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Peering for Pleasure and Profit

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Introductions

- Thanks very much for inviting me to speak to you
- Currently Head of Capacity Planning and Peering and Transit strategy at Easynet/Sky
- RIPE NCC Board member
- Peering Coordinator at British Telecom, Level 3 (Europe and Asia), PacketExchange, and Flag

Agenda

- What am I talking about?
- What is peering and why you should do it
- Exchange points and direct peering
- Tools of the trade
- Peering policy – what is it
- Peering Strategy – what is it
- Sample Strategies
    - Small ISP or content provider
    - National ISP
    - Regional ISP
    - Global with Tier 1 pretensions
- Conclusions
- Questions and Answers

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Why the title?

Pleasure: The state or feeling of being pleased or gratified.

1. A source of enjoyment or delight: *The graceful skaters were a pleasure to watch.*

2. Amusement, diversion, or worldly enjoyment: *"Pleasure . . . is a safer guide than either right or duty"* (Samuel Butler).

3. Sensual gratification or indulgence.

4. One's preference or wish: *What is your pleasure?*

Why the title?

Profit:

- An advantageous gain or return; benefit.

- The return received on a business undertaking after all operating expenses have been met.

Why the title?

Peering:

- The act of one national Internet backbone provider accepting and passing traffic from another national provider. See NAP.
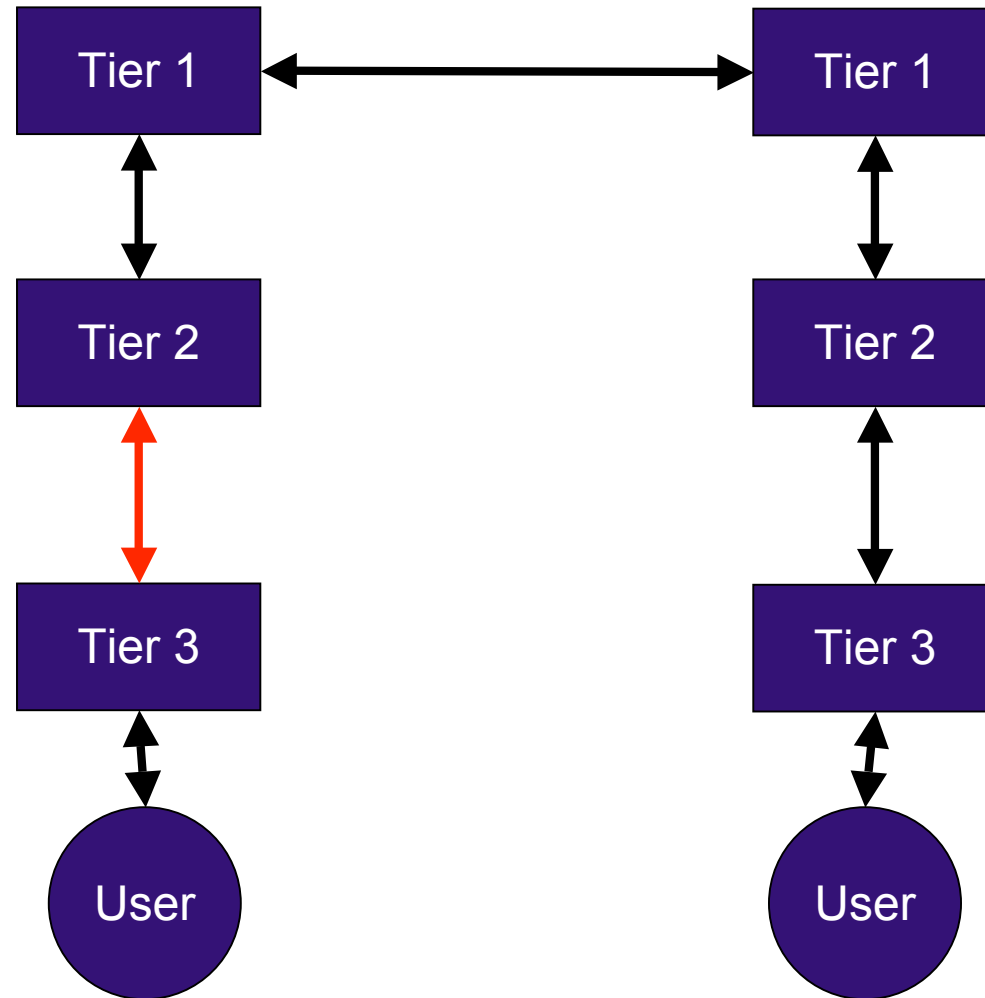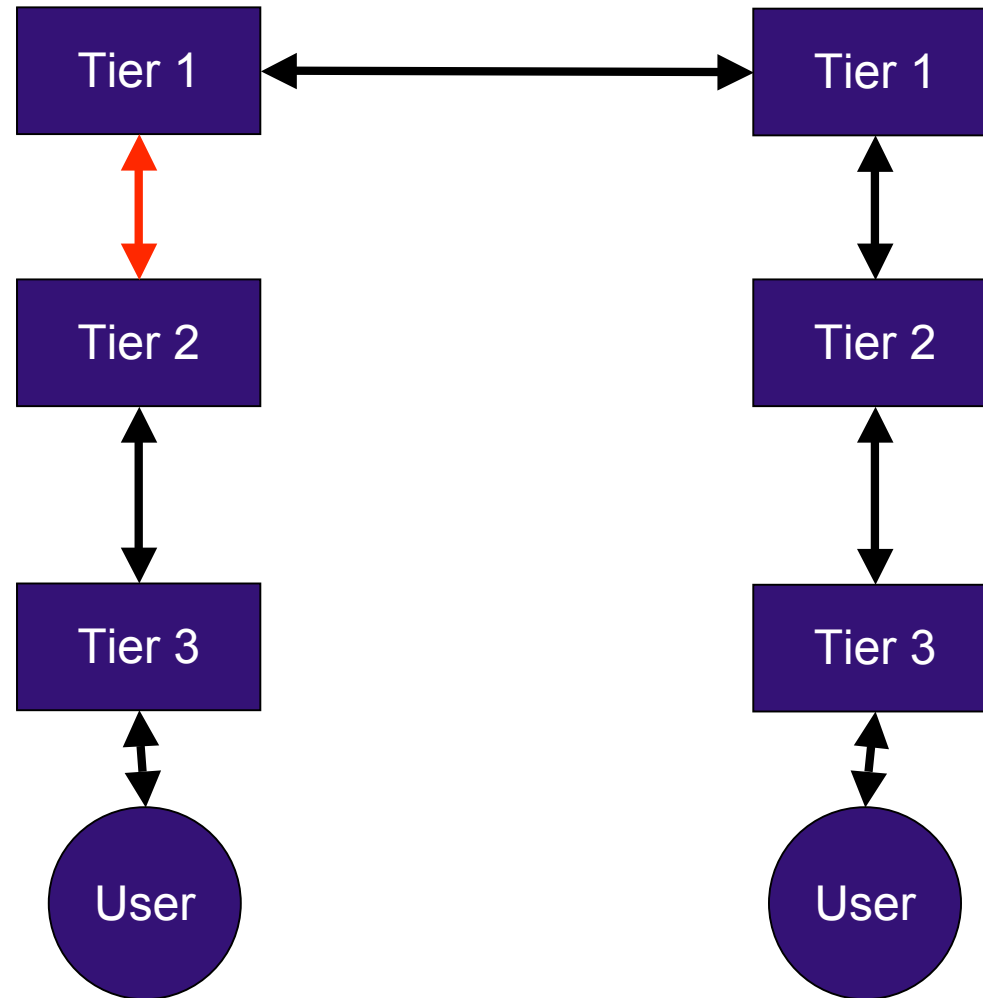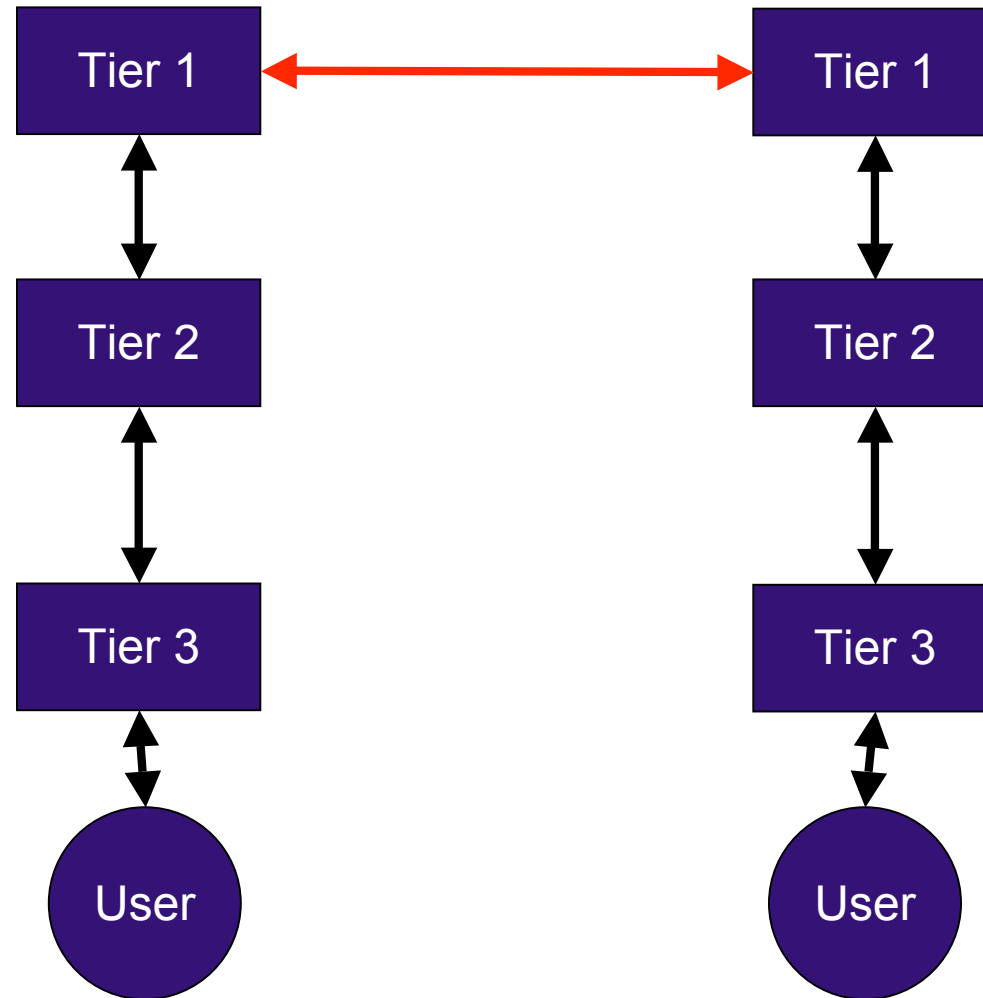
Peering – what is it?
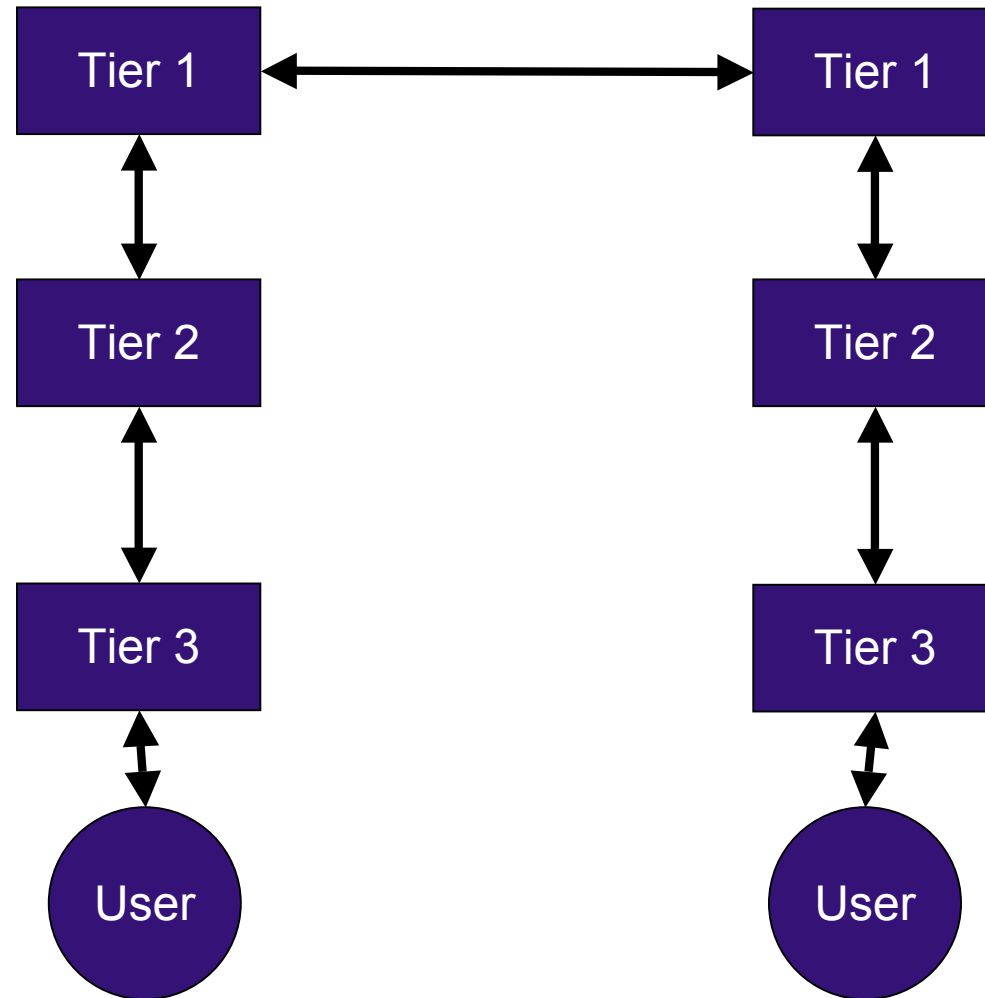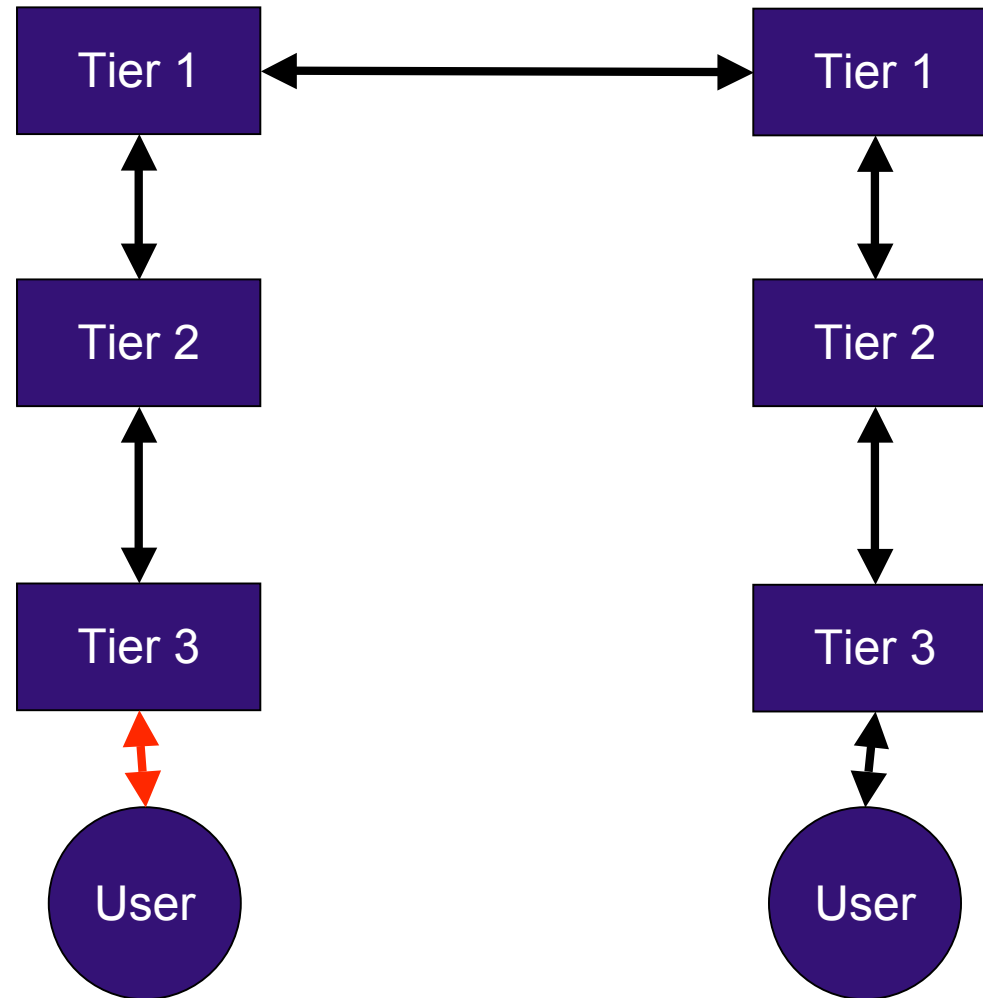
Peering – what is it?

