ELIOT: An Edge Lightweight & IoT Blueprint in Akraino

Wenjing Chu
@ Tungsten Fabric Developers Summit, KubeCon Seattle, 2018
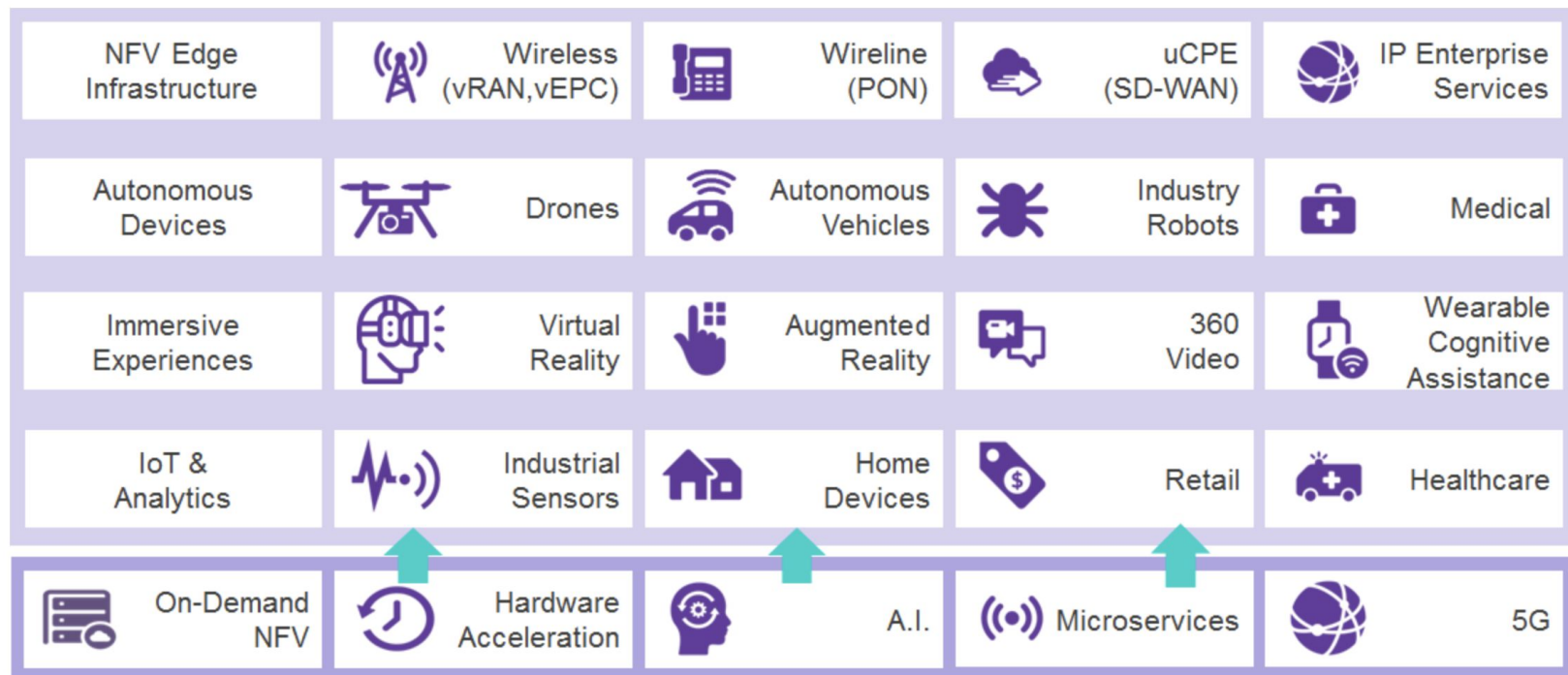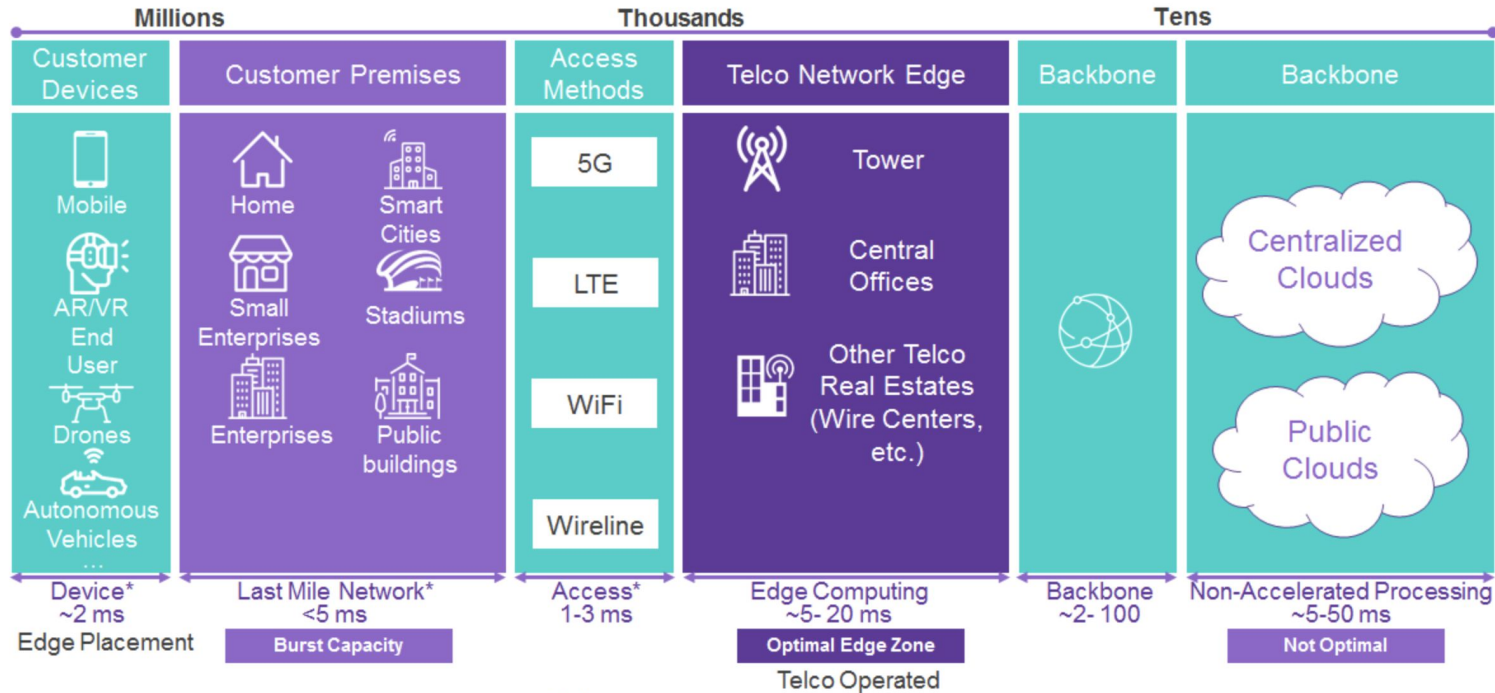
Agenda

