Edge Cloud TSC Report

Fu Qiao

Trevor Cooper

Julien Zhang

Outlines

- Taskforce Objectives

- Survey on OPNFV Projects

- Survey on Upstream Projects

- Recommendations

OPNFV

Taskforce Objectives

- Report back to TSC with recommendations on an OPNFV Edge Cloud Strategy

- Survey related projects in OPNFV to understand overlaps and synergies

- Determine need for additional Edge projects or activities in OPNFV

- Recommend possible collaboration across OPNFV Edge activities

- Recommend possible collaboration with other open-source communities

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Survey - OPNFV Projects

Survey questions https://etherpad.opnfv.org/p/tsc_edge_cloud_project_questions

Survey results summary https://wiki.opnfv.org/display/meetings/Edge+Cloud

Result Highlights:

- Multiple OPNFV projects are relevant to Edge, but have narrow focus and different perspectives

- No common definitions or community objectives for Edge

- Lack of collaboration with upstream Edge projects

- Lack of definition for Edge scenarios, Edge dev environment, Edge testing

- No common forum for Edge topics e.g. Edge WG or umbrella Edge project

- EdgeCloud aiming for a common framework but current focus is requirements

Survey on Upstream Projects (highlights)

OpenStack Foundation

- Edge Computing WG
  - white paper published, driving edge related work with OpenStack Foundation
  - Weekly audio and IRC meetings; top use-cases: 5G, CPE
  - Studying use-cases https://wiki.openstack.org/wiki/Edge_Computing_Group/case_studies
- FEMDC: SIG for fog/edge/distributed cloud, focusing on academic study and testing
- StarlingX: new project to open source Windriver Titanium Cloud, provide edge features, including light-weight OpenStack, "real-time" features, remote provisioning
- Airship: new project to open source AT&T Oceans project for distributed cloud, automated provisioning and management in a declarative way

Linux Foundation

- Akraino
  - New project, no seed-code or governance structure yet
  - Generate "blueprints" for Edge, including hardware, infrastructure software
  - APIs, middleware?
  - Integration of multiple upstream projects Airship, StarlingX, … ?
- ONAP
  - Edge automation working group focusing on Edge Cloud for Casablanca (3rd release Nov 15th)
  - Add hierarchical orchestration
  - Extend hardware platform awareness, Provide a way to select the best region to place dynamic apps

Recommendations (1)

- Develop clear messaging to establish and reinforce OPNFV relevance and unique role in the Industry to address challenges with integrating, deploying, testing, managing Edge Cloud
    - Consider publishing a White Paper and/or joint conference sessions highlighting collaboration with upstream projects
    - Develop a roadmap of Edge announcement/s (ONS in September?)
- Solicit feedback from EUAG for validating approach and tracking progress
- Establishing Edge WG
    - Provide a unified view of OPNFV Edge activities to help projects collaborate and avoid duplication
    - Maintain an "Edge dashboard" or equivalent tool to track progress and community artifacts for Edge
- Build joint effort across edge related projects for scenario design, test case design, Pharos spec design, and etc..
    - Bring projects that are labeled as edge related projects into the WG for ongoing discussion and definition
    - Build edge scenarios with integration of scenarios from all different projects
    - Tracking and coordinate the progress of each different projects
- Collaborate with upstream projects for possible testing and integration
- Maintain list of perceived gaps in upstream projects wrt Edge and OPNFV activities contributing to resolving these gaps
- Develop OPNFV position wrt ETSI MEC and how it maps to OPNFV

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Recommendations (2) – Edge Project

- Code development

  – Build code base for developers to work on and focus community effort

  – Test case development for Edge

- Pharos spec: collaborate with Pharos team for edge spec definition

- Collaboration with Upstream Projects

  – OpenStack Edge Computing WG – liaison with updates to TSC, consider follow up white paper and other opportunities for joint messaging

  – Keystone team and Glance team for OpenStack edge testing

  – FEMDC for Edge testing framework

  – Seek collaboration with StarlingX for integrating as an OPNFV scenario

  – Monitor Akraino - evaluate collaboration once governance structure formed and there is clear project definition

  – Monitor Airship

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Recommendations (3)

- OVP (Compliance Program)

  - Develop profile of Edge platform capabilities

  - Develop set of Edge relevant test cases based to test against commercial platforms

  - Include Edge test-cases in release after Gambia

- Pharos

  - Expand Pharos spec with "n" Edge flavors

    - OpenStack Edge Computing group - 1) small, 2) medium

    - Airship 1) Minimal (fully embedded), 2) small DC (enterprise edge, Access level CO/DC with limited space and power), 3) large (Metro level CO/DC)

    - StarlingX 1) EdgeSX 2) Edge 3) Core

    - etc.

