Accelerating Caribbean Internet Infrastructure – IXPs, ASNs and Network Autonomy and Resilience

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CIGF 16

27 August 2020

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Discussion Points

- Network Autonomy: Benefits of getting resources directly from LACNIC
- Internet Exchange Points (IXPs)

Resources directly from LACNIC?

Critical Internet Resources

– IPv4 Addresses
– IPv6 Addresses
– ASNs (Autonomous System Numbers)

Importance of direct control of numbering for organisations (1/2)

- Greater network management efficiency
  - Better fit-for-purpose numbering plans (public vs. private IPs; IPv4 vs IPv6)
  - Advantageous when changing upstream provider (no need to renumber)
- Most recommended for multihoming
- Autonomy: direct visibility in the Internet ecosystem with an ASN
  - CDNs (content delivery networks) measure traffic among ASNs. Without an ASN, your organisation's traffic cannot be distinguished from the whole enabled by your ISP. More difficult to justify peering and/or cache decisions

Importance of direct control of numbering for organisations (2/2)

- Needed to interconnect with other operators (peering, IXPs)
  - LACNIC Policy dedicated to operators of critical infrastructure – special privileges to get IPs

The ‘abc’s about IXPs

What is an IXP?

A place where ISPs and other organisations interconnect
  - NAP (previously)
- Shared infrastructure among different operators to interchange their traffic
  - ISPs, Content Providers, Universities, Media, Banks, etc.
- Definition from the IX Federation (http://www.ix-f.net):
  - *A network facility that enables the interconnection of more than two independent Autonomous Systems, primarily for the purpose of facilitating the exchange of Internet traffic.*
- Usually there will be several AS that interconnect, which is distinct from private peering that is done between two networks

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Characteristics

- An IXP is a technical installation that allows operators to interconnect
- An IXP is different from an access network and from a transit/carrier network
- The IXP's function is to interconnect networks, not provide access nor act as a transit provider or carrier
- An IXP allows interconnection for networks of separate organisations: independent autonomous systems
- An IXP doesn't require traffic between to AS to pass through a third party

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Some advantages for IXPs (***stability*** and ***resilience***)

- Local traffic routed locally (technical and political implications - no transit cost, security concerns, etc)
- Less latency for applications
- Less costs
- Possibility of CDNs
- Traffic from a country/region/zone not seen from other countries/regions unintentionally
- Introduction of new tech (IPv6, RPKI, etc)
- Coordinated actions for cyber incidents, technical problems, etc.
- Sense of 'community'
  - Share problems, strategies, common actions

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Key points for an IXP's success

- Beyond technical aspects, it is important to create community, trust
- Ideally, the IXP should never interfere with peering agreements between members
- Aligned vision of various members: large and small operators, ISPs vs. CDNs, etc.
- Different types of agreements (multilateral,bilateral)

Types of Agreements

Bilateral

- Each provider determines requisite relationships with other provider
- ISP gateway routers establish BGP sessions with gateway routers of other providers

Multilateral

- Each provider establishes sessions in the concentrator
- Gateway routers at ISPs are neighbours to the IXP

IXP Members

- It is important that content providers form part of the IXP
- Not only CDNs but also local providers:
  - Universities / NRENs
  - Government networks and agencies
  - Media
  - Others
- This way, local traffic is routed locally
- Resolves a lot of connectivity problems

Services that add value to IXPs

- DNS root servers: see LACNIC +RAICES project: raices.lacnic.net
- ccTLD authoritative servers
- Route servers
- RPKI Validator: see LACNIC FORT project: https://fortproject.net/en/home
- Filter prefixes that are not allowed
- Special communities (e.g. blackhole)
- User portals (traffic, looking glass, administration, etc)

PeeringDB – www.peeeringdb.com

- Database for organisations wanting to peer
- Contains contact information and peering sites for:
  - Networks
  - IXPs
- Useful for others to reach you to peer

PeeringDB: example

NAP Colombia

Organization	NAP Colombia
Long Name	NAP Colombia
City	Bogota
Country	CO
Continental Region	South America
Media Type	Ethernet
Protocols Supported	✓ Unicast IPv4 ○ Multicast ✓ IPv6
Notes	

Contact Information

Company Website	http://nap.co
Traffic Stats Website	http://nap.co/html/estadisticas.php
Technical Email	operadornap@ccit.org.co
Technical Phone	+575240325
Policy Email	admonnap@ccit.org.co
Policy Phone	+577563456

LAN

DOT1Q	○
MTU	1500

Prefixes

Protocol	Prefix
IPv4	206.223.124.128/25
IPv6	2001:13c7:6000::/64

Peers at this Exchange Point

Filter

Peer Name / ASN	IPv4 / IPv6	Speed / Policy
Columbus Networks Main 23520	206.223.124.165 None	20G Selective
EdgeUno Main 7195	206.223.124.146 None	100G Selective
EMPRESAS MUNICIPALES DE CALI Main 10299	206.223.124.133 None	10G Open
GlobeNet Main 52320	206.223.124.158 None	10G Selective
IFX Main 18747	206.223.124.143 2001:13c7:6000:1baf::d99b	10G Selective
InterNexa Colombia Main 18678	206.223.124.154 2001:13c7:6000:48f6::3634	20G Selective
Media Commerce Partners S.A Main 27951	206.223.124.142 2001:13c7:6000:6d2f::c142	10G Open
NAP Colombia Main 14970	206.223.124.170 2001:13c7:6000:3a7a::e170	100M Selective
Orange Business Services South America Main 6505	206.223.124.140 None	1G Selective
Red Nacional Académica de Tecnología Avanzada RENATA Main 27817	206.223.124.187 2001:13c7:6000:6ca9::35	10G Open

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Questions?

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