10-11-22 - 5G SBP Off Week Working Group Meeting

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Attendance

Please enter you name and company. Tag yourself using LF ID User Name. Don't have an LF ID yet? Go here: https://myprofile.lfx.linuxfoundation.org/.

Name	Company
LJ Illuzzi	Linux Foundation
Ganesh Venkatraman	Kaloom
@Nadathur Sundar	Intel
Muddasar Ahmed	MITRE

Agenda:

- Antitrust
- Request for Note Taker
- Start Recording- helps facilitate minutes and Action Items
- Welcome 1st Time Attendees
- Lab Status
- Video Shoot
- Roadmap - whats next
- Documentation
- Any Other Business

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LF Anti-trust

- We will start by mentioning the project's Antitrust Policy, which you can find linked from the LF and project websites. The policy is important where multiple companies, including potential industry competitors, are participating in meetings. Please review and if you have any questions, please contact your company legal counsel. Members of the LF may contact Andrew Updegrove at the firm Gesmer Updegrove LLP, which provides legal counsel to the LF.
    - Antitrust Policy

Start Recording

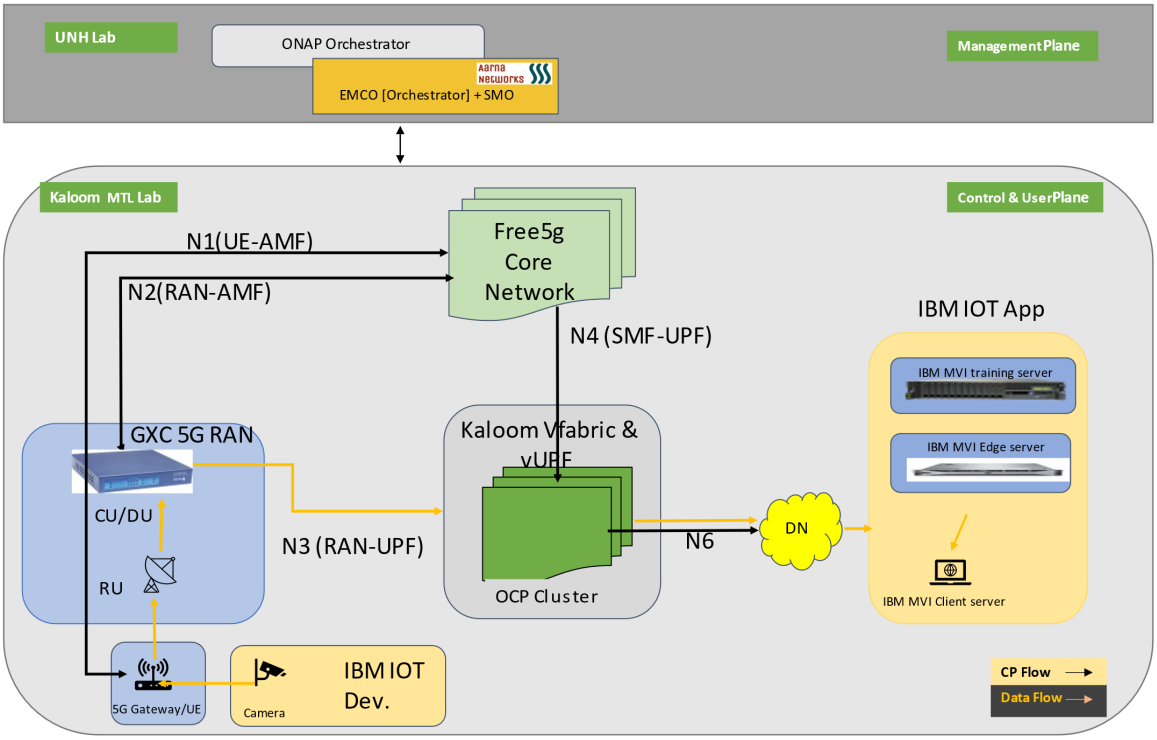
Welcome 1st Time Attendees

Welcome all. new attendees. If you have any questions about participating in this community, please contact Louis Illuzzi (lilluzzi@linuxfoundation.org).

