

Presentation

Overview of the MEC Hackathon Setup for Application Developers

Hands-on session with OpenNESS from Intel

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Overview of the MEC Hackathon setup for application developers

Abstract

This tutorial is providing an overview of the overall setup offered to Hackathon participants, with MEC servers available and remotely accessible from developers. Registered users will be able to try the OpenNESS and understand how to develop MEC applications

Agenda

1. Introduction

- ✓ Multi-access Edge Computing overview
- ✓ Need for Providing a Hackathon Edge Platform For Application Developers.
- ✓ Main Considerations for attracting the Hackathon Developers ecosystem

2. Collaboration & Offerings – Hardware & Software Platform For Edge Developers

- ✓ HW Bare Metal Servers and Interconnection From Equinix
- ✓ The Cisco UCS Platforms for the MEC Hackathon
- ✓ Software Platform for Edge Developers – OpenNESS , OpenVINO & MEC Location API

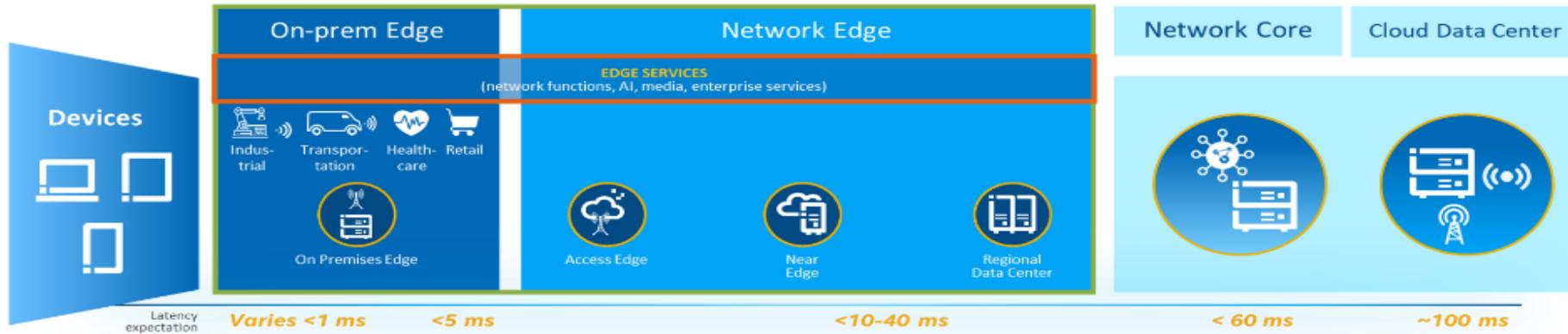
3. A Detailed Description of the MEC Server Solution

- ✓ Setup for Virtual participation (**NEW**)
- ✓ Setup for F2F participation

4. Conclusion

Edge Computing overview

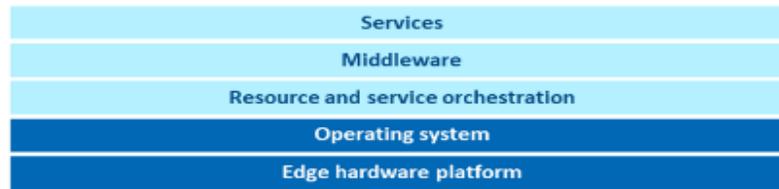
Delivering Cloud Native Platforms for the Edge



Cloud-computing at the network edge.

- Proximity
- Ultra-low latency
- High bandwidth
- Real-time access to access network and context information
- Location awareness

Lower TCO with a consistent cloud native platform approach across edge locations



Key challenges to overcome

- Deliver platform consistency & scalability across diverse edge location requirements
- Optimize cloud native frameworks to meet stringent edge KPIs and network complexity
- Leverage a broad ecosystem and evolving standards for edge computing

EDGE

CLOUD

Edge computing spanning a variety of network locations, form factors, and functions

Providing a Hackathon Edge Platform For Application Developers

Annual **Droidcon** event:

<https://it.droidcon.com/2020/hackathon>



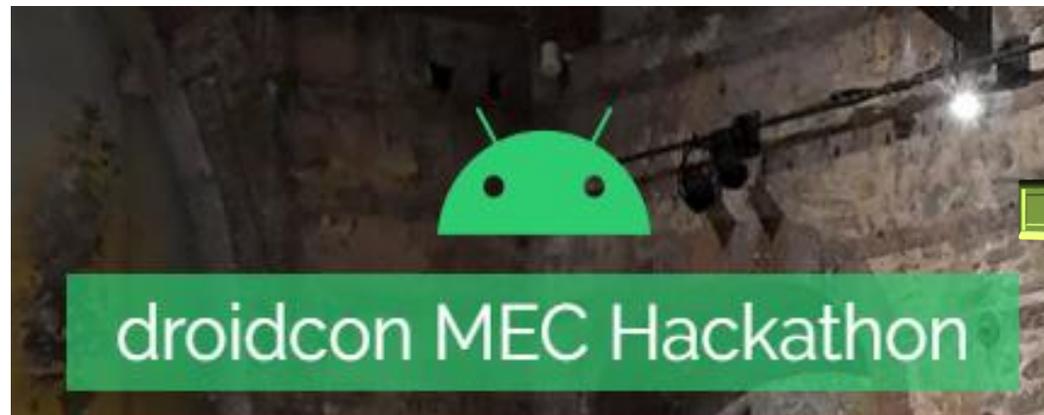
Past **MEC Hackathons**:

- 18-19 September 2018: 3 parallel events ([link](#)): Berlin (co-located with Edge Computing Congress), Beijing (China), and Turin (Italy);
- 17-18 September 2019: 2 parallel events ([link](#)): London, UK (co-located with Edge Computing Congress) and Shanghai (China);
- 18 November 2020: 1 event ([link](#)): San Francisco (America);

Goals: MEC promotion and SW developers engagement, feedback to the standards, MEC innovation.

