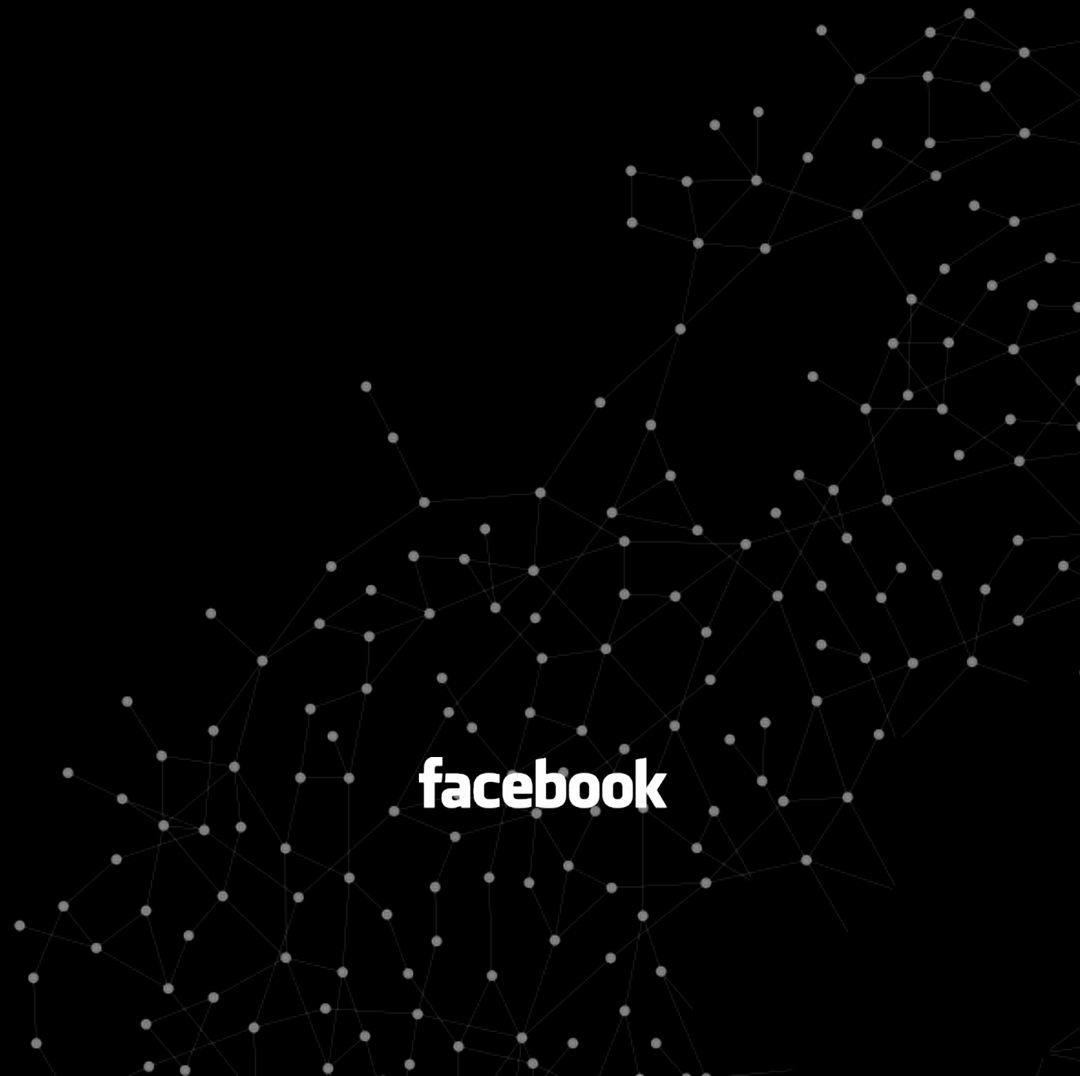

facebook
INFRASTRUCTURE

Being Open:

Facebook and Its Edge

Lee Hetherington

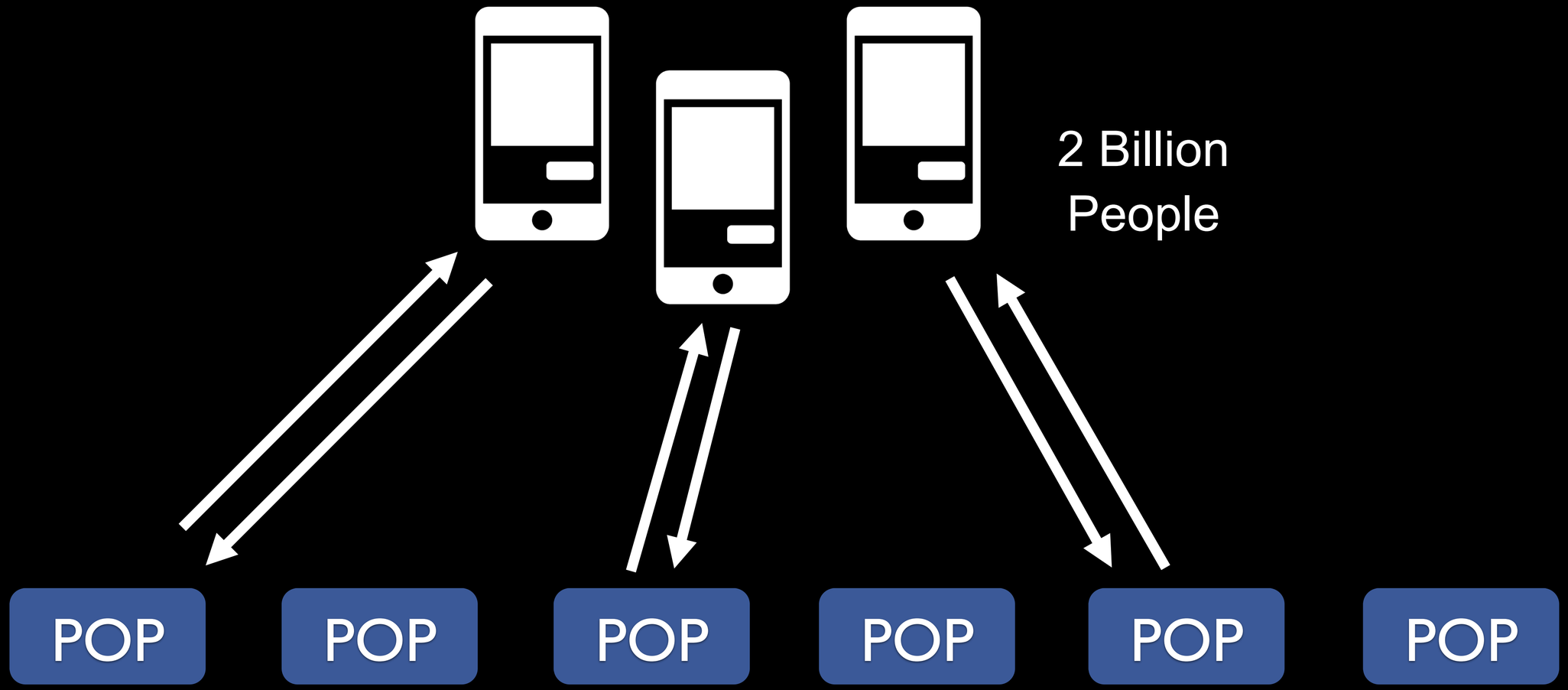
NaMeX, Rome, 3rd July 2017



facebook


15% of global egress
is already IPv6
more than 2 Billion Users

Our edge connects to the world

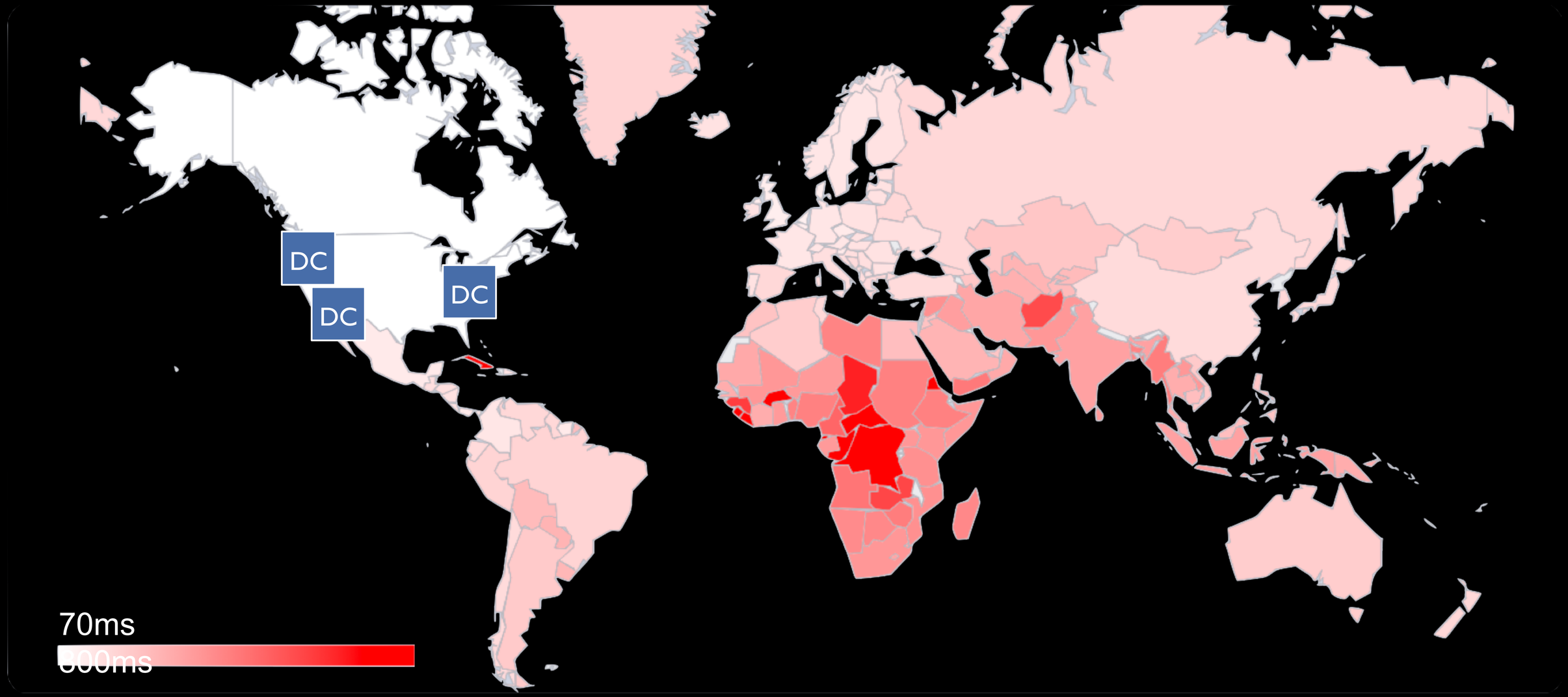


What is Facebook?