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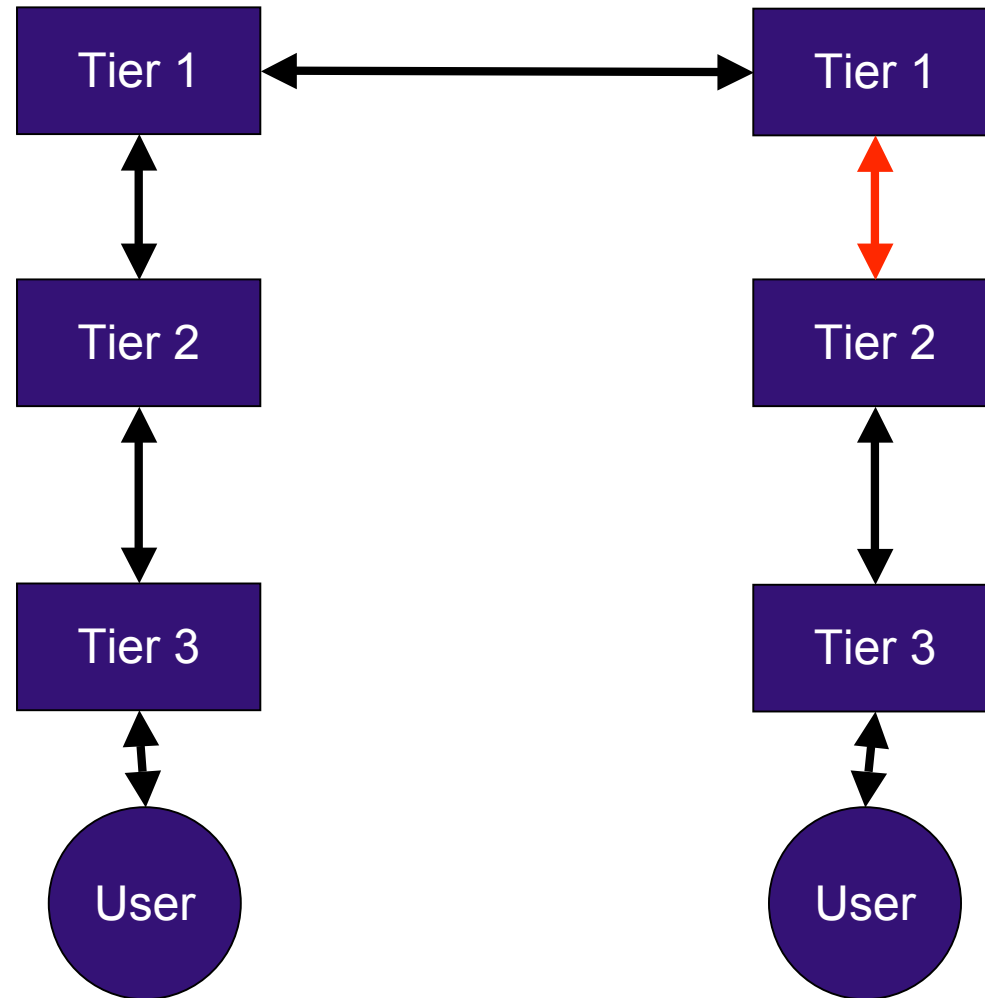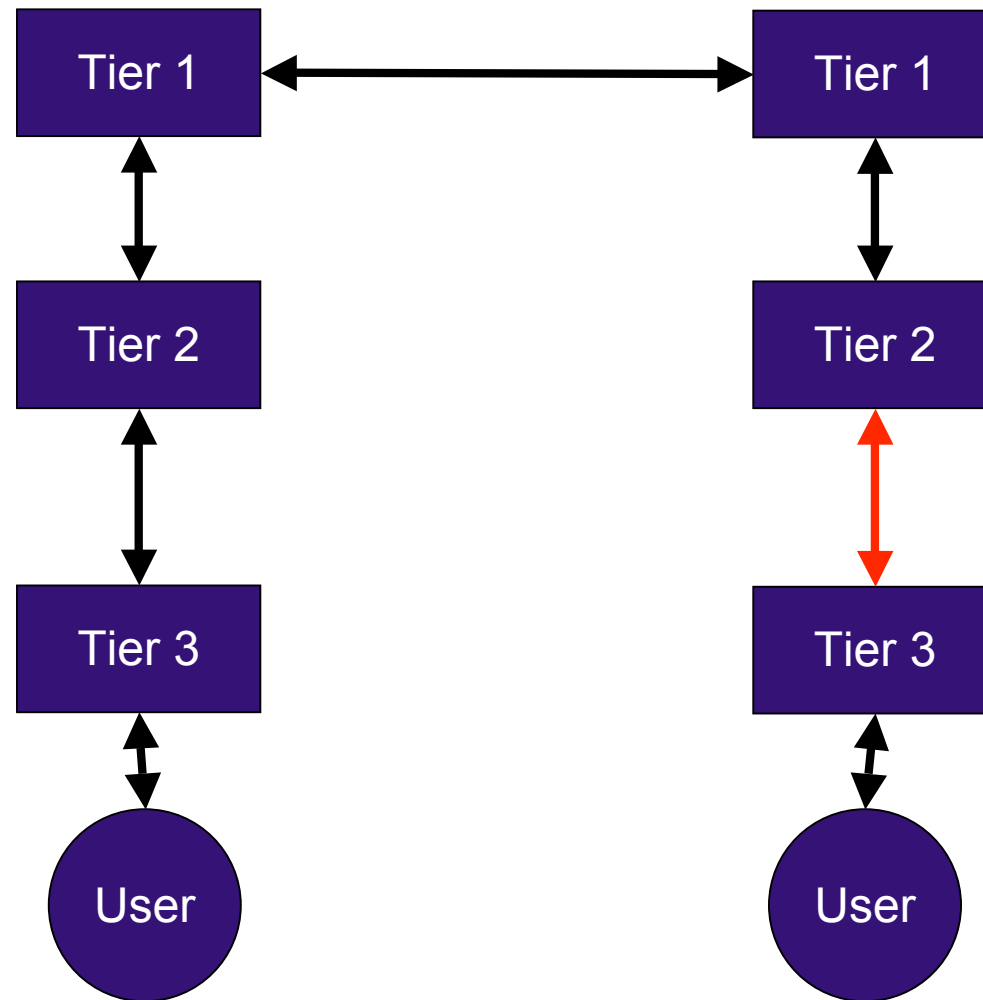# Peering – what is it?

