

CS 725/825 & IT 725

Lecture 1

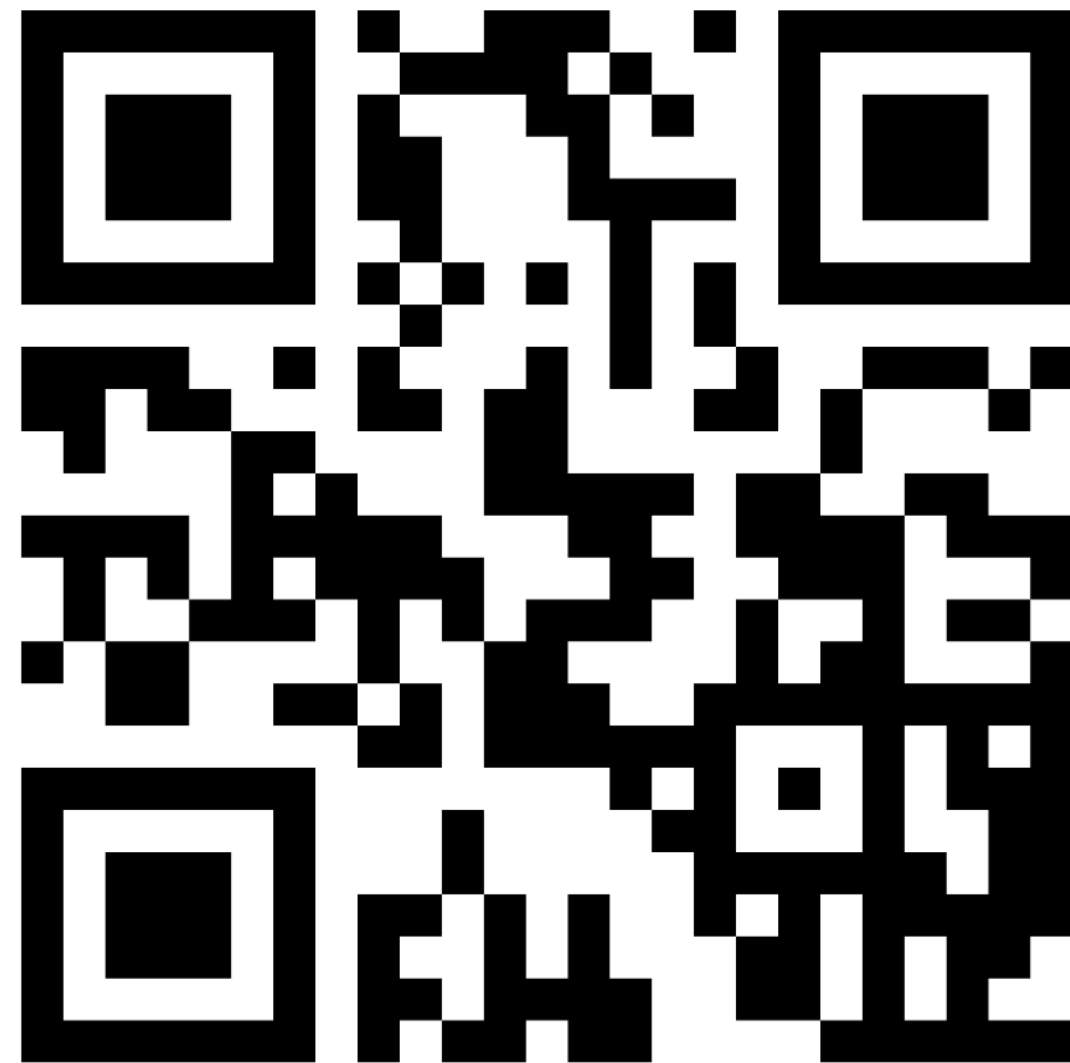
Course Introduction

August 29, 2023

Course website

- The “entry point” for all aspects of the course:

