DDoS and Cloud Access Services

MAX Participants Meeting

April 25, 2018
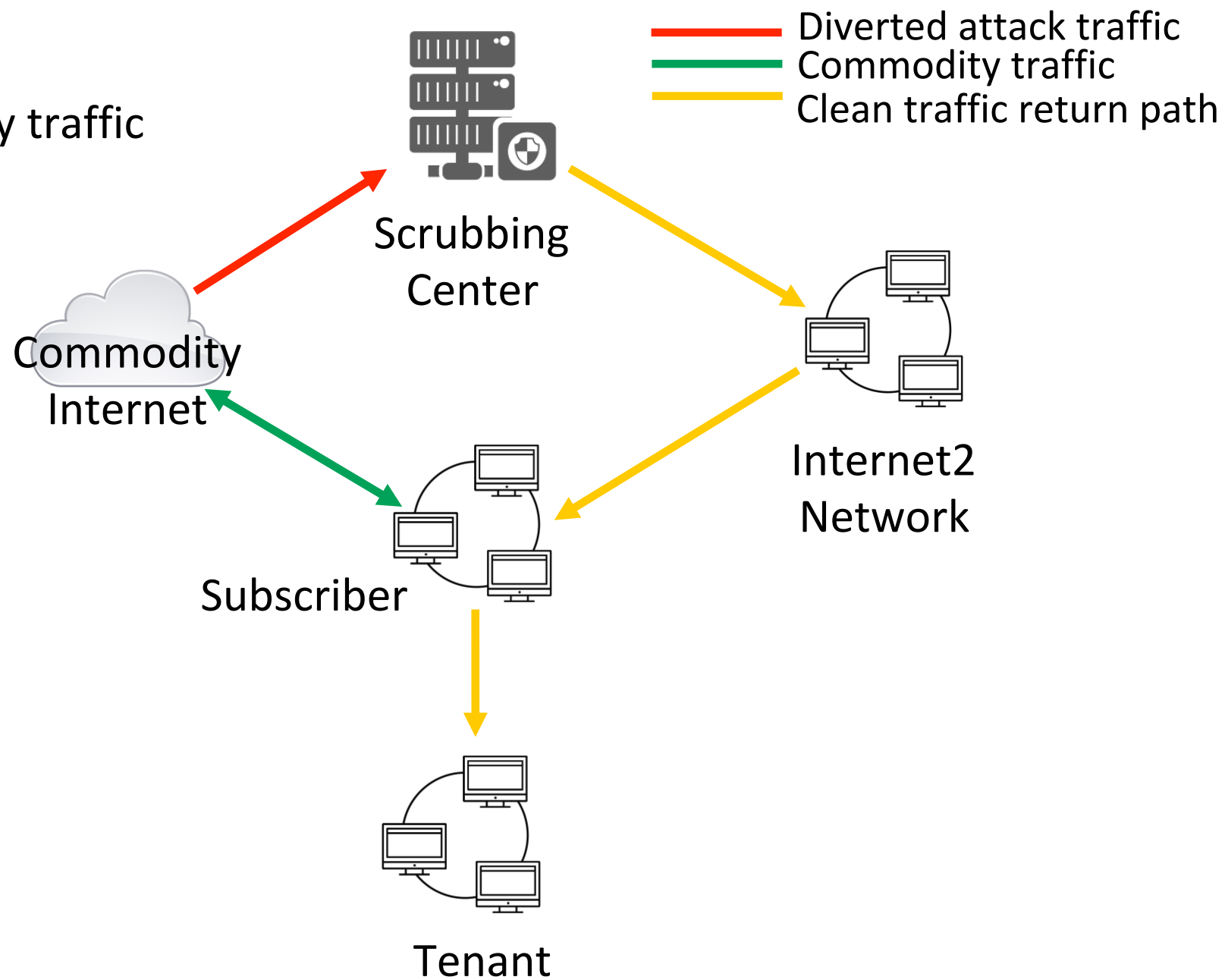
George K. Loftus

AVP Network Services, Internet2

Internet2 vDDoS Mitigation Service

- Internet2 in conjunction with MAX offers a cloud-based Distributed Denial of Service (DDoS) Mitigation Service provided by Zenedge/Oracle.