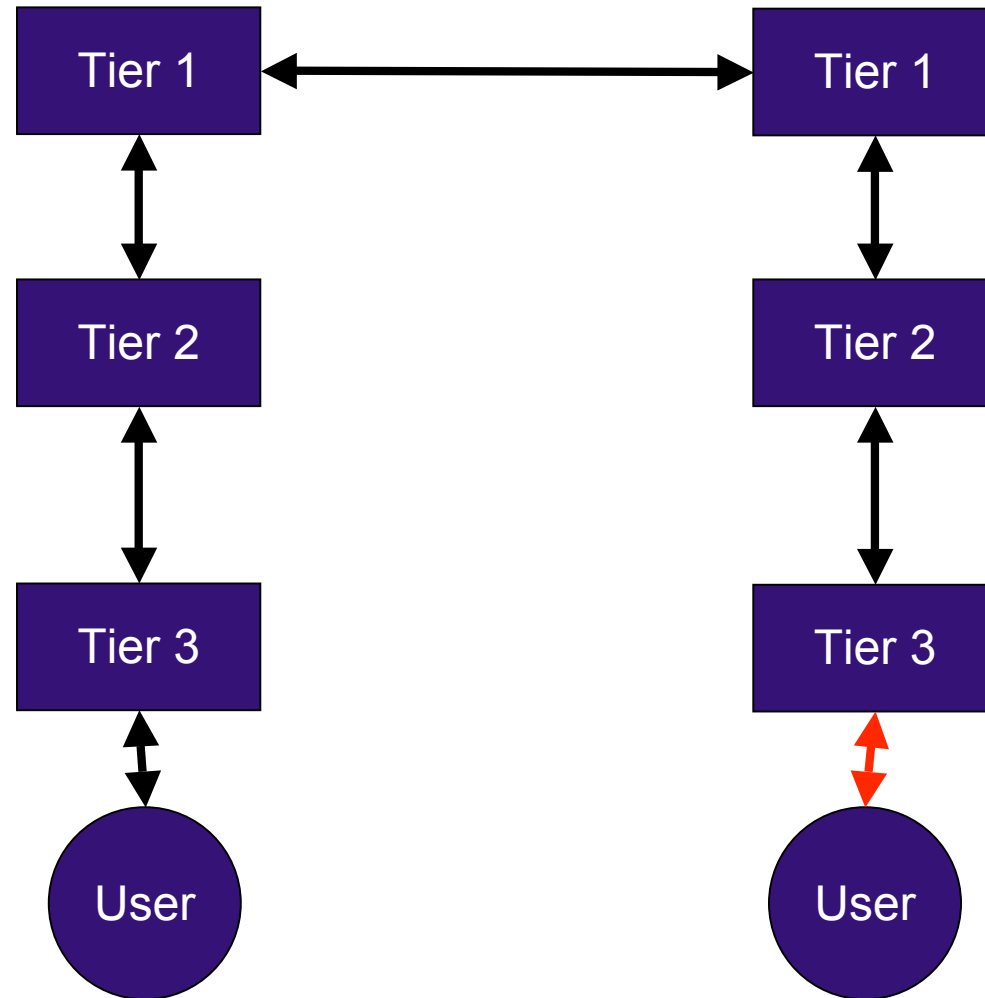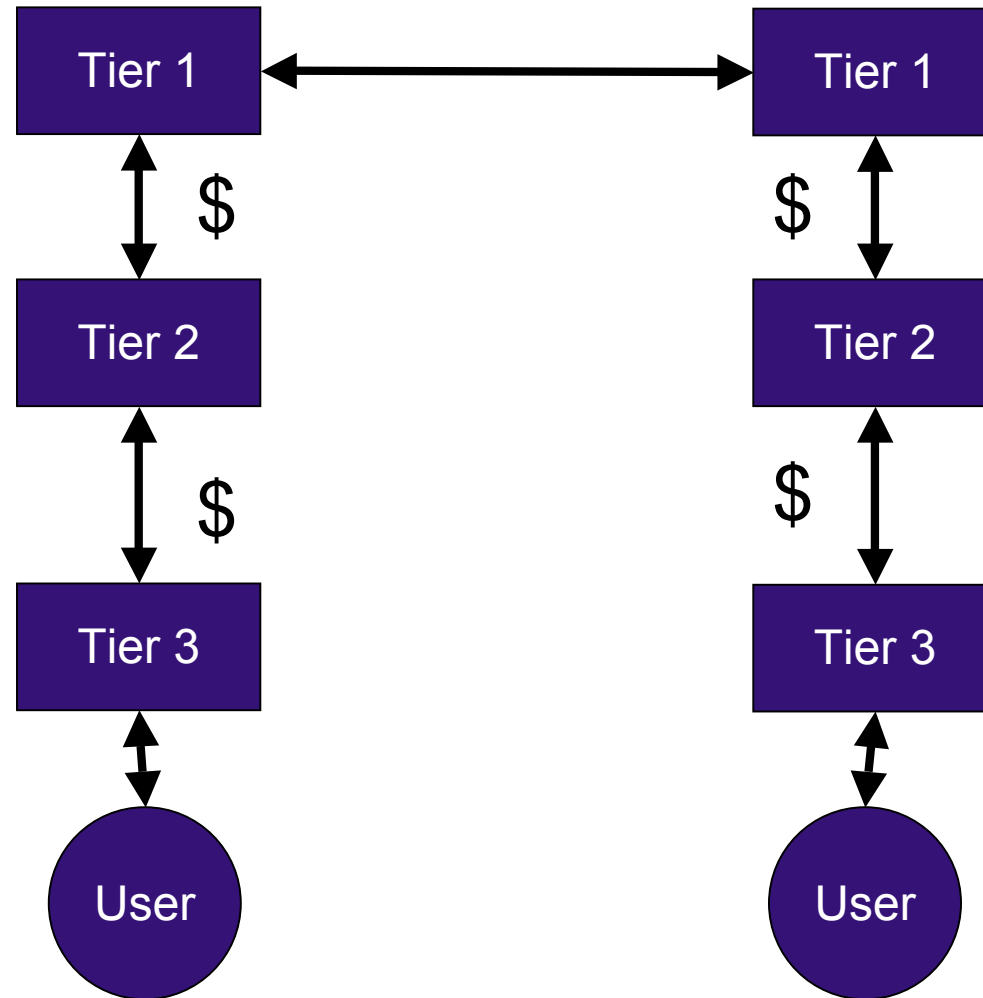# Peering – what is it?