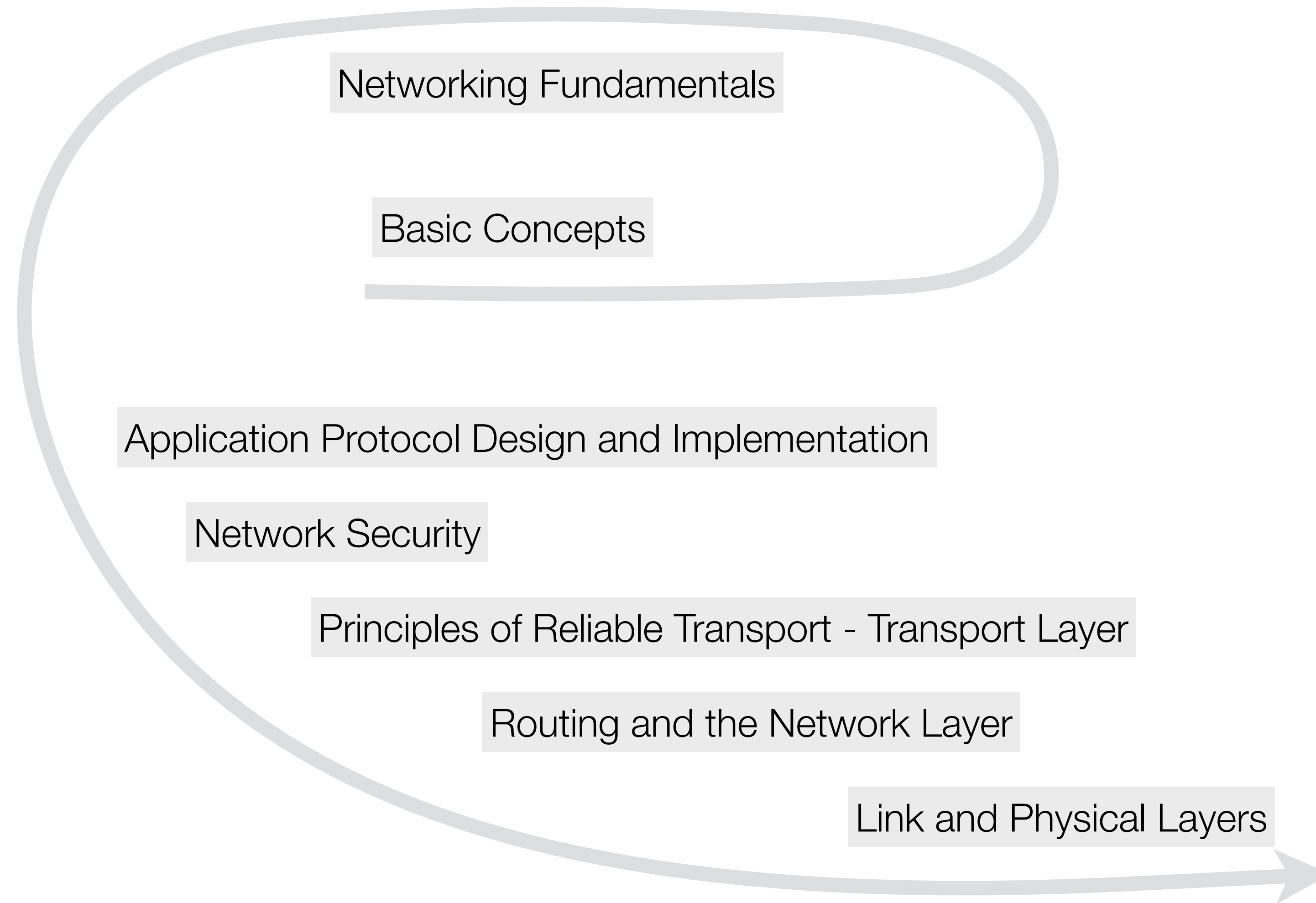
<https://www.cs.unh.edu/~cs725/>



Coursework & Evaluation

- ▶ Five **homework assignments**: 40%
 - Assuming no major schedule disruption, assignments will be due at the start of the class (2:10 pm) on Wednesdays: September 27, October 18, November 1 and 15, and December 6, 2023
- ▶ Two in-class **exams**: 40%
 - October 11 and November 8, 2023
- ▶ **Final exam/project**: 20%
 - Take home Research paper and problem answers due December 16, 2023
- ▶ Extra credit will be given, at my discretion, for work significantly above and beyond what was asked and for continued participation in online discussions.

Course Outline



Yes, we will visit some subjects multiple times!

Teaching Method

- ▶ Lectures (conceptual and practical subjects)
- ▶ Guided exploration and reading
- ▶ Paper and pencil problems
- ▶ Programming exercises
 - protocol implementation
 - protocol design
- ▶ Hands on experimentation with networks
- ▶ Network performance evaluation

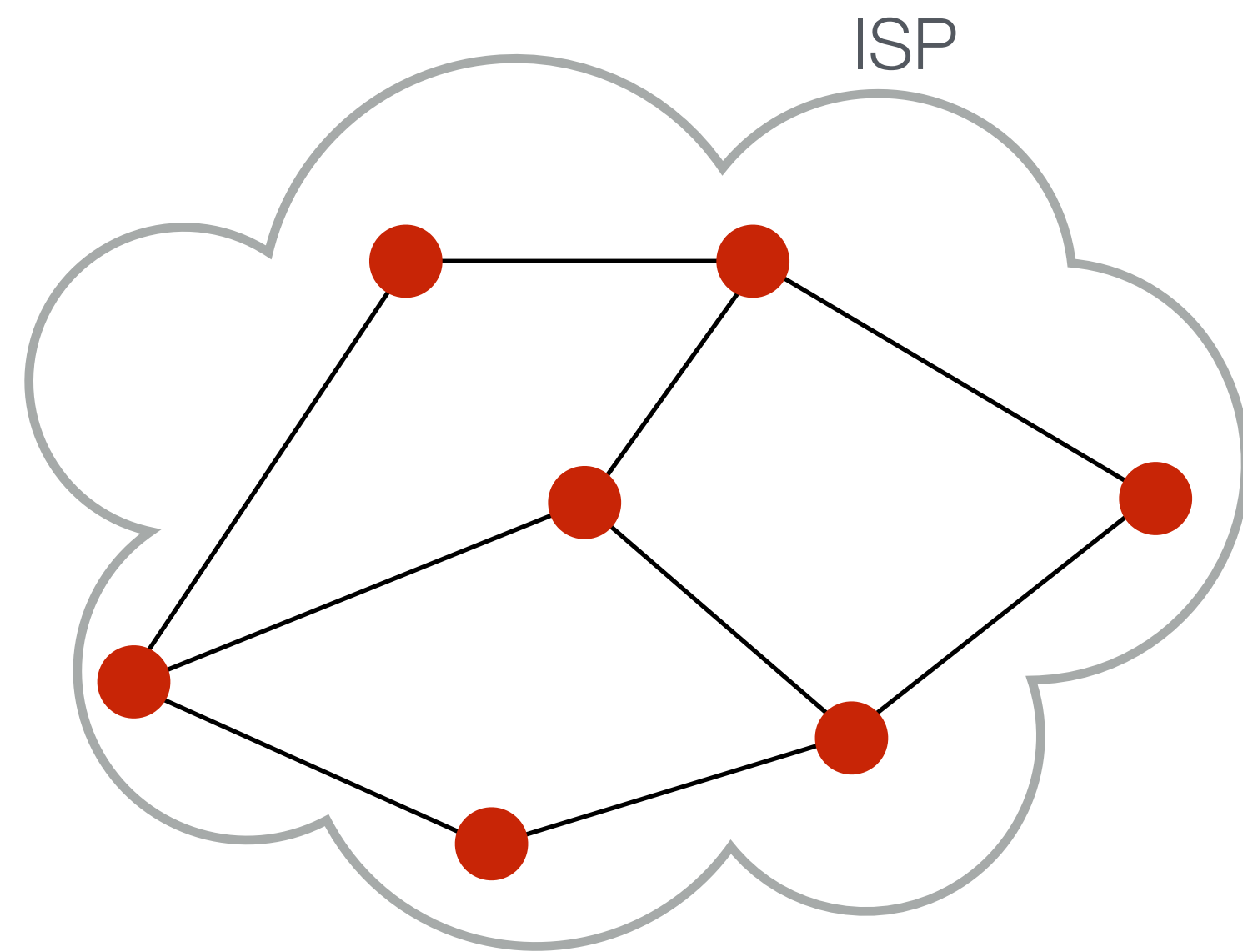
What is the question?

- ▶ What are the **key network performance characteristics**?
 - What makes one networking technology better than another?
 - What aspects of networks we need to improve going forward?

