CARIBBEAN ICT Roadshow

CTU Symposium
Establishing a BVI IXP

Hosted by the

Caribbean Telecommunications Union

In collaboration with

Packet Clearing House

Caribbean Telecommunications Union

PCH Packet Clearing House

About the Facilitators

Bevil Wooding…

an Internet Strategist with over 15 years experience consulting to organizations in the private and public sectors on a range of Information Technology, Internet and Community Development projects, he has been a strong advocate in developing countries for the adoption of Internet and internet-based technologies as a tool for e-government, corporate and social transformation.

Jonny Martin…

Jonny Martin has significant experience with internet infrastructure providers in New Zealand and the Pacific islands, having worked for both large incumbent and small startup providers. His strengths include an ability to build pragmatic and cost effective networks, along with an acute understanding of the policy and economic issues faced when building out networks in relatively small and isolated countries..

Symposium Objectives

- Build stakeholder awareness of the key economic and technical considerations behind IXPs
- Increase Understanding of global trends and best practices for IXPs
- Activation of the process to establishing an Internet Exchange Point in the BVI

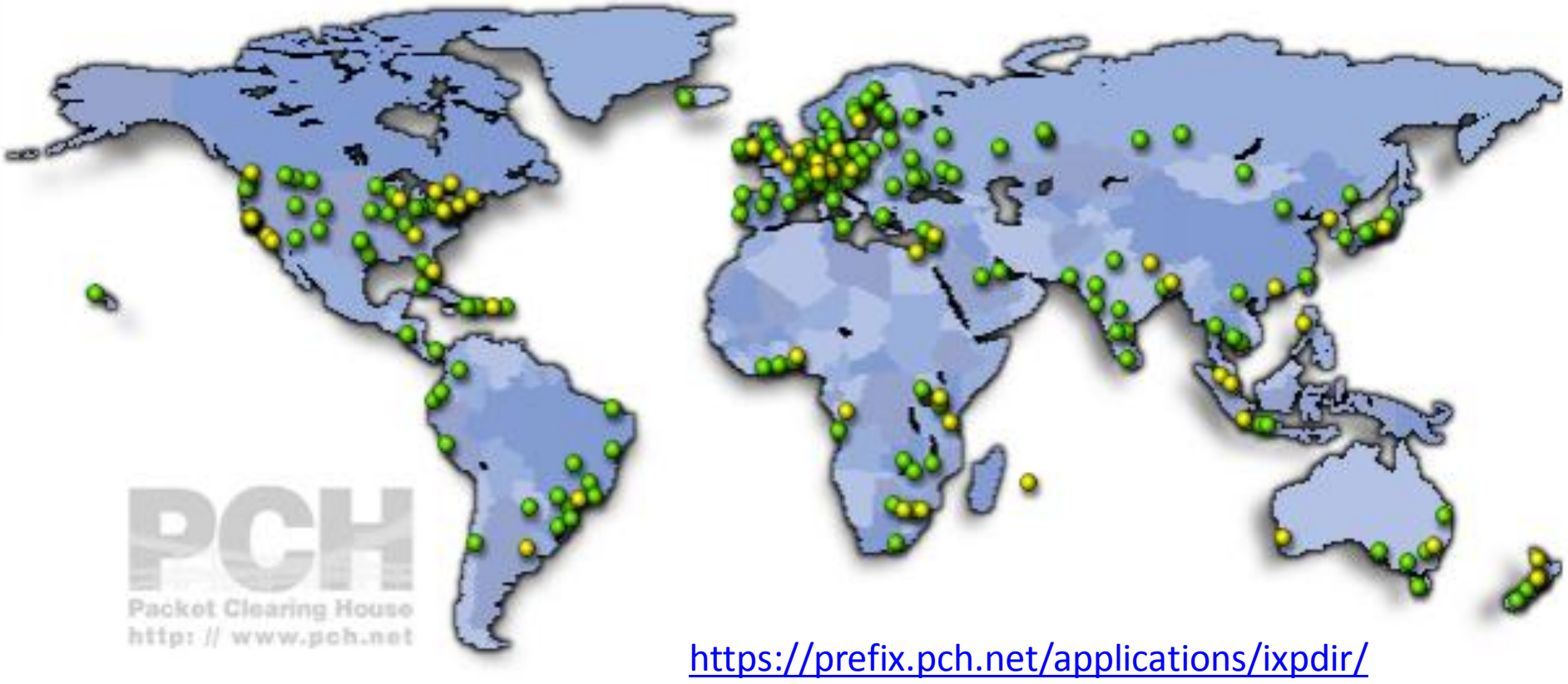
Agenda

- **IXP: The Value Proposition**
  - IXP Overview
  - IXPs Demystified
  - Business Models/Growth Path
  - Benefits of a "Nearer IX"
- **IXP FAQ**
  - Why We Can't Qs
  - Why We Shouldn't Qs
  - How Can We Qs
  - What We Need Qs
- **IX Checklist**
  - Governance
  - Location
  - Pricing
  - Policy
  - Additional Services
- **Open Forum**
  - IXP Considerations & Perspectives

Quick Reminder: IXP Defined

- An **Internet exchange point** (**IX** or **IXP**) is the point at which 3 or more ISP networks interconnect for the purpose of exchanging customer traffic

IXPs Across the World



https://prefix.pch.net/applications/ixpdir/

Attraction of Local 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 Local IXPs

- There are technical and non-technical advantages to the direct interconnection IXPs facilitate
  - ✓Lower Cost
    - ✓Increased network capacity
  - ✓Higher Performance
    - ✓Higher speed
    - ✓Reduced latency
    - ✓Greater resilience

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The Case for IPXs in the Caribbean

National Benefits

Building block for ICT based development

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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: 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 whose agenda may not be congruent with national policy or interests.

National Benefits: Network Performance

- IXPs enable high-bandwidth, low latency applications like multimedia, gaming, and file-sharing
  - The improved price/performance ratio (reduced APBDC) of local traffic

National Benefits: Additional Value

- Enables co-ordination of security, infrastructure protection, abuse response activities
  - Can act as a “center of expertise” for Internet technology
  - Facilities growth and development of stakeholder community which can engage in other activities promoting local interests

National Benefits: Additional Value

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

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

National Benefits: Additional Value

- Opens the opportunity for increased diversity and resilience for participants
  - e.g. mutual backup arrangements, storage arrangements, etc.