The publication of a great standard is not enough. It also needs to reach-out the end users.

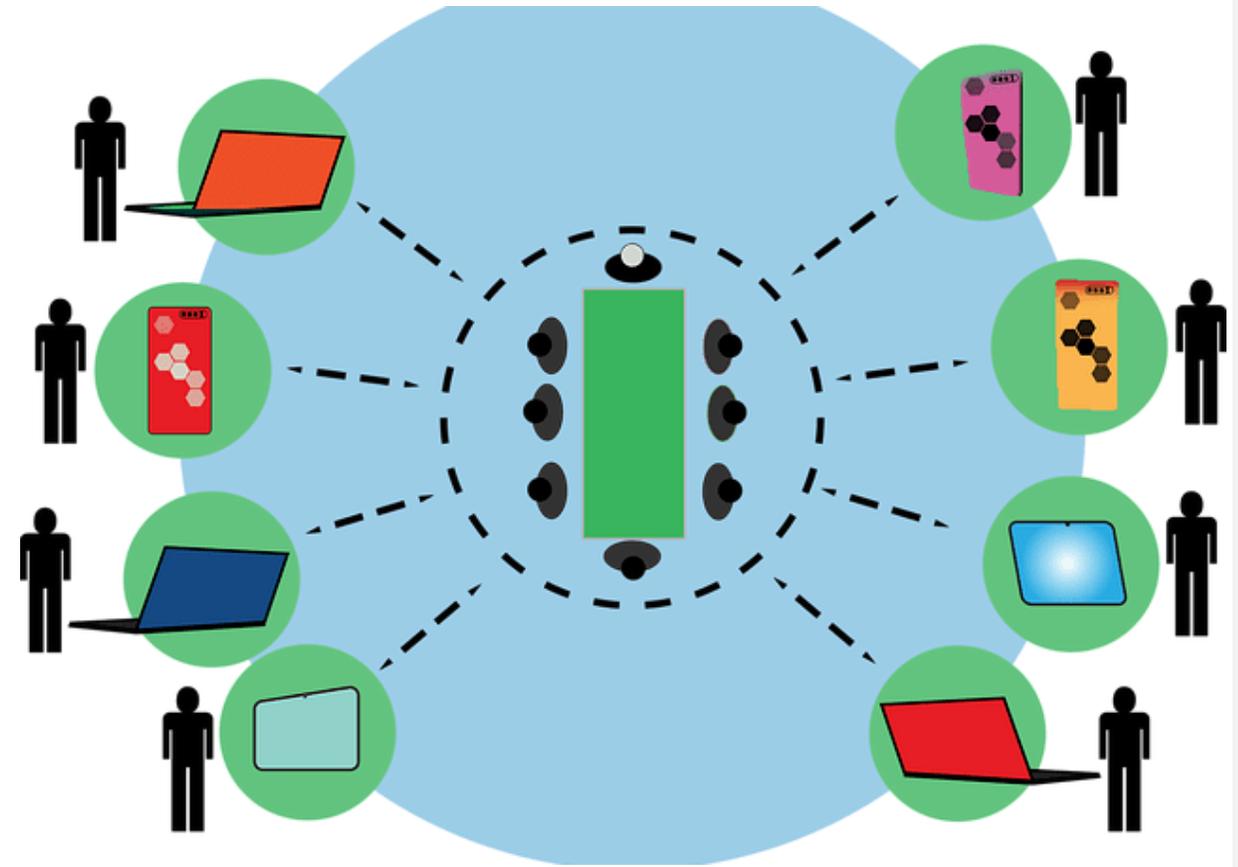
Developers community should be engaged, to increase the adoption of that technology



25-26 November 2020, in collaboration with Droidcon ([link](#)): F2F (co-located with Droidcon Italy), now also GLOBAL and REMOTE.

Providing a Hackathon Edge Platform For Application Developers

COVID-19 situation



**Need For
Virtual Participation**

Main Considerations for attracting the Hackathon Developers ecosystem



- **Remote/cloud availability of the edge environment:** Remote availability of the edge environment was an important criterion in the successful execution and participation of developers worldwide.
- **Isolation and privacy:** The provided machine setup must provide each developer team with its own isolated environment, each with a dedicated OS, on a single and powerful hardware platform running OpenNESS.
- **Edge SW development environment availability:** The solution must provide the latest version of OpenNESS toolkit, MEC Location API, OpenVINO, and other software tools to each participating developer/team.
- **Repeatable and fast deployment:** To support a new team joining the hackathon, the server should be set up to instantiate new copies of the VM images. Also, in case of a version upgrade of OpenNESS, a new VM can be created to support the update once and then reused for all developers.