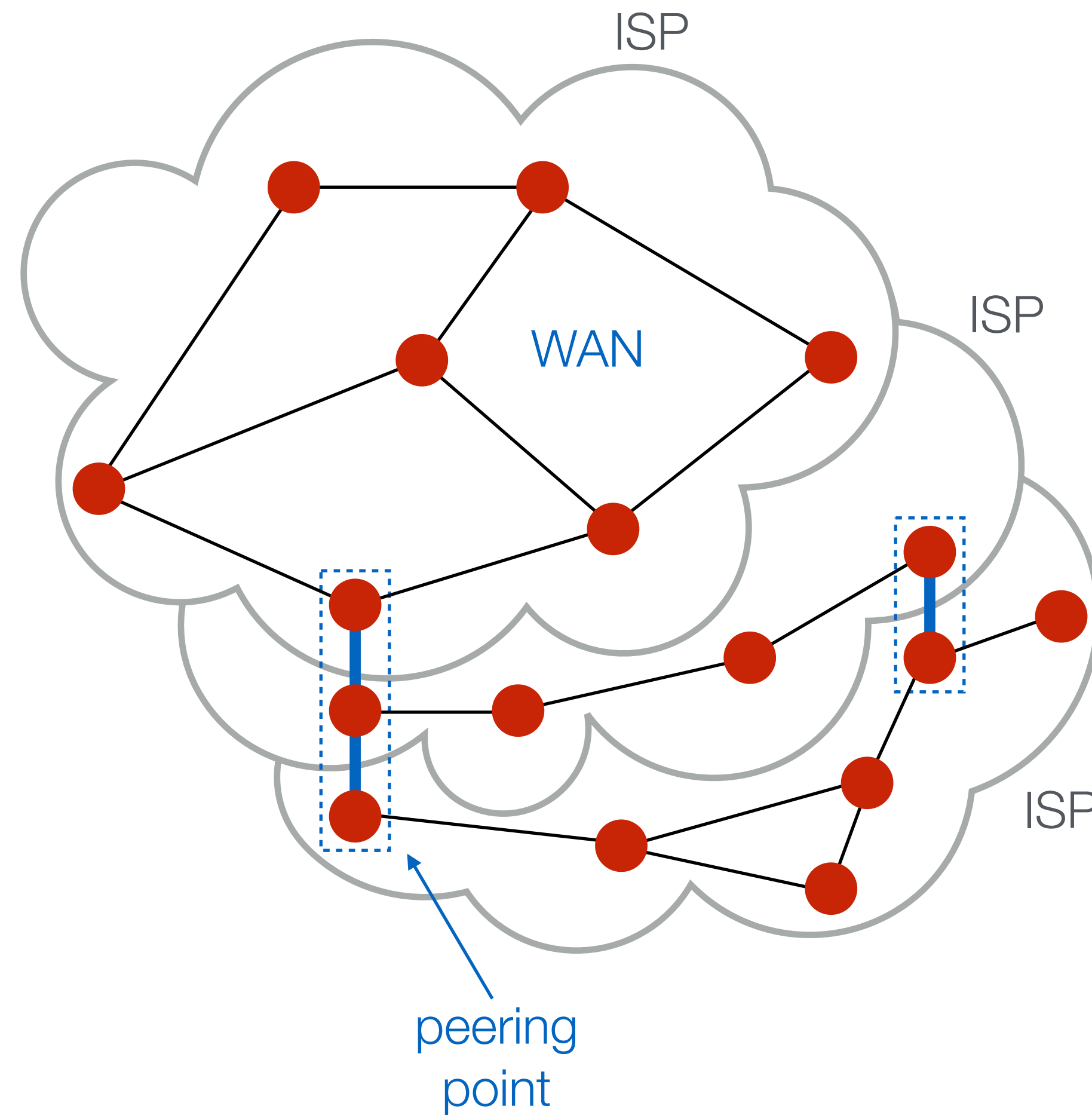
What is the question?

- ▶ "Faster" networks
 - Higher transmission rate
 - Lower latency
- ▶ Security
- ▶ Lower error rate (bit error rate, packet loss probability)
- ▶ Higher availability (reliability)
- ▶ Ubiquity
- ▶ Lower monetary cost
- ▶ Improved user experience (lower complexity)

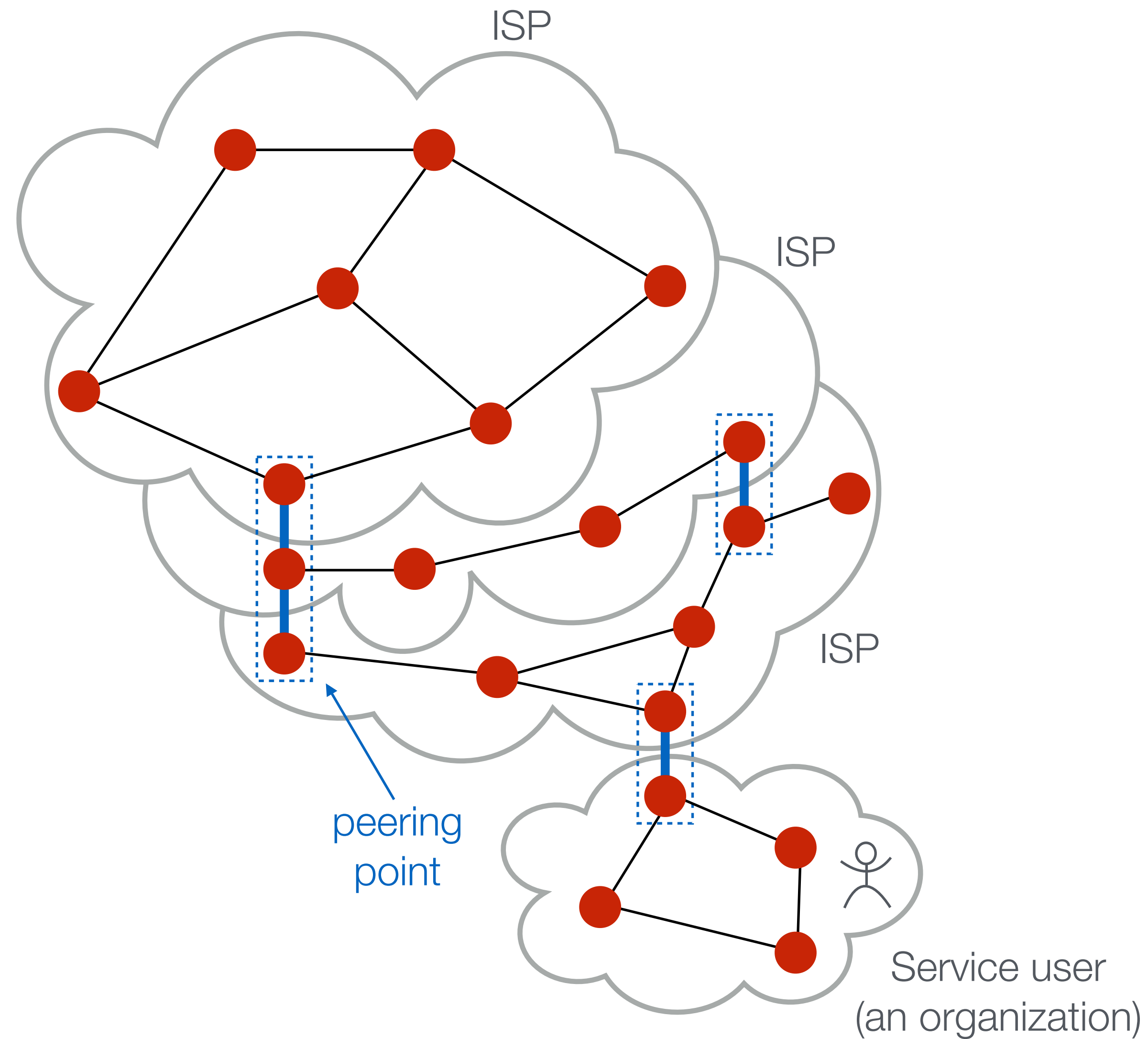
Internet...



