

Remote Peering

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Meet the Presenter



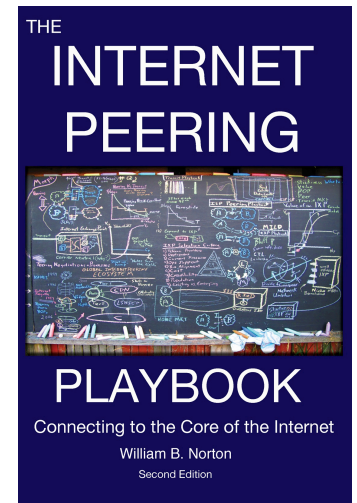
William B. Norton

- Started working on Internet (NSFNET) in 1988
- 1st “Chairman” of North American Network Operator Group (NANOG) (1994-1998)
- 1998-2008 Co-Founder & Chief Technical Liaison, Equinix Inc. (NSDQ: EQIX)
- 2008-Present - DrPeering, Executive Director
 - Two-day On-Site Peering Workshops (EU/Africa)
- 2013 International Internet Exchange (IIX) CSO

White paper process...

White Paper Process

- Peering : under-documented Internet Operations Topic
- Interconnection Strategies for ISPs
 - “When does peering make sense?”
 - Lunches, document answers, create model, review, stepwise refinement
- Result: White Paper that reflects the community mindset
- 2008: 12 white papers --> Book



on Amazon.com
DropBox
iTunes

Freely available on
<http://DrPeering.net>

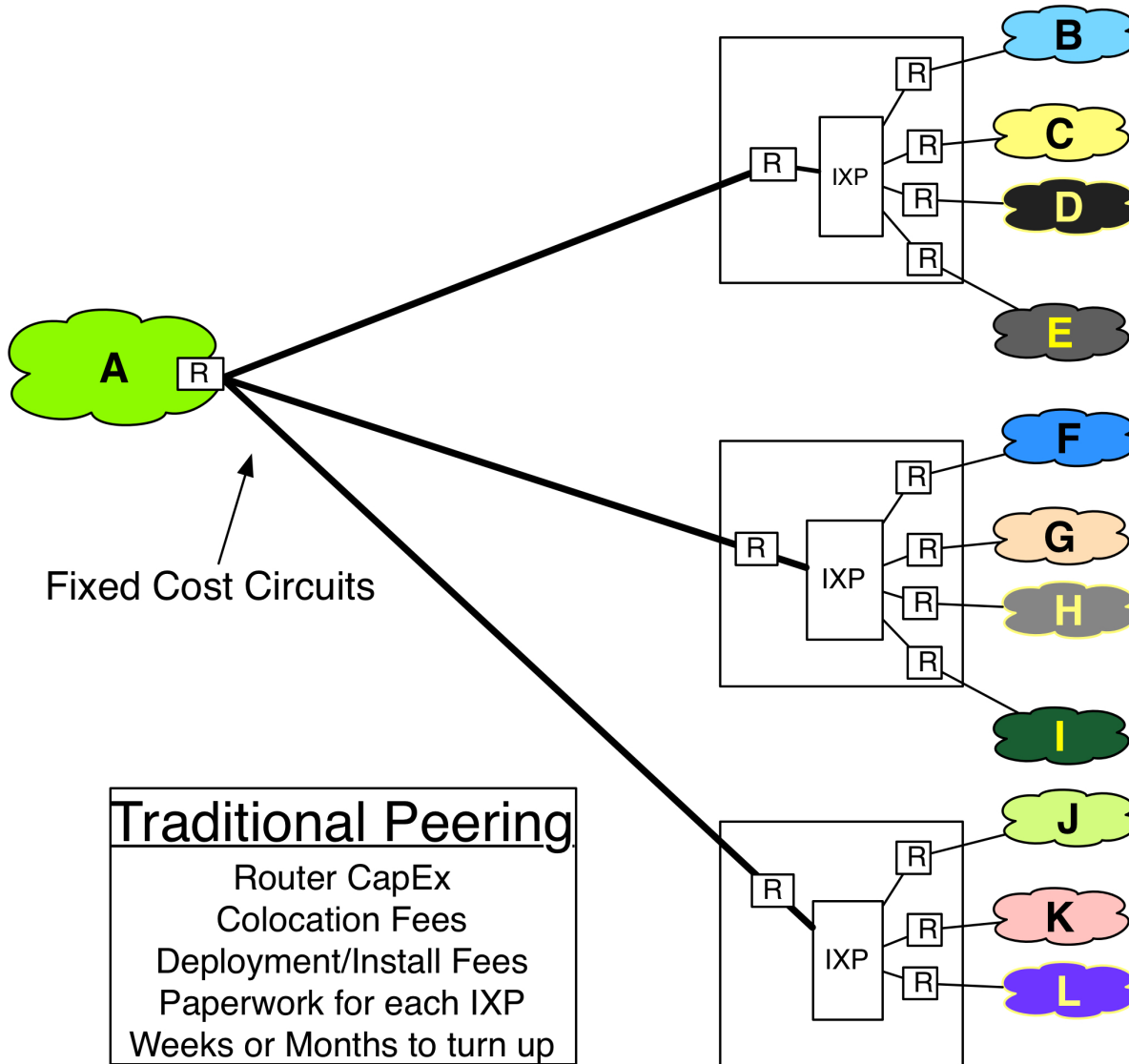
What has changed?