- Subscribers to the service are able to direct attack traffic to Zenedge, and carry the clean traffic back to them on their existing Internet2/MAX connection.

Protecting commodity traffic

Legend:
- Diverted attack traffic
- Commodity traffic
- Clean traffic return path

Scrubbing Center

Commodity Internet

Internet2 Network

Subscriber

Tenant

Internet2 DDoS Mitigation Service

- The Subscriber has access to an aggregated amount of 'clean pipe" service (10G) to which the *community* has subscribed.

- MAX has a commit rate of 1G of clean pipe capacity but is allowed to burst into the available capacity on the clean pipe (up to 10G)

- Each Subscriber and Tenant will have access to Security Operations Center (SOC), a services portal and a direct connection via Internet2/ MAX back to its edge.

Internet2 DDoS Mitigation Service

- Provides coverage for commodity traffic and R&E traffic
  - IPv4 and IPv6
  - Coverage of unlimited number of events

- Traffic is returned via a vrf provisioned during service onboarding

- Scrubbing is signaled via eBGP peering with provider SOC
  - Provider will announce /24 (IPv4) subnet globally to draw traffic to the scrubbing center and returned to connector/campus

Cloud Access Services

Cloud Exchange

Cloud Connect

Use of the community's existing 800 Gbps+ of layer 3 peering capabilities to the major cloud providers for advanced, community enabled access to cloud services.
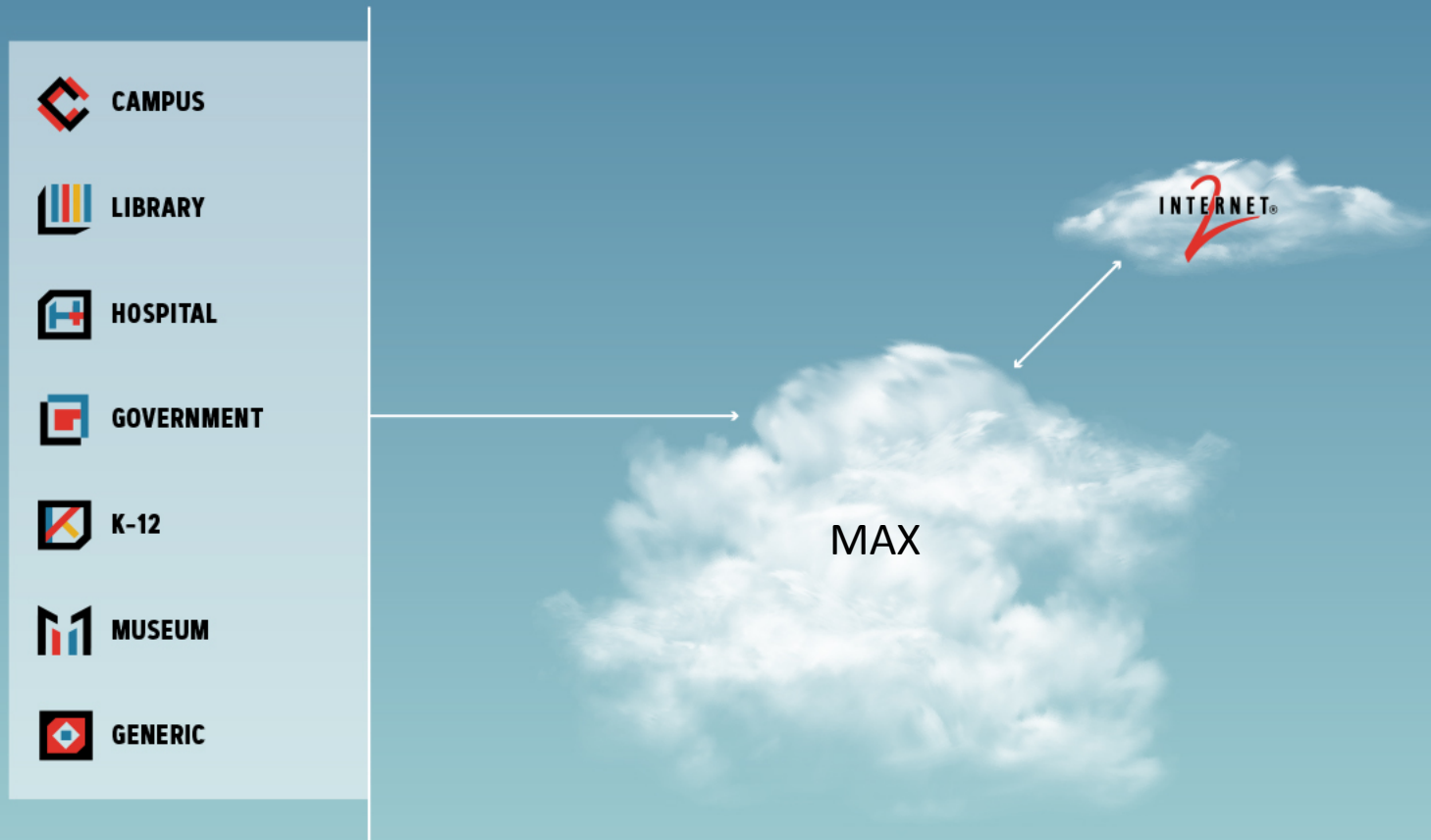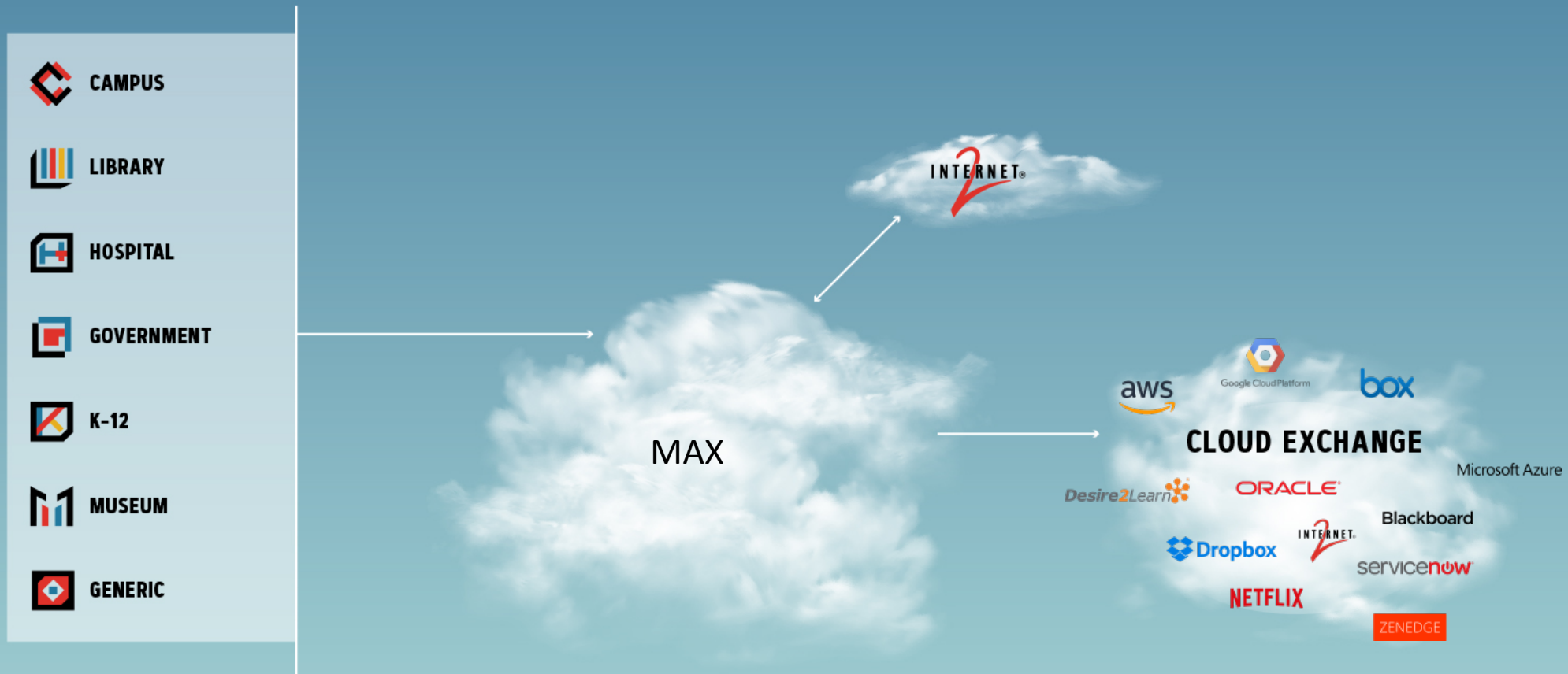
Microsoft Azure

