Integration & Testing for Amsterdam Status and Needs

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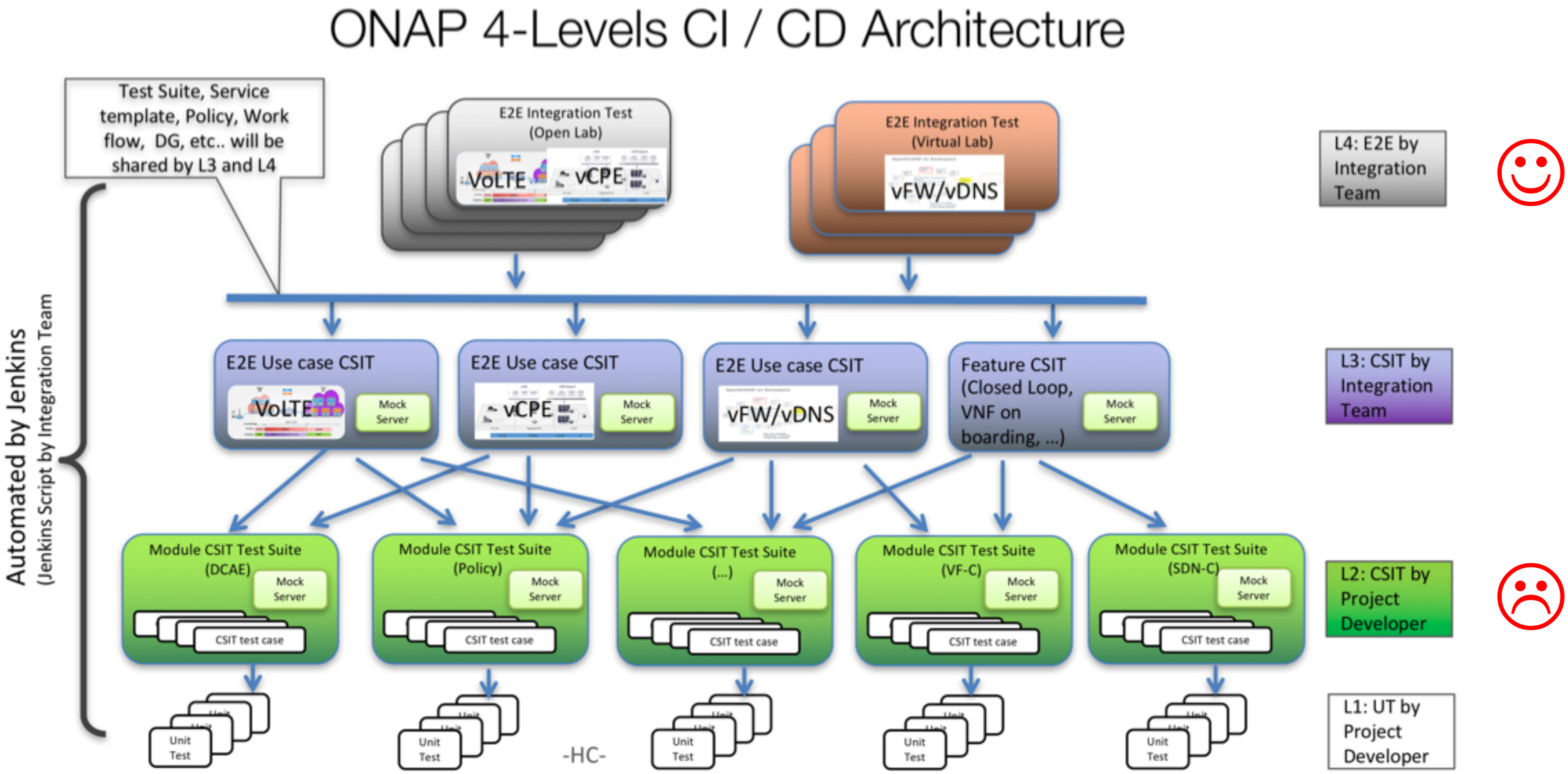
September 26, 2017

