

IXPs in Asia & Pacific: Latest

Philip Smith

<philip@nsrc.org>

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Background

- This is a quick tour of the IXPs across Asia & the Pacific
- Any omissions or errors are solely mine
- Focus is on open neutral IXPs rather than commercially operated datacentre interconnects

Background

- Several organisations are involved in assisting with the set up Internet Exchange Points in the Asia & Pacific region:
 - Network Startup Resource Center (NSRC)
 - Also APNIC, PCH, & ISOC
- Plenty of help available, including:
 - Facilitating meetings of stakeholders
 - Holding hands
 - Donations of switches
 - BGP/IXP Workshops, etc
- IX development across the region has been more challenging than in Europe
 - The benefits are less well understood
 - Incumbents tended to be first with Internet access services, unlike in Europe



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IXPs in Asia & Pacific

A quick tour around the region

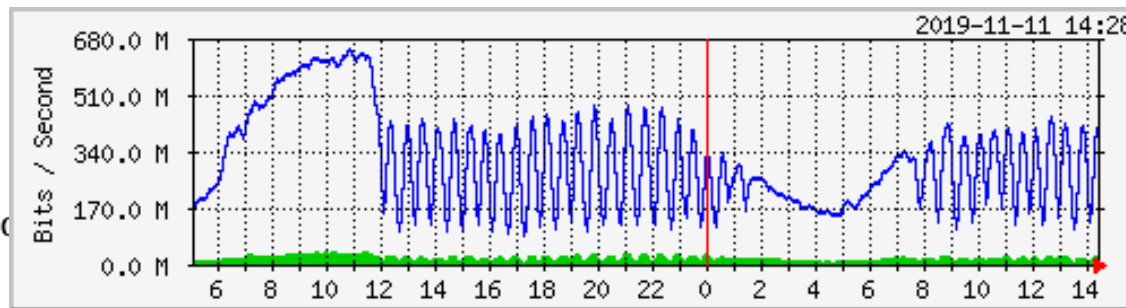


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Afghanistan

- Initial discussion about an IXP in 2004
 - Under the umbrella of ISP Association
 - Popped up again in 2009 as a discussion point
- An IXP was set up in Kabul in 2011 but ceased operations
 - There are several ISPs in Kabul, all with satellite links out
- NIXA launched in March 2019
 - <https://www.nixa.af>
 - Seems to be Govt run L3 interconnect

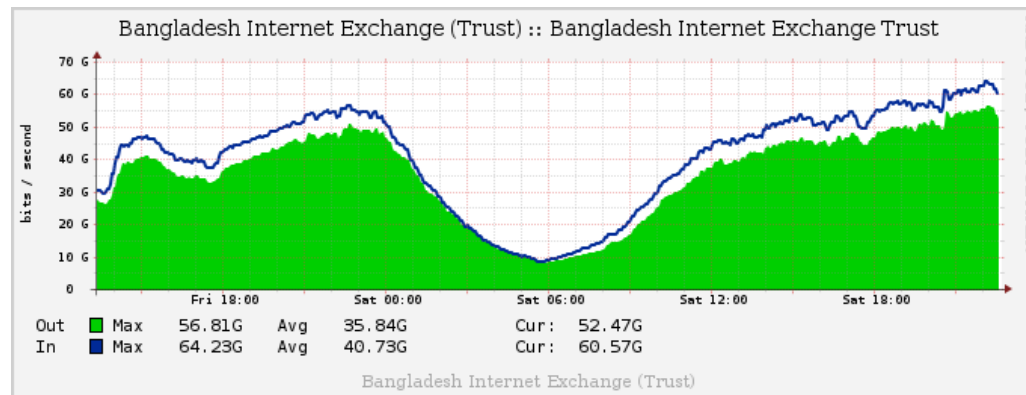


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Bangladesh

- Bangladesh Internet Exchange (BDIX)
 - Established in 2004
 - <http://www.bdix.net/>
 - Created as a collaborative effort of the major ISPs in Dhaka
 - 100Mbps, 1Gbps and 10Gbps access speeds
 - 100Mbps still via fibre media convertors (sigh!) being upgraded to 1Gbps
 - 111 members

