





The Peering Math 

Understanding the

# Business Case for Peering



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# THE BUSINESS CASE FOR PEERING

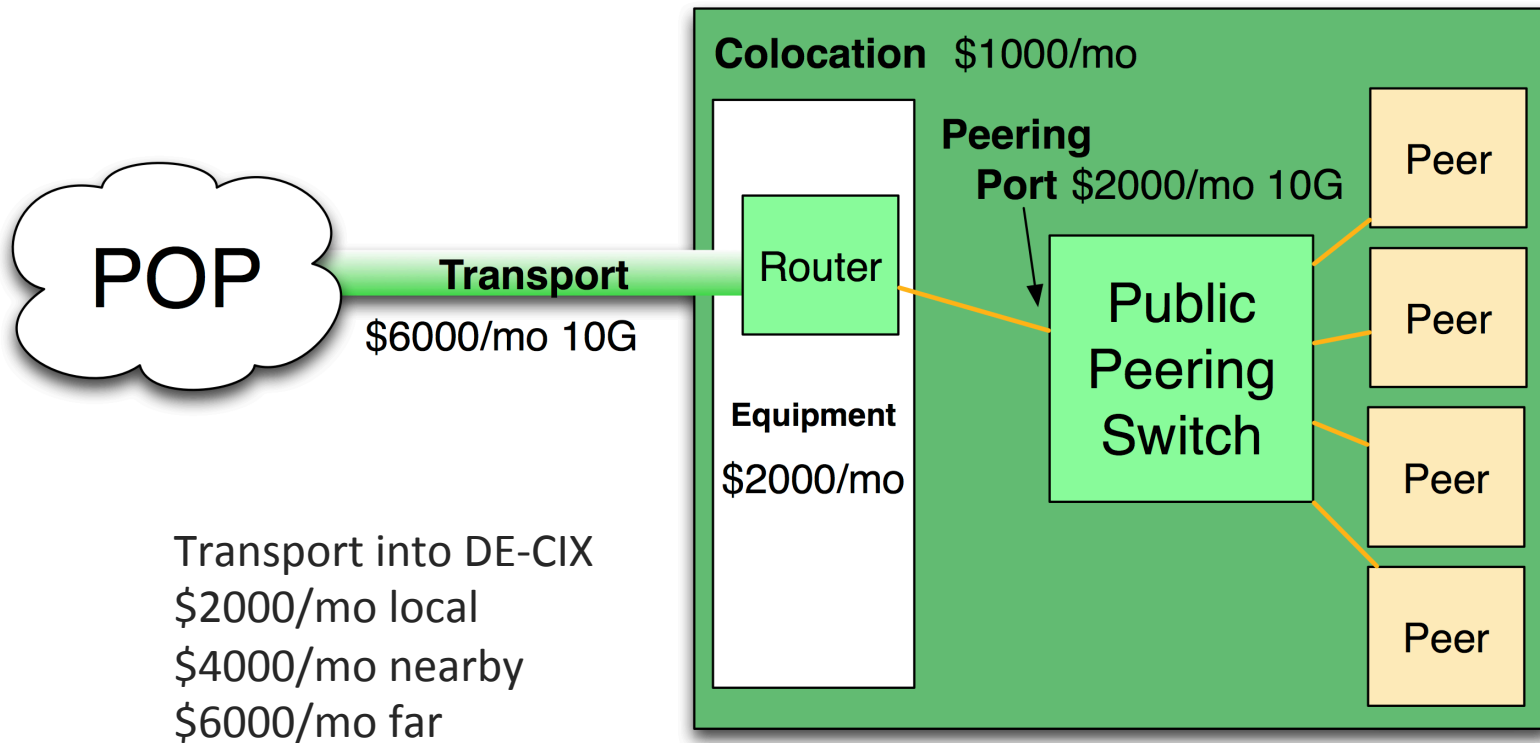
# Overview of this Business Case for Peering Section

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- “For the CFO, keep it simple”
  - When does peering make sense financially?
  - Don’t convince, prove.
  - “Tell me again why I should burn a port for free peering when I could make revenue off of it?”
- Bryan Garrett (BellSouth) story
  - Used internally
  - Reviewed quarterly
  - External expertise

# The Cost of Peering in Germany

Assumptions	Far
Transport into IX:	\$6,000 per month
Colocation Fees:	\$1,000 per month
Peering Fees:	\$2,000 per month
Equipment Costs:	\$2,000 per month
<b>Total Cost of Peering:</b>	<b>\$11,000 per month</b>



# Cost of Internet Peering

<b>Assumptions</b>	<b>Far</b>
Transport into IX:	\$6,000 per month
Colocation Fees:	\$1,000 per month
Peering Fees:	\$2,000 per month
Equipment Costs:	\$2,000 per month
<b>Total Cost of Peering:</b>	<b>\$11,000 per month</b>

Cost of Peering allocated across the amount of traffic peered for free.

