

Seattle's Community IXP: 20 Years Strong



WHO WE ARE

The SIX is a non-profit IXP in Seattle, WA.

We provide reliable, low-cost interconnections between member networks in the Northwest United States and beyond.

1997

A 111ms RTT between two companies on the 19th floor of the Westin Building carrier hotel caused them to peer directly. Inspired by a Bill Manning NANOG presentation, a hub was added along with a third org in June 1997, thus launching the Seattle Internet Exchange.




2017

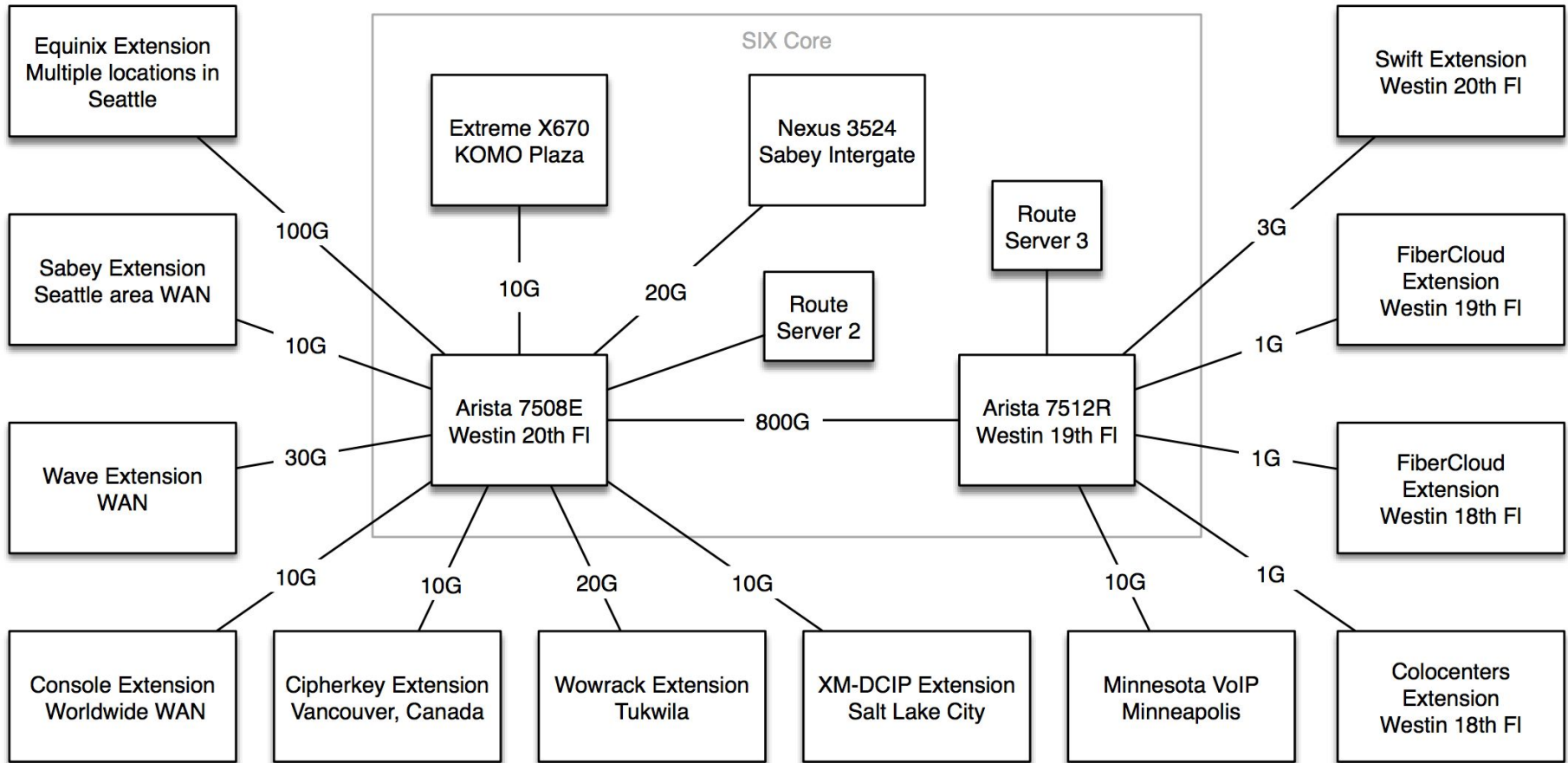


The SIX is now believed to be among the largest non-MRC Internet Exchange Points (IXP) on the planet, serving hundreds of peers and moving upwards of 0.75 terabits per second.

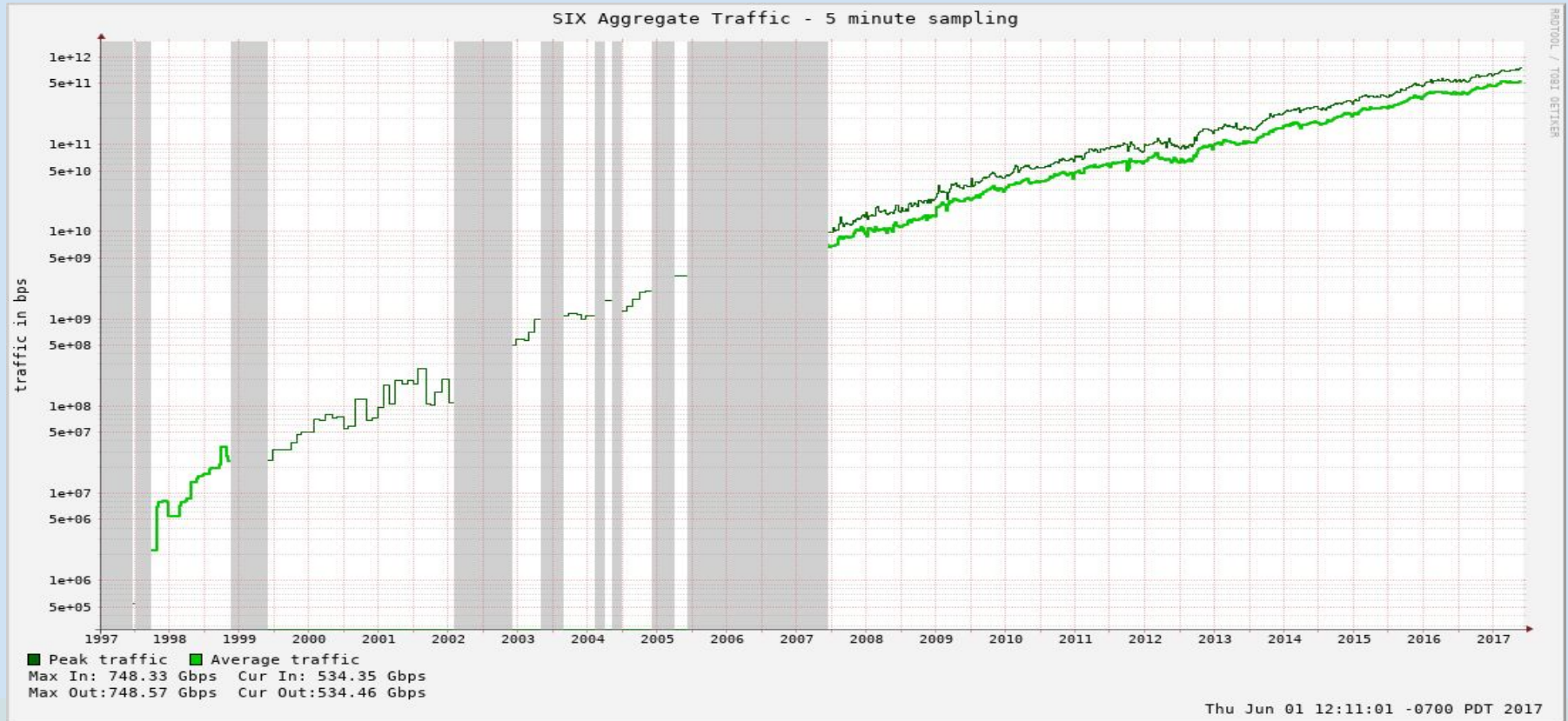
We do all of this with one part-time paid engineer and a team of volunteers.

