



MAX 1999-2019

20 Years of Connecting the Future!

2019 MAX PARTICIPANTS MEETING

APRIL 11, 2019



MAX 1999-2019

20 Years of Connecting the Future!

2019 MAX PARTICIPANTS MEETING

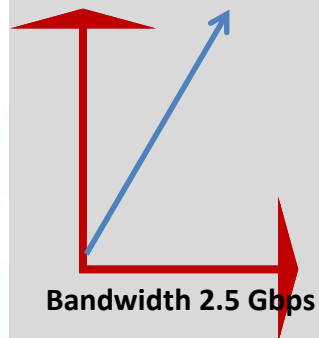
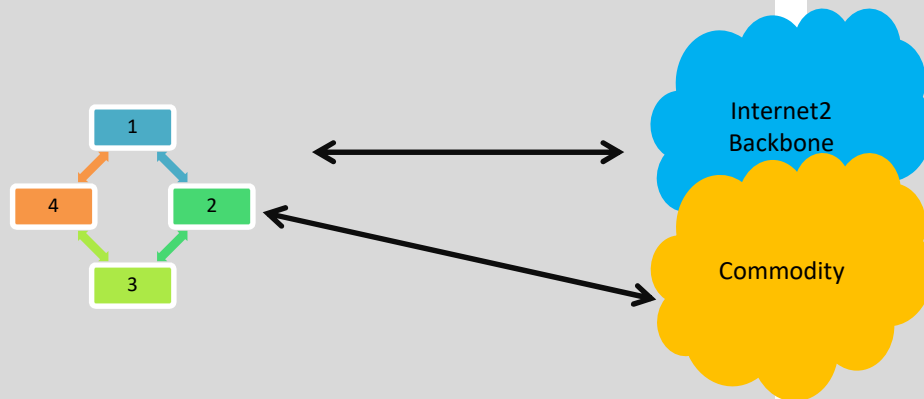
TRIPTI SINHA
APRIL 11, 2019

