GLIF Control Plane Update

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iGrid2005

Control Plane Challenges For GLIF Migrating towards Automation….

Taking one baby step at a time …

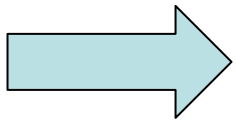
- **CIM - Common Information Base - translation of repository to machine based**
- **Common Services repository**
- **WEB services based services towards automation**
- **Translation of administrative policy to low-level policy for automation**
- **Scheduling services**
- **Automated Testing and monitoring**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

Why is the Control Plane important to GLIF?

Today

End-to-end Optical connections between two laboratories across the Globe:

- **takes "lots of phone calls"**
- **takes "lots of emails"**
- **tens of people**
- **connection becomes relatively static**
- **over three weeks!!!!**
- **Failed link may result in days of out-of service**



We want to…

- **applications/sensors/end-users/instruments to initiate an end-to-end connection**
- **Resources for short periods of time or long depending on application**
- **We want automatic recovery - restoration/protection**

- **How do we as a community go from where we are today to what we really want?**
- **We need to use the Morphnet concept in the GLIF community….**
  (Part of the infrastructure for vertical integration research and other part as production)

Control Plane

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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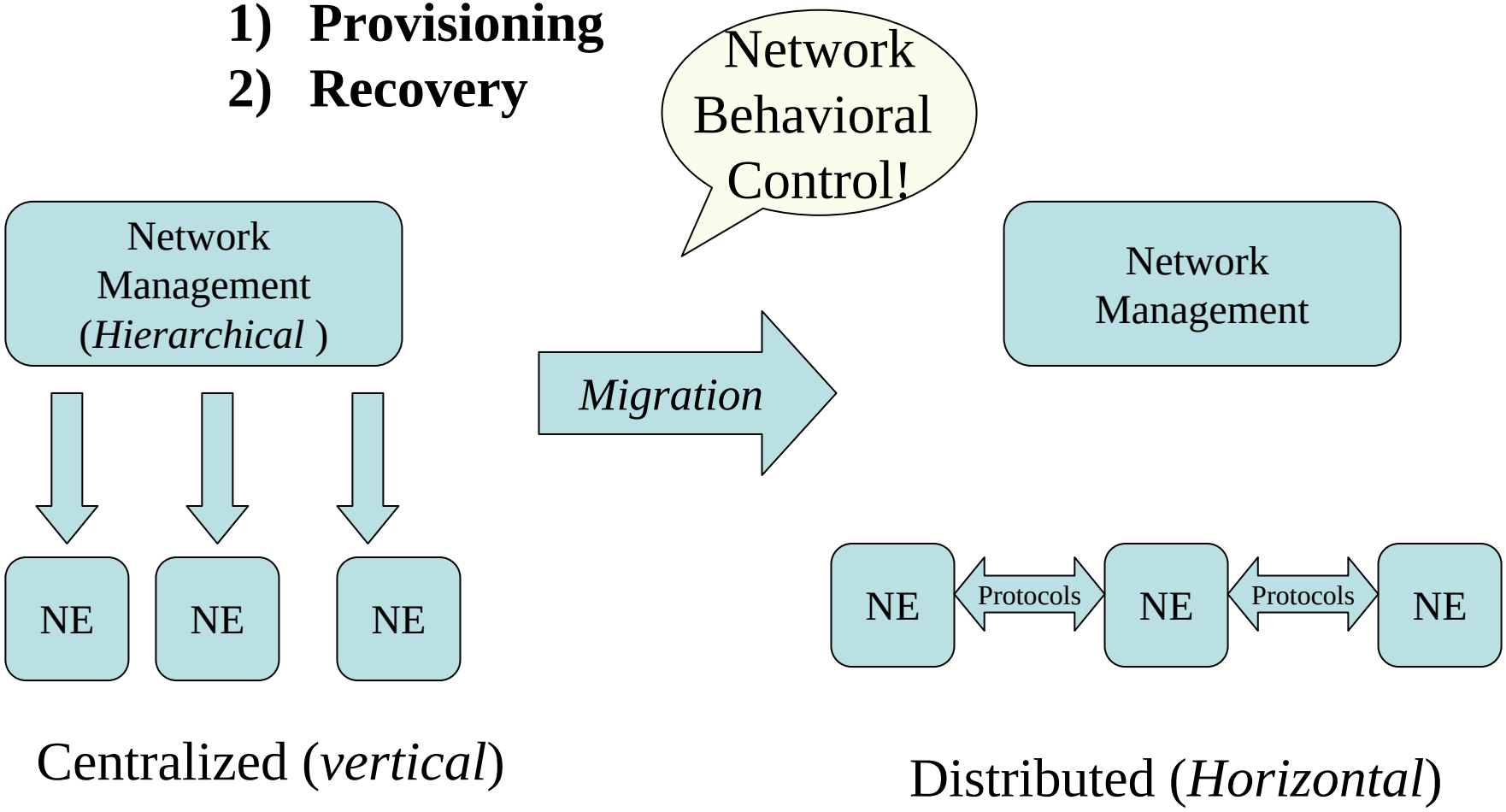
Centralized vs. Distributed…

