



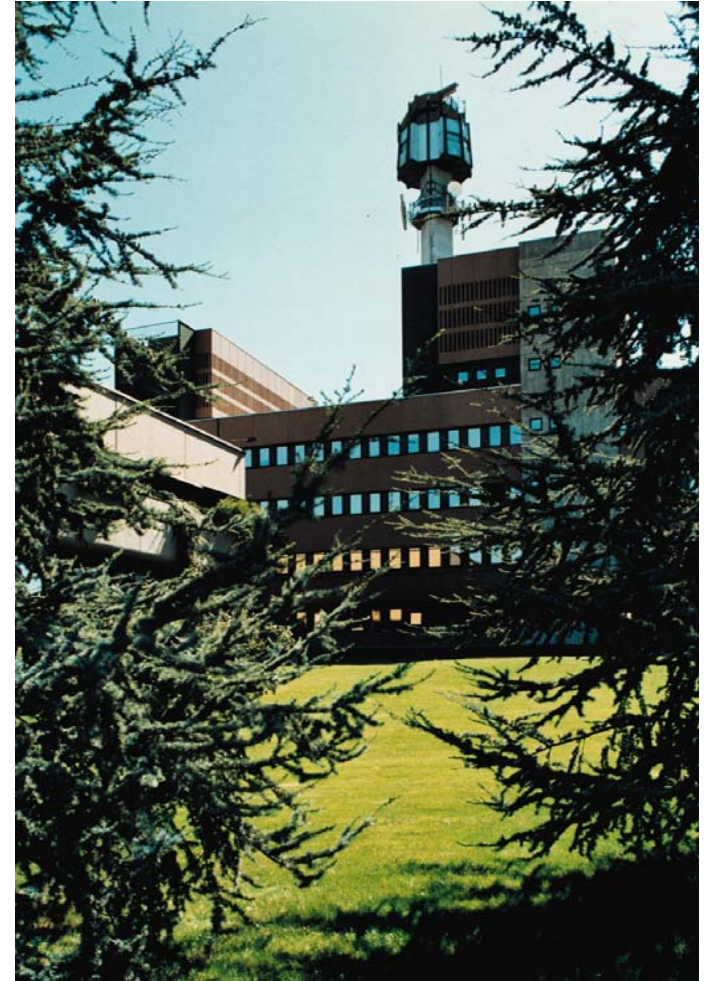
AT THE



WORLDWIDE INTEROPERABILITY DEMONSTRATION
SUPERCOMM 2005

Company Overview

- ◆ Telecom Italia Lab is the R&D branch of the Telecom Italia Group.
- ◆ TLC Centre of excellence from 1964, Telecom Italia Lab took part in the definition and affirmation of, among others, GSM, MPEG and optical networks.
 - **Over 1000 researchers**

