CARIBBEAN PERSPECTIVE: IXPs & IPv6

Brent Mc Intosh | MCNET-SOLUTIONS

OVERVIEW

Boosting the Caribbean's Economic Potential Through Critical Digital Infrastructure

"The Caribbean has immense potential to boost its digital economy through technological innovations such as next-generation Internet protocol connectivity and critical infrastructure support."

How can Caribbean stakeholders, with the support of ARIN's trusted services, achieve these goals and continue to bring economic success to our region?

THE GAME CHANGER: INTERNET EXCHANGE POINTS AND IPv6

The importance of local critical infrastructure and its supporting technologies are manifested every second as we access crucial digital services seamlessly.

- For the most part, the ordinary end-users just expect a "perfect" user experience, not caring about underlying technology.
- Enable local networks to efficiently exchange data, thus eliminating the need to exchange local Internet traffic via expensive international transit links.
- Increasing the affordability and quality of connectivity in local communities.
- Recent Caribbean IXP deployments are fully dual-stacked, increasing new connectivity opportunities.

WHAT PROTOCOLS AND INFRASTRUCTURE ARE WE SPEAKING ABOUT?

IXPs & IPv6

It starts with resilient and secure infrastructure.

This cannot happen without numbering resources and trusted partners.

Resources

Autonomous System Numbers and IPv6 allocations (micro-allocations) for the IX LAN

WHAT PROTOCOLS AND INFRASTRUCTURE ARE WE SPEAKING ABOUT?

