



**NOAA** NATIONAL OCEANIC AND  
ATMOSPHERIC ADMINISTRATION  
UNITED STATES DEPARTMENT OF COMMERCE

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**NOAA SCIENCE NETWORK**

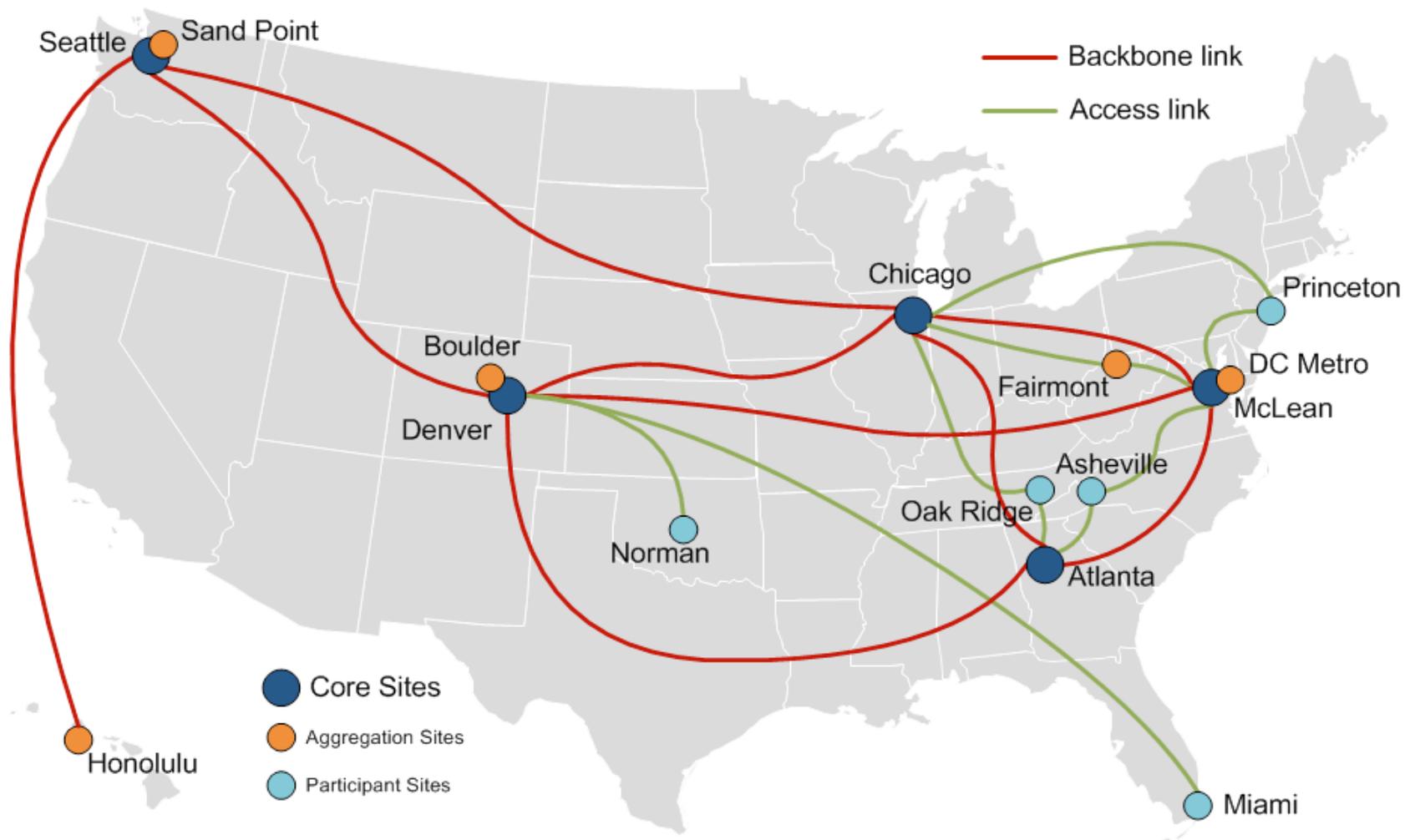
**OCONUS Update**

**June 2013**

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# Current Network