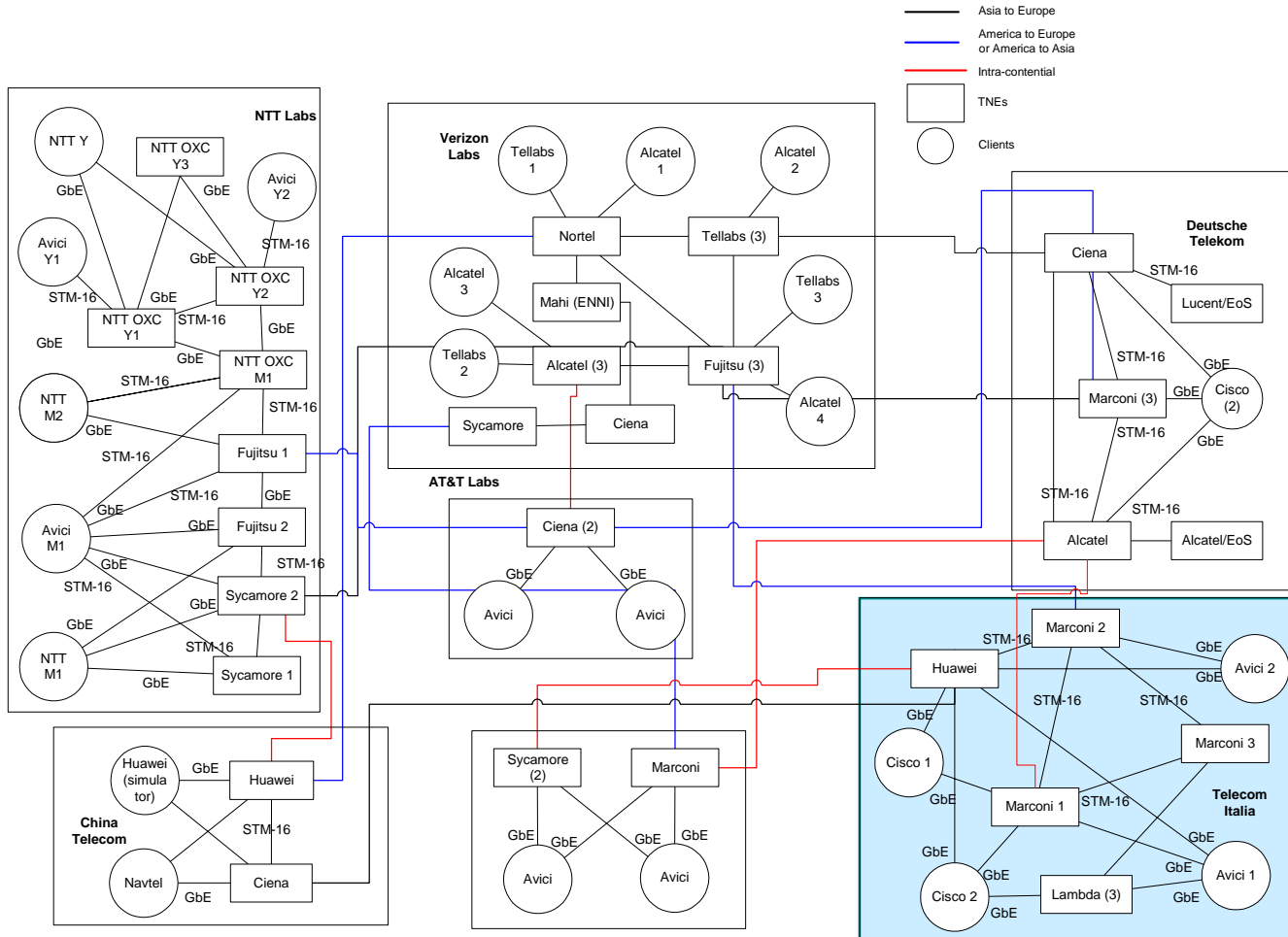


Our interest in OIF Worldwide Interoperability Demonstration...

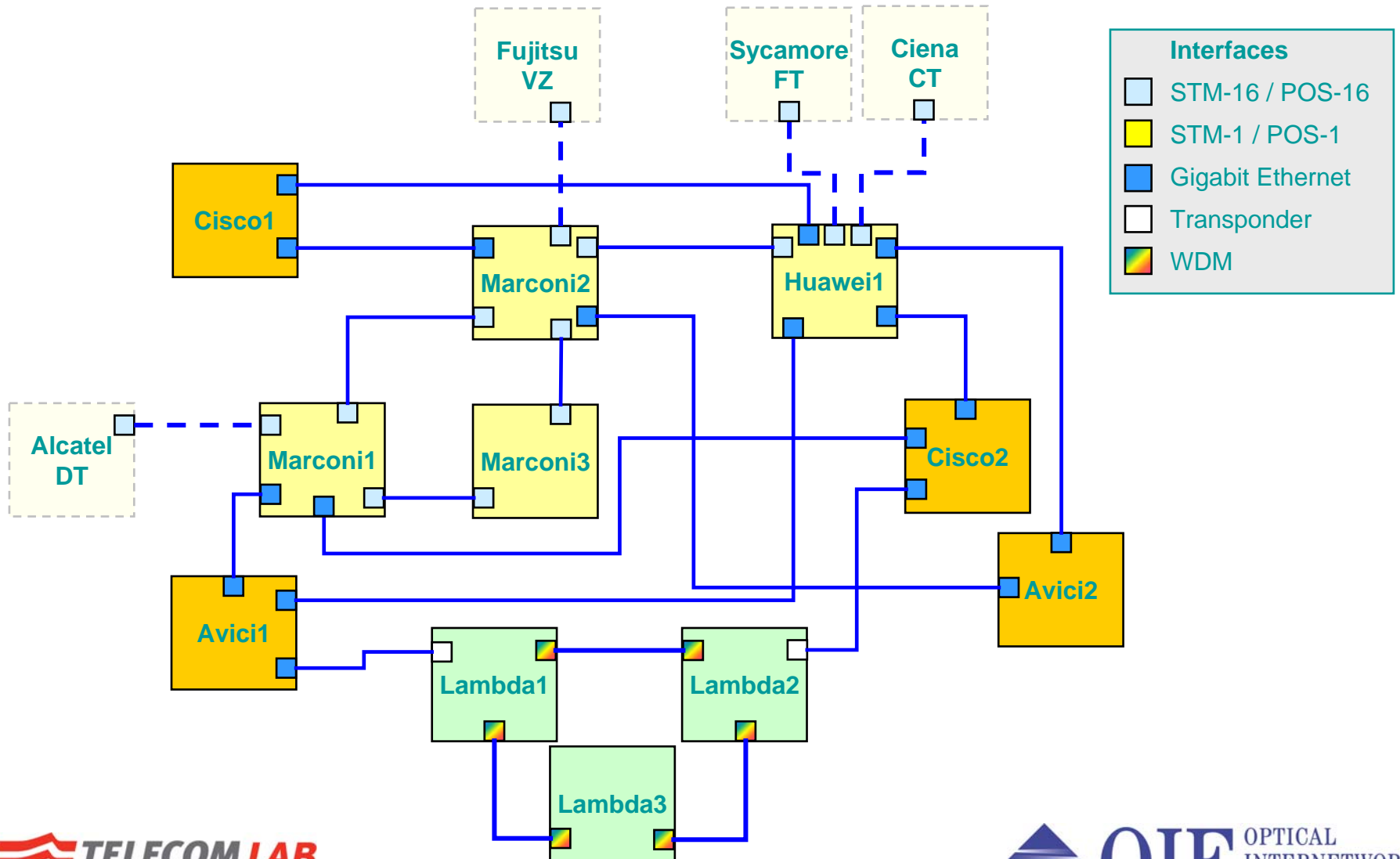
- ◆ **Control Plane and UNI/E-NNI interfaces for:**
 - **Dynamic resource allocation**
 - **Automatic provisioning by client equipment via UNI**
 - **Automatic discovery and network inventory**
 - **Efficient use of existing SDH infrastructure for the offering of Ethernet data services**
 - **Transparent optical transport**
 - **Enabling new services (BoD, OVPN...)**