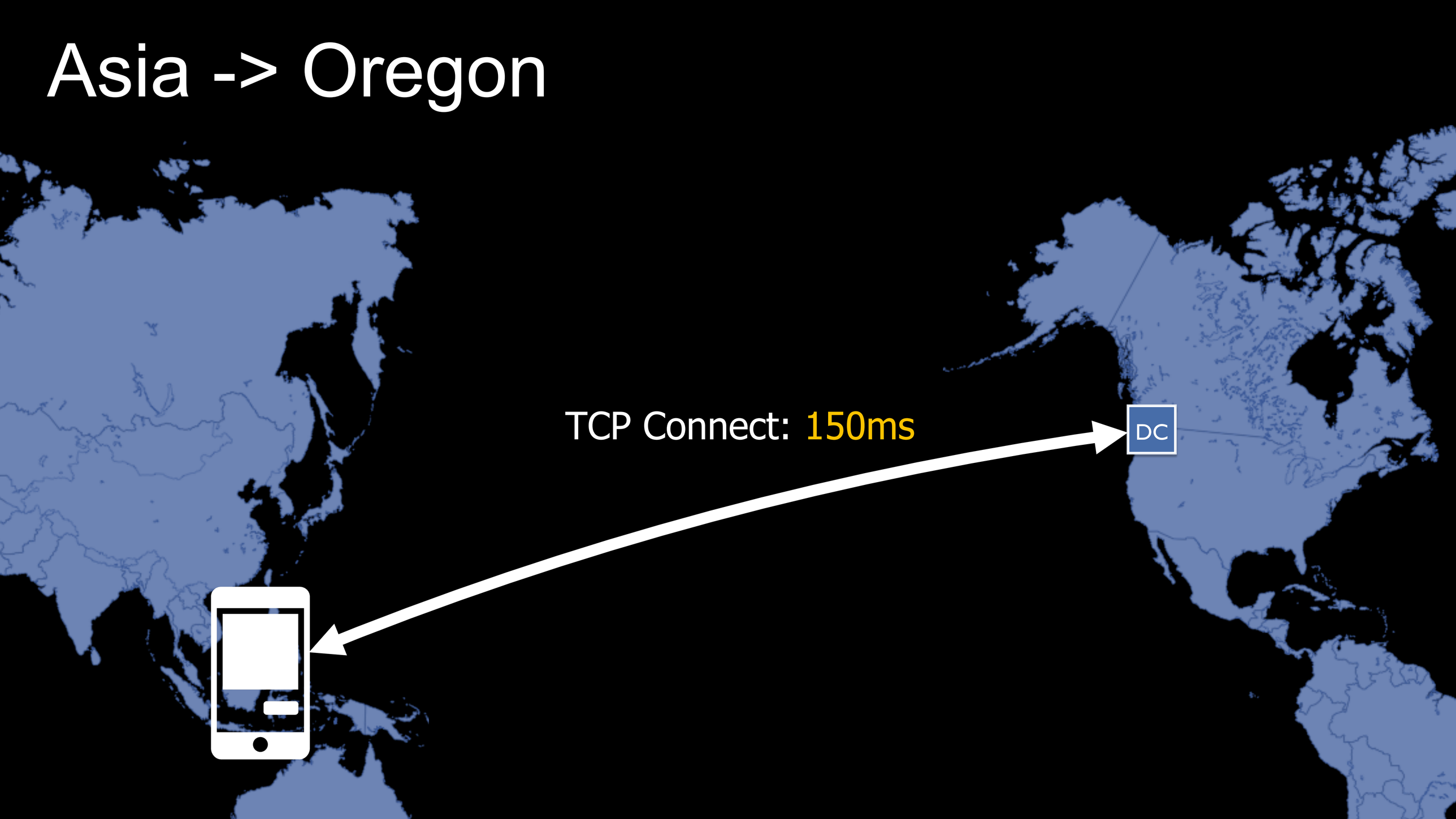
- **dynamic**
  - newsfeed
  - likes
  - status updates
- **static**
  - images
  - videos
  - css
  - js