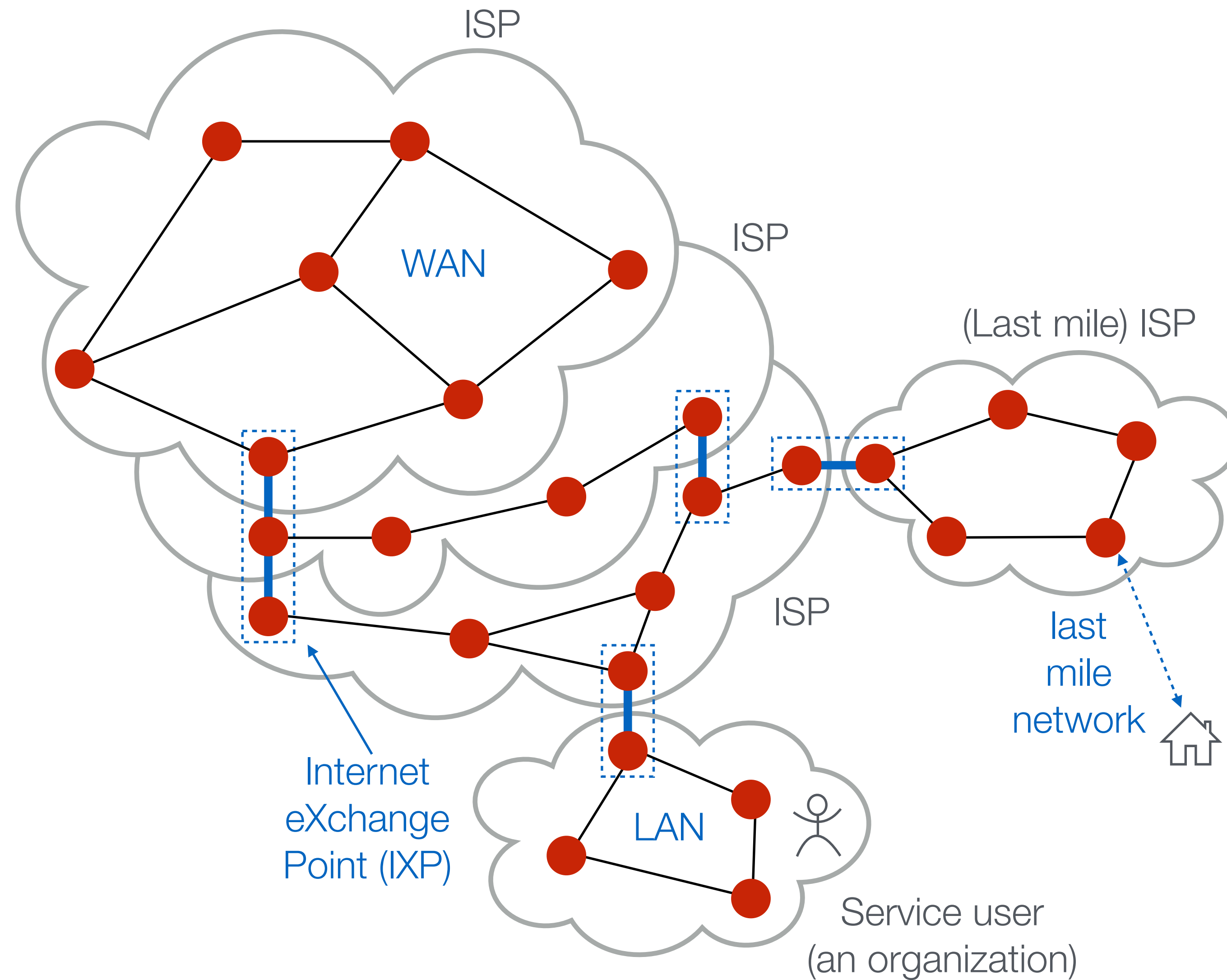
Interconnected network



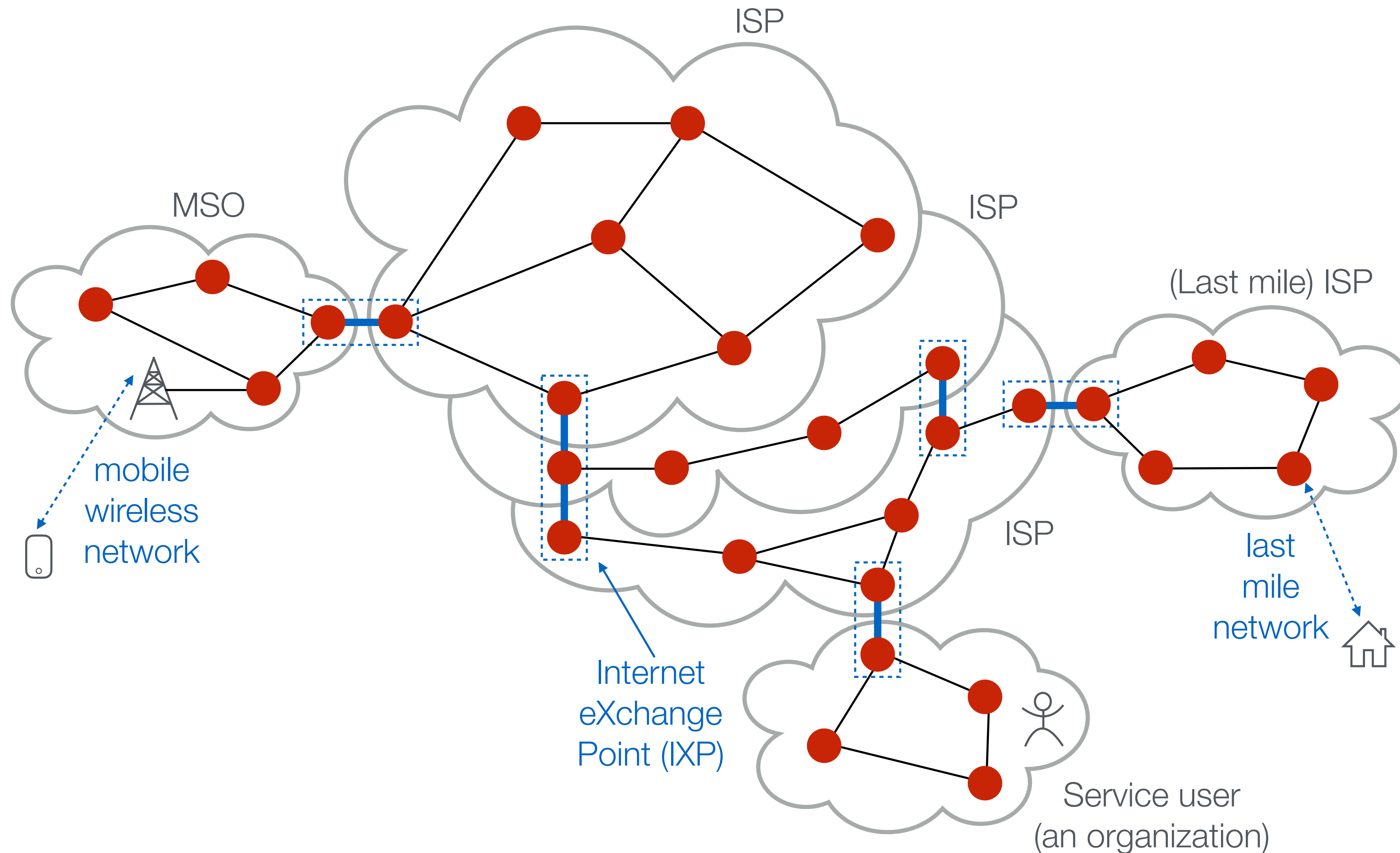
Internet service consumer