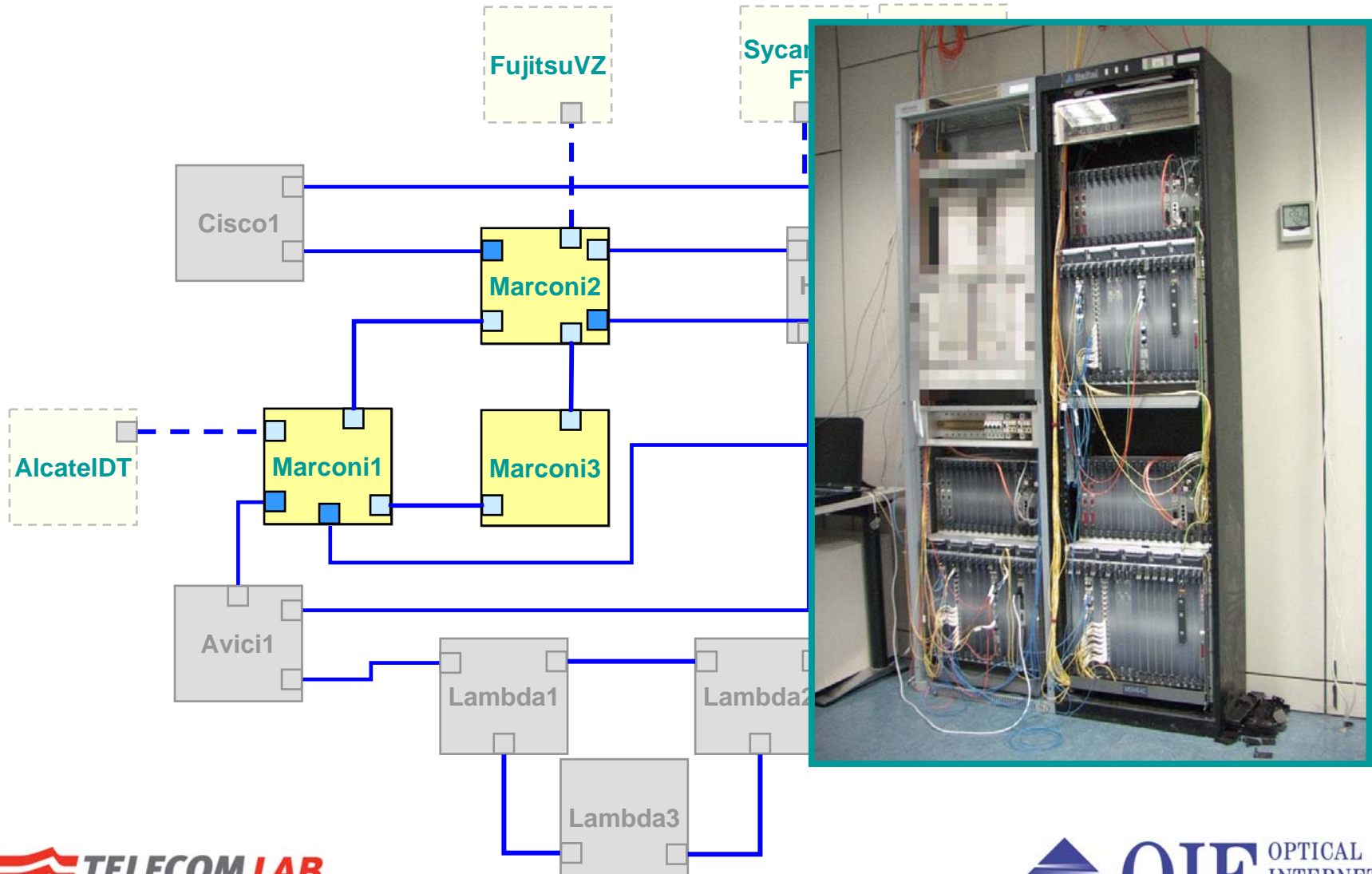
Global Demonstration Topology



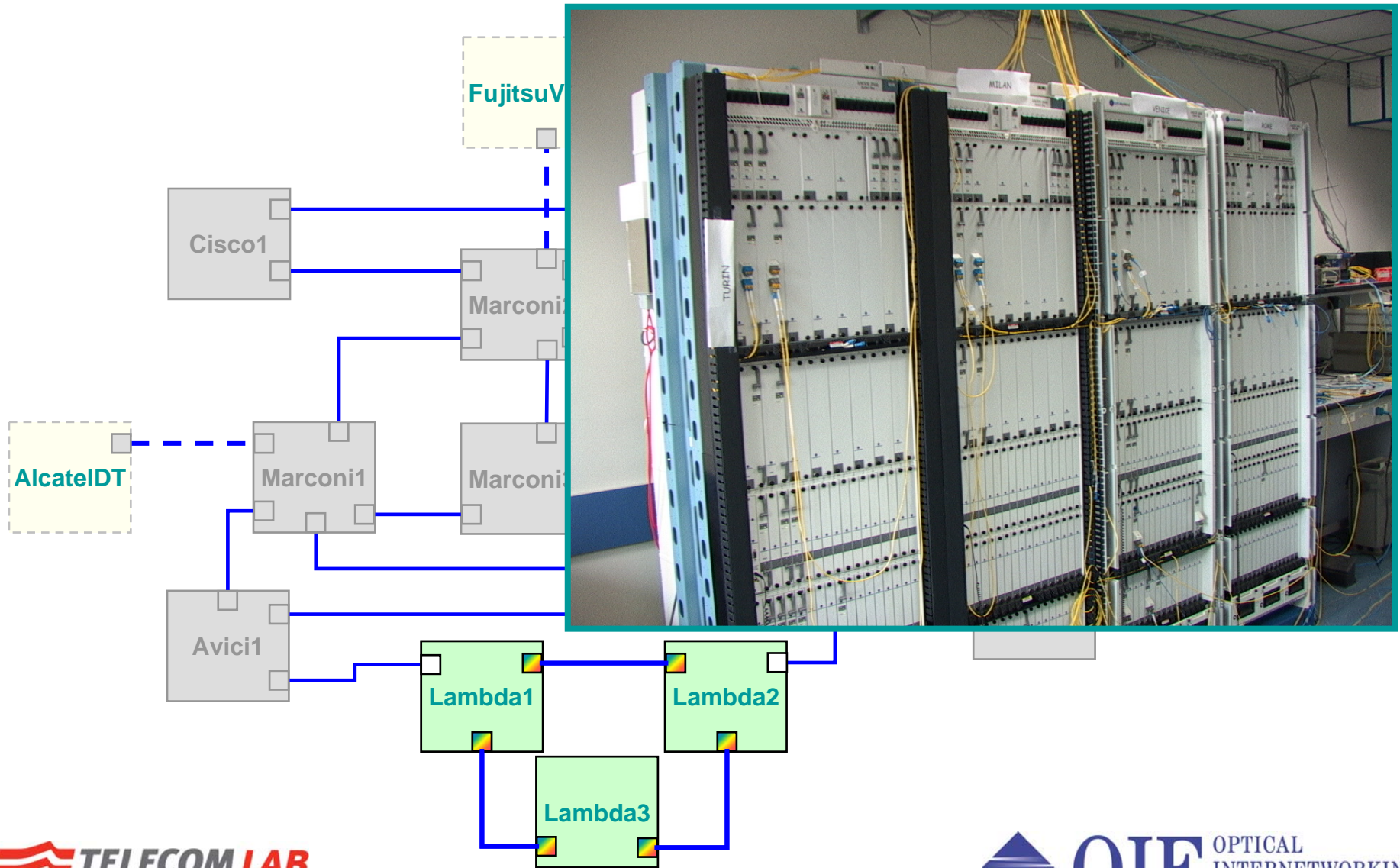