5G Super Blueprint Overview and Getting Started

Lab Status

Updated lab diagram:



- Hard Hat Detection is working
- Anyway to measure end-to-end latency/speed?
- Next Steps:
    - 5G UE gateway coming up
    - IBM to install SW on servers in Kaloom
    - Pano visiting Kaloom on 10/11
- Save configs and scripts for all the servers
- Risks-
    - Network response between Dallas and Seattle

Ready for Video Shoots

1. Demo video on 10/13
2. "Behind the Scenes"
    a. Each contributor encouraged to provide a video clip introducing themselves and there company, there contribution to the project, and value prop.

Live Interaction in Seattle

User Story- ONE Summit participants view a video screen showing live demostration of hardhat detection taking place at the Kaloom lab. Demonstration shows live system function both with and without hard hat

Script Ideas:

- Intro from the lab- "Hi I'm Bob, and I'm Joe"
- Bob: "oh no, I forgot my hard hat". System alerts non-compliance.
- Try baseball cap, or beanie cap to see if system can be fooled
- Joe, enteres the scene with hard hat on and carrying a spare hard hat.
- Bob dons hard hat and enters the detection area; system shows compliance
- Joe re-enters enters the detection area; system shows compliance

What do we need from venue:

- video screen
- Lighting?
- wired ethernet (RJ45)

What do we need from community

- Streaming software: OBS (Pano)
- VPN server?
- labtop
- Resources on-site beforehand to setup and test
    - LJ in Seattle on Monday
    - Muddasar in Seattle on Monday evening

Roadmap- whats next

- Kaloom has committed to providing the 5G SBP Lab on a permanent basis. Thank you!
- Core Diversity- add SD-Core
- Core Diversity - add Open5GS
- Massive IoT Use Case- use an emulaltor to simulate millions of IoT devices. (maybe invovling sensors, or crowd size detection, or ??)
- Secuity and Authenication Use Case - Remote Attestation for IoT device secuity and authenication
- Dynamic Transport Slicing Use Case - private 5G services over public RAN using dynamic transport slicing. ONAP/Orchestration play. Use Case- Multi-tenancy of 5G Core and 5G RAN (Muddasar)

Potential for quarterly 5G SBP webinars

User Stories:

- Worker A enters an area of the factory floor where hard hats are required. Worker A IS wearing a hard hat. The system detects that Worker A IS w earing a hard hat and responds with action A.
- Worker B enters an area of the factory floor where hard hats are required. Worker B is NOT wearing a hard hat. The system detects that Worker B is NOT wearing a hard hat and responds with action B.
- Worker C enters an area of the factory where facemasks are required. Worker C IS wearing a facemask. The system detects that Worker C IS we aring a facemask and responds with action C.
- Worker D enters an area of the factory where facemasks are required. Worker D is NOT wearing a facemask. The system detects that Worker D is NOT wearing a facemask and responds with action D.

Mandatory Goals & Time Line:

- Proof of Concept End to End system demonstrating:
    - Hard Hat detection
    - Facemask detection
    - **Static Transport Slicing - how will we show this?**
    - Low latency (5G vs wifi?). How would wifi perform in the same environment? Can we benchmark wifi in Kaloom lab?
        - **How will we show this? Perhaps visual indicators that shows the process in real-time. Green light and flashing red light?**
        - **How long does it take when a person enters the camera view until a light goes off. This can show ultra low latency processing.**
    - **Massive IOT**
        - **Work with Hardik**
- **NOTE- we will have 15 minutes during the ONE Summit Keynote to show the demotration including Live lab interaction. How do we get the most bang for the buck?**
    - **Working with LFN Marketing - All ideas welcome.**
- High Level Lab Build & Timeline
    - Lab is up and running end-to-end. *Target Completion Date:* 11 Oct 2022
        - IBM risk wrt Resources. Status Yellow.
            - VPN install to be completed
            - SW install after VPN testing
        - GXC connection with Free 5GC is pending - ETA complete this week
    - Video shoot in the lab depicting mandatory goals above. *Target Completion Date: 17 Oct 2022*
        - Work with LFN Marketing on video shoot ideas (story lines, helmets, facemasks, the benefits of 5G, why 5G is better then wifi?) i.e. how do we show something cool

        - How do we show slicing?
    - Send raw video to editor. *Target Date: 18 Oct 2022*
    - Video submission to ONE Summit: *Target Date: 04 Nov 2022*
- Slideware- Work with LFN Marketing Team. *Target Completion Date: 04 Nov 2022*
- **ONE Summit** 15 Nov 2022
- Build Guide: *Target Completion Date:* 25 Nov 2022