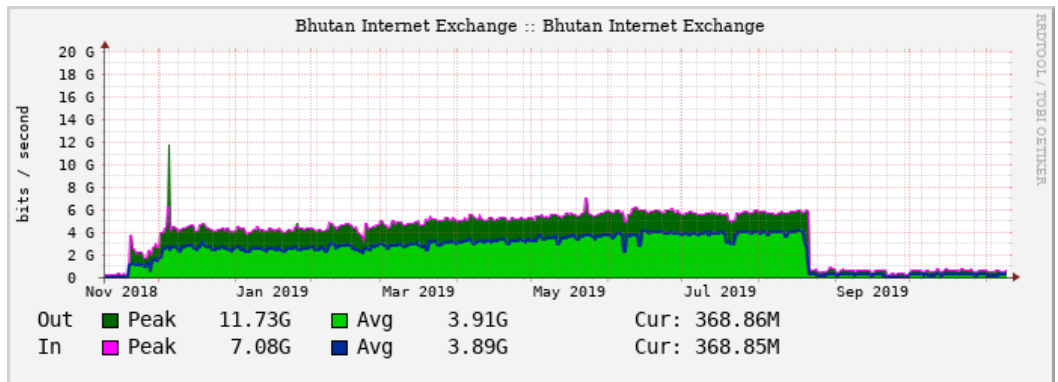
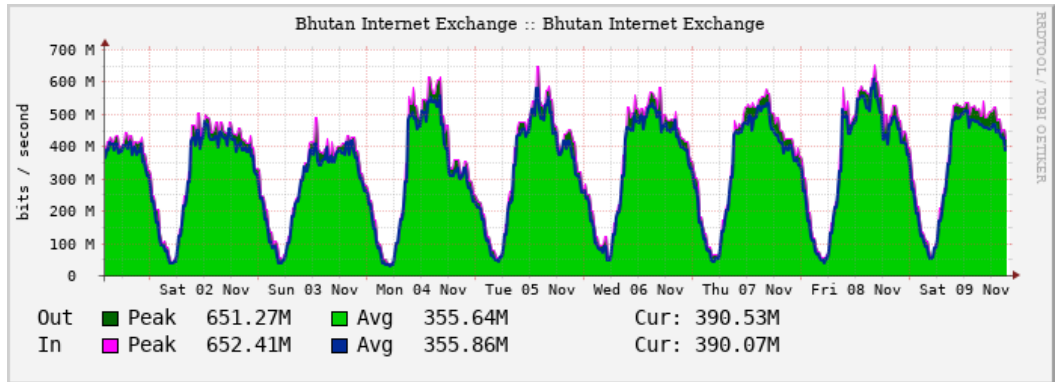


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Bhutan

- btIX established in 2017
 - <https://www.btix.bt/>
 - Open neutral interconnect
 - Industry association, 7 members
 - Located in Thimphu Tech Park
 - Aggregate traffic around 600Mbps
 - Content cache traffic between two biggest ISPs now over PNI rather than IX
- btIX hosted this year's btNOG
 - <https://www.nog.bt/>



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India

- NIXI
 - National Internet Exchange of India: Mumbai, Delhi, Chennai, Kolkata
 - Not much success due to restrictive policies enforced on participants
- Mumbai IX – operated by DE-CIX
 - <https://www.mumbai-ix.net/>
 - Setting up other IXPs around the country
- Extreme-IX
 - <https://extreme-ix.org/>
 - In Mumbai, Delhi, Chennai, Hyderabad
- AMS-IX India partnering with SIFY for IXP in Mumbai
- IIFON (India Internet Foundation) established IXP in Kolkata, and planning other locations in the smaller cities across India
- Peering & Internet landscape is much better than it was 3-4 years ago
- Still a long way to go before there is true “keep local traffic local”



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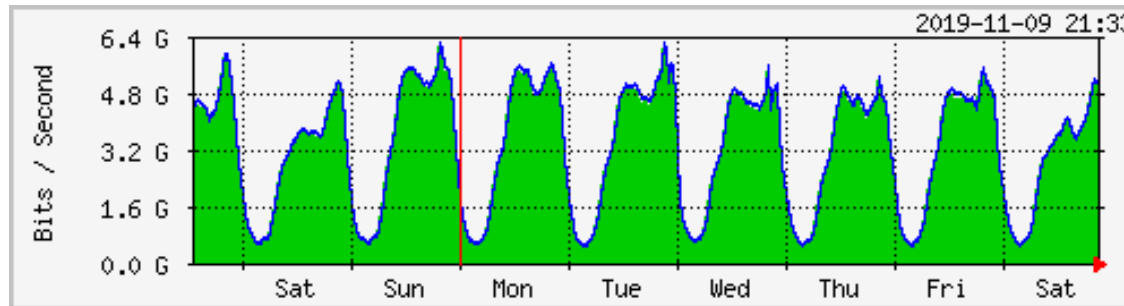