UNI2.0+E-NNI Test bed



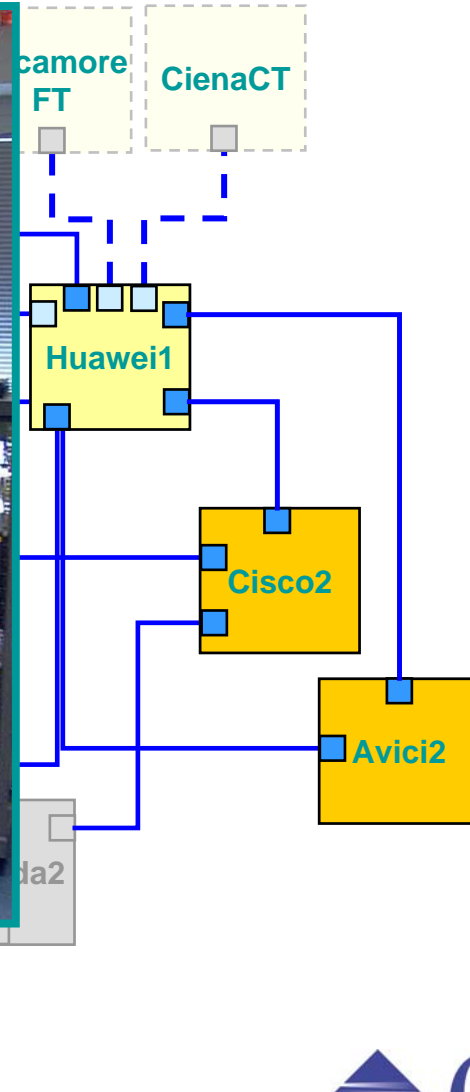
UNI2.0+E-NNI Test bed



UNI2.0+E-NNI Test bed



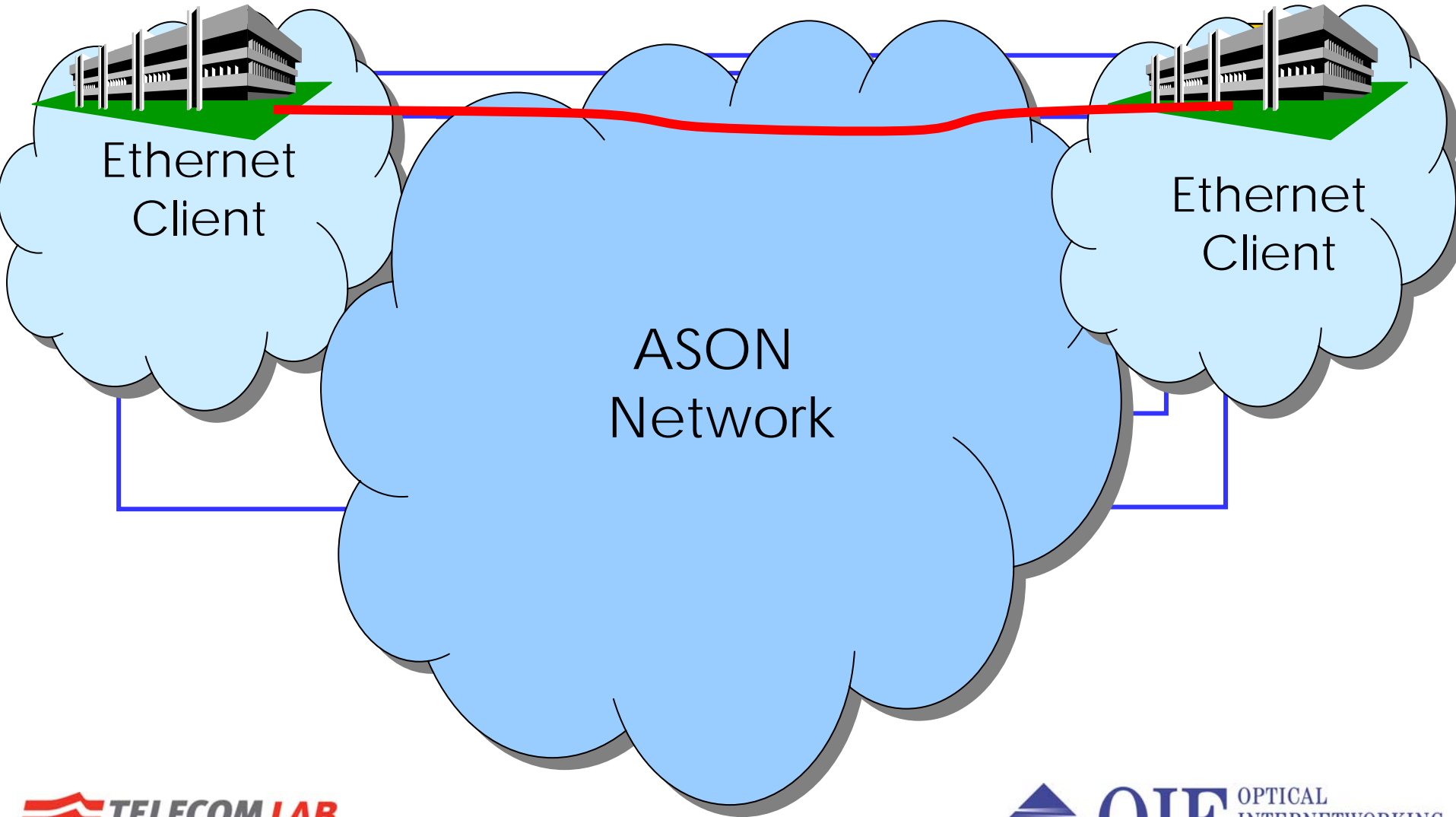
