

# Optical Internetworking Forum

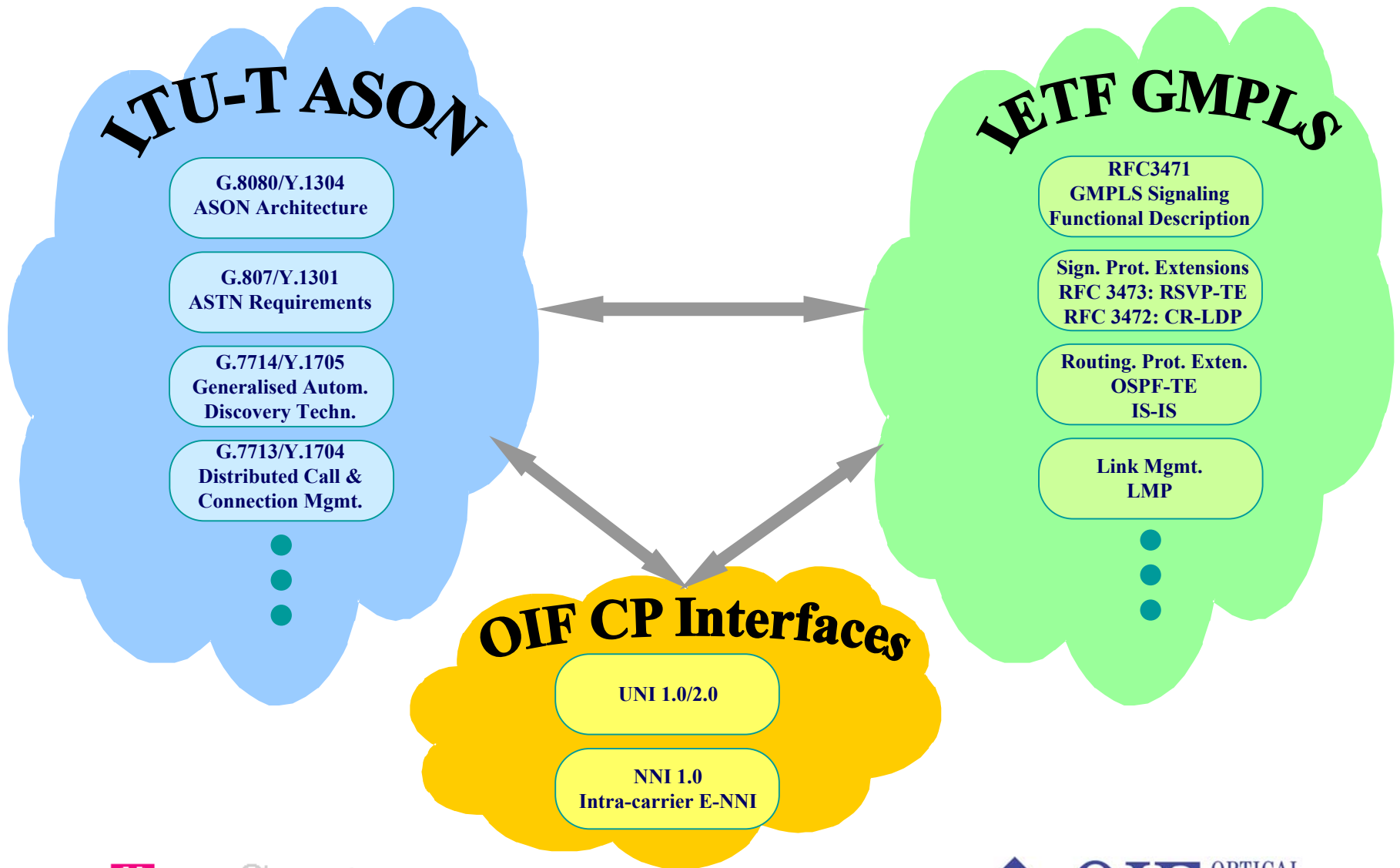
## Networking Working Groups



**OIF**

OPTICAL  
INTERNETWORKING  
FORUM

# GMPLS/ASON Standardisation Bodies & Forums



# Optical Internetworking Forum - OIF

- ◆ Launched in April 1998 to foster development of low-cost scalable internet using optical technology
- ◆ The only industry group bringing together professionals from the data and optical communities
- ◆ Open forum: 170+ member companies
  - Carriers
  - Component and systems vendors
  - Testing and software companies
- ◆ Mission: To foster the development and deployment of interoperable products and services for data switching and routing using optical networking technologies
- ◆ OIF website: [www.oiforum.com](http://www.oiforum.com)

