

Case for Internet Exchange Points in the Caribbean

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What is an IXP: Quick Reminder

An Internet exchange point (IX or IXP) is a physical infrastructure that allows different Internet Service Providers (ISPs) to exchange Internet traffic between their networks by means of mutual peering agreements, which allow traffic to be exchanged without cost.

The Caribbean Scenario

Look at Some Regional Characteristics



Developments in recent years

Deregulation

- Introduction of market competition

Greater Usage

- More consumers and businesses are online
- Increased Mobile Internet uptake

Increased Content Production

- Packaging of content for global consumption

More E-Government initiatives

- more government info and services online

Caribbean Content Development

A significant increase in content being developed specifically for Caribbean audiences

- *TEMPO: MTV / Viacom on Brightcove*
- *JumpTV (Canada)*
- *Canal, TNH (Haiti)*
- *CVM , Hype TV, 96.1 FM (Jamaica)*
- *Gayelle, CNC3 (Trinidad)*
- *CBC (Barbados)*
- *Muzik Media: New Jersey Entrepreneur*

Caribbean Content Hosting

However, a significant portion of Caribbean content is hosted outside the region

- *Go-Jamaica: Interland (Georgia)*
- *Trinidad Express: MTO Telecom (Quebec)*
- *triniPULSE: Fluid Hosting (New York)*
- *TeleCuracao: Network Solutions (Virginia)*
- *ISAAC 98.1 (TT Radio): MaximumASP (Kentucky)*
- *WheyYuhDey (Ackee): pair Networks (Massachusetts)*
- *Republic Bank (California)*

The Mobile Internet

Networking considerations for the Mobile Internet are the same as those for any IP network

High speed, multi-megabit wireless networks need large amounts of bandwidth

- Most of this traffic ends up being routed through the US

Technical Capacity Issues

Limited development of critical Internet resources

Limited Awareness of Relevant Technical Developments

- Limited participation in ICANN / LACNIC / ARIN / international fora

Limited capacity for cost-effective hosting

Telecom & Regulatory Issues

Dominant Telecom Operators & Large ISPs

- misguidedly seeking to prevent effective competition

International Providers

- currently have little inclination to peer locally or otherwise support regional development

Telecom & Regulatory Issues

Regulatory Agencies

- often reflexively seeking to extend their statutory authority over telephony to Internet infrastructure

Legal Provisions

- prohibitions on non-regulated telecommunications facilities, restrictive licensing regimes, burdensome tax treatments

Global Crisis - Caribbean Impact

Collapse of Traditional Economic Pillars

- Tourism
- Agriculture
- Commodities

Increase in Cost of Goods/Services

Social and Cultural Erosion

Global Crisis - Caribbean Impact

Heavy dependency on imports, loans, and external intellectual capital has left the region exposed and extremely vulnerable in the current global economic crisis.

The search is on in countries throughout the region for alternative sources of sustainable economic development

Caribbean Response

Governments and Corporations are increasingly looking to the Internet and ICT for economic salvation.

The notion of developing “knowledge-based” societies is no longer a deferrable option, it is a national and regional imperative.

Caribbean Response

The survival of the region is now inextricably linked to the extent to which it can quickly and optimally develop and leverage its information and communications resources

Which pill will the region choose.....?

Status Quo



Survival & Growth



The Case for Caribbean IPXs

The IXP Advantage

*Accelerating the regional
development of critical
Internet resources*



Attraction of IXPs

IXPs provide cheaper, more efficient, lower latency paths between networks

IXPs help foster a local community - both content and providers

Aggregation of demand makes it more attractive for additional transit providers to enter the market

Attraction of IXPs

There are several technical and non-technical advantages to the direct interconnection IXPs facilitate, but the primary reasons are

- ✓ cost
- ✓ latency
- ✓ network capacity

The IXP Advantage: Cost

Traffic passing through an exchange is cost-neutral, whereas traffic to an ISP's upstream or transit provider is costly.

Reducing the APBDC, or “cost of goods” allows ISPs to maintain higher levels of profitability, reduce costs, or increase reinvestment.