Attainable/Stretch/Roadmap Goals (in addition to Mandatory Goals above), prioritized. Need to sort out which goals below are attainable, which are stretch, which are roadmap

1. Live Interaction with the Kaloom Lab
    a. Live interaction, Live feed with the lab is lowest risk. Develop Storyline. ***21 Oct 2022***
        i. Working with LFN Marketing Team- All ideas welcome.
        ii. **What is the bandwidth requirement to get feed to Seattle? What connection is needed between Seattle and Kaloom and Dallas of live demo.**
        iii. **Dedicated connection (RJ45) rather then event wifi**
            - **Live feed from Montreal**
            - **Streaming software (OBS) - Pano**
    b. Placeholder- Equipment for onsite ready to ship. *Target date: 31 Oct 2022*
    c. Placeholder- Onsite setup and test complete. *Target date: 11 Nov 2022*
2. **Massive IoT simulation. A massive IoT simulator (open source preferred) is used to demostrate scalability of the system. *Target Date:***
    a. **GXC can possibly provide solution. Hardik/Ganesh have lead**
    b. **high priority - stretch goal**
3. Remote Attestation (Peraton Labs) - authenication of IoT devices (cameras). End point protection agent.
    a. Leaning toward Roadmap goal

Marketing- Pano

- Draft Storyboard review
- SME Table Time (cocktail table) at event
    - Set dedicated times for SMEs to discuss and answer questions around the proof point and 5G SBP in general
    - Volunteers

Documentation

- ***Standing Motto: document as you code.... document as you build***
- Documentation Focus: 5G SBP Infrastructure, Use Cases Slicing, UULC, Massive IOT
- Documentation is critical to successfully showcase and archive our work. It allows for evolution of the work to continue forward. It allows consumers to duplicate the work, and it allows participating companies to leverage the collateral and showcase the work they have done in the project.
- For this demo we have to start documentation early and continuously leading off with documenting the overall architecture, labs topologies, setups, and builds, marketing storylines

Any Other Business

********** Parking Lot **********

ONE Summit Demo

- The goal is to demonstrate end to end slicing from core to RAN
    - Expectations- Radio (RAN), Transport, Core slicing
    - Transport slicing (DoD/GovOps)
        - Options-
            - [ ] GV- proposal to put GXC in UNH and connect with a pipe. This way transport is part of the soluton.
            - [ ] Hardik Jain All equipment may be installed Montreal. If so how do we proceed with Transport slicing?
            - [ ] Potential for Core (Free5GC) to be installed at UNH (per Neil).. Use Case Scenario (Neil)- Locate GXC equipment in the Kaloom lab with Kaloom UPF; this could represent a use case where you need to co-locate the UPF and RAN to get higher preformance traffic split out at an edge site. In this case the UNH lab can represent resources deeper in the network that might handle with a lower performance requirement. Demo can show slices at the Kaloom lab (edge), with core function happening in the UNH lab.
    - Secure slicing- Muddasar to lead
        - [ ]

Muddasar Ahmed To provide a holistic view of security attributes, then we can decide what can be implemented in the Nov timeframe and beyond. Detail the steps and security functionality needed at every stage of the slice life-cycle. Queue this up for **06 Sep 2022**