Timeline

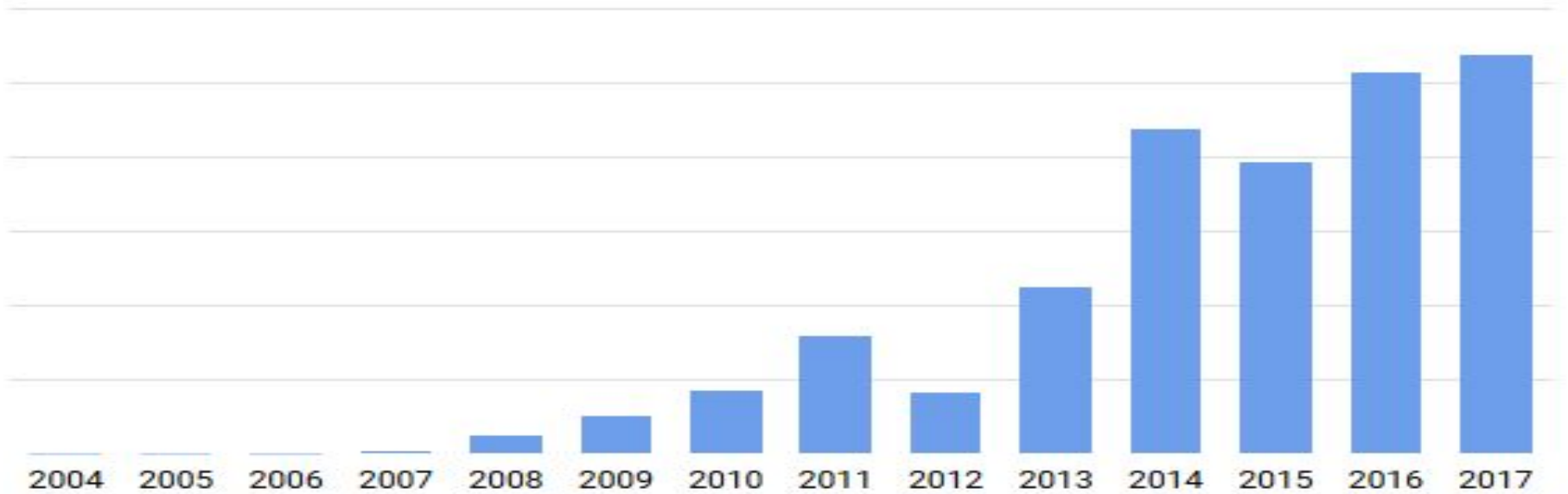
- 
- 1997 Simple 10 megabit ethernet hub
 - 1998 Cisco 1900 XL 10/100
 - 2001 Added Cisco 4912G - First GigE ports
 - 2004 5 core switches, plus 6 extension switches are listed.
 - 2006 First 10G
 - 2007 Cisco 6509
 - 2009 Cisco 6509 <> Cisco Nexus 5020
 - 2011 Cisco 6509 <> Arista 7508/7508E
 - 2015 First 100G
 - 2017 Arista 7512R <> Arista 7508E
 - 2020 Fantasy 400G Switch <> Arista 7512R <> Arista 7508E



