ORCHESTRATING AN OPENSTACK* BASED IOT SMART HOME

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Intel Open Source Technology Center

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INTRODUCTION

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Dr. Yih Leong Sun
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Cloud Architect

AGENDA

Demonstrate an architecture that enables an IoT Smart Home solution

- The IoT wave of data
- An example IoT application
- Cloud reference architecture
- Application solution options
- Data analytics

THE IOT WAVE OF DATA

Are you ready to ride the wave or will you be washed away?

People

- In 2020, it is expected that the average internet user will generate ~1.5 GB of traffic per/day[1]
  - Up from ~650MB in 2015

Machines

- A Smart Hospital will generate 3,000 GB/day[2]
- Self-driving cars are generating over 4,000 GB/day… each[3]
- A connected plane will generate 40,000 GB/day[4]
- A connected factory will generate 1 million GB/day[5]

OPEN HOUSE (DEMO)

Tour the house

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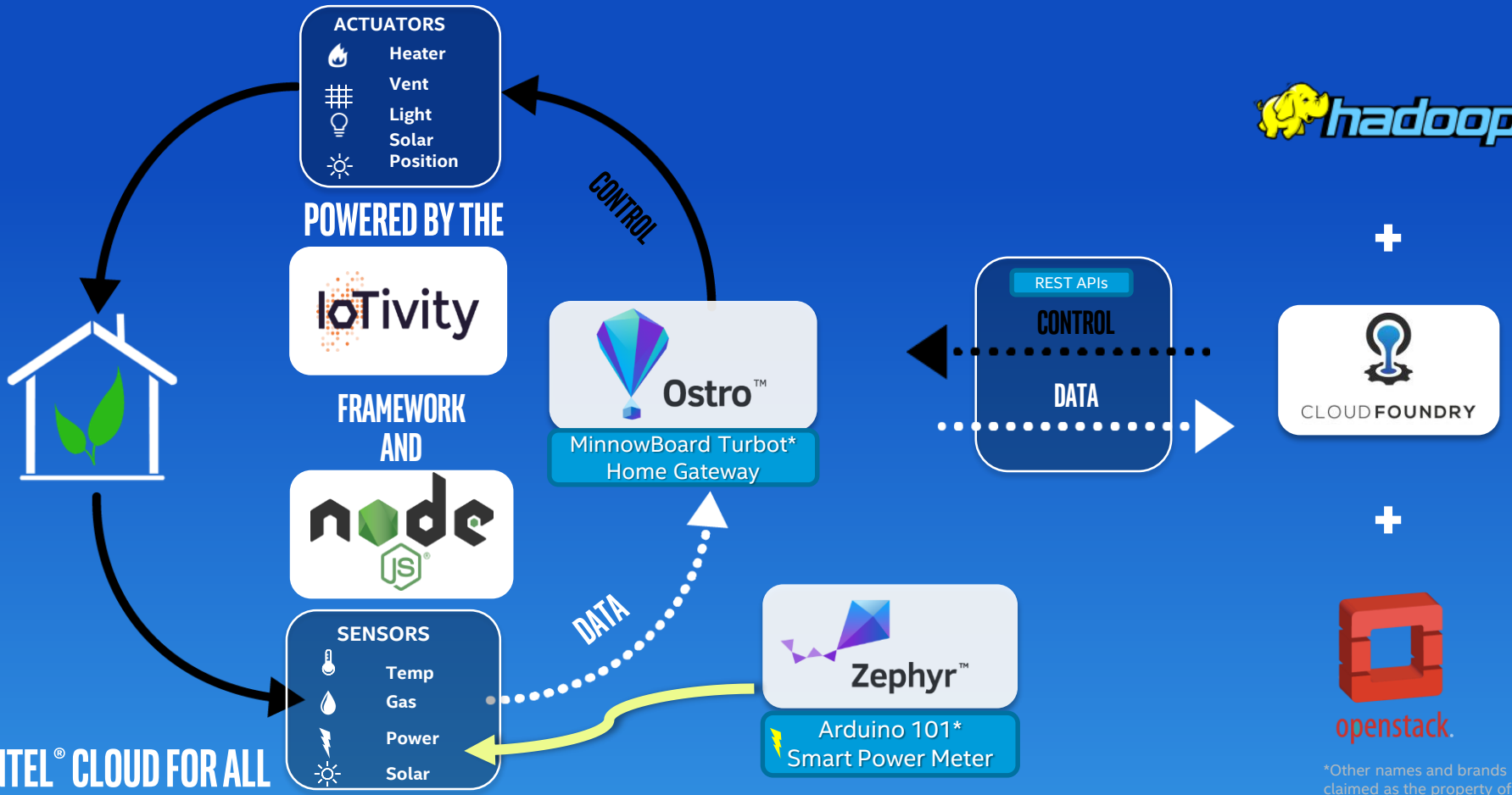
IOT AUTOMATED CONTROL: SMART HOME