* Marco Platania, Chengli Wang, Yang Xu, Kang Xi, Stephen Gooch

Agenda

- Integration Testing and Status
  - Unit Testing (UT)
  - Continuous System Integration Testing (CSIT)
  - Integration Lab Testing
    - How do we track the test issues
    - The Latest Status
    - How to Use Integration Lab for Pair / Integration Testing Proposal
  - End to End lab deployment status overview
    - vCPE
    - VoLTE
- Integration Testing Practice and Results from Orange Open Lab
- Integration Deployment with Heat Template
  - Assets Requirement and Deployment topology,
  - A Quick Overview of How to Use Heat Template to Deploy ONAP in Integration Lab
- Needs

ONAP Testing Strategy



Our goal is to automate all the testing to achieve continuous release

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Unit Testing Update (as of 6:50 AM, 9/24/2017, PDT)

The following data is reported by Sonar:

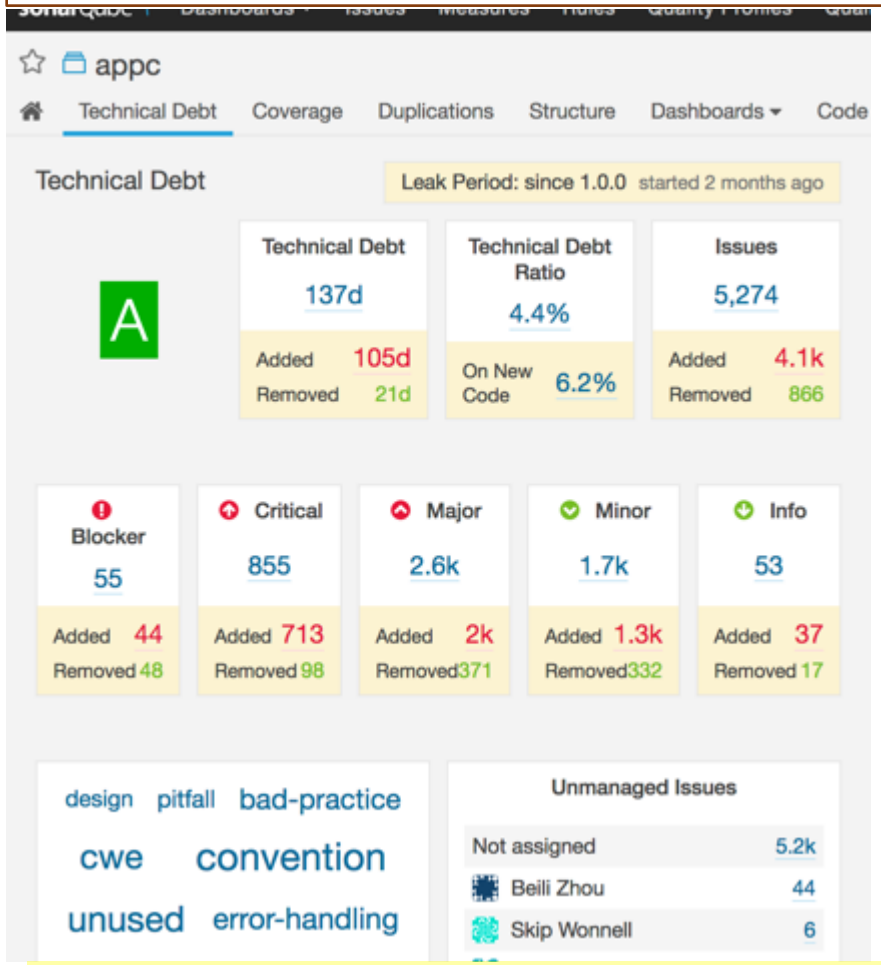
- Unit Tests: **8,043**,
- Average code coverage: 35.12%
  - Our actually unit tests and coverage is higher than this:
    - It only includes Java code, Python uses different
    - We hasn't require UT for Javascript