<b>Mbps Exchanged</b>	<b>Peering Cost</b>
100 Mbps	\$110.00 per Mbps
200 Mbps	\$55.00 per Mbps
300 Mbps	\$36.67 per Mbps
400 Mbps	\$27.50 per Mbps
500 Mbps	\$22.00 per Mbps
600 Mbps	\$18.33 per Mbps
700 Mbps	\$15.71 per Mbps
800 Mbps	\$13.75 per Mbps
900 Mbps	\$12.22 per Mbps
1000 Mbps	\$11.00 per Mbps
1100 Mbps	\$10.00 per Mbps
1200 Mbps	\$9.17 per Mbps
1300 Mbps	\$8.46 per Mbps
1400 Mbps	\$7.86 per Mbps
1500 Mbps	\$7.33 per Mbps

# 4 Internet Peering Metrics

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- All of these metrics are variants of **Does Peering make sense?**
  1. **Peering Break Even Point:** How much traffic do I have to peer for free to save enough money to cover the cost of peering?
  2. **Effective Peering Bandwidth:** What is the maximum amount of traffic I can realistically push through peering infrastructure?
  3. **Minimum Cost of Traffic Exchange:** When I max out peering, what will be the best case scenario cost of peering?
  4. **Effective Peering Range:** Where is the peering sweet spot, when peering proves financially rational?