UNI2.0+E-NNI Test bed



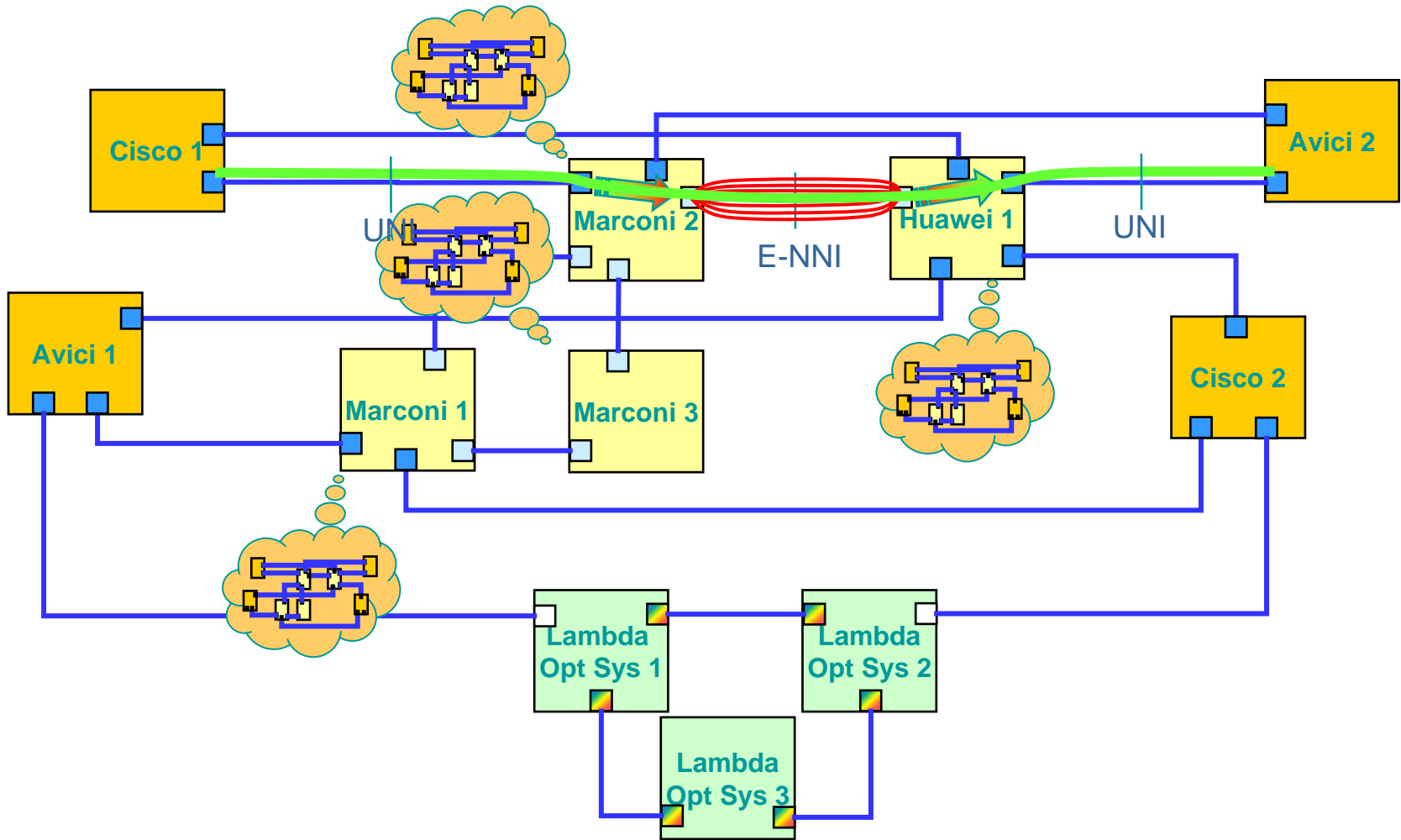
What we have successfully demonstrated...

