

An Introduction to the UNH InterOperability Laboratory High Speed Token Ring

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Overview

- Purpose and Mission
- Organization and Structure
- The Activities of the IOL
- Vision for the Future
- Challenges
- Conclusion



Purpose and Mission

■ Two Mission Components:

Internal Component To foster excellence in UNH students in the field of computer communications.

External Component To improve the operation and interoperability of multi-vendor computing environments.



Organization

■ Philosophy:

Lightweight

Cooperative

■ The IOL (structure seen by UNH I)

- Single lab site located in Durham, NH. All staff are UNH employees or UNH students.

■ Consortia (structure seen by developers)

- Focus on a particular area of interest
- Function as independent business units

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The Activities of the IOL

■ Testing Services

- multiple types, test several aspects of a product from conformance to a standard to operation of a technology overall

■ Education and Research

Focus on aspects related to computer communications and interoperability testing

■ Technology education and presentation

- Technology demonstrations at NH-I, WWW-based training and information. classes



Testing Services

■ Consortium-Based

scheduled lab time

group testing periods, (bake offs, plug fests)

■ Non-consortium-Based Testing Service

Contracted Testing Service

Specialized Alpha/Beta Testing
Agreements



Types of IOL Testing

■ Conformance Like Testing

parametric tests, drawn from standard
not all aspects of a standard are tested

■ Interoperability Testing

- testing characterized by direct device-to-device testing
- operation in complex "real" networks
- operation in reference networks



Types of IOL Testing

■ Systems Testing

- Tests operation of overall product, including user interface and documentation
- Tests operation under load and in erred environments

■ Internetwork Testing

- Tests operation in networks where multiple technologies are used. Used where devices have multiple interfaces.



Areas of testing experience

- Application layer
- Protocols in the Transport, Network, and Data Link Layers
- Signaling in the Physical layer, including templates, jitter, systematic jitter, skew, and other physical layer issues
- OS-level testing of SCSI disk drivers and subsystems



“Joinable” IOL Consortia

■ Mature Consortia

- FDDI, NETMGT, Token Ring, 100VG-AnyLAN, Ethernet

■ Operational, but significant development still underway

- Fast Ethernet, ATM, IP/Routing

■ New Consortia - limited or no testing services

- Wireless, Fibre Channel, Gigabit Ethernet



Ethernet-related Testing

- Ethernet, Full Duplex, Switched Ethernet, Fast Ethernet, Gigabit Ethernet
- IEEE 802.3 Conformance test for a 10BASE-T MAU
- Repeater Testing (chapter 9), Collision tests
- 100BASE-TX physical layer, MAC, and repeater tests
- Physical layer interoperability tests



Token Ring

- MAC layer conformance tests
- PHY layer physical signaling tests
- JTOL, JTOLX, AJ, FAPS, DFAPS, return loss
- Concentrator tests
- Source Route Bridging
- Large Ring Testing
- Operation of Higher Layer Protocols on Token Ring Internetworks
- Dedicated Token Ring (IEEE 802.5r)



FDDI

- Large Ring Tests
- SMT 6.2-7.3 Conformance Testing
- Higher Layer Protocol Operations on FDDI
- MAC Layer Bridge Testing



Network Management

- SNMP protocol testing
- Agent MIB consistency testing
- MIB instantiation testing
- MIB enrollment testing
- RMON testing
- Management station testing
- MIB get/set testing



100VG-AnyLAN

- MAC testing
- RMAC testing
- PHY testing
- Interoperability Testing
- Testing Service Mode of Operation



ATM

- UNI 3.0, 3.1, 4.0 onward
- Address registration and SSCOP
- ILMI
- LAN Emulation 1.0
- IP operation (RFC 1483 & 1677)
- PNNI 1.0
- Traffic management and QOS
- Network Management
- MPOA 1.0



Internet Protocol

- OSPF conformance testing
- OSPF interoperability testing
- RIP testing
- IPv6



Fibre Channel

FCIC



Gigabit Ethernet

- Physical Layer Testing
- MAC Testing
- Interoperability Testing based on current draft of IEEE 802.3z



ADSL

■ Under Investigation



Working with the IOL

■ Consortium Membership

one annual fee from \$6,000 to \$10,000
depending on consortium

- can test multiple times with different products
- must leave representative platform at the lab for others to test against
- do not have to be present at lab during test



Working with the IOL

■ Consortium membership

- Flexible--the lab can be used to perform testing beyond standard test suites

■ One time testing service

- Similar to a testing house, one time fee
- No requirement to leave platform

■ Contracted Service

- Varies by contract, typically extended testing of an overall product



Vision for the Future

- Addressing the whole interoperability problem from layer 0 to layer 7
- Improve access to the IOL's testing tools and services
 - network based access
 - building tests using standardized tools
- Support ANSI, IEEE and others during early aspects of standards development



Challenges

■ Meeting new expectations

- Leadership role in the development of design verification testing technology
- must be timely and accountable on a consistent basis
- involvement in the standards process

■ Support during development

- obtaining support during test suite development is difficult
- companies join when test suites are available and products are ready



The IOL works because...

- Lightweight structure

 - no complex agreements

 - no lawyers

- Cooperation Vs. Confrontation

 - most companies strive for quality

- Mutual benefit to industry and academia

 - test suite development excellent vehicle for training students in computer communications



Dedicated Token Ring

- Interoperability Parallels Standard
- Five Phases of Group Testing
- Members of Consortium Participated
- N+1 Las Vegas 1995 Interoperability Demonstration
- Dedicated Token Ring Training Online



Plan of Action

- Decide to Form High Speed Tokon Ring
- Have Charter Meeting
 - Establish Charter
 - Establish Fees
- Develop Testing/Training Technology
- Build Membership
- Provide Testing
- Interim Meeting at the Laboratory

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