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CONTRIBUTION TO T1 STANDARDS PROJECT

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PROJECT **Optical Hierarchical Interfaces**

ABSTRACT

This document contains the slide presentation for T1X1.5/2001-097.

Notice

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A Rough Analysis of the Control Traffic Pattern in an Optical Environment

(ANSI T1X1.5/2001-097)

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NAYNA Networks

Outline

- Introduction
- Goals
- Reference Model
- Assumptions
- Analysis Procedure
- Main Parameters
- future work

Introduction

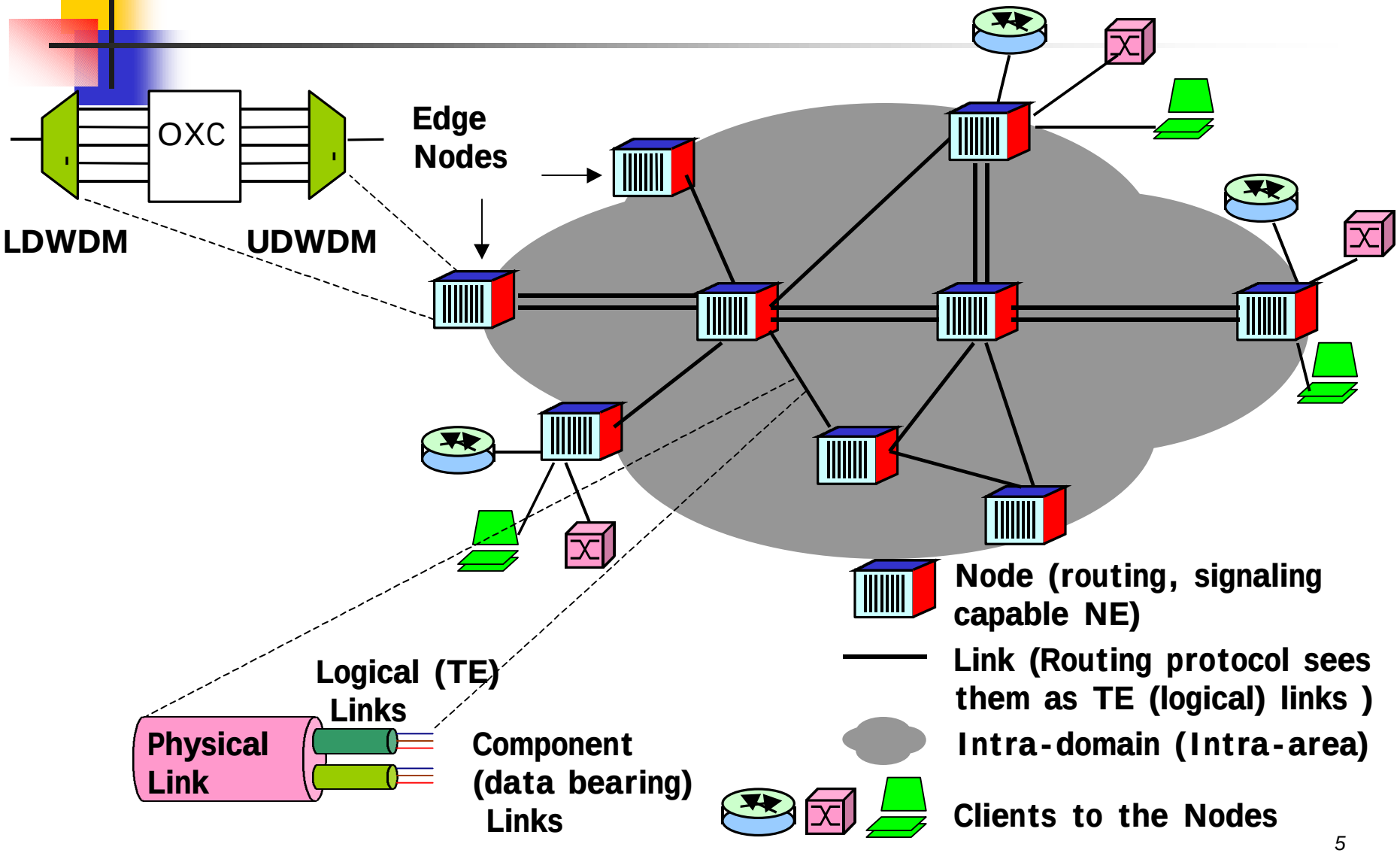
- Control traffic due to:
  - Link management protocols:
    Verifying connectivity, fault detection
    – E.g., LMP, ODP, NTIP
  - Routing protocols – E.g., OSPF, BGP
  - Signaling protocols – E.g., RSVP, LDP

Goals

- Initialization time traffic analysis
- Stable condition traffic analysis
- Failure condition traffic analysis

- Only intra-domain (or inter-area) is done
  - Inter-domain (or inter-area) and Inter-AS will be done later

Reference Model



Assumptions

- OSPF, RSVP, LMP
- GMPLS scenario is considered
- Only intra-domain case
- Only one node comes up or goes down at a given time
- No retransmissions
- No fragmentation and reassembly
- Broadcast medium
- Nodal processing is negligible

Analysis Procedure

- Compute different protocol packet sizes
- Compute traffic for three conditions
  - Initialization time
  - Stable condition
  - Failure condition
- Classify traffic as sequential (Max) or parallel (Sum)
- Calculate traffic with realistic assumptions
- Assume uniform spread of traffic
  - Using keep alive timers
- Compute the traffic for different topologies

Sample: OSPF Messages

Message type	Number of bytes
Common message header (CMH)	24
Link state header (LSH)	20
Router link LSA (RLLSA)	LSH + 4 + {(# of links) * (12 + [4 * (# of ToS reported)]) }
Network link LSA (NLLSA)	LSH + 4 + (# of attached routers) * 4
Summary LSA (SLSA)	LSH + 4 + (# of ToS reported) * 8
AS External LSA (ASELSA)	LSH + 4 + (# of ToS reported) * 12 + 12
Hello packet (Hpkt)	CMH + 20 + (# of valid neighbors) * 4
Database description packet (DDpkt)	CMH + 8 + (# of LSAs) * 20
Link state request packet (LSRpkt)	CMH + (# of LSAs) * 16
Link state update packet (LSUpkt)	CMH + 4 + [LSA Length 1 + …]
Link state acknowledgement packet (LSACKpkt)	CMH + (# of LSAs) * 20

Main Parameters

- # of Peers affects routing messages
- # of Edge nodes affects signaling
- # of clients affects signaling
- # of TE links affects routing
- # of Data bearing links affects link mgmt
- # of connection reqs/sec affects signaling

Future Work

- Inter-area and inter-as scenarios
- Include other routing protocols
- Include element and net mgmt protocols
- Extrapolate for complicated topologies