International RTT

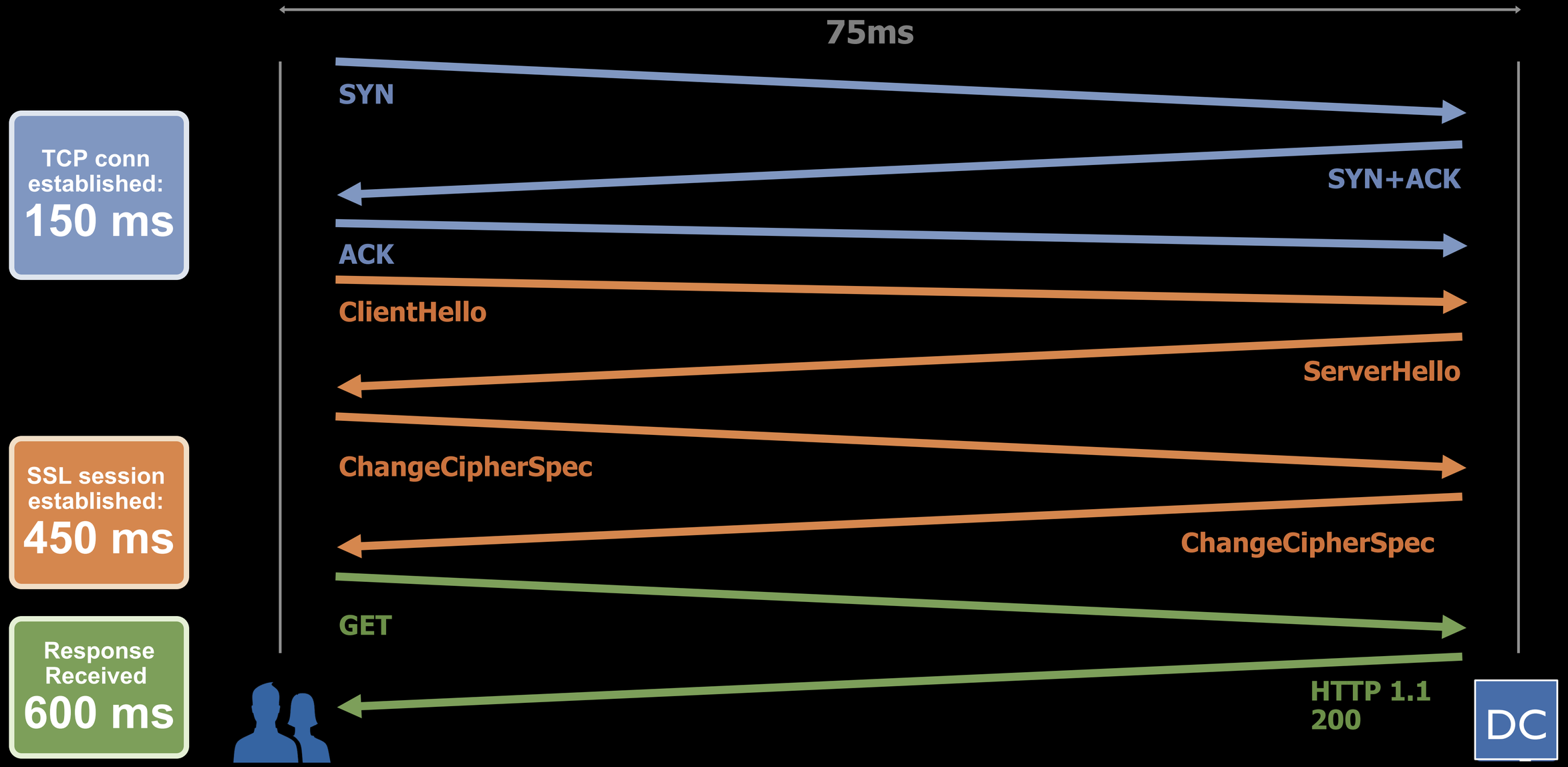
circa 11/2011



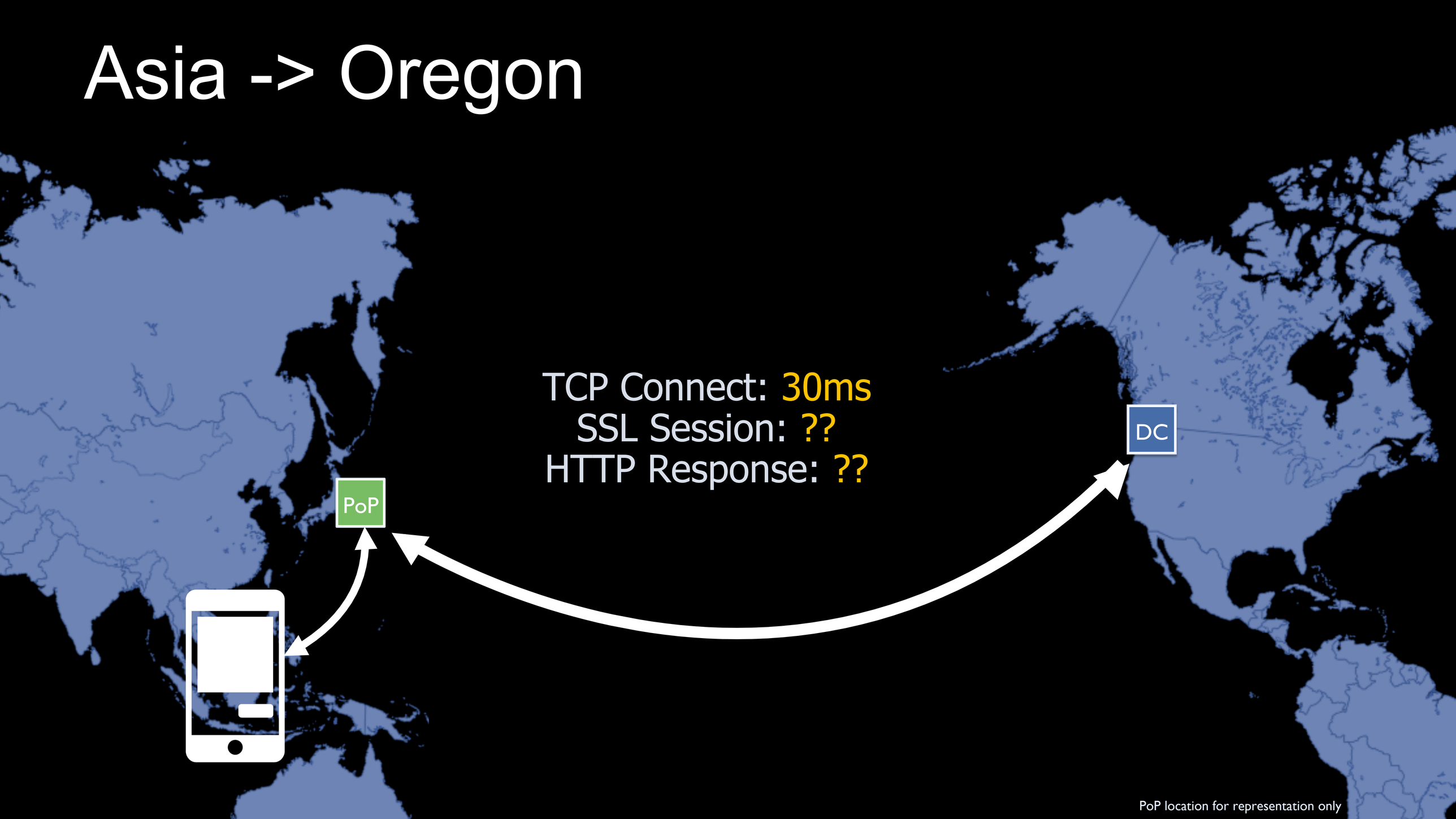
Asia -> Oregon



HTTPS Asia -> Oregon

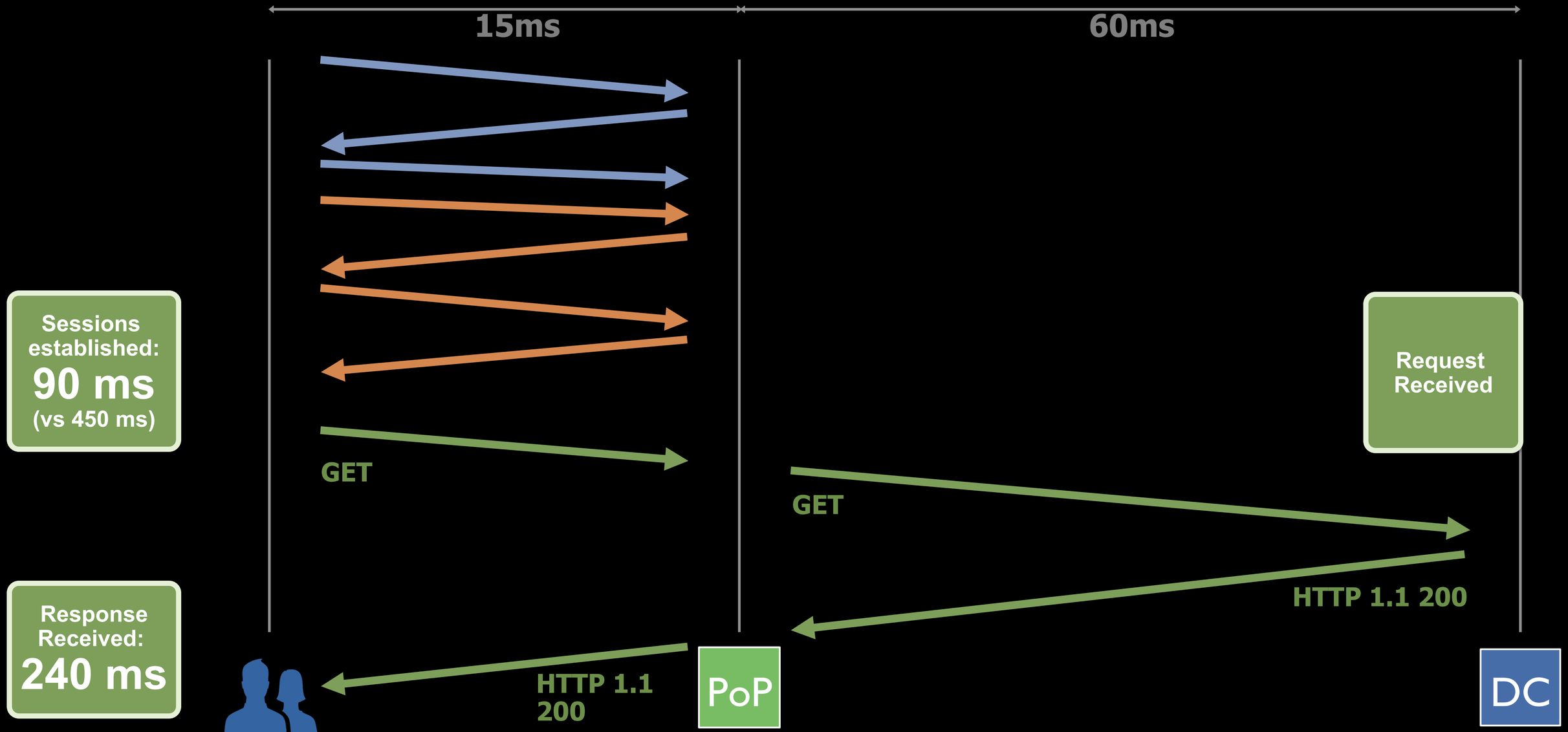


Asia -> Oregon

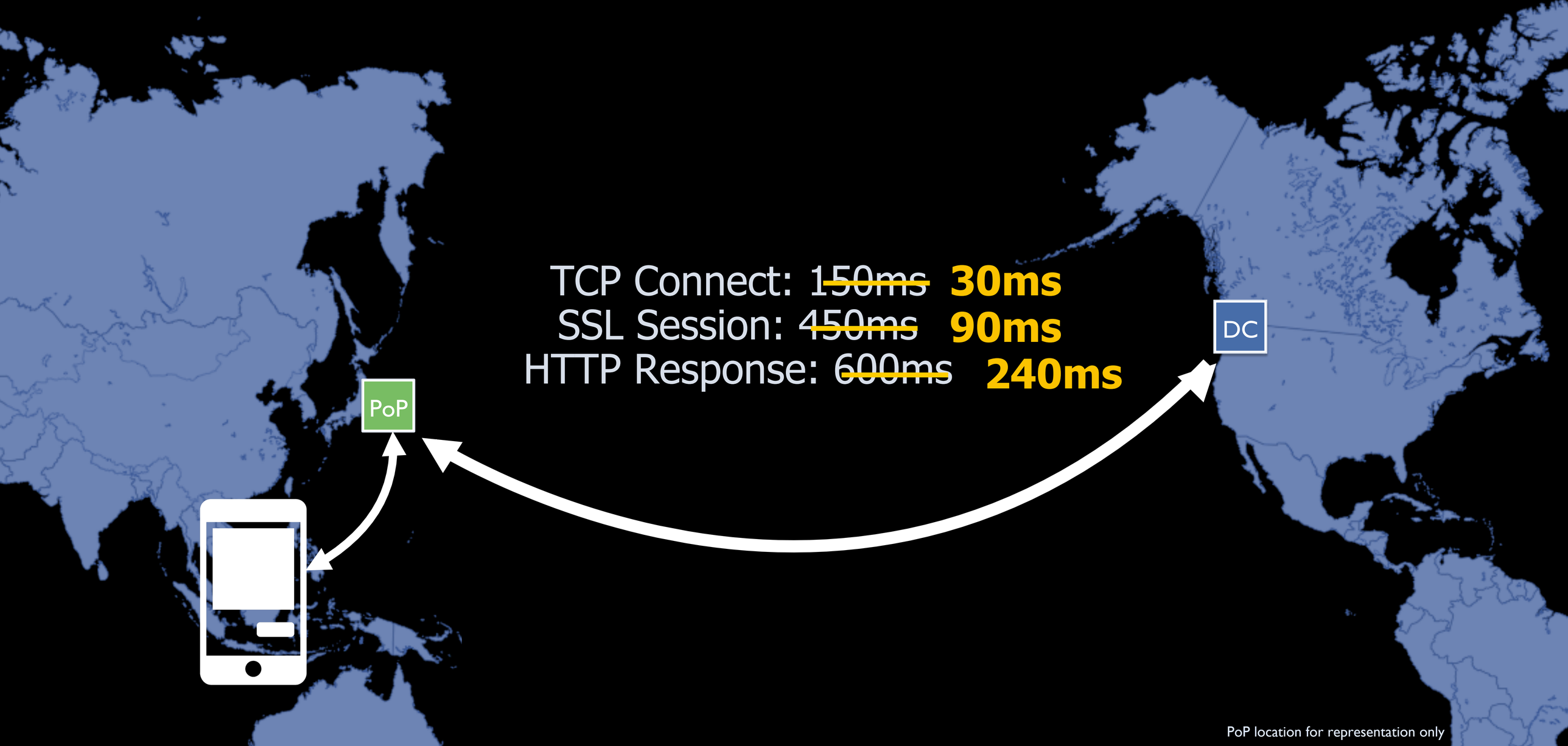


PoP location for representation only

HTTPS Asia -> POP -> Oregon



Asia -> Oregon



PoP location for representation only

Caches

Static Objects: Videos, Pictures
Cachefill from PoP
Dynamic still served from PoP

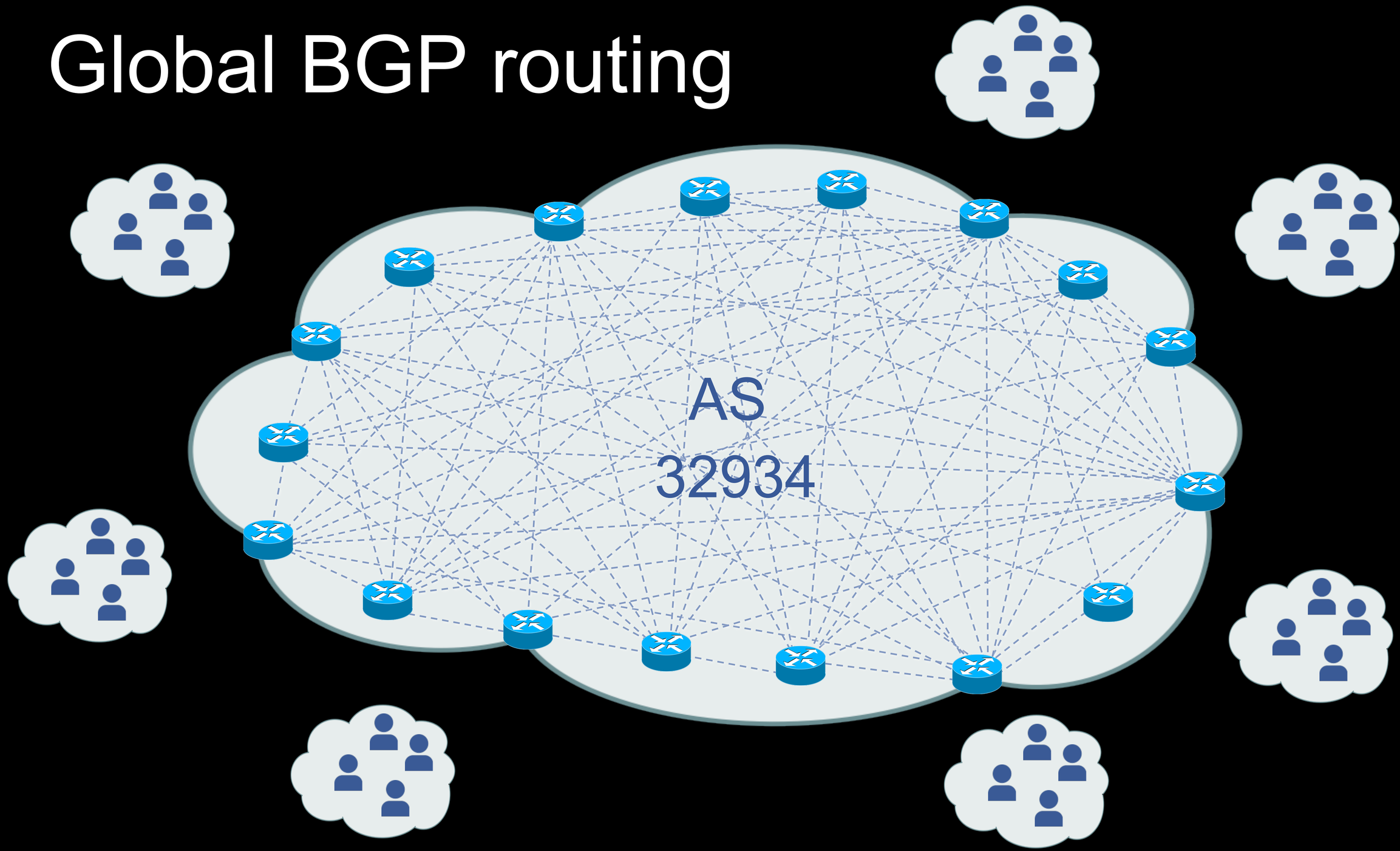
TCP Connect: ~~150ms~~ **~~30ms~~** **10ms**
SSL Session: ~~450ms~~ **~~90ms~~** **30ms**
HTTP Response: ~~600ms~~ **~~240ms~~** **40ms**

PoP and Cache locations for representation only


"Wow, Italy is so beautiful!"
TEXT
PHOTOS
VIDEOS
VR / AR

Evolving beyond BGP

Global BGP routing



Which PoP is best?

