Ref. Arch. for Edge Cloud using Composable Infra

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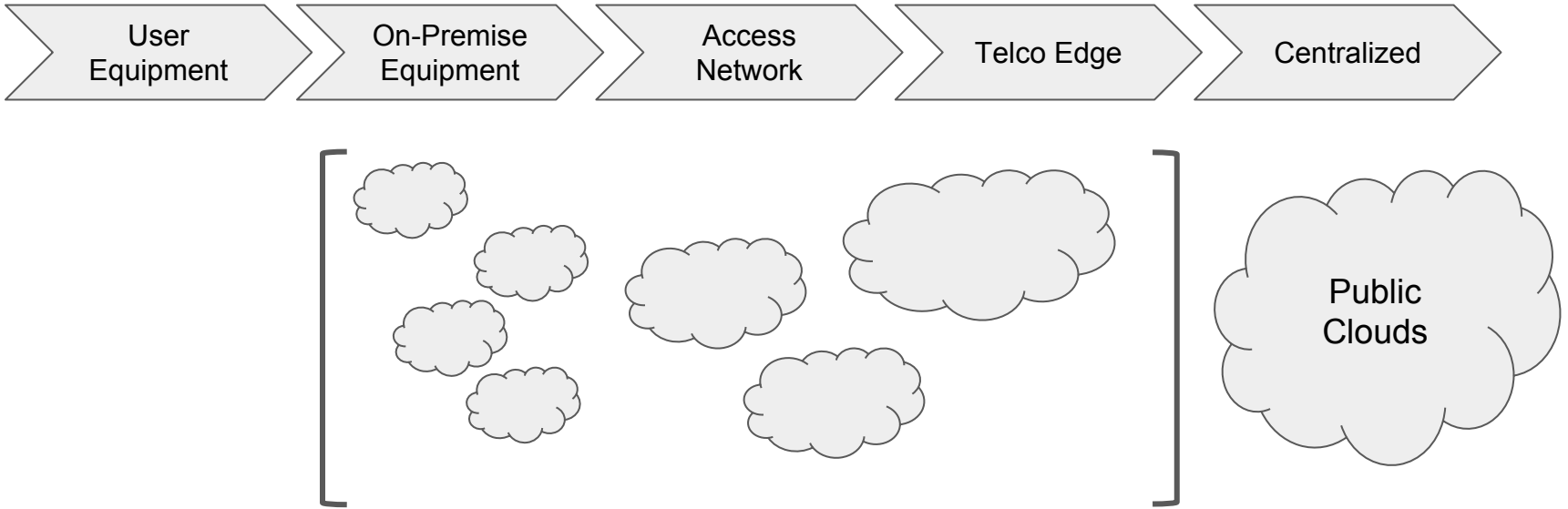
https://etherpad.openstack.org/p/Edge_Cloud_Using_Composable_Infra

Agenda

- What is Edge?
- Common Implementations
- Our Definition of Edge Cloud
- Composable Infrastructure - Intro
- Reference Architecture
- Federation of Edge Clouds
- Use Case
- Discussion

What is Edge Cloud?



Working Definition

“The boundary separating application-agnostic computing from static applications, sensors, or other devices incapable of participating in dynamic job scheduling defines the outer Edge of a Cloud.”