Key areas for Today's Control Plane are:

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



Fault Management - Recovery

Recovery Mechanisms
Protection/Restoration

Protection

- Recovery resources are pre-configured prior to failure.
- Protection could have the form of dedicated or shared (slightly more efficient than dedicated).
- Protection is less efficient use of network resources.
- Protection provides faster recovery times than restoration and is easier to implement.

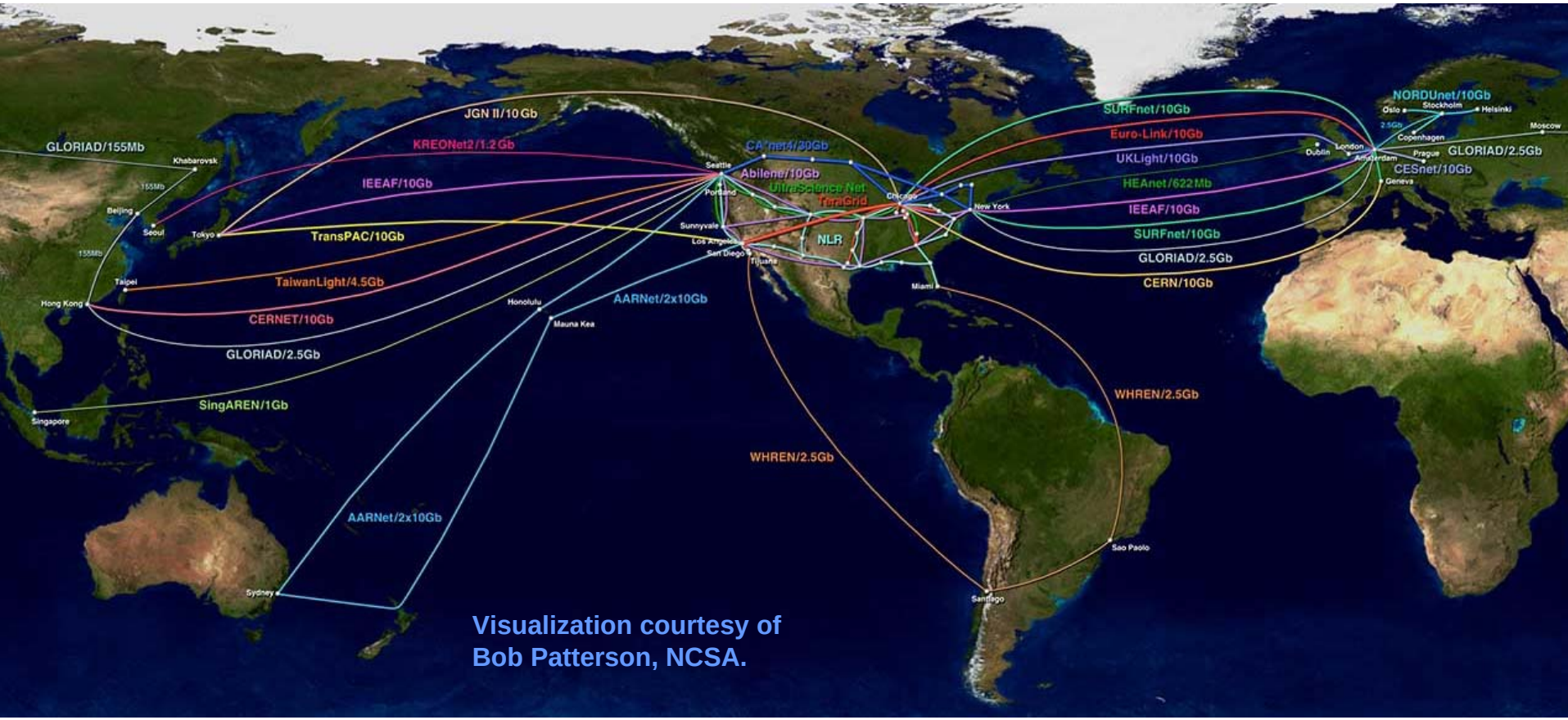
Vs.

Restoration

- Recovery resources are dynamically configured after a failure has occurred.
- Restoration makes efficient use of network resources.
- Restoration usually has slower recovery times than protection.