Celebrating 20 Years of MAX

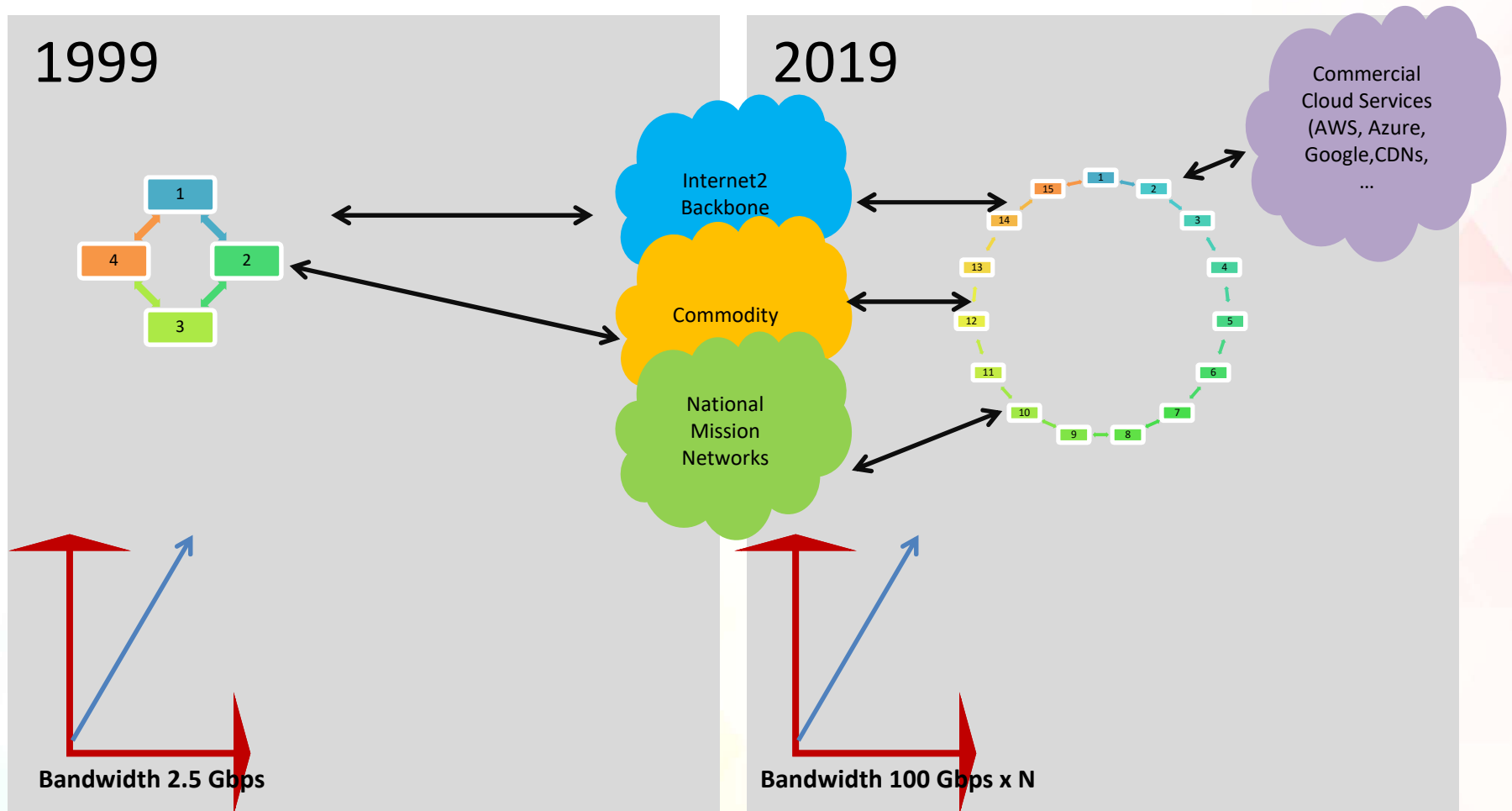
1999 - 2019

20 Years of Connecting the Future!

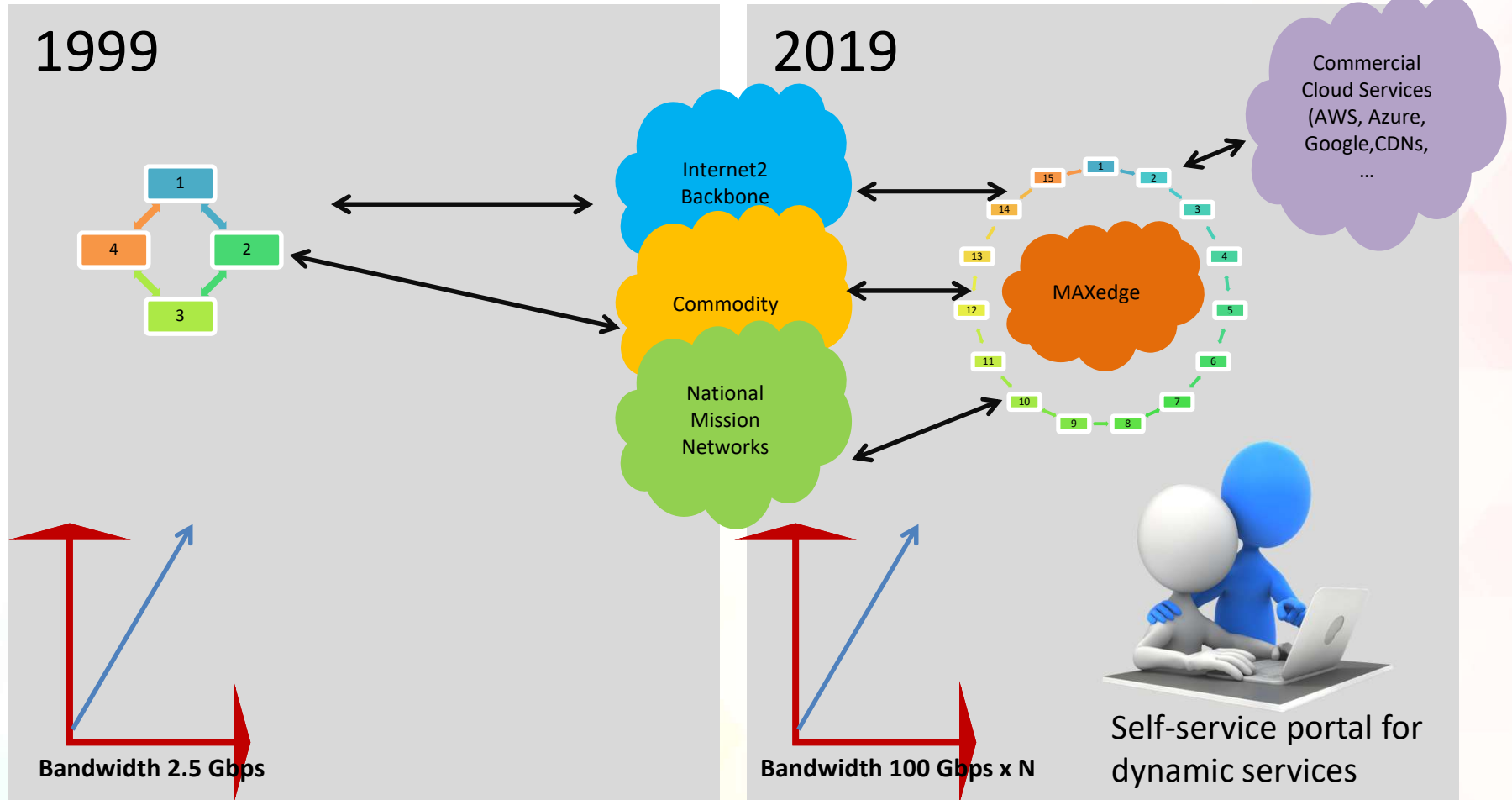
1999



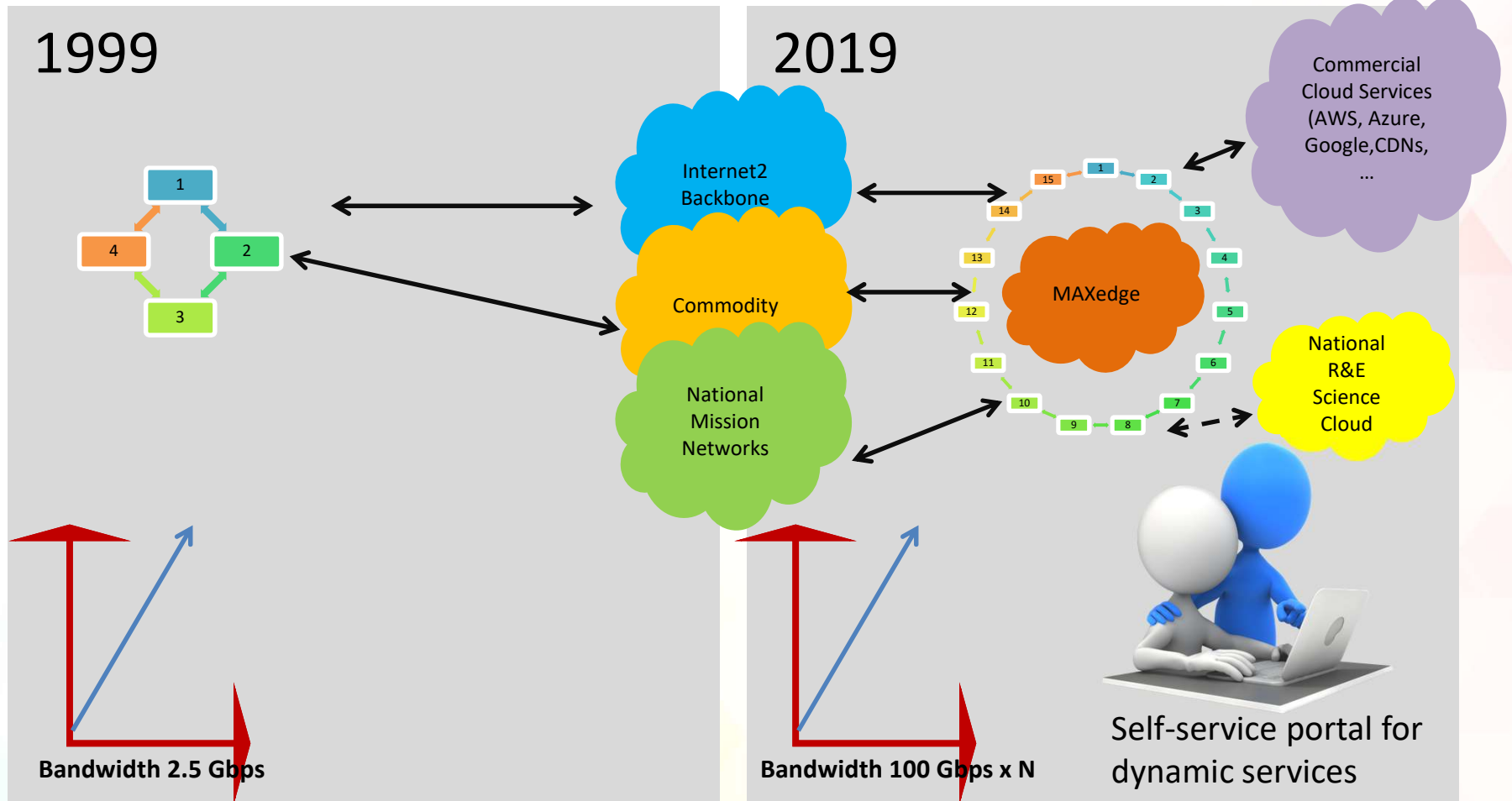
20 Years of Connecting the Future!