Hardware Assets Offered

For the Developers ecosystem :

Virtual Infrastructure

- a collaboration with Equinix



HW Bare Metal Servers and Interconnection From Equinix

The company is a leader in global colocation data center market share, with 210 data centers in 25 countries on five continents.

F2F Infrastructure

- a collaboration with Cisco.



The Cisco UCS Platforms for the MEC Hackathon

Software Assets offered

- OpenNESS
- OpenVINO
- oneAPI
- Location API stack (location API installation -a collaboration with Links foundation).

**Environment Supporting
Edge Application Deployment**

Droidcon MEC hackathon

Events

- **Nov 25th - Deepdive on OpenNESS (online tutorial)**
- **Nov 25th - Hands-on session with oneAPI**
- **Nov 26th - ETSI MEC Location API (F2F/online tutorial)**

Ex- Additional Tools

Open Network Edge Services Software: OpenNESS



www.openness.org

OpenNESS is an open source MEC software toolkit that enables **highly optimized and performant edge platforms** to on-board and manage applications and network functions with **cloud-like agility across any type of network**



MODULAR



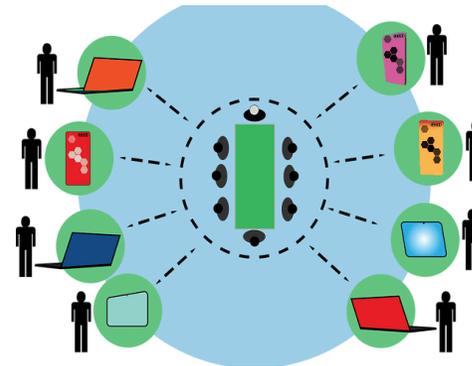
**MICROSERVICES
ARCHITECTURE**



**CONSUMABLE AS A
WHOLE OR IN PARTS**

Virtual Participation

For the developers who wanted to attend the hackathon competition virtually. 

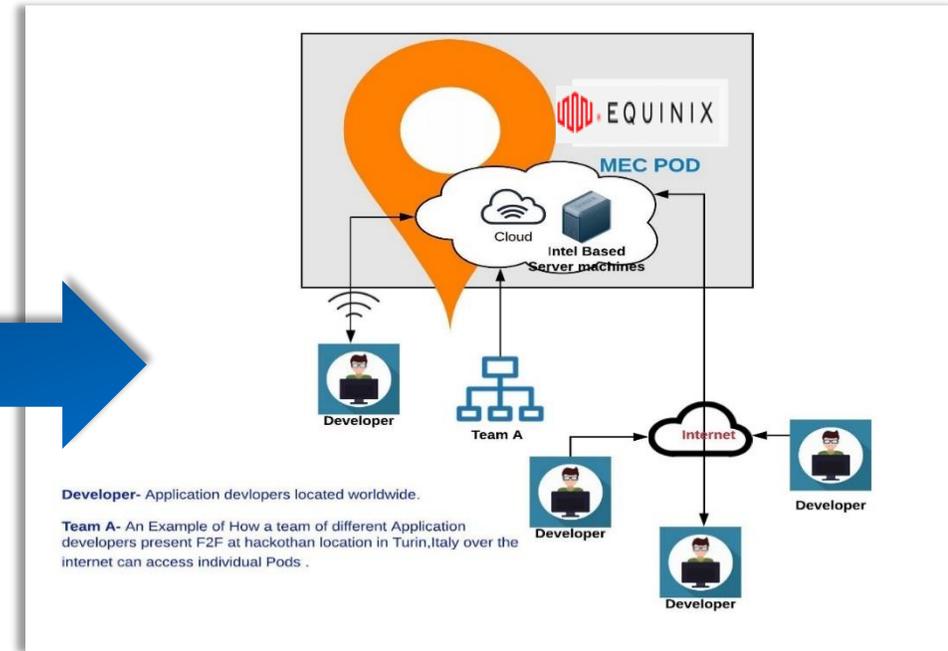


Virtual 'Edge SW Development' Environment Setup

The following steps were taken to set up the remote environment:

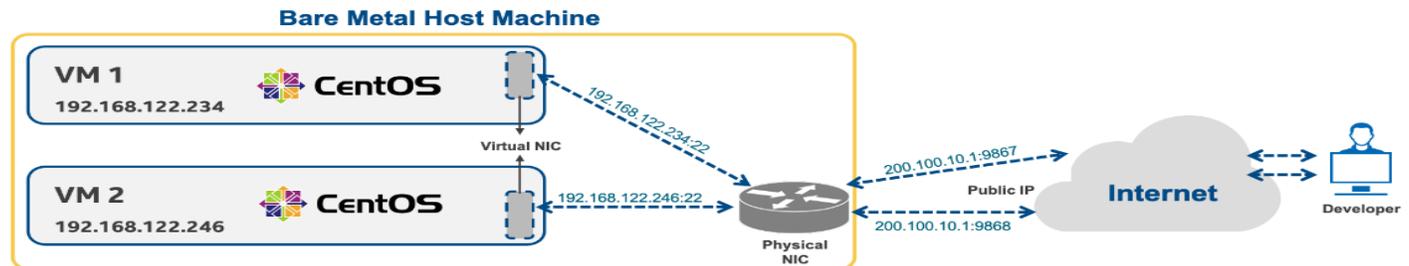
1. Pod Server Selection

★ Global Server Availability-Close to the Developers

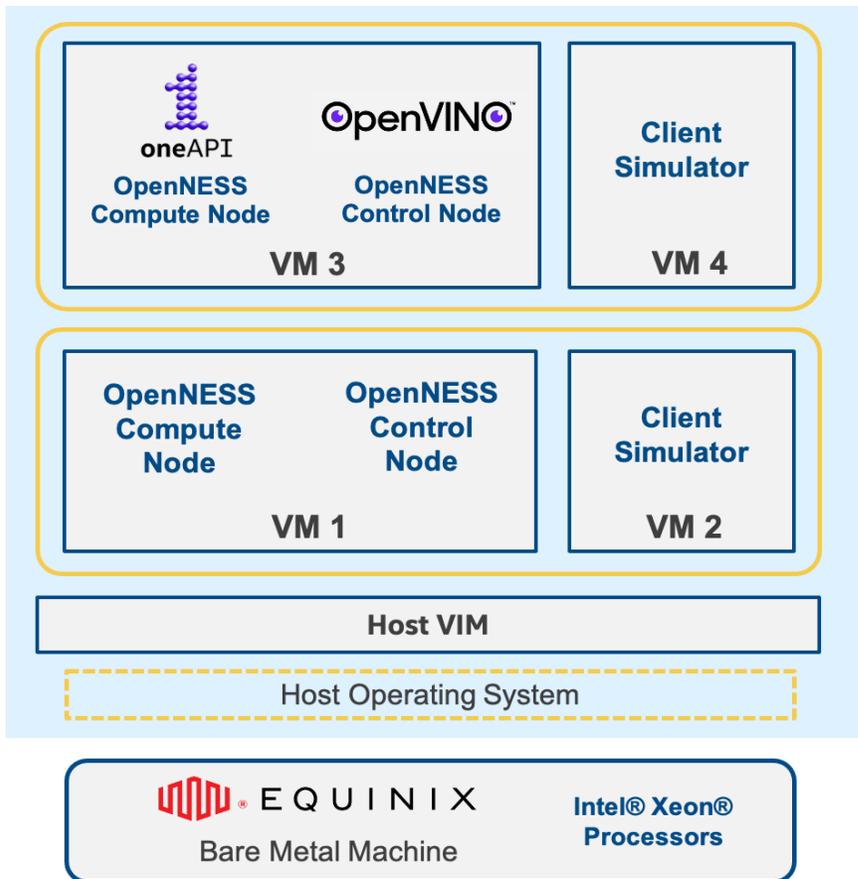


2. VM Environment Creation For mulitple pods

★ Isolation & Privacy



Virtual 'Edge SW Development' Environment Setup



*Single Node Set up with OpenNESS installation
for 2 Developers Teams on the same Equinix machine*

3. OpenNESS installation

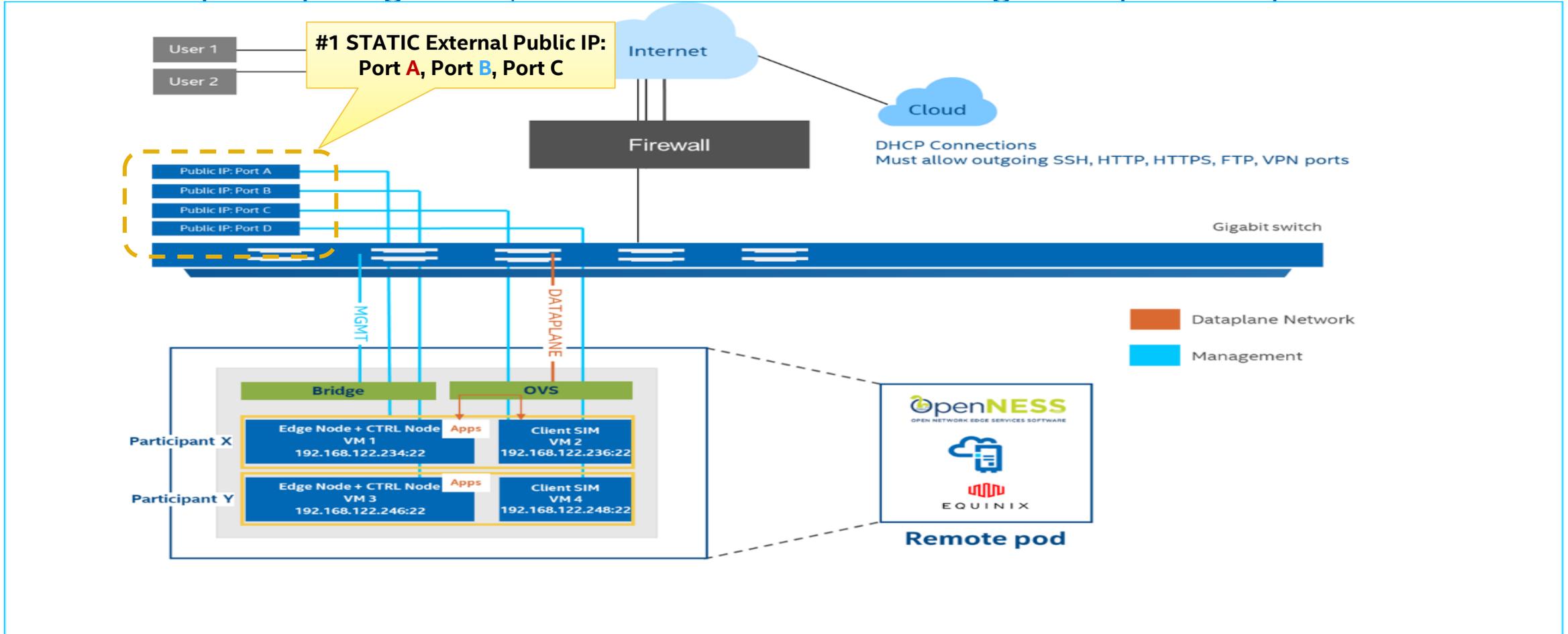
- We opted for latest OpenNESS platform (**Release 20.06**) [1] having *both controller node and compute node running on a single VM.*
- A Client Simulator (containing the Client App) is instead instantiated in a separated VM running on the same Packet/Equinix machine .