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*Other names and brands may be claimed as the property of others.

APPLICATION PROFILE

Behavior

- Steady and predictable
- High growth
- On-off
- Random or periodic bursting

Micro-services

- Application service
- Collection orchestration
- Growth and scalability

Lifecycle

- Upgrades and API compatibility
- CI/CD

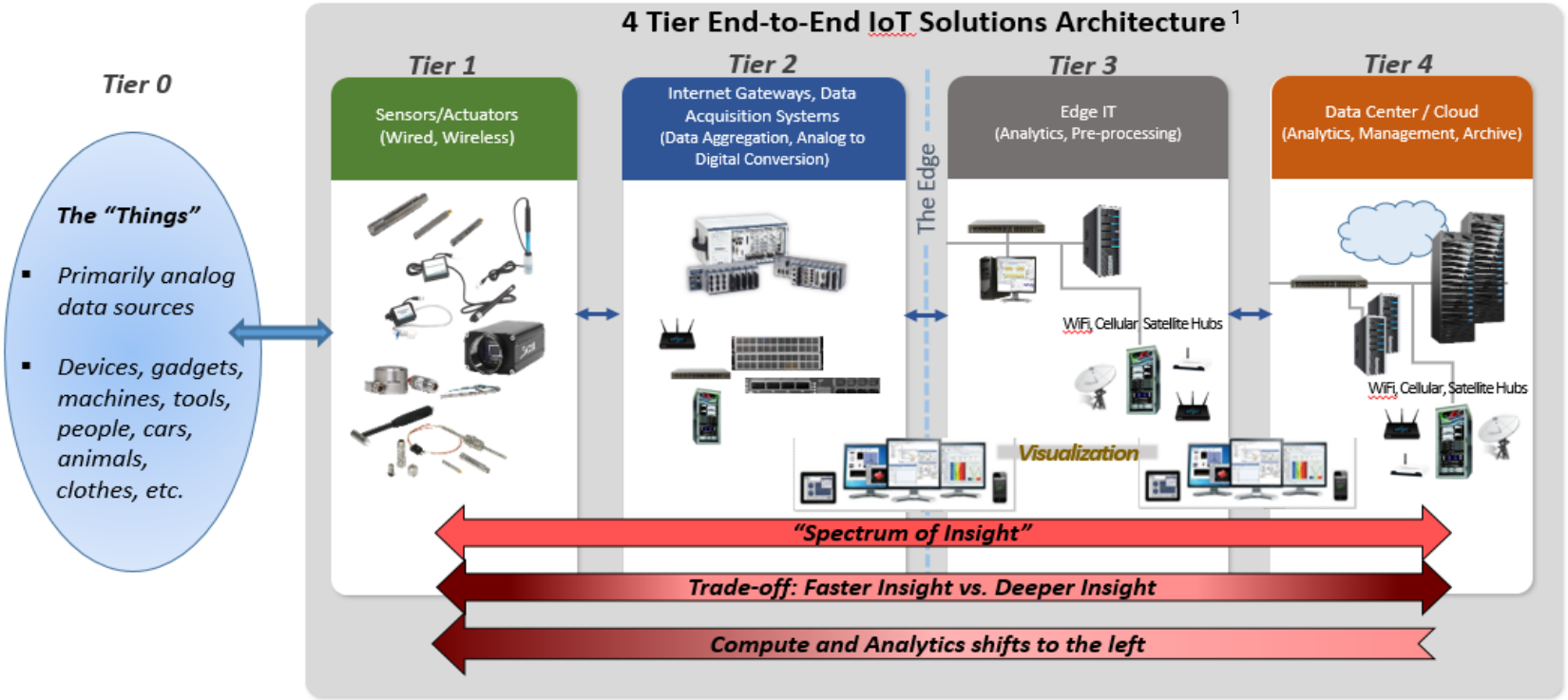
Security

- User authentication
- Network encryption
- Data Encryption
- Patching
- Intrusion Detection