- ◆ **A distributed optical control plane with Ethernet over SONET/SDH adaptation using GFP-F and VCAT, i.e.:**
 - ◆ **Multi-layer signaling and routing**
 - ◆ **Agnostic client layer**
 - ◆ **Automatic provisioning over multiple domains**
 - ◆ **Automatic provisioning between client and server networks**
 - ◆ **Automatic provisioning by NMS or Client networks**
 - ◆ **Ethernet service adaptation**
 - ◆ **Ethernet Transparent transport over lambda switched network**

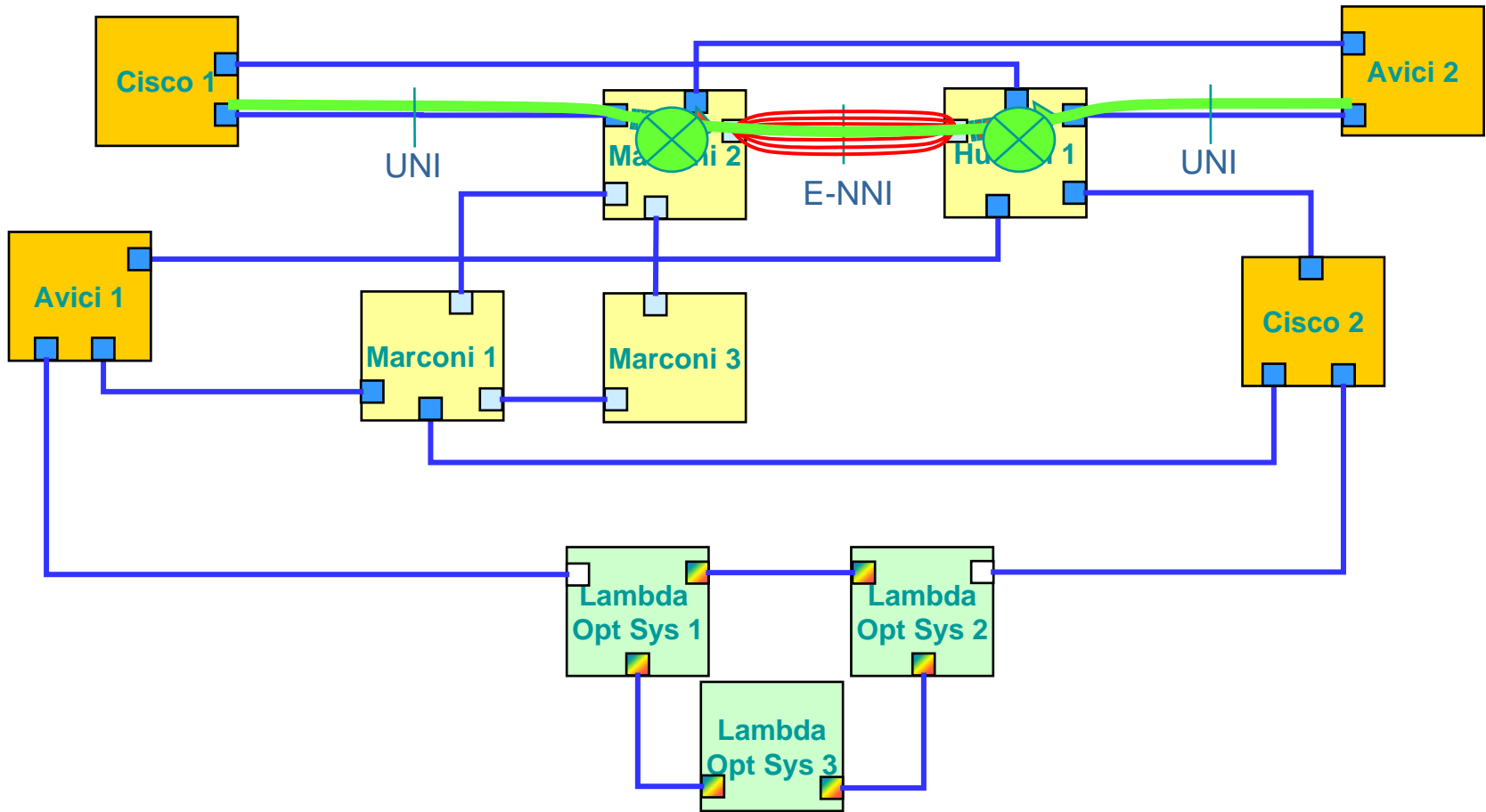
Test scenario: an example of application