National Benefits: Additional Value

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




Internet Exchange Points

THE VALUE PROPOSITION

Session 1: IXPs Demystified

- Where does Internet Bandwidth Come From & Why Do We Even Need to Care
- What is an Exchange Point
- How Does It Work
  - Economically
  - Technically

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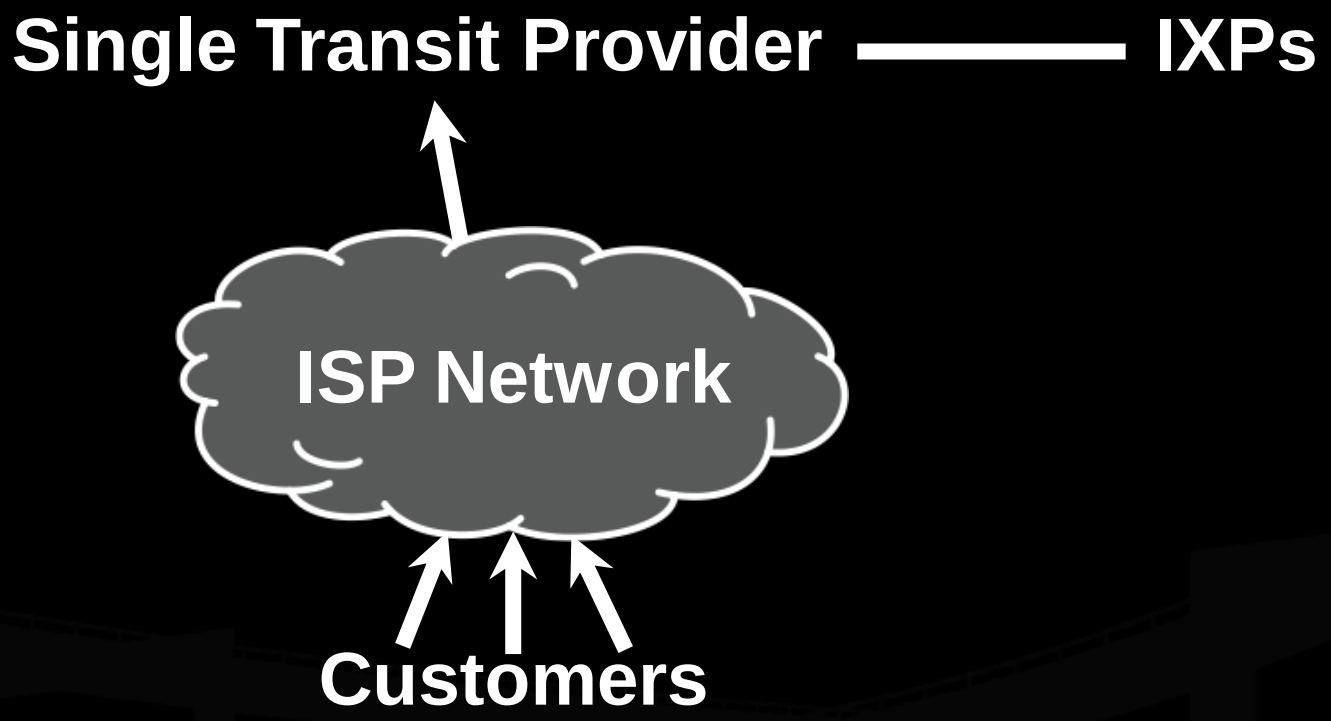
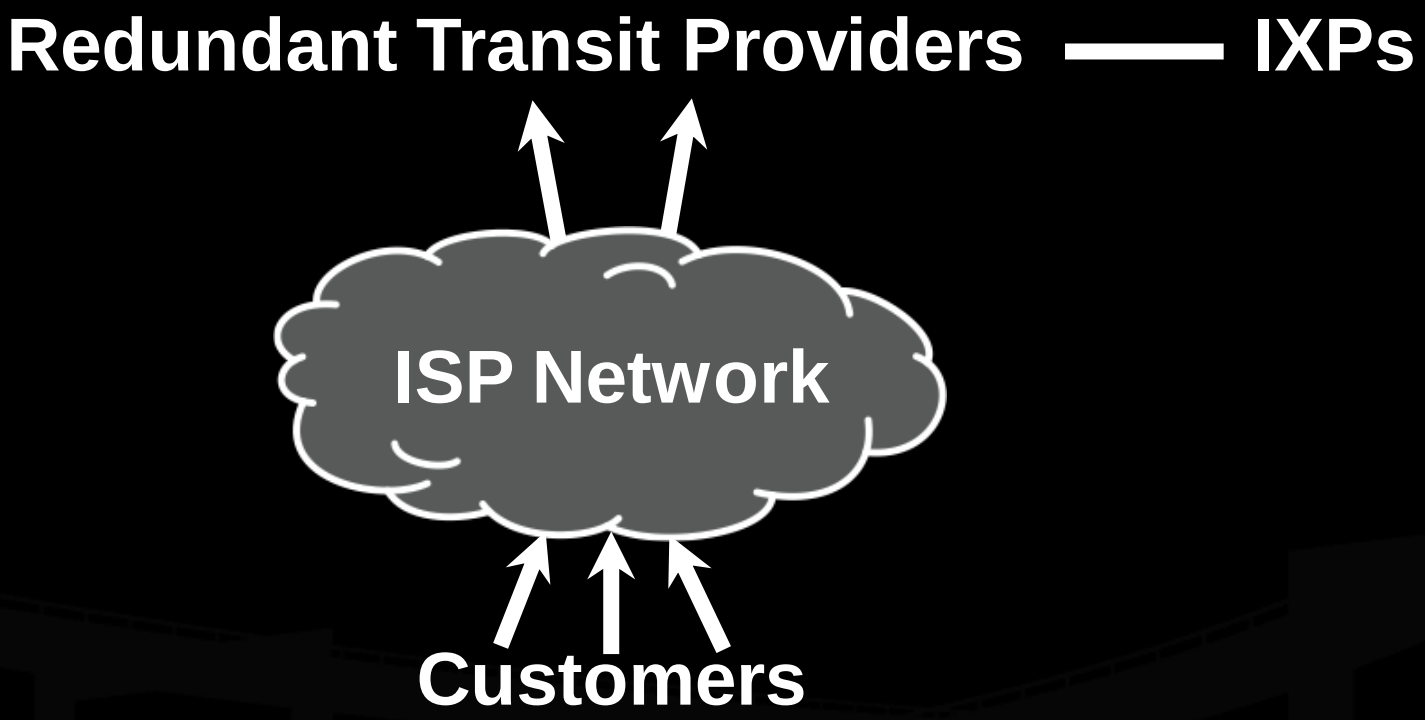
IXPs Demystified

Making sense of Internet Exchange Points…understanding why they matter!