Maldives

- No Internet Exchange Point
 - Only two operators

Nepal

- Nepal IX (NPIX) was the first open neutral IXP in South Asia
 - Established in 2002
 - <http://www.npix.net.np/>
 - Now 40 members in two locations in Kathmandu
 - Most local traffic now passes through NPIX



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Pakistan

- PKIX launched in January 2017 during SANOG 29
 - First site in Islamabad (located at PERN NOC, the Pakistan Education and Research Network)
 - <http://www.pkix.pk/> (not up to date)
 - Second site in Karachi now operational with 5 members
 - New site in Lahore being worked on



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Sri Lanka

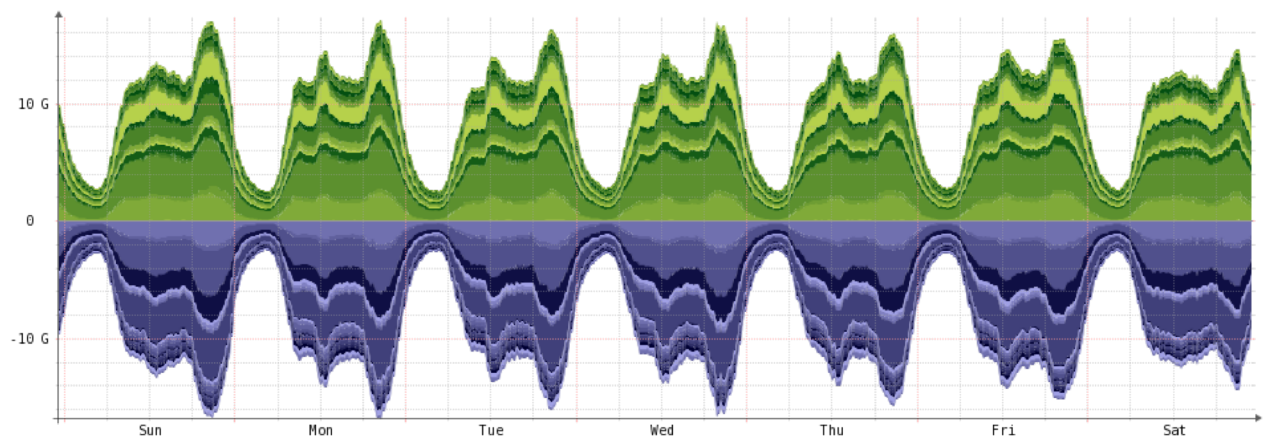
- No open neutral IXP
- SLIX is operated by Lankacom, one of the major operators
 - Subsidiary of Singapore Telecom
 - While it is listed as an IX, it looks and feels like a domestic commercial transit service (like Singapore Telecom's "IX")

Brunei Darussalam

- No Internet Exchange Point
- TelBru is the main operator in Brunei
 - BRUIX is their “exchange”, but is part of TelBru’s transit business

Cambodia

- Cambodian Network Exchange in Phnom Penh
 - <http://cnx.net.kh/>
 - Established in 2008
 - Major sponsor is Sabay Digital
 - Based on a Cisco Nexus switch (1Gbps and 10Gbps access speeds)
 - 35 peers



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Indonesia

- NiCE (National Interconnect Exchange)
 - <http://www.openixp.net/>
 - Formed in 2010
 - Biggest IXP in Indonesia (>700 members)
 - <http://www.openixp.net/routedasn.html>
- Indonesia Internet Exchange (IIX)
 - Operated by APJII, the Association of Internet Service Providers Indonesia
 - APJII also operates IDNIC and is the National Internet Registry for Indonesia
 - Formed in 1997
 - <http://www.iix.net.id/>



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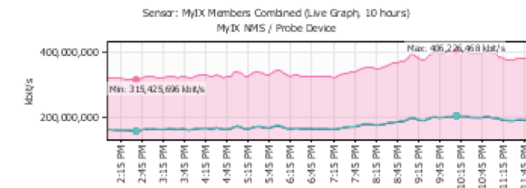
Lao PDR

- No Internet Exchange Point
- Network Operators are required to connect to LANIC, the Lao National Internet Center
 - Transit from LANIC is via Thailand and Vietnam
 - All licensed operators are required to peer with LANIC who operate the Lao Internet Gateway

Malaysia

- MYIX

- Established by the Malaysian Government in 2006
- Carrier neutral and Non-profit
- <http://myix.my/>
- 6 locations in Malaysia
 - Kuala Lumpur, Cyberjaya, Penang, Johor, Kuching, Kota Kinabalu



