Next Generation Peering for Next Generation Networks

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What is Pacific Wave?

Pacific Wave is a state-of-the-art international peering exchange and GLIF facility designed to serve research & education networks throughout the Pacific Rim and the world.

Goal: enhance research and education network capabilities by increasing network efficiency, reducing latency, increasing throughput, and reducing costs.

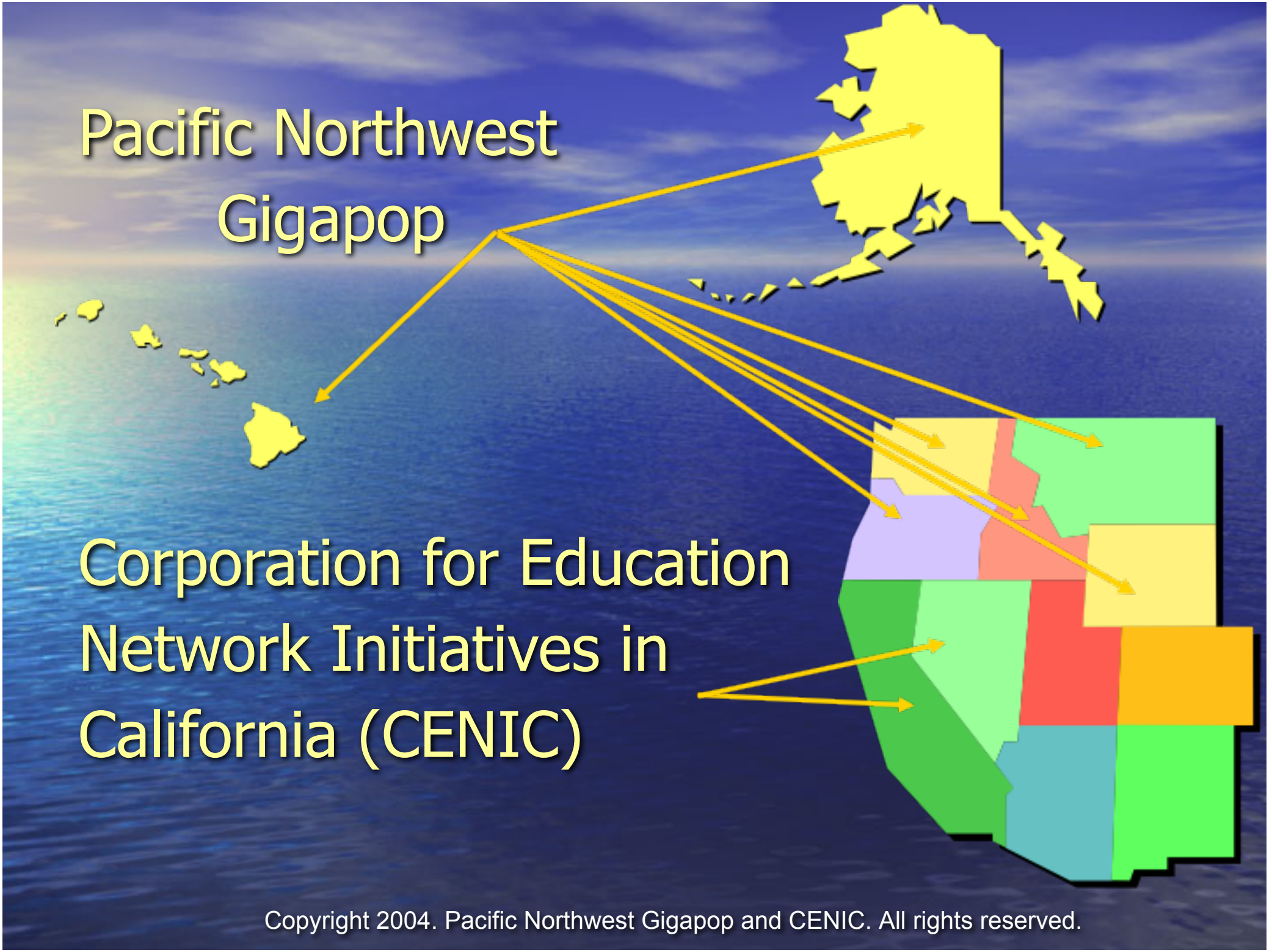
A project of CENIC and PNWGP, in collaboration with the University of Southern California and the University of Washington