- [ ] Consult with Periton Labs on IoT device security

- Use Case(s): what do we want to show?
  - Streaming
  - IoT (security cameras, robotics)
    - Visual inspection at the edge use case (Satish Sadagopan) - application layer, as opposed to network layer. Can be transitioned to Ultra-low lantency use case.
    - *Satish Sadagopan provided vision on Use Case details/definition/Architecture*
      - ***<Insert Satish slides from 08/16>***
      - *Edge server requirement- Lenovo SE 350 https://www.lenovo.com/us/en/data-center/servers/edge/ThinkSystem-SE350/p/77XX6DSSE35*
      - *A model for hard hat detection is available*
      - *A model for mask detection is available*
        - *Temperature sensor in camera?*
          - *What happens when high temperature is detected?*
          - *Can also be folded into a safety Use Case (fire alert).*
      - *Wireline inspections for grid utilities - mobile IoT device*
      - *One camera can support multiple models*
      - *Deployment models based on Helm charts - confirm with Satish*
      - *Use of a common orcherator was discussed- Satish Sadagopan to look into this*
        - *Option- ONAP can take the place of IBM Edge Application Manager (Chaker). Showcase ONAP as a common orchestrator where any edge service can be plugged into ONAP and ONAP can support all control loop functions as well as data analytics, and collection analytics*
        - *Consider EMCO*
      - *Analytics Use Case - Muddasar- Drill down on Use Case submission*
    - Periton Labs (David) - working on security of IoT devices attached to 5G networks (via DARPA)
  - Edge Computing Support (DoD/GovOps):
    - IoT Device Authentication at the Edge - Periton Labs has technologies for authentication and **?remote added station?** at the edge.
    - Traffic Routing at the Edge -
    - Packet Filtering at the Edge - can enable device authentication at the edge
- Core Options:
  - Free5GC - installed in Kaloom lab, along with GXC RAN
  - SD-Core - DARPA Performers have experience with SD-Core
  - What capabilities does the core need to have to full fill the use case(s)?

