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)
UNH-IOL Industry Engagement

Standards Groups

Developers (R&D)

Users

Standards

Standards Feedback

Devices

Results

Test Ideas

Results & Feedback
Industry Involvement
Technology Testing Areas

- **Broadband**
  - DSL
  - Home Networking (TR-069 & IPv6 CE Router)
  - VDSL2 Vectoring
  - GPON
  - G.fast
- **IP Networking**
  - IPv6
  - Real-Time Communications
  - Routing/SDN
- **Consumer/Home**
  - DLNA/RVU
  - Wireless
- **Switching/Timing**
  - Avnu
  - IEEE 1588
  - Ethernet Switching Protocols
- **Storage**
  - Fibre Channel
  - iSCSI
  - NVMe
  - PCIe
- **High Performance Computing**
  - OpenFabrics
  - 40 & 100 Gigabit Ethernet
  - 10 G Ethernet
  - Ethernet Switching Protocols
- **Mobile/Wireless**
  - MIPI Camera
  - MIPI Display
  - MIPI Battery
  - MIPI M-PHY
  - Wireless
- **Ethernet/Enterprise**
  - Power over Ethernet
  - 40 & 100 Gigabit Ethernet
  - Backplane Ethernet
  - 10 Gigabit Ethernet
  - Automotive Ethernet
  - Gigabit Ethernet
  - Fast Ethernet
  - 10BASE-T Testing
  - Cable/Channel Testing
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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