- A Brief Intro to the Akraino Community
- ELIOT: An Edge Lightweight and IoT Blueprint
    - Use cases, where on the edge
    - Some principles
    - Architecture
    - Continuous deployment
- SD-WAN: ELIOT + Tungsten Fabric
- Project Planning

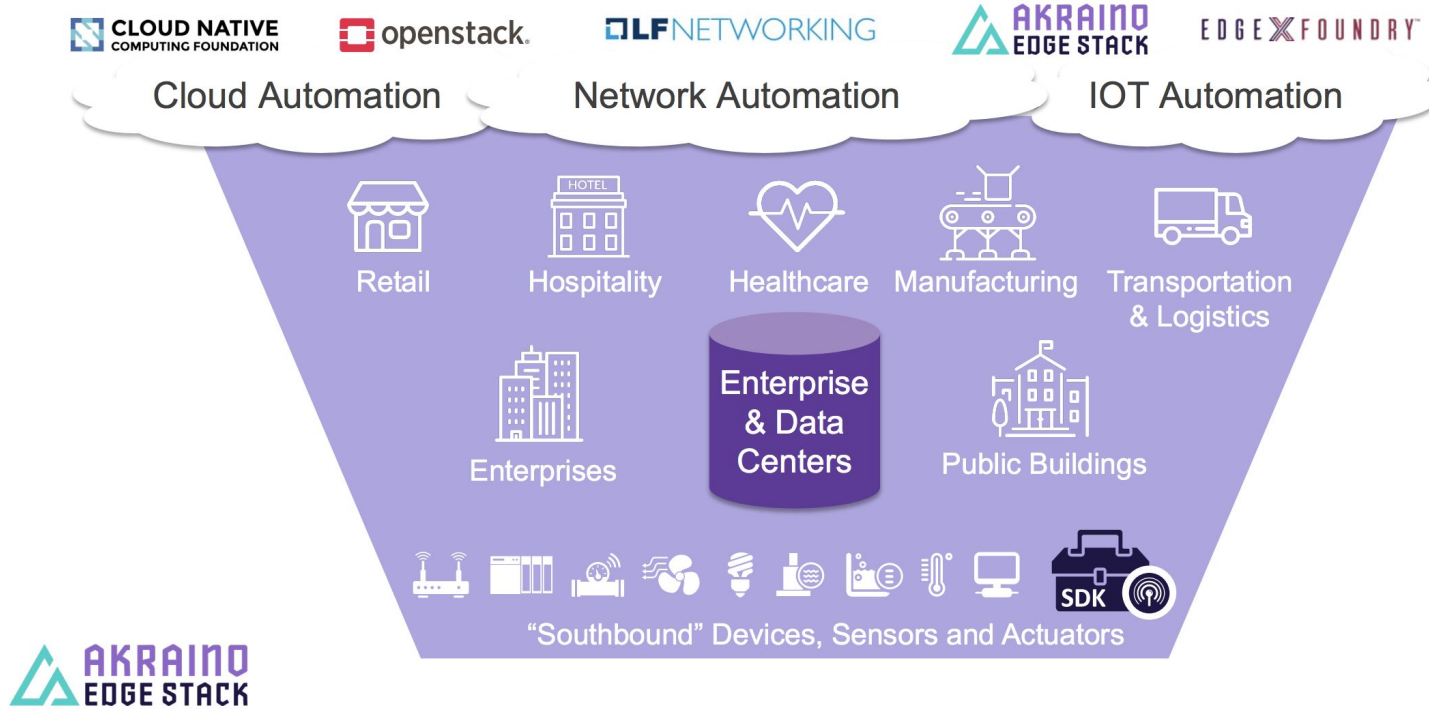# Akraino: A New Edge Focused Open Source Community

NFV Edge Infrastructure	Wireless (vRAN, vEPC)	Wireline (PON)	uCPE (SD-WAN)	IP Enterprise Services