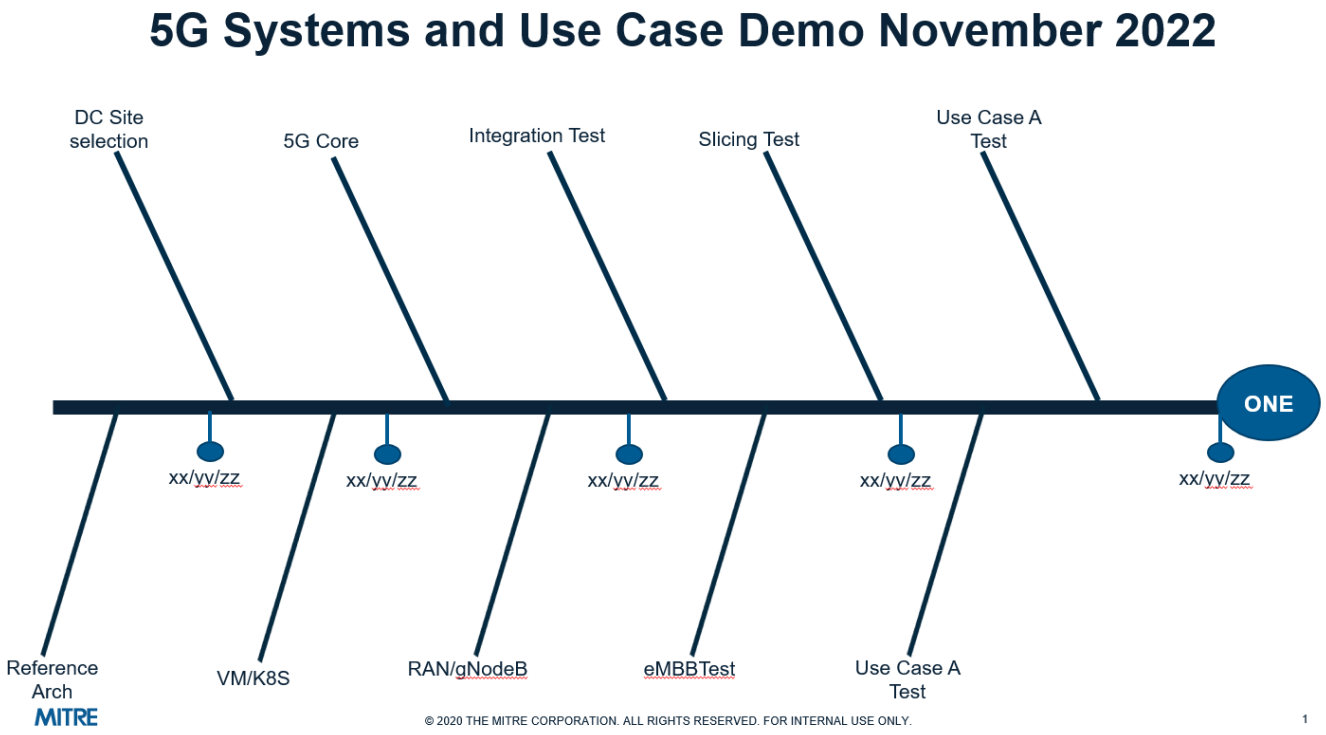
Lab Status/Upgrades

- Lab Architecture Slides
  - Finalizing overall labs architecture and topologies
    - What are the outstanding questions and issues that need to be addressed?
  - Lab architecture updates based on use case functionality needed. The ask is to update the lab diagrams with what components currently in-place/installed, in what lab, what components are pending installation, and where components need to be installed based on the Use Cases
- Kaloom Status-
  - Free5GC Installed - do we shift Free5GC to UNH per above?
  - GXC RAN installed
- Hardware order status?
  - Graphic cards shipped, need to be installed
- Software upgrades at Kaloom Lab? - Tunde to provide details
  - Currently we will do both CU and DU at same location.
  - Based on last discussion if needed we can split between UNH and Kaloom lab

Workplan Outline

- Infrastructure
  - Core - Free5GC currently installed at Kaloom
  - Orchestration - common orchestrator?
    - EMCO as default orchestrator (Yogen proposal)
    - ONAP to set policy
  - RAN - GXC currently installed at Kaloom
  - End to End Slicing
  - Security (stretch goal?) - Lead(s) Muddasar (Mitre)
    - Muddasar provided high-level details on 09/06: SBP_Demo_Secure Slicing.pptx
    - **Followup and Next Steps:**
- Labs
  - Kaloom
  - UNH
  - Wavelabs
  - Dallas- Ganesh
  - **Question- where should the IBM models deployed?**
    - **IBM lab requires connectivity to other labs**

        - **Moving models to another location requires re-training**
- Edge Use Case(s)
    - Visual Inspection at the edge. Leads - Satish (IBM)? Ganesh/Tunde (Kaloom)?
        - IoT Device Authentication- resources- Periton Labs
            - Slicing (integration)
        - Fixed IoT device
        - Common orchestrator - ONAP/EMCO
        - Mobile IoT device (stretch goal)
    - Massive IoT emulator - to demonstrate the system can handle millions of IoT devices
    - Traffic Routing (stretch goal?) - what does the Use Case look like?
    - Packet Filtering (stretch goal?) - what does the Use Case look like?
    - **Yogen thoughts:**
        - **a) Dynamic and static slicing is already been demonstrated in early version, using eMBB in last Oct/Nov. though it's not completely dynamic but mix of static and dynamic factors.**
          b) In current state of art, static slicing for URLLC and demonstrating GenX RU/DU/CU compliant with O-RAN and UE device from IBM will be value add.
            - **One can characterize this effort to show case following values:**
              1. O-RAN compliant RAN stack.
              2. URLLC use case demonstration with static slicing.
              3. Transport slicing (if required).
              4. 5G enabling AI/ML MEC application in edge location.



Action Items (open)

- [ ] Kader Khan, Parthiban Nalliamudali , Benjamin Posthuma begin work setting up radio components in Wavelabs lab. Can radio be shipped to Wavelabs in Hyderbad? GXC-radios working with Magma. Testing of all Magma 5G capabiliites underway. Other radio vendor DMW
- [ ] Tracy Van Brakle extend invitation to other operator members of ORAN (i.e. Verizon)
- [ ] Heather Kirksey Reach out to outreach committee on Magma Slack #magma-outreach-committee to discuss joint marketing opportunities.
- [ ] Tracy Van Brakle Any link to Multi-Operator RAN from Dec 2021? Referenced on a previous call.
- [ ] Alex Stancu Can help with ORAN implementation. Martin- what is the success criteria? Agenda item for Deep Dive meeting?
- [ ] Martin Skorupskican add detail and next steps for SMO Framework. https://wiki.o-ran-sc.org/x/-YvYAg

Lab Architecture:

- 1st Draft: https://docs.google.com/presentation/d/12Bs-RoH-yKvKTrHocDK57LiHIGvTT3tQKFR10xetSpg/edit#slide=id.g1295cdd58af_0_0
- Updates from 10 May 2022 5G SBP Deep Dive meeting
- How do we add Wavelabs lab into the architecture?
- Request that the RNA and core details be specified on the google doc.