Pacific Wave: Background

- 1996: PNWGP & LAAP regional peering exchanges created. Microsoft, Boeing, and regional R&E networks connect
- 1999: First international connection—Canada's CA*Net3.
- 2001: Australia's AARNet connects. Seattle exchange officially named Pacific Wave.
- 2003: Upgraded Seattle switches to 10GbE capability. Internet2/Abilene connects at 10GbE. Groups in Taiwan, Japan (including GEMNet2), Singapore connect.

Pacific Wave 2004

- Embarked on joint project with CENIC to create first geographically extensible peering exchange SEATTLE to LOS ANGELES with National LambdaRail fiber facilities.
- Korea and Qatar connect. AARNet connects at 10GbE.
- Participates in Data Reservoir experiment with WIDE, IEEAF, CA*Net4, and CERN (7.5Gbps data transfer over 10GbE circuit from Tokyo to Geneva)
- Participates in 2-way high-definition video conferencing between Pittsburgh, Seattle, and Canberra with Research Channel, AARNet, Intel, University of Washington for SC04.



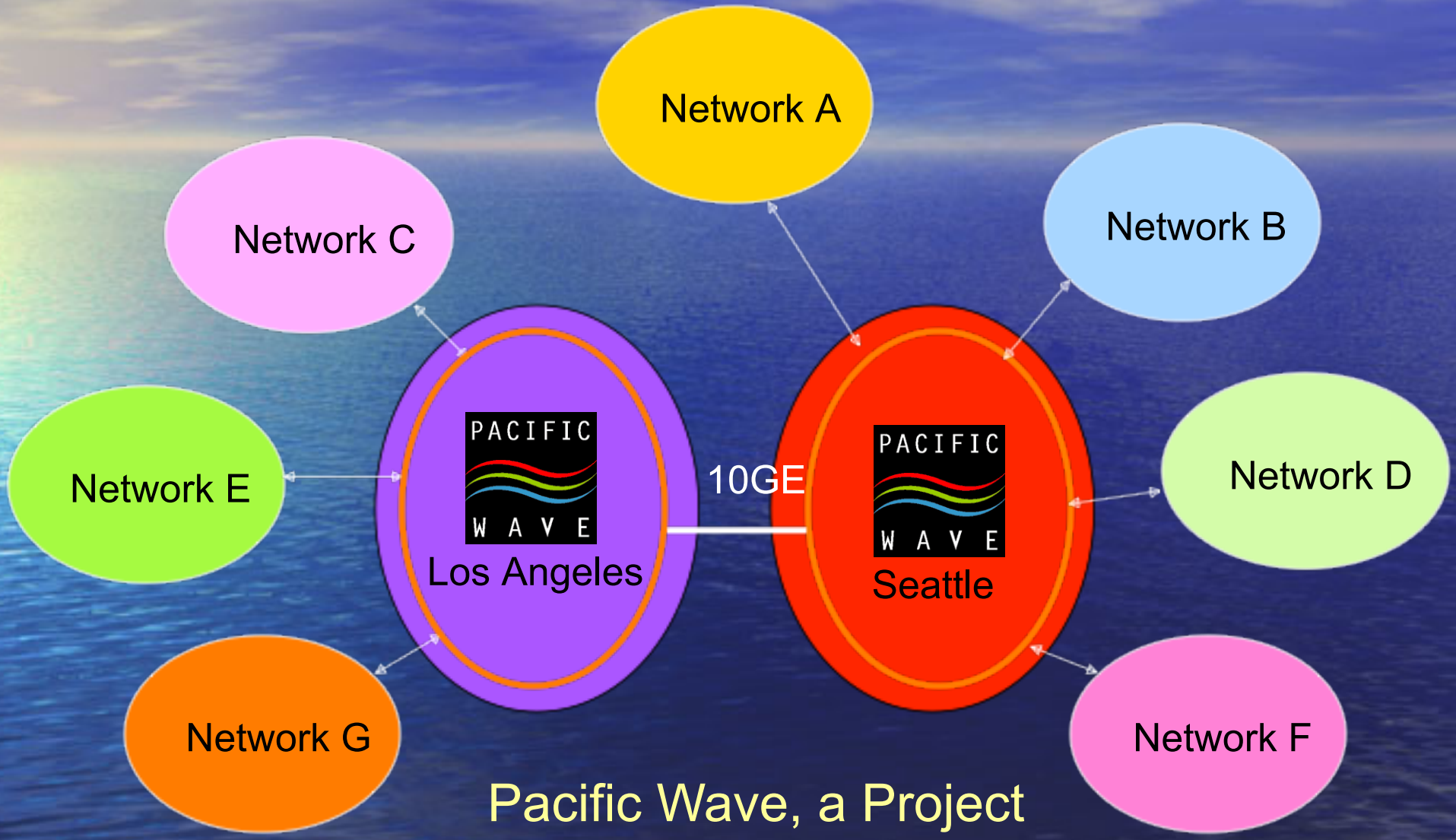
U.S. Pacific Coast Peering Removes Geographic Barriers