# N-Wave Design Basics

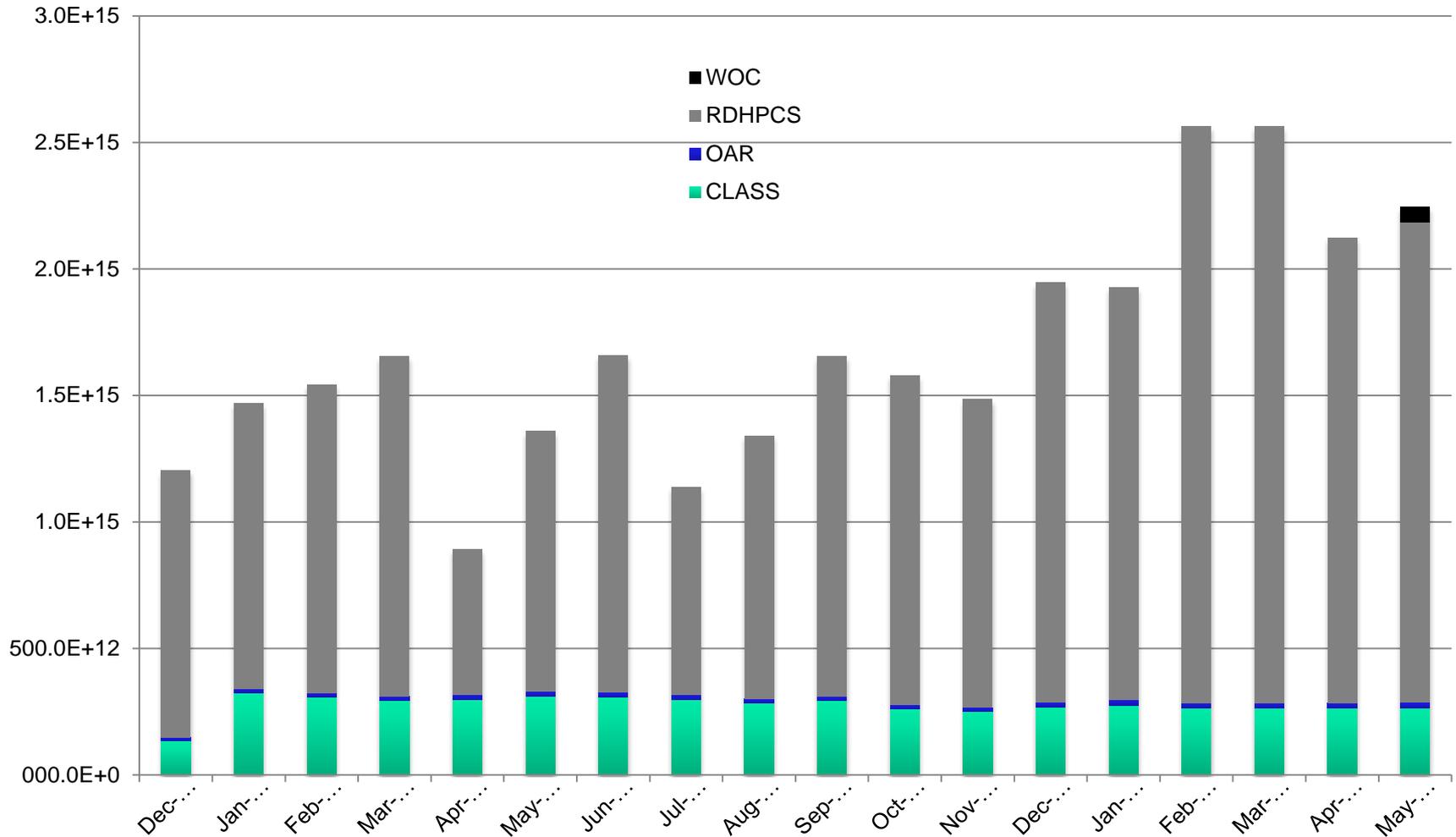
- 10 Gigabit Ethernet / Multi Protocol Label Switched (MPLS) Backbone
- Fully Meshed Dense Wave Division Multiplex (DWDM) waves for backbone circuits
  - Provided by Internet2 and National Lambda Rail
- 1G and 10G backbone access connections
- 100 Gigabit upgrade path