Data

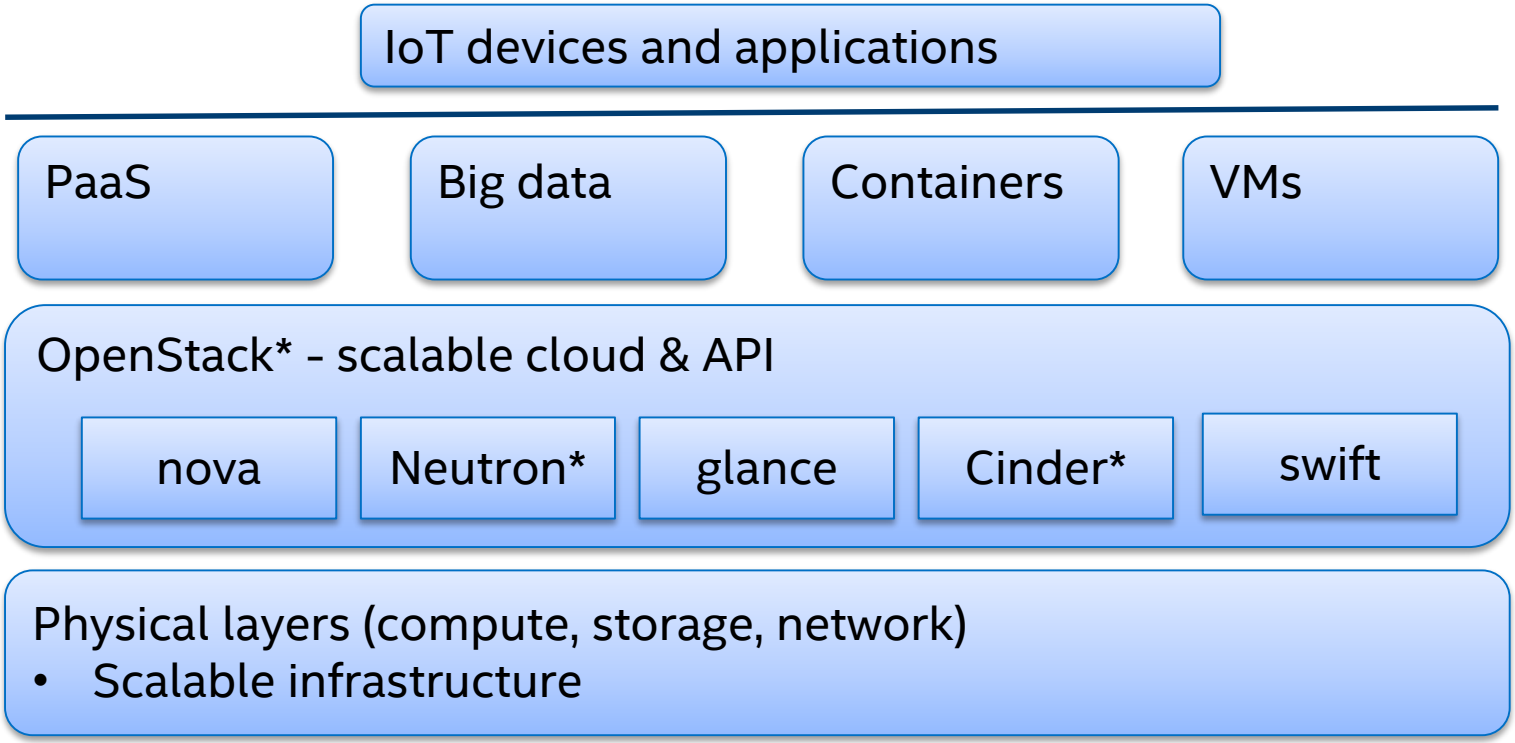
- Gathering
- Processing
  - Edge vs the cloud
- Retention
  - Edge vs the cloud

COMPUTE AND DATA: LOCATION IS EVERYTHING



1. "The 7 Principles of the Internet of Things (IoT)," Tom Bradicich, VP & GM, Servers and IoT Systems, Hewlett Packard Enterprise. Used with permission.