CENIC and **PNWGP** have combined efforts to create an advanced, extended peering facility on the U.S. West Coast.

Concept: an extensible, geographically dispersed peering fabric

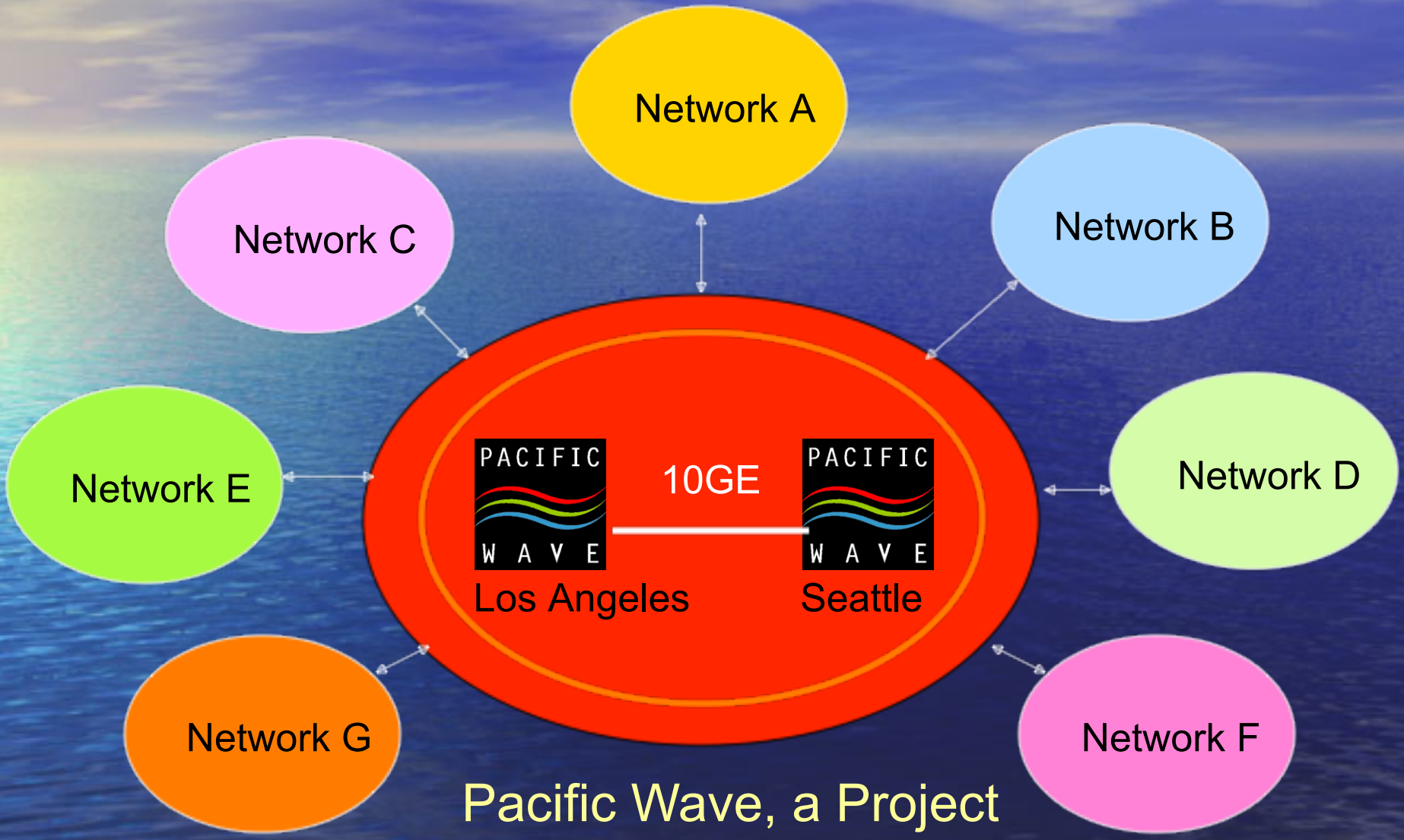
Result: you connect at any one location on the fabric and have the option to peer with any other participant, regardless of where they are connected