aws

Google Cloud Platform

Enabling the Internet2 & Regional infrastructures to offer "direct-connect" *private Layer 2 and Layer 3* access to Microsoft, Amazon and Google cloud platforms.
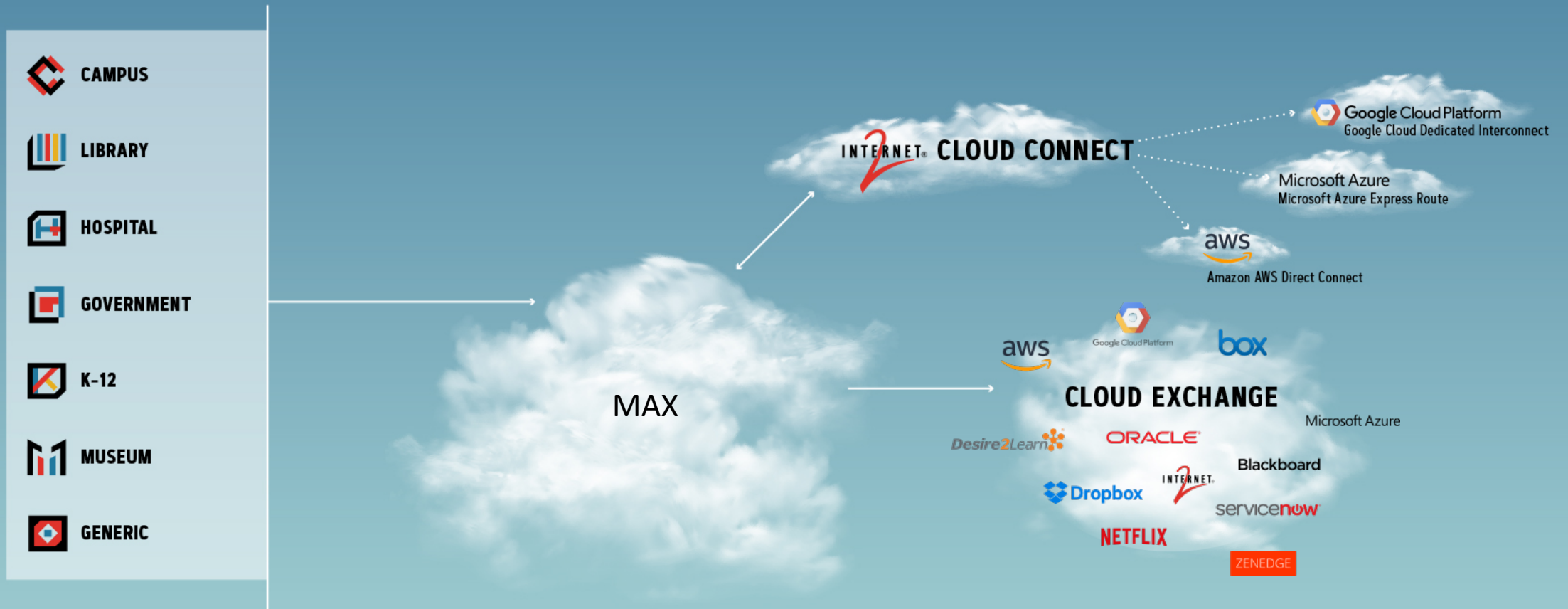
Regional and Internet2

