GLIF Control Plane meeting

Chair: Gigi Karmous-Edwards and
Secretary: Licia Florio

Feb 8th and 9th, 2006

GLIF Interim meeting

Feb 8-9th Control Plane Agenda

Feb 8th

3:30 - Agenda Bashing
3:45 - Relation between Control Plane, CDS and NDL
Jeroen Van Der Ham
4:30: -

Feb 9th

8:30 - Practical Demonstrtion of Network Descriptions
Andree Toonk
9:30 - Common Service Definition
Jerry Sobeiski
11:00 - Management Plane vs. Control Plane
Gigi Karmous-Edwards
1:00 - Joint session w/ Tech

Control Plane Challenges For GLIF Migrating towards Automation….

Taking one baby step at a time …

- **CIM - Common Information Base - translation of repository to machine based**
- **Common Services repository**
- **WEB services based services towards automation**
- **Translation of administrative policy to low-level policy for automation**
- **Scheduling services**
- **Automated Testing and monitoring**
- **Control plane protocols**
- **Policy and Security**
- **Interdomain routing**

One Definition of Control Plane

"Infrastructure and distributed intelligence that controls the establishment and maintenance of connections in the network, including protocols and mechanisms to disseminate this information; and algorithms for engineering an optimal path between end points."

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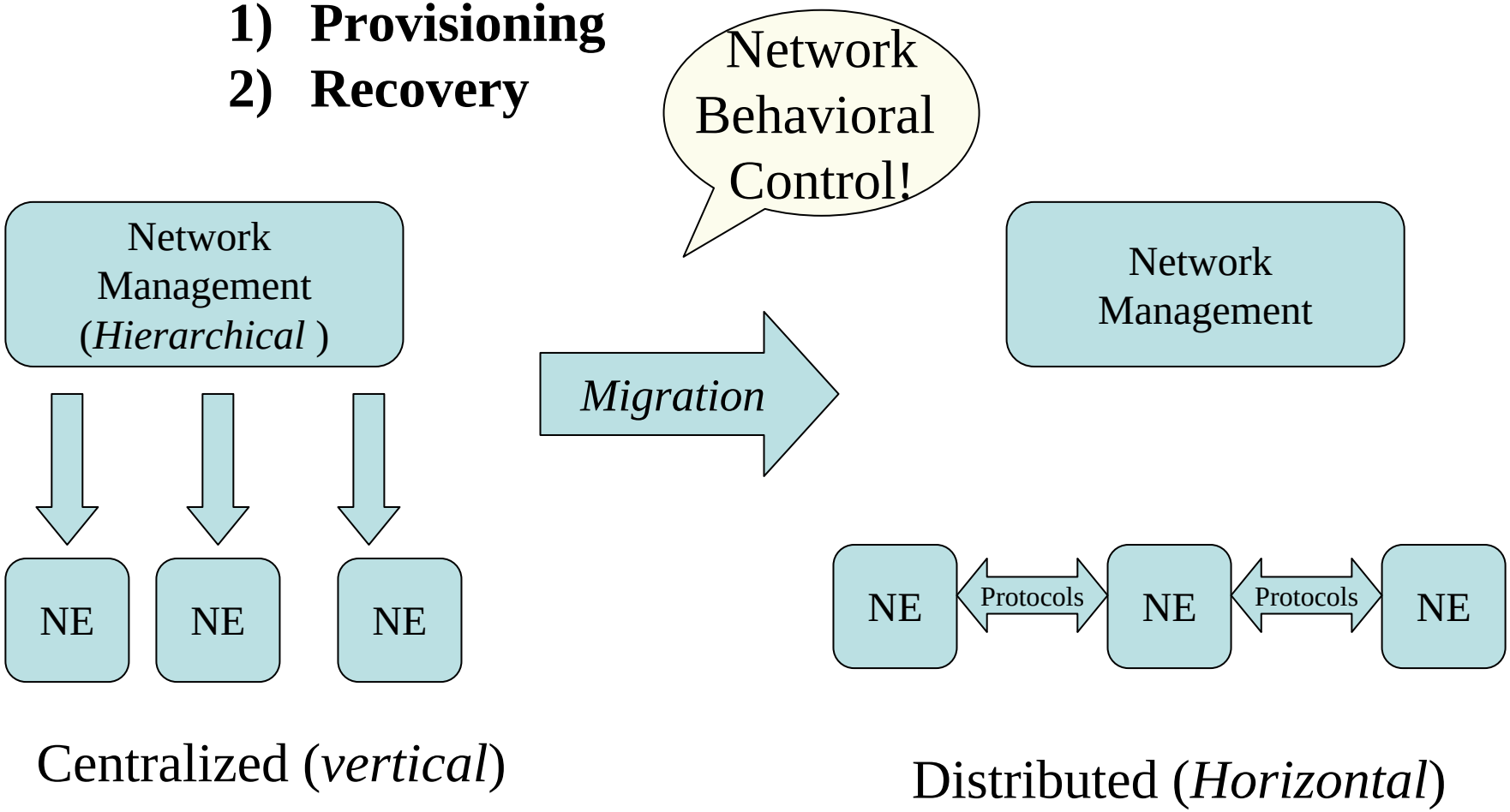
Centralized vs. Distributed…