# N-Wave Customer Usage

- R&D High Performance Computing (biggest data)
  - Boulder, GFDL, Fairmont, Oak Ridge
- NESDIS CLASS Archive data (big data)
  - NSOF, NGDC, NCDC, Fairmont
- NOAA-to-NOAA general traffic – NSSL, AOML, Boulder
- NESDIS GOES-R AWIPS, C&C backup
  - Wallops, NSOF, SSMC, IV&V, NESCC
- NESDIS JPSS
  - Product Delivery from Fairmont, NSOF
- NOAA Security Ops Center (SOC) – Fairmont & SSMC
- NOAA Web Ops Center (WOC) – Boulder & DC
- GFDL – Transport to TIC sites for Internet access
- NOAA National Ocean Service sites – Charleston, Sand Point, SSMC



# Traffic Volumes



# Availability

- Network operational on Jan 1<sup>st</sup> 2011
- Core Network - “carrier class”
- Dual connected customers
  - 99.99% or higher Availability (52-week)
- SLAs done with customers if possible or needed.

# N-Wave Value

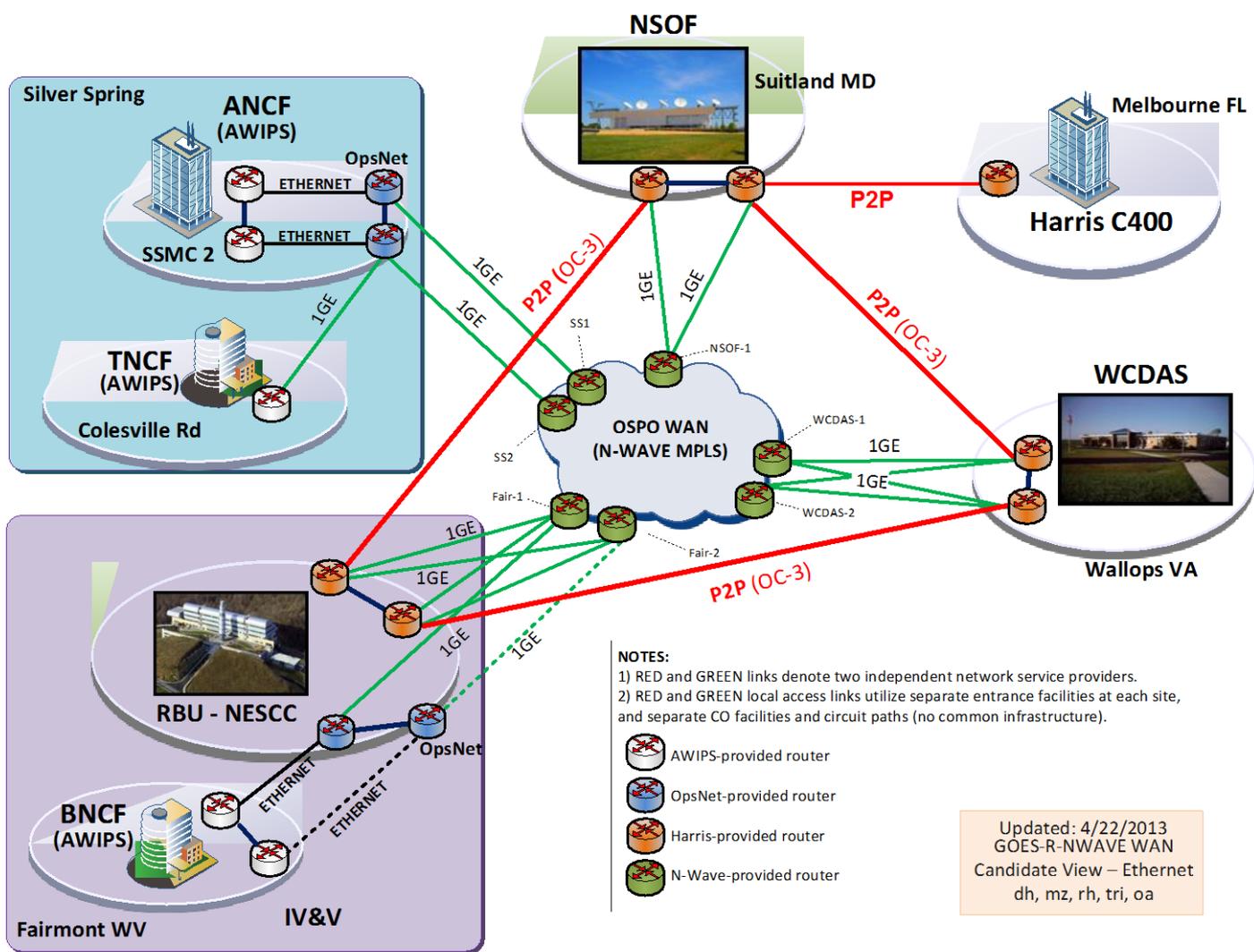
- High bandwidth (1Gbps-10Gbps) are substantially less expensive than Networx in most cases.
- Secure (TIC) commodity Internet diversity & savings
- Secure cost effective 24x7x365 Network Operations
  - Full A&A (C&A) including background checks
  - Contract based
- Top Tier Network Engineering
- Keeps up with the modern technology edge
  - 10 Gigabit Ethernet now – 40/100 GE in the future
- Predictable network infrastructure
  - Performance
  - Security
  - Transparency of operations

