



NNENIX
NORTHERN NEW ENGLAND
NEUTRAL INTERNET EXCHANGE

- ❖ What is NNENIX?
- ❖ A not-for-profit organization
- ❖ All volunteer - 3 founding Directors, 2 technical ops staff
 - ❖ Educational mission to promote and foster better Internet infrastructure in Maine and the region



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- ❖ How does NNENIX help promote and educate about the Internet?
 - ❖ By providing training, education, and consulting support about how the Internet really works (technical and political), training on how to setup BGP routing, peering relationships, and help collaboration in the network operator community & for economic development
 - ❖ Also a physical Internet Exchange Point (IXP) with locations for network operators to connect to each other



- ❖ Benefits of an IXP are many - latency, cost, capacity, resiliency
- ❖ Avoid the “boomerang effect” for traffic
- ❖ local traffic stays local, not going to Chicago, NYC, or Boston
 - ❖ faster connections at a lower cost
 - ❖ resiliency and redundancy in the event of fiber cuts or other network outages in the region or globally
- ❖ For example, students at home doing homework for K12 and UMaine system, will have more direct access
- ❖ VPN access from home would be faster if it stayed local



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- ❖ July 2016 - 1st organizer meetings (Letourneau, McCarthy, Troutman)
- ❖ September 2016 - TAM meeting, 1st public announcement
- ❖ November 2016 - Incorporated Maine non-profit entity
- ❖ March 2017 - PCH donation of equipment, Portland location operational
- ❖ November 2017 - Hurricane Electric arrives in Portland



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- ❖ February 2018 - Orono location operational
- ❖ February 2020 - 6 members - UMaine, PCH, WoodyNet, HE, McFarlane Associates, Pioneer Broadband
- ❖ May 2020 - Northern Light Health has joined, connecting in June
- ❖ other new members in progress



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- ❖ NNENIX was formed with support and donations from Maine Fiber Company, Packet Clearing House, Cisco Systems, and the University of Maine system
- ❖ Maine Fiber Company
 - ❖ Donation of cabinet space and power in Portland for our initial start-up period
 - ❖ organizational startup expenses (\$10,000)



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- ❖ Packet Clearing House (PCH.NET)
 - ❖ global non-profit institute dedicated to fostering IXPs and improving Internet infrastructure around the world, supported by various governments, Internet Service Providers & tech companies
- ❖ Operator of over 120 country code Top Level Domains (ccTLD) for DNS
- ❖ Major donation of Cisco Nexus 9396 and 3524 switches & support contracts



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- ❖ Cisco Systems
 - ❖ Donation of DC power supplies for 9396 switch
- ❖ University of Maine System
 - ❖ support for technical operations
 - ❖ access to UMS existing caching appliances for NNENIX
 - ❖ charter paying member



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- ❖ NNENIX physical Internet Exchange is operational in two locations:
 - ❖ Portland, Maine (MFC Regen Hut, 9 Westland Ave.)
 - ❖ 1, 10, and 40 GigE ports available, and LAG bundles
 - ❖ Orono, Maine (UMaine Neville Hall)
 - ❖ 1 & 10 GigE ports available, and LAG bundles
- ❖ 10 GigE connection between sites



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- ❖ The global Domain Name System (DNS) relies on thirteen Root servers to operate.
- ❖ Root Servers are all over the world, instances of 10-150 server clusters each, handling billions of requests per day
- ❖ www.root-servers.org



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- ❖ NNENIX is hosting Root DNS Servers
- ❖ “E” Root DNS server instance operated by NASA
 - ❖ e.root-servers.net
- ❖ “D” Root DNS server operated by University of Maryland
 - ❖ d.root-servers.net





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- ❖ Access to content distribution caches
- ❖ Local servers, faster delivery at lower cost
 - ❖ Today NNENIX provides access to Netflix, Akamai and Google content caches
 - ❖ this is typically 40-50% of residential ISP peak traffic
 - ❖ traffic comes from the exchange instead of via IP transit.
- ❖ More Content Delivery Networks will join in future & larger carriers