Test scenario: an example of application



Test scenario: an example of application



No.	Time	Source	Destination	Protocol	Info
1	0.000000	10.134.4.1	10.134.24.1	RSVP	PATH Message. SESSION: IPv4-UNI, Destination 10.134.24.1, Tunnel ID 7, Ext Ad
4	0.027447	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32773,
6	0.273170	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32773,
8	0.281143	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
9	0.286766	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32774,
12	0.556019	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32774,
14	0.564289	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
15	0.569817	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32775,
18	1.673904	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32775,
20	1.681900	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
22	1.687679	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32776,
24	2.920256	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32776,
26	2.928346	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
28	2.934142	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32777,
30	4.143194	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32777,
32	4.151181	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
33	4.156854	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32778,
38	5.383838	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32778,
40	5.391840	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
41	5.397447	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32779,
44	5.738945	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32779,
46	5.747015	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
48	5.855552	10.134.24.1	10.134.12.6	RSVP	PATH Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32780,
50	5.874135	10.134.12.6	10.134.7.1	RSVP	PATH Message. SESSION: IPv4-UNI, Destination 10.134.7.1, Tunnel ID 1, Ext Ad
51	5.914275	10.134.7.1	10.134.12.6	RSVP	RESV Message. SESSION: IPv4-UNI, Destination 10.134.7.1, Tunnel ID 1, Ext Ad
53	5.925715	10.134.12.6	10.134.24.1	RSVP	RESV Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 32780,
55	6.018619	10.134.24.1	10.134.4.1	RSVP	RESV Message. SESSION: IPv4-UNI, Destination 10.134.24.1, Tunnel ID 7, Ext A
56	6.083735	10.134.4.1	10.134.24.1	RSVP	CONFIRM Message. SESSION: IPv4-UNI, Destination 10.134.24.1, Tunnel ID 7, Ex
58	6.086795	10.134.24.1	10.134.12.6	RSVP	CONFIRM Message. SESSION: IPv4-E-NNI, Destination 10.134.12.6, Tunnel ID 327
60	6.098515	10.134.12.6	10.134.7.1	RSVP	CONFIRM Message. SESSION: IPv4-UNI, Destination 10.134.7.1, Tunnel ID 1, Ext

Frame 1 (198 bytes on wire, 198 bytes captured)

Ethernet II, Src: 00:30:f7:70:b1:49, Dst: 08:00:3e:09:00:01

Internet Protocol, Src Addr: 10.134.4.1 (10.134.4.1), Dst Addr: 10.134.24.1 (10.134.24.1)

Resource Reservation Protocol (RSVP): PATH Message. SESSION: IPv4-UNI, Destination 10.134.24.1, Tunnel ID 7, Ext Address 10

RSVP Header. PATH Message.

MESSAGE-ID: 54 (Ack Desired)

SESSION: IPv4-UNI, Destination 10.134.24.1, Tunnel ID 7, Ext Address 10.134.4.1.

HOP: IPv4 IF-ID. Control IPv4: 10.134.4.1. Data If-Index Reverse: 10.134.4.1, 10501. Data If-Index Forward: 10.134.4.1, 1

TIME VALUES: 30000 ms

LABEL REQUEST: Generalized: LSP Encoding=Ethernet v2/DIX, Switching Type=Layer-2 switch Capable (L2SC), G-PID=Ethernet (S

GENERALIZED UNI: Source IPv4 1.1.134.24, Destination IPv4 2.1.134.12

SENDER TEMPLATE: IPv4-LSP, Tunnel source: 10.134.4.1, LSP ID: 7.

SENDER TSPEC: IntServ: Token Bucket, 125000000 bytes/sec.