- Johor Bahru IX

- In southern city of Johor Bahru – across the Johor Strait from Singapore
- <http://www.jbix.my/> – now operated by DE-CIX
- 44 participants, 1G and 10G ports

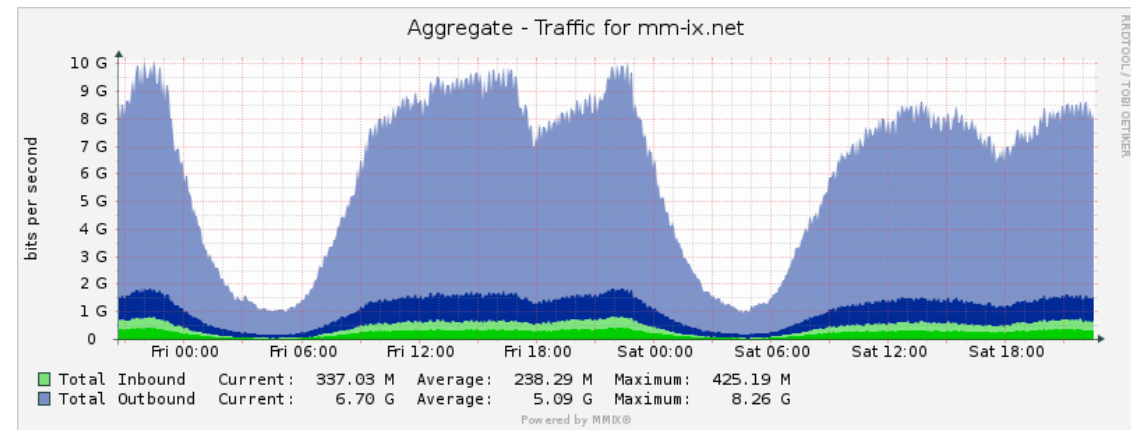


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Myanmar

- MMIX established in 2017
 - <https://www.mm-ix.net/>
 - Neutral industry owned association
 - Aggregate traffic around 8Gbps
 - 4 membership categories
 - 12 peers so far



- Facilitating MMNOG and MM Peering Forum in January 2020
 - <https://2020.mm-ix.net/>

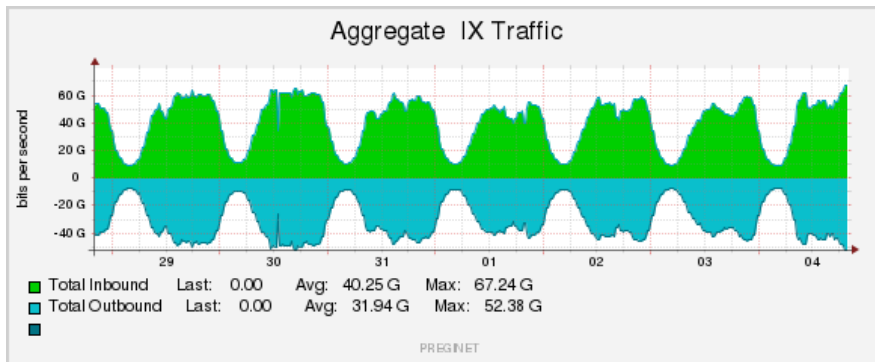


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Philippines

- Philippine Open IX (PHOpenIX)
 - Operational by 2011 and operated by DOST-ASTI (Department of Science and Technology, Advanced Science and Technology Institute)
 - <http://phopenix.net/>
 - 60 members, around 60Gbps of traffic
 - Nodes in Metro Manila (Makati, Quezon, Pasig) and Cebu
 - Based around Cisco Nexus 3064 switches
- Other efforts now underway to set up smaller IXPs across the country



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Singapore

- Singapore is now a datacenter and interconnect city!
- Apart from Equinix Singapore...
- SGIX (Singapore Internet Exchange)
 - Launched in 2010
 - <http://www.sgix.sg/>
 - Over 150 members, multiple locations
- SOX (Singapore Open Exchange)
 - Launched in 2001 (because SingTel IX (STIX) is not an IX)
 - <http://www.sox.net.sg/>
 - At the National University of Singapore & GlobalSwitch