# OIF Objectives

## ➡ Low-Cost Scalable Optical Internetworking

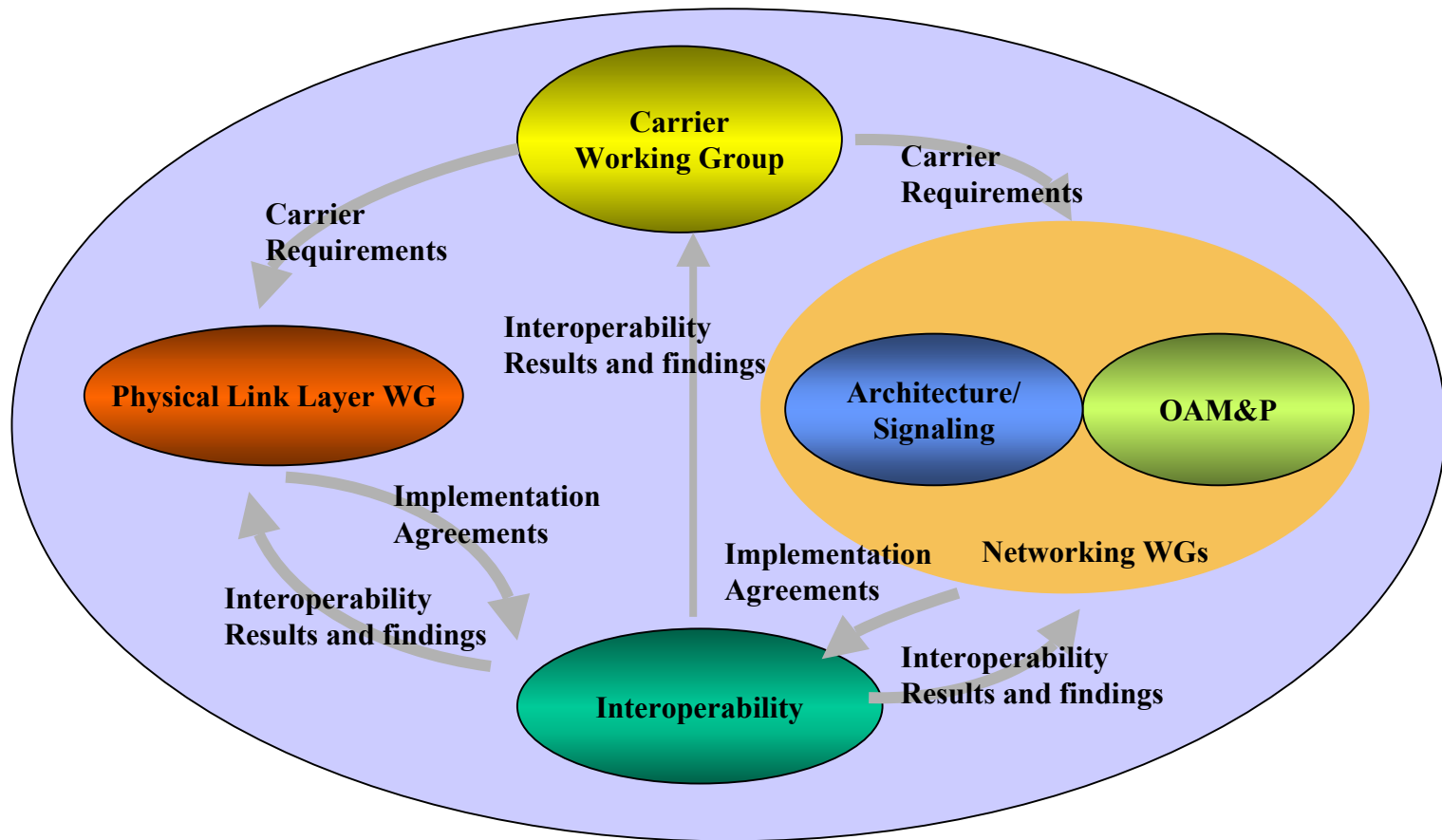
- ◆ IP-over-switched optical network architecture
- ◆ Physical layer
  - Low-cost optical interfaces between networking elements
  - Standard device level electrical interfaces for low-cost systems
- ◆ Control layer interoperability between data and optical layers
  - Dynamic configuration using IP signaling and control mechanisms
- ◆ Accommodate legacy network under the new physical and control layer mechanisms