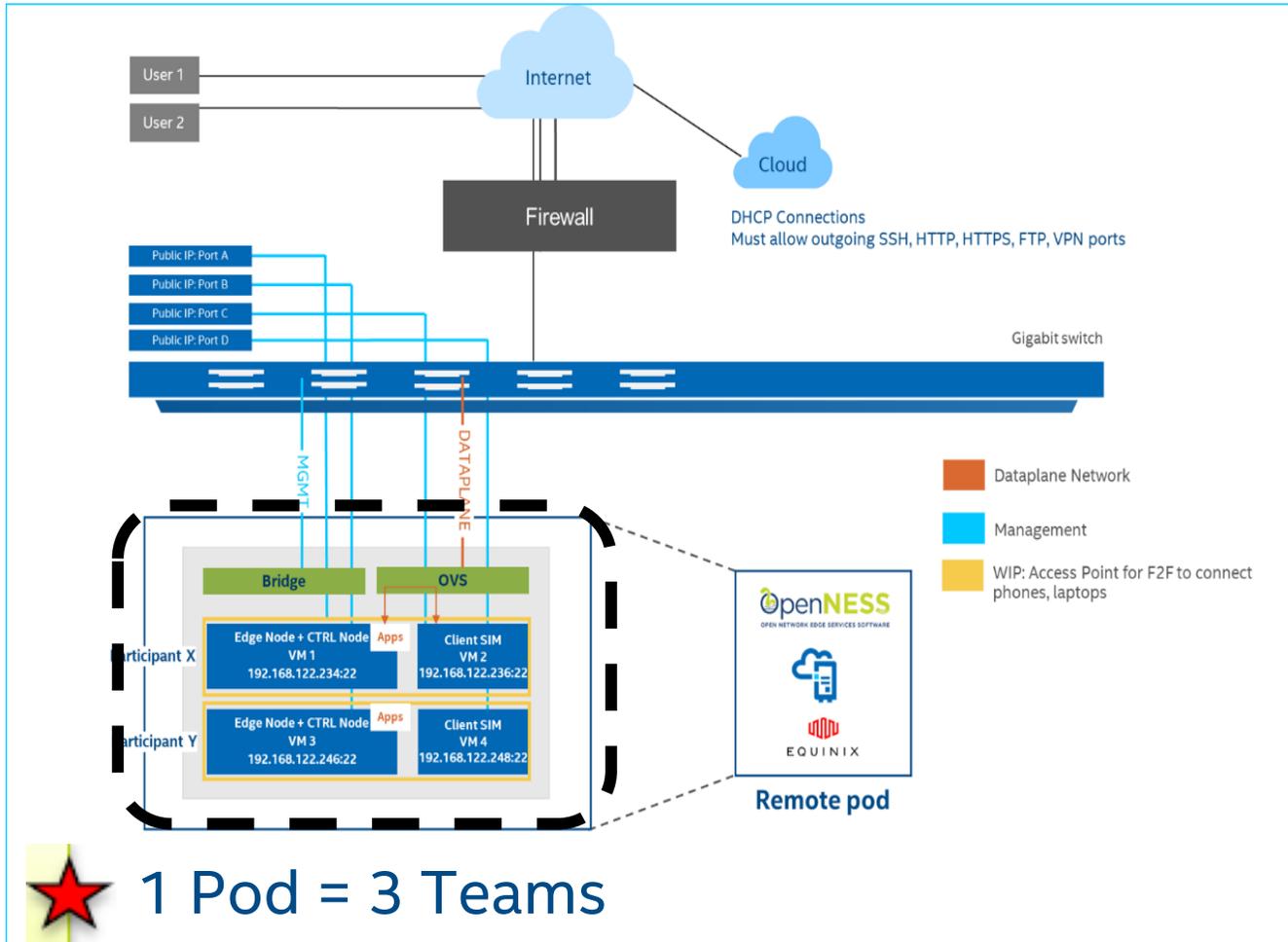
Edge SW Development Environment

Virtual 'Edge SW Development' Environment Setup

4. Final configuration of the end-to-end environment provided isolated environments for each of the participating teams, each with its own OS on a single and powerful platform.