  - Definitions and terminology ... expand PDF?

  - Support heterogeneous hardware within a POD

  - Investigate feasibility to adopt ENOS framework for simulating distributed clouds

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Edge Cloud Industry Groups

- Open Stack Foundation
- Linux Foundation
- Other Industry Groups are forming/evolving

Open Stack Foundation

- Open Infrastructure Edge Computing initiative https://www.openstack.org/edge-computing/

- Edge Computing Group https://wiki.openstack.org/wiki/Edge_Computing_Group

  - Weekly audio and IRC meetings; top use-cases: 5G, CPE
  - Case studies https://wiki.openstack.org/wiki/Edge_Computing_Group/case_studies
- FEMDC SIG https://wiki.openstack.org/wiki/Fog_Edge_Massively_Distributed_Clouds

  - EnOS / EnOSlib – Experimental eNvironment for Openstack with 8k cores http://enos.readthedocs.io/en/stable/
  - Summit presentation https://www.openstack.org/videos/vancouver-2018/can-we-operate-and-use-an-edge-computing-infrastructure-with-openstack
- Keystone https://wiki.openstack.org/wiki/Keystone_edge_architectures

  - Edge architectures for identity management
- Glance https://wiki.openstack.org/wiki/Image_handling_in_edge_environment

  - Image handling / synchronization in an edge environment
- Airship http://www.airshipit.org/

  - Automated cloud provisioning and management in a declarative way
- StarlingX http://www.starlingx.io

  - Edge stack based on Wind River Titanium Cloud (OpenStack variant) + OVS-dpdk + CentOS
  - Industrial and telecom features … resilient, low latency, QoS
  - Simplified installation and commissioning, fault management, service management, …
  - Orchestrate application of software patches across distributed cloud.
  - Three sizes: (i) single-server (ii) dual-servers,(iii) 4-100's of servers

OPNFV

Linux Foundation

- OPNFV

  – Edge Cloud project https://wiki.opnfv.org/display/PROJ/Edge+cloud

  – Auto - automation of VNF management with Edge Cloud use-case

  – CRAN - exploring deployment with MEC and 5G

  – Pharos spec - Edge Variants

  – Collaborating with OpenStack (requirements, use-cases, testing Keystone Edge features, ...)

- ONAP https://wiki.onap.org/display/DW/Edge+Automation+through+ONAP

  - Edge automation working group focusing on Edge Cloud for Casablanca (3rd release Nov 15th)

    - Add hierarchical orchestration

    - Extend hardware platform awareness, Provide a way to select the best region to place dynamic apps

- Akraino integrated edge stack, APIs, middleware https://www.akraino.org/

  - Deliver "blue-prints"

- EdgeXFoundry https://www.edgexfoundry.org/

  - API framework for enabling IoT services at the Edge

- ONF CORD https://opencord.org/

  - Cloud for central office with commodity servers, white-box switches, open source software

  - Uses ONOS control plane for SDN and managing network components https://onosproject.org/

Other Industry Groups

- Telecom Infra Project (TIP) https://telecominfraproject.com/

  - Lab and field implementations for services/applications at the network edge

- Open Edge Compute Initiative (OEC) http://openedgecomputing.org/

  - Developing Open Edge API for 3rd party developers
  - "Living Edge Lab" real-world testbed for Edge Computing http://openedgecomputing.org/lel.html
... etc.

- MobiledgeX https://mobiledgex.com/

  - Currently not an Industry forum, owned by Deutsche Telekom … "Eventually this will be driven by multiple operators,"
  - Creating a global marketplace for organizations to deliver and drive the business of edge enabled services …

OPNFV