# N-Wave GOES-R Support

- IPv6 MPLS WAN support for GOES-R (S, and T):
- Provide routine data transport of products to AWIPS
- Provide backup connectivity for mission C&C
- Minimum availability of 99.9%
- Sites: Wallops, Fairmont, Silver Spring, Suitland



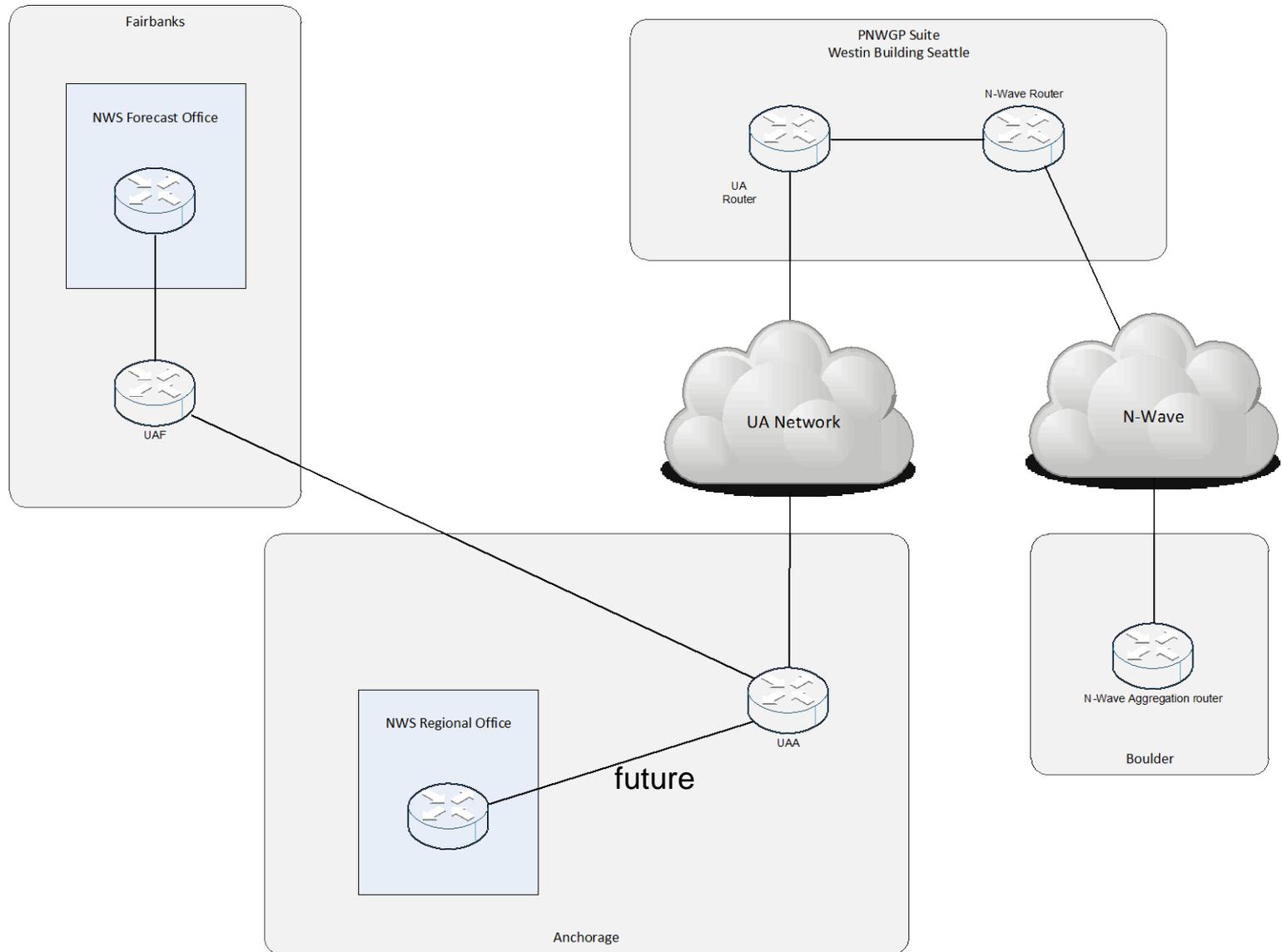
# Approved Baseline Telecommunications Architecture



# OCONUS - Hawaii

- One OC-3 (155 Mbps) to Hawaii
  - Terminates into PRC metro-area network, to reach all of NOAA sites, prior to IRC occupancy
  - IRC responsible for MAN
- Options exist for 1 Gbps circuit