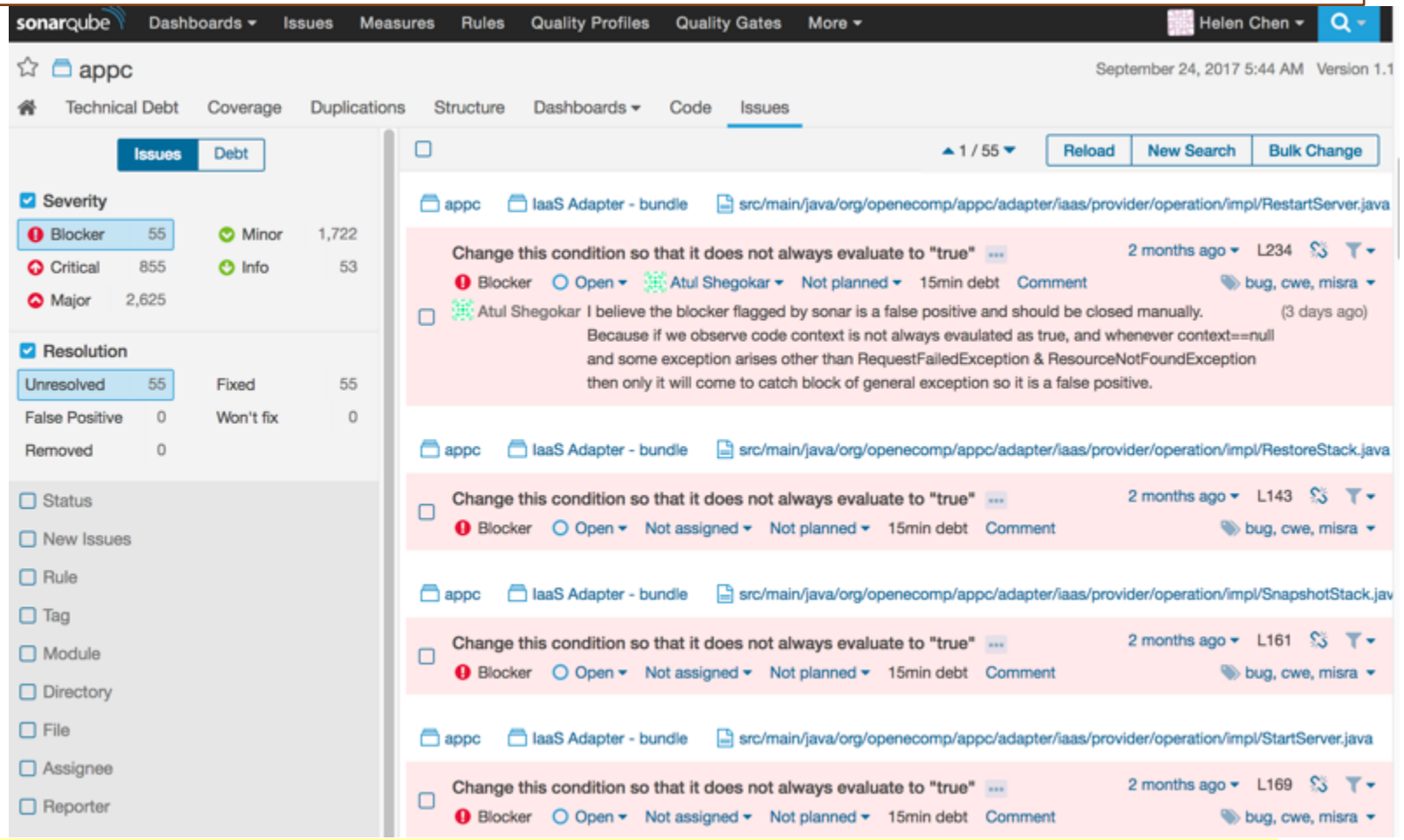
    SDN-C Core, DMaaP/datarouter no report in Sonar