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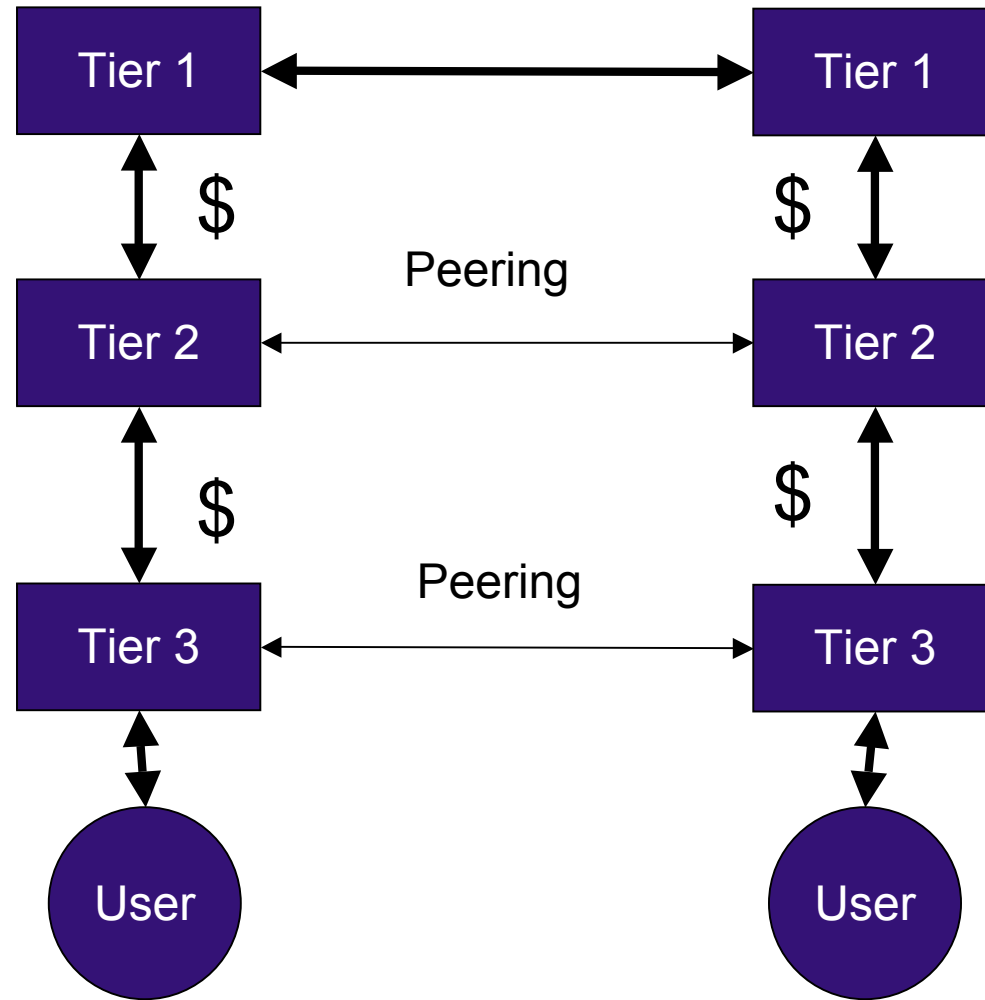# So what is the problem?

Other Problems

- Latency
    - Traffic may dog-leg via the US or Europe
    - Especially important for peer to peer traffic or gaming
- Congestion
    - Expensive international links
    - Makes everything unresponsive
- Jitter (or delay variance)
    - A combination of the above
    - Makes VOIP and video difficult to use or unusable

What do we do to fix it?

Advantages

- Tier 2 and 3 pay less transit charges (Hurrah!)
- Local traffic stays local
    - Lower latency
    - Less jitter
    - Less chance of congestion
    - Less dependency on external factors (like undersea cable breaks)
- Cooperation between ISPs
    - Overall better service
    - Possible moves towards a trade association

Disadvantages

- Tier 1 sees less revenue (but who cares)

- Tier 2 may see less revenue (but is paying less to Tier 1)