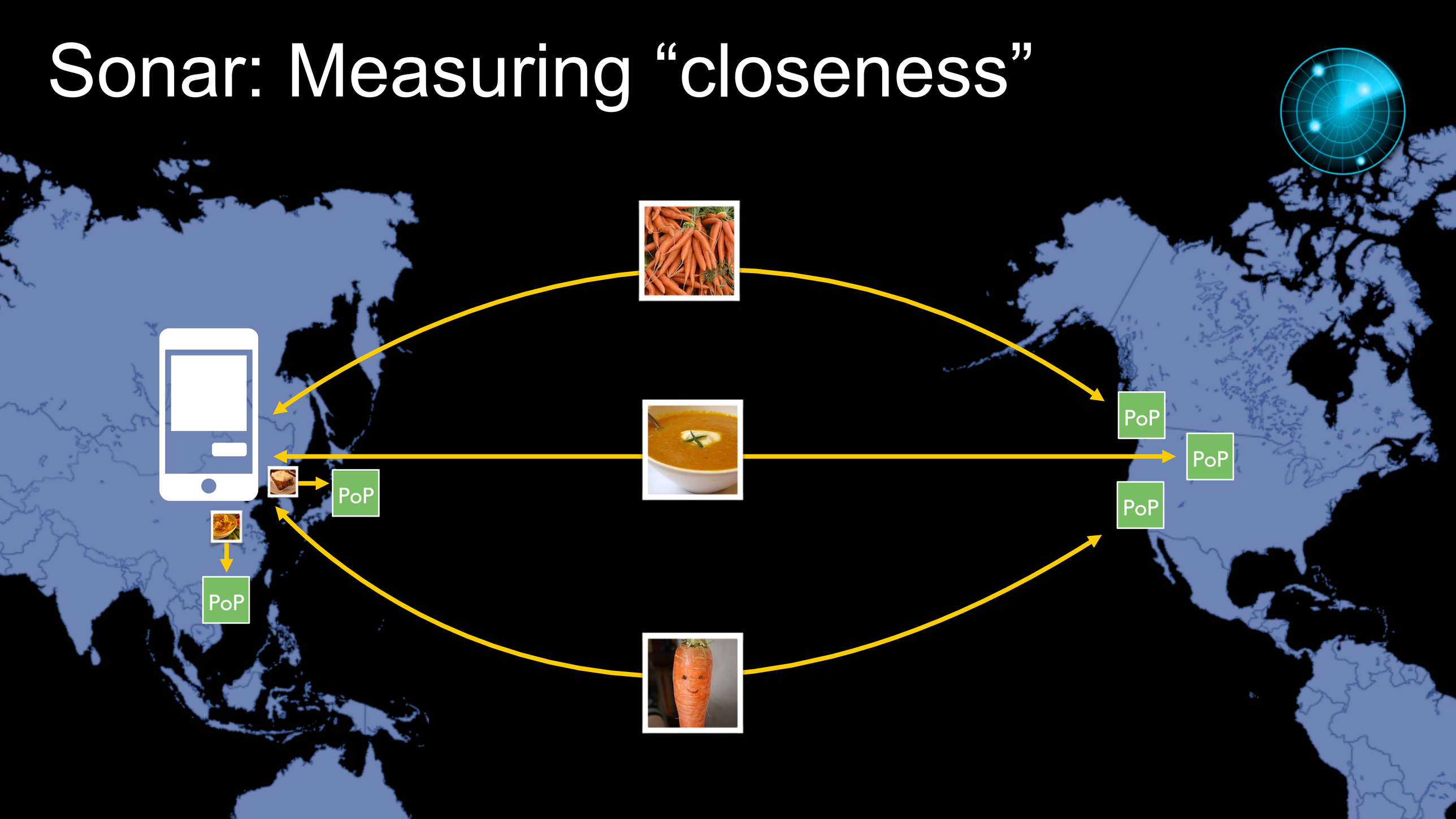
Considerations:

- Closest Edge to user

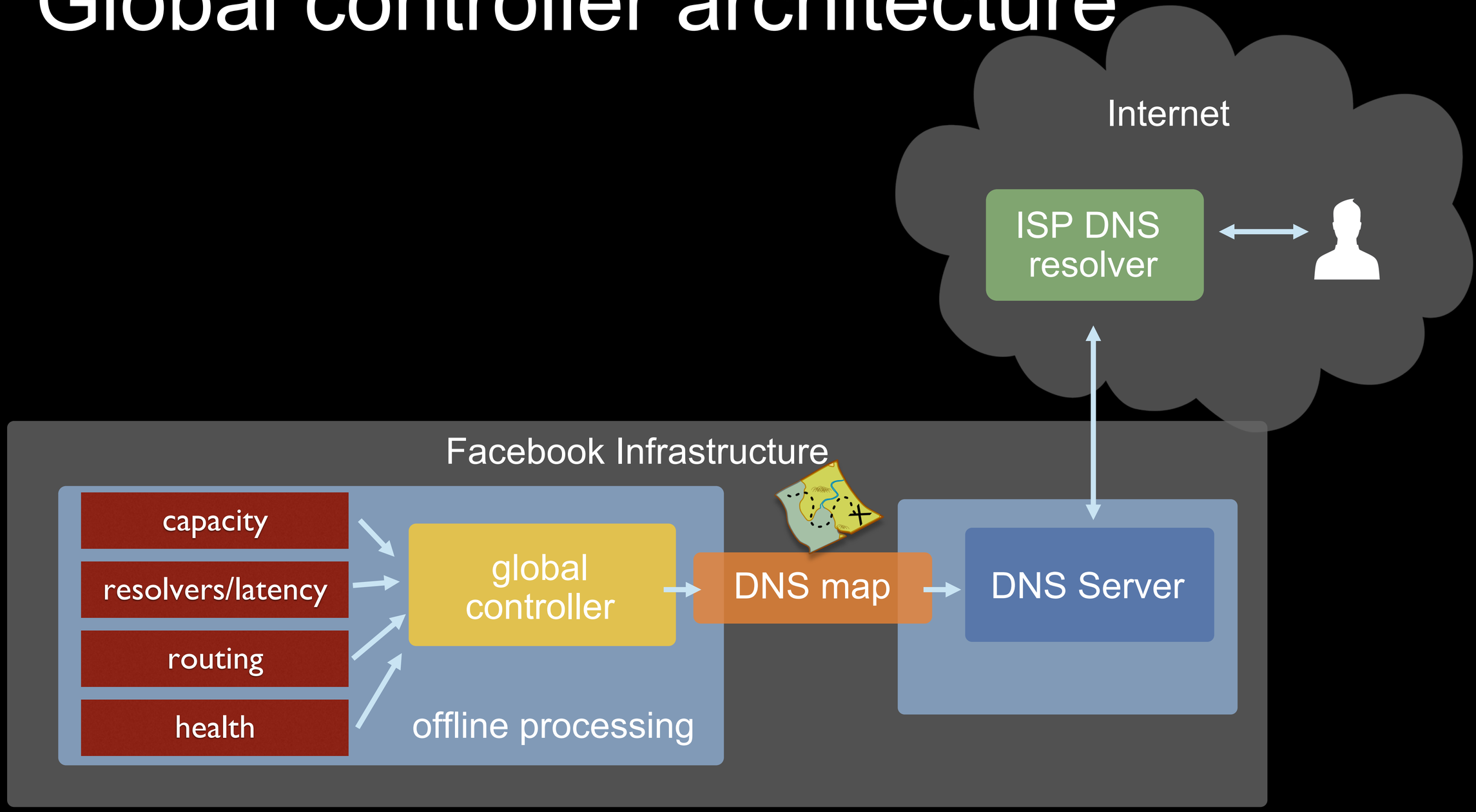
POPs

???

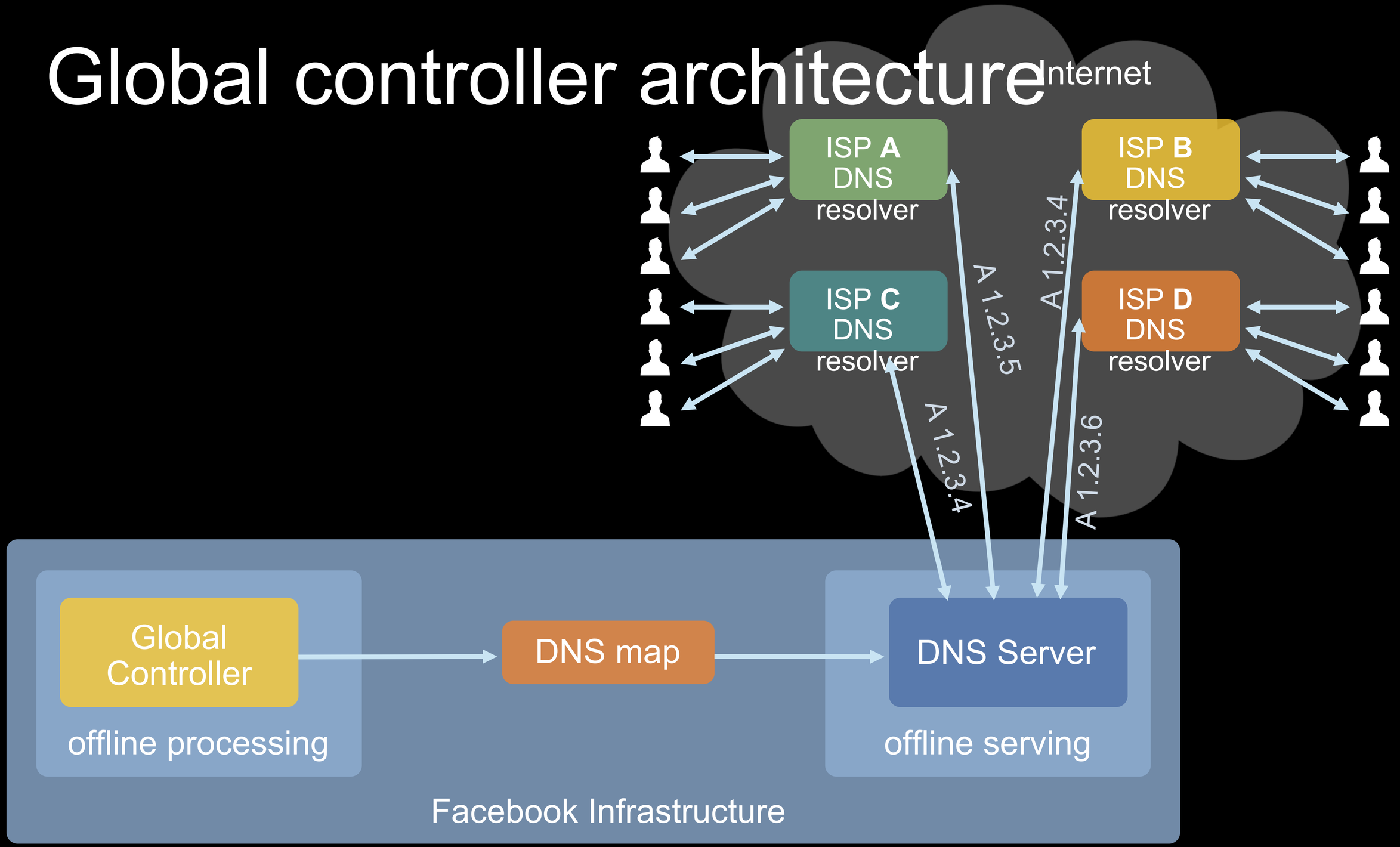
Sonar: Measuring “closeness”