Virtual 'Edge SW Development' Environment Setup



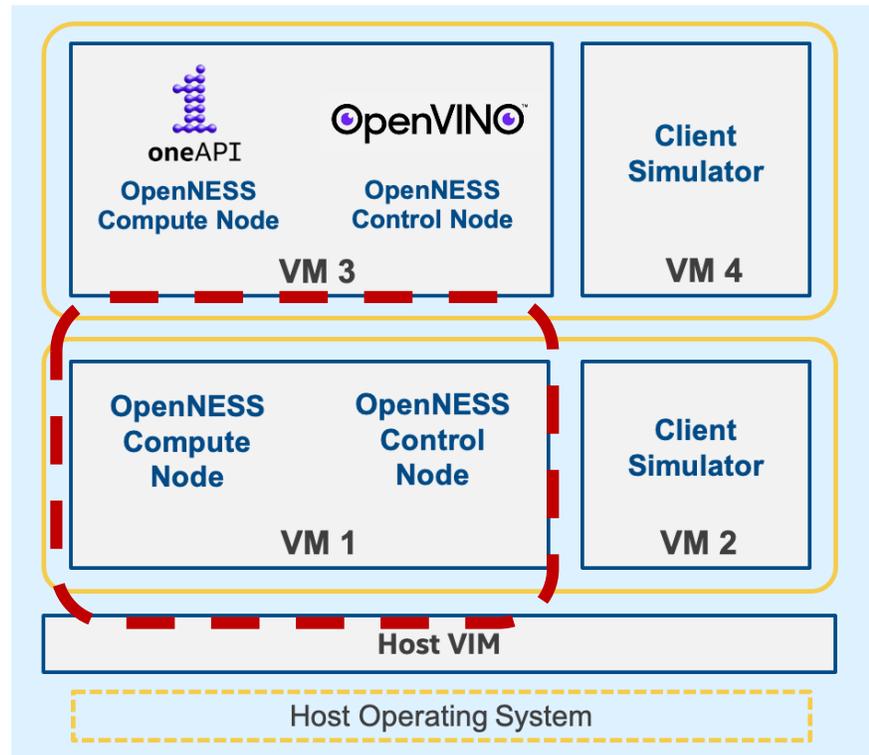
NOTES:

- Client app running
 - On customer terminals (laptops) OR
 - On Client Simulator (for debugging/testing purposes).
- Customer laptops are connected to the Edge Node through internet.
- Client Simulator can be used to :
 - test Openness setup locally (w/o dataplane going through Internet)
 - In case of Internet issues (connectivity, low throughput, high latency)

Total of 1 server required for each Remote POD serving up to 3 teams:

- For **TEAM #1** (2VMs Assigned) i.e.
 - 1 VM having
 - 1 Controller
 - 1 Edge Node
 - 1 Simulator VM per team
- Based on VM requirements we anticipate we can support 10 VMs per server

Remote Pod Setup



Single Node Set up with OpenNESS installation for 2 Developers Teams on the same Equinix machine

Assets offered to the Developers at hackathon

- openNESS platform
- MEC location API
- oneAPI framework
- Applications –open VINO

For Example: **Team#1**

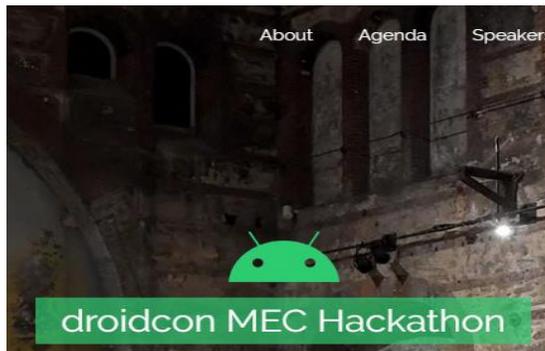
2 VMs Allocated i.e VM1 and VM2

- HD space - 80 GB per Team
 - VM1 60GB
 - VM2 (simulator)20GB
- RAM - 48 GB per Team
 - VM1 32GB
 - VM2 16GB

Single-node network edge cluster - A single-node cluster scenario, that is, a single machine working as a control plane and node,³ was developed for both pod setups. This type of installation is very effective for resource-constrained edge deployments. Also, co-locating the control plane improves reliability by removing a point of failure.