- Management may see peering as cooperation with potential competitors (but we all know how to manage our management don't we?)
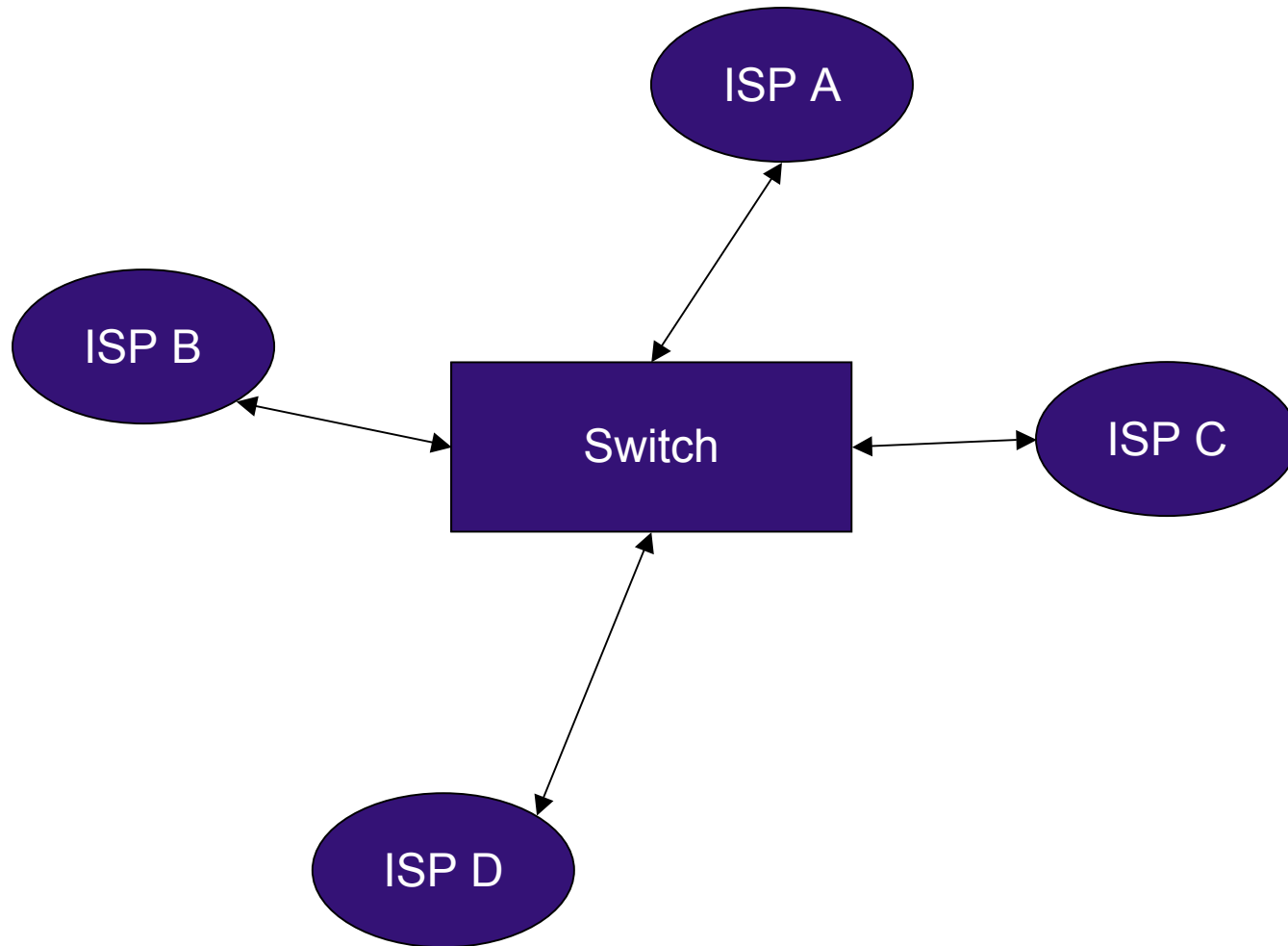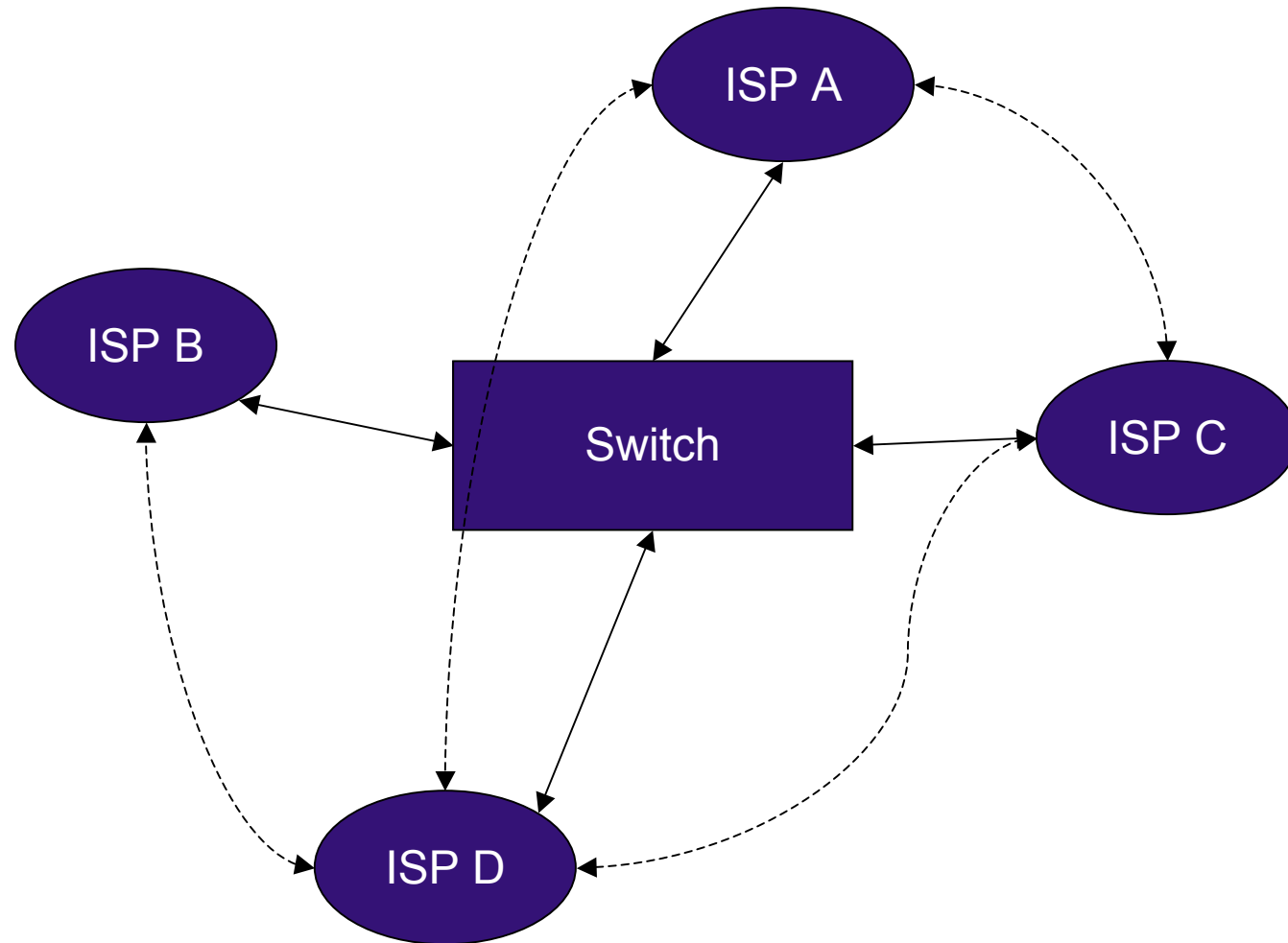
How do we do it?

- Via an Internet Exchange Point
    - A neutrally managed layer 2 switch

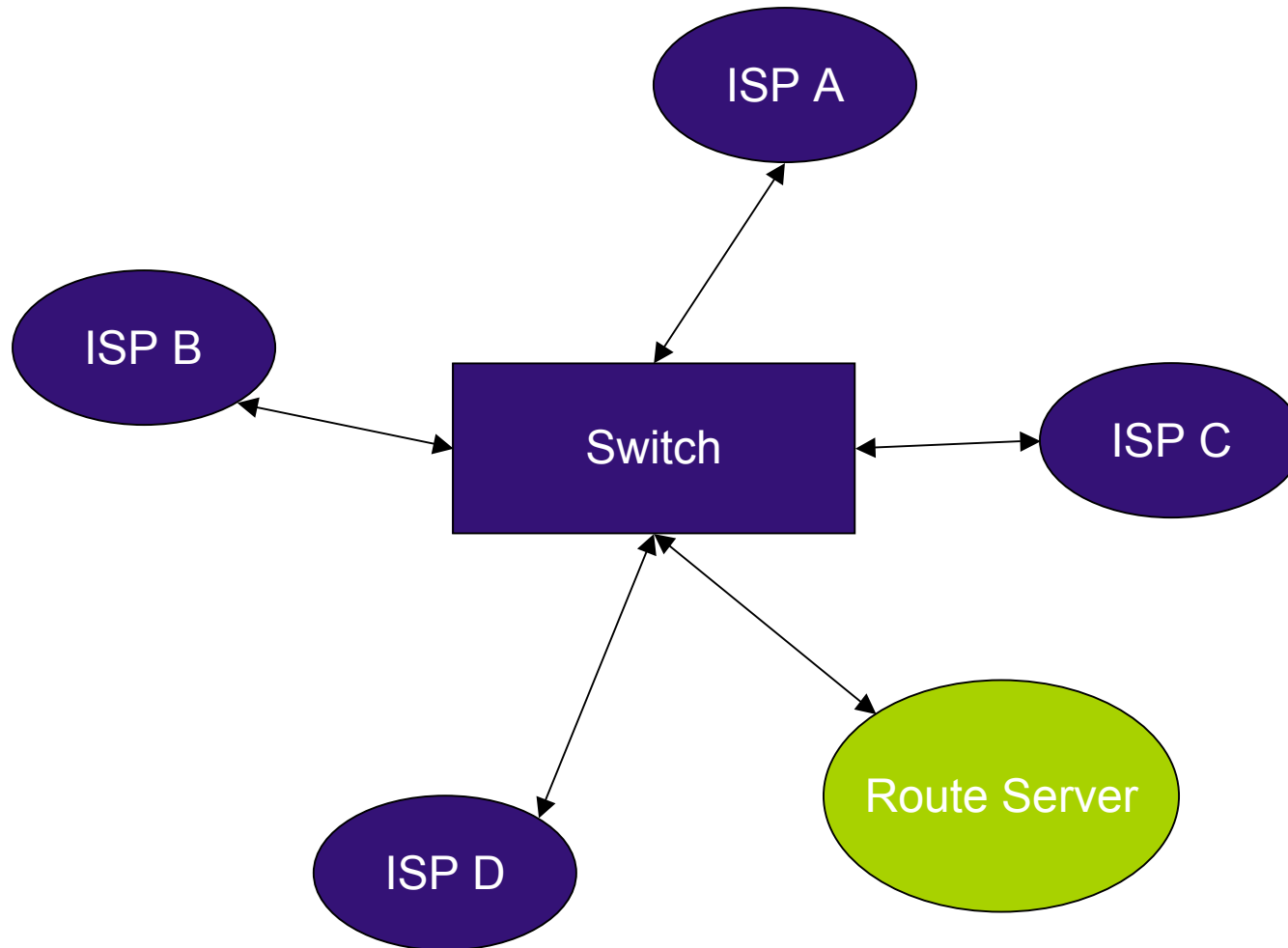- Via direct peering
    - A direct connection between two ASes