- For details: https://sonar.onap.org/

Unit Test Tool

https://sonar.onap.org/





Suggest to clear out at least those blocker issues at Beijing Release

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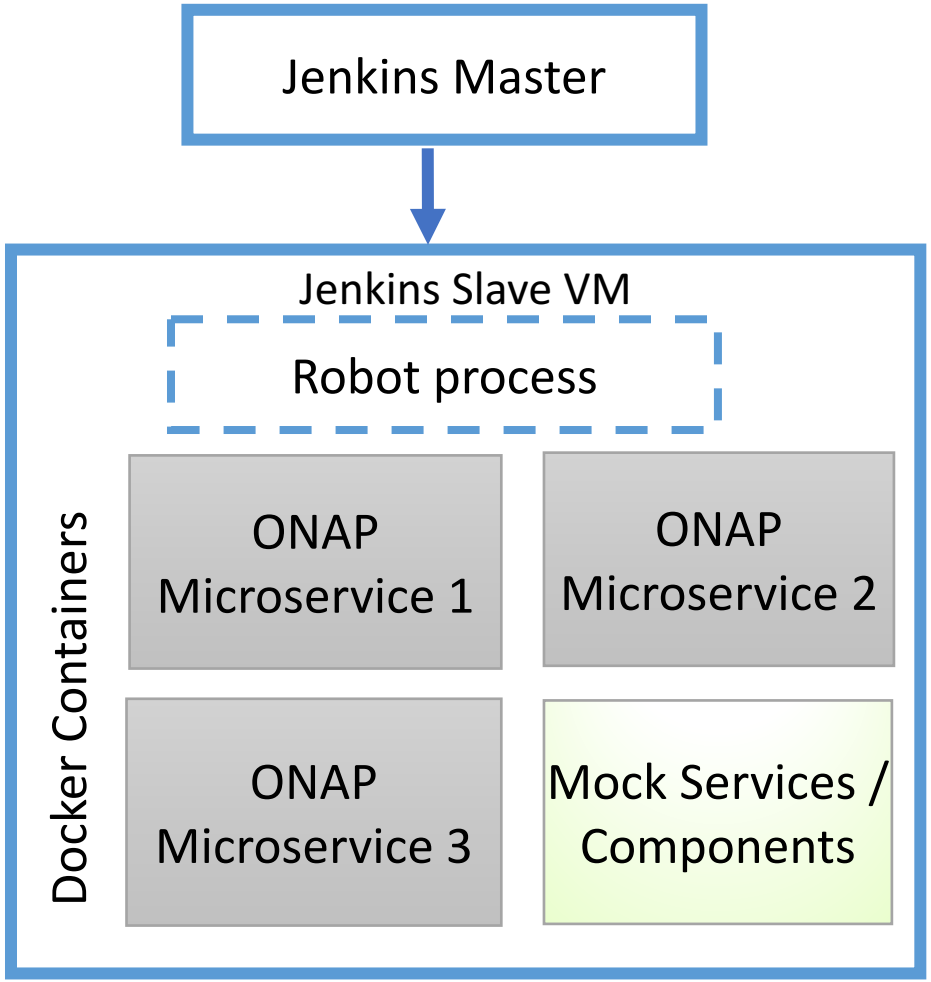
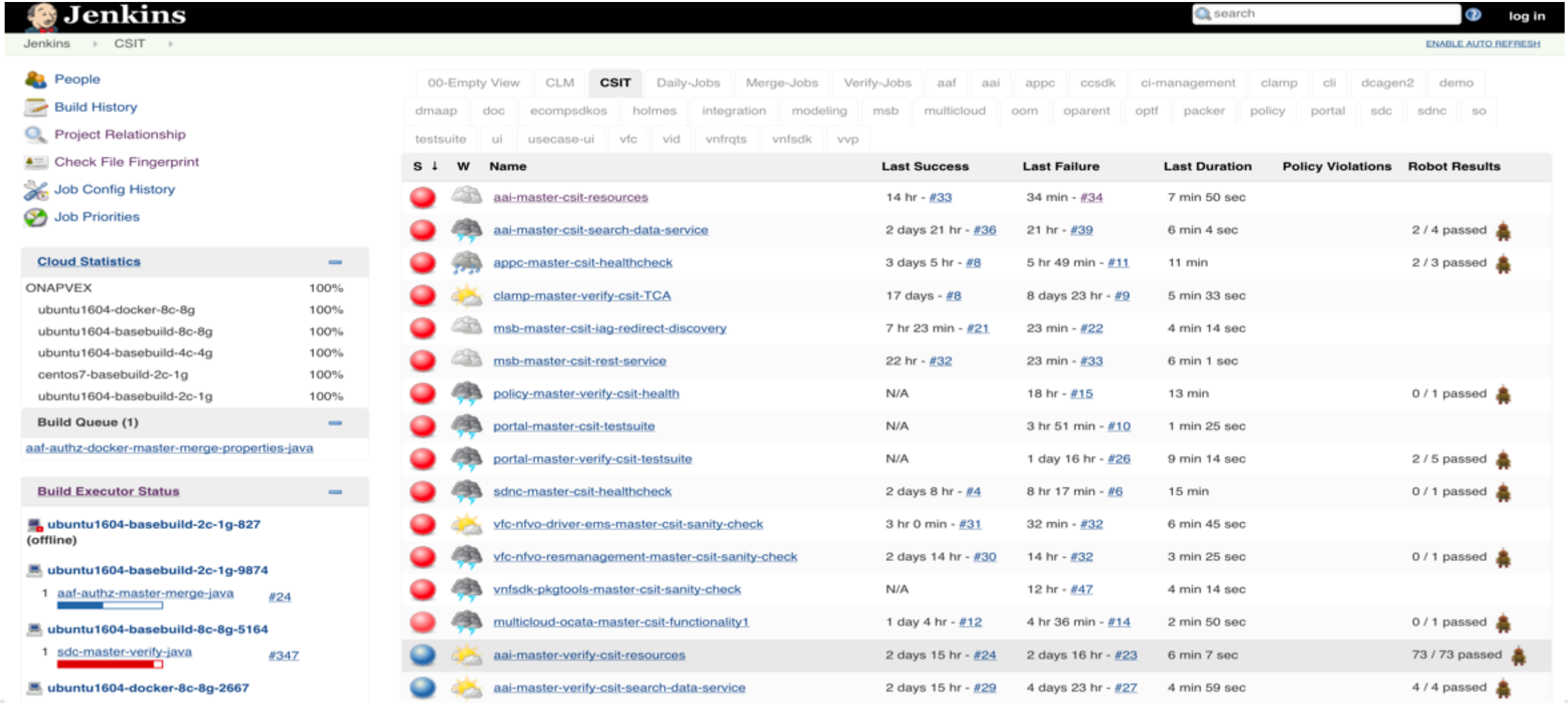
CSIT Env Setup in ONAP Amsterdam Release

