Internet2 - Cloud Connect Self Service Portal
OESS 2.0

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OUTLINE

• Review of Internet2’s Cloud Access, with focus on Cloud Connect
• Changes to OESS to support L3VPNs on MPLS VRFs and Cloud Connect
• Adding the new portal to the Cloud Connect Pilot
• This is a work in progress, we welcome feedback and suggestions
## Cloud Access Services

### Cloud Exchange

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.

### Cloud Connect

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

<table>
<thead>
<tr>
<th>Microsoft Azure</th>
<th>Amazon (AWS)</th>
<th>Google Cloud Platform</th>
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Internet2 Cloud Connect

Regional Network

- CAMPUS
- LIBRARY
- HOSPITAL
- GOVERNMENT
- K-12
- MUSEUM
- GENERIC

Internet 2 Cloud Connect

- Google Cloud Platform
- Google Cloud Dedicated Interconnect
- Microsoft Azure
- Microsoft Azure Express Route
- Amazon AWS Direct Connect

Cloud Exchange

- Desire2Learn
- Oracle
- Blackboard
- Netflix
- ZenEdge
L3VPN
Multi-cloud
Community
Use Case
Cloud Connect – Current Status

• **Microsoft:**
  • Access:
    • Available: Ashburn, Chicago and Dallas
    • Future: West Coast - Bay Area this winter

• **Amazon:**
  • Access:
    • Available: Ashburn, Chicago and Dallas
    • (Hosted VIF Ashburn only)
    • Future: West Coast – Bay Area this winter

• **Google:**
  • Access:
    • Available: Chicago, Ashburn, Dallas
    • Future: West Coast – Bay Area this winter
OESS 2.0 – what is new?

- L3VPN (VRF) provisioning
- New Web-UI
  - L3VPN provisioning only today, intend to add Layer 2 after the initial cloud integrations
- Phonebook
- Cloud provider integration
  - AWS Direct Connect today, ExpressRoute and Google Cloud Interconnect planned
- Q-in-Q support
- Traffic Shaping
- Router Proxy Integration for L3VPNs
L3VPNs in OESS

- Provisioned / Modified via NetConf interaction
- IPv6 and IPv4 BGP peerings
- Multiple BGP peerings per endpoint
- Maximum Prefix-limit 1000
- Configurable AS / IP Addresses / Authentication Key
- Statistics
  - BGP Peer statistics
  - VRF route table statistics
  - BGP Peer status
New WebUI
Phonebook

• A list of connectors, members, and participants of the Internet2 network
  – Can show details about each “entity” that exists on the network
  – Hierarchical (Connector -> Participant), (Project -> Project Member), etc…
• Provisioning is now done by Entity
  – Instead of selecting “rtsw.chic.net.internet2.edu xe-1/0/0” – select “Indiana University”
• Entities can be associated to an ACL
  – If a connector sets aside some number of VLANs for a participant they can associate those VLANs in OESS and people will be able to automatically provision to those VLANs for the participant.
Using the phonebook to select endpoints

- Search for the Entity not the interface
- Browsable through Hierarchy
- Request Access button
  - Emails the contacts of the entity for access
- Shows you available VLANs
  - VLANs for the entity (not the port)
AWS Direct Connect Integration

- Provisioning an L3VPN into AWS is handled automatically by the system – just enter your AWS account information.
- Approve the Direct Connect connection in your AWS console.
- Peering will automatically be configured between Internet2 and AWS as well as any additional endpoints configured on the L3VPN.
Q-in-Q support and Traffic Shaping

• Q-in-Q support added via web-services
  – Required for future Microsoft Azure ExpressRoute support
• Traffic Shaping required for AWS / Azure / GCP
  – This is specified in the Layer3 provisioning UI
  – Note that this is a cap facing the provider (and the provider similarly caps traffic toward Internet2); it is not a guaranteed traffic level
Router Proxy integration

- Router Proxy integration for a specific L3VPN
  - Users can select an L3VPN they have access to and run commands against the L3VPN and the L3VPN's specific items
    - For example show interfaces (shows only interface involved in the L3VPN)
    - Show BGP peers (shows only BGP peers associated with the L3VPN)
  - Provides same level of security restrictions as existing router proxy and is limited to which users can run which commands on which elements
Details about the Release

- 116 pull requests
- 476 commits
- 16k lines of code changed
- 4 developers (2 primary)
- 4 months of development
Cloud Connect Pilot

• Internet2 is continuing the Cloud Connect pilot through July 30, 2019
• If you are interested in becoming part of the Cloud Connect Pilot, or want to try out the new interface, contact cloudconnect_request@internet2.edu
  – Yes, that’s an underscore in the email address…
• Ask your regional to update their OESS ACLs with the proper entity information
• Possibly pre-provision a set of VLAN tags from the Internet2 connection to your institution
Future Work

- Cloud Connect – Microsoft Azure ExpressRoute
- Cloud Connect – Google Cloud Platform Interconnect
- Layer2 Provisioning in new Web-UI
- Add ability to edit / managed Phonebook entries to customers
- Grouper / Co-Manage integrations
- Additional Router Proxy integrations
- Additional Statistics / Reporting for end users
- More UI work
Demo times - Coral Sea 2

- Wed: 11:40am
- Wed: 3:30pm
- Thurs: 11:40am

Questions?