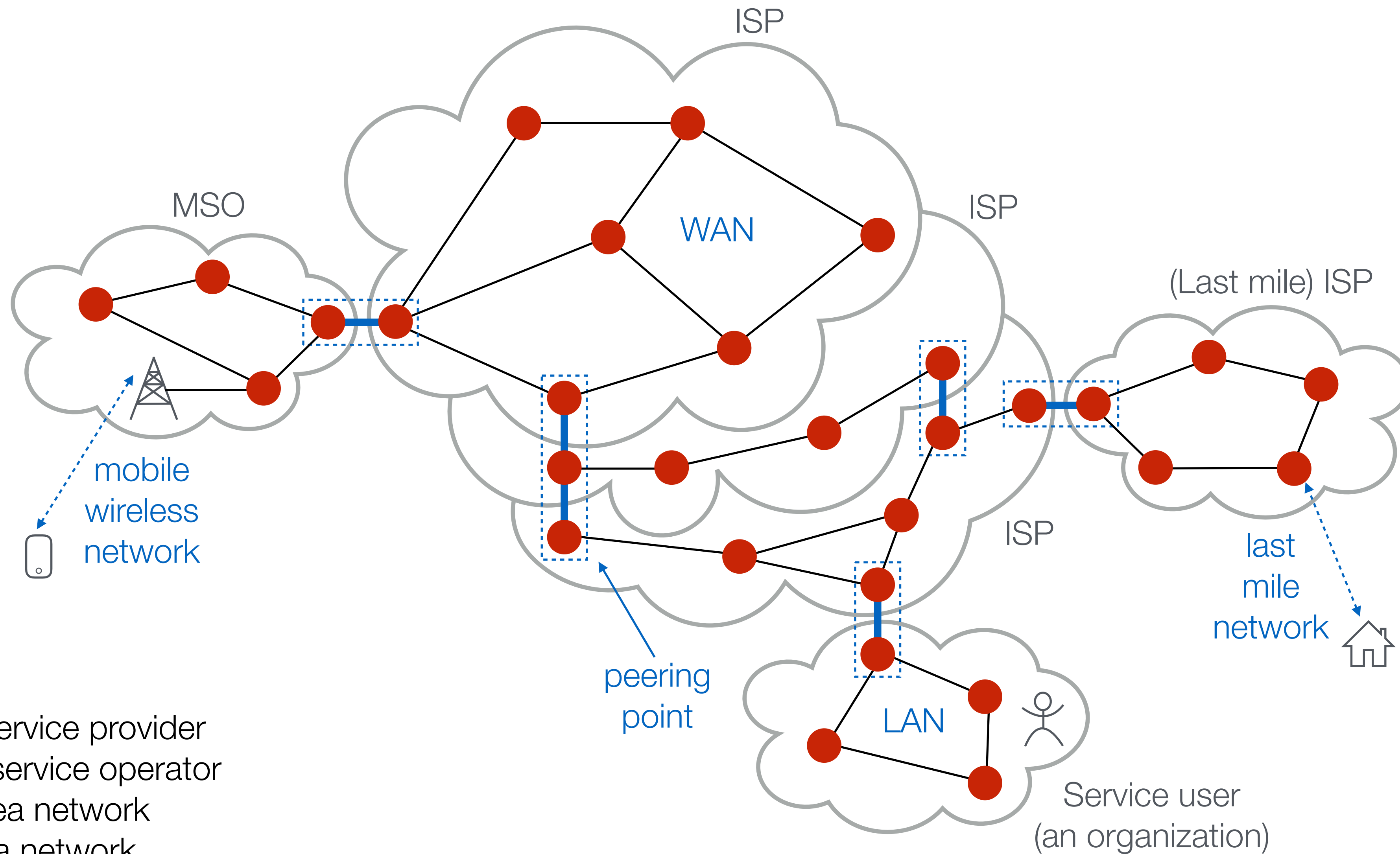
Last-mile networks



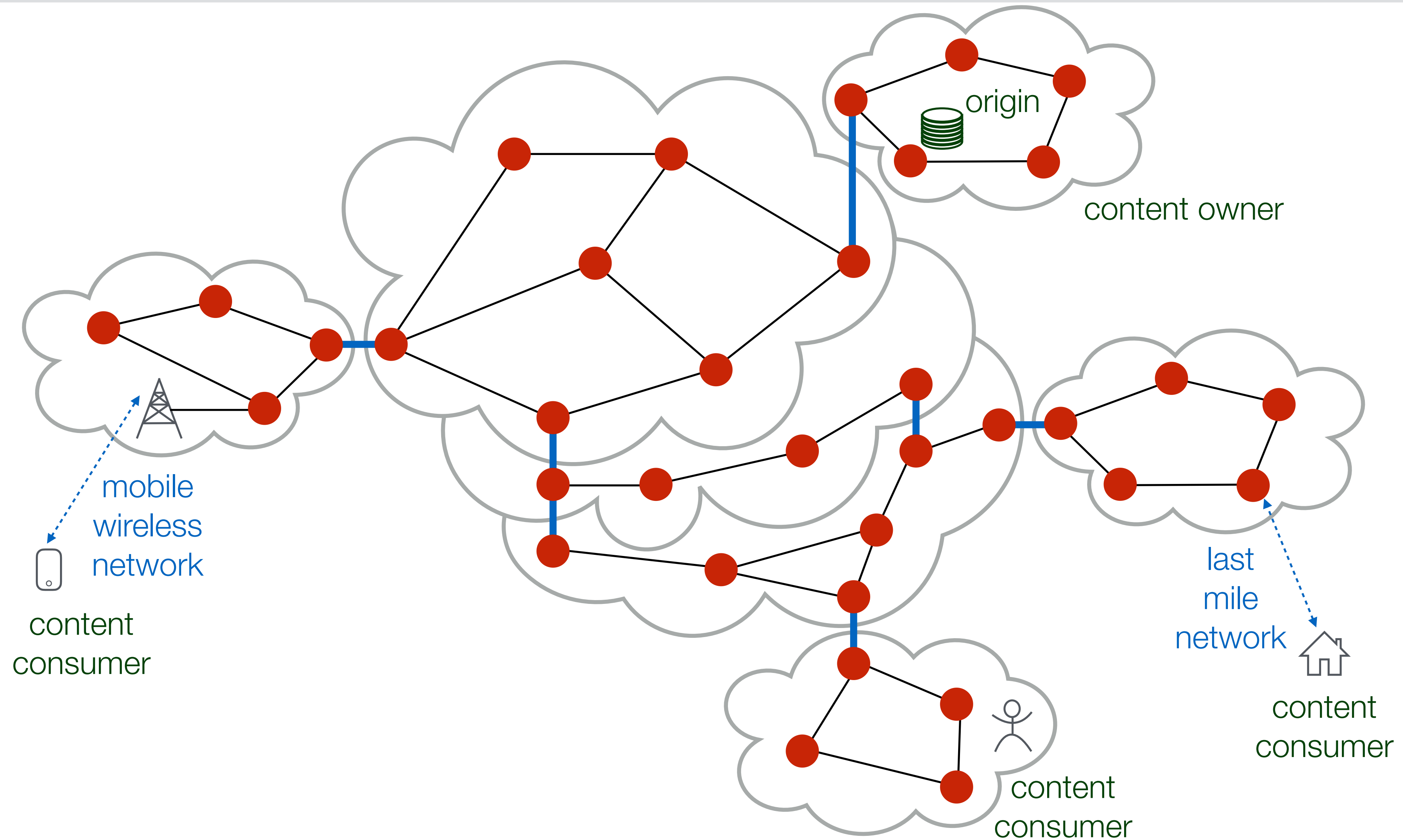