Interesting things

1. ePublishing – price \leq \$9.99 70%, 30%
 2. Content Providers Network Savvy & Peering
 3. Obstacles to African Fiber Deployment
- Talk about 2 things today:
 1. Remote Peering
 2. ...stumbled upon another interesting thing...

REMOTE PEERING

Traditional Peering Model

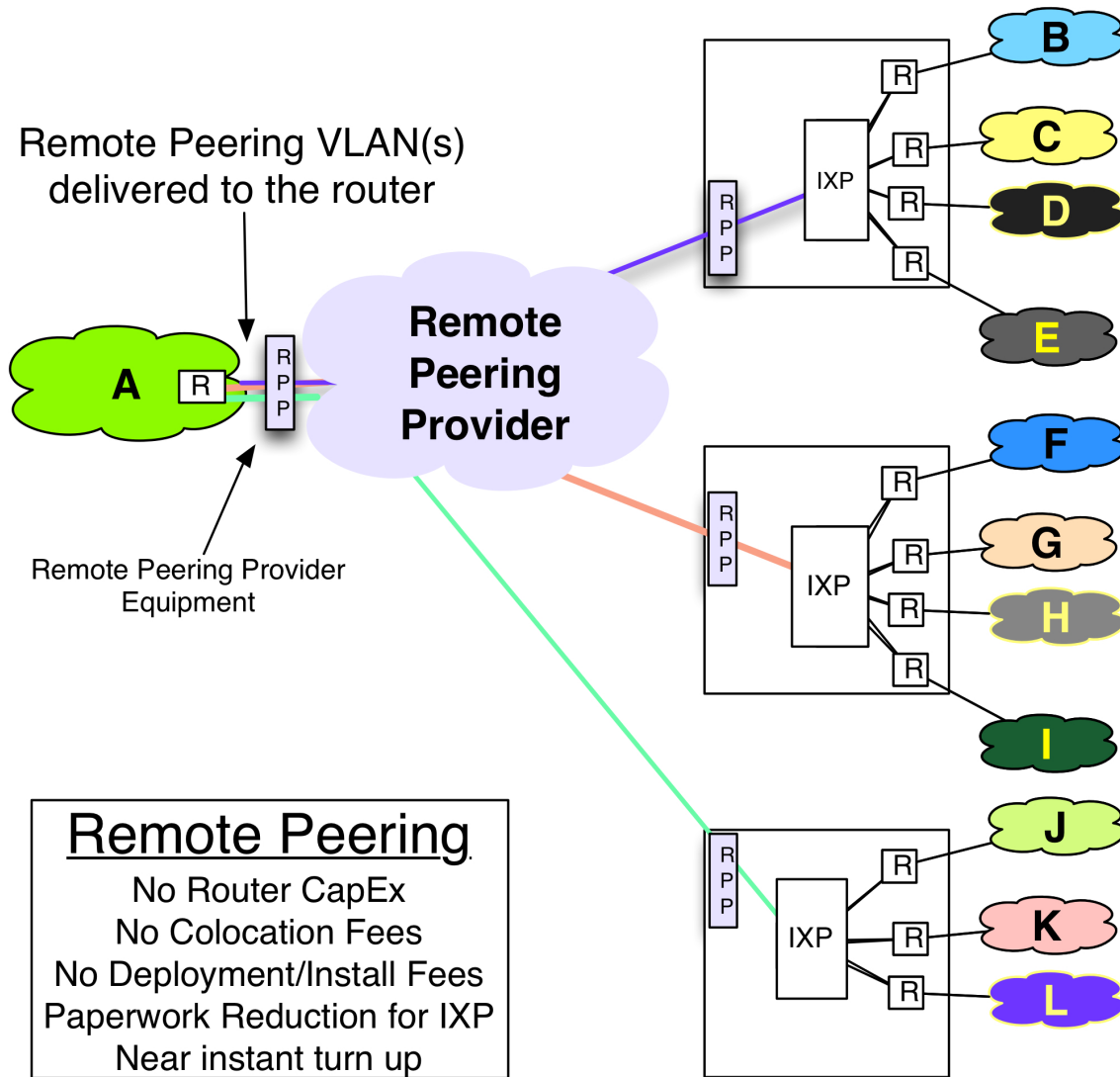


Traditional Peering
 Router CapEx
 Colocation Fees
 Deployment/Install Fees
 Paperwork for each IXP
 Weeks or Months to turn up

Component	Cost
10G Transport	\$1500/mo
Router	\$2000/mo
Colo	\$1500/mo
10G Peering Port	\$2000/mo
	\$7000/mo

$$\begin{aligned}
 \text{MinCostOfTrafficExchange} &= \frac{\text{CostOfPeering}}{\text{EffectiveBandwidth}} \\
 &= \frac{\$7000 / \text{mo}}{7000 \text{ Mbps}} = \$1 / \text{Mbps}
 \end{aligned}$$