- CSIT: testing a specific feature or functionality comprehensively to capture integration issues inside your project
- Test Suites written using Robot Framework
- Microservices run via docker
- Mock southbound services
  - e.g. mock VIMs or SDN controllers
- Robot test suites executed via Jenkins
  - Can also be run manually in developer's environment
- ONAP CSIT is tracked at: https://jenkins.onap.org/view/CSIT/



ONAP CSIT Inside Projects (as of 7:10 AM, 9/24/2017, PDT)

Details: https://jenkins.onap.org/view/CSIT/



ONAP CSIT Inside Projects Status Summary
(as of 7:10 AM, 9/24/2017, PDT)

- Our goal is: M2: env setup; M3: 50%; M4: 100%
- Status:
  - Implemented CSIT infrastructure with Robot and Docker
  - How to create CSIT Tutorial
    - Wiki page: https://wiki.onap.org/display/DW/Creating+a+CSIT+Test
    - Video: https://wiki.onap.org/display/DW/Creating+a+CSIT+Test?preview=/8232252/11928547/How%20to%20creating%20CSIT.mp4
  - We currently have **65 CSIT test suites,** including **308 CSIT test cases**

1. A&AI
2. APPC
3. CLAMP
4. CLI
5. DMaaP
6. Holmes
7. Integration
8. MSB
9. Multicloud
10. Policy
11. Portal
12. SDNC
13. SO
14. VFC
15. VNFSDK

CCSDK (Dan Timoney)
DCAE (Lusheng Ji)
Modeling (Hui Deng)
UUI (Tao Shen)
SDC (Michael Lando)
VID (Amichai Hemli)

Not all projects have CSIT env setup yet!