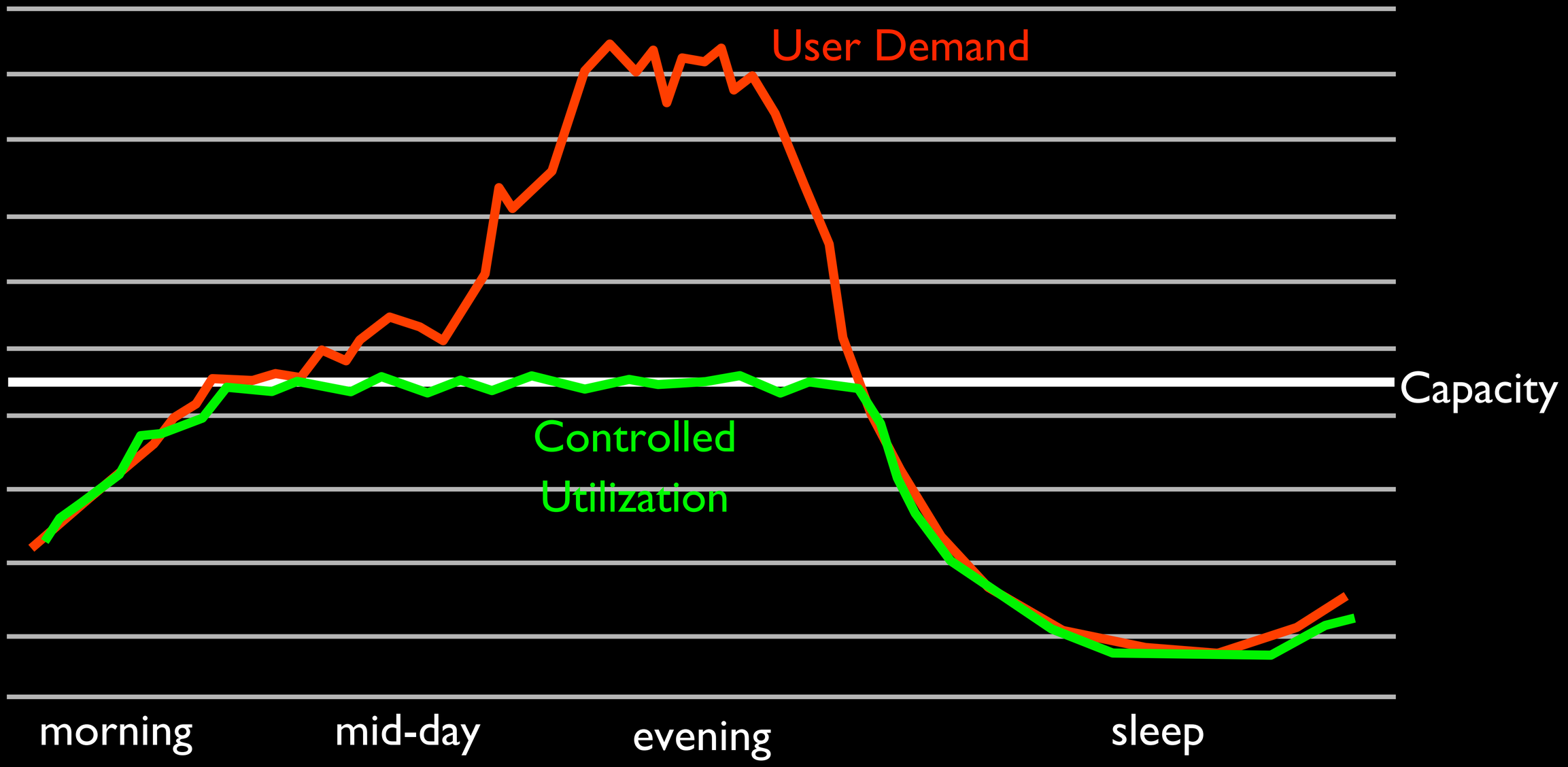
Global controller architecture



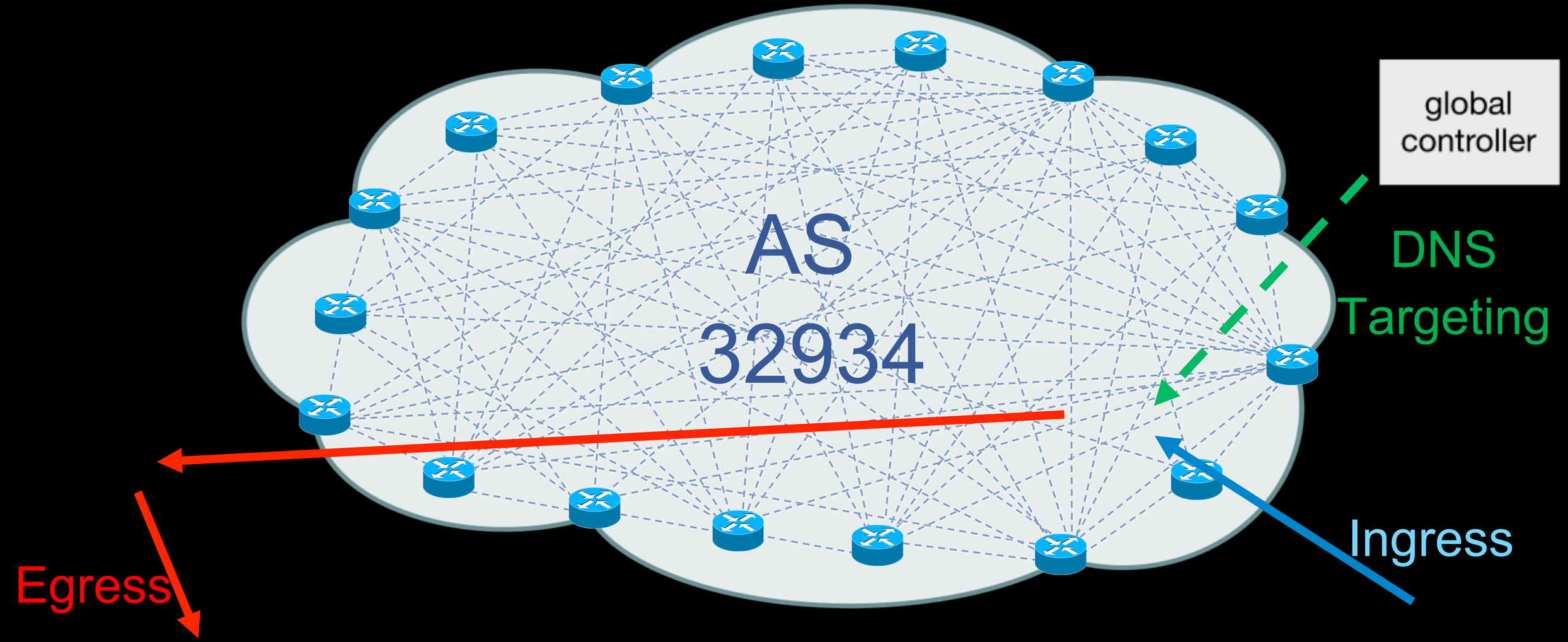
Global controller architecture



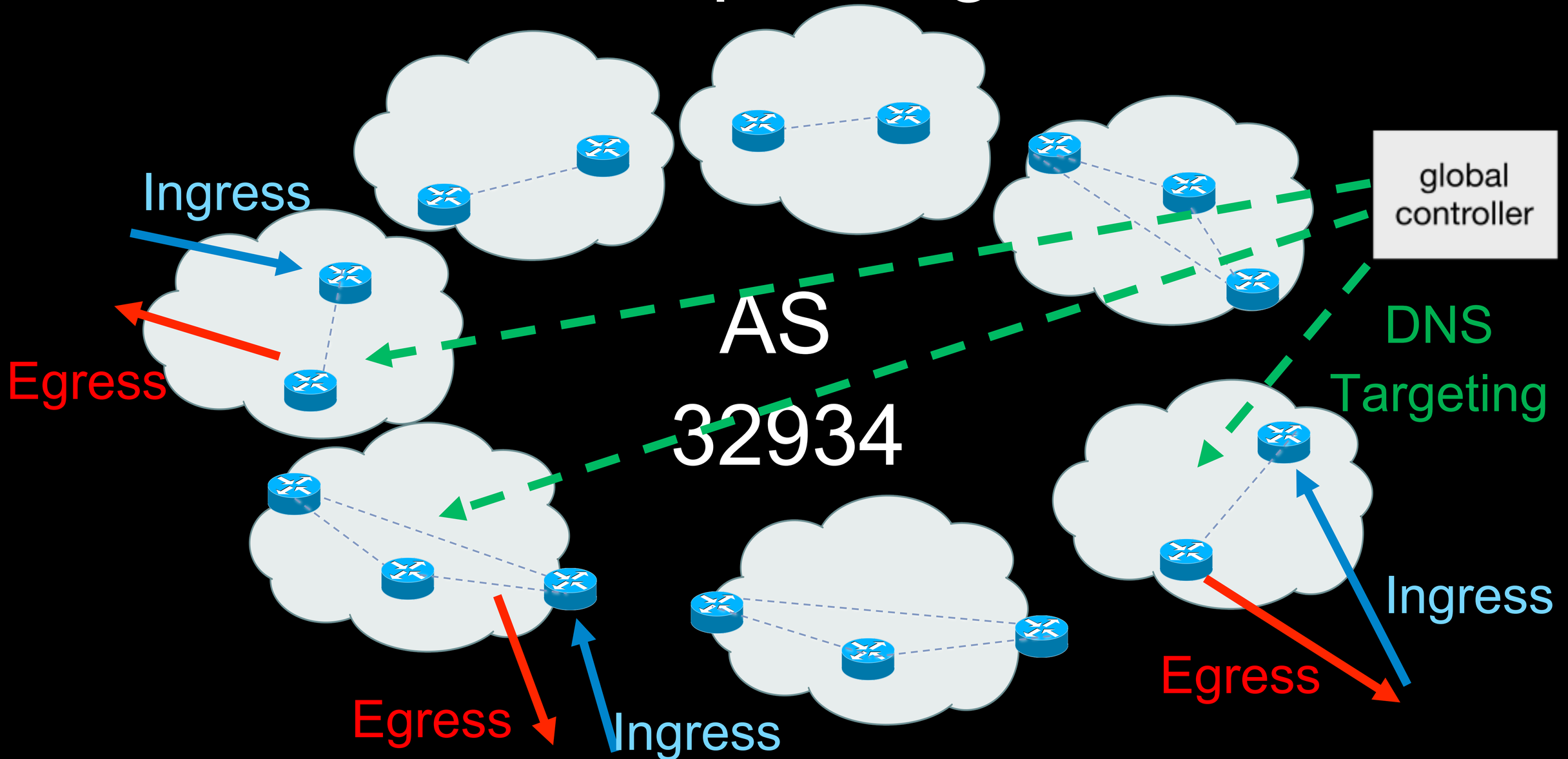
Global controller in action



But what about BGP & targeting?