Pacific Wave 2004



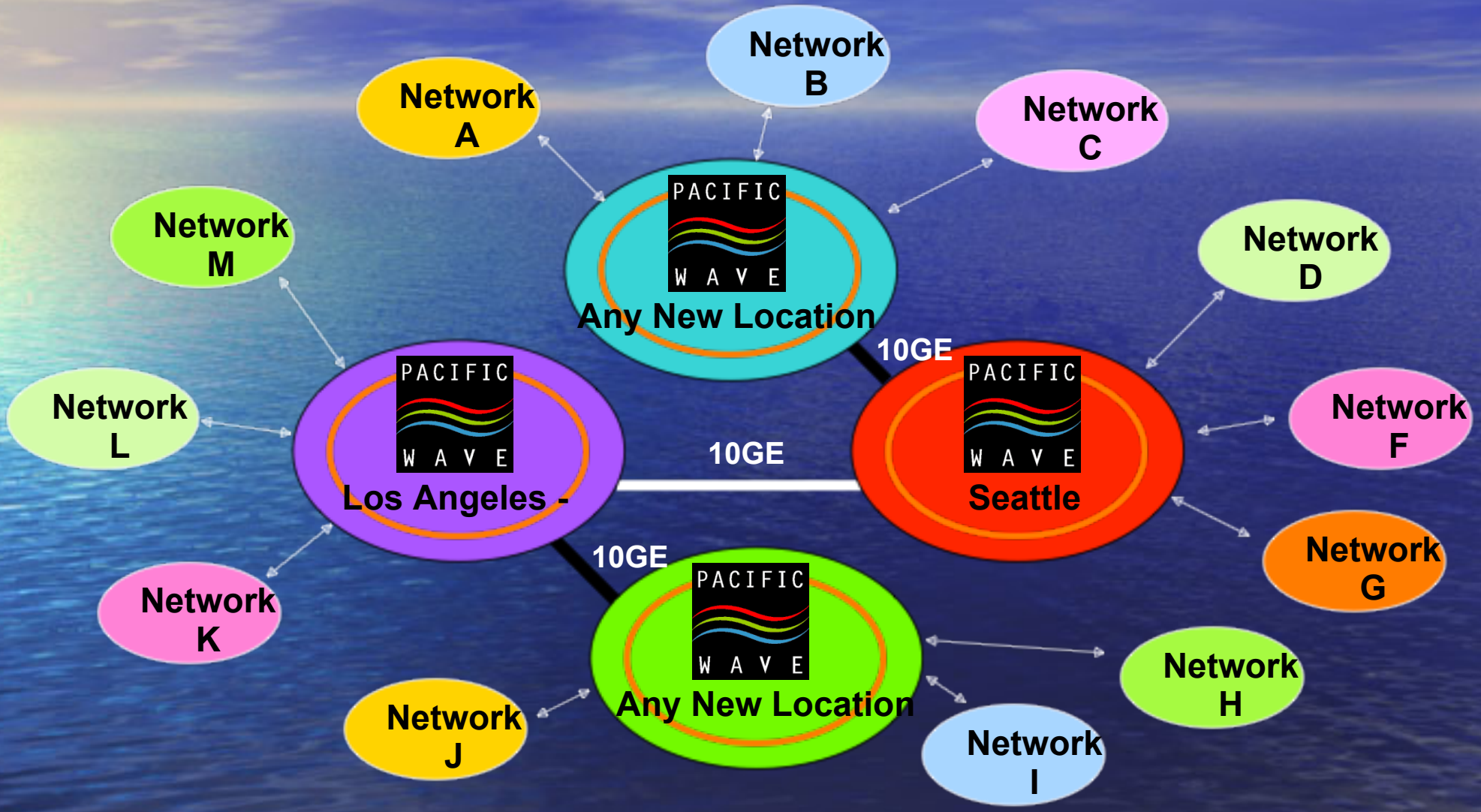
Pacific Wave, a Project of CENIC and PNWGP