ISPs' Average Per-Bit Delivery Costs, or APBDC, are the measure of their efficiency in delivering traffic

The IXP Advantage: Cost

IXPs provide a no-cost outlet for the local portion of one's traffic, thereby reducing the APBDC of all participants in the IXP

This gives participants a significant advantage, and one which grows even greater with time, over any competitors who fail to participate in the IXP.

Ceteris paribus, decreasing the cost of delivering any segment of one's traffic results in a corresponding reduction in one's overall APBDC, and realized benefit.

The IXP Advantage: Latency

The direct interconnection enabled by IXPs significantly reduces latency by avoiding having domestic data packets travel outside national borders to get from one local network to another.

- *typically to the US, potentially across continents*

The IXP Advantage: Latency

The increased number of paths learned through an IXP improves routing efficiency and fault-tolerance for participants and **renders participants far more resilient to international cable failures**

The IXP Advantage: Latency

It is reasonable to expect that **latency would be reduced from ~140ms to 3ms-5ms** through the use of a local IXP

- vastly improving the customer experience for local content, gaming, file-sharing, and latency-sensitive applications like voice and video.

The IXP Advantage: Network Capacity

In telecommunications **Speed x Distance = Cost**

- For the same price, a decrease in distance yields an increase in speed, or network capacity.
- Or, for the same speed, a decrease in distance yields a decrease in cost.



The IXP Advantage: Network Capacity

In the case of moving the relevant IXP from Miami to, say, Basseterre, St Kitts, a reduction from 3,500 miles (round trip) to perhaps one mile, the decrease in distance is so dramatic that **cost can be minimized to near zero**, while speeds can be increased from some multiple of STM-1 to 1gb or 10gb.

The IXP Advantage: Network Capacity

There is no question that **a local IXP would result in a vast increase in the network capacity available for sale to domestic customers**, without demanding any significant corresponding capital or operational investment

The Case for Caribbean IPXs

National Benefits

*Building block for ICT based
development*



National Benefits: Industry Growth

An IXP is a prerequisite to the development of any significant domestic content production, hosting, or colo industry.

- This barrier must be surpassed before major content providers like Google, Amazon, Akamai, or UltraDNS will even consider providing local services within Caribbean national markets.

National Benefits: Network Performance

The improved price/performance ratio (reduced APBDC) of local traffic in the wake of the formation of a local IXP will also enable high-bandwidth, low latency applications like multimedia, gaming, and file-sharing.





National Benefits: Better Value Proposition

The increased demand for these services, and ISPs' ability to supply them at a new lower price-point, serves to **increase** both **market penetration** and the **total revenue-value** of the market, relative to the pre-IXP status-quo.

National Benefits: HR Development

The maturation of the local network infrastructure provides a **nucleus for education and retention of the Internet-skilled labor force** that ISPs need in order to continue their growth and economic progress.

National Benefits: Privacy Control

Sending sensitive data across national borders presents a privacy risk to governments and corporations.

By keeping local traffic local, sensitive data is not subject to inspection by other governments.

National Benefits: Value-Add

Enables co-ordination of security, infrastructure protection, abuse response activities

- Can act as a “center of expertise” for Internet technology
- Facilitates growth and development of stakeholder community which can engage in other activities promoting local interests

National Benefits: Value-Add

Makes available a logical place to locate, and hence attract, other Internet infrastructure resources

- e.g. top-level name servers, time servers, performance measurement tools, research projects

National Benefits: Value-Add

Opens the opportunity for increased diversity and resilience for participants

- e.g. mutual backup arrangements

National Benefits: Value-Add

Can create market for out-of-region transit providers to sell services to entire community of national ISPs at single cost-effective location

What Next?

For network operators who wish to proceed with the creation of an IXP, the next steps would be:

- Form a small working-group of committed-participant organizations
- Determine a neutral location that's acceptable to all
- Define an IXP policy document, that participants agree to abide by
- Secure small IPv4 and IPv6 subnets from ARIN/LACNIC for the peering subnet
- Install a small Gigabit-Ethernet capable switch
- Configure BGP route-announcement between peers across the IXP

Thanks. Questions?

Copies of this presentation can be found
in Keynote, PDF, QuickTime and PowerPoint formats at:

[http:// www.pch.net / resources](http://www.pch.net/resources)

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