Remote Peering Model



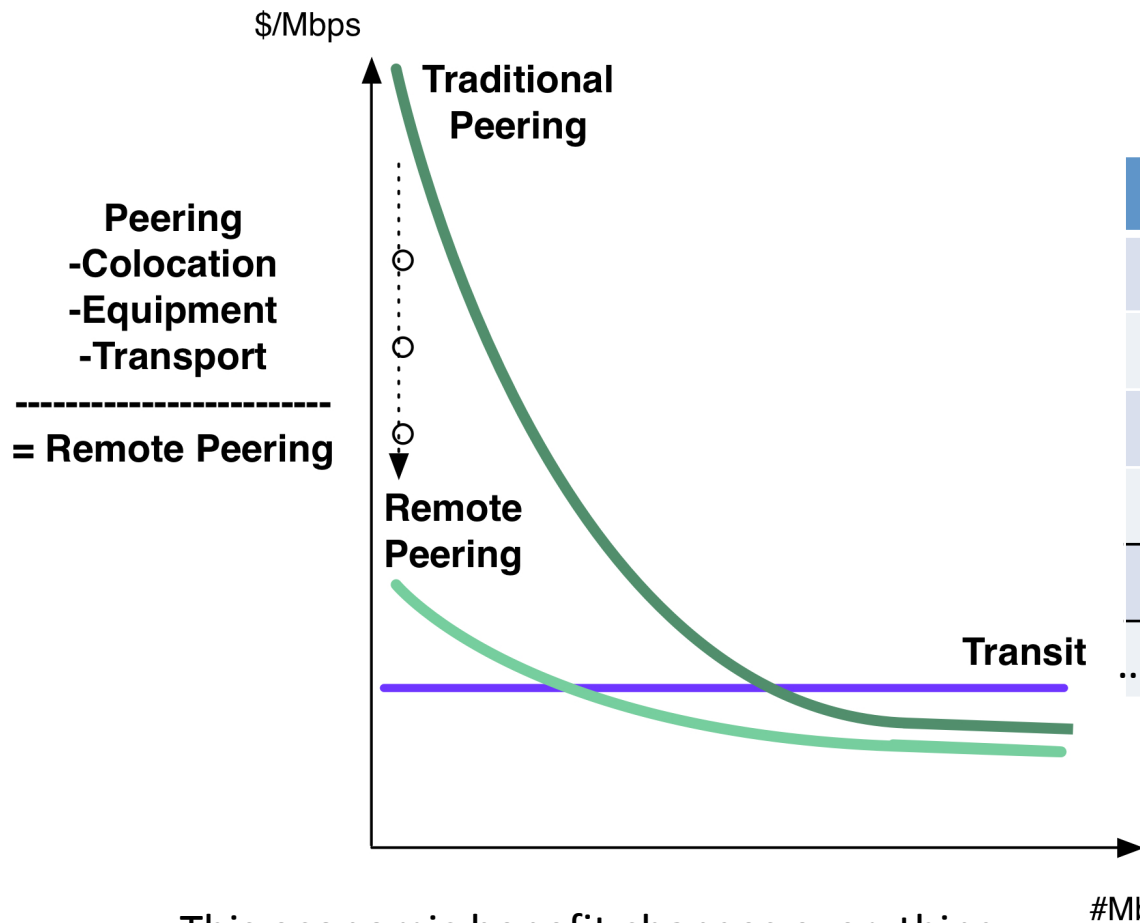
Component	Cost
10G RemotePeering	\$1500/mo
Router	\$2000/mo
Colo	\$1500/mo
10GPeering Port	\$2000/mo
	\$3500/mo

$$MinCostOfTrafficExchange = \frac{CostOfPeering}{EffectiveBandwidth}$$

$$= \frac{\$3500 / mo}{7000Mbps} = 50cents / Mbps$$

The Business Case for Remote Peering

Traditional Peering
vs. Remote Peering
vs. Internet Transit



Why does this work?

Component	Cost
10G RemotePeering	\$1500/mo
Router	\$2000/mo
Colo	\$1500/mo
10GPeering Port	\$2000/mo
	\$3500/mo