Metro-level BGP peering islands

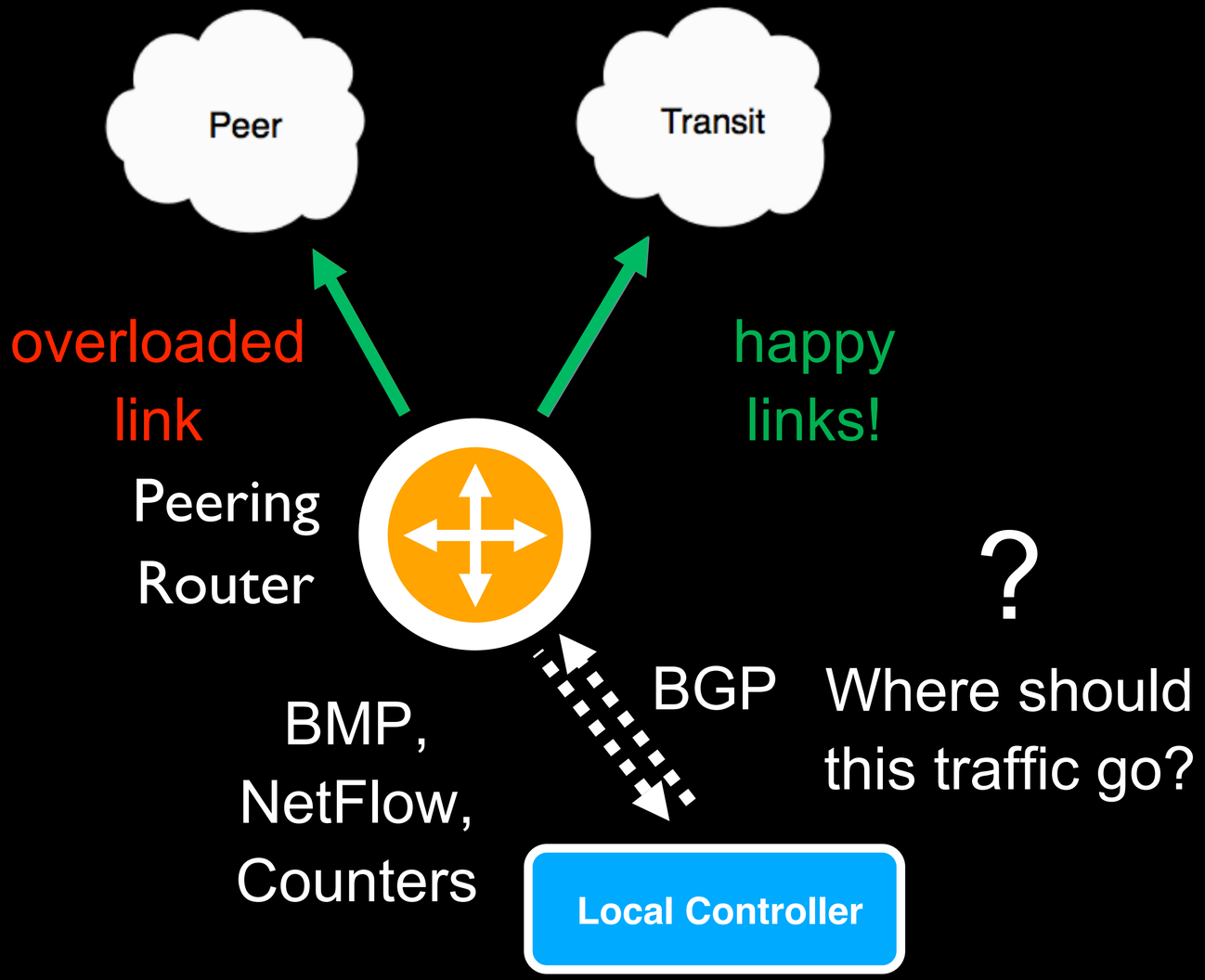


Even on an island, BGP is limited

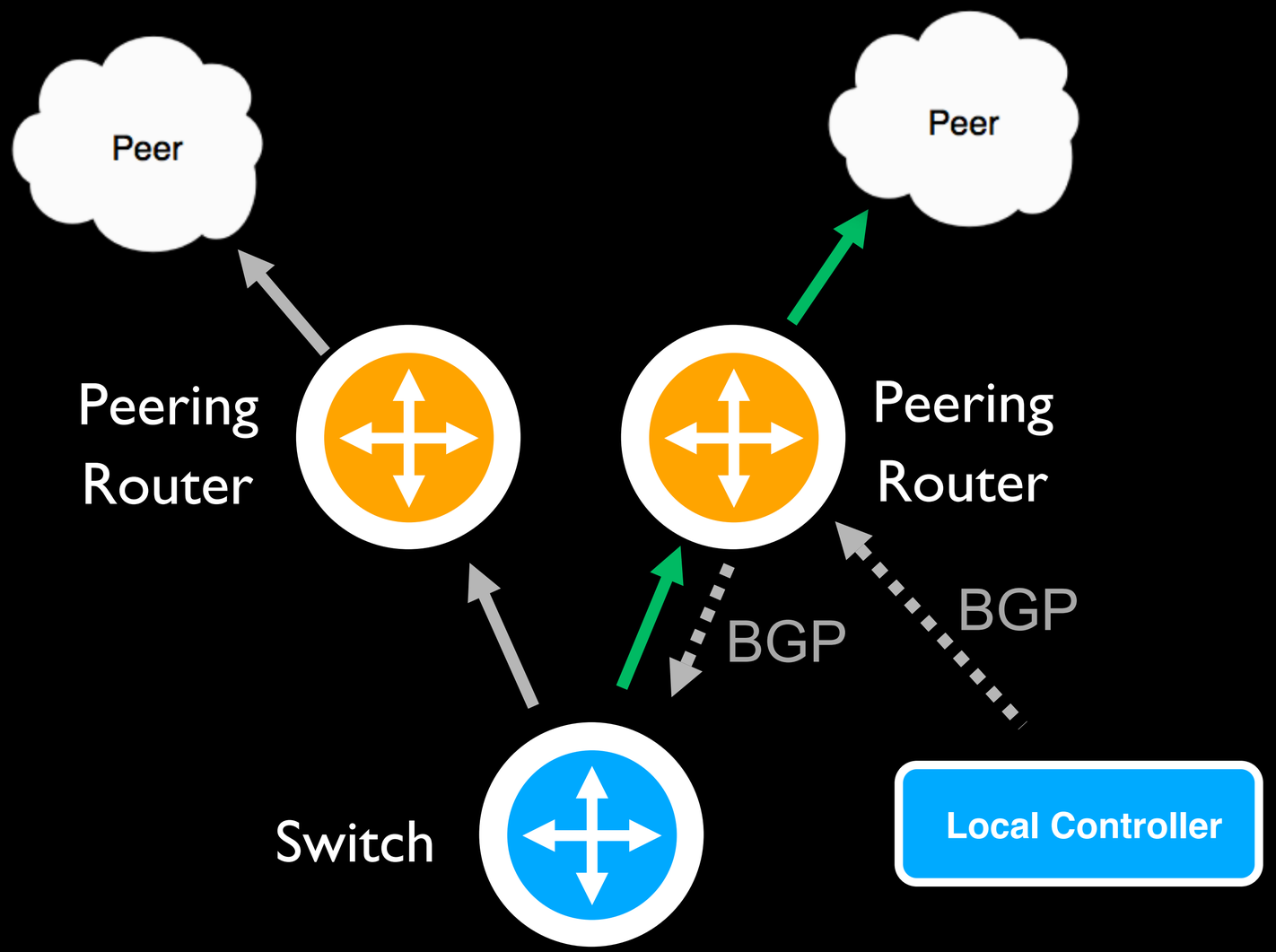
BGP cares about…	We care about…
1. longest prefix 2. local preference 3. AS path 4. MED	1. capacity 2. packet loss 3. latency 4. service performance