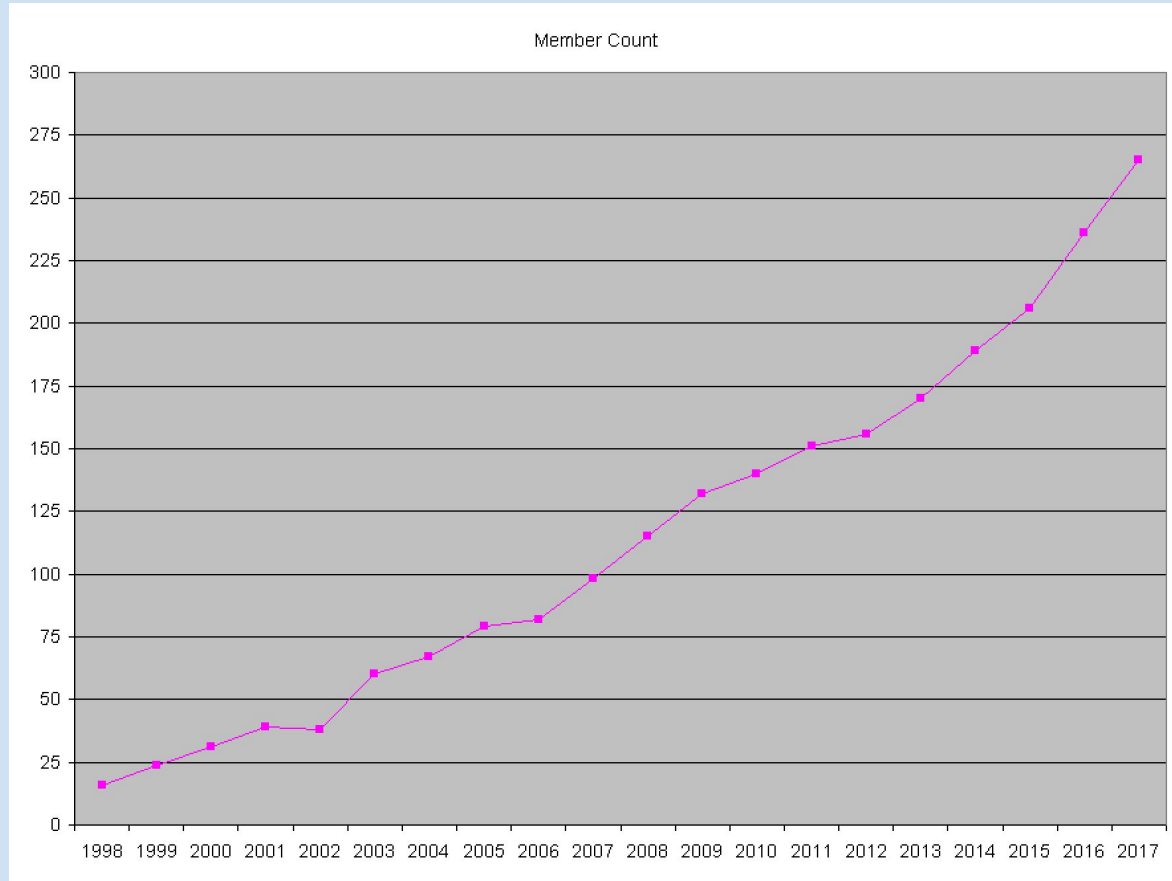
SIX AGGREGATE TRAFFIC: The Road to 1 Tbps



SIX FINANCE



SIX MEMBERSHIP



TRANSPARENCY

[About](#) [Connect](#) [Participants](#) [Traffic Graphs](#) [Route Servers](#) [Blackholing](#) [Topology & Extensions](#) [Rules](#) [Frequently Asked Questions](#)

[Testimonials](#) [Contributors](#) [Who's Who](#) [Documents](#) [Photos](#) [Contact](#)