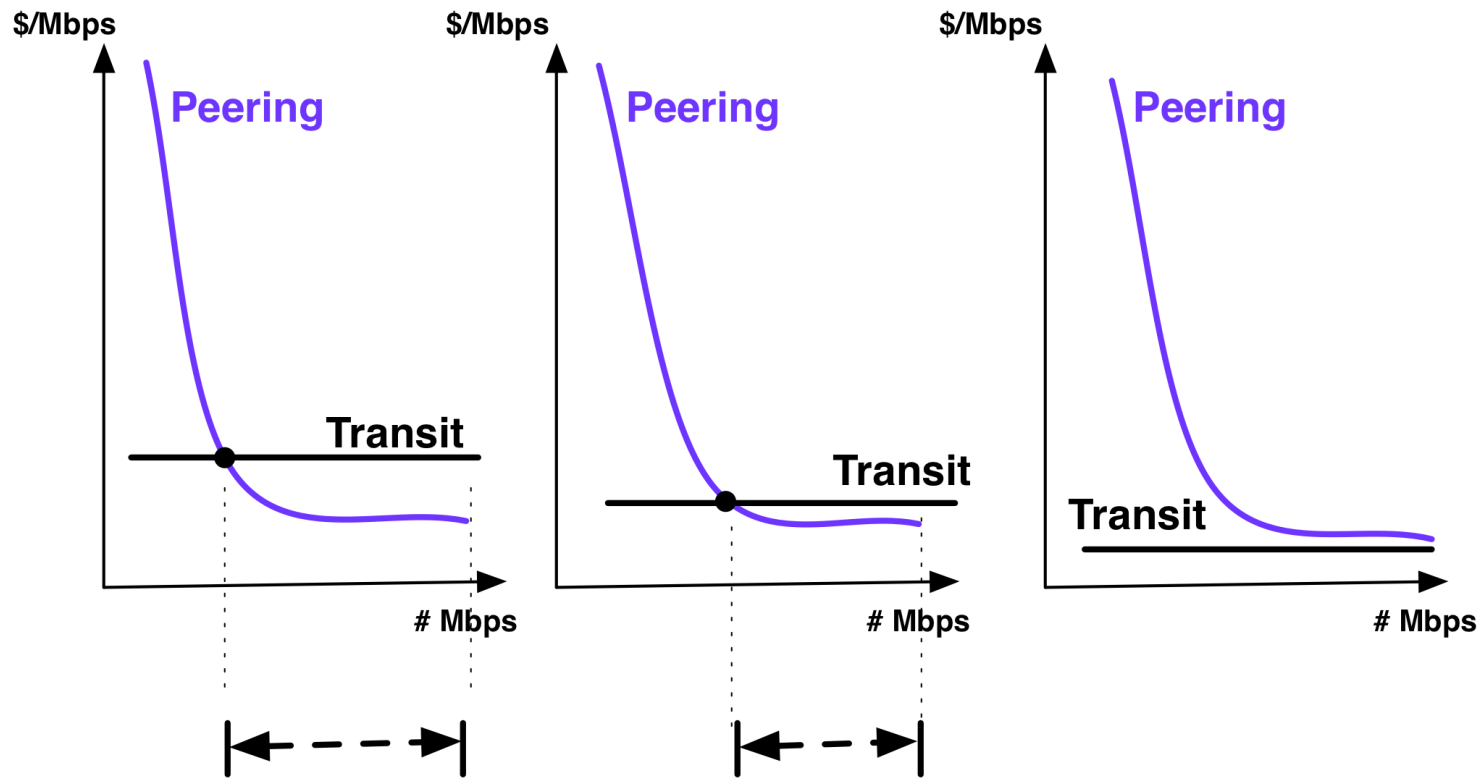
...we remove the relatively static costs

...This economic benefit changes everything

#Mbps

Breath of fresh air...