Mobile (cell) networks



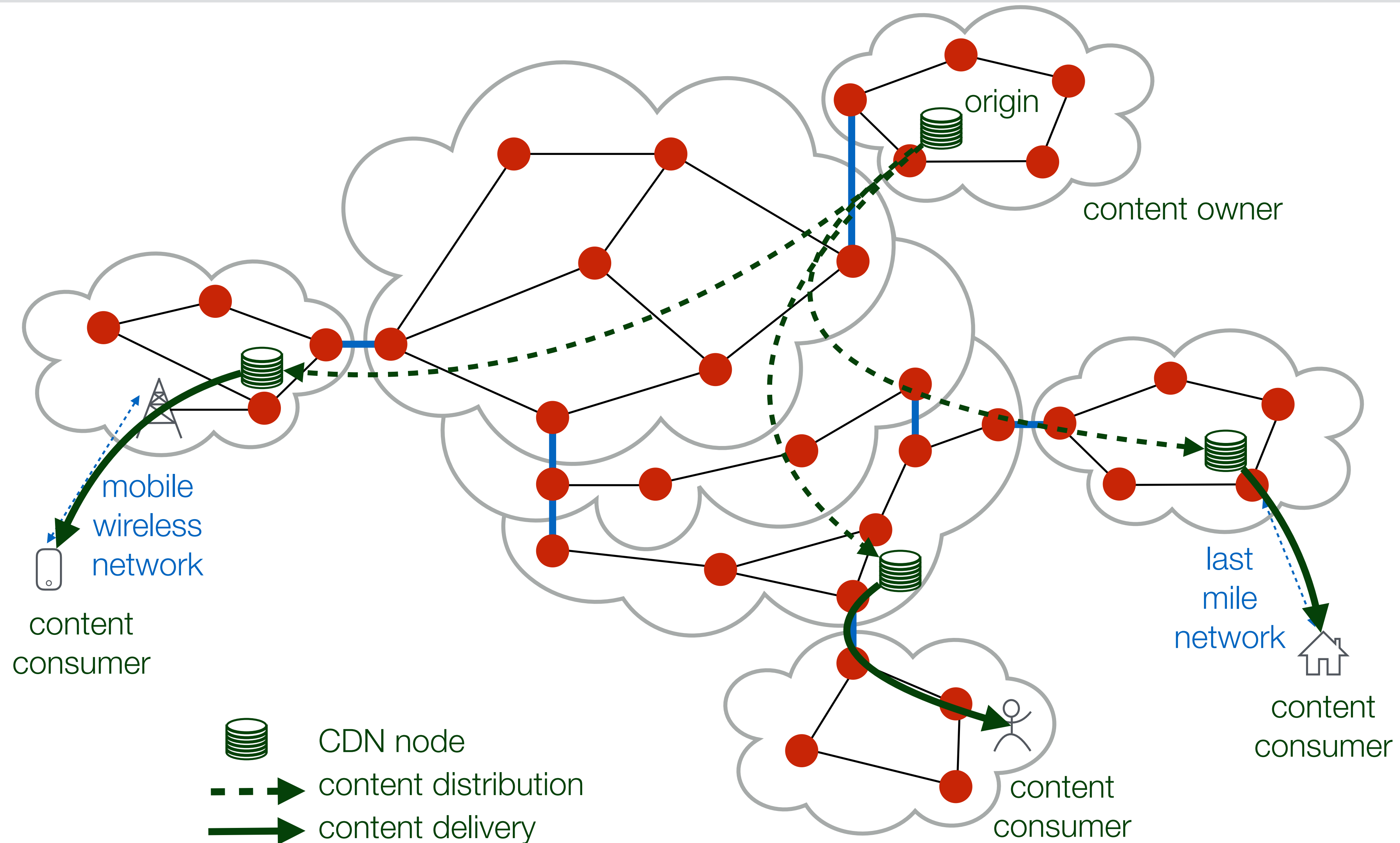
Internet today



Content Delivery



Content Delivery Network (CDN)