Regional and Internet2 Network Connectivity

CAMPUS

LIBRARY

HOSPITAL

GOVERNMENT

K-12

MUSEUM

GENERIC

INTERNET2

MAX

aws
Google Cloud Platform
box

CLOUD EXCHANGE

Desire2Learn
ORACLE
Microsoft Azure

Blackboard

Dropbox
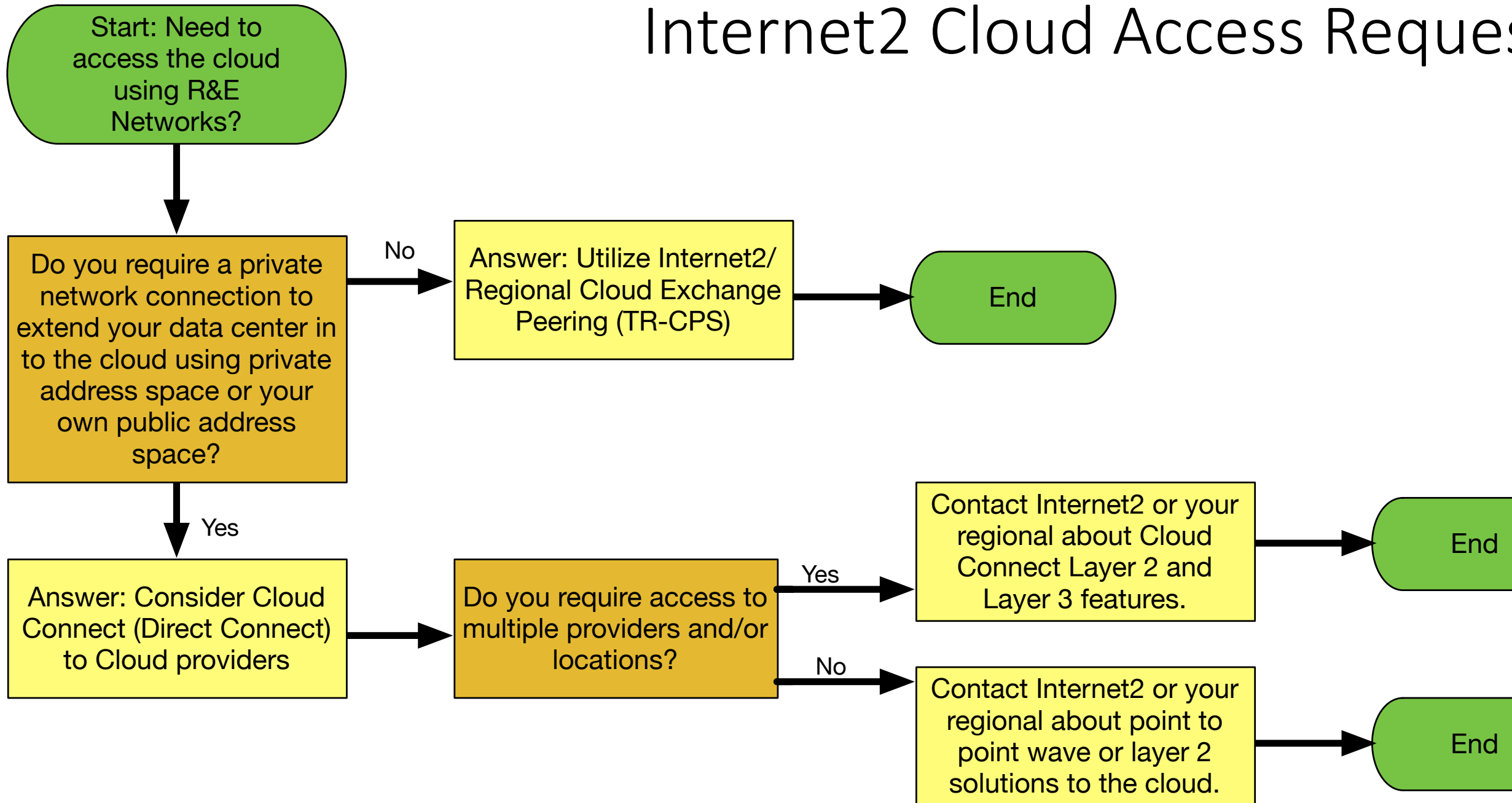INTERNET2
servicenow

NETFLIX

ZENEDGE

CLOUD EXCHANGE
available to Regional members today, at no additional fee

- Regional provides its members with direct access to over 15 cloud service providers on the Cloud Exchange
- Cloud Exchange allows Regional members to have high performing on-net access to cloud service providers, avoiding the commodity internet and reducing latency