Breath of Fresh Air to Peering Community



**Peering Break-Even Point
easy to reach,
Long runway**

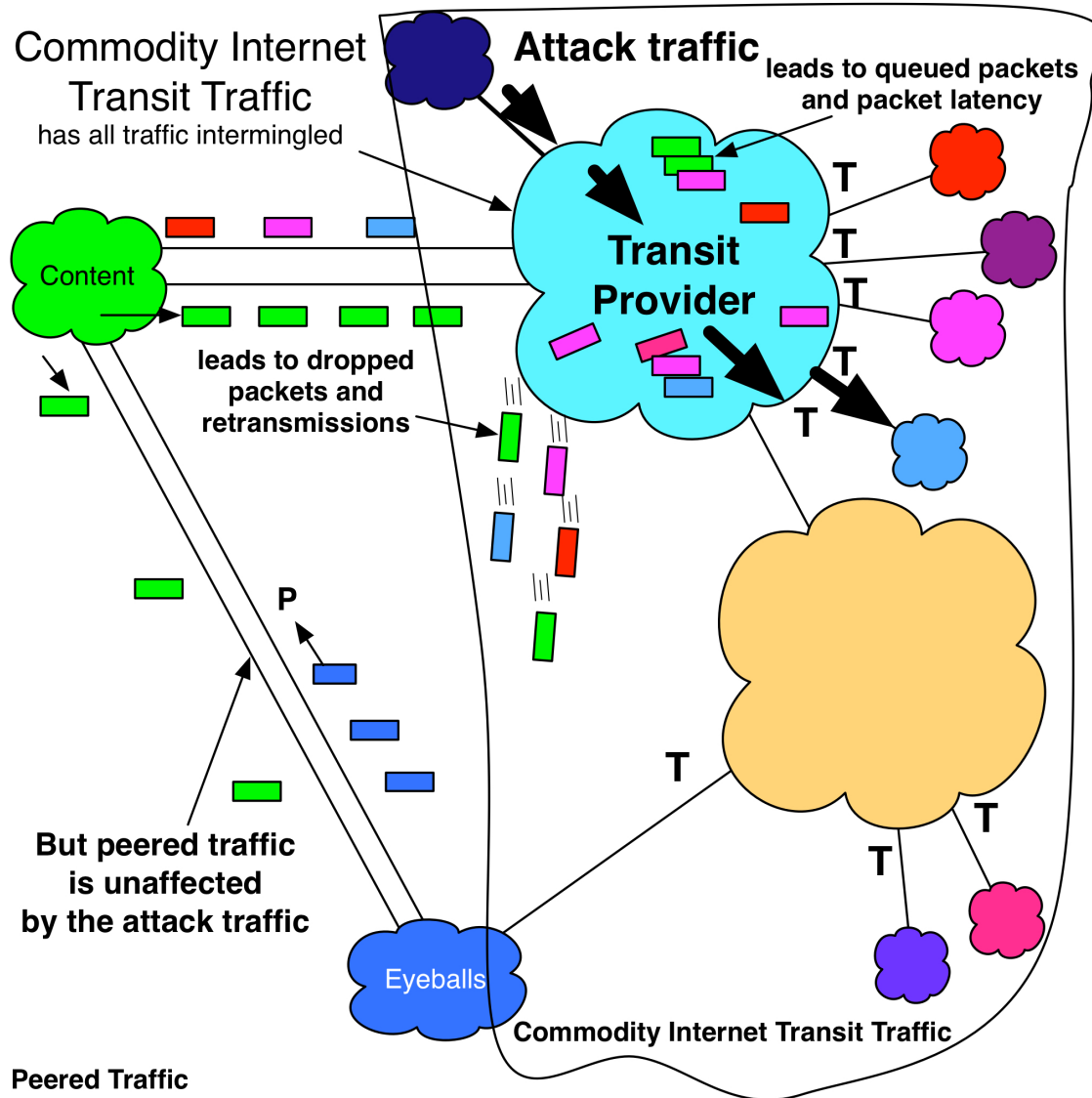
**Peering Break-Even Point
harder to reach,
Short runway**

**Peering Break-Even Point
unreachable,
No Runway**

My new bold thesis

PEERING IMPROVES SECURITY

#1) Less vulnerable to *side effects* of DOS



Denial of Service Attack

Counter:
More Resilience not Secure

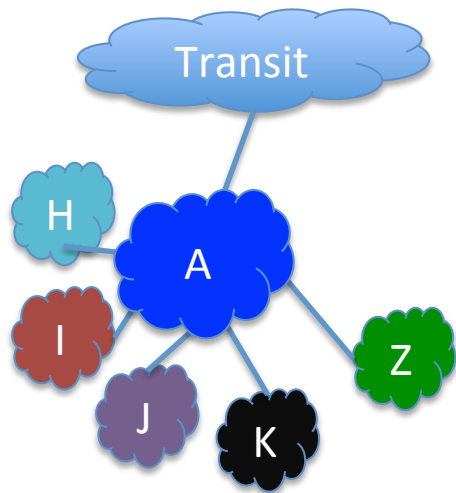
Secured communications
Requires that pkts get through!