20 Years of Connecting the Future!



20 Years of Connecting the Future!



MAX Focus on Thematic Activities

MAX Strategic Plan 2019 - 2024

- MAXimizing the next five years

Intelligent Edge

- MAXedge – formalizing the edge as a service point, adding resources and bringing on customers

Optimizing the Network

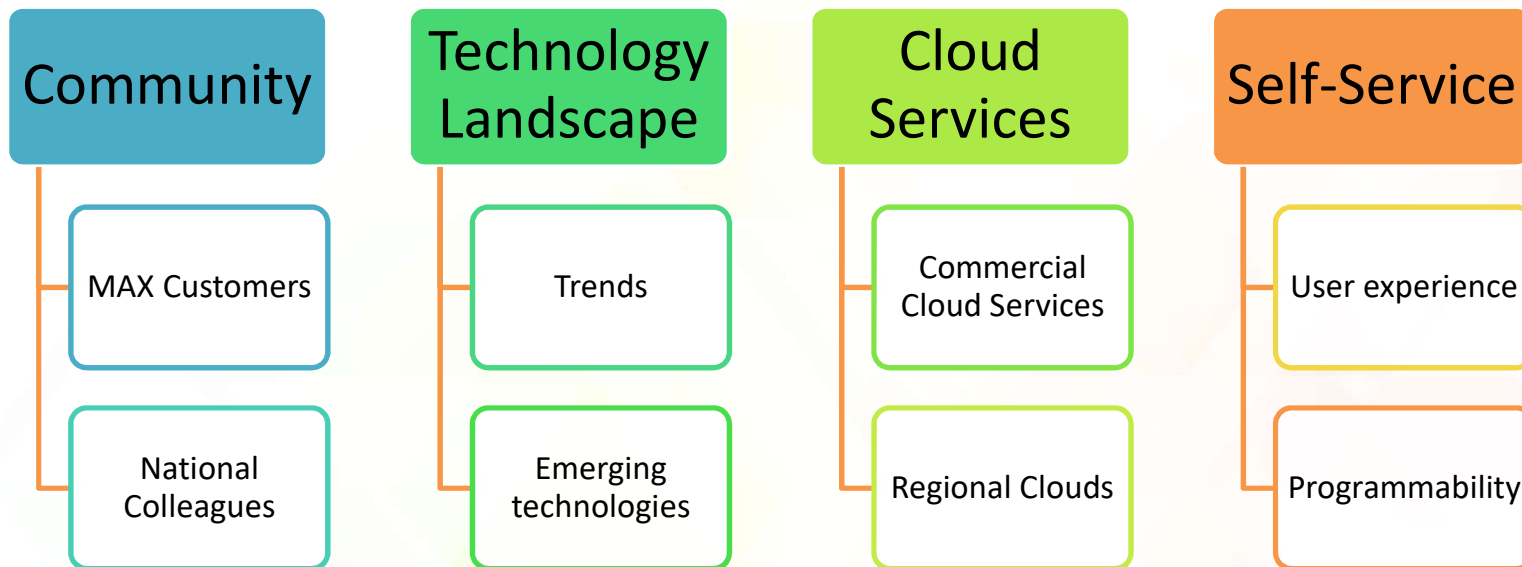
- Optimizing the MAX network topology

National Science Platform

- Staying engaged in the national conversation on an advanced science cyberinfrastructure platform

MAX Strategic Plan 2019-2024

MAX Strategic Plan 2019 - 2024



Six Strategic Goals

Goal 1

Advanced Networking, Operational Excellence, and the MAX Network Footprint

Goal 2

Flexible Transport, Security, and Intelligent Edge Services

Goal 3

Customer Engagement and Partnerships

Goal 4

Research and Development

Goal 5

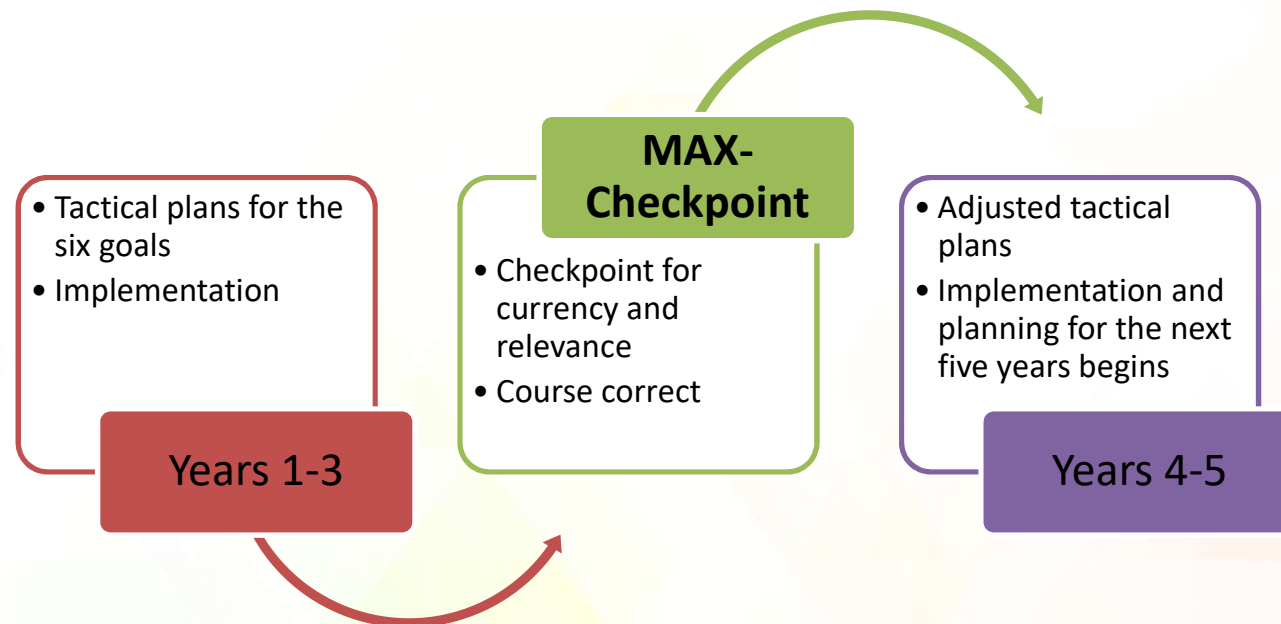
Financial Planning and Competitive Value