F2F Participation

For the developers who wanted to attend the hackathon competition onsite – **Italy** . 🇮🇹

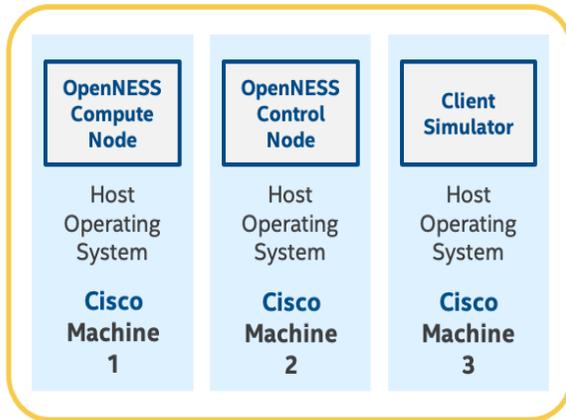


F2F Pod Setup

To enable F2F participation, two types of server pod configurations were used:

Pod configuration 1:
3 Cisco Machines

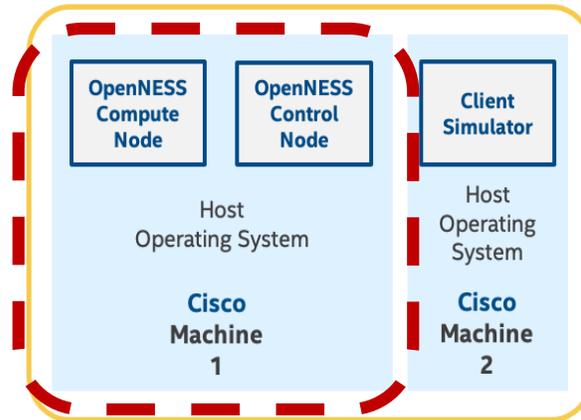
Team#1



- Most Server/Machine used
- + Easiest to install
- + Best Performance

Pod configuration 2:
2 Cisco Machines

Team#2



- + Less Server/Machine used
- + Easy to install
- + Good Performance

- Pod configuration #1 used three Cisco servers, each having an OpenNESS compute node, OpenNESS control node, and client simulator respectively.
- Pod configuration #2 used two Cisco servers. One of these servers had the OpenNESS installation with a combined controller and edge node, and one server was running the client simulator.

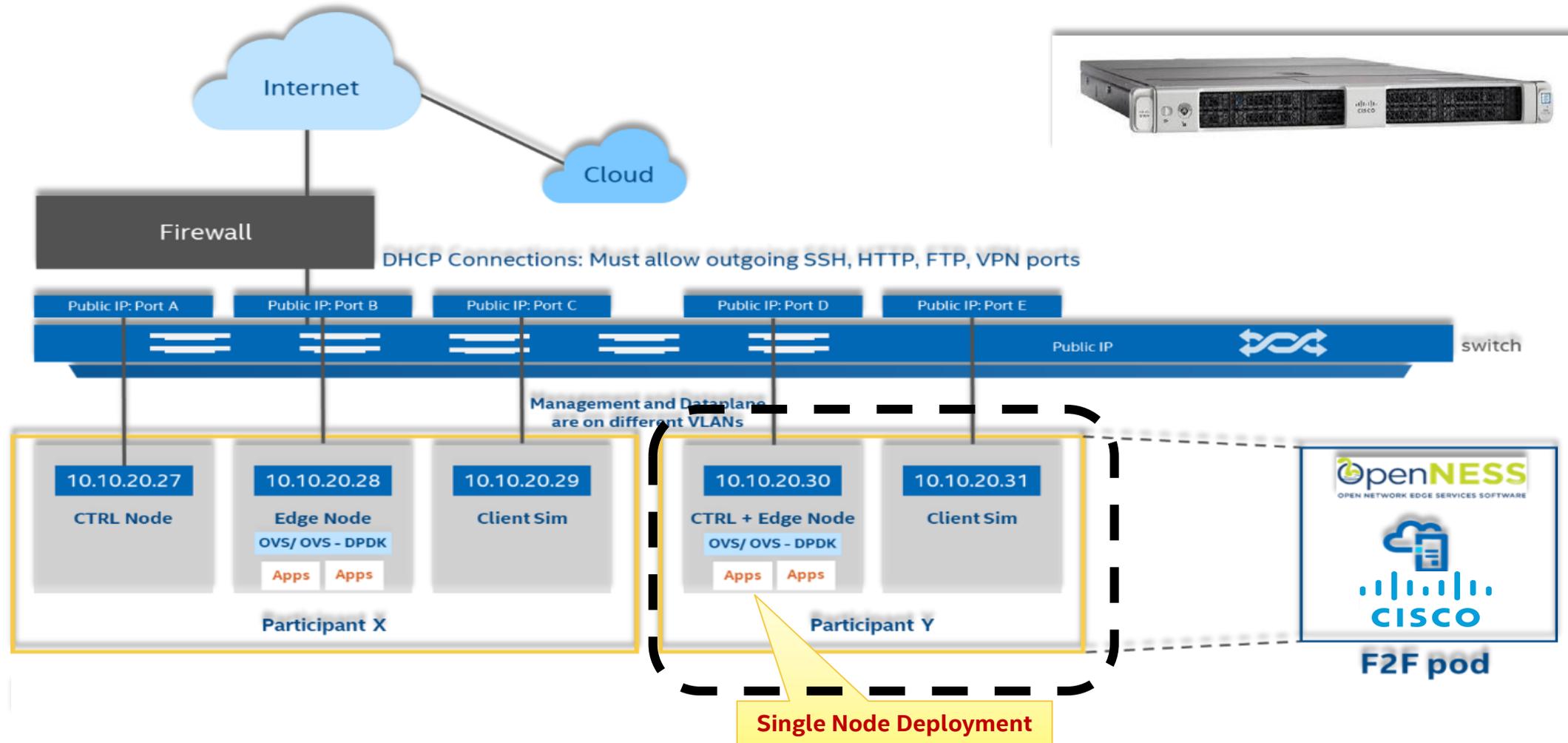
OpenNESS website - <https://www.openness.org/news-and-events/openness-20-06-released>

Reduce Cost

Single node Deployment latest OpenNESS platform (Release 20.06) having both controller node and compute node running on a Single Machine.