CLOUD REFERENCE ARCHITECTURE



IOT APPLICATION PLATFORM OPTIONS

Platform as a Service

- Cloud Foundry*, OpenShift*, Juju*, and many more
- Containers

Infrastructure as a Service

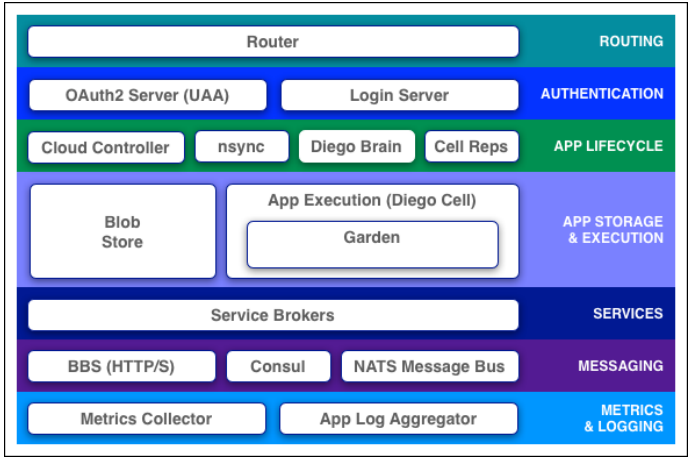
- VM
- Bare metal

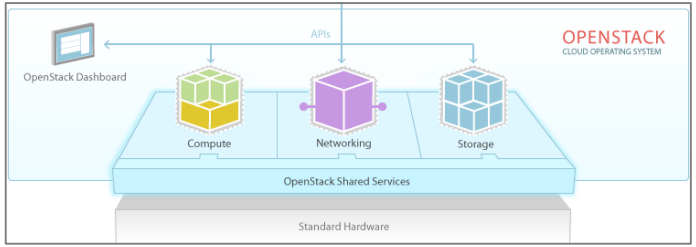
IOT APPLICATION PLATFORM EXAMPLE

Cloud Foundry* deployment on OpenStack*

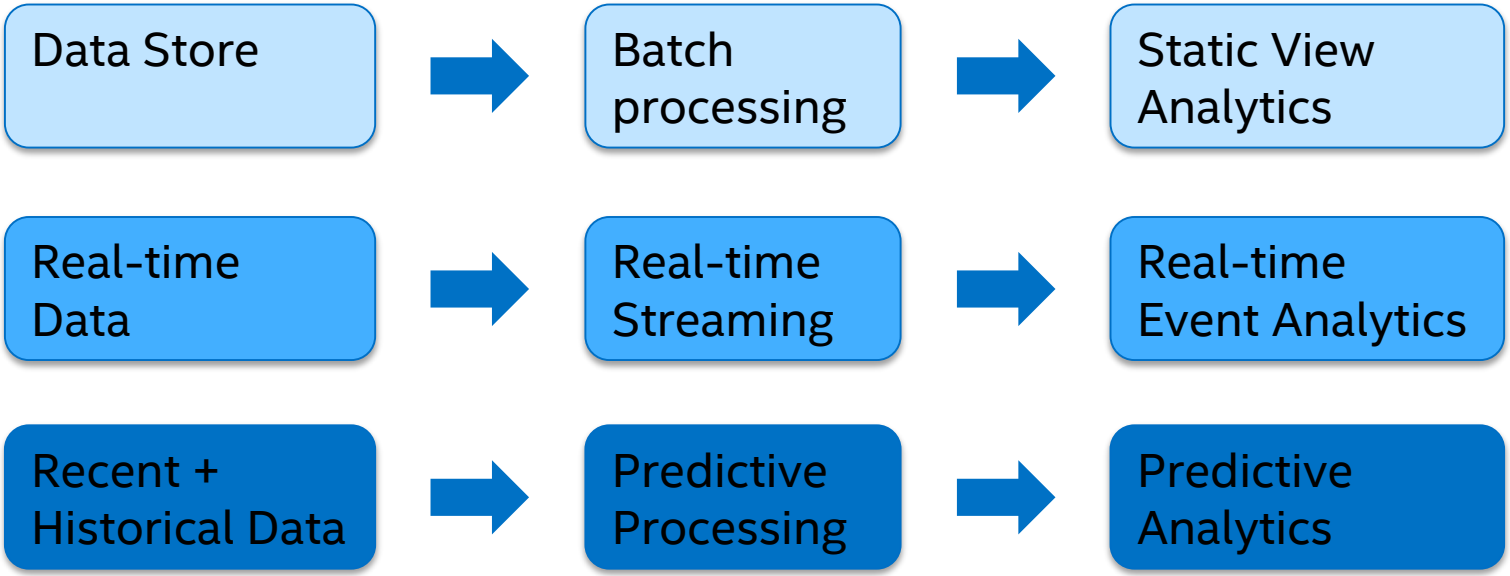
- Validate your OpenStack Instances
  - OpenStack API, metadata service, instance inter-connectivity, mount volume, deploy image
- Security groups
  - Ingress/egress filter
- DNS
- Cloud Foundry deployment manifest

