

CEE Peering Day ISOC IXP & Interconnection Activities

18-19 March 2015

CEE Peering Day

Bratislava 2015



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18 - 19th March 2015

ISOC: Global IXP & Interconnection/Peering Activities

- **ISOC works with partners throughout the world to build IXPs, human capacity, and bottom-up governance of IXPs**
- **How do we do this:**
 - **With partners: Euro-IX, RIRs (RIPE-NCC, AfriNIC, APNIC, LACNIC), IXPs, Cisco, Comcast, Google, Alcatel, Microsoft, NSRC, PCH, and other global and regional experts**
 - **Through Grants: IXP Toolkit:**
 - ❖ IXP Toolkit Grant from Google
 - ❖ Alcatel and Cisco donations & equipment grants
 - ❖ Comcast and Microsoft grants for IXP development and training

IXP Toolkit & Best Practices Project

- **ISOC awarded a grant by Google to extend its Internet exchange point (IXP) activities in emerging markets.**
- **Create an IXP Toolkit: A study and Methodology to Identify Best Practices | www.internetsociety.org/ixptoolkitguide/**
 - ❖ Released 25 February 2014 | Rebooting 2ndQ2015
- **Create an IXP “Portal”: Access 2 information & experts | www.ixptoolkit.org**
 - ❖ Released 25 February | Rebooting 2ndQ2015
 - ❖ IXP Videos
- **Partner to Conduct Training and Hold Workshops | Building Capacity**
 - ❖ Montenegro (Feb 25-27) & Measurement studies in LAC and Africa

IXP Work in Asia | 2013-2014 & 2015

2014

- Workshop in Papua New Guinea (w/PNG Regulator & NSRC)
- Equipment to support new IXP in Thailand
- Collaboration with partners to help with Samoa workshop | Ongoing 2015 – June/July 2015 Workshop planned

2015

- IXP Launch in Bangkok! New IXP – BKNIX (ISO cert data-centre)
- Experts NEEDED to assist with training and mentoring



IXP Work in Latin America & The Caribbean | 2013-2014

- 12 IXP Workshops | Best Practices, Technical Assistance, Community Building in LAC**
- 6 IXPs Launched | Argentina (2), Bolivia, Costa Rica, Honduras, Mexico.**
- 6 IXPs “Leveled-up” via equipment donations in LAC | Argentina, Ecuador, El Salvador, Grenada & Panama.**
- 11+ Case Studies | Contracted Regional Experts in LAC to Develop Case-studies in South America and the Caribbean**
- Fellowships for training events & IXP equipment donations**
- LAC IXP Study (Nov 2013): Argentina, Brazil, Colombia & Ecuador**
- Bolivia IXP Measurement Study started (2014) & Expanding Activities to Paraguay and Central America (Raspberry Pi deployment)**

IXP Work in Latin America & The Caribbean | 2015

- Additional workshops planned with LACNIC, PCH and local partners
- Equipment sent to Paraguay & Mexico (Cisco donation)
- Funding received from Comcast for additional work in Paraguay & Bolivia
 - ❖ Team will continue baseline measurement studies in Bolivia & Paraguay and likely 3 additional countries in LAC
 - ❖ Data here on data collection efforts to date in Bolivia: <http://ite.lacnog.org/>
 - ❖ Data here on LACNIC/LACNOG/ISOC/IXF Data Collection: <http://cnet.fi.uba.ar/PIT/>
- 11+ Case Studies | Contracted Regional Experts in LAC to Develop Case-studies in South America and the Caribbean | April/May 2015 on rebooted IXP Toolkit site & Case-studies
- LAC IXP Study (Nov 2013): Argentina, Brazil, Colombia, & Ecuador:
- Caribbean study (April 2015): 11 Caribbean Countries | IXP analyses included
- Caribbean Peering Forum | May 2015 (Barbados)
- LACNOG - LAC Peering Forum | October 2015 (Bogota, Colombia)

IXP Work in Africa | 2013-2014 & 2015

2013-2014

- **60 Workshops | Best Practices & Technical Assistance workshops (African Union AXIS Project)**
- **Equipment sent to DRC-Kinshasa, Egypt, Ghana, Malawi, Tunisia**