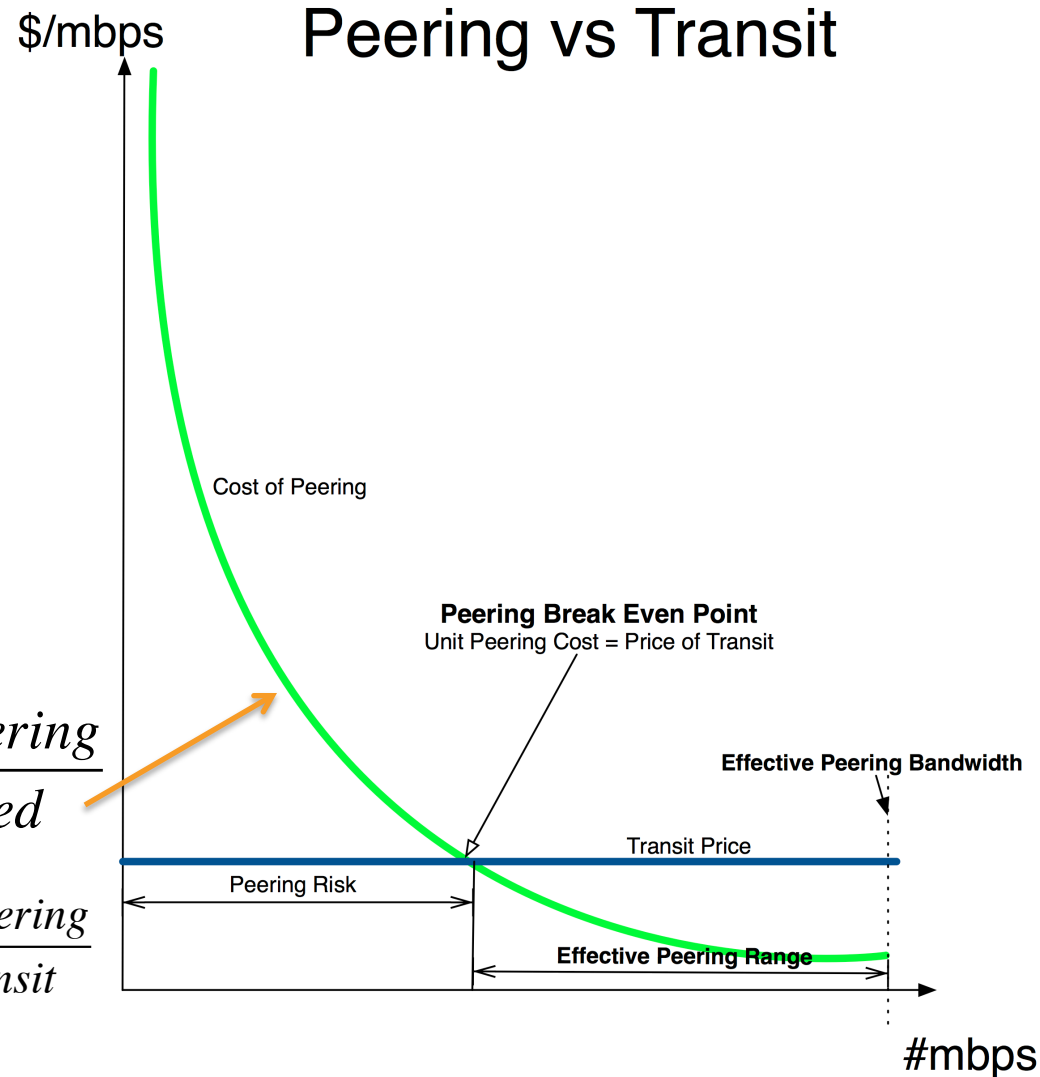


# Peering Breakeven Point

- **Definition:** The **Peering Break Even Point** is the point where the unit cost of peering exactly equals the unit price of Internet Transit.
- Example use: “If we can peer at least 3Gbps it will save us money to peer.”