Global Lambda Integrated Facility

World Map



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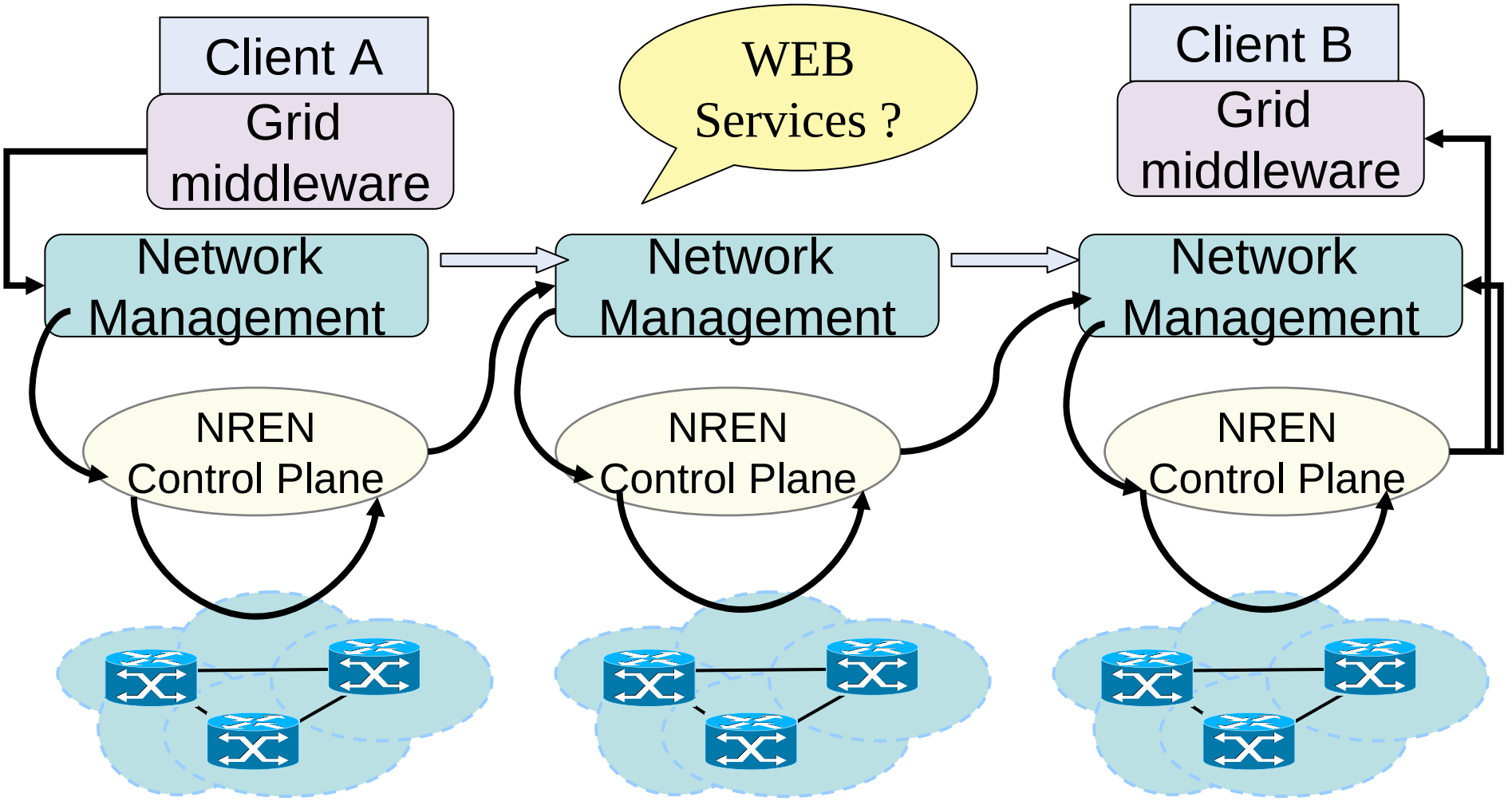
GLIF Automation?



GLIF Control Plane and Grid Middleware Integration

Mission: **To agree on the interfaces and protocols to automate and use the control planes of the contributed Lambda resources to help users on a global scale access optical resources on-demand or pre scheduled.**

several key areas we need to focus on.

- Define and understand real operational scenarios
- Defining a set of basic/common services:
  - Precise definitions
  - Developing semantics the whole community agrees to for machine to machine communications
- Interdomain exchange of information for both control planes and management planes
  - Determine what information needs to be monitored
  - How to abstract monitored information to share
- Determine what existing standards are useful vs. where Grid requirements are unique and new services and concepts are required
  - How do we standardize mechanisms and protocols that are unique to the Grid community
- Define a Grid control plane architecture
- Work closely with E-science applications to provide vertical integration