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Integration Test Tracking

https://wiki.onap.org/display/DW/Integration+Project

- Integration Test
  - **ONAP Platform Test**
    - Integration Test Blocking Issues
    - ONAP master branch Stabilization
  - vCPE Design and Test Cases
  - vCPE Integration Test Case
  - VoLTE Integration Test Cases (draft versio
  - VoLTE Use Case Development Tasks

Pages Edit Save for later Watching

/ ... / Integration Test

ONAP Platform Test

Created by Helen Chen, last modified just a moment ago

Integration Test Blocking Issues

ONAP master branch Stabilization

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Integration Test Blocking Issues

https://wiki.onap.org/display/DW/Integration+Test+Blocking+Issues

Integration Test Blocking Issues

Created by Helen Chen, last modified by Yang Xu on Sep 18, 2017

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P
DCAEGEN2-69	DCAE initialisation failure		Jul 18, 2017	Sep 20, 2017		Lusheng Ji	Kanagaraj Manickam	
INT-203	SDNC Failed Robot Health Check		Sep 16, 2017	Sep 18, 2017		Marco Platania	Yang Xu	
INT-204	APPC Failed Robot Health Check		Sep 16, 2017	Sep 18, 2017		Marco Platania	Yang Xu	
SO-123	Bad request response from SDNC during VF module creation		Sep 12, 2017	Sep 18, 2017		Rob Daugherty	Parvez Shaik	
SDNC-77	VF_MODULE_MODEL table is not present in SDNC database.		Sep 09, 2017	Sep 18, 2017		Dan Timoney	Parvez Shaik	

5 issues Refresh

How to report integration blocking issues: Open a jira ticket?

1

Service Orchestrator / SO-123

Bad request response from SDNC during VF module creation

Details

Type:	Bug	Status:	OPEN
2 Priority:	Highest	Resolution:	Unresolved
3 Affects Version/s:	Amsterdam Release	Fix Version/s:	Amsterdam Release
4 Labels:	Integration		
Sprint:	MSO Sprint 3		

Integration Testing @ Integration Lab (as of 2:00PM, 9/22/2017 PDT

At the moment, ONAP code is not stable: we are unable to run ANY End to End use cases, such as vFW / vDNS

What we have tested with master branch so far?