Typical IXP (Physical)

Typical IXP (Logical)

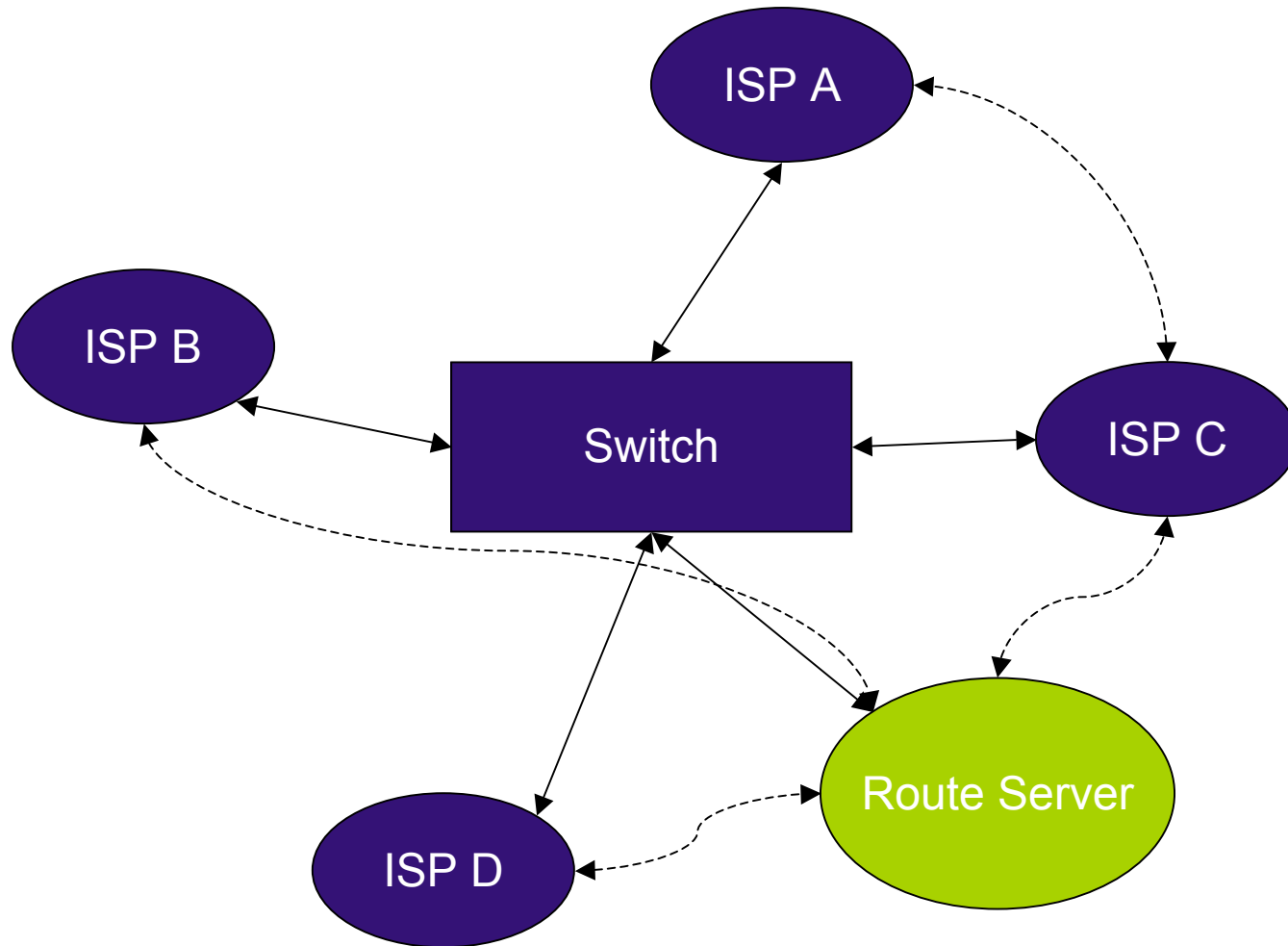# Typical IXP (Physical with route server)

Route Server

- Typically a PC running UNIX/Linux
- Zebra or Quagga
- Sets up BGP sessions with IXP members
- Distributes routes (not traffic)
- May be mandatory or optional

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Typical IXP (Logical with route server)

IXP pros and cons

- Pros
  - Only one connection needed
  - Can be very cheap
  - All potential peers immediately available (especially with route server)
  - Can form the basis for cooperative ventures such as trade associations
- Cons
  - Infrastructure may congest (unlikely)
  - Single point of failure
  - Bad traffic (broadcast storms) may disrupt peering
  - Lack of flexibility (with route server)
  - May be difficult to measure traffic to individual peers
  - There may not be an IXP available (so create one, see PCH)

