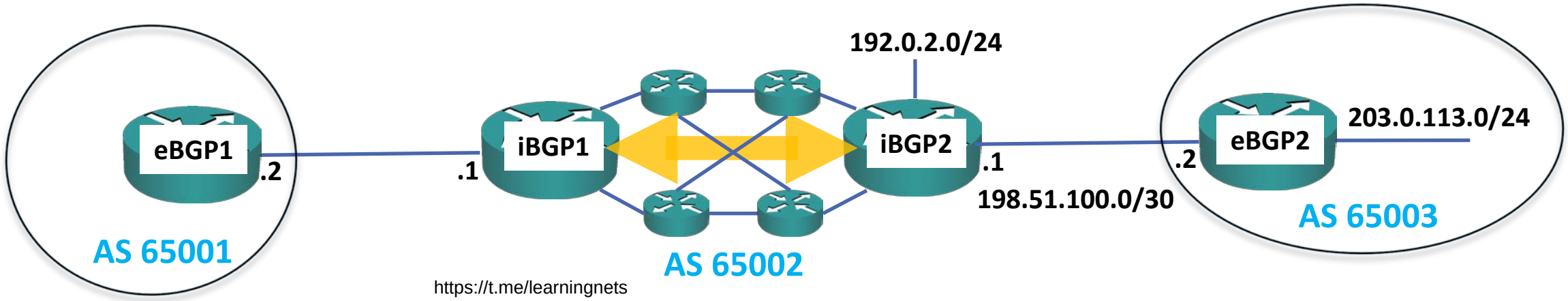
BGP and Administrative Distance

- Routes may be learned to a destination network via both BGP and an IGP such as OSPF or EIGRP.
- If the best route learned via BGP has the best (lowest) Administrative Distance, it will be inserted into the routing table.
- Routes learned via iBGP have an Administrative Distance of 200
- Routes learned via eBGP have an Administrative Distance of 20
- IGP routes should be preferred for internal networks

BGP and Administrative Distance

- eBGP2 advertises 203.0.113.0/24 to iBGP2 via eBGP
- iBGP2 advertises 203.0.113.0/24 to iBGP1 via iBGP
- iBGP2 advertises 192.0.2.0/24 to iBGP1 via both iBGP and an IGP

- iBGP1 will have an iBGP route to 203.0.113.0/24 (its only available route)
- iBGP1 will have an IGP route to 192.0.2.0/24 (best Administrative Distance)



BGP Path Selection

- The BGP table often has multiple paths available to a destination network.
- By default, BGP selects only a single best path and does not perform load balancing.
- If a router learns multiple different paths to a destination via BGP, the BGP selection process eliminates less preferred paths until a single best path is left.
- Paths are chosen because of policy, not bandwidth.

BGP Path Selection

- Routers make their own decision about the best next hop to reach each destination network.
- A BGP router will select its own next hop to a destination, but it does not control the path the next AS will use.
- Administrators can change BGP policy from the default in order to influence paths taken outbound to destination networks, and neighbor AS's paths inbound to their own networks.

BGP Path Selection

- BGP Path Attributes (included in BGP updates) can influence path selection
- They include:
  - AS Path
  - Next Hop
  - Origin
  - Local Preference
  - MED Multi Exit Discriminator

Consider only routes with no AS loops and a valid (reachable) next hop.

Use Longest Prefix Match.

Where multiple routes are available to identical network and prefix:

- Prefer highest weight (local to router).
- Prefer highest local preference (global within AS).
- Prefer route originated by the local router (‘network’ command or redistribution).
- Prefer shortest AS path.
- Prefer lowest origin code: IGP (‘network’) < EGP (legacy) < incomplete (redistributed).
- Prefer lowest MED (exchanged between autonomous systems).
- Prefer EBGP path over IBGP path.
- Prefer the path through the closest IGP neighbor.
- Prefer oldest route for EBGP paths.
- Prefer the path with the lowest neighbor BGP router ID.
- Prefer the path with the lowest neighbor IP address.

Longest Prefix Match

- A packet with destination address 203.0.113.1 matches all 3 routes. 203.0.113.0/30 is the longest prefix match and will be selected.
- A packet with destination address 203.0.113.10 matches the last 2 routes, which have identical network and prefix. Path selection tiebreakers will be used.

- Available valid routes:

```
203.0.113.0/30 via 1.1.1.1
203.0.113.0/24 via 2.2.2.2
203.0.113.0/24 via 3.3.3.3
```