http://docs.cloudfoundry.org/concepts/architecture/

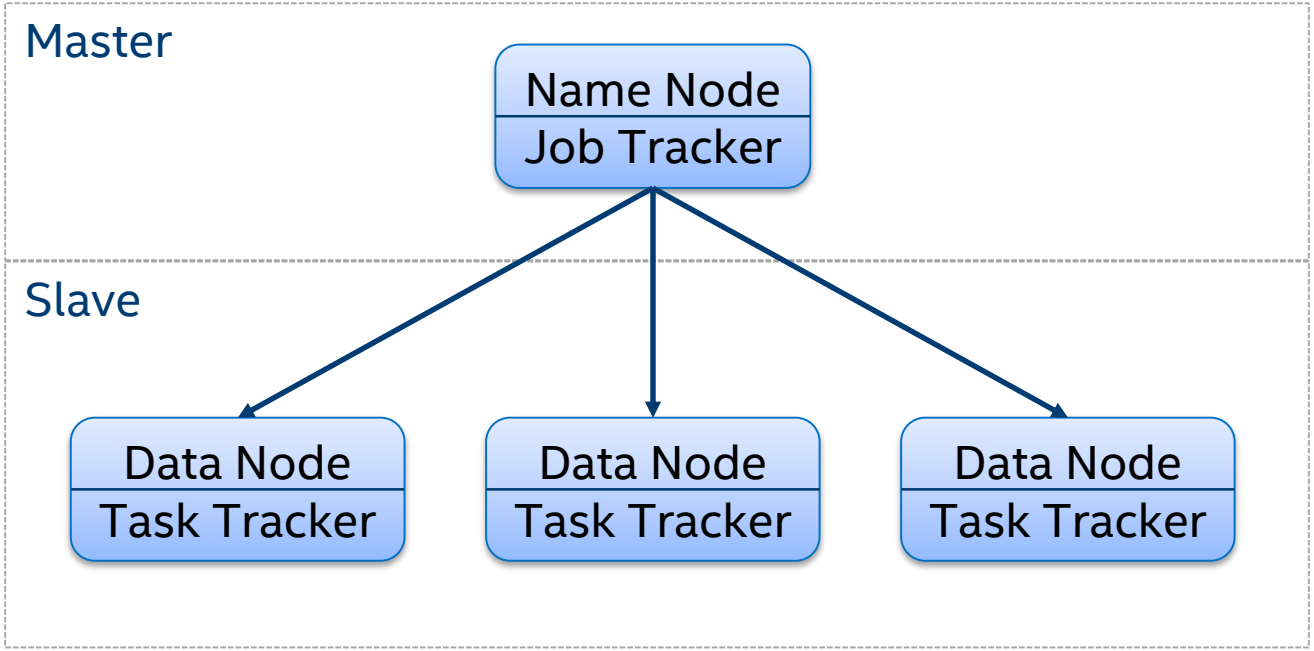




IOT ANALYTICS - DATA PROCESSING MODEL



IOT ANALYTICS – HADOOP* DEPLOYMENT ON OPENSTACK*



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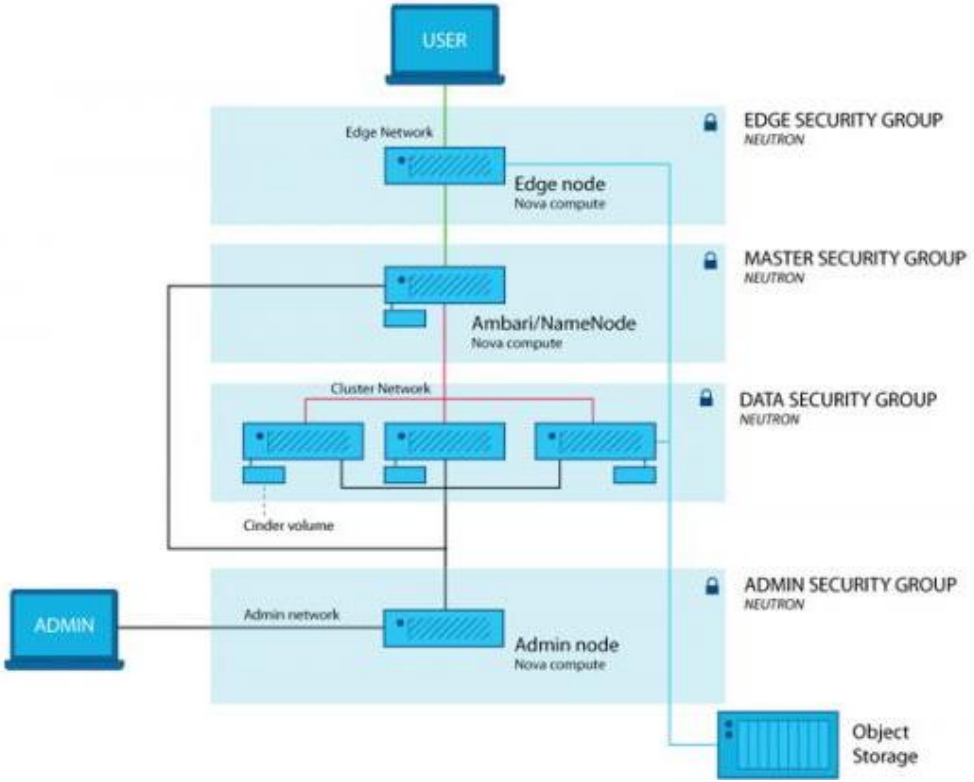

https://www.openstack.org/software/sample-configs/#big-data

KEY POINTS

What is different about a deployment for IoT?

- Data management
- Balance of analytics location and control
- Scaling
- Micro services and API architecture (know your requirements)
- Loss of connectivity is not an issue, it is a feature -> design for failure

CALL TO ACTION

- Know your application requirements
- Implement data management and processing at all levels
- Expect services to drop, devices to float on and offline.
- Plan for scalability
- Download the demo source and test the IoT solution
  - https://01.org/smarthome

THANK YOU

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ADDITIONAL INFORMATION

Session - Building a Flexible OpenStack Cloud from the Ground Up:

https://www.youtube.com/watch?v=ewiR1xG1pOs

Validate your OpenStack instances:

- https://docs.cloudfoundry.org/deploying/openstack/required-flavors.html
- https://docs.cloudfoundry.org/deploying/openstack/cf-stub.html
- https://docs.cloudfoundry.org/deploying/openstack/using_swift_blobstore.html

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- https://docs.cloudfoundry.org/deploying/openstack/using_swift_blobstore.html

IoTivity:

- https://www.iotivity.org/

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