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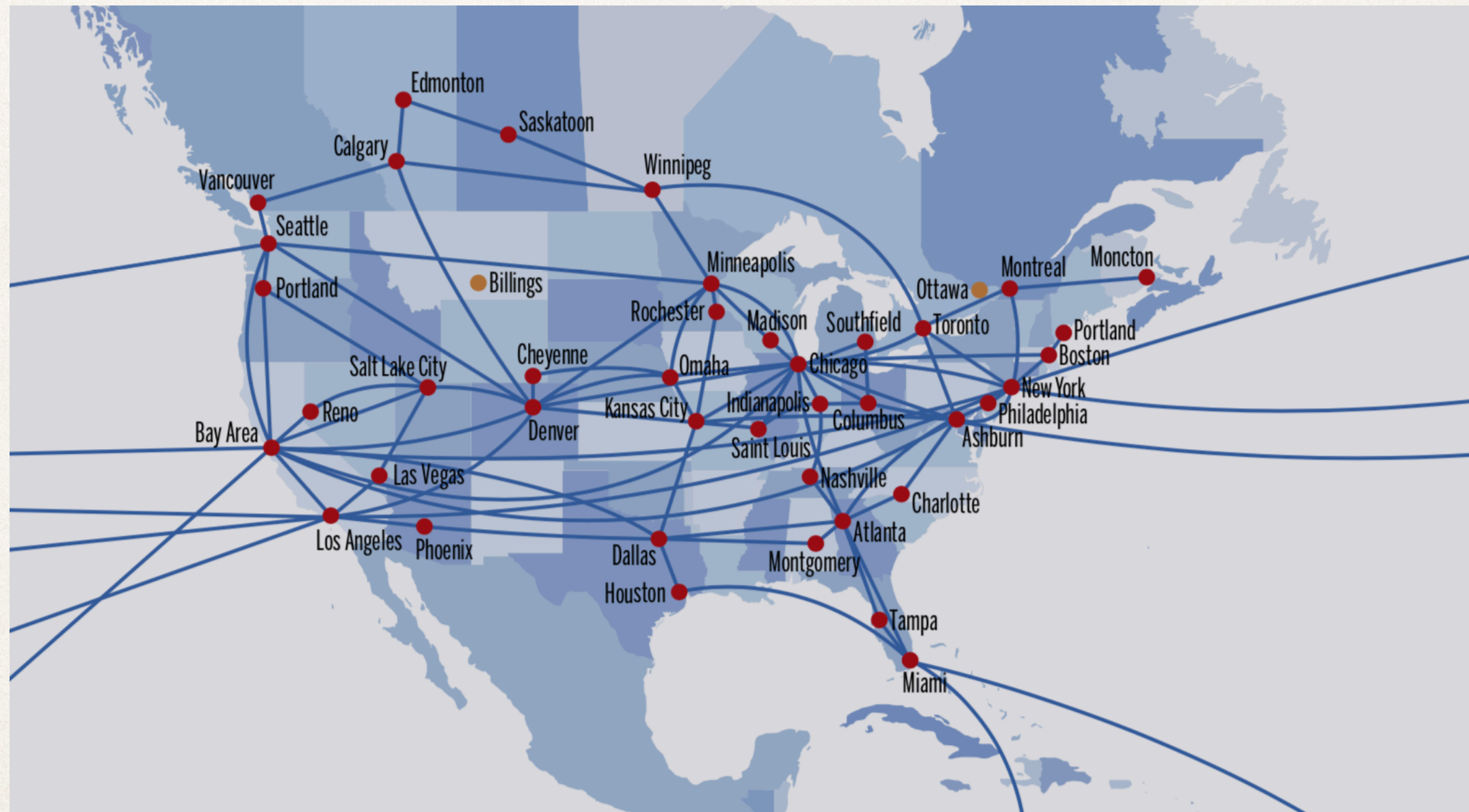
- ❖ NNENIX future plans include expansion to:
- ❖ New Hampshire
 - ❖ Manchester, Hanover
- ❖ Vermont
 - ❖ Burlington
- ❖ Expansion will be driven by membership demand



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- ❖ Hurricane Electric created global POP in Portland, Maine because of NNENIX



NNENIX.NET



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- ❖ Hurricane Electric is a global Tier 1 carrier
- ❖ IPv4 ~100k routes, 1/7th of global IPv4 Internet
- ❖ IPv6 ~26k routes, 1/2 of global IPv6 Internet
- ❖ L2 connections available to any other HE POP globally (160+ locations)
- ❖ will Open Peer with any other NNENIX member
- ❖ Market leading IP transit pricing now available in Maine
- ❖ 100 GBit connection in Portland, first in Maine



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