Trusted Partners
ARIN, CaribNOG, CarPIF, PCH, ISOC

ARIN
American Registry for Internet Numbers

Carib NOG
Caribbean Network Operators Group

British Virgin Islands Internet Exchange

CarPIF
CARIBBEAN PEERING & INTERCONNECTION FORUM

SKNIX
St.Kitts & Nevis Internet Exchange Point

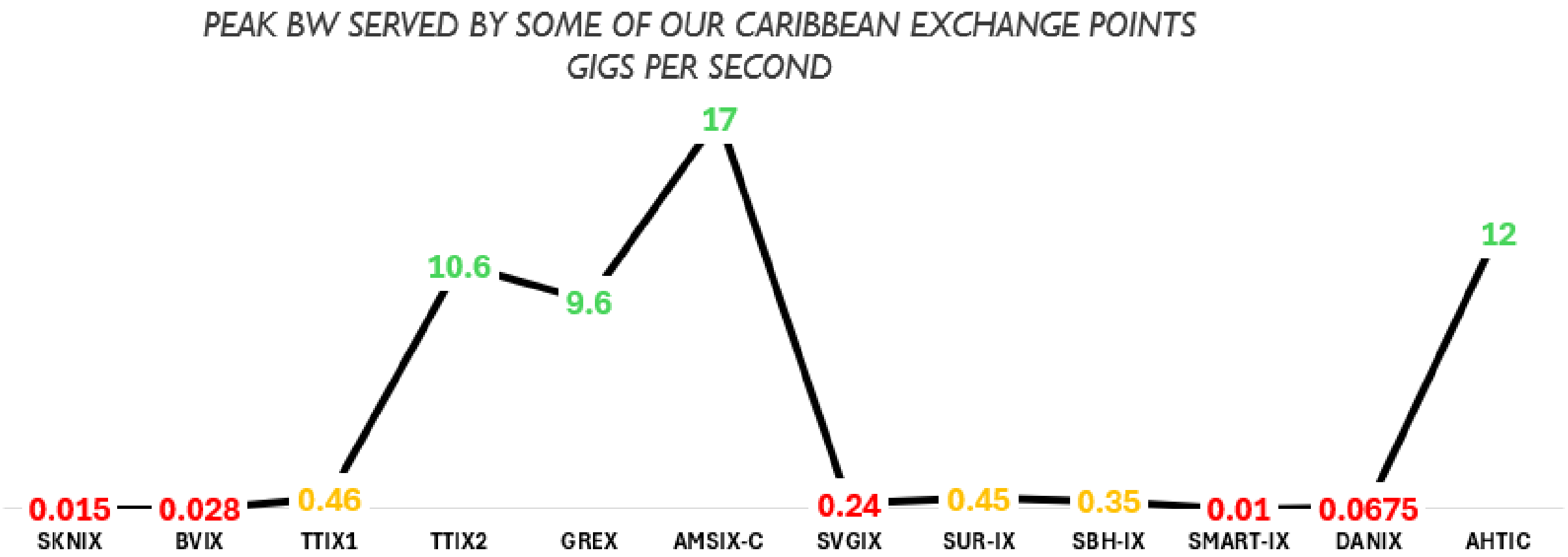
smart-ix
open for all

SUR-IX

SBH-IX

GREX

KEY CARIBBEAN STATISTICS



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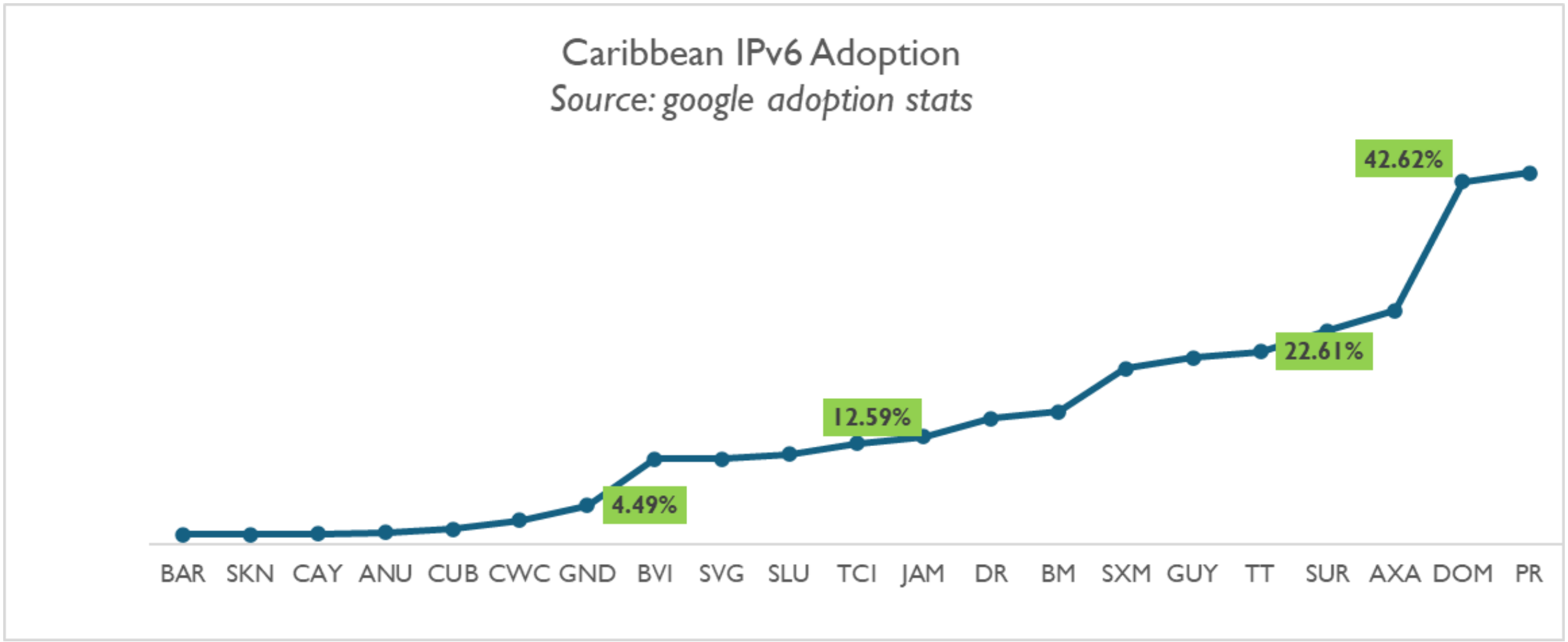


BUILDING CRITICAL INFRASTRUCTURE – THE NEXT STEP

- DNS root server deployments for DNS security and improved DNS responses/resolutions
- National Data Center services
- Hosting global connected delivery networks (CDNs) to serve popular content locally from edge servers (e.g. Cloudflare, Apple, Akamai, Google, etc.)
- Local content hosting platform to improve digital innovation and national digital growth index
- Addressing cybersecurity challenges with DNSSEC and local DNS anycast