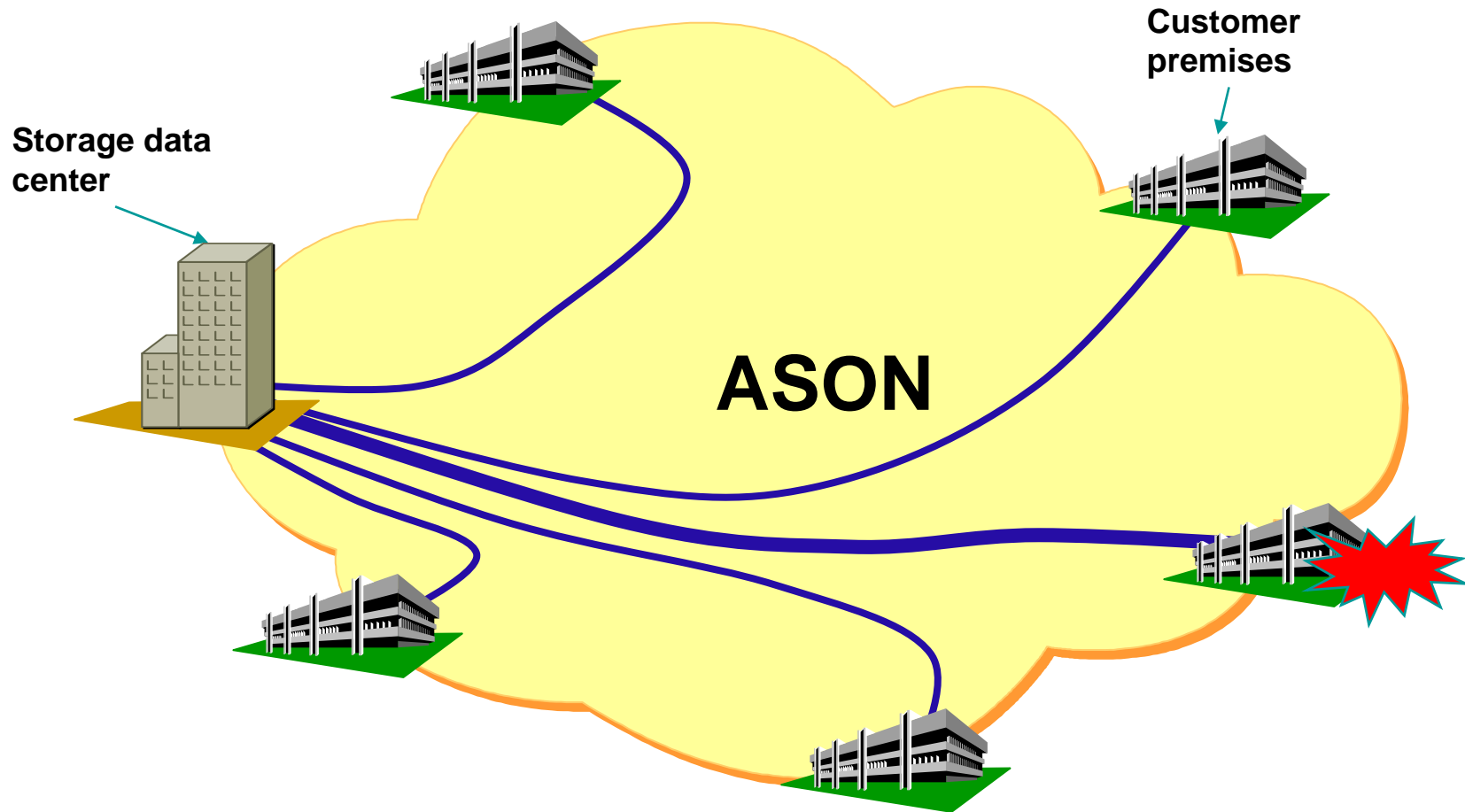


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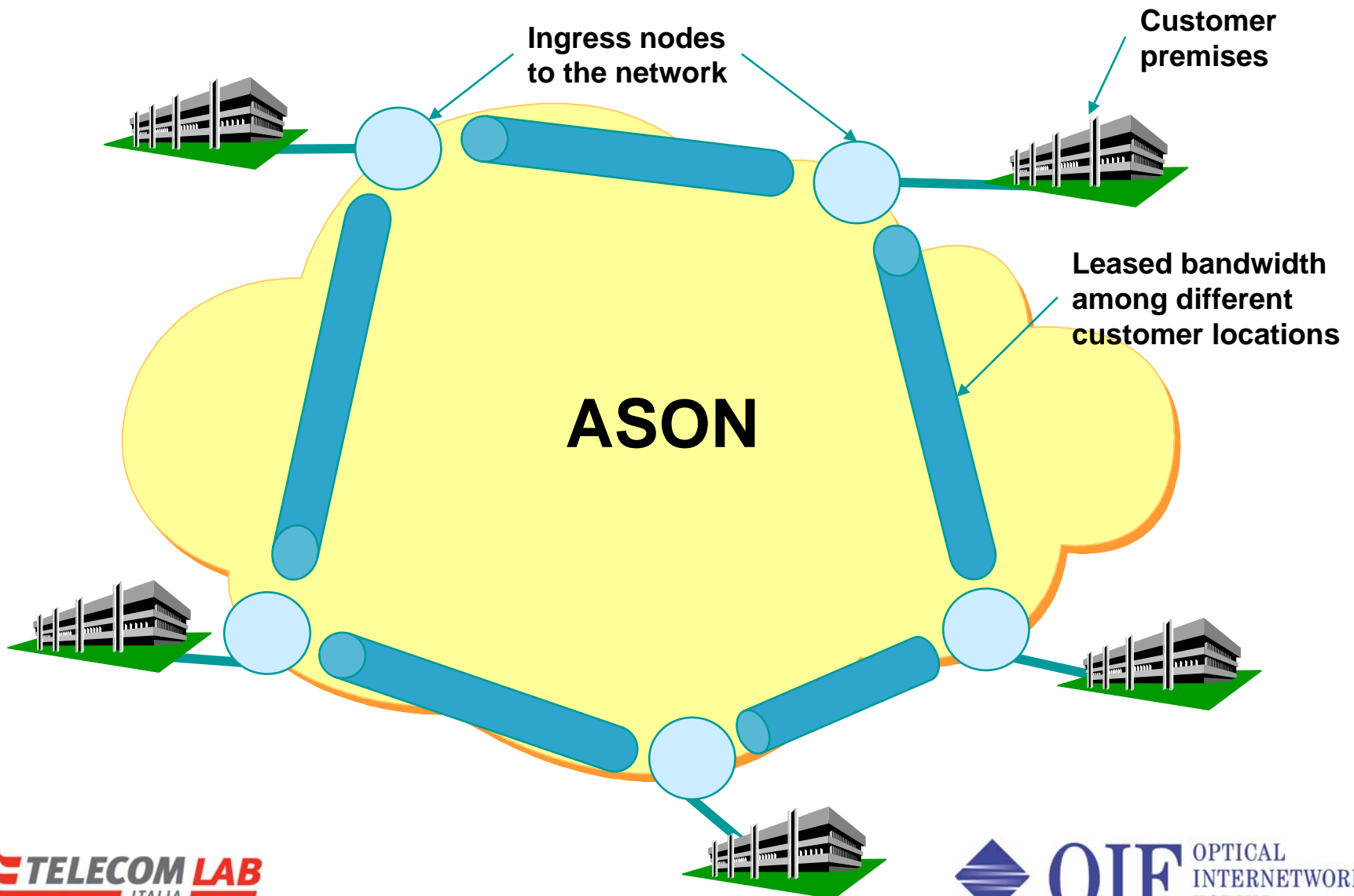


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Bandwidth on Demand: an example



Optical VPN: an example



Optical VPN: an example