Goal 6

Marketing, Sales, and Communications

Ensuring Currency and Relevance of the Plan

3+2 MAX-Checkpoint



The Four MAX Pillars



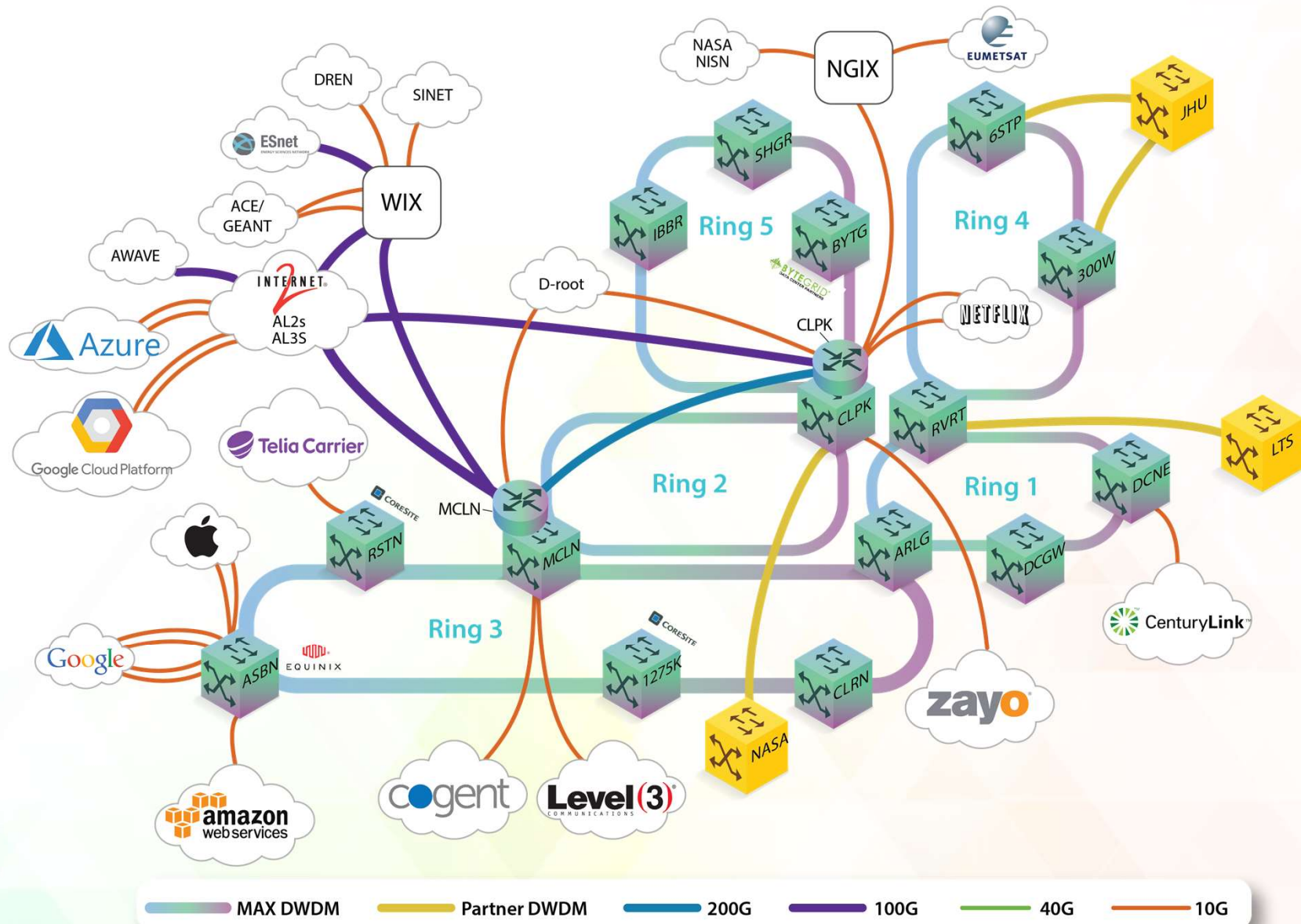
Applied Cyber Innovation for Higher Education and Research