Key areas for Today's Control Plane are:

1) **Provisioning**
2) **Recovery**



Control Plane Functions

- **Routing - Intra-domain and Inter-domain**
  - **1) automatic topology and resource discovery**
  - **2) path computation (***How do we use the infrastructure***)**

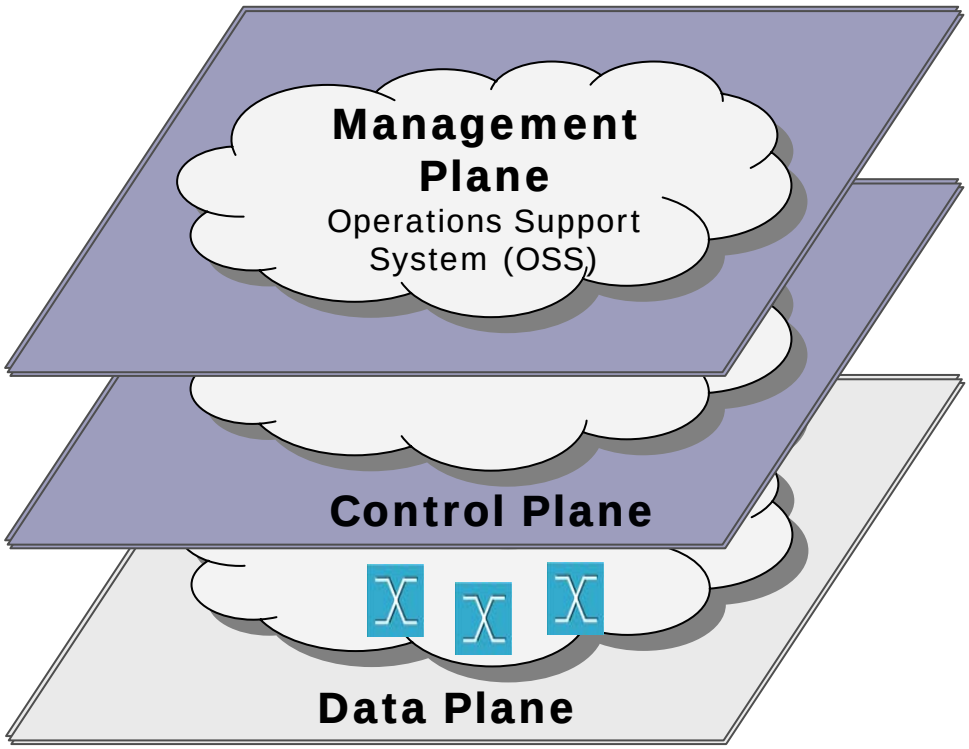
- **Signaling - standard communications protocols between network elements for the establishment and maintenance of connections**

- **Neighbor discovery - NE sharing of details of connectivity to all its neighbors (***very powerful tool***)**

- **Local resource management - accounting of local available resources**

Control Plane

“Planes”