Autonomous Devices	Drones	Autonomous Vehicles	Industry Robots	Medical
Immersive Experiences	Virtual Reality	Augmented Reality	360 Video	Wearable Cognitive Assistance
IoT & Analytics	Industrial Sensors	Home Devices	Retail	Healthcare
On-Demand NFV	Hardware Acceleration	A.I.	Microservices	5G

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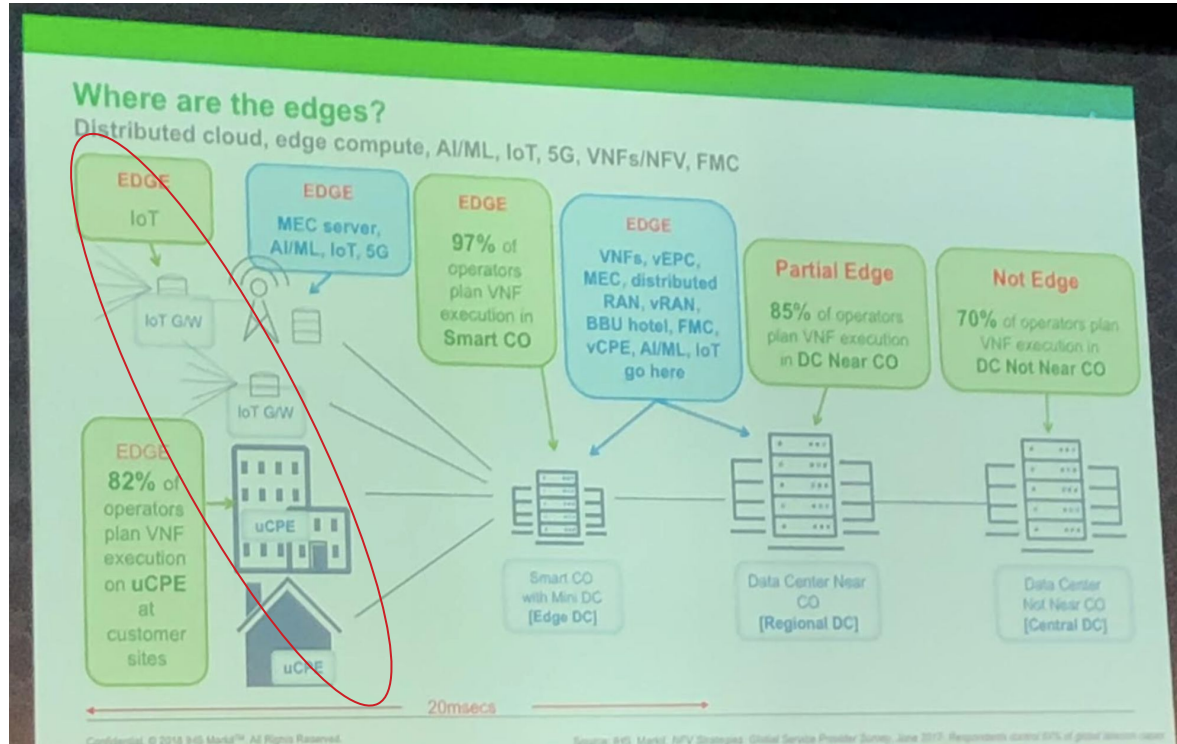
Many Edges... Service Providers