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The Keyword

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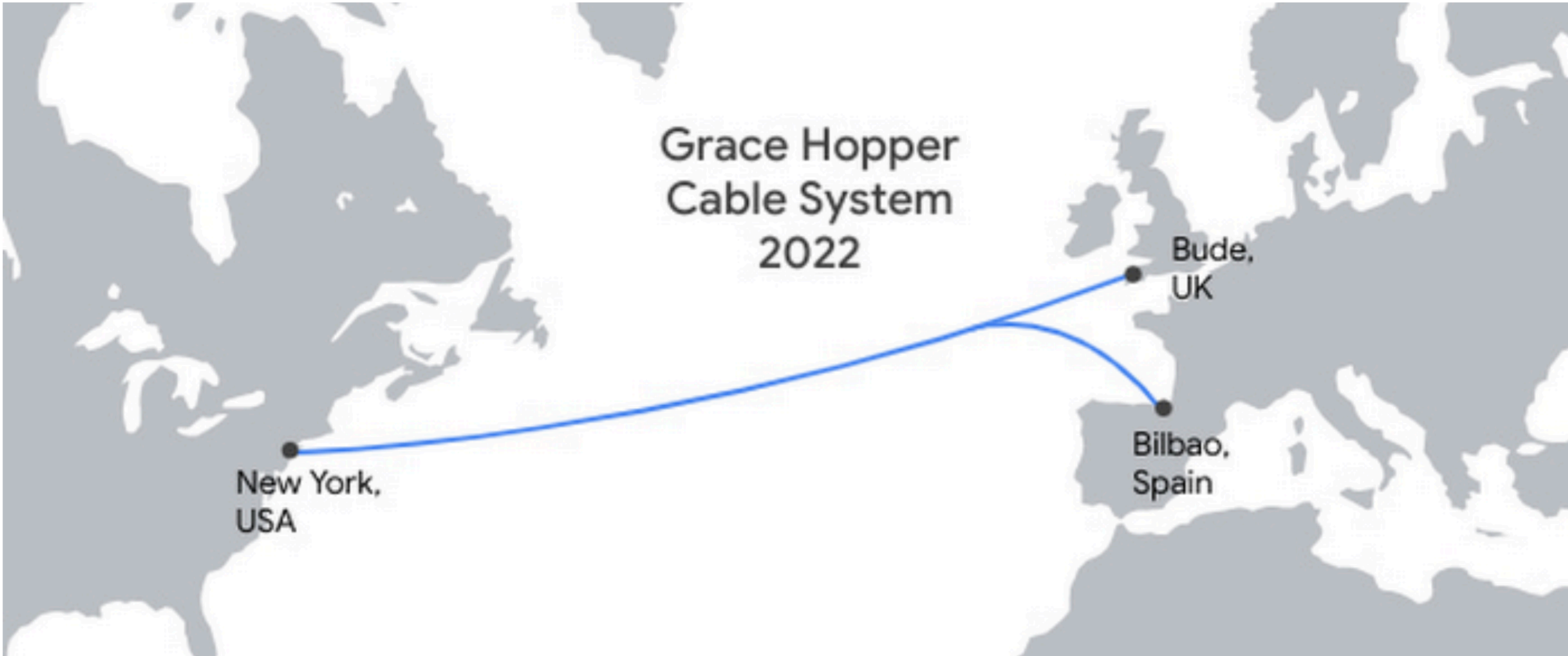
Sep 14, 2021 · 2 min read