Direct Peering
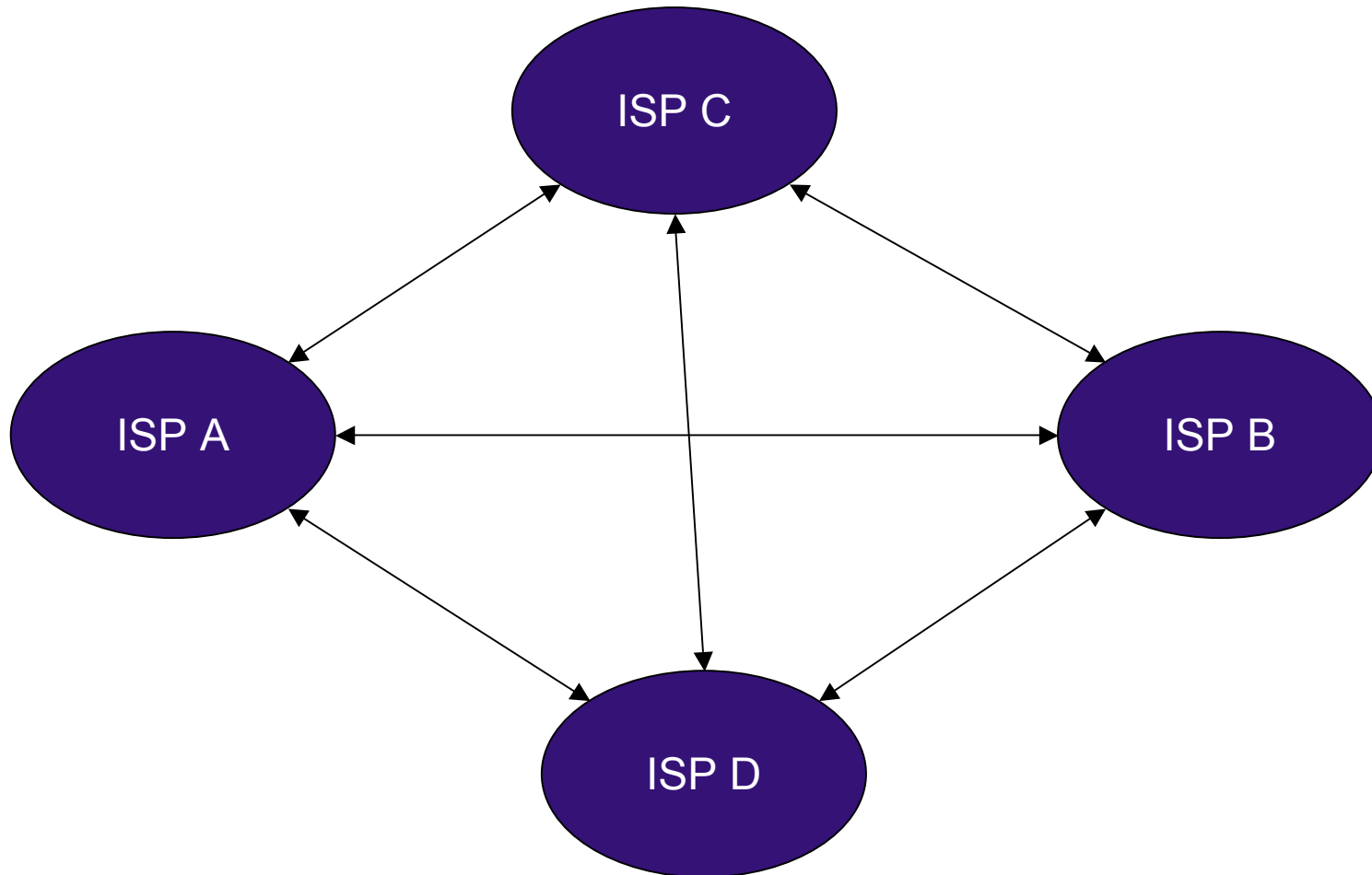
Direct peering pros and cons

- Pros
    - Easy to see how much traffic is flowing to your peer
    - No single point of failure
    - No interference between peering session
- Cons
    - Port required for each peer (expensive)
    - Bringing up session needs physical installation (so tends to inhibit peering)
    - Cannot share bandwidth between several peers

Compromises

- Start peers on a shared infrastructure (IXP)

- Measure peering flows

- Migrate onto direct peerings when economical to do so

- Best of both worlds

- Assumes that you have the means to measure traffic flows

Tools of the Trade

- Good business card file

- PeeringDB

- Arbor (or similar)

- Renesys

- Local database

- Friendly and engaging smile

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Business card file

- Contact details
- Phone number
- Email address
- Write things on the back (like AS number)
- May get extensive
- Review regularly (but don't throw away cards, peering coordinators move between companies but keep the same job)

PeeringDB

- Free!
- Incredibly useful resource
- http://www.peeringdb.com
- Guest access (guest/guest)
- Register your own account
  (https://www.peeringdb.com/registration/register.php)
- Enter your own network's details
- Easily search for details of potential peers

Peering DB

PeeringDB (search)

PeeringDB (search results)

Arbor Peakflow (or similar)

- For each router in network
  - Takes netflow data
  - Takes an iBGP feed
  - Takes SNMP feed
- Used to determine traffic to and from a peer (or potential peer)
- For a potential peer will show the current path
- Also shows
  - Traffic breakdown (by destination port)
  - Traffic flowing from a peer to a peer (useful for detecting misconfigurations)
  - Peering adviser mode, shows peers to aim for
  - Traffic flows within network
  - Historical data
- Disadvantage
  - Cost (licensed per router)
  - May lie to you

Arbor Peakflow (example)

Renesys

- http://www.renesys.com

- Historical routing topology data

- Very useful
    - Debugging routing problems
    - Working out routing topologies

- Peering advisor tool

- Free
    - Give them a peering
    - Get access to basic tools

- Pay
    - Get automatic advisories of routing topology problems to feed to your NOC

Local Database

- Where do I peer

- Who do I peer with?

- How do I contact them?

- Who *don't* I peer with?

- Missing peering points

- Anything else you might want to record

Friendly and Engaging Smile

- It helps to be friendly (but see later caveats)
- Buy drinks
- Bring tee-shirts
- Go to meetings
  - RIPE
  - NANOG
  - APRICOT
  - SANOG
  - MENOG
  - UKNOF
- Sponsor MENOG meetings

Policies and Strategies

- Peering Strategy
  - How do I plan to achieve: reduced transit costs, increased profits, better customer experience, world domination etc
  - Private
- Peering Policy
  - What do I tell people who want to peer with me?
  - Should be publicly available (on your web site)
  - Includes contact info
  - Referred to on your PeeringDB page
  - If you are a large player or are very selective then should be objective in order to avoid problems with regulators

Types of Peering Policies

- Open (we peer with anyone)

- Selective (we are a bit fussy about who we peer with)

- Restrictive (we actively discourage people from peering with us)

- Closed (we won't peer with anyone)

Example policy: Small ISP or Content Provider

- Open policy

- Primary aim to reduce costs

- Peering with anyone

- Probably only able to attract peering from other similar peers

- Bring up as many peers as possible while trying to increase market share

Example Policy: National ISP

- Selective Policy
- Aim to exchange traffic with similar sized ISPs
- Will probably involve connecting to foreign peering points
- Avoid peering with customers of existing peers or customers of short term target peers
- Possibly depeer smaller existing peers if this will increase traffic to larger peers
- Analyse traffic and monitor target peers policies
- Acquire more customers (and the right sort of customers)
- Watch the markets and the technical web sites
- Gradually tighten peering policy
- May take several years

Example Policy: Regional with pretensions

- Policy selective verging on restrictive
- Depeer smaller peers if this moves traffic to larger peers or targets
- Adjust BGP policies to concentrate traffic on larger peers, especially if their peering policy changes
- Attempt to negotiate transit contracts with peering escape clauses
- Expand network further
- Acquire more customers
- Study markets and peering flows
- Monitor target peers peering policies and strike immediately you satisfy them

Example Policy: Global tier 1

- Restrictive peering policy
- Stop paying transit charges
- Continually monitor traffic and other tier 1 peers' peering policies
- All peerings probably direct by now
- Meet with your peers peering coordinators whenever possible
- Collect your bonus

Conclusions

- Pleasure
  - It can be a lot of fun being a peering coordinator
  - Cooperation
  - Meeting like minded people
  - Making the internet a better place (without peering there would be no internet)
- Profit
  - Peering is your markup
  - Difference between the price you pay for transit and the price you charge your customers
  - More peering generally means more profit and happier customers

Questions?

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