- Regional engineers have the ability to review and optimize member connections to the Cloud Exchange—along the entire path to help members make the most of their cloud connections
- Cloud Exchange was designed from the ground up to focus on hosting cloud providers most valued by the Research & Education community
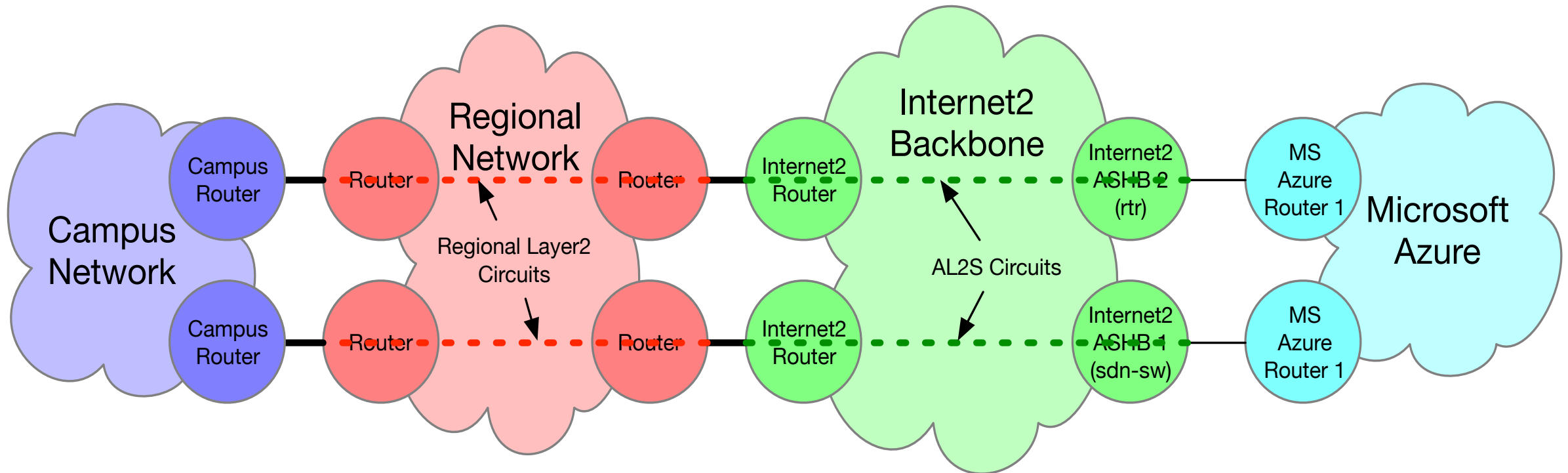- Member

Internet2 Cloud Connect

Internet2 Cloud Access Request

Start: Need to access the cloud using R&E Networks?

Do you require a private network connection to extend your data center in to the cloud using private address space or your own public address space?