- Global (“like SS7”)
- Distributed and resilient
- Non-manual, i.e., automated
- Separated from the data plane

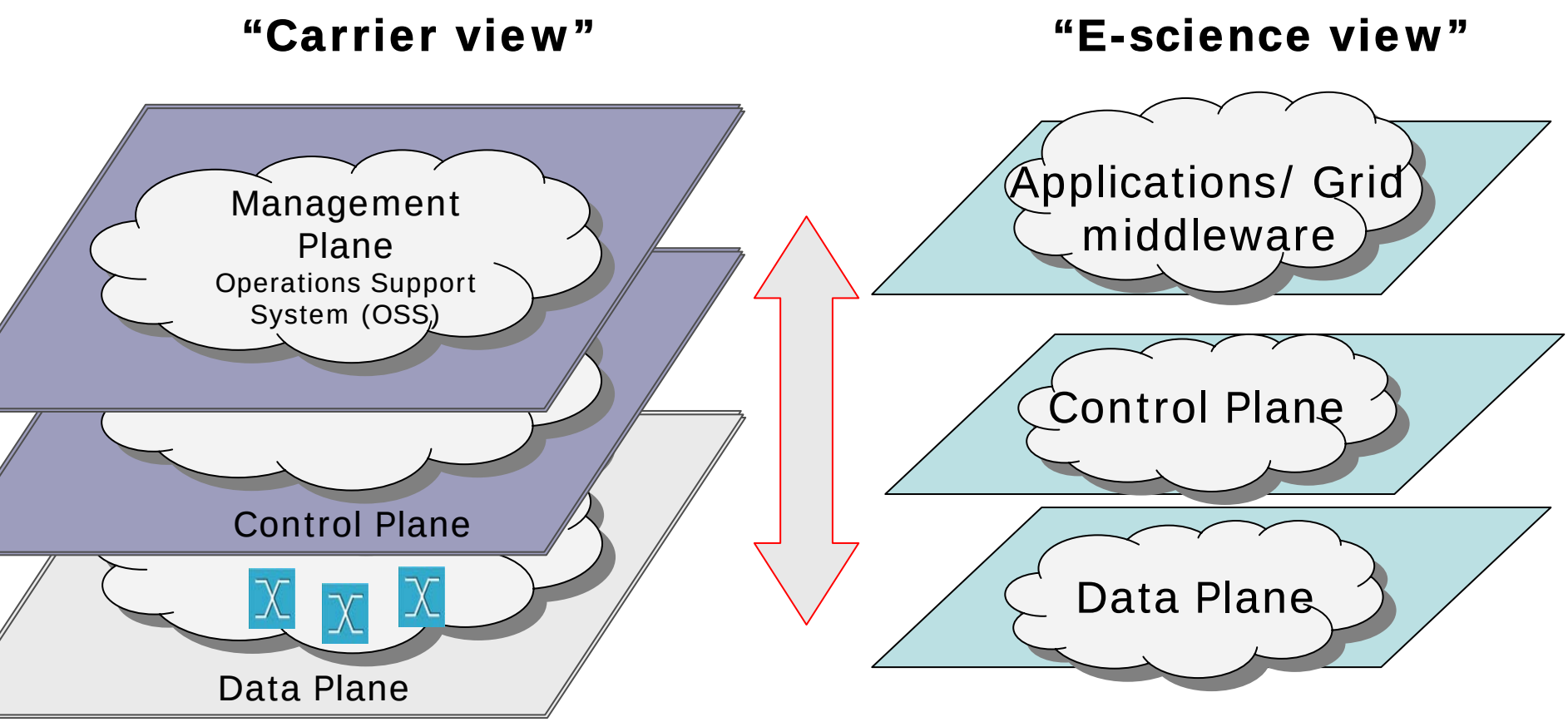
Network-wide, global, comprehensive, distributed, automated software system that enables interoperability, responsiveness, flexibility, enhanced access to network resources, and, speed and efficiency gain

Functions' Migration

Functions	Traditional Approach	Emerging Approach	
	Mgmt	Mgmt	Control
Fault management	X	X	X
Configuration of services (planned)	X	X	
Accounting	X	X	
Performance Management	X	X	X
Security		X	
Configuration of services (signaling)			X
Connection management		X	X
Routing		X	X
Auto-discovery			X
Generation of call "service" records			X
Generation of demand capacity			X

Alanqar, W., Jukan, A.: "Extending End-to-End Service Provision and Restoration in Carrier Networks", IEEE Communications Magazine, Jan 2004.