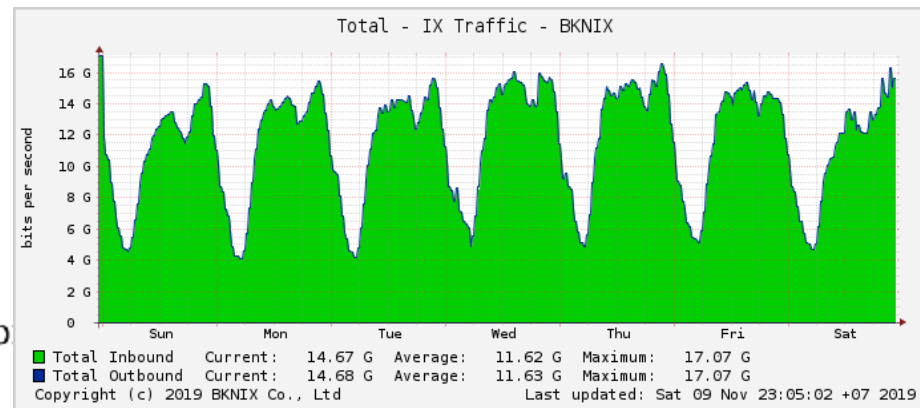


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Thailand

- Each Internet Gateway (international transit provider) must run an “IXP”
 - None are neutral – owned and operated by carrier
- Bangkok Neutral Internet Exchange (BKNIX) was established in early 2015
 - Operated by the THNIC Foundation, located in Bang Na and CW Tower
 - <https://bknix.co.th/en>
 - First and only open neutral IXP in Thailand, 27 members
- BKNIX host annual Peering Forum along with ThaiNOG in mid-May
 - <https://peeringforum.bknix.co.th/2020/>



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Timor Leste

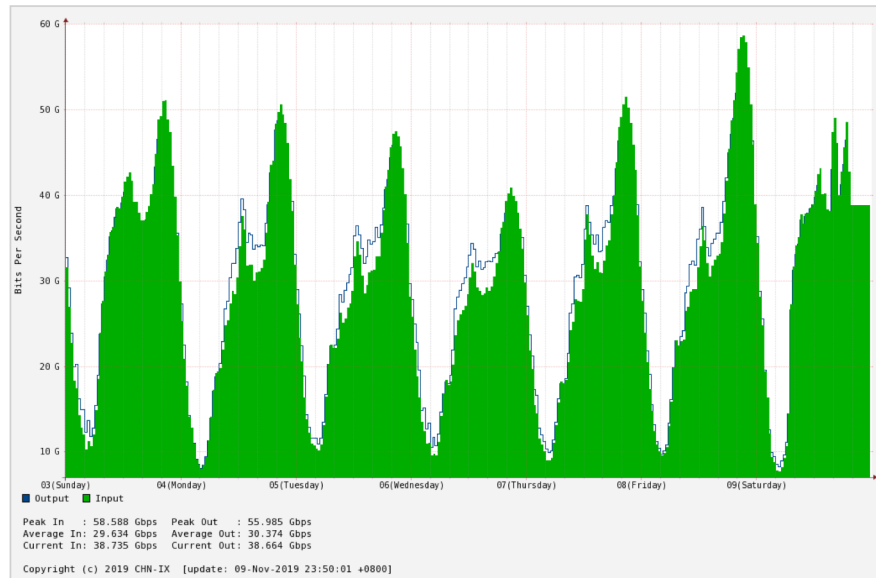
- No Internet Exchange Point
- Two major operators
 - IXP being discussed by Government and operators, as well as interested parties and supporters

Vietnam

- VNNIC, the operator of .vn and National Internet Registry for Vietnam, operate VNIX
 - <https://www.vnnic.vn/en/dns-vnix/vnix-member-isp?lang=en>
 - Has 18 members across three locations, Ha Noi, Da Nang and Ho Chi Minh City
 - Access speeds of 1Gbps and 10Gbps

China (Mainland)

- CHN-IX
 - The first carrier neutral IXP in mainland China
 - Launched in December 2015 in Beijing
 - Shanghai and Guangzhou sites following
 - Initiative of ChinaCache, partnering with AMS-IX
 - <http://www.chn-ix.net/>