# OIF Activity Results

- ◆ **Implementation agreements based on:**
  - **Carrier group's requirements**
  - **Existing standards and specifications when available**
  - **New solutions when necessary**
- ◆ **Interoperability testing procedures**
  - **Ensures compliance to implementation agreements and ultimately interoperable products and networks**
- ◆ **Input into other standards bodies**
  - **Formal liasons in place with numerous other organizations (ITU-T, IETF, ANSI T1, ATM Forum, IEEE 802.3, MEF, TMF, NPF)**

**Details see: [www.oiforum.com](http://www.oiforum.com)**

# OIF Working Group Structure

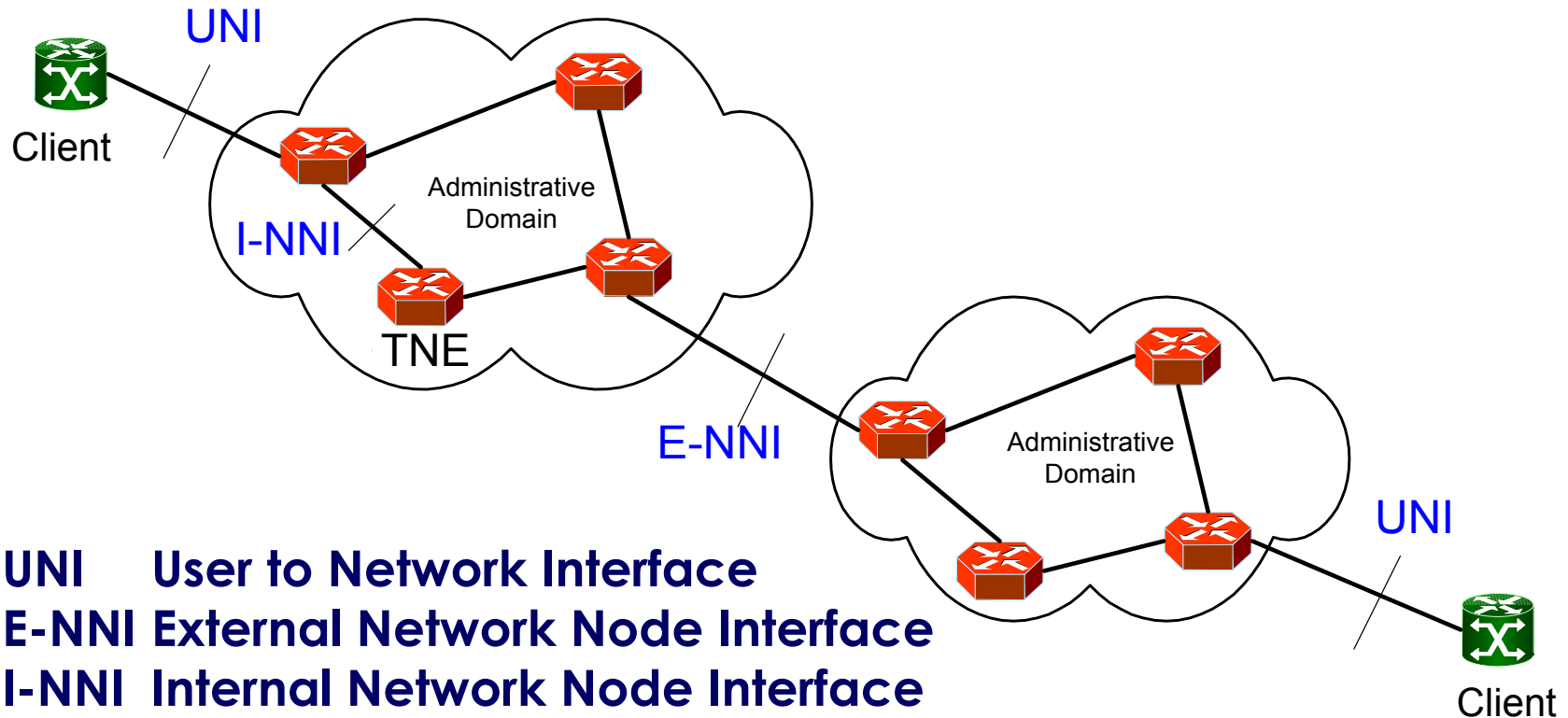


# OIF Networking WG Objectives

- ◆ Address interoperability issues between data or optical networks (focus on issues *between* domains or vendors, not *within* them)
- ◆ Support rapid implementation of cost-effective, robust optical internetworks
- ◆ Working Group objectives:
  - Carrier WG defines goals and requirements
  - Architecture/Signaling WG identifies solutions and writes protocol Implementation Agreements (IAs)
  - OAM&P WG focuses on management functions, provisioning issues and security
  - Interoperability WG coordinates test events to evaluate interoperability and feed back results to refine the IAs

# Optical Network Control Plane Interfaces

- **OIF UNI and NNI, combined with GMPLS and ASON enable rapid end-to-end optical network provisioning**



- **UNI** User to Network Interface
- **E-NNI** External Network Node Interface
- **I-NNI** Internal Network Node Interface
- **TNE** Transport Network Element



# UNI 1.0 Functions

- ◆ **Connection services for SONET/SDH clients**
  - Signaling to automatically create, delete and query connections
- ◆ **Signaling Protocols based on GMPLS**