Control Plane “Drivers”



Application

Network-wide, global, comprehensive, distributed, fully automated software system that enables interoperability, responsiveness, flexibility, enhanced access to network resources, and, speed and efficiency gain

Control Plane Focus today

1. Network Configuration
2. Network Recovery

GMPLS IP Control Protocols:
Signaling: RSVP-TE
Routing: OSPF-TE based on Link State protocols (LSA)
Discovery: LMP
Also, Non-GMPLS control plane signaling for OBS

IP protocols:LMP, OSPF-TE

LMP Functionality:

- Link Connectivity verification
- Link parameter correlation
- Control channel management
- Link Fault utilization

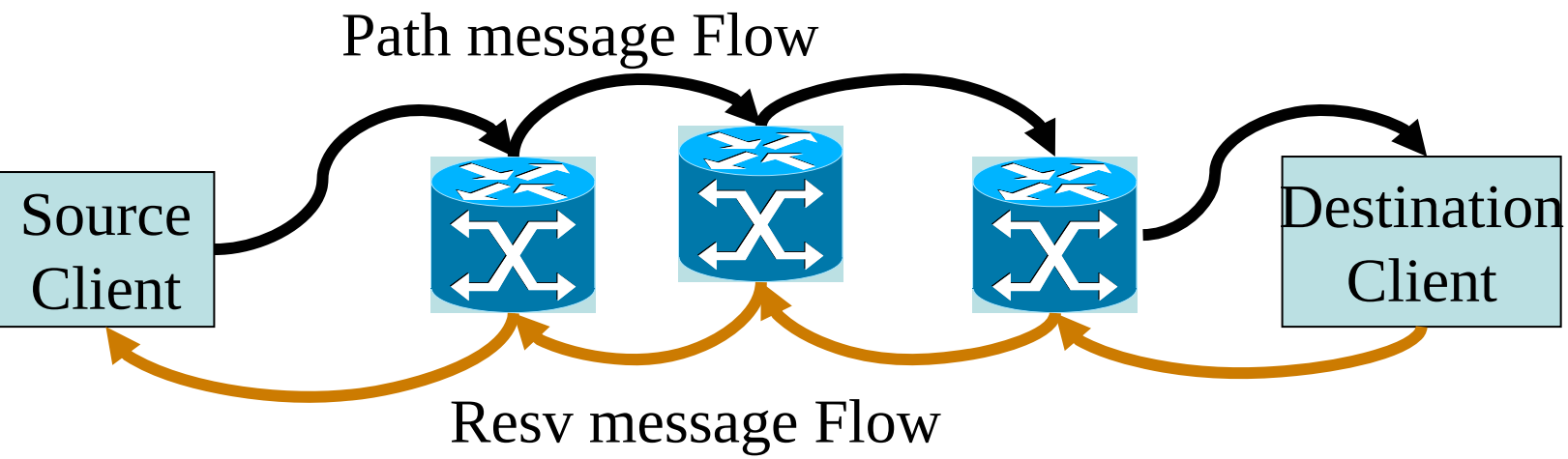
- **OSPF : Link State Routing protocol**
- LSA - Link state advertisements
- This collects TE information to build a Topology database

RSVP-TE

Separate control link for RSVP-TE messages

Network model:

1) Overlay- no routing between the client and the network
2) Augmented - separate routing instances, but some info is passed, ii.e IP destination address
3) Peer - single routing instance between client and network



TE - Traffic Engineering

TE GOAL: is to facilitate efficient and reliable network operation and network optimization.

Results in:

- minimization of loss
- minimization in delay
- Maximization of throughput
- Enforcement of SLA’s

TE routing is not just based on static “link cost” but rather multiple constraints:Bandwidth, Availability, Latency, and link cost.