Roadmap - updated 5G SBP Phases

- 29 Mar 2022 Off-Week deep dive meeting focus was on Road discussion: https://wiki.lfnetworking.org/x/iZ8ZB
- 22 Mar 2022 Roadmap refresh presented by Amar
    - 5G Super Blueprint Roadmap
    - Magma 1.7 release pending. Testing underway
    - Targeting early Q2 for Phase 1.
    - Phase 1- in addition Anuket will need to be refreshed.
    - Phase 2- key addition is to implement GenXcomm integrations:
        - GenXcomm with ONAP (ONAP working as a SMO)
        - GenXcomm with Magma
        - GenXcomm with Anuket
    - Phase 2 stretch goal- ONAP configuration management of 5G core and/or ORAN

Architecture and Adjacent Communities

- Request for a 5G Super Blueprint Requirements & Use Case Advisory Group
    - The need for such a group was confirmed and formally requested during the March DTF
    - Wiki page created: Requirements & Use Case Advisory Group
    - Role: identify use cases, requirments, architecture, platform component roles and ensure alignment among the participating communities.
    - Discussion Points-
        - Community thoughts on creating this group?
        - Any additional thoughts on the role of the group? Especially from the folks who attended the March DTF.
        - How would we staff this group? one per community (ONAP, Magma, EMCO, Anuket, O-RAN, End Users, etc.)?
    - Call for Action- signup to work on this important Advisory group.
- Proposal to use the off Tueday for working meetings
    - Perhaps we can rotate between Requirements & Use Case Advisory Group, ONAP and EMCO Alignment, ORAN Alignment teams, RAN workstream.
    - Call for Action- Anyone from these teams interested in taking the March 29 slot? Maybe ORAN Alignment per below Next Steps?
- ONAP/EMCO Alignment updates
    - Material from Last weeks DTF:
        - Latest Deck - Architecture, Role, Use Cases
        - 2022 LFN Workshop - EMCO and ONAP On-boarding and use case alignment
            - Review Role Alignment, Use Cases, Action Items from above as needed
    - Next Steps:
- ORAN Alignment
    - Proposed starting points-
        - Look at O-RAN reference architecture
        - Sort/prioritize use cases
    - Potential workstreams- (picking up the discussion from 02/22)
        - Plugfest (June 2022) focusing on 5G SBP and Multi-Operator RAN (reference Dec 2021- Multi-Operator RAN- Tracy) Link: https://futurenetworks.ieee.org/conferences/2021-first-responder-and-tactical-networks-workshop
    - Is there an ORAN (preferably ORAN-SC) implemention available that can be installed? Wavelabs offered to open their lab for this.
- 5G RAN (RU + CU/DU)
    - Work that can be started now:
        - Coordination between GenXcomm, Wavelabs, UNH.
            - Kader offered to setup lab in India. Would need help setting up radio in India. off week meeting?
        - GenXcomm RAN server requirements.
            - Hardik/GenXcomm to name a dedicated resource to work 5G SBP
            - Ben will check on resource
        - GenXcomm has an ORAN implemenation that we can perhaps leverage.
        - ORAN-SC implementation - Alex Stancu can help
            - Yogen asked about recommended model. Tracy recommends a hybrid model over higherarcial model
- Monthly Magma call- "Magma 5G- Everything you need to know".
    - Last meeting recording: https://www.youtube.com/playlist?list=PLQ88zlc9KWGfhOZsRdtqs6UbP9vEeUExz
    - Logistics- 2nd Friday of every month
        - 8am PT/11am ET/ 1500 UTC
        - Zoom: https://zoom.us/meeting/register/tJwpfumgrDksG93YBPRW6vmrNVHWR-IVMEsG
        - April 8 meeting has been canceled
    - Joint marketing opportunties - Heather
    - ONAP Requirements
        - Magma feature submission: https://github.com/magma/grants/issues => Issues 36, 37 and 38 have been submitted to cover ONAP Requirements
            - Here is the list of requirements to support ONAP/Magma Integration, supported by Neil Hoff (OPS 5G Customer):
                - We want to move forward with our Network slicing use case therefore we would like to know if there is any feedback on the presentation (ONAP/Magma Service Assurance Integration – KPIs) made by Jorge Hernandez-Herrero last year
                - What would be the Magma KPIs to support Network Slicing?