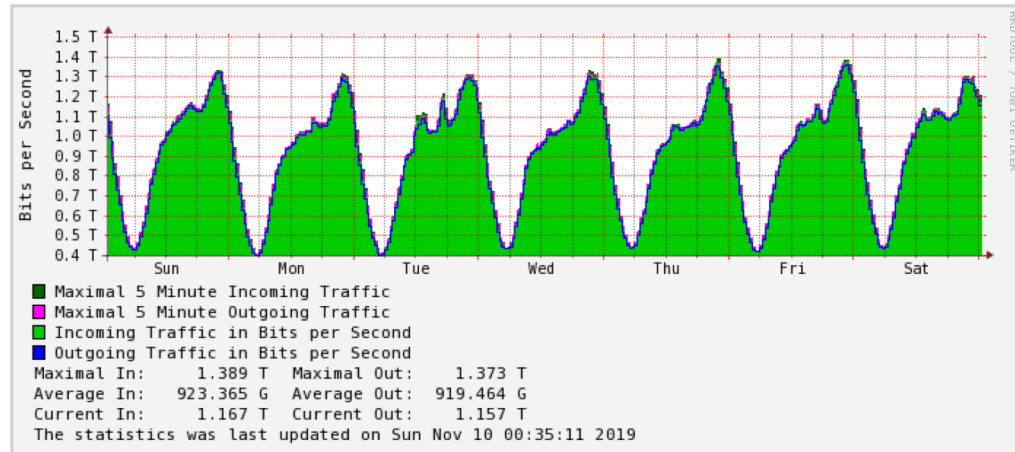
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Hong Kong

- HKIX

- The oldest IXP in Asia, formed in April 1995
- Hosted and operated by the Chinese University of Hong Kong
- <http://www.hkix.net/>
- 322 participants



- Also AMS-IX Hong Kong in partnership with HGC



— 54 members, 53Gbps of traffic
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Japan

- WIDE operated NSPIXP-2
 - Established in 1996
 - <http://nspixp.wide.ad.jp/2/> (not updated)
 - Now known as DIX-IE (Distributed IX in Edo)
- Then there are three commercial IXPs:
 - JPNAP <http://www.jpnap.net/english/> (2001)
 - JPIX <https://www.jpix.ad.jp/en/> (1997)
 - BBIX <http://www.bbix.net/en/> (2003)
- Very well established IXP environment across major cities



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Korea

- Carrier operated “IXP”s by LG Telecom and Korea Telecom
- Korea Internet Neutral Exchange (KINX)
 - The only carrier neutral IXP
 - Established in 1999
 - <https://www.kinx.net/?lang=en>
 - Provides many other services apart from being an IXP



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Mongolia

- Started with the Mongolia Internet Exchange (MIX)
 - Built by Infocon in 2001, L3 & static routes
- OpenMIX created as a true neutral interconnect by a few ISPs
 - Migrating ISPs off MIX onto a Catalyst 6509 based IX in 2009
- Govt and Regulator required relocation to the National DataCentre in 2011
 - And became very closed MIX by 2012 with few participants
 - Cisco Nexus 7010 but operating at L3
- The Regulator facilitated meeting of the major ISPs about fixing the IXP
 - Broad agreement that IXP was needed
 - Offers to host from Gemnet and from Mobicom – no carrier neutral DC in Ulaanbaatar ☹
- Today (2019) the two main transit providers (Gemnet and Mobicom) both operate L2 interconnects for their customers and whoever else wants to join
- Still no open neutral interconnect!



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Taiwan

- Taiwan Internet Exchange (TWIX)
 - Established in 1997
 - http://www.twix.net/index_e.html
 - 29 members
 - Operated by Chunghwa Telecom
- Taipei Internet Exchange (TPIX)
 - Established in 2002
 - <http://www.tpix.net.tw/>
 - Located in Chief Telecom building in Taipei (carrier neutral IDC)
 - 53 members
 - Cisco Nexus 9508 switches (1GE/10GE/100GE)



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Australia

- IX Australia operates IXPs around Australia
 - <https://www.ix.asn.au/>
 - Not-for-profit, carrier and commercially neutral
 - Runs WA-IX, ACT-IX, QLD-IX, NSW-IX, VIC-IX and SA-IX
 - WA-IX established in 1997
 - Other IX locations followed in 2011-2013
 - Capacities up to 100GE



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Fiji

- IXP established in 2018
 - Not open, not neutral
 - Facilitated by Telecommunications Authority of Fiji
 - After years of discussions amongst community
 - <http://www.taf.org.fj/Publications/Fiji-IX.aspx>
 - Located at Fintel's Cable Landing Station in Suva
 - Only for Fiji ISPs:
 - Fintel, Telecom Fiji, Digicel, and Vodafone Fiji
 - Uni of South Pacific is only non-telco member
 - Two local IPTV providers joining too (?)
 - No one else allowed to join ☹️