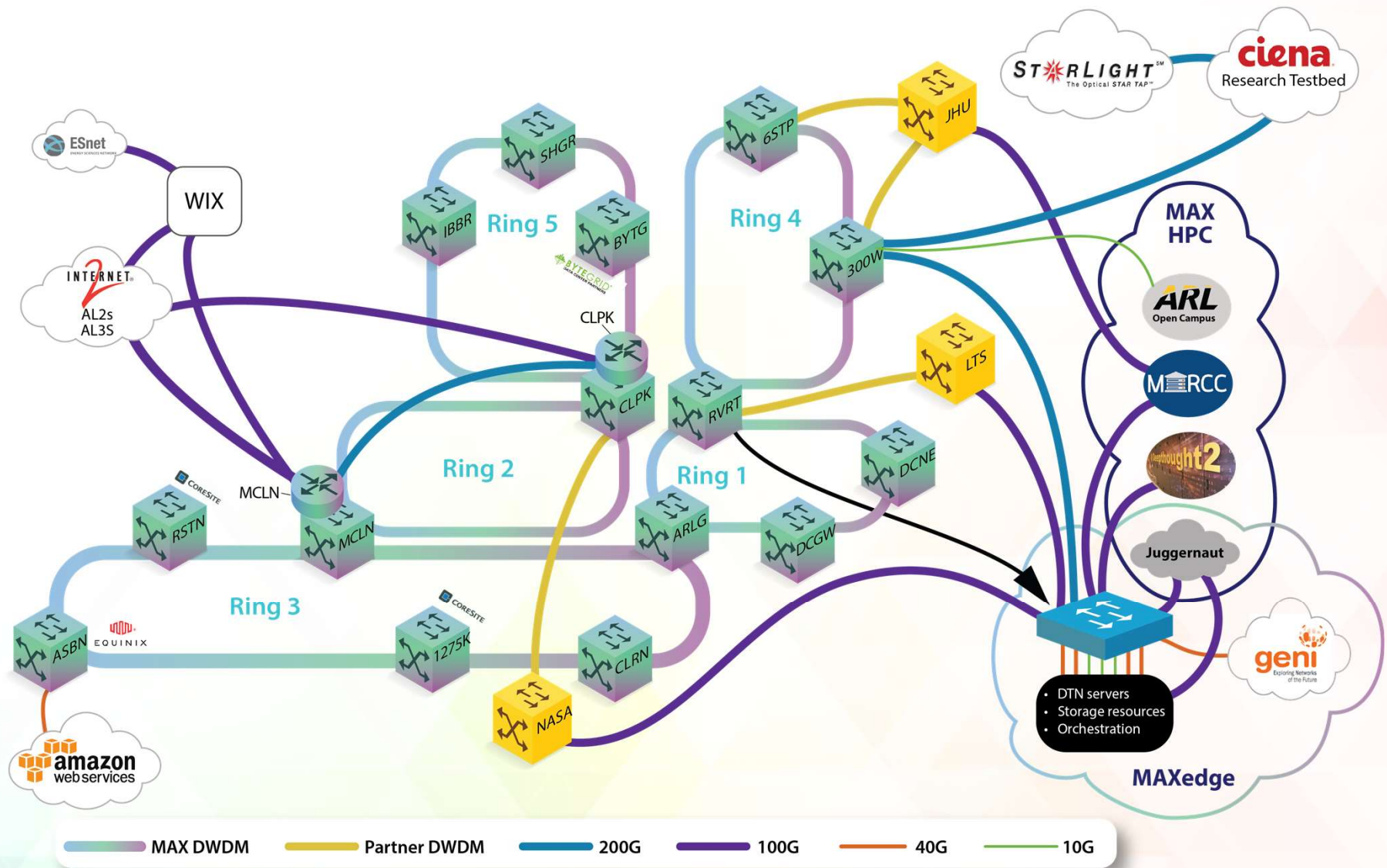
Applied Cyber Innovation for Higher Education and Research



MAX Production Network Topology



MAX Research Network Topology

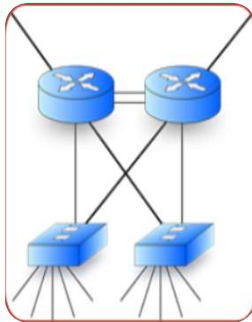


MAX Cyberinfrastructure Platform by the Numbers



MAX optical (DWDM) network

- Current capacity: 88 lambdas
- Deployed 100G lambdas: 13
- Current deployed 10G lambdas: 25
- Deployed alien 200G lambdas: 2 (plus 1 pending)
- Temporary SC18 alien 200G lambdas: 4
- Deployed alien 10G lambdas: 6



MAX routed network

- Backbone Capacity: 200 Gbps
- External traffic off-load capacity: 450 Gbps

MAX Network Peering

National Mission Networks

- DREN (DOD) • ESnet (DOE) • Internet2 (I2) • NASA–NISN
- N-Wave (NOAA)

International Networks at WIX

- ACE/GEANT (European R&E network)
- SINET (Japanese R&E network)

Higher Education and State Networks

- MDREN • Network Maryland

Cloud and CDN Networks

- Apple • Amazon/AWS • Google • Netflix

Commodity Networks and Datacenters on-net

- CenturyLink • Cogent • Telia Sonera • Zayo
- ByteGrid • Coresite • Equinix

Trusted Internet Connection (TIC)

- In partnership with NOAA, MAX hosts a TIC and offers TICAP services



Applied Cyber Innovation for Higher Education and Research

MAX Services

Current Services
Layer 3 – IP Routed (R&E) Service
1G
10G
100G
Layer 2 – Ethernet Transport Service
1G
10G
Layer 1 – DWDM Transport Service
10G
100G
Data Center
Access to on-net data centers