Many Edges… Enterprises

A Blueprint

- Use Case Driven
- End-to-End Focused On An Integrated Solution for the Use Cases
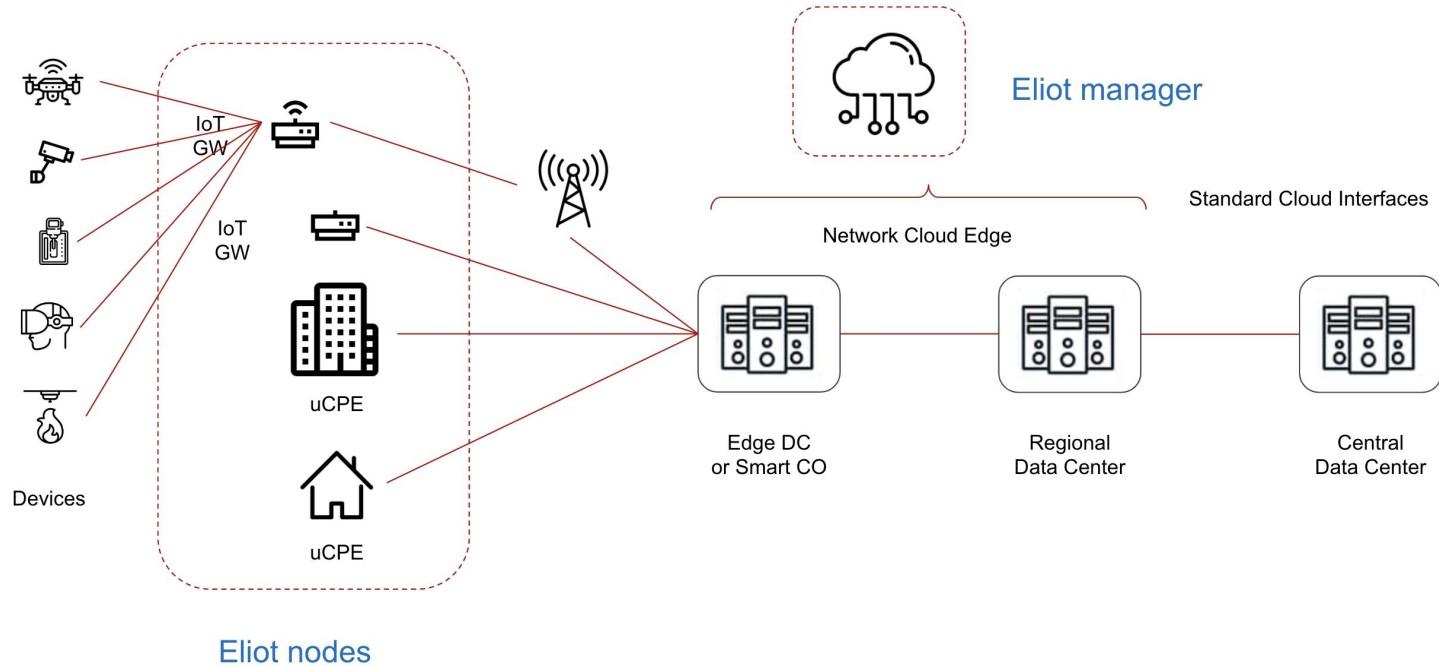- Production Ready