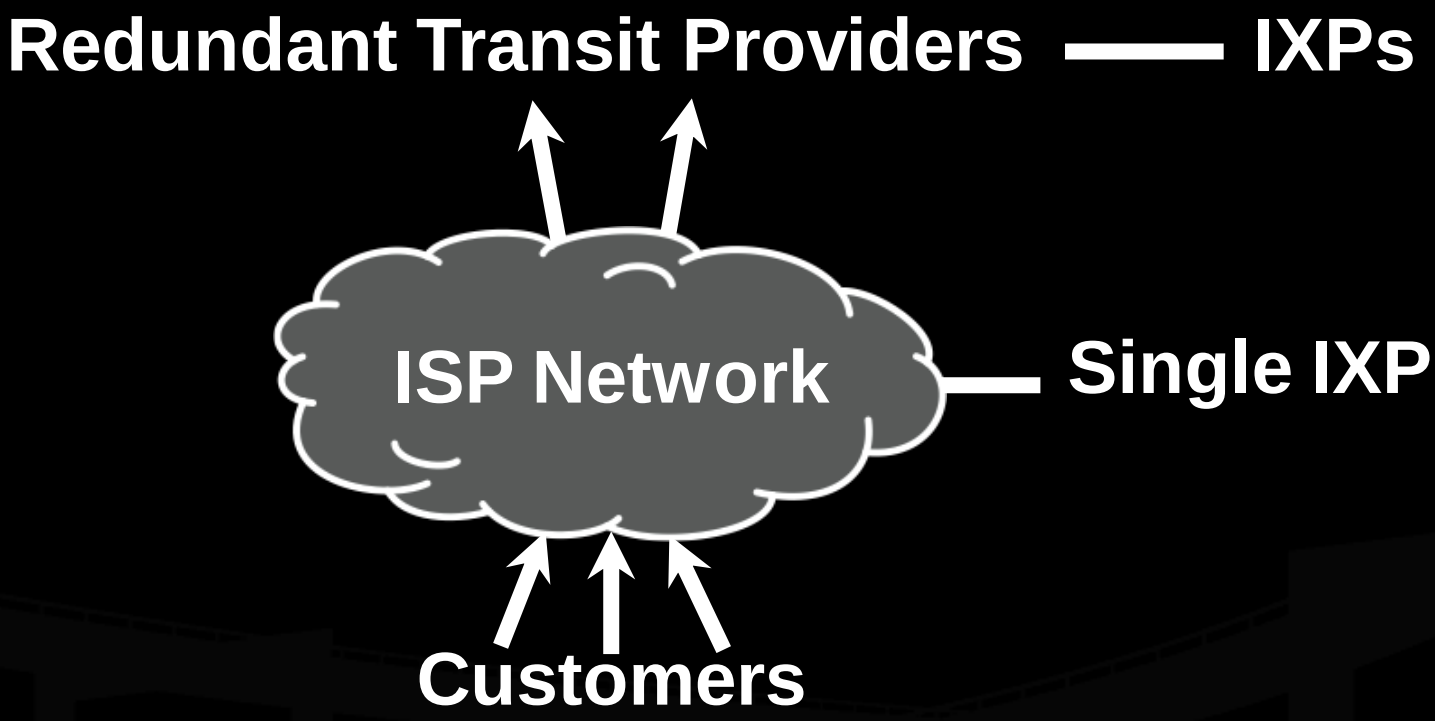
ISP Lifecycle: Simple Aggregator



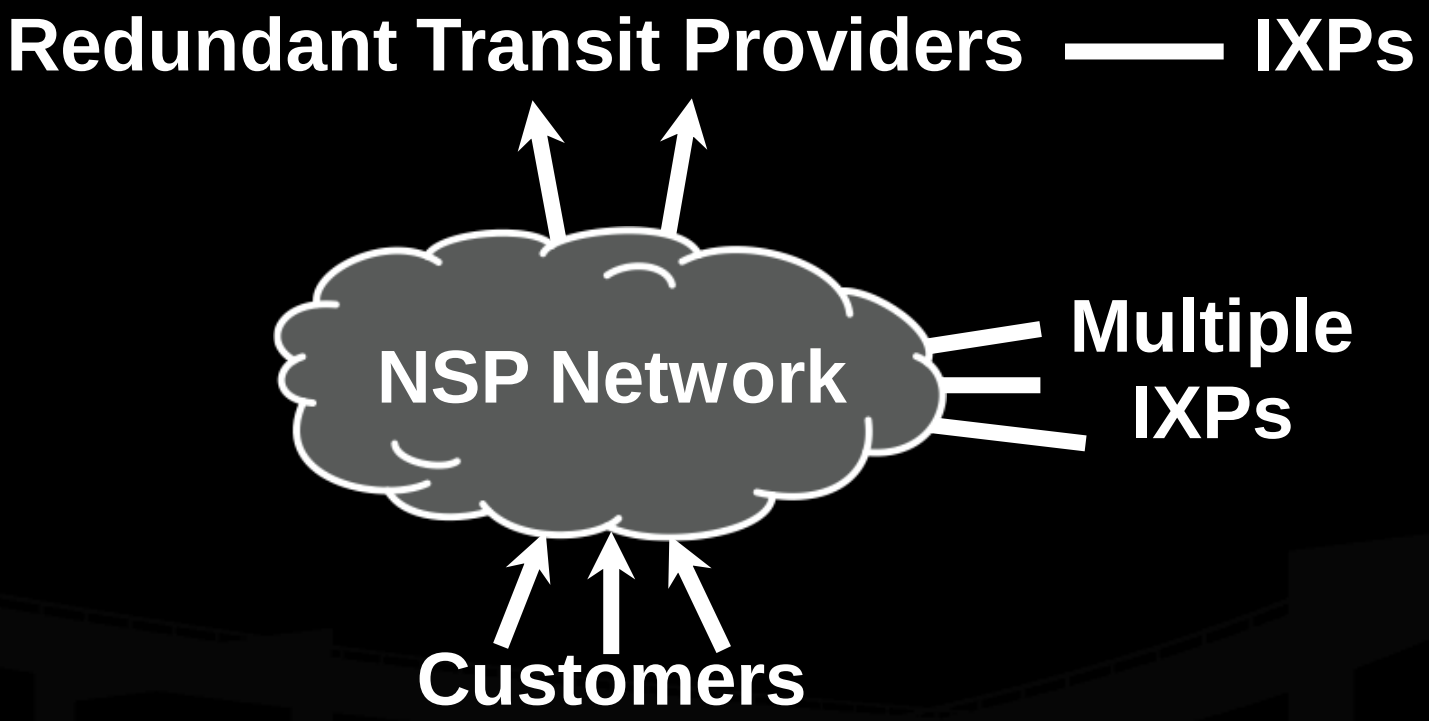
ISP Lifecycle: Redundancy and LCR



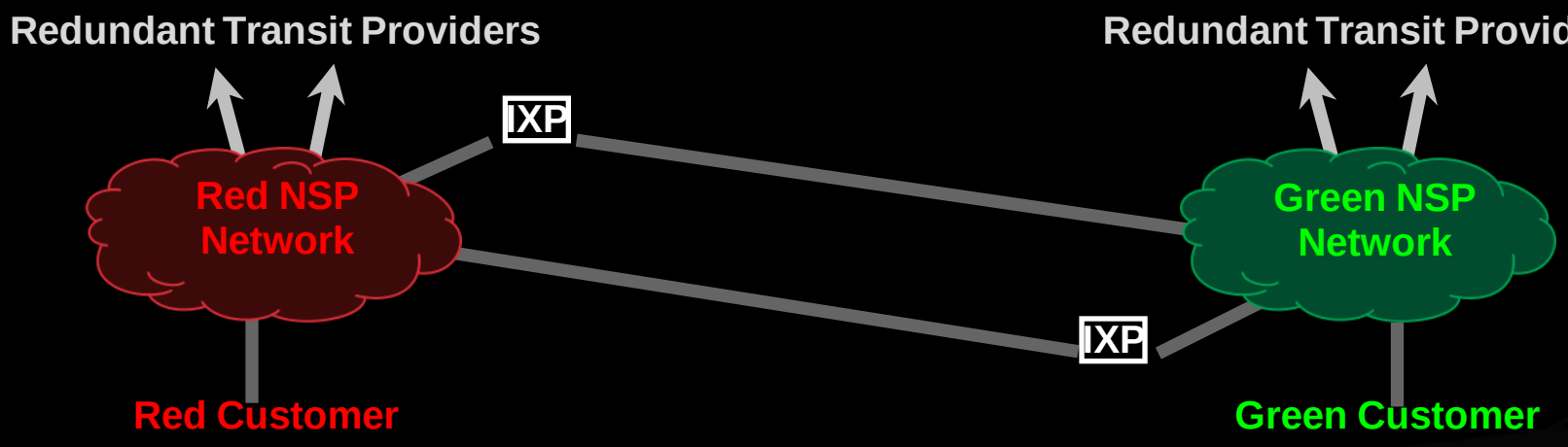
ISP Lifecycle: Local Peer