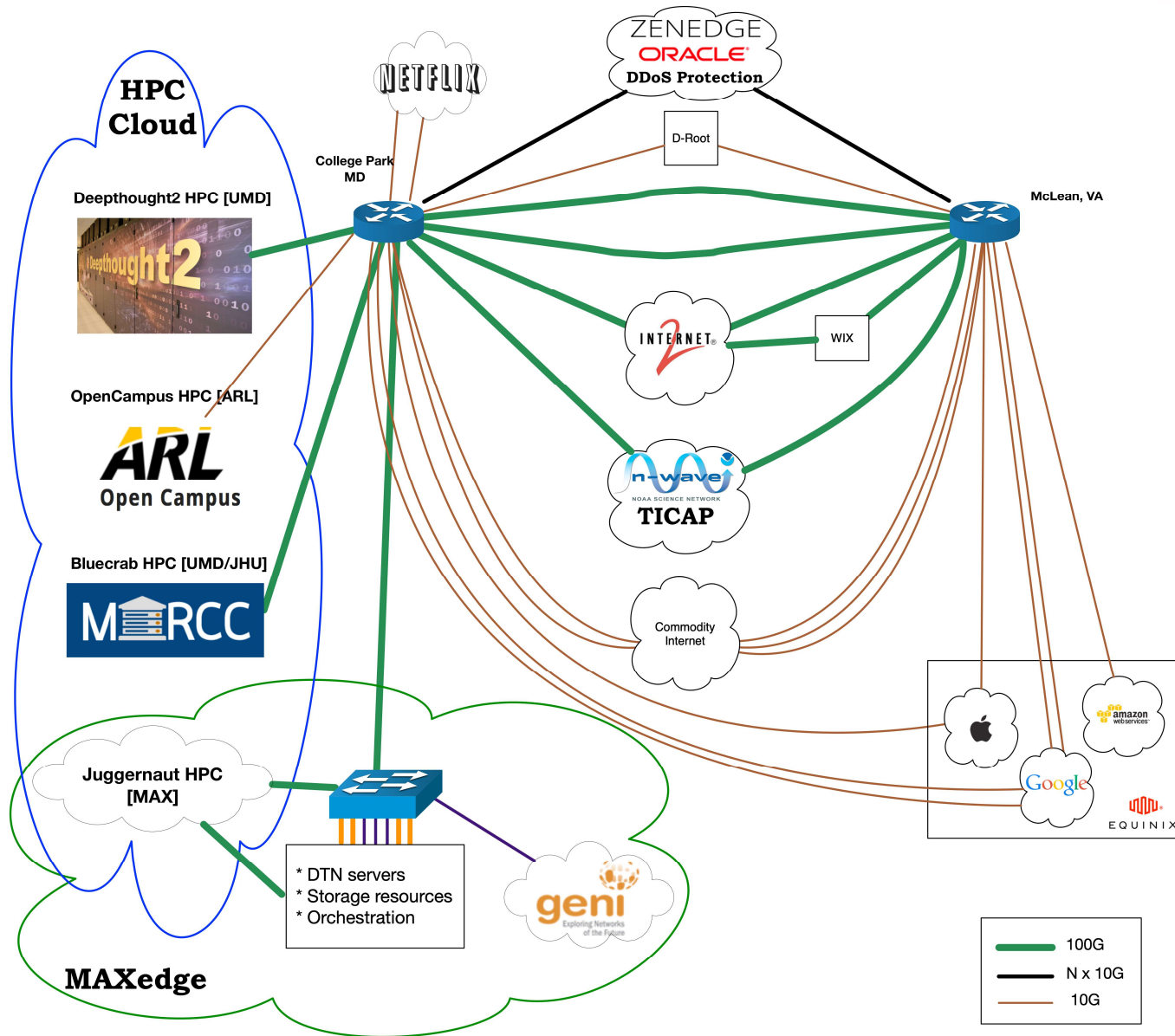
Current Services
IP Commodity Routes
Commercial Providers
TR-CPS
Advanced Services
MAX AWS Direct Connect
Research Network Connection
MAX Platinum Service
Access to multiple services
Other Services
Rack Colocation Space
Machine/Virtual Machine Hosting
Remote Hands

MAX Services

Current Services
Washington International Exchange (WIX)
10G
100G
Next Generation Internet Exchange (NGIX)
1G
10G
100G
HPC Offering
Compute Cloud and Custom Solutions
Security
DDoS
TiCAP

Current Services
MAXedge Services
Intelligent, advanced, and innovative edge services (compute, storage, cloud connect,...)
Managed Alien Wave Services
Managed and Facilitated Alien Wave Optical Services