THE STRATEGY BEHIND THE RESULTS FOR CARIBBEAN IXPs

- Multi-Stakeholder engagement: CaribNOG, CARPIF, ARIN, PCH, ISOC, governments
- Public and private sector digital strategies for e-commerce in general — creating collaborative agendas that will breed success for a digital economy
- Local content hosting platform to improve digital innovation and national digital growth index
- Building the pillars for developing a national cybersecurity defense index
- A *CHAMPION* is required

KEY CONSIDERATIONS

Caribbean IXPs can be instrumental in developing the local Internet ecosystem because they …

- Encourage development of local and regional communications infrastructure,
- Are not expensive to start,
- Build a community of technical experts,
- Attract a variety of global and local services,
- Incentivize the creation of local content and applications, and
- Facilitate value-added services (e.g. SUR-IX, DC Interconnect).

WHAT MOST CARIBBEAN IXPs OFFER TODAY

- Local traffic exchange
- Peering Model: Bi-lateral non-mandatory selective peering policy (ISPs mostly)
- Connectivity Options: 1/10 gbps, fiber
- PCH anycast: D- and E-root, in some cases F-root
- Protocol Support: IPv4

WHAT ALL CARIBBEAN IXPs WILL OFFER IN THE FUTURE

Full suite of connectivity services: Local cloud services interconnects, CDN peering, regional DC cross-connects

Peering Model: Bi-lateral non-mandatory, open peering policy

Connectivity Options: 1/10/40/100 gbps, fiber, IPv4 and IPv6 by default

Global CDN hosting through regional partnerships

Local DNS anycast (IPv4 and IPv6)

ENTERPRISE vs ISP

The Challenge: IPv6

1. A large number of Caribbean Internet service providers (ISPs) have IPv6 allocations but have not deployed IPv6 in transit and access networks.
2. Some ISPs do IPv6 transit services.
3. Carrier Grade NAT (CGN) is still being deployed.
4. Enterprise businesses are now seeing the importance of IPv6, driven by global trends. Public cloud services support v6-only virtual private clouds.

GRENADA

ASes	Prefixes
10	**91**
IPv4: 6 IPv6: 4	IPv4: 70 IPv6: 21

BARBADOS

ASes	Prefixes
10	**327**
IPv4: 7 IPv6: 3	IPv4: 324 IPv6: 3

ISP BENEFITS — A USE CASE

Staying Ahead of the Game

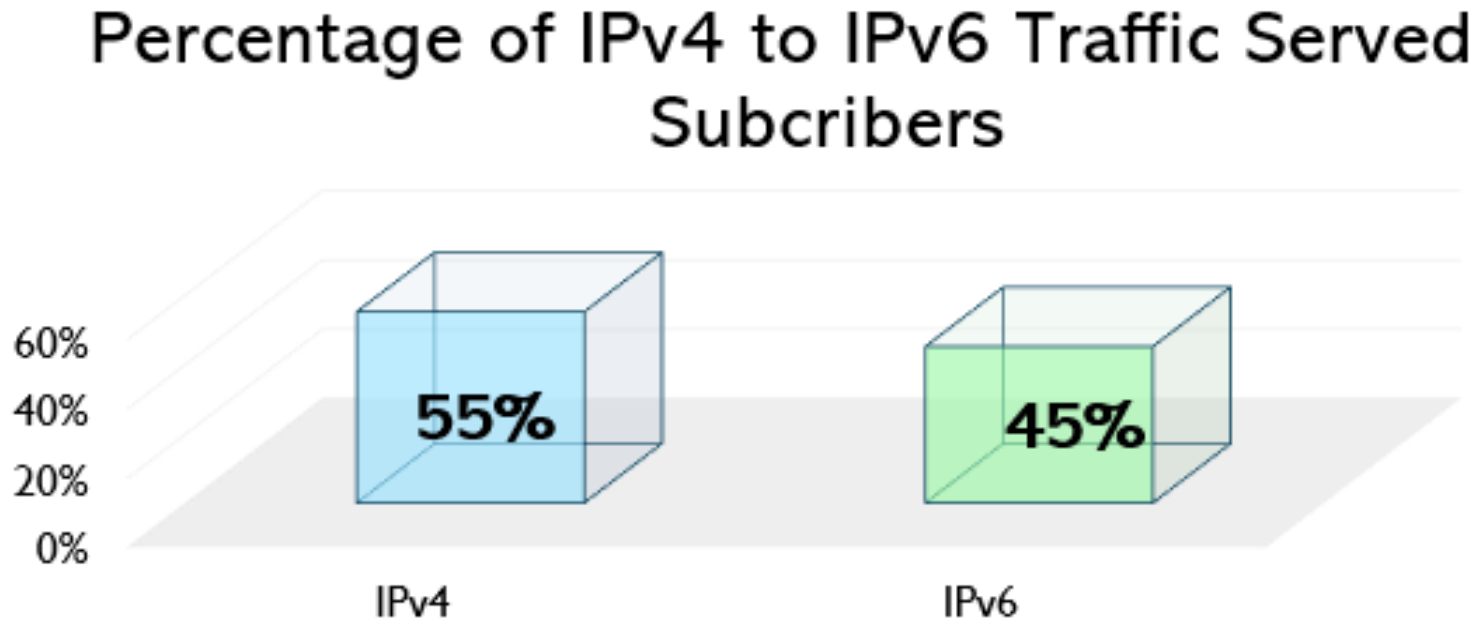
- First Caribbean ISP to deploy **dual-stack** from "**core to door**"
- Best IPv6 operating practices were followed:

  Staff Training → Deployment Planning → Implementation → Optimization
- Benefits for locally hosted CDNs
- Benefit from providing secure e-services with low latency access

IPv6 SNAPSHOT — CABLE BAHAMAS

cablebahamas
technology unleashed

Making the Difference: Dual-stack service networks FTTX and will transition to IPv6 on LTE network



ENTERPRISE BENEFITS — AN IXP AND IPv6 USE CASE

- First financial entity to peer on the Grenada IXP
- First financial entity to deploy IPv6
- Benefits for locally hosted CDNs
- Benefit from providing secure e-services with low latency access
- Multi-homed
- Resource Public Key Infrastructure (RPKI) for signing and filtering of prefixes

ENTERPRISE BENEFITS — AN IXP AND IPv6 USE CASE

Validating route **2620:a2:e000::/48**

from origin **AS399273**

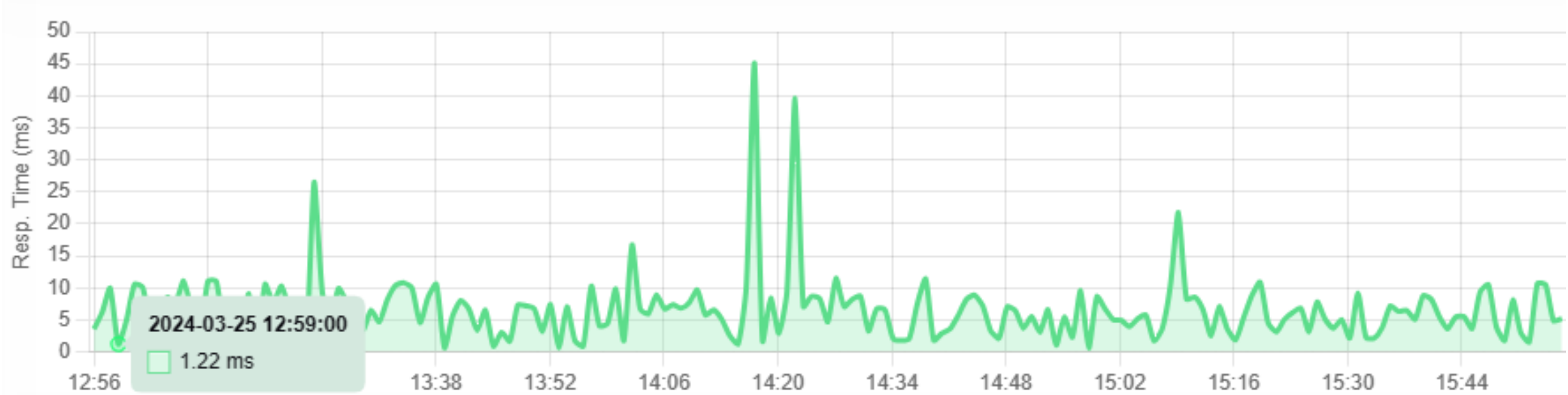
✓ **Valid**

1 covering ROA found

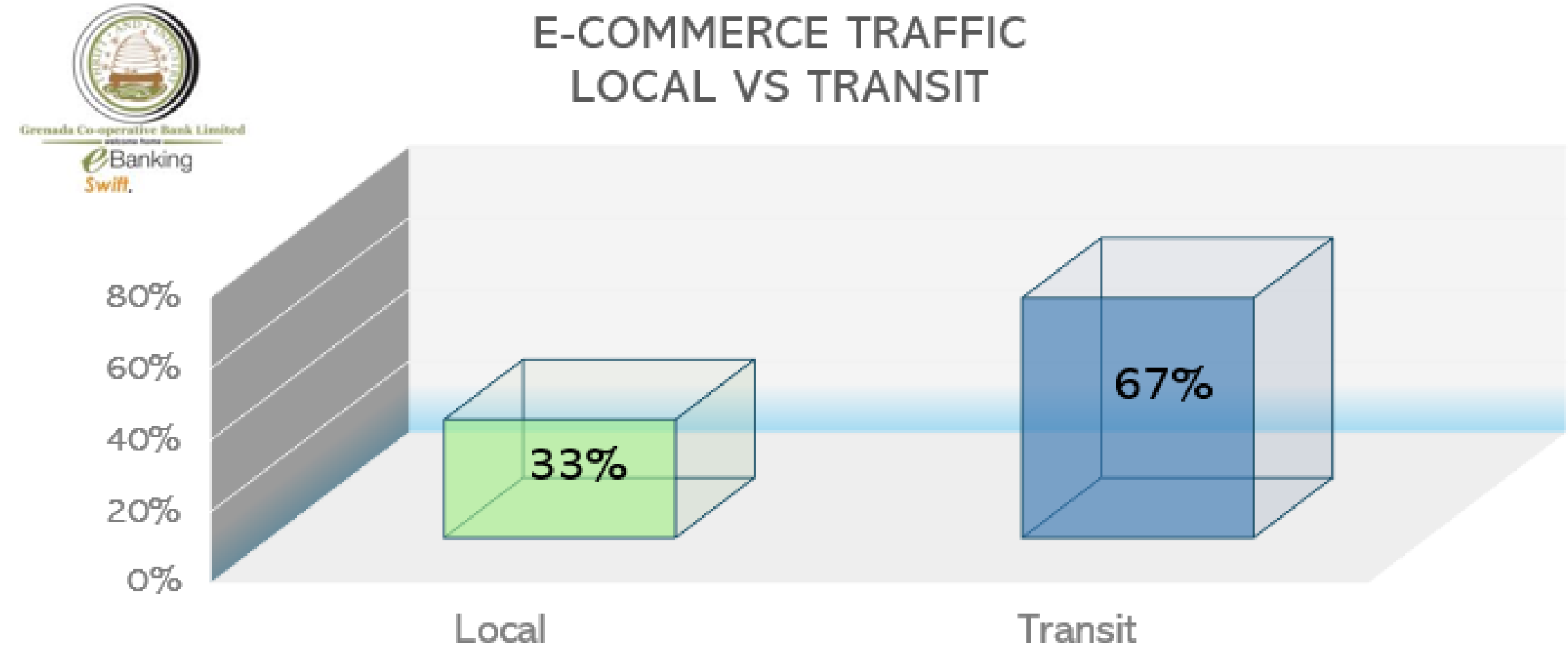
DNS 6 6

6 (5) **secure.grenadaco-opbank.com** 2606:4700:10::6816:264

C (38) secure.grenadaco-opbank.com



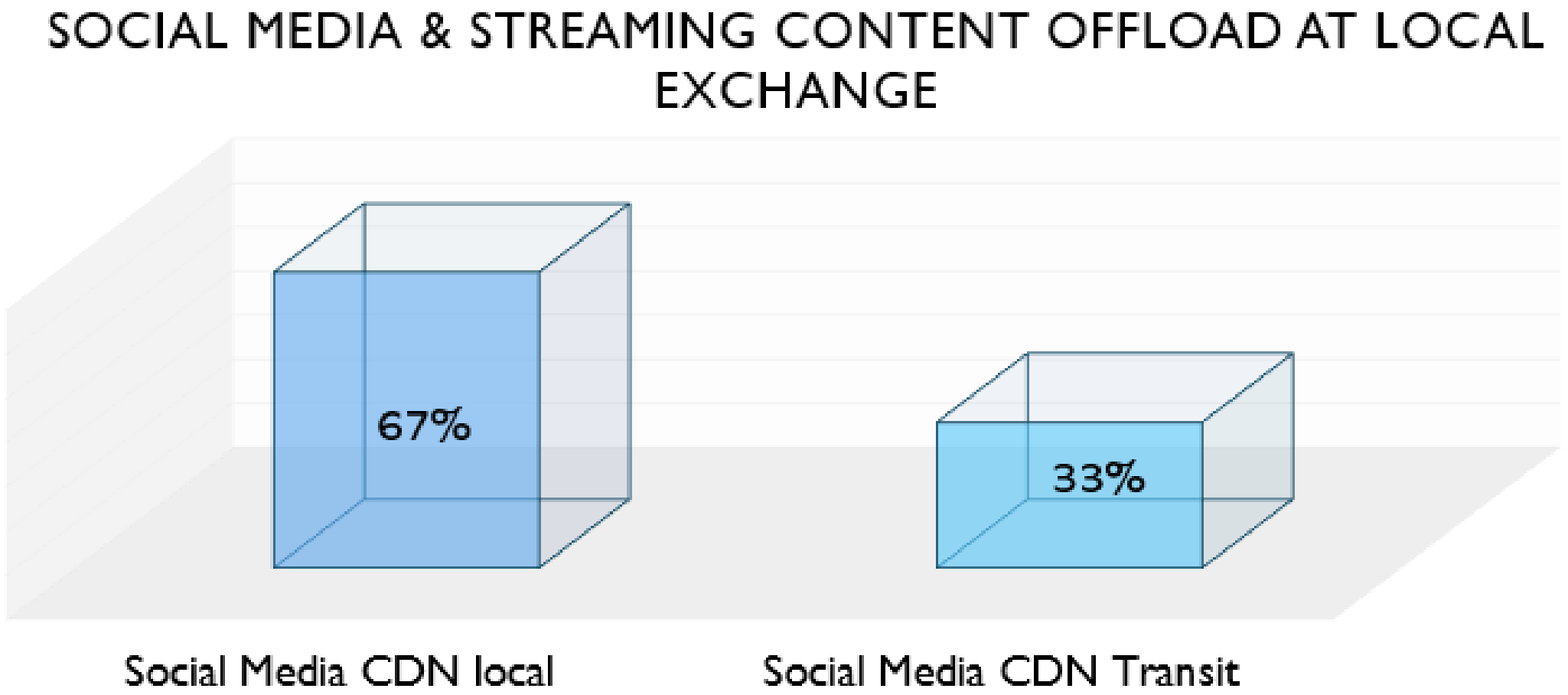
ENTERPRISE BENEFITS — GRENADA CO-OP BANK



GOVERNMENT BENEFITS — AN IXP USE CASE

- First government entity to peer on local Internet exchange
- Best quality of experience for DNS, streaming, and social media services
- Benefits from providing secure e-services with low latency access
- Soon to deliver additional e-gov services as Internet exchange and private cloud are both tenants of same data center

GOVERNMENT BENEFITS — AN IXP USE CASE



RISE OF THE CARIBBEAN SUPPORTING COMPANIES FOR IXP & IPv6

CALATECH
CARIBBEAN LATIN AMERICA TECHNOLOGY LIMITED

Kapasiti Consulting

CALATECH

IPv6, DNS, IPAM, network design, and network performance monitoring

KAPASITI

IXP and data center operations and support

MCNET-SOLUTIONS

IPv6, ISP, and enterprise deployment and training

MOVING FORWORD TO THE FUTURE WITH IPv6 & LOCAL EXCHANGE POINTS

Requirements:

- The right partners, such as ARIN
- Caribbean tech community participation (CaribNOG, CarPIF)
- Following industry standard and trends

ARIN
American Registry for Internet Numbers

CaribNOG
Caribbean Network Operators Group

CarPIF
CARIBBEAN PEERING & INTERCONNECTION FORUM


THANK YOU.