Therefore,
Peering Improves Security

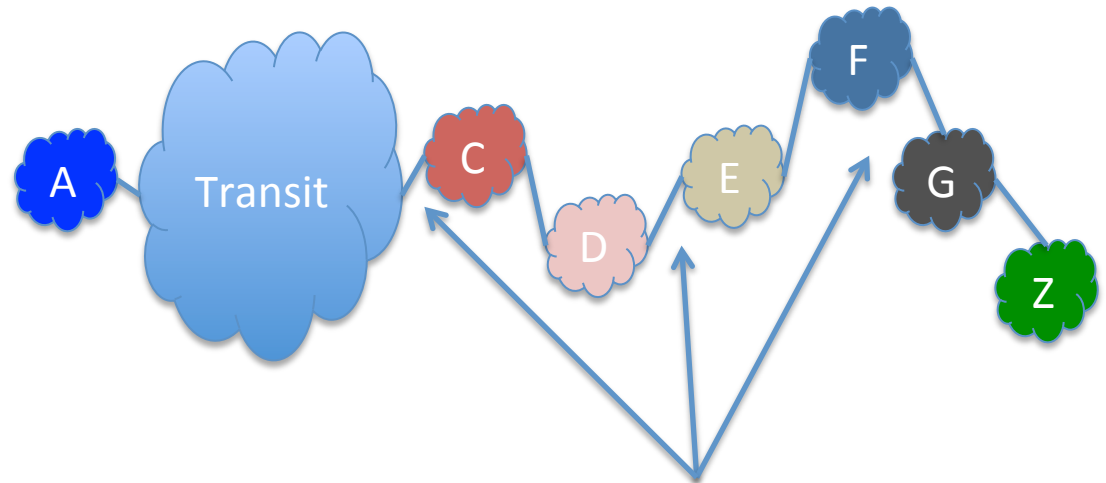
#2) Less Points of vulnerability

A Network Operator that Peers

A Network Operator that only buys Internet Transit



Vs.



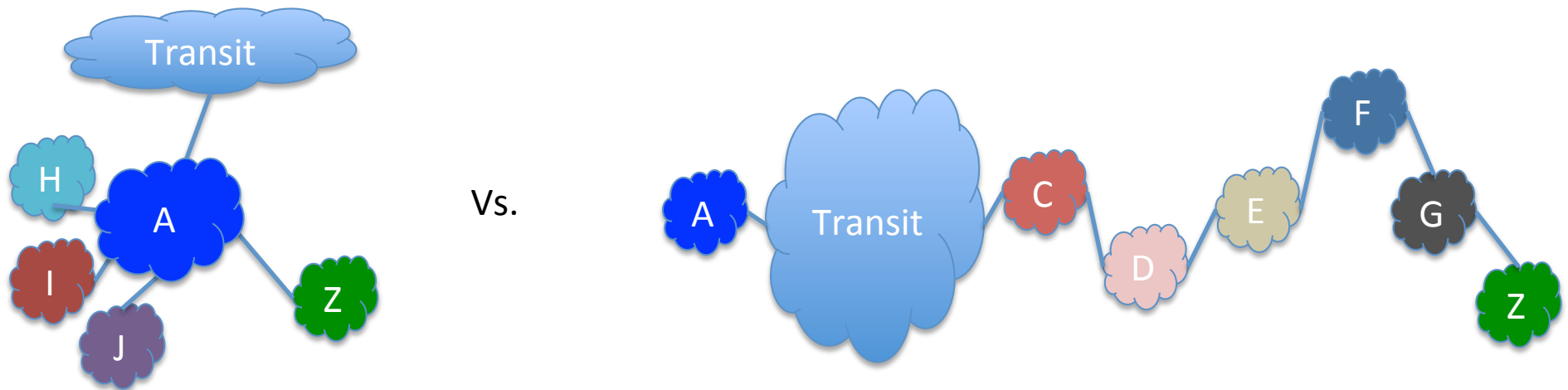
Longer paths are more vulnerable to

- Attack, capture, Man-in-the-middle, etc.
- Less visibility along traffic path

Counter: Capture at transport layer

Counter-Counter: Worse w/longer AS Path

#3) Direct NetOps-NetOps relationship



- Practical: Escalation Path
- Direct Contact: Personal Relationships
- Speed addressing problem

Summary

1. Remote Peering is peering without a physical router presence required at the IXP
2. Remote Peering reduces CapEx and OpEx
 - Enables more networks to start peering
 - Enables networks to peer in more places
 - Breathes new life into the peering ecosystem
3. Peering Improves Security

Thank you for your time!

Email me for a PDF of
Chapter 14: Remote Peering

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