MAX Service Panel



SuperComputing 2018 Dallas



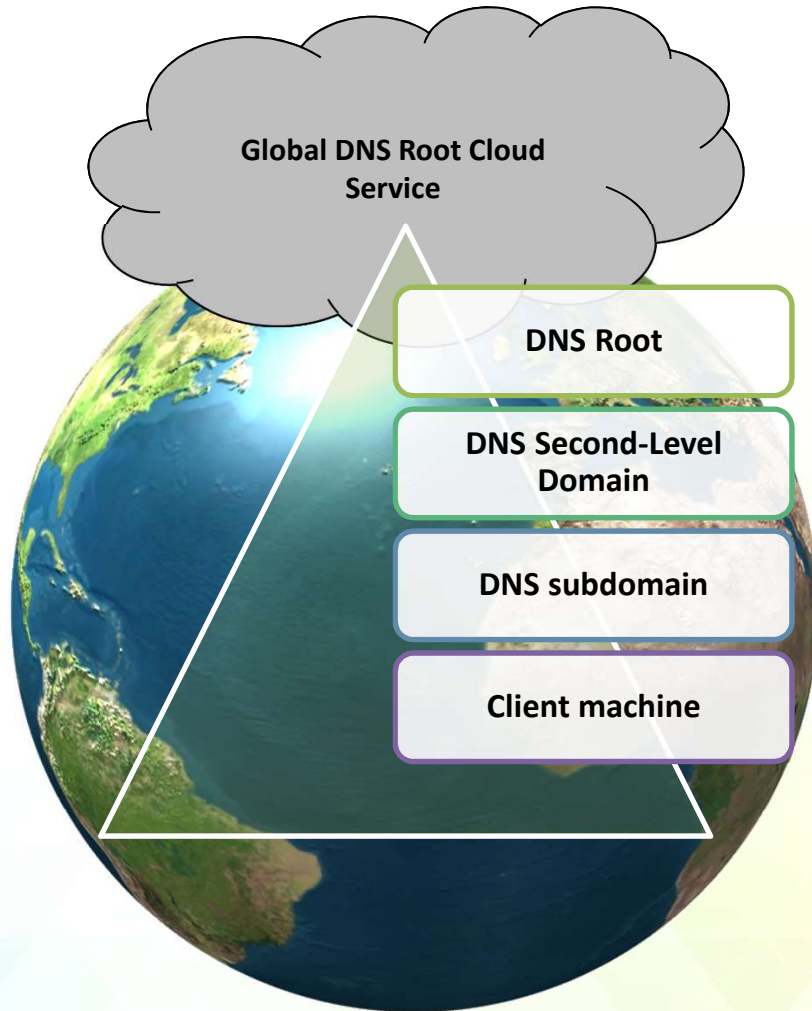
SuperComputing 2018 Dallas



SuperComputing 2018 Dallas

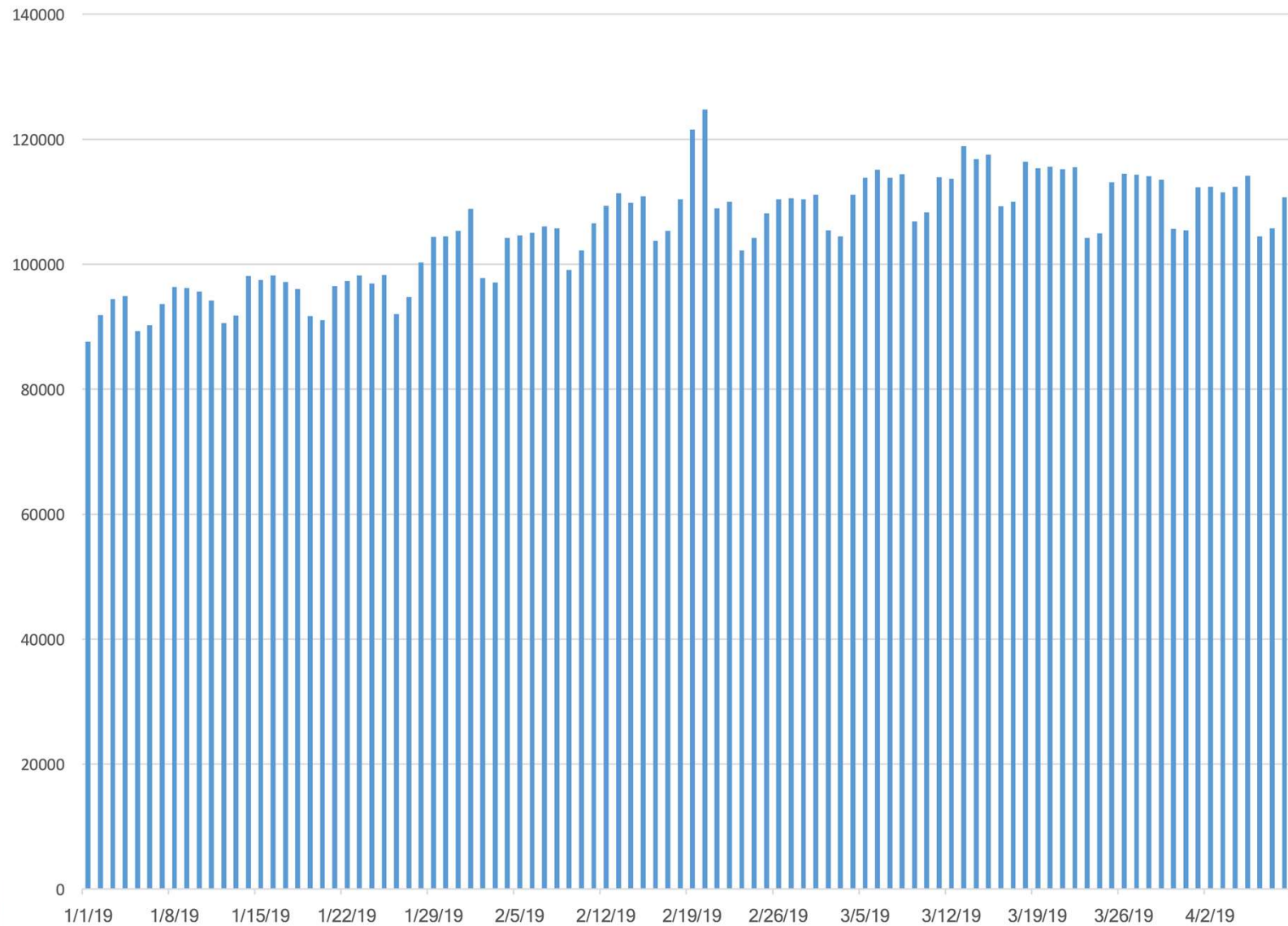


Global DNS Root Services

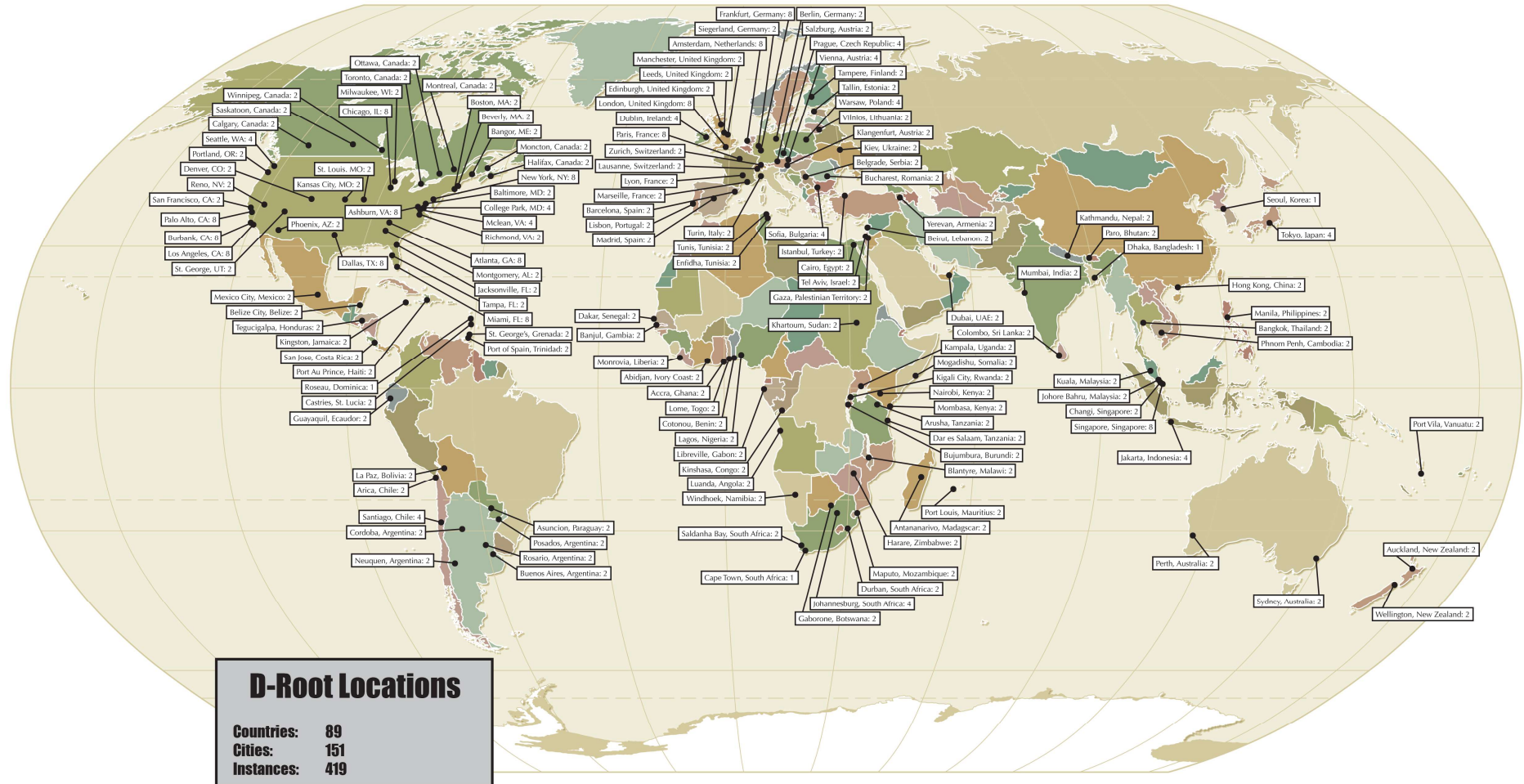


- ☐ UMD operates D-root and has been a steward of this global service since November 18, 1987.
 - ☐ One of 12 global organizations that operate 13 root DNS servers
 - ☐ 1000+ DNS root server instances in the global DNS root cloud
1. Cogent Communications
 2. Internet Corporation for Assigned Names and Numbers (ICANN)
 3. Internet Systems Consortium
 4. NASA Ames Research Center
 5. Netnod
 6. Réseaux IP Européens Network Coordination Centre
 7. **University of Maryland**
 8. University of Southern California
 9. U.S. Department of Defense Network Information Center