Name

- Parent Directory
- 20170512_Wowrack_Interconnect_Revision.pdf
- 20170510_2016_Form_990.pdf
- 20170506_Annual_Report.pdf
- 20170418_Consent_of_Directors_in_Lieu_of_Annual_Meeting.pdf
- 20170418_Bylaws.pdf
- 20170411_Wowrack_Interconnect_Revision.pdf
- 20170403_Annual_Meeting_Minutes.html
- 20170328_Consent_of_Directors_in_Lieu_of_Special_Meeting.pdf
- 20170327_Finances.pdf
- 20161229_Minnesota_VOIP_Interconnect.pdf
- 20160730_Board_Meeting_Minutes.html
- 20160712_Wowrack_Interconnect_Revision.pdf
- 20160620_Consent_of_Directors_in_Lieu_of_Special_Meeting.pdf
- 20160518_IRS_Form_W-9.pdf
- 20160506_2015_Form_990.pdf
- 20160502_Annual_Report.pdf
- 20160429_Bylaws.pdf
- 20160429_Board_Meeting_Minutes.html
- 20160428_Finances.pdf
- 20160428_Bylaws.pdf
- 20160428_Annual_Meeting_Minutes.html
- 20160425_Board_Meeting_Minutes.html
- 20160121_IX_Interconnect_Revision.pdf
- 20151129_Bylaws.pdf
- 20151129_Board_Meeting_Minutes.html
- 20151125_IRS_Form_W-9.pdf
- 20150701_Board_Meeting_Minutes.html
- 20150616_IX_Interconnect.pdf
- 20150506_2014_Form_990-EZ.pdf
- 20150504_Annual_Report.pdf
- 20150429_Board_Meeting_Minutes.html
- 20150428_Finances.pdf

This is how we publicly share everything we do and decide to do.

L2 SIX fabric extensions within the Westin Building

- Implicit assumption is always to put low-cost, flexible, convenient peering first
- Minimal debate, planning, or engineering up front; organic growth
 - There were two separate hubs in the very beginning; has been woven into SIX DNA
 - Distributed -> Consolidated -> Distributed (with a well-defined core)
- Seemed like a good idea at the time, and overall, has proven to be positive
 - Some operational issues; some extension operators better than others
 - Very large blast radius and uplink capacity are major concerns
- PAIX-SEA (now Equinix) was one of the earliest “extensions”

L2 SIX fabric extensions outside the Westin building

- Considerably more controversial / risky to expand beyond building walls
 - Simplicity sometimes at odds with mission of promoting peering adoption
 - Some risk-taking acceptable, as long as it is done thoughtfully
 - Extensions know they will be disconnected without notice if negatively impacting core IXP

- Started with Fisher Plaza as a relatively low-risk use case
 - Solid dark-fiber interconnect over short metro distance
 - Experienced operational personnel
 - Real demand from real customers/peers

- Expanded to other select metro Seattle and even distant locations

Monitoring, Alerting, Operations, and Remote Hands

- How does SIX handle monitoring & alerting?
 - NAGIOS and noc@ go to admins, with paid admin as primary responder.
 - Continuous sniff of broadcasts is performed and daily reports are emailed. Broadcast issues are jumped on to make it so new issues are more easily visible.
- On call / incident response?
 - 4-hour and NBD support. When NBD, we make sure to have linecard spares.
- Badly-behaving peers/members/extensions?
 - Always reserve the right to protect the fabric, regardless of what that means cutting off

WHAT ARE THE KEY LESSONS LEARNED?

K.I.S.S. - Focus on moving packets inexpensively

Volunteers + Staff = Winning Combination

Community presence, evangelism

One-time port fees vs. monthly recurring costs

Transparency

Autonomy & Avoiding Political Distraction

Distributed Switching Fabric (pros/cons)

Vendor Engineering Support / Engagement / Risk



Thank you for your time and interest.

Feedback, Questions, and Rotten Vegetables always welcomed and appreciated.

Seattle Internet Exchange
info@seattleix.net



Jared Reimer
jared@cascadeo.com