<https://www.itu.int/itu-d/tnd-map-public/>

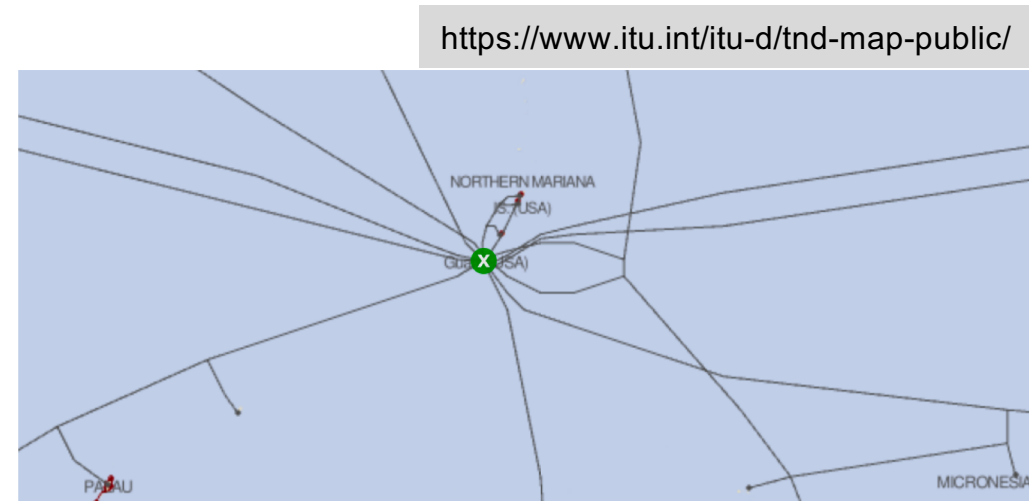


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Guam

- MARIIX established in 2018
 - Marianas Islands Internet Exchange
 - <https://mariix.net/>
 - Hosted by University of Guam
 - (no neutral DC on island)



- Docomo hosts and operates GU-IX, but not open or neutral
 - <http://www.gu-ix.net/>
 - Only for local operators (PDS, IT&E, GTA, Guam CableVision)



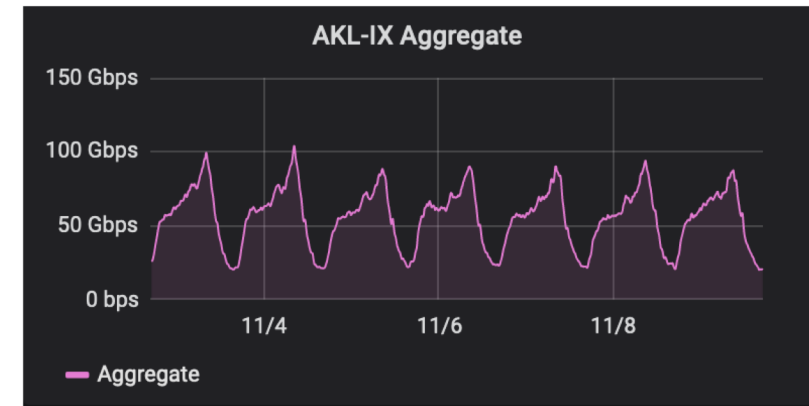
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New Zealand

- IX-NZ is non-profit carrier neutral IX founded in 2016

- In Auckland at TDC, Vocus and Chorus DCs
- <https://ix.nz/service/peering/>
- Over 70 members
- Around 100Gbps of traffic



- NZIX (Citylink) operates APE, WIX and CHIX in New Zealand

- <http://www.nzix.net>
- APE: 58 members, 10Gbps of traffic
- WIX: 86 members, 5Gbps of traffic
- CHIX: 5 members, traffic unknown



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Papua New Guinea

- PNGIX was established in 2017
 - After 15 years of trying through countless PacNOG workshops and previous efforts by local community
 - Facilitated by the regulator, NICTA (National Information & Communications Technology Authority)
 - With support from ISOC, NSRC and then APNIC
 - <http://www.pgix.org.pg/index.php> – not updated ☹️



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Vanuatu

- Vanuatu was first Pacific Island nation to deploy an IXP
- The VIX was established in 2012
 - No website ☹️
- An initiative of the Office of the Government Chief Information Officer (OGCIO)
 - Housed in a Govt Datacentre (the only neutral location in Port Vila)
- Initially only satellite Internet for Vanuatu – fibre arrived in 2013, making the IXP and the on-island shared GoogleCache a massive boon for the Internet industry

As for the rest of the Pacific...