ELIOT: Where On the Edge

- › Two main use cases
  - » Enterprise Edge lightweight, e.g. uCPEs, SD-WAN
  - » IoT gateways
- › The management entity can be anywhere in the cloud, including edge of the network or cloud.
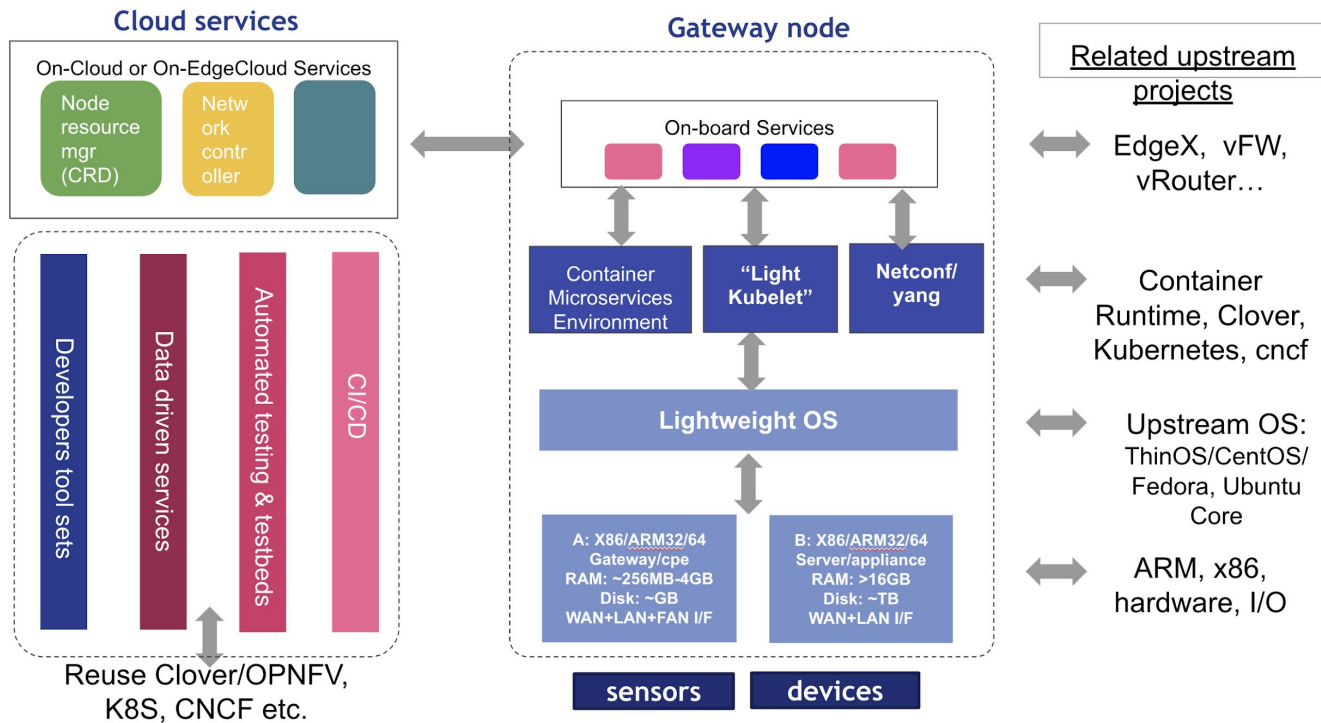
Slide thanks to Michael Howard of IHS.

ELIOT Node and Manager

Eliot manager

Standard Cloud Interfaces

Network Cloud Edge

IoT GW

IoT GW

uCPE

uCPE

Devices

Eliot nodes

Edge DC
or Smart CO

Regional
Data Center

Central
Data Center

Some Principles...