  - RSVP-TE or CR-LDP with UNI extensions
- ◆ **Service Discovery & Neighbor Discovery**
  - Based on Link Management Protocol (LMP)
- ◆ **UNI Signaling Mechanisms**
  - Out-of-band or in-band control channels
  - Invoked either directly to NE or by proxy
- ◆ **UNI 1.0 was undergoing a minor update (UNI 1.0 Release 2) to align it with code points from recently approved IETF RFCs**

# UNI 2.0 Overview

- ◆ **The UNI 2.0 update will provide advanced services and applications to leverage capabilities of UNI 1.0**
  - **Driven by carrier priorities**
  - **Aligned with OIF NNI developments**
- ◆ **Major UNI 2.0 enhancements:**
  - **Additional transport signal types (UNI 1.0 supports SONET/SDH rates of STS-1 and above)**
  - **Call control for ITU-T ASON compliance**
  - **Improved network resiliency**
  - **Control plane security**

# E-NNI Overview

- ◆ The OIF E-NNI provides signaling and routing between administrative domains within a carrier's network.
- ◆ Major features of the OIF E-NNI include:
  - Support for ASON call control
  - Hierarchical routing domains which enable scalable routing control. This allows carriers for example to partition their resources in local, regional, national and international levels.
  - Based on IETF GMPLS signaling and routing protocols.
  - Control plane successfully demonstrated at OFC 2003.

# Summary

- ◆ The OIF Networking WGs have developed Implementation Agreements covering UNI, NNI and control plane security.
- ◆ Close relationship with Carrier WG keeps efforts in tune with business needs of service providers.
- ◆ Public and private trials of UNI and NNI have been valuable to refine the specifications and promote their benefits.
- ◆ OIF is poised to continue this work with the E-NNI, UNI 2.0....