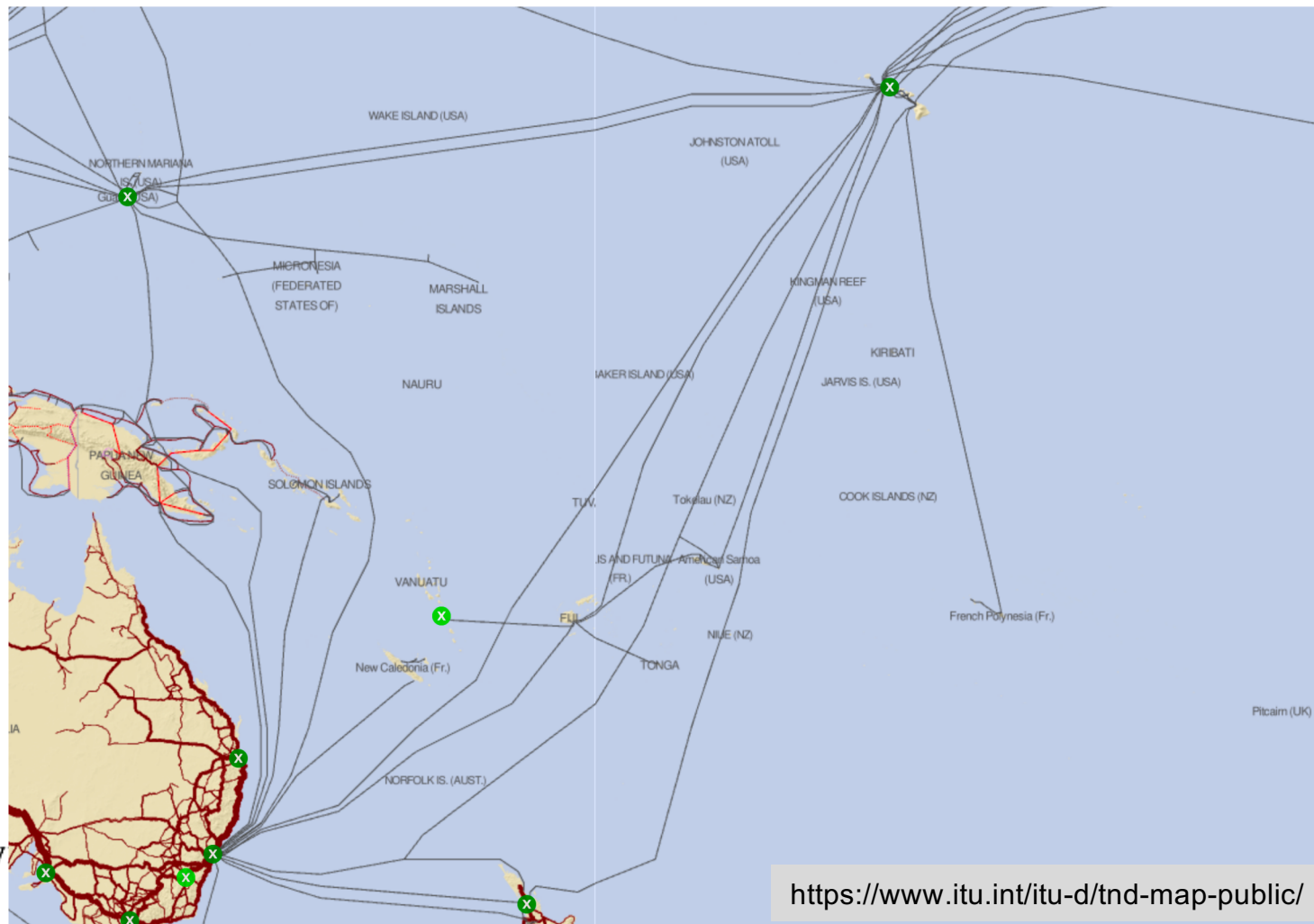
- Vanuatu was first Pacific Island nation to have an IXP, the VIX, established in 2012
- PNG, Guam and Fiji followed in last 2 years
 - Herculean efforts by many
- As for the rest:
 - Samoa: enthusiasm, commitments made, workshops done, switch installed in 2016, hoping to reignite progress given Fiji's "closed" IXP
 - Other nations usually have incumbent and a mobile operator (usually Digicel)
 - No enthusiasm for interconnection between those two
 - South Pacific IXP idea has raised its head again ☹
 - <https://www.unescap.org/events/strengthening-efficient-internet-traffic-management-through-subregional-internet-exchange>



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As for the rest of the Pacific



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<https://www.itu.int/itu-d/tnd-map-public/>



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