE (RDMA over Ethernet)
- **1588**

- **Digital Living**
  - DLNA Certification
  - RVU Alliance Cert.
- **Ethernet**
  - 10BASE-T Ethernet
  - Fast Ethernet
  - Gigabit Ethernet
  - 10 Gigabit Ethernet
  - 40/100 Gb/s Ethernet
  - Power over Ethernet
  - Backplane
  - Automotive Ethernet
- **Ethernet Switching Protocols**
  - AVnu
  - Data Center Bridging
  - MACsec
  - VLAN
  - Spanning Tree (Rapid/Multiple)
  - Shortest Path Bridging / TRILL
- **Broadband**
  - TR-069
  - GPON
  - DSL
- **Home Networking**
  - TR-069
  - IPv6 CE Ready Logo
Ethernets

• Covering speeds from 10 Mb/s to 40/100 Gb/s

• Conformance
  • MAC control through PHY including Flow Control, PCS, PMD, PMA, MAU, RS, ANEG, PoE, and Backplane Startup Training

• Interoperability
  • One of the most comprehensive test beds available in the world

• Energy Efficient Ethernet test suites help enterprise and business consumers reduce costs
Green IT

• Energy Efficient Ethernet (EEE)
  • Test suites available for all flavors of Ethernet

• Currently investigating:
  • European Computer Manufacturer Standards (ECMA)
  • Smart Grid
  • Energy Star Small Network Equipment (SNE) Specification
Data Centers / Data Storage

- UNH-IOL involvement in advanced protocols and technologies driven by open standards:
  - Open Fabrics Software & Logo Program
  - Data Center Bridging
  - Infiniband, iWarp, RoCEE
  - 40/100 Gig Ethernet
  - 6G SATA & 6G SAS
  - Fibre Channel over Ethernet
  - 8G & 16G Fibre Channel
  - Non-Volatile Memory Express
IPv6

• USGv6 Test Program
  • The IPv6 Consortium offers accredited testing that has passed rigorous quality and procedural standards
  • IPv6 Host, Routing, and NPD testing

• IPv6 Ready Logo
  • Involved in the logo program for nearly a decade
  • North American Regional Officer and technical contributor

• Routing Protocols
  • BGP, OSPF, RIP, IS-IS, and PIM-SM
Home Networking

• IPv6 Ready CE Router Logo
  • Partnered with ISOC’s World IPv6 Launch to verify IPv6 functionality for CPE Routers (Home gateways)

• BBF.069 Conformance Certification
  • Partnered with the Broadband Forum to certify CPE devices against the latest TR-069 standard
Broadband

- Technologies Covered:
  - Copper: ADSL2/2plus & VDSL2
  - Optical: GPON
- Large scale interoperability test beds
- Direct participation in Broadband Forum testing efforts, including plugfests
- Industry standard & custom test tools provide flexibility and accuracy
Testing and Measurement

• The UNH-IOL engages with leading test and measurement vendors
  • Providing valuable feedback to early T&M product vendors
  • Partnering to develop new capabilities where appropriate or desired
  • Developing in house capabilities where necessary and validating T&M products in all areas of testing
• Test and measurement companies benefit through participation
  • Increased exposure to latest advancements in technology, industry forums, and other members
  • Devices are utilized by students and help to cultivate the next generation of engineers providing experience
Annual Membership

• The UNH-IOL uses a membership-based model that saves companies money by eliminating the expense required to set up and operate a multi-vendor test environment

• The UNH-IOL’s scope of services and working model allows it to accommodate members and non-members, companies and organizations both large and small, technical and marketing requirements, and national and international groups

• Annual membership ranges from $15,000-to $25,000

• For non-member companies, the UNH-IOL provides a flexible and cost-effective way to test and certify single products
Media Contact Information

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