$$CostOfPeering = \frac{MonthlyCostOfPeering}{\#MbpsExchanged}$$

$$PeeringBreakEvenPoint = \frac{MonthlyCostOfPeering}{UnitPriceOfTransit}$$



# Application of Peering Breakeven Point

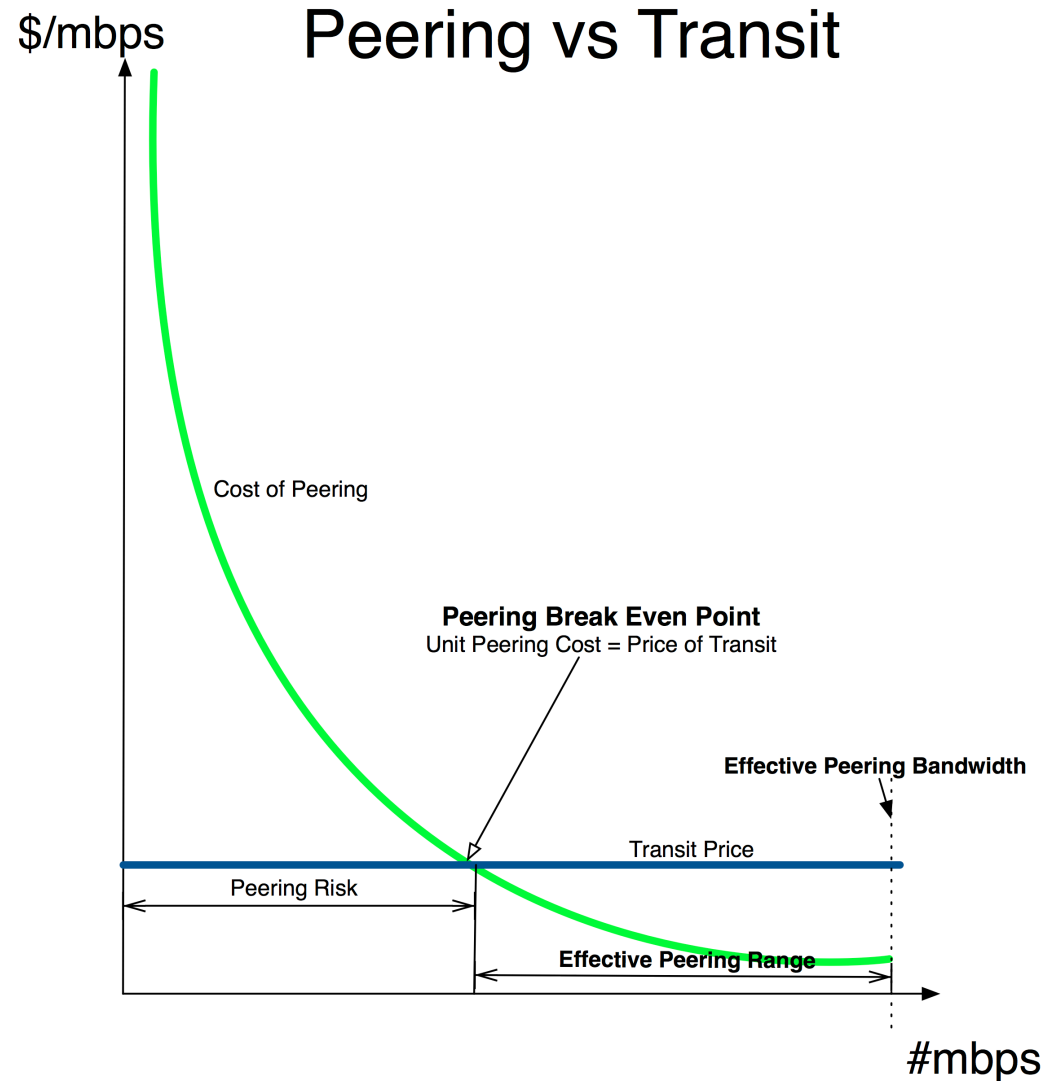
- “If you can peer 3143Mbps I can prove to you it makes sense to build in”