Local network controllers

Evolving beyond BGP ...with BGP

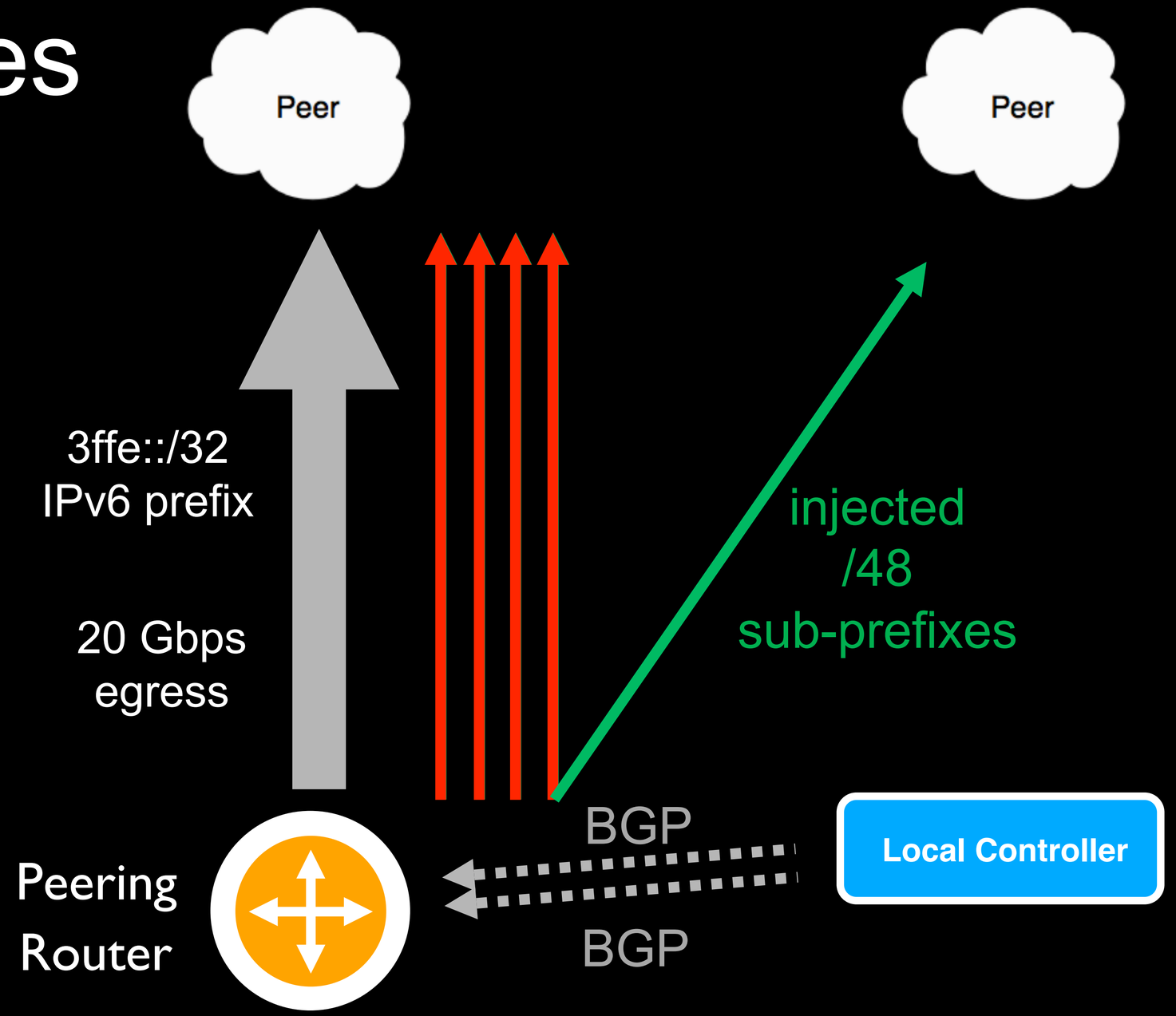


Metro Traffic Engineering



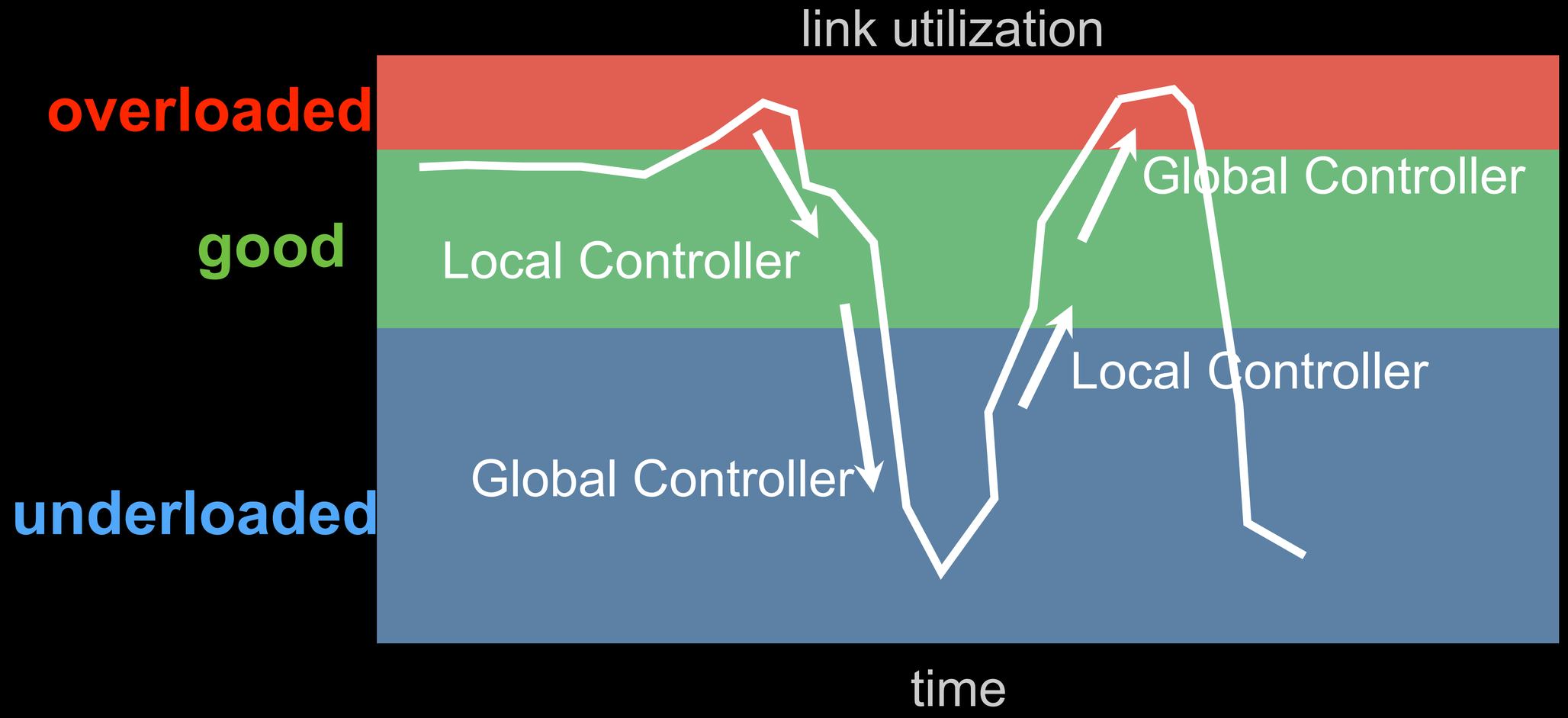
Awesome! So it’s all solved?