- Prioritize on future applications
  - e.g. those enabled by 5G, and by ML/AI
- Operation should be fully or highly automated
  - driven by live data
- Cloud native
- Scale first

ELIOT Software Stack

Cloud services

Gateway node

On-Cloud or On-EdgeCloud Services

Node resource mgr (CRD)

Network controller

On-board Services

Developers tool sets

Data driven services

Automated testing & testbeds

CI/CD

Container Microservices Environment

"Light Kubelet"

Netconf/ yang

Lightweight OS

A: X86/ARM32/64
Gateway/cpe
RAM: ~256MB-4GB
Disk: ~GB
WAN+LAN+FAN I/F

B: X86/ARM32/64
Server/appliance
RAM: >16GB
Disk: ~TB
WAN+LAN I/F

Reuse Clover/OPNFV, K8S, CNCF etc.

sensors

devices

Akraino lightweight blueprint – ELIOT - for Edge Lightweight and IoT

Related upstream projects

EdgeX, vFW, vRouter…

Container Runtime, Clover, Kubernetes, cncf

Upstream OS: ThinOS/CentOS/ Fedora, Ubuntu Core

ARM, x86, hardware, I/O

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Hardware options

- **Any hardware that meet the minimum requirements**
  - For developers and user community: virtual machines
  - For developers and user community: widely available enthusiast's favorites: RPi
  - For deployable choices
    - ARM family based
    - x86 family based
    - GPU, and other accelerators
- **The management software requires cloud services (private or public), e.g. Akraino network edge blueprints**
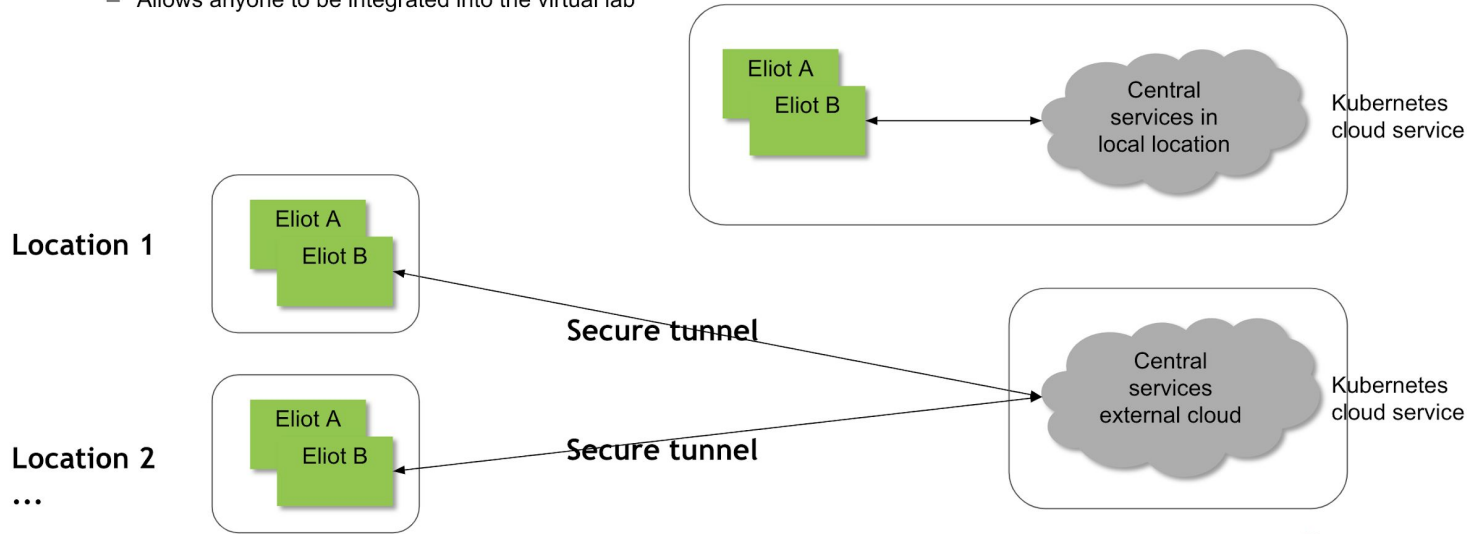
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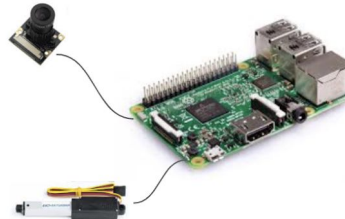
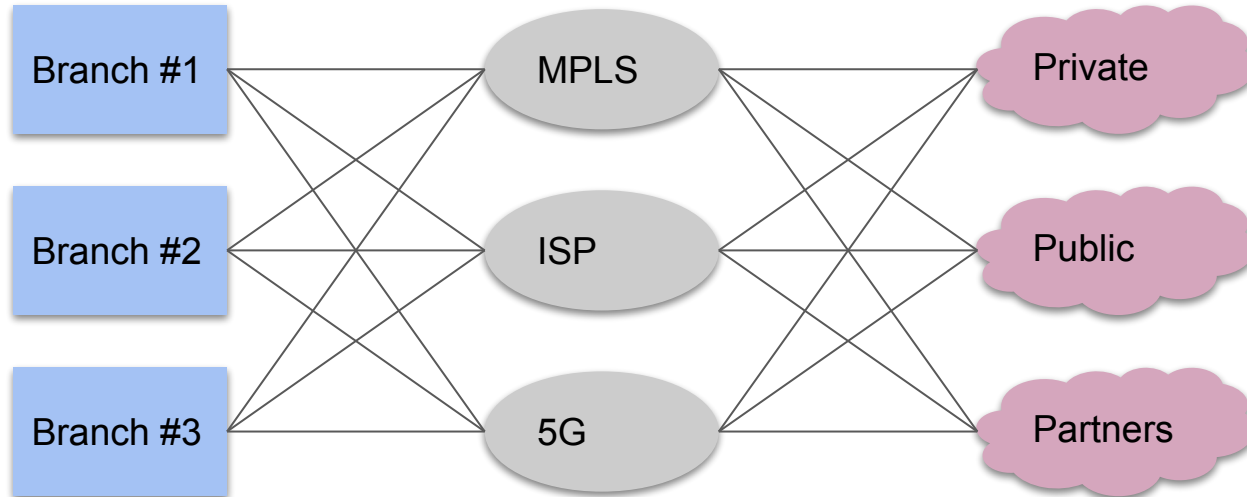# Lab and Testing