No → Answer: Utilize Internet2/ Regional Cloud Exchange Peering (TR-CPS) → End

Yes → Answer: Consider Cloud Connect (Direct Connect) to Cloud providers → Do you require access to multiple providers and/or locations?

Yes → Contact Internet2 or your regional about Cloud Connect Layer 2 and Layer 3 features. → End

No → Contact Internet2 or your regional about point to point wave or layer 2 solutions to the cloud. → End
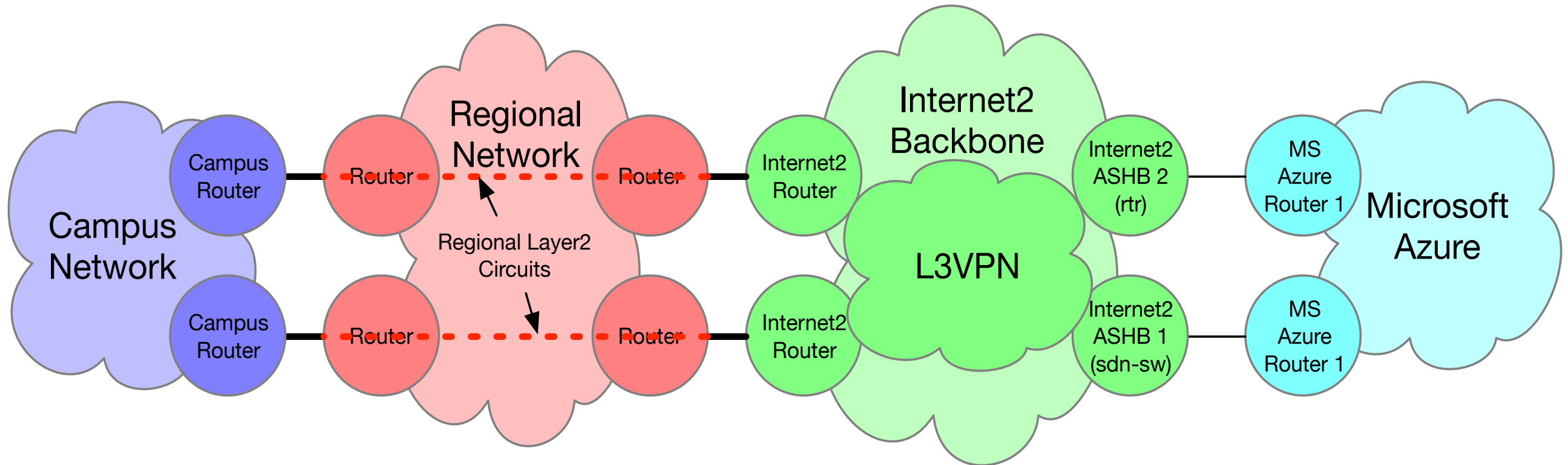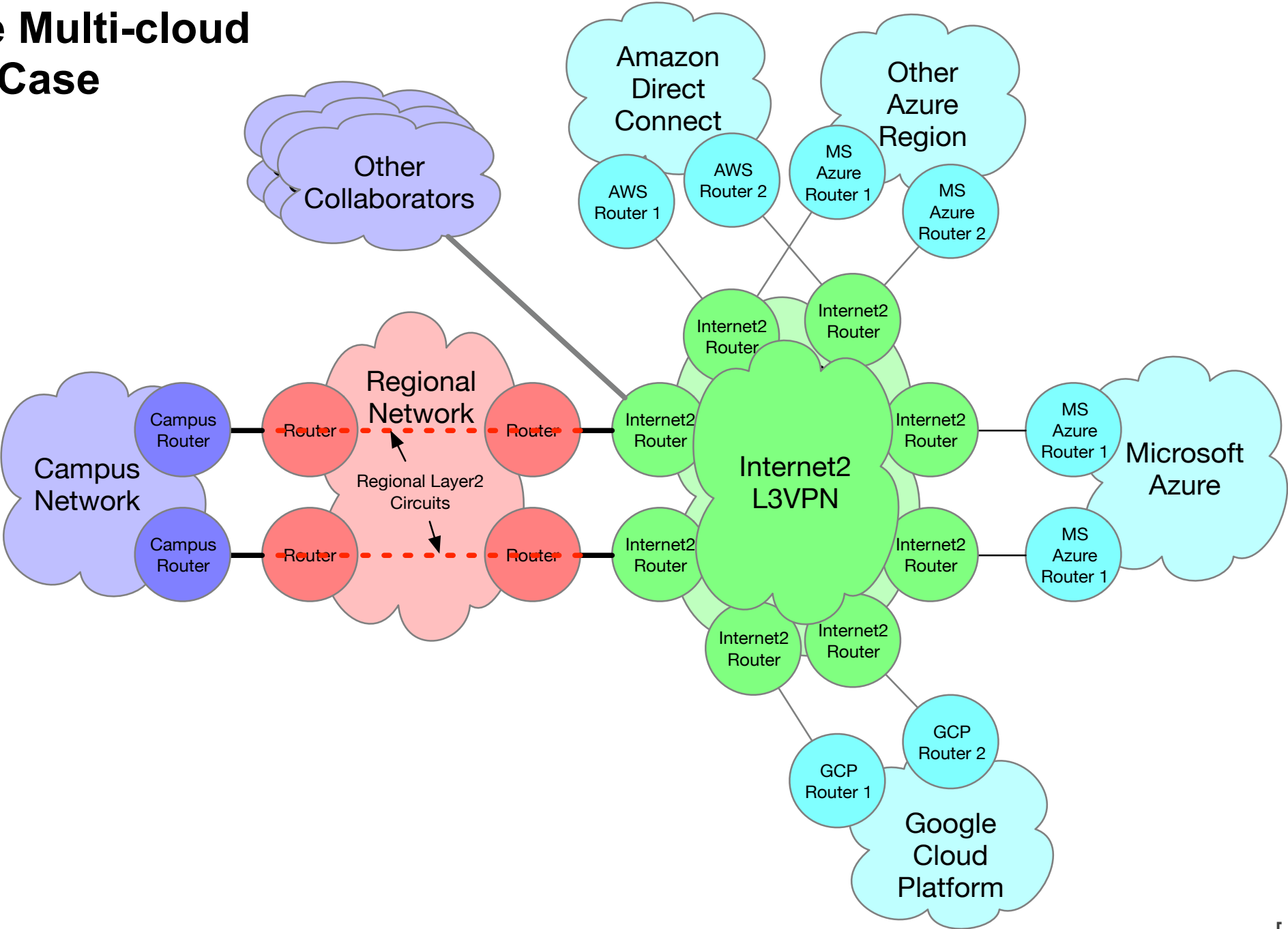
Layer 2 – AL2S Circuit Option

* While end-to-end redundancy is shown, redundancy is only mandatory for the interconnect between Internet2 and Microsoft.

Layer 3 – MPLS L3VPN Option

* While end-to-end redundancy is shown, redundancy is only mandatory for the interconnect between Internet2 and Microsoft.

Imagining Future Multi-cloud Community Use Case

Cloud Connect – Current Status

- **Microsoft:**
    - Access:
        - Available: Ashburn & Chicago
        - Next Site: Dallas June '18
        - Future: West Coast - Bay Area Fall '18
    - Members connected:
        - OSHEAN – Layer 2 & Layer 3
        - Georgia Tech – Layer 3
        - Vanderbilt – Layer 2

- **Amazon:**
    - Access:
        - Available: Ashburn & Chicago
        - Next Site: Dallas July '18
        - Future: West Coast – Bay Area Fall '18
    - Members connected:
        - MCNC – working to bring up pilot connection
        - University of Michigan – working to bring up pilot
        - OSHEAN – working with Brown University
        - Georgia Tech - working to bring up pilot connection

- **Google:**
    - Access:
        - Available: Chicago
        - Ashburn, Dallas, Bay Area planned