

**COMMITTEE T1 – TELECOMMUNICATIONS**

**T1X1.5**

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**T1X1.5/2001-111**

**CONTRIBUTION TO T1 STANDARDS PROJECT**

**TITLE** Slide Presentation for T1X1.5/2001-097  
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**PROJECT** Optical Hierarchical Interfaces

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**ABSTRACT**

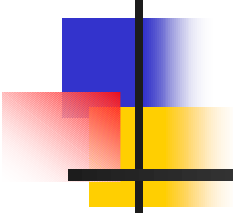
This document contains the slide presentation for T1X1.5/2001-097.

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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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## Outline

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

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# Introduction

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- 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

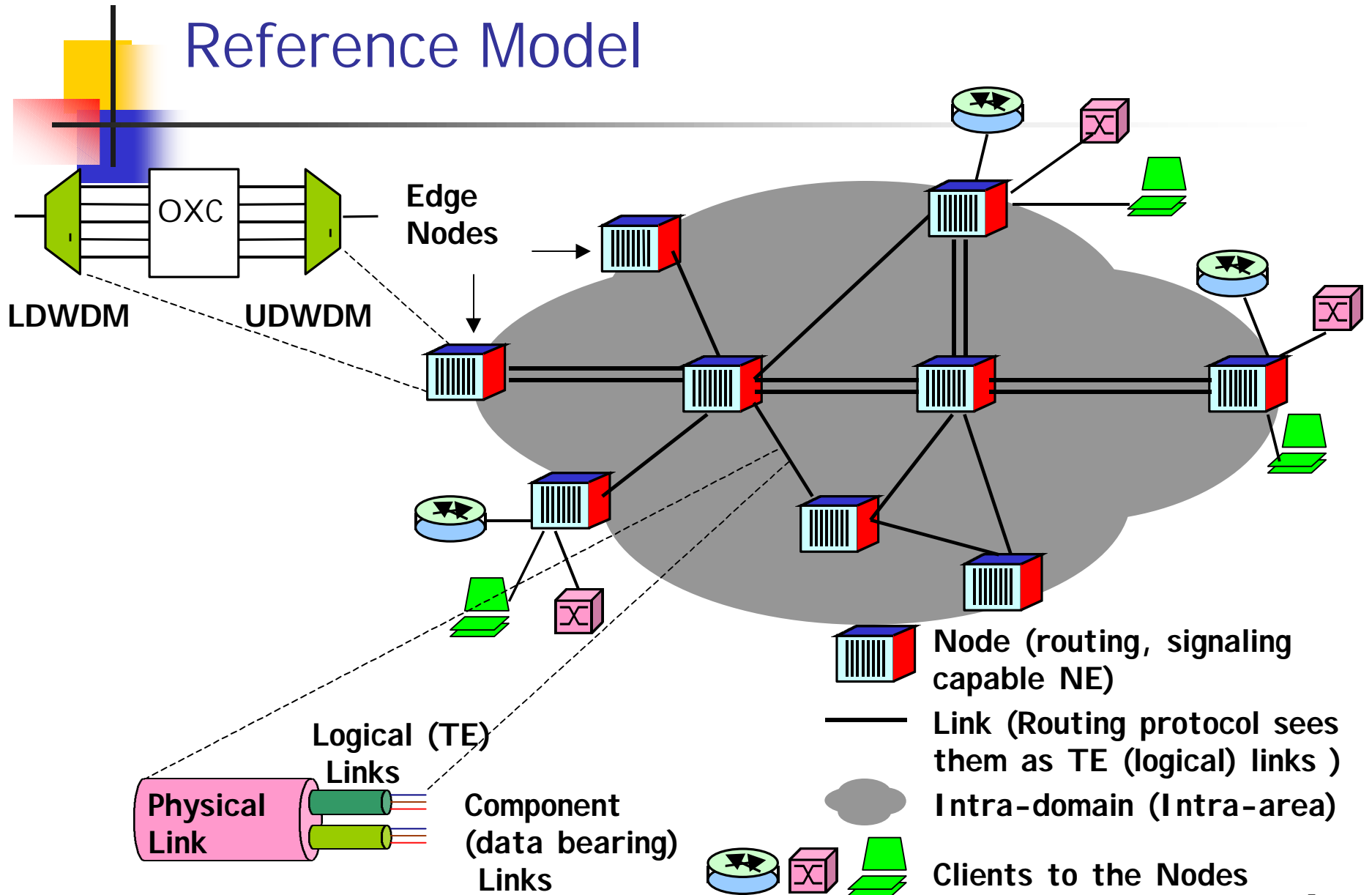
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## Goals

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- **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



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## Assumptions

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- 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

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## Analysis Procedure

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- 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)	$LSH + 4 + \{(\# \text{ of links}) * (12 + [4 * (\# \text{ of ToS reported})])\}$
Network link LSA (NLLSA)	$LSH + 4 + (\# \text{ of attached routers}) * 4$
Summary LSA (SLSA)	$LSH + 4 + (\# \text{ of ToS reported}) * 8$
AS External LSA (ASELSA)	$LSH + 4 + (\# \text{ of ToS reported}) * 12 + 12$
Hello packet (Hpkt)	$CMH + 20 + (\# \text{ of valid neighbors}) * 4$
Database description packet (DDpkt)	$CMH + 8 + (\# \text{ of LSAs}) * 20$
Link state request packet (LSRpkt)	$CMH + (\# \text{ of LSAs}) * 16$
Link state update packet (LSUpkt)	$CMH + 4 + [LSA \text{ Length } 1 + \dots]$
Link state acknowledgement packet (LSACKpkt)	$CMH + (\# \text{ of LSAs}) * 20$

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## Main Parameters

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- # 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

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## Future Work

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