Huge Prefixes

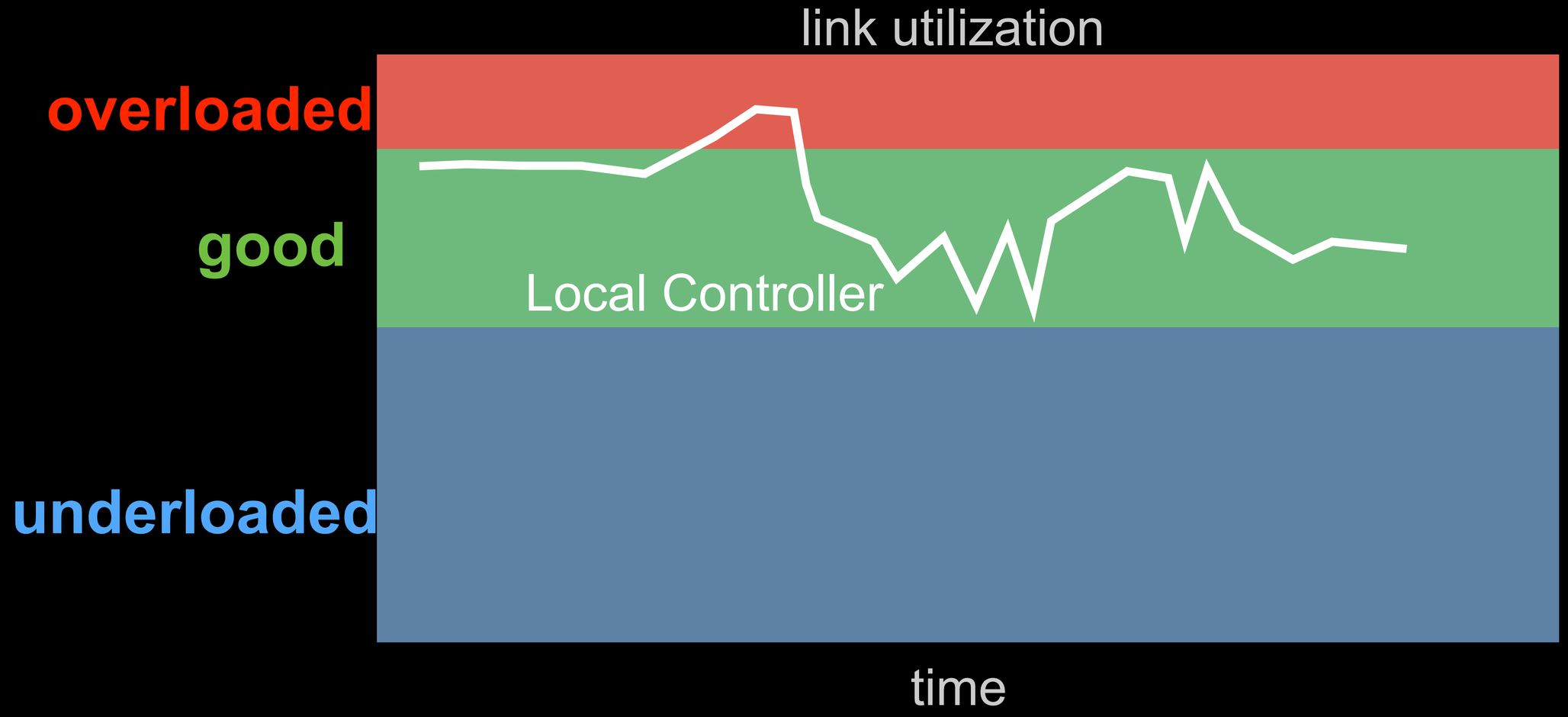


Oscillation between controllers

Local and Global Controller interaction



Clear roles so they don’t oscillate

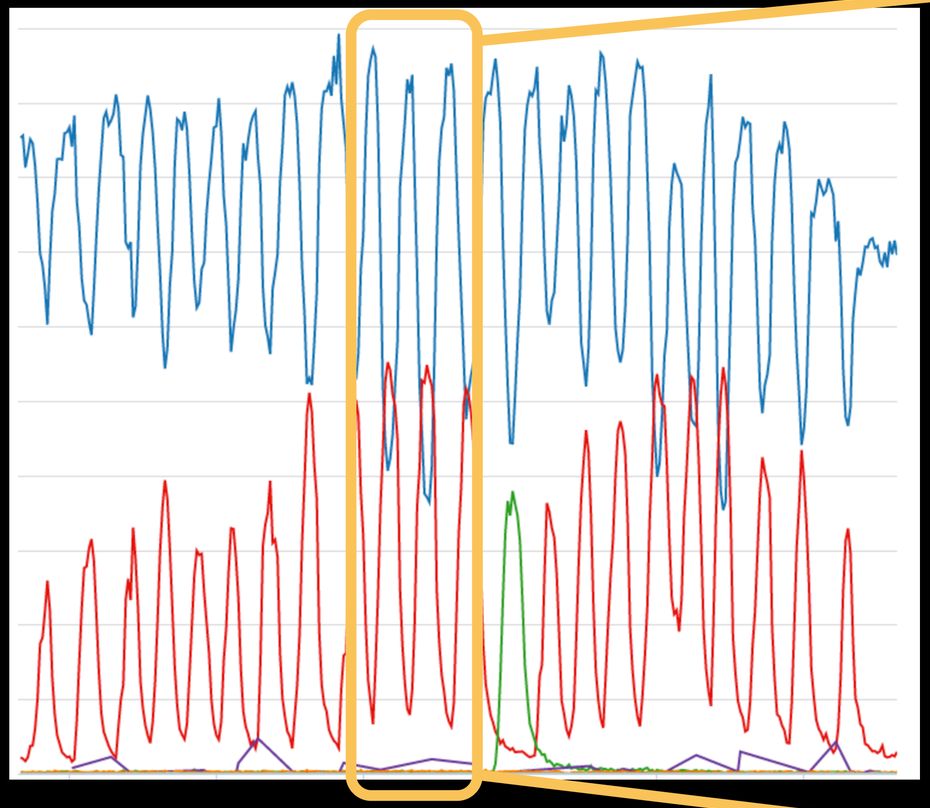


Oscillation from imprecise data

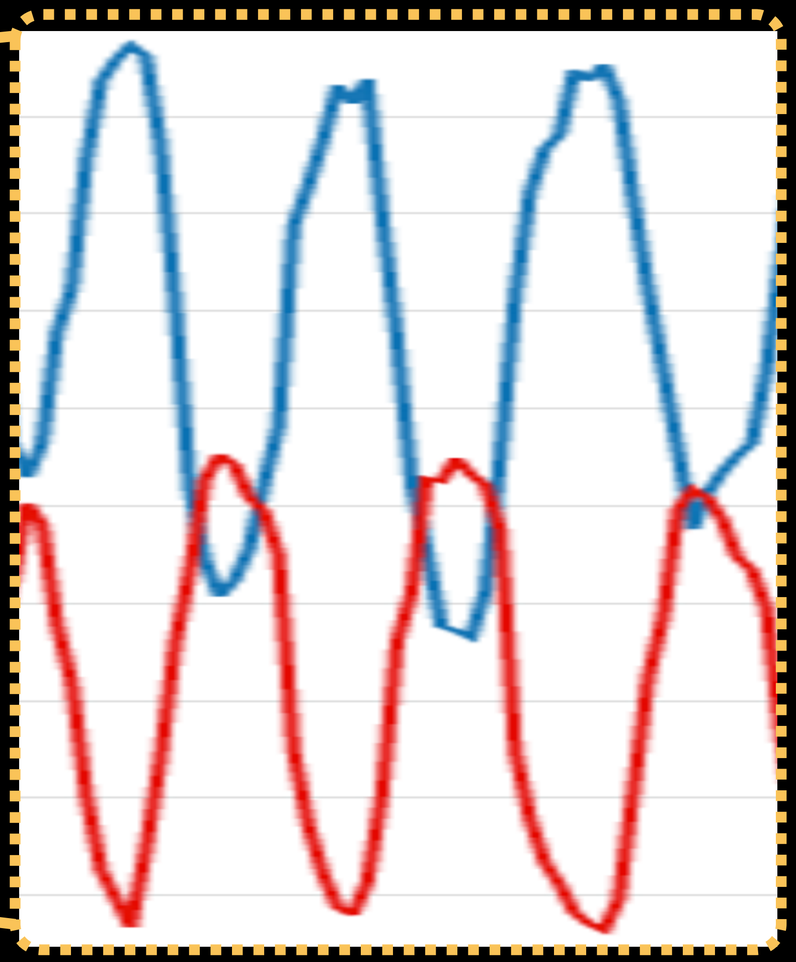
Lack of Precise Bandwidth Estimation

20 Gbps

10 Gbps



w/o precision



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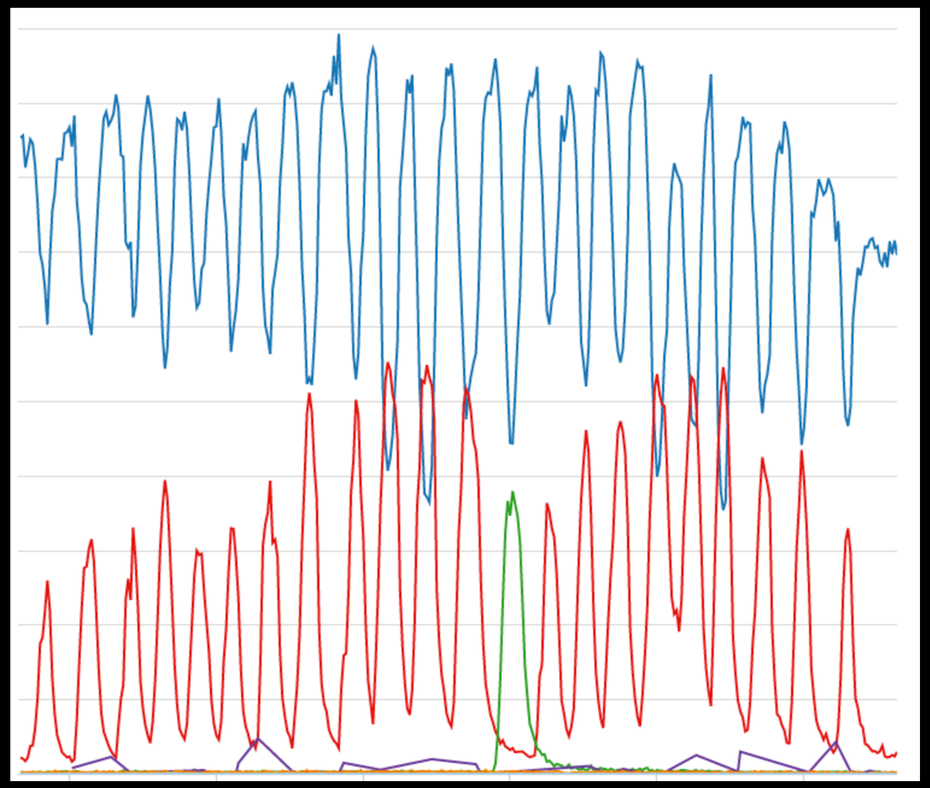
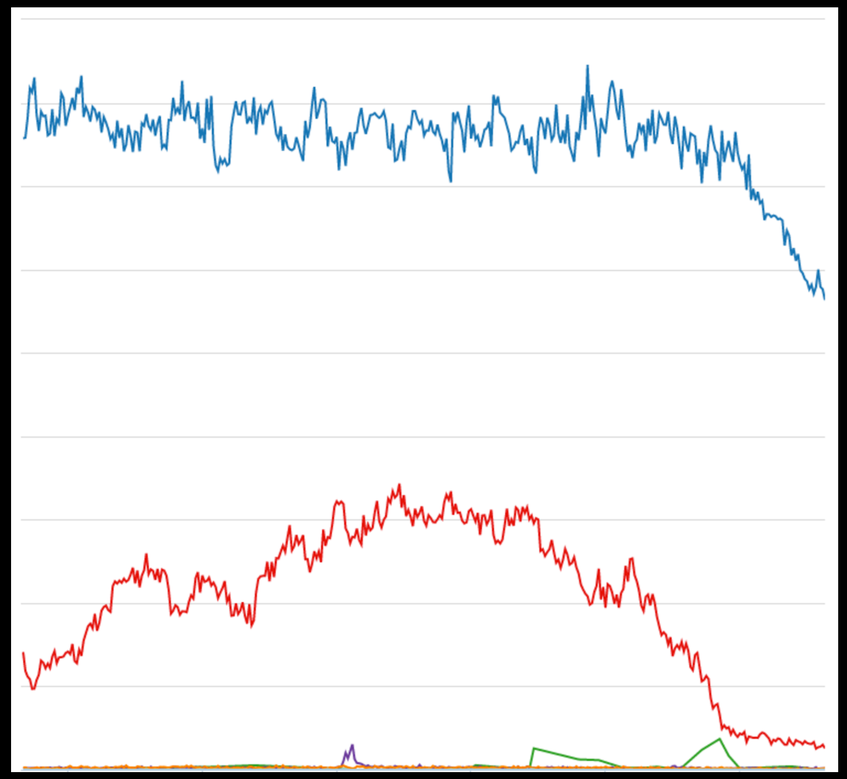
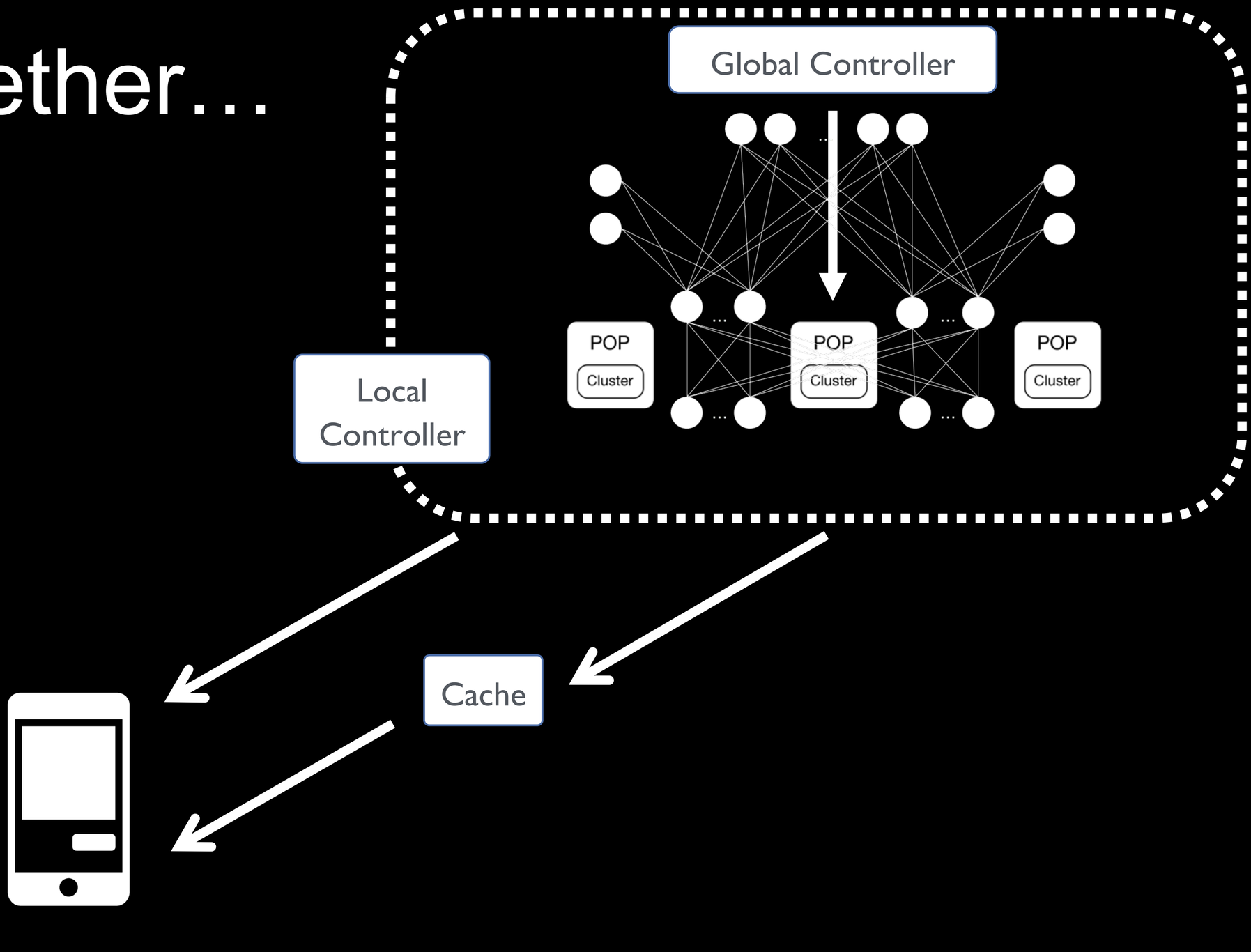


w/o precision



w/ precision

All together…



Summary

Questions?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