<b>Assumptions</b>	<b>Far</b>	<b>Near</b>	<b>Local</b>
Transport into IX:	\$6,000 per month	\$4,000 per month	\$2,000 per month
Colocation Fees:	\$1,000 per month	\$1,000 per month	\$1,000 per month
Peering Fees:	\$2,000 per month	\$2,000 per month	\$2,000 per month
Equipment Costs:	\$2,000 per month	\$2,000 per month	\$2,000 per month
<b>Total Cost of Peering:</b>	<b>\$11,000 per month</b>	<b>\$9,000 per month</b>	<b>\$7,000 per month</b>
market price at origin	\$3.50 per Mbps	\$3.50 per Mbps	\$3.50 per Mbps
market price at dest	\$2.00 per Mbps	\$2.00 per Mbps	\$2.00 per Mbps
<b>peeringBreakEven (Mbps)</b>	<b>3143 Mbps</b>	<b>2571 Mbps</b>	<b>2000 Mbps</b>
<b>minCostOfTraffic (\$/Mbps)</b>	<b>\$1.57</b>	<b>\$1.29</b>	<b>\$1.00</b>



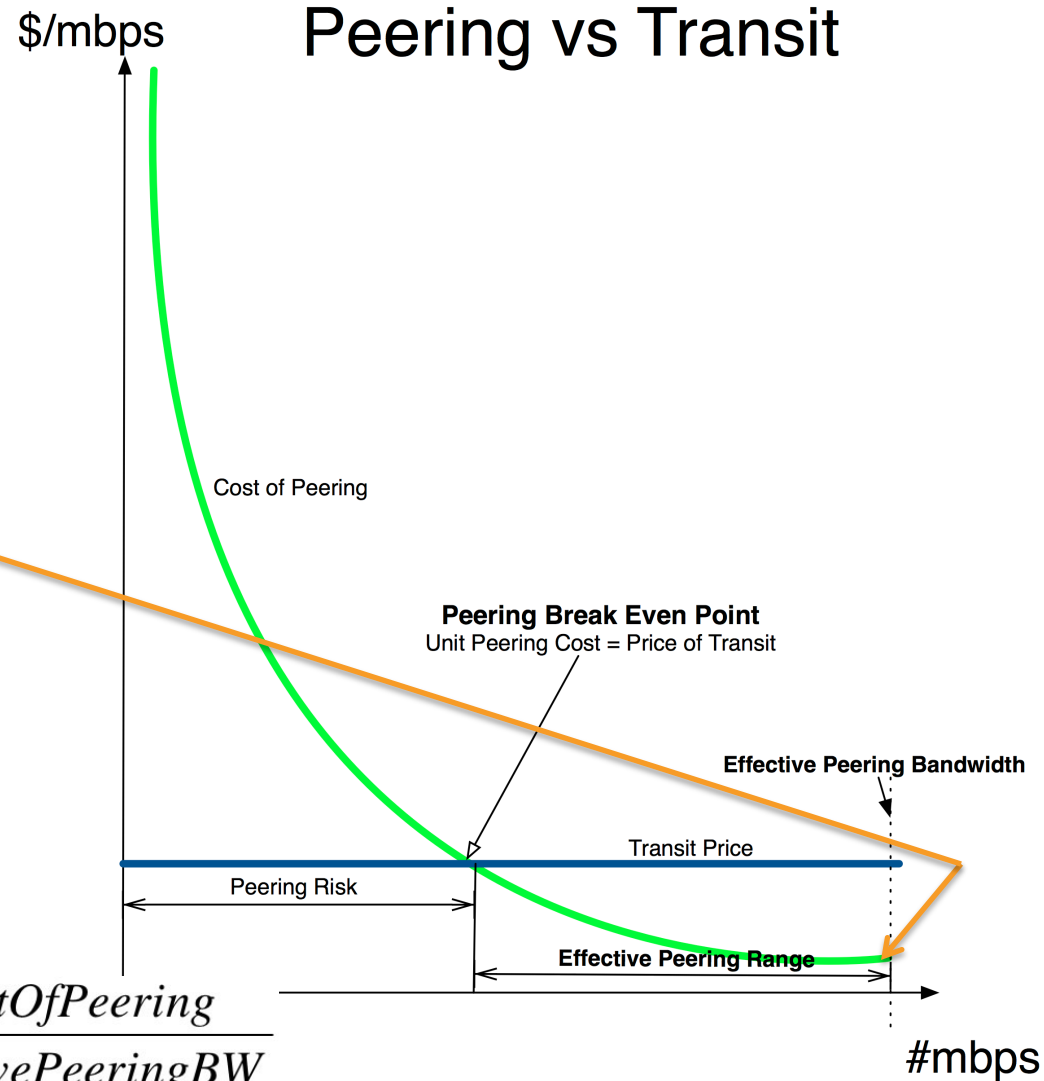
# Effective Peering Bandwidth

- **Definition:** The **Effective Peering Bandwidth** is the maximum amount of traffic that can be safely transported (without packet loss) across a peering infrastructure.
- In practice, about 70%
- Effective Peering Bandwidth = 70% \*  
Thinnest Pipe
- i.e. EPB of 10G is 7Gbps



# Minimum Cost of Traffic Exchange

- **Definition:** The **Minimum Cost for Traffic Exchange** is the lowest unit cost obtainable in a peering infrastructure deployment.
- Example use: “If we max out peering we will pay \$1/Mbps for that traffic.”