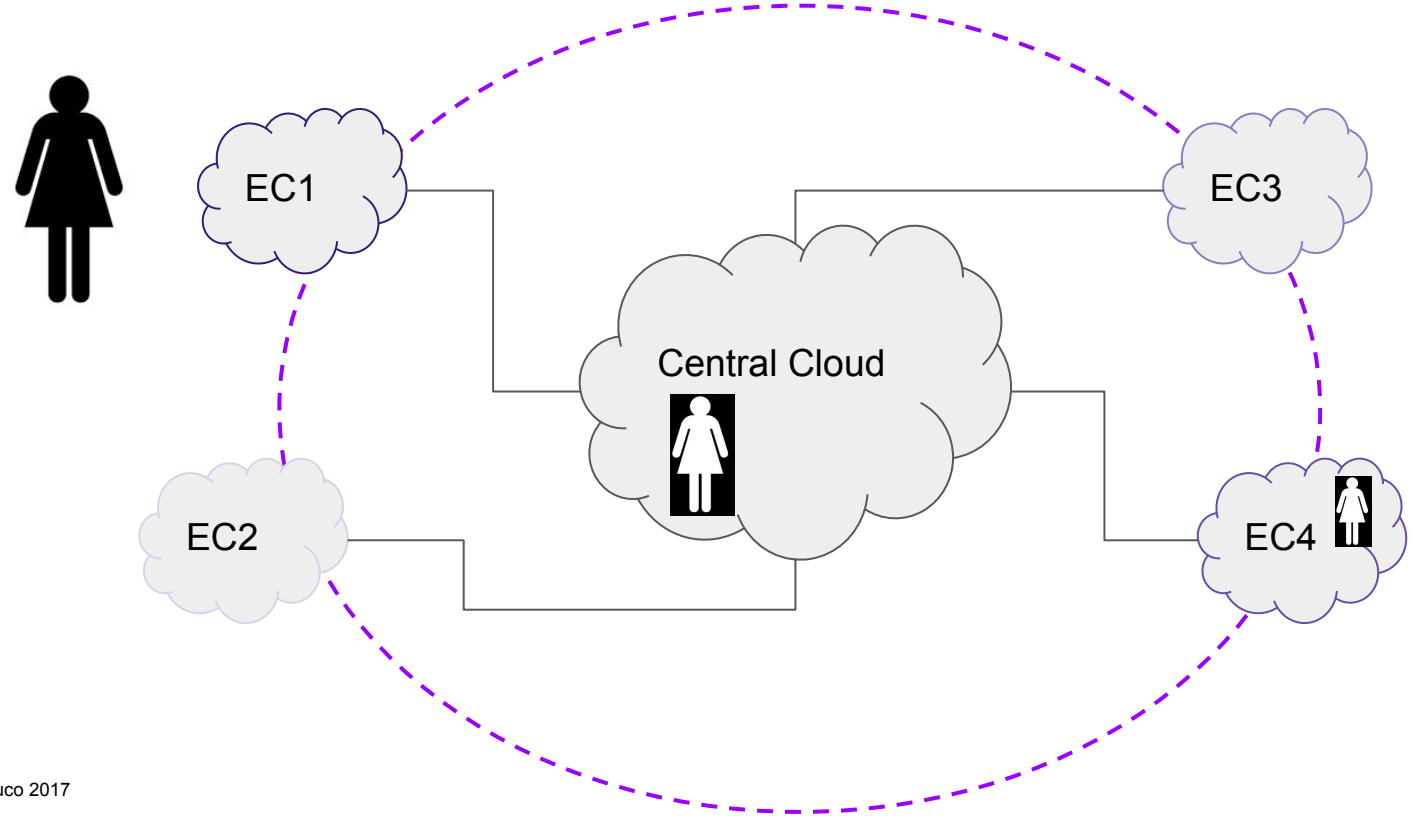
But...

The mere presence of an Edge Cloud is insufficient for workload distribution.

The Edge Cloud must be discoverable.

And an authentication, authorization, and metering system must encompass both central and edge clouds, regardless of whether they are public or private.

Federation of Edge Clouds



Common Implementations

- Minimalist Edge Devices. Eg. Amazon Snowball Edge
- Hardware Agnostic Platforms. Eg. GE Predix Machine
- Academic Research. Eg. Cloudlet from CMU
- Telco-leased consumer electronics
- Cloud-in-a-box implementations?
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Composable Infrastructure - Intro

- Compute, Storage, Network fabric are treated as services
- Resources can be pooled on demand & across frames
- Ex. HPE Synergy, Intel Rack Scale Design

Large Compute vs Large Storage

C	C	C	C	S	S
C	C	C	C	S	S

C	C	S	S	S	S
C	C	S	S	S	S

Reference Architecture

- Minimalist OpenStack
  - Nova, Glance, Neutron, Keystone, Cinder, Ceph, Heat, Ceilometer (?)
- Hyper Converged Infrastructure
  - Compute, Storage, Networking services spread evenly across all nodes
  - Control Plane Services can run on any node as needed
    - Typically consume < 10% of each node
- HPE Synergy
  - HPE 12000 CTO Frame
  - HPE Synergy Composer
  - Fluid pool of compute & storage resources
    - HPE Synergy 480 Gen9 Compute Module
    - HPE Synergy D3940 Storage Module

Use Cases

- Mobile Clinics providing medical services at remote locations
  - Storage Intensive - cache patient records when network unavailable
  - Compute Intensive - AI for augmented medical diagnostics
- IoT / Smart City
  - Compute Intensive - run lambda functions to process large quantities of sensor data
  - Network Locality - ideal placement is within two network hops from sensor placement
- Track animal behavior in national parks
  - Storage Intensive - Images, Videos
  - Real-time analysis of emergent behavior ?
- Augmented Reality & Personal Translators

Discussion