 10. U.S. Army Research Laboratory
 11. Verisign
 12. WIDE Project and Japan Registry Services
- ☐ From 2015-2018 UMD co-chaired the global advisory committee – Root Server System Advisory Committee (RSSAC) – to the ICANN board to advise on matters pertaining to the security and stability of the global DNS root server system.
 - ☐ Useful URLs:
 - <http://root-servers.org/>
 - <http://icann.org/>
 - https://en.wikipedia.org/wiki/Root_name_server

2019 D-root Average Daily Queries per Second



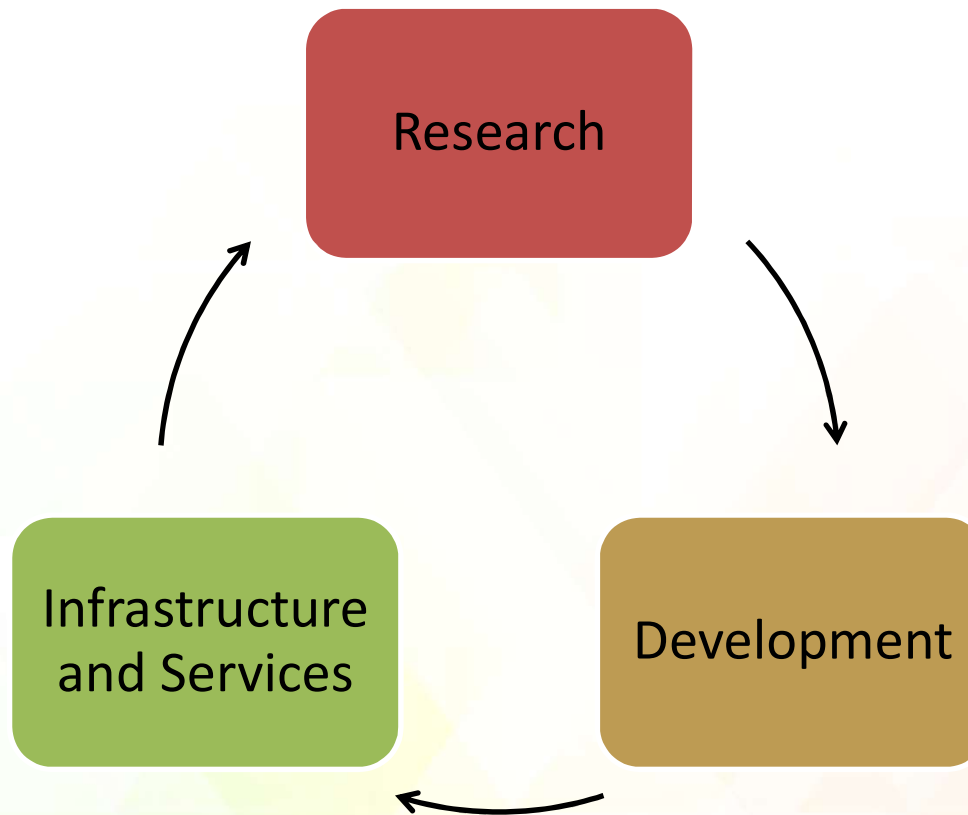
DNS Queries to D-Root on April 8, 2019: 9,568,164,314



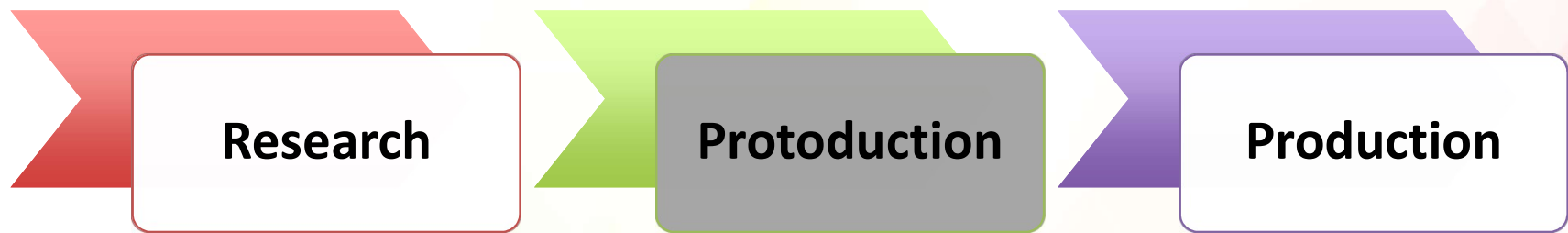


Applied Cyber Innovation for Higher Education and Research

The Cycle of Research, Development and Advanced Services



From Innovation to Service



MAXedge – a highly resourced intelligent edge service