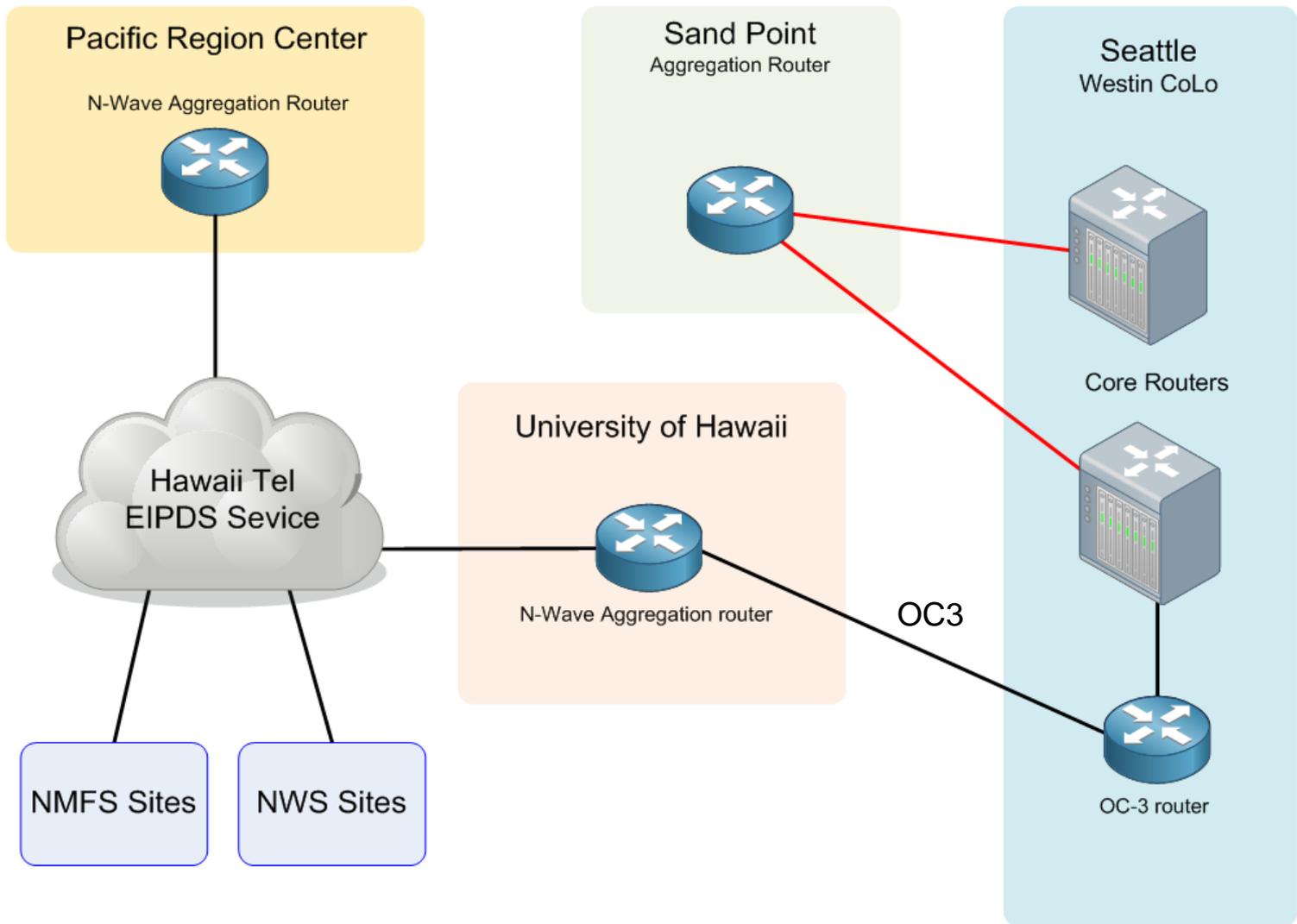
# N-Wave connection to Alaska



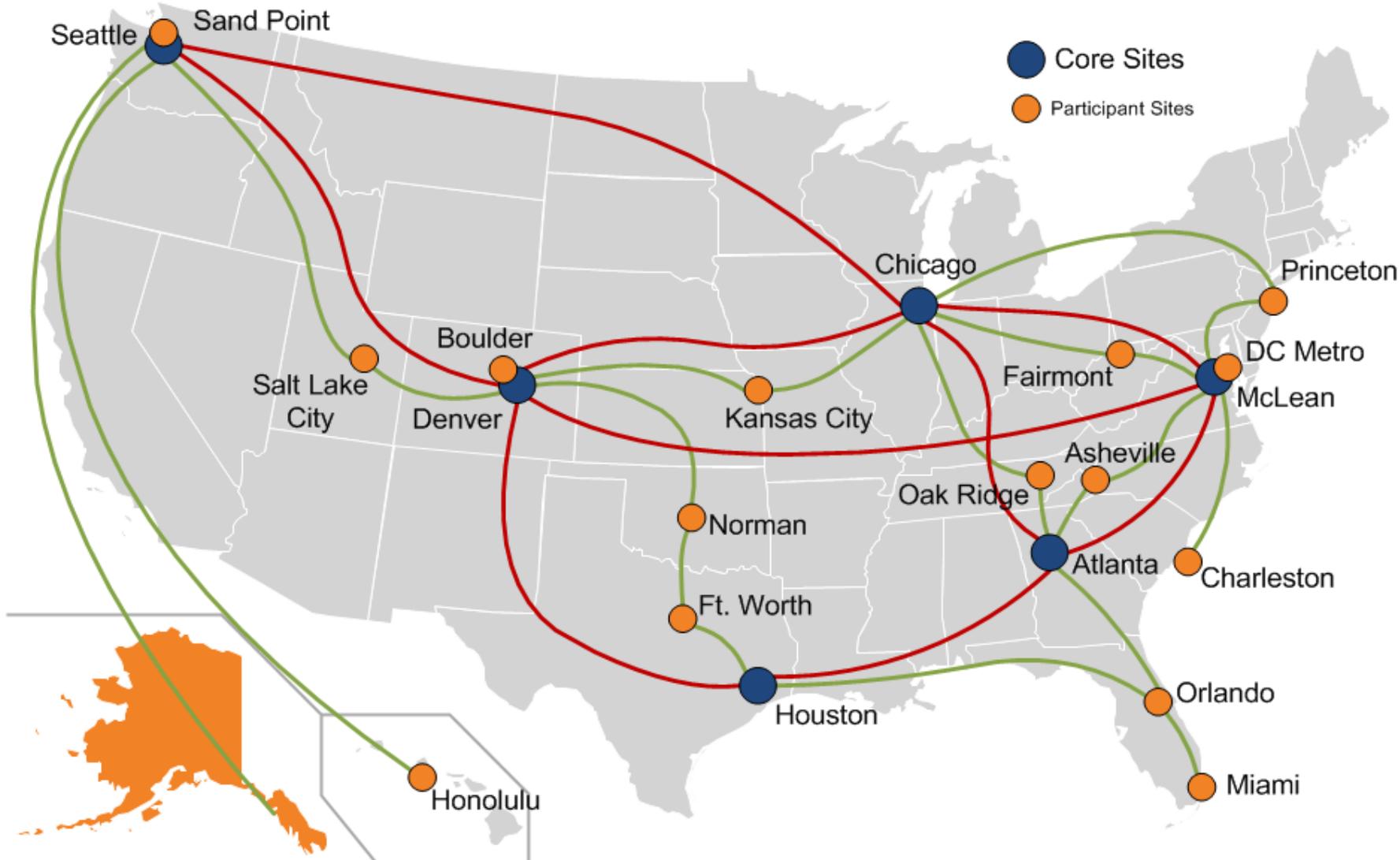
# OCONUS - Alaska

- Peering Boulder with U of AK R&E network in Seattle (over N-Wave)
  - TIC compliant connection
- Investigating NOAA <-> UAK science data flows
  - Models (HRRR, FIM)
  - Satellite products, Level 0 data?

# Hawaii Connectivity



# Future



# Alaska: How can we help?

- Satellite data?
- Model data?
- NOAA: Trusted Internet Connection

# http://noc.nwave.noaa.gov

The screenshot shows a web browser window displaying the NOAA N-Wave Project website. The browser's address bar shows the URL <http://noc.nwave.noaa.gov/nwave/index.html>. The website features a navigation menu at the top with links for NOAA HOME, WEATHER, OCEANS, FISHERIES, CHARTING, SATELLITES, CLIMATE, RESEARCH, COASTS, and CAREERS. The main header includes the "n-wave" logo and the text "NOAA RESEARCH NETWORK". Below the header, there are navigation links for OAR, CIO, and HPCC, along with search options for "This Site" and "All NOAA".

The central part of the page displays a map of the United States with several sites marked. A legend indicates three types of sites: Network Core Site (blue dot), NOAA Customer Site (orange dot), and Future Customer Site (light orange dot). The map shows connections between Boulder and Denver (Network Core Sites), and Boulder, Chicago, Atlanta, and Washington, DC (Network Core Sites). Other sites include Sand Point, Seattle, Fairmont, ORNL, Norman, Asheville, GFDL, and Miami.

Below the map, there are sections for "N-Wave Traffic" and "NOAA N-Wave". The "NOAA N-Wave" section states: "N-Wave is NOAA's research network. N-Wave is a 'network built on partnerships'".