Introduction

Thursday 7 April 2022
Please sit in the area reserved for your region
Your network topology

- **Provider 1**
- **Provider 2**
- **IXP**
- **Customer 1**
- **Customer 2**
- **Peer**

**Links and Sessions**
- eBGP sessions
- iBGP sessions
**Question 1.7:** Configure iBGP sessions in a full-mesh fashion.
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Question 1.7: Configure iBGP sessions in a full-mesh fashion

Use the loopback interfaces for the iBGP sessions using `update-source`
Question 2.1: Configure eBGP sessions
Question 2.1: Configure eBGP sessions

https://duvel.ethz.ch to see with whom you are connected
Question 2.1: Configure eBGP sessions

Only Lyon knows how to reach 179.0.15.0/24. Use next-hop-self.

Customer 1
179.0.15.1

Customer 2
179.0.15.2

Provider 1

Provider 2

IXP

VIEN

MUNI

BASE

ZURI

GENE

LUGA

MILA
How to debug BGP

From your routers’ CLI:
- show ip bgp summary
- show ip bgp
- show ip bgp neighbour X.X.X.X routes
- show ip bgp neighbour X.X.X.X advertised-routes
How to debug BGP

From your routers’ CLI:

- `show ip bgp summary`
- `show ip bgp`
- `show ip bgp neighbour X.X.X.X routes`
- `show ip bgp neighbour X.X.X.X advertised-routes`
How to debug BGP

**From your routers’ CLI:**

- `show ip bgp summary`
- `show ip bgp`
- `show ip bgp neighbour X.X.X.X routes`
- `show ip bgp neighbour X.X.X.X advertised-routes`

shows routes learnt with BGP along with their AS path
How to debug BGP

**From your routers’ CLI:**

- `show ip bgp summary`
- `show ip bgp`
- `show ip bgp neighbour X.X.X.X routes`  
  (shows routes received from neighbour X.X.X.X)
- `show ip bgp neighbour X.X.X.X advertised-routes`
How to debug BGP

**From your routers’ CLI:**

- `show ip bgp summary`
- `show ip bgp`
- `show ip bgp neighbour X.X.X.X routes`
- `show ip bgp neighbour X.X.X.X advertised-routes`
How to debug BGP

From your routers’ CLI:
- show ip bgp summary
- show ip bgp
- show ip bgp neighbour X.X.X.X routes
- show ip bgp neighbour X.X.X.X advertised-routes

From the mini-Internet website

Connectivity matrix

Looking glass

BGP policy analyser

policy analysis

updates every 5 minutes, last updated on 2022-04-05 at 19:35.

The BGP advertisements of AS 52 violate policies:
- You should not export 21.0.0.0/8 to AS 50 (because it is a Peer-Peer link)
- You should not export 31.0.0.0/8 to AS 50 (because it is a Peer-Peer link)
- You should not export 51.0.0.0/8 to AS 50 (because it is a Peer-Peer link)
Business relationships conditions

see lecture about routing policies (slide 83+)

send to

from

AS1

peer

provider

customer

peer

peer

focus

customer

peer

provider
Business relationships conditions
see lecture about routing policies (slide 83+)

peer

AS2

provider

AS1

announce prefix p

peer

AS3

peer

AS4

customer

AS5

customer

focus

peer

from

send to

customer

peer

provider

from

peer

provider
Business relationships conditions
see lecture about routing policies (slide 83+)

\[ \text{AS2} \rightarrow \text{AS1} \rightarrow \text{AS3} \rightarrow \text{AS4} \rightarrow \text{AS5} \]

- \text{peer} announce prefix p to \text{customer}
- \text{peer} announce prefix p to \text{provider}
- \text{focus} to \text{peer} from \text{customer}
- \text{send to} \text{customer} peer provider

- \text{peer} announce prefix p to \text{customer}
- \text{provider} announce prefix p to \text{customer}
- \text{peer} announce prefix p to \text{provider}

\[ \text{AS1} \rightarrow \text{AS2} \rightarrow \text{AS3} \rightarrow \text{AS4} \rightarrow \text{AS5} \]
Business relationships conditions

see lecture about routing policies (slide 83+)

[Diagram showing interconnection of AS1, AS2, AS3, AS4, AS5 with arrows indicating relationships and labels for customer, peer, provider.]
Business relationships conditions

see lecture about routing policies (slide 83+)

[Diagram showing AS relationships with focus, announce prefix p, and send to policies]

- AS4 to AS1: customer
- AS1 to AS2: provider
- AS1 to AS3: peer
- AS4 to AS1: announce prefix p
- AS1 to AS5: announce prefix p
Business relationships conditions
see lecture about routing policies (slide 83+)

AS1

peer

provider

AS4

AS2

AS3

announce prefix p

focus

peer

customer

provider

send to

from

customer

peer

provider

peer

provider

peer

provider

peer

provider
Business relationships conditions

*see lecture about routing policies (slide 83+)*

**Diagram:**
- AS1 is connected to AS2, AS3, AND AS5.
- Connections are labeled with "focus" and "announce prefix p".
- Arrows indicate the direction of information flow.

**Table:**

<table>
<thead>
<tr>
<th></th>
<th>Customer</th>
<th>Peer</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Provider</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- ✓: Allowed
- : Not allowed