ISP Lifecycle: Network Service Provider



Hot Potato Routing



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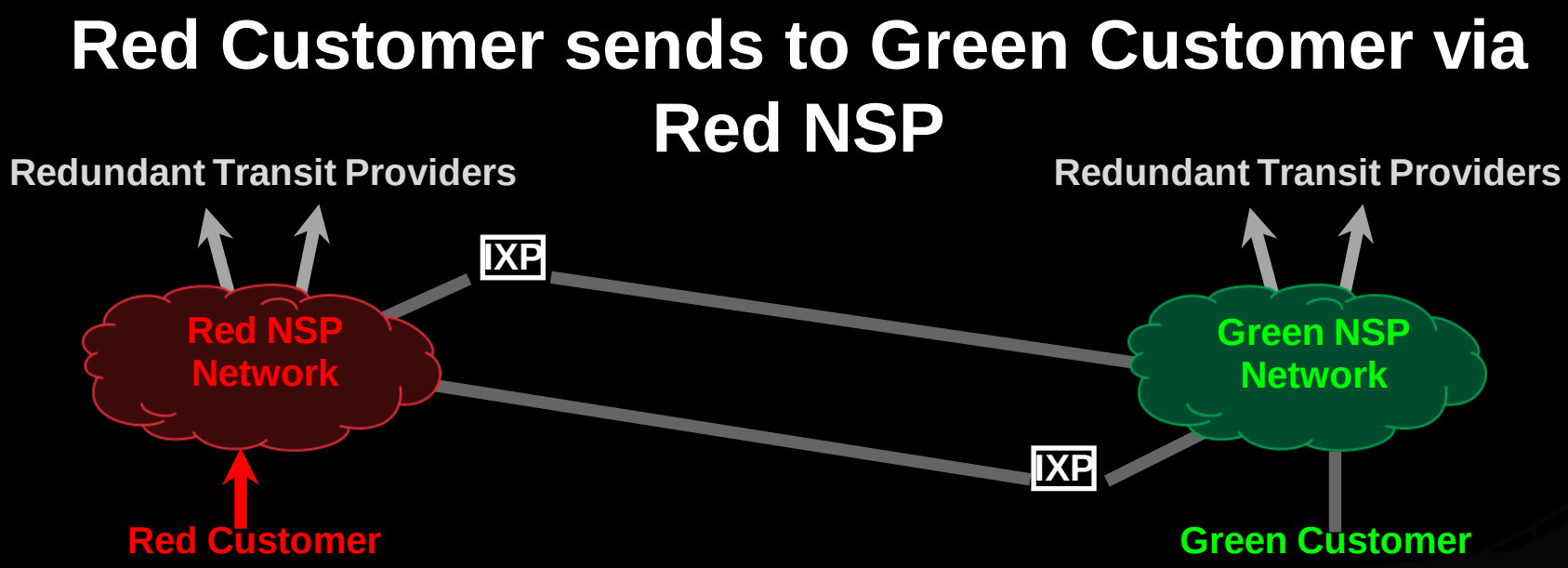

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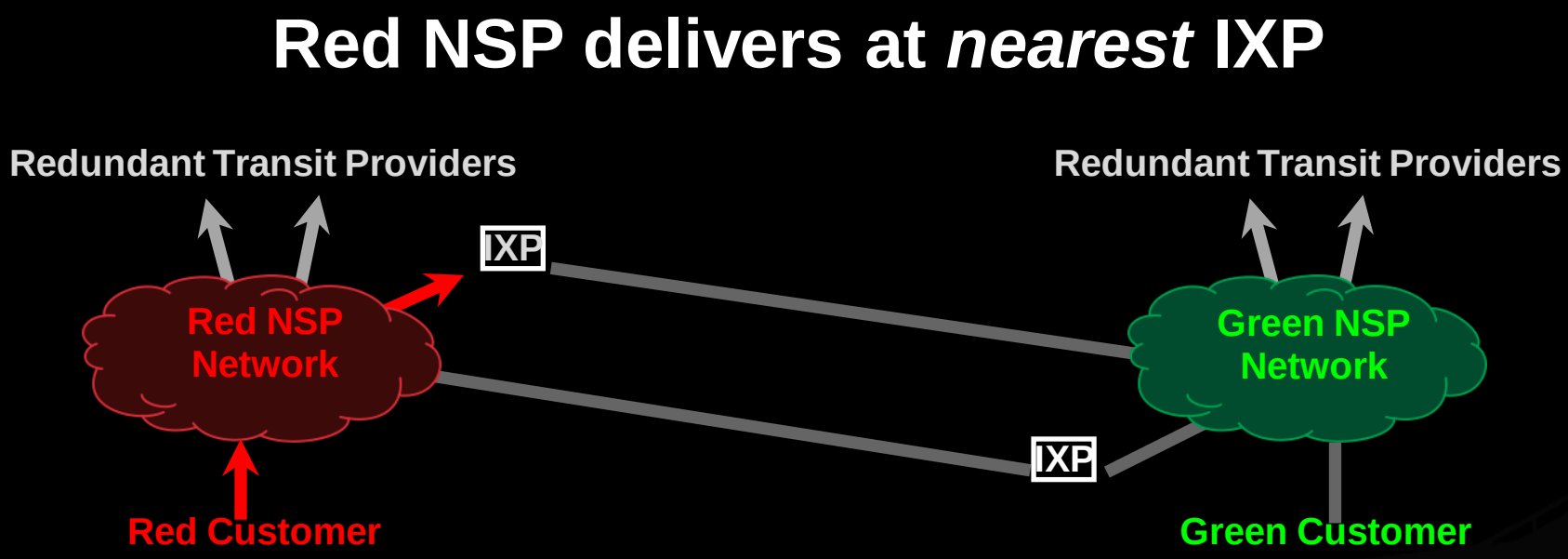