› **2 types of labs may be enabled for Eliot**

» Centralized lab location: all physical gateways reside in a shared lab

» Distributed lab locations: physical gateways can reside in different admin domains as long as secure tunnel is enabled

– Allows anyone to be integrated into the virtual lab
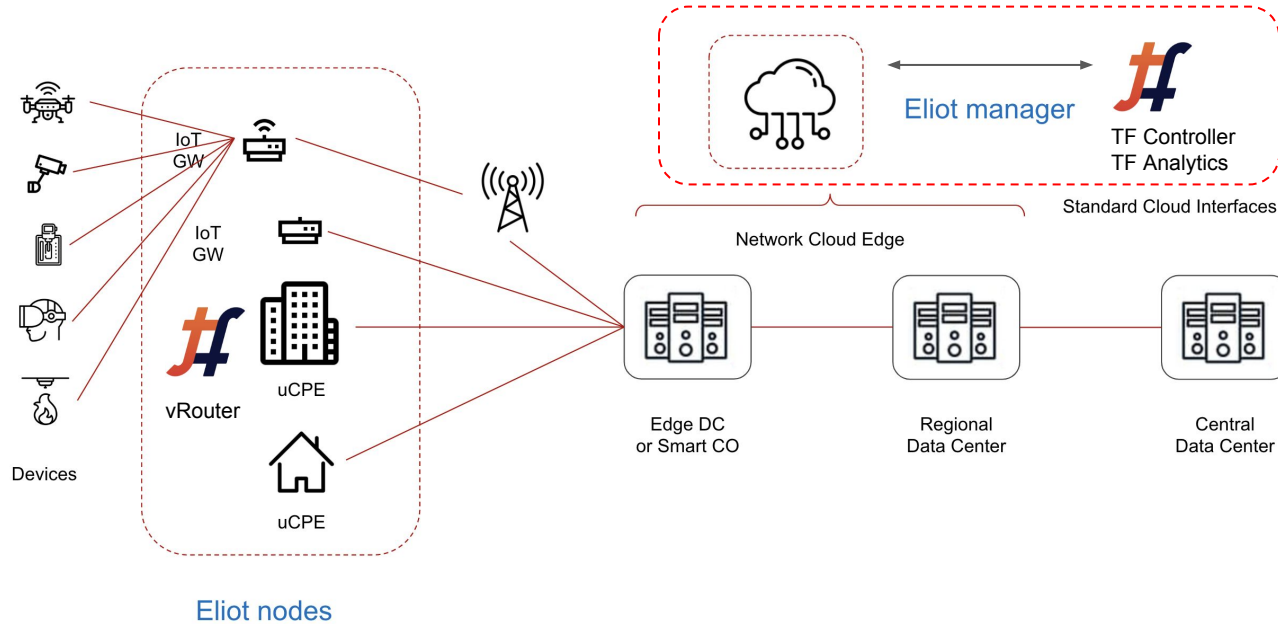
ELIOT Intelligent and Automated Operations