Pod configurations for F2F participation
(example for two developers' teams on different Cisco servers)

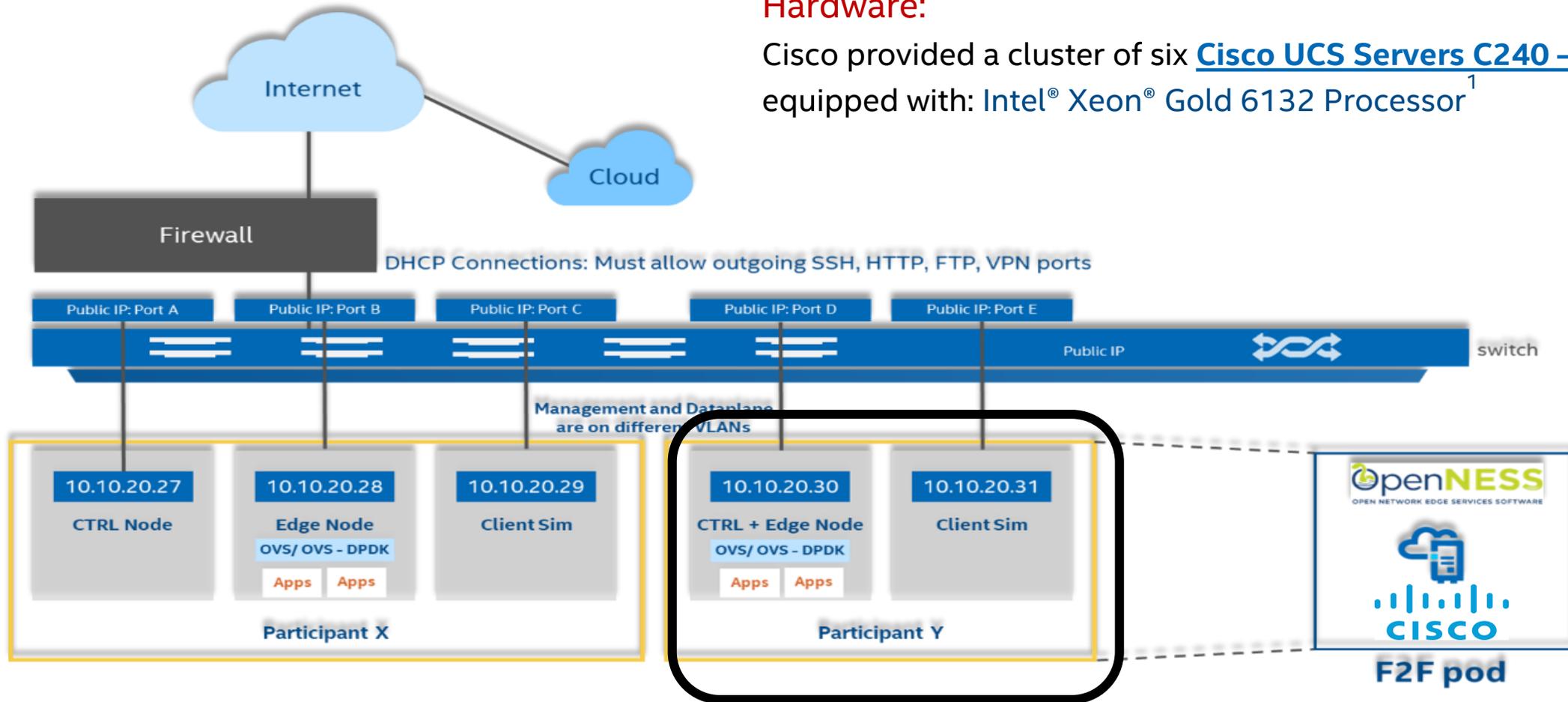
Final F2F Setup- at Turin, Italy



Final F2F Setup-at Turin, Italy

Hardware:

Cisco provided a cluster of six Cisco UCS Servers C240 – M5 equipped with: Intel® Xeon® Gold 6132 Processor¹



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Conclusions

The main advantages of the presented **cloud-ready network-outside solution** for the hackathon include the following:

- Specifically designed to address common challenges with **edge deployments**
- **Virtualized Solution** :Leverages virtualization technologies to install OpenNESS so that edge computing infrastructure can be **shared, replicated, and installed quickly** on other MEC nodes.
- Enables more resources to be allocated, such as memory or SSD space allocation, depending on the developer's application usage. Infrastructure will help in a **faster deployment and upgrade** of individual VMs with the latest OpenNESS software.
- In case of addition of a new team to the hackathon, no new servers are needed, thanks to the ability to instantiate new copies of the VM images on the machine.

References

WHITEPAPER:

<https://networkbuilders.intel.com/solutionslibrary/providing-a-hackathon-edge-platform-for-application-developers>

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