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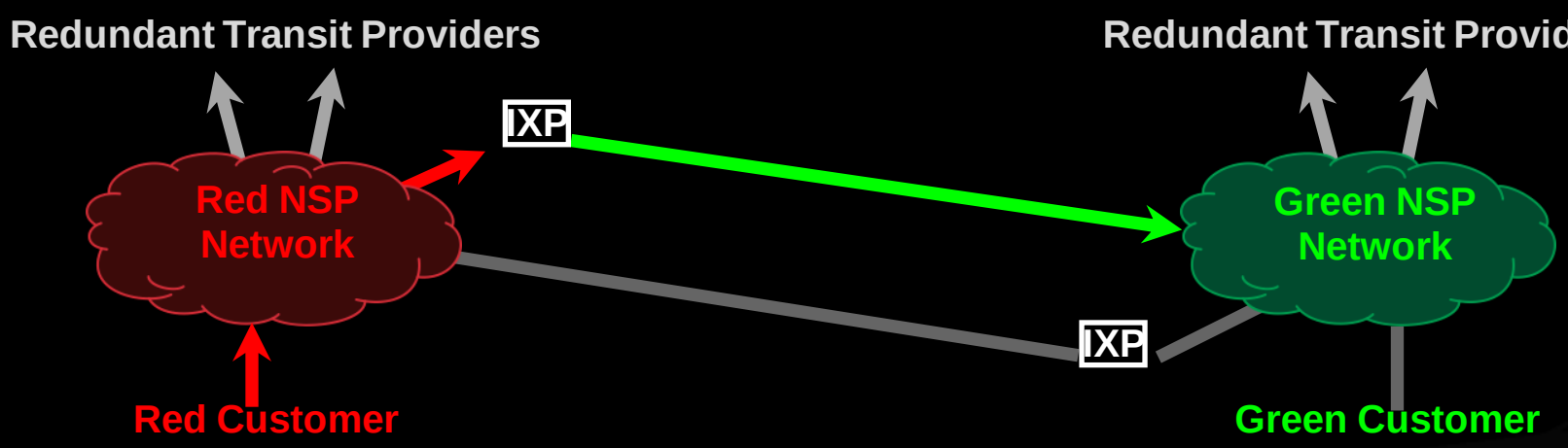
Hot Potato Routing

Green NSP backhauls from distant IXP



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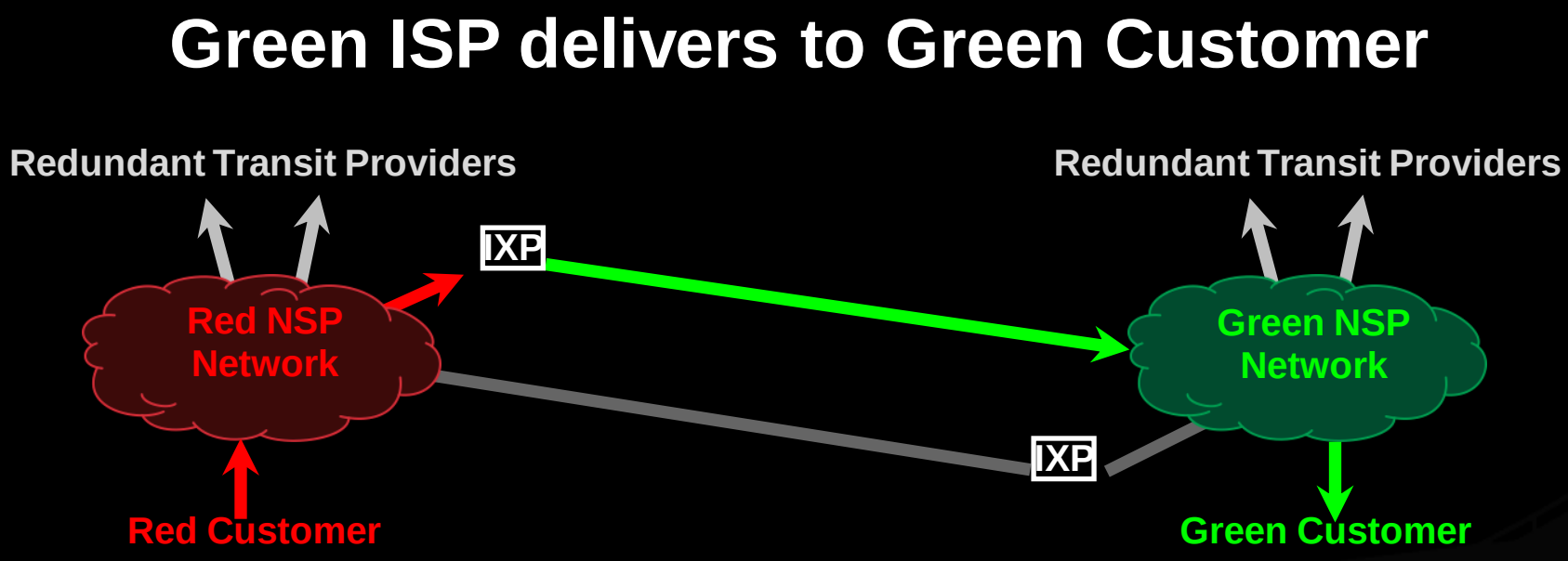
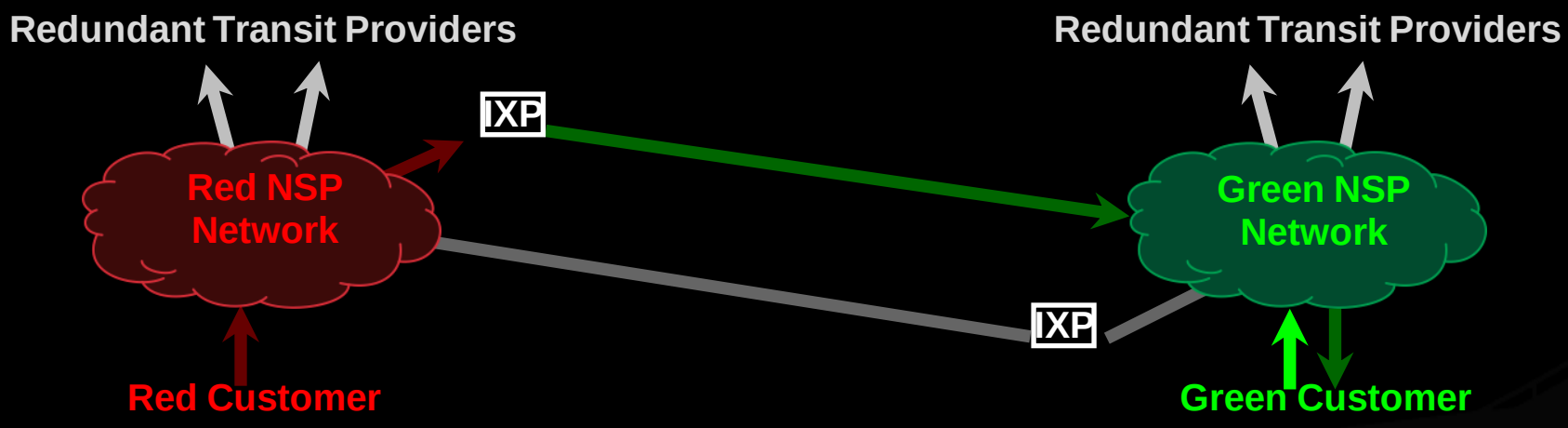