- ELIOT is designed for zero touch automated operation
- Continuous deployment is a prerequisite
- Live data and testing driven automation will be built in
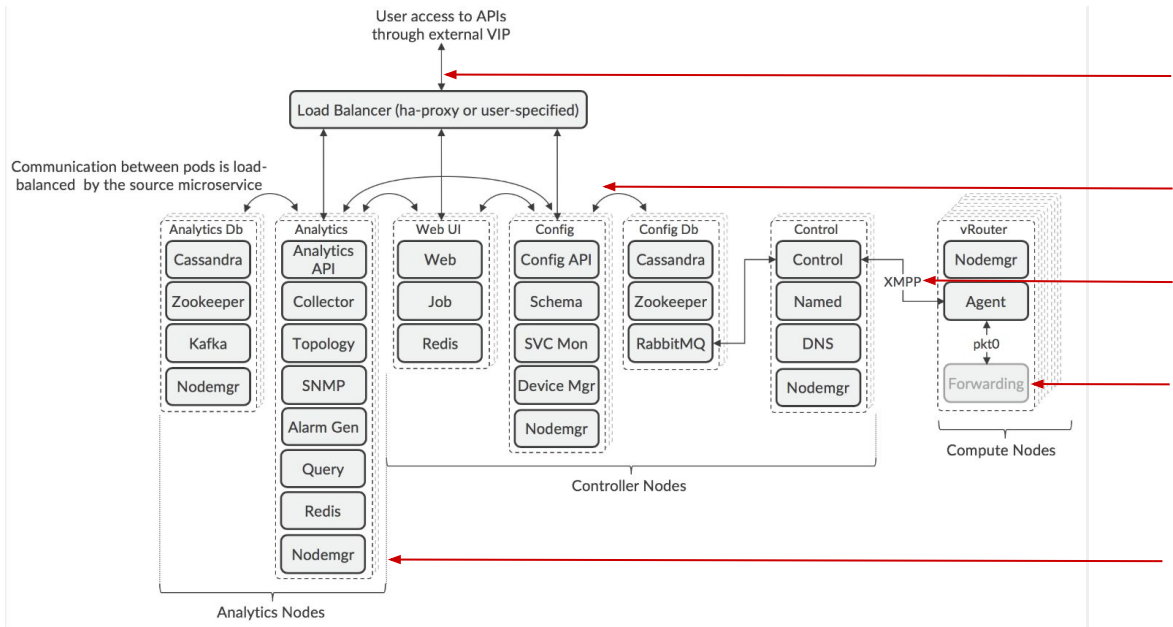
SD-WAN Use Case

- Hybrid networks
- Hybrid clouds
- Remove the complexity

Tungsten Fabric powered SD-WAN

Eliot manager

TF Controller
TF Analytics

Standard Cloud Interfaces

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IoT GW

vRouter

uCPE

uCPE

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Design Choices & Integration Points

TF community inputs welcome !

Planning

› **Community and Project Planning dates**

    » November 5-6, online Zoom workshop, initial proposal

    » December 6-7: Akraino F2F meeting, Santa Clara, CA, Eliot project acceptance

    » December 10-13: TF Developers Summit, KubeCon Seattle

› **First release: depends on Akraino community planning, but aims for 1H19**

Project Links

- Akraino: wiki.akraino.org
- Eliot blueprint info page : https://wiki.akraino.org/pages/viewpage.action?pageId=6128264
- Project wiki and source on the way ~Jan 2019...

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Thank You

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