- During our Integration with Magma, an issue has been identified: Magma K8s resources need to be installed in different namespaces, and therefore be split into separate Helm packages. Is there a delivery date from Magma to deliver it? thanks

Workstreams

- ONAP/Magma Integration #1
  - 22 Mar 2022 - Update from Aarna: The action item is to try workaround in Helm charts on ONAP Istanbul release. We have been facing challenges with ONAP (I release) deployment. On one ONAP deployment on the UNH server where we managed to deploy, the ONAP portal is extremely slow, and takes few minutes to respond. We are trying to install on another server but were unable to allocate new servers due to issues with UNH LaaS setup. These are finally resolved, and we are able to allocate a new server on which we will restart ONAP deployment, and then the workaround to deploy Magma with modified Helm charts.
  - 08 Mar 2022 - CBA and Helm repos. Louis/Yogen need to unstick check-in issue.
  - 22 Feb 2022 - Ran out of time for update
  - 08 Feb 2022 Yogendra: Working on a Helm chart issue by splitting them up. Access gateway. Small infra changes. We'll them be taking up the Magma orchestrator. Is there any specific help from Magma needed (Suresh)? Yes, that would be a great help (orchestrator charts). Suresh and Yogendra to synch offline. Helm chart fixes will require namespace changes (the ideal path). There is also a workaround to force all namespaces to be the same. The community agrees this is not the ideal long-term solution. It was requested that the Magma community, led by Suresh (Wavelabs) work with Yogen to package the Helm charts with namespace corrections as the long-term solution. Suresh to consult with Magma community if this will lead to any conflicts with Magma namespace as it exists today.
- ONAP/Magma Topic: #2
  - 22 Mar 2022 Kader - have servers and simulators. Waiting on 5G radio.
  - 08 Mar 2022
  - 22 Feb 2022 - Ran out of time for update
  - 08 Feb 2022 Wavelabs + Rebaca making good progress (in Wavelabs lab) on integration. Before Magma 1.7 come out, we'd like to replicate this in the community labs (by cloning). If using Wavelabs for community use, need to address some issues (e.g. jumphost set up as a trusted host). Can a jumphost be set up at Kaloom and/or UNH? Hanen/Suresh/Amar looking into it. Option may be to connect the labs. Reference- UNH lab is used for 5G resources (Amar).

- Magma namespace changes- Namespace changes needed in Magma to resolve Helm chart issue (permanent fix)- Wavelabs/Suresh
- ONAP/ORAN -SMO Framework workstream (Service Management Orchestration)
  - Martin- weekly meeting in place on SMO Framework packages. What ONAP group is involved? https://wiki.onap.org/x/DgmsBw
  - Tracy- proposal to show SMO Framework demo to show capabilities - Off-week call?
    - Automated deployment and testing - using SMO package and ONAP Python SDK - DRAFT -demo recording ar bottom of page
    - Tracy- SMOs for gNB, etc
- ORAN/Anuket workstream
- 5G RAN:
  - 22 Feb 2022 What workstreams can begin now that GenXcomm is onboard?
  - 08 Feb 2022 Need to check in with GennXcom and determine RAN side of 5G SBP (CU/DU). Catherine suggestion: Bring this to the ORAN-SC community (Tracy + Martin). LF Staff to make connection.

Lab Resources

- UNH- Faraday cage in place.
- Kaloom (Montreal) - Hanen, GenXcomm radio is currently at Kaloom lab. Hanen will talk with Ganesh. (Kaloom previously ran the UPF and fabric). Faraday cage in place
  - Missing radio parts- SW for RAN. If GenXcomm has this, then much easier to deploy
- Wavelabs (India)-

Action Items (completed)

- [x] LJ Illuzzi- SMO Framework packages. What ONAP group is involved? https://wiki.onap.org/x/DgmsBw
- [x] LJ Illuzzi Create wiki to look at the various use cases among communities.
- [x] Martin Skorupski start putting together use cases among open source communities. Starting point --> ORAN Alignment
- [x] Amar Kapadia Will update wiki on roadmap
- [x] LJ IlluzziRoadmap refresh
- [x] Kader Khan Suresh Krishnan Create requirements document capturing ONAP requirements for Magma (as discussed on 03/08). Requirements doc created
- [x] Hardik Jain dedicated resource from GenXcomm to work 5G SBP. Ben will help with resource. Rajesh Ramesh is named resource.

Any Other Business

- 22 Feb 2022 ONAP/Magma Integration - Service Assurance - KPI Network Slicing. This is being tracked by ONAP for Enterprise Task Force. Will come into play in the 5G SBP down the line.