2015

- **Follow-on mentoring with partners to be provided to five (5) IXPs**
- **Networking workshops for DRC-Kinshasa, Nigeria & Zambia**
- **African Peering & Interconnection Forum | 25-27 August 2015 (Maputo, Mozambique)**
- **Support to NOGs**
- **Measurement study being planned working with Spanish university & coders from Benin | Encourage data to be published on IX web-sites**

IXP Work in Europe & CIS | 2014 & 2015

2014

- **IXP Workshops in Georgia & Montenegro**
- **Equipment sent to IXP in Armenia**
- **Supported RIPE SEE & CEE Peering Forum**



2015

- **IXP Workshop in Montenegro (February 23-27) | RIPE-NCC, France-IX, NIX.CZ, INEX, Cisco, ICANN**
- **Equipment to be sent to Montenegro**
- **Support of CEE Peering Forum & RIPE SEE**
- **Study to be done in Kyrgyzstan re Internet Infrastructure/IXP potential & access/connectivity overview (May – October)**

Tech Infrastructure & Impact



LIXP – Lesotho

- ❖ **IXPs need not be expensive to be effective.**
- ❖ **The LINX, now one of the largest IXPs in the world, started with 5 members on a donated switch.**



KIXP – Kenya



IXPN - Nigeria

IXP Impact: Measuring the Benefits and Impact of IXPs | Kenya and Nigeria Case Study

<i>Benefit</i>	<i>KIXP</i>	<i>IXPN</i>	<i>Summary</i>
Latency	Reduced from 200-600 ms to 2-10 ms	Reduced from 200-400 ms to 2-10 ms	Noticeable increase in performance for end users
Local traffic exchange	1 Gbit/s peak	300 Mbit/s peak	Savings on international transit of over \$1 million per year in each country
Content	Google network present locally, along with rehoming of domestic content	Same as in Kenya	Increase in usage and corresponding revenues for mobile data traffic
E-government	Kenya Revenue Authority gathers taxes online	Usage by education and research networks	Social benefits from e-government access to IXPs
Other benefits	An increasing amount of regional traffic exchanged at KIXP	Financial platforms hosted locally	Further economic benefits resulting from IXPs

- **Reduced latency, increased performance & driving demand**
- **Direct savings on international transit** (\$1.5M p.a. Kenya, \$1M Nigeria)
- **Facilitating e-government and education services**
- **Catalyzing local hosting and content industry**
- **Increased mobile data market** by an estimated \$6 million in Kenya
- **Attracting regional traffic – KIXP & Driving better technical expertise**
- <http://www.internetsociety.org/ixpimpact>

IXP Impact: LAC Study | November 2013

- **LAC Findings:**

- **Argentina:** In one city → \$100.00 per Mbps pre IXP/ down to \$40.00 per Mbps post IXP
- **Brazil:** NIC.br | PPT Metro System 26 IXPs attracting investment/content | 600Gbps at Peak
- **Ecuador:** (Pre) International transit was \$100 Mbps | (post) Local traffic costs \$1.00 Mbps
 - ❖ Now running RPKI
 - ❖ After CDN cache installed in Quito in 2009 -> traffic up 700%
- **Additional Activities & Studies**
 - ❖ Measurement Study in Bolivia | Raspberry Pi deployment
 - ❖ Network efficiency Study in Argentina | Cabase and University of Buenos Aires

LAC IXP Study can be found here: <http://bit.ly/1k6NaO0>

Resources

- LAC IXP Study | “Connectivity In Latin America and the Caribbean: The Role of Internet Exchange Points” <http://ow.ly/Jiw8s>
- Bolivia IXP Study | “Do Internet Exchange Points Really Matter? Evidence from Bolivia” <http://ow.ly/Jiw5X>
- IXP Toolkit | <http://www.internetsociety.org/ixptoolkitguide>
- Africa IXP Study | “Assessment of the Impact of Internet Exchange Points (IXPs) – Empirical Study of Kenya and Nigeria” <http://www.internetsociety.org/ixpimpact>
- Lifting Barriers to Internet Development in Africa | Suggestions for Improving Connectivity <http://ow.ly/Jiwhx>
- Rwanda Content Study | “Promoting Local Content Hosting to Develop the Internet Ecosystem” <http://ow.ly/JiwAE>

Jane Coffin
coffin@isoc.org

Thank you for your attention!

The Internet Society | www.internetsociety.org
IXP Toolkit & Portal | www.ixptoolkit.org
Feedback | feedback@ixptoolkit.org



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