Jayne Stowell

Strategic Negotiator, Global Infrastructure, Google Cloud

Share



Grace Hopper Cable System 2022

New York, USA

Bude, UK

Bilbao, Spain

Last year, we [announced](#) a new subsea cable — named Grace Hopper after the

Curie cable route



Firmina cable route

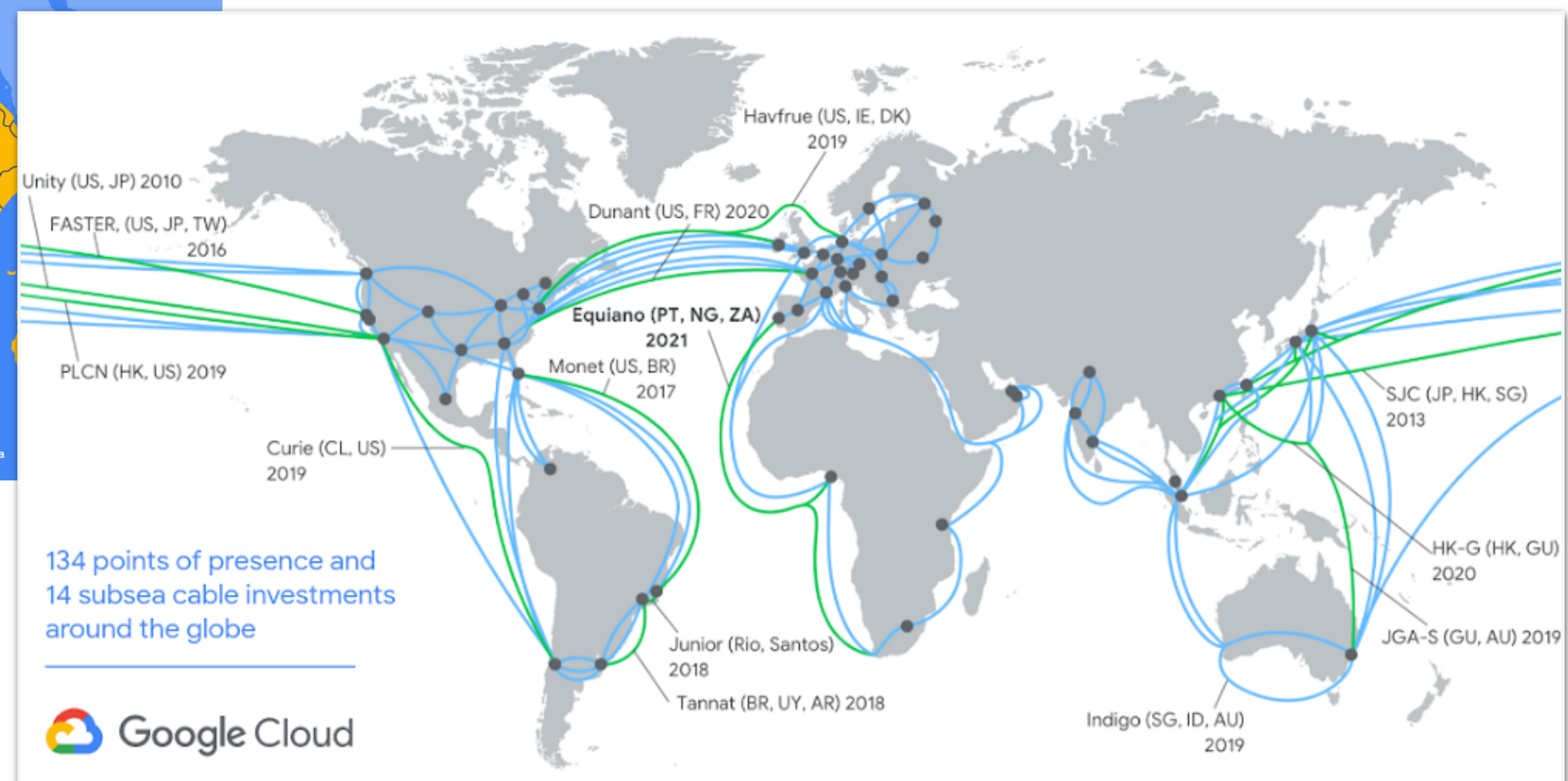
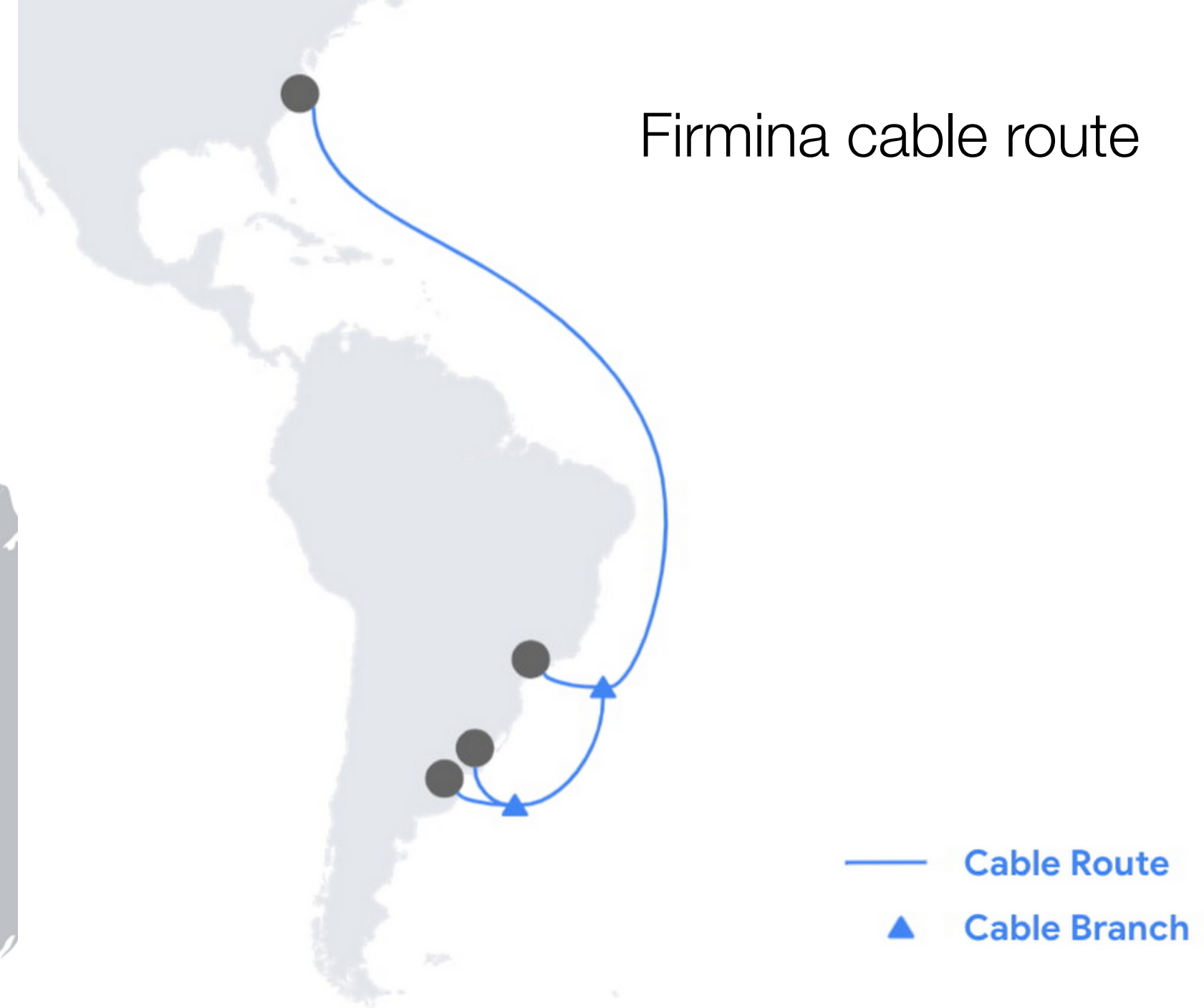


Image sources: Google Cloud Blog
<https://cloud.google.com/blog/products/infrastructure/curie-subsea-cable-set-to-transmit-to-chile-with-a-pit-stop-to-panama>
<https://cloud.google.com/blog/products/infrastructure/announcing-the-firmina-subsea-cable>
<https://cloud.google.com/blog/products/infrastructure/introducing-equiano-a-subsea-cable-from-portugal-to-south-africa>

Other network categories

- ▶ Datacenter and Storage Networks
- ▶ Personal Area Network (PAN)
- ▶ Sensor networks, Internet of Things (IoT), Cyber-Physical Systems
- ▶ Mobile and Vehicular networks
- ▶ Home automation
- ▶ Industrial networking
- ▶ etc...