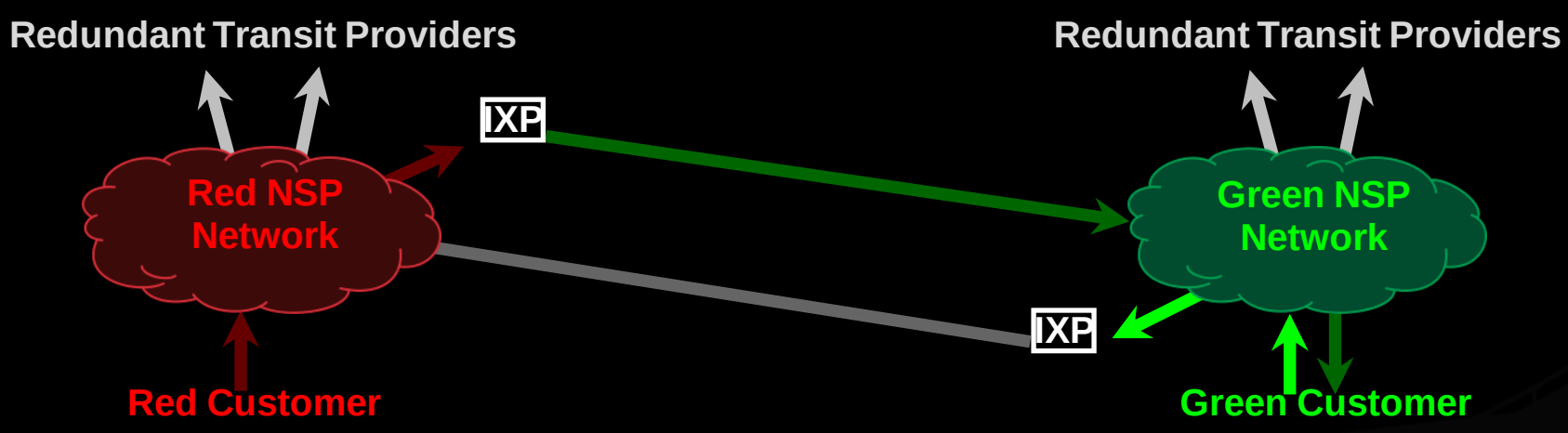
Hot Potato Routing

Green Customer replies via Green NSP



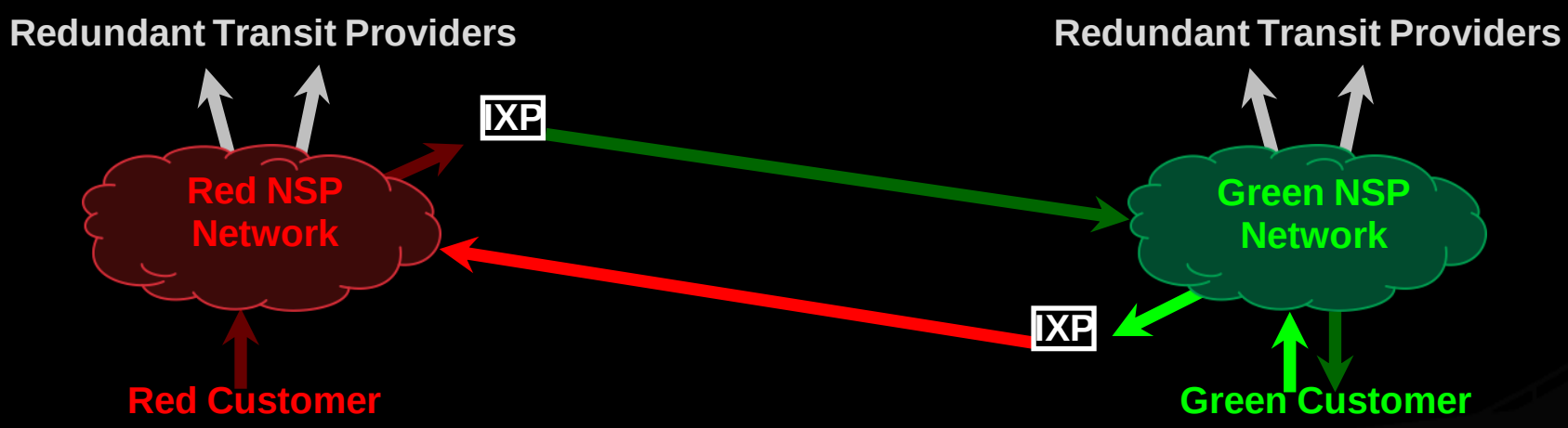
Hot Potato Routing

Green NSP delivers at nearest IXP

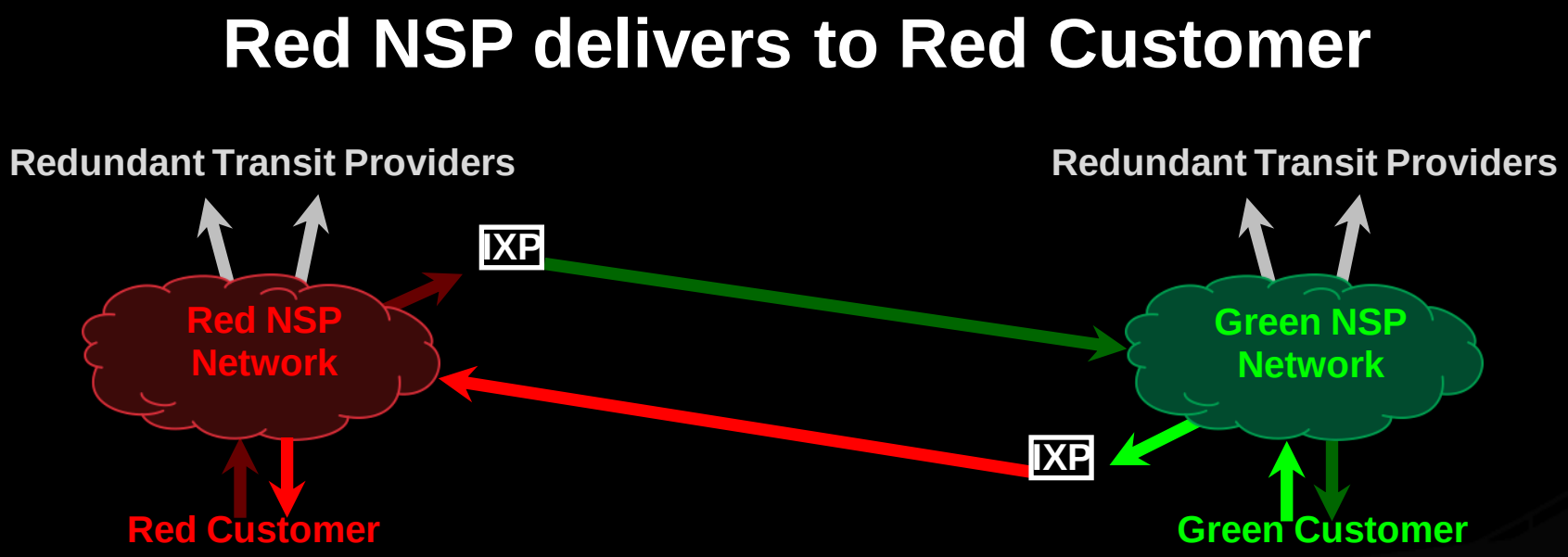


Hot Potato Routing

Red NSP backhauls from distant IXP

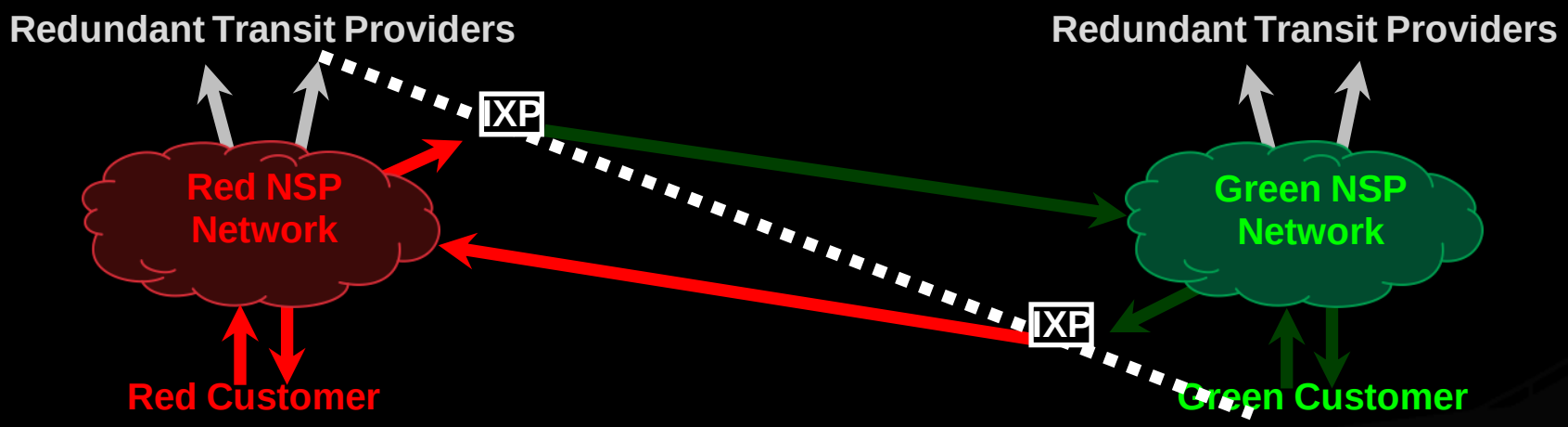


Hot Potato Routing



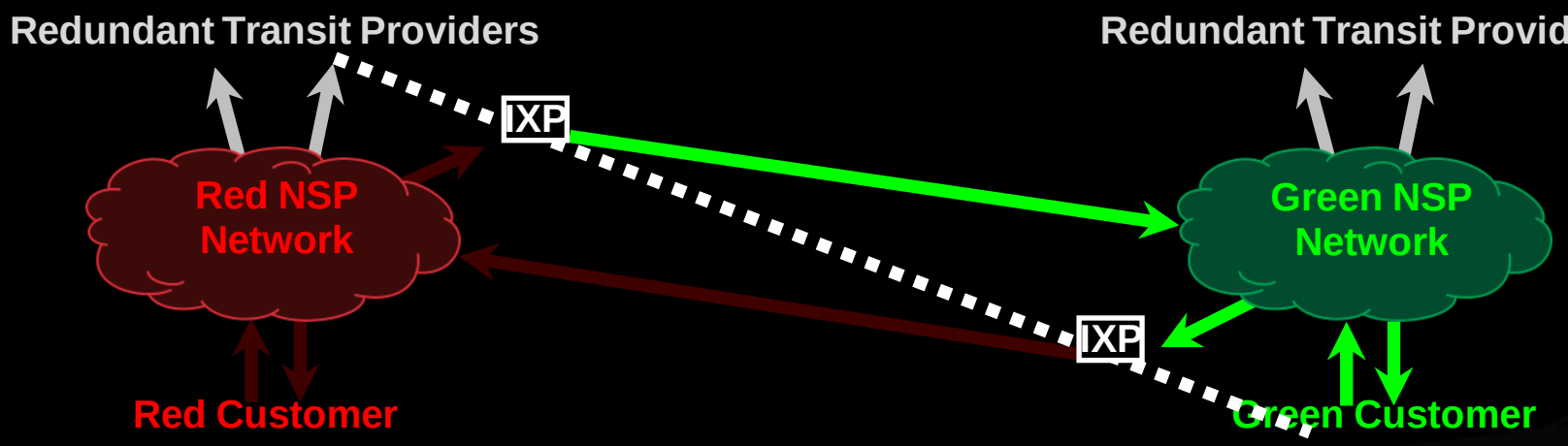
Hot Potato Routing

Red Network is responsible for its own costs



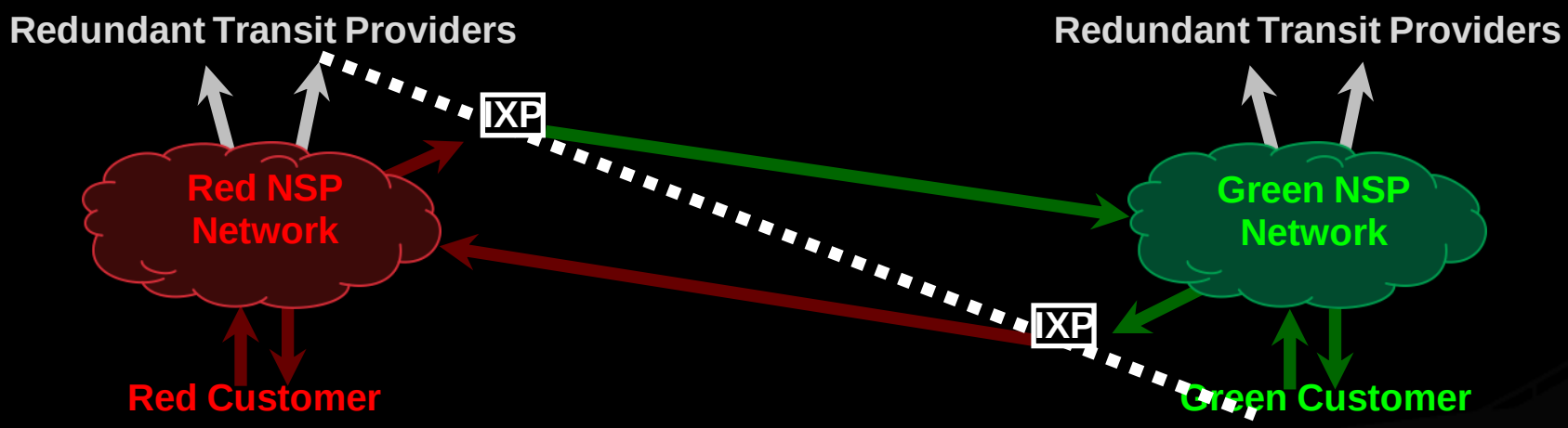
Hot Potato Routing

Green Network is responsible for its own costs



Hot Potato Routing

Symmetry: Fair sharing of costs



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The efficiency of the Internet depends upon this principle:

For any two parties who wish to exchange traffic, there must be a pair of exchanges, one near each party.

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The manifestation of this inefficiency:

Countries which haven't yet built Internet Exchange Points disadvantage themselves, and export capital to countries that already have.

Benefits of a "Nearer IX"

- Technical
  - IXPs provide cheaper, more efficient, lower latency paths between networks
    - Provide an interface between multiple ISPs – this in turn enables ISPs to avoid 'tromboning' local and regional traffic

Benefits of a "Nearer IX"

- Economic
  - Reduces the APBDC, or "cost of goods" allowing ISPs to maintain higher levels of profitability, reduce costs, or increase reinvestment
  - Helps stimulate market entry by new ISPs, web hosting and equipment co-location developers, and content creators.