New Model



Pacific Wave, a Project of CENIC and PNWGP

Easily Extensible to Future Locations



Pacific Wave, a Project of CENIC and PNWGP

Pacific Wave Connectors – Nov. 2004

- AARNet
- Abilene/Internet2
- CA*Net4
- CENIC
- GEMNet (IPv4 and IPv6)
- KREONet2
- Pacific Northwest Gigapop
- Qatar Foundation
- SingAREN
- TANET2

Pacific Wave Connectors – Nov. 2004

Defense Research and Engineering Network (DREN)

Energy Sciences Network (ESNet)

Comcast

The Boeing Company

Microsoft Corporation

Peer1.net

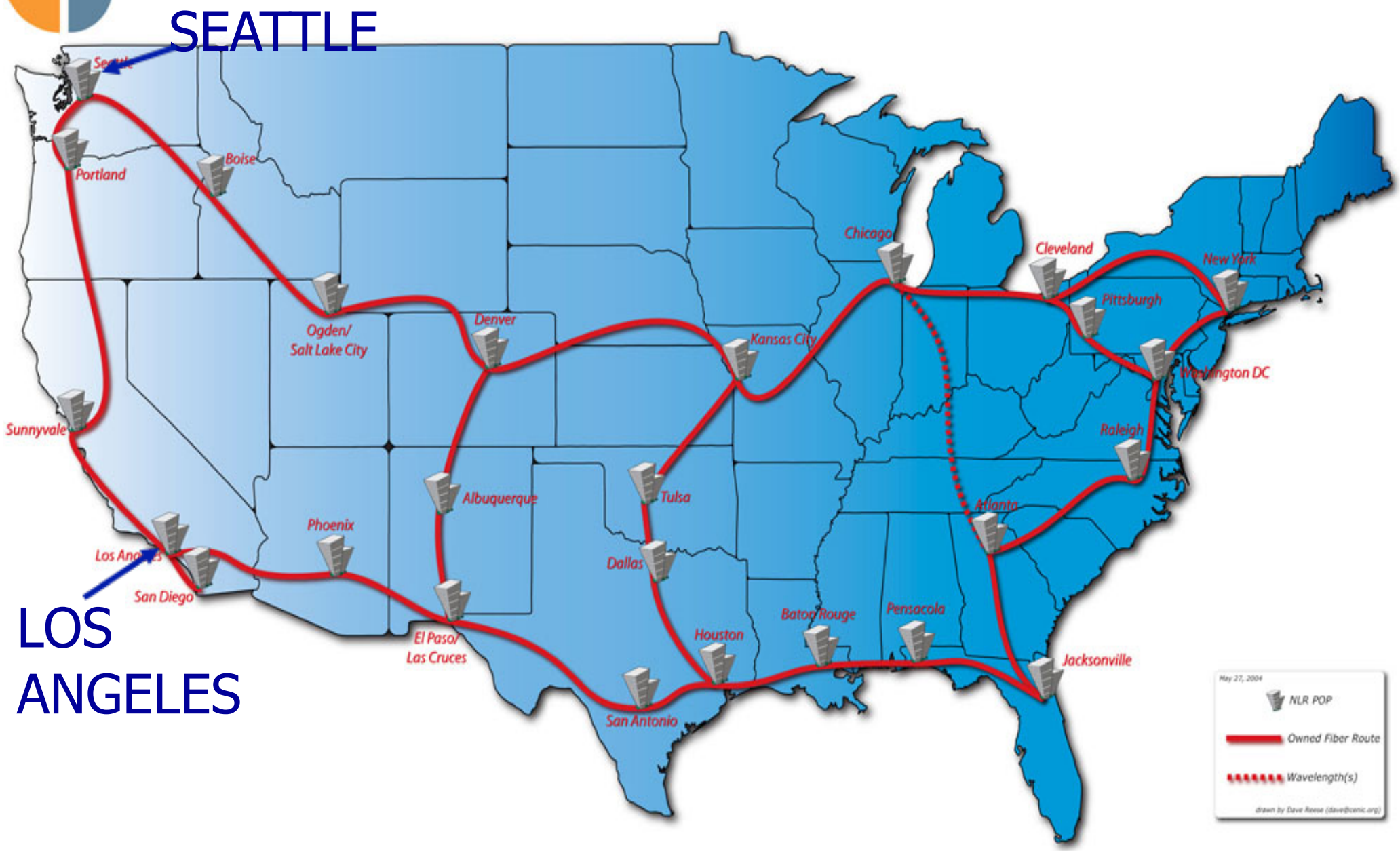
Pointshare (a division of Siemens Medical)

Pacific Wave Fundamentals

- **Layer 2, Ethernet-based** exchange facility
- **ATM-free** zone
- **Multicast** enabled
- **All IP traffic types** supported (ipv4, ipv6, multicast)
- **Jumbo Frames** supported

Pacific Wave nodes in **Los Angeles and Seattle interconnected by 10GE** service(s) from National LambdaRail.

National LambdaRail Architecture



For more information regarding NLR see http://www.nlr.net or contact info@nlr.net