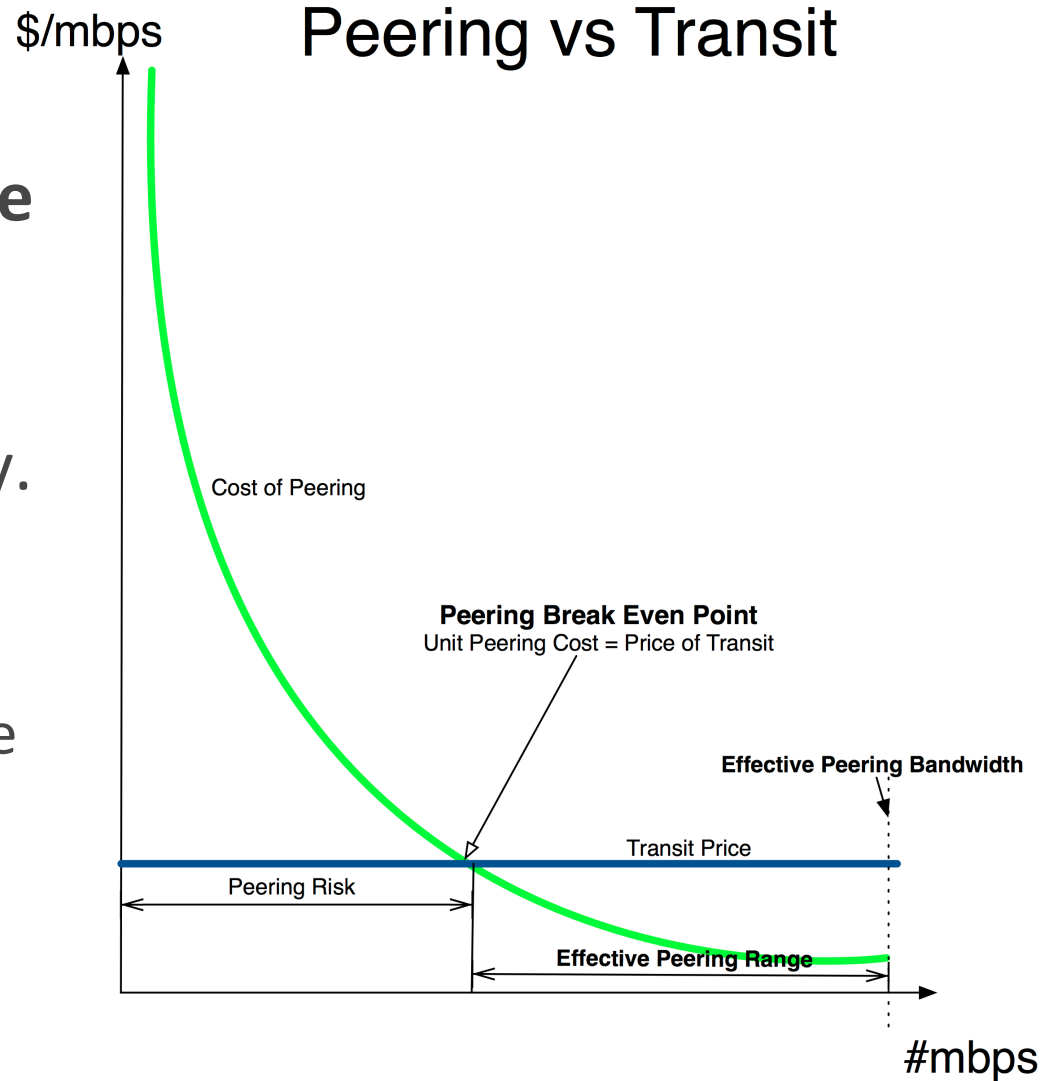


$$\text{minimumCostOfTrafficExchange} = \frac{\text{costOfPeering}}{\text{effectivePeeringBW}}$$

$$\text{minimumCostOfTrafficExchange} = \frac{\$11,000 \text{ perMonth}}{7000 \text{ Mbps}} = \$1.57 \text{ perMbps}$$

# Effective Peering Range

- **Definition:** The **Effective Peering Range** is the range of peering traffic exchange that makes sense financially.
- “Sweet Spot”
- Example use: “Peering provably makes sense if we can freely peer between 3.1Gbps and 7Gbps”



# Non-Financial Motivations for Peering

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1. Low Latency
2. Control Over Routing
3. Redundancy
4. Aggregation benefits w/peering and Transit at IX
5. Make more money with lower latency and loss

# Non-Financial Motivations for Peering

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6. ISP relationships-be one of the cool kids
7. Marketing benefits
8. Network reliability
9. I want to paid to travel

# Challenges with Peering

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- Network Expertise Required
- Admin startup costs
- Peering not always granted
- Greater operational overhead
- Peering process may be slow
- Peering may not be granted
  - Hence the Peering Playbook



# Challenges

- Challenges: Build into an IX? (Get used to the terminology)
- 1. What is the monthly bill if you buy 1.5Gbps of transit at \$2/Mbps and also peer 1Gbps at an IX with a total monthly peering cost of \$5000/month?  
 $1500\text{Mbps} * \$2/\text{Mbps} = \$3\text{K} + \$5\text{K} = \$8\text{K}$
- 2. You have 5 Gbps of video traffic to push and your price of transit is \$2 per Mbps with a 2G commit. Does it make sense to build into Sean's Internet Exchange if the circuit in costs \$3000/mo, colo costs \$1000/mo, the 10Gbps peering port costs \$3000/mo and you think you can peer away 2Gbps for free at the IX?

No: Transit is cheaper @ \$2/Mbps      Peering:  $\frac{\$3\text{K} + \$1\text{K} + \$3\text{K} = \$7\text{K}}{2000\text{Mbps}} = \$3.50/\text{Mbps}$

- 3. You have 3 Gbps of video traffic to push and you just started a two-year contract paying transit fees of \$2 per Mbps with a 2G commit. Does it make sense to build into Abel's Internet Exchange if you can peer 2Gbps away for free with the only cost being port costs at \$2500/mo for a 10 gig port?

No, you are still on the hook for  $2\text{Gbps} * \$2/\text{Mbps} = \$4000$ , adding in the \$2500 for the peering port puts you at \$6500/month! Cheaper to just send all 3Gbps through transit.