Benefits of a "Nearer IX"

- Social
  - IXPs help foster a local community – for technical skill, content developers and service providers

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From "Can't" to "Should"

Questions Commonly Raised in IXP Start Up Discussions

FREQUENTLY ASKED QUESTIONS

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The FAQ List

- We've found around the globe that the common positions and questions on IXPs and the IXP startup process can be grouped into the following categories:
  - We Can't Because…
  - We Shouldn't Now Because…
  - How Can We…
  - What will We need to…
  - But What About…

We Can't Because…

- Our market is too small
- There is no suitable venue
- Someone will jump on our transit
- Our network is optimized for US exchanges
- Its going to be too expensive
- All of the other guys wont come on board

We Shouldn't Because…

- We don't have enough local traffic to exchange
- We'll be giving our competitors an unnecessary advantage
- Things are just fine as they are
- Government/Regulators will mess everything up

How Can We….

- Build ours economically
- Determine what governance model is right for us
- Find the right location
- Manage the Exchange efficiently
- Increase the size of our Market
- Get big content providers to participate
- Encourage small ISPs to participate
- Get more information on IXPs

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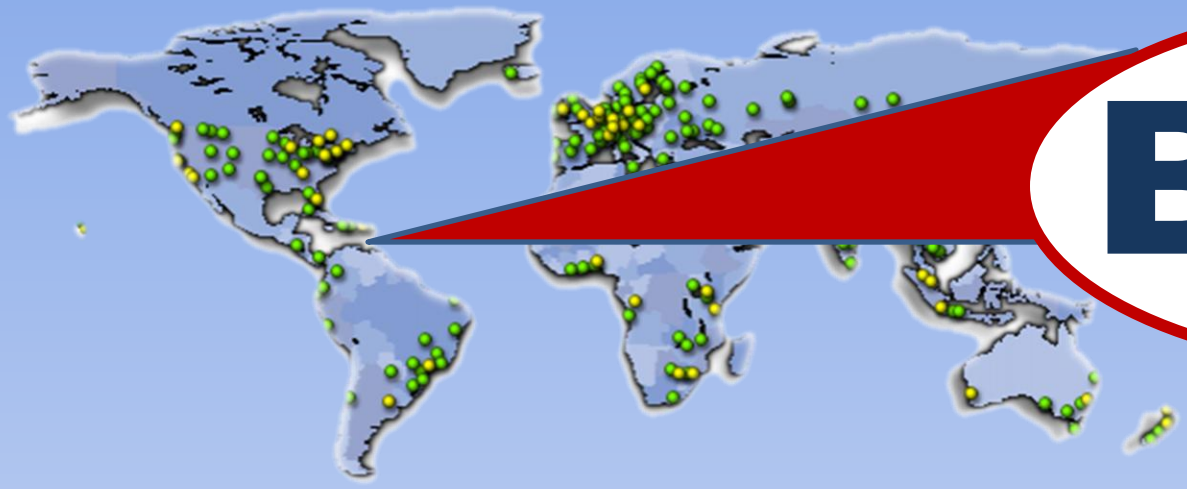

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Making it Happen

BRITISH VIRGIN ISLANDS INTERNET EXCHANGE CHECKLIST

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IXP Business & Technical Policy

There must be agreement amongst stakeholders BEFORE IXP is set up

- Key areas to be negotiated between members
  - ☑Governance
  - ☑Location
  - ☑Pricing
  - ☑Policy
  - ☑Additional Services

Summary Checklist

- ☑ Governance (Ownership)
  - ☑ **MOU**
  - ☑ Non Profit
  - ☑ Private corporation
  - ☑ Corporative
- ☑ Governance (Management)
  - ☑ Board?
  - ☑ 1 Vote per Member?
  - ☑ Money Management?

Summary Checklist

- ☑Location
  - ☑In/Out Town?
  - ☑Facility?
    - ☑Neutral/ISP/Gov/University?
  - ☑ Rent or Rent-Free?
  - ☑Connectivity
  - ☑Building Ownership

Summary Checklist

- ☑Pricing
  - ☑Free?
  - ☑Flat Rate?
  - ☑Traffic Based?
- ☑Additional Services
  - ☑Yes?
  - ☑No?
- ☑Business Policy
  - ☑Acceptable use
    - ☑Key considerations?
- ☑Technical Policy
  - ☑Interconnection
    - ☑Which Model?
  - ☑Technical Management

Summary Checklist

- ☑Governance (Management)
- ☑Location
- ☑Pricing
- ☑Interconnection policy
- ☑Acceptable use
- ☑Additional Services

Summary

- Peering is a complement to transit – only top-tier ISPs can rely solely on peering for coverage.
- Companies will peer when they perceive mutual benefit.
- Peering agreements are the result of commercial negotiations.
- Each ISP decides whether, how, and where to peer by weighing the benefits and costs of entering into a particular interconnection agreement.

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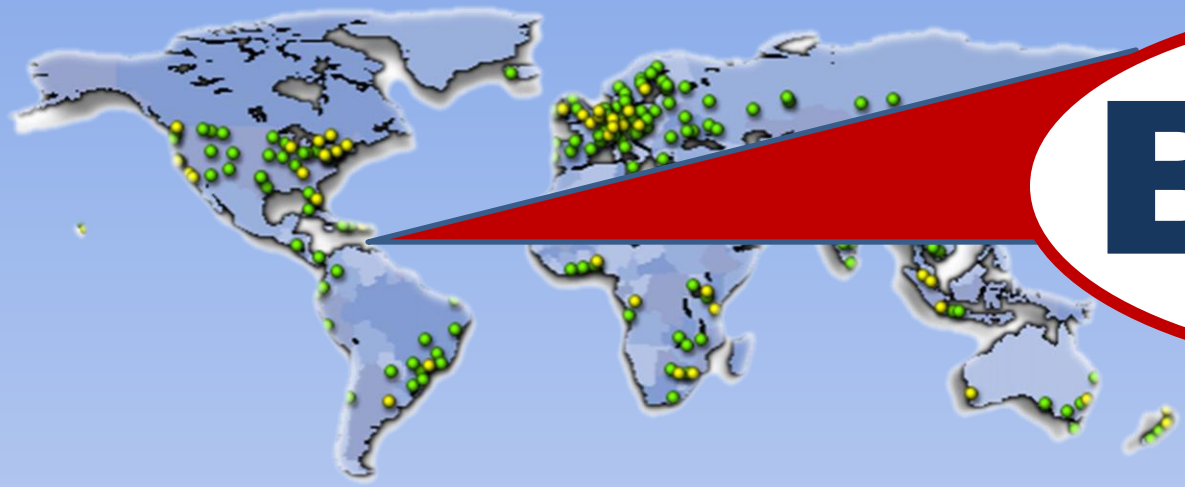

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OPEN FORUM

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Thank You…

Online Resources

- Packet Clearing House: http://www.pch.net
- Global IXP Directory: http://www.ep.net
- Euro-IX Association of IXP Operators: http://www.euro-ix.net
- RIPE EIX Working Group: http://www.ripe.net/ripe/wg/eix/