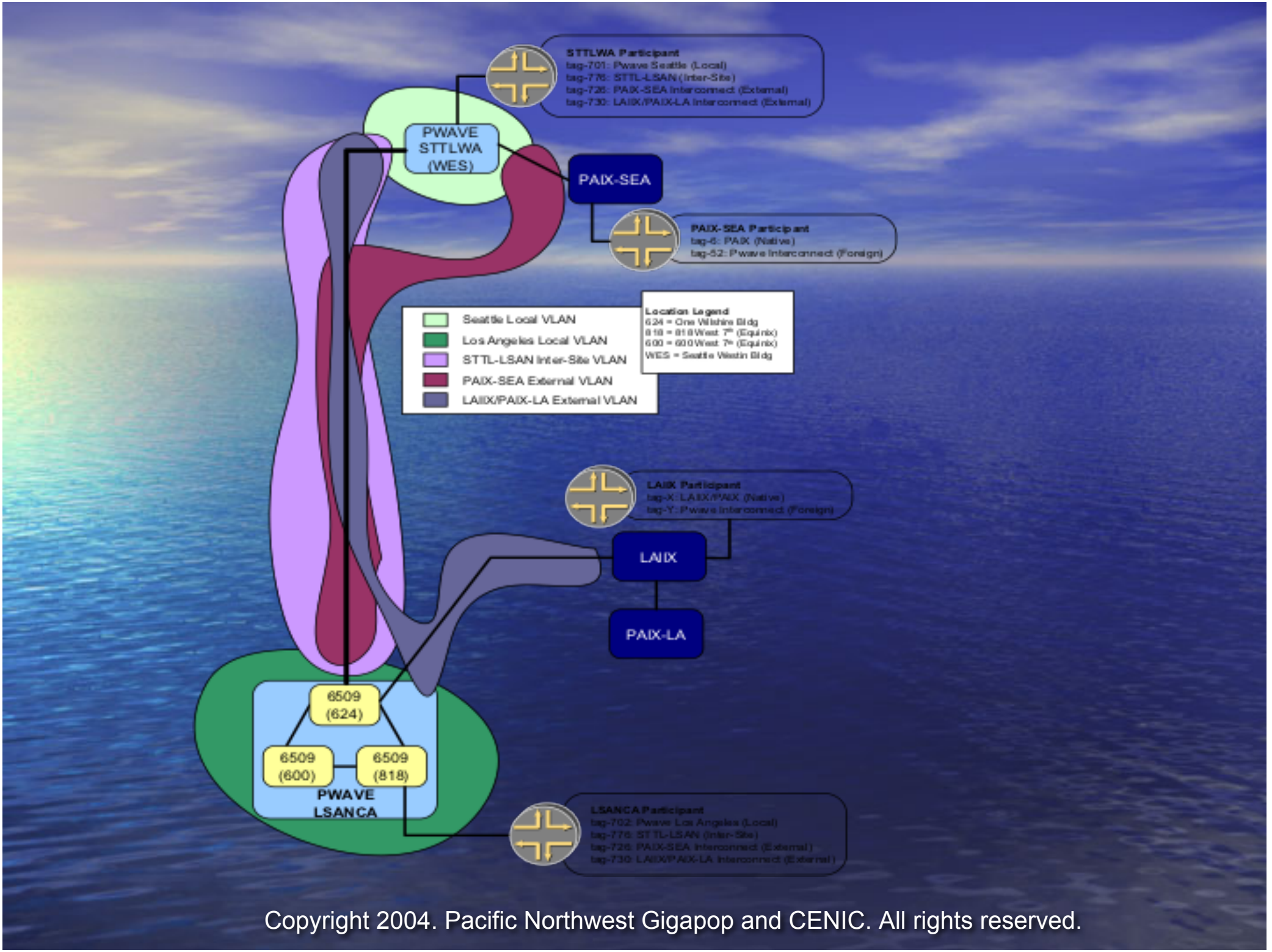
Service Features

- Self-selected & self-configured peerings
- LA or SEA connection node options
- No AUP
- Support available 24 x 7 x 365
- Participants will be asked to peer with both CENIC and PNWGP
- National LambdaRail facilities also available at Pacific Wave locations in support of GLIF and high-end research activities

See www.pacificwave.net for more info.

Technical Support: The Goal

- Cooperative engineering development and deployment
  - engineering@pacificwave.net
- Consistent, documented principles for extended fabric as well as for node-site connections
- Partner exchange point interconnect (e.g. Switch and Data PAIX, Telehouse LAIIX)
- Consistent documented BGP policies



Technical Challenges

- Managing 2,250 kilometers of fiber
- Preventing unwanted inter-fabric transit
- Scalability
- Maintaining local switch fabric separation
- Multiple entities acting as one

Business Operations

Keep It Simple…

- One contact point for information:
  - www.pacificwave.net
  - 888 PAC WAVE (888 722 9283)
  - info@pacificwave.net
- One contract
- One price card

Customer Support Operations

- NOC Services: unified approach for the customer (888 PAC WAVE; noc@pacificwave.net)
- Unified, single database for customer information
- Device monitoring with visibility at all locations
- Access, through normal site escalation procedures, to engineering support
- Single trouble-ticket system

For More Information

- Email: info@pacificwave.net
- Web: www.pacificwave.net
- Phone: +1 888 PAC WAVE or
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Thank you!

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