- Both vFW and vLB installed and executed correctly by themselves without ONAP
- Installed ONAP1.1 in developer lab (Windriver Lab), 4 VMs (DCAE, APPC, SDNC, and SO) right now fail Robot health check.
  - DCAE: Keystone V2 API (O1: Turn on V2 in Integration Lab; O2: leverage Multivim API)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P
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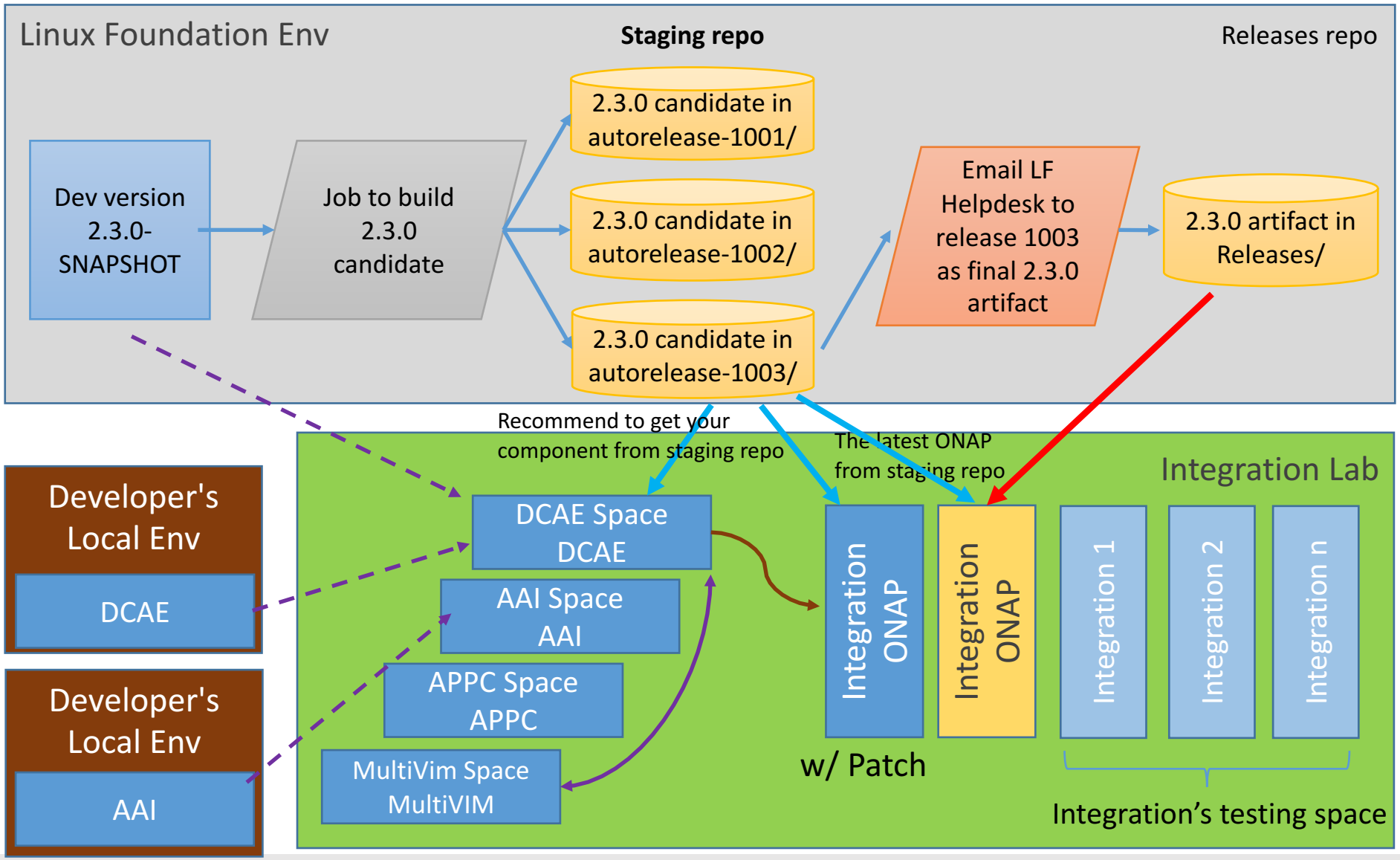
Integration Testing Plan

- For Integration team,
  - We'll do more testing on Integration Lab with a goal of weekly update with the latest ONAP build before RC0,
  - After RC0, we'll do daily update
- The testing results will be published at:

  https://wiki.onap.org/display/DW/ONAP+master+branch+Stabilization

Pair / Integration Testing Suggestion in Integration Lab



- Keep two instances of the whole ONAP for integration testing
  - One each project could patch it, one is not
  - Integration Testing will take from staging repo, update daily
- Pairing testing could get from either staging or snapshot or local build; staging is recommended
- Recommend to always commit your code into git first and then testing

Integration Lab Usage Status (as of 9/22/2017 PDT)

- We currently have registered 85 users, 27 of which have logged on.
- Of the 27 users we are averaging 8 concurrent users.
- A & AI, APPC, DCAE, OOM, VIM, and Integration projects are currently active.

- Resource used:
  - Local Storage: using 1.6TB of 48.9TB.
  - Memory: using 424GB of 2.8TB
  - CPU: using 7 physical of 600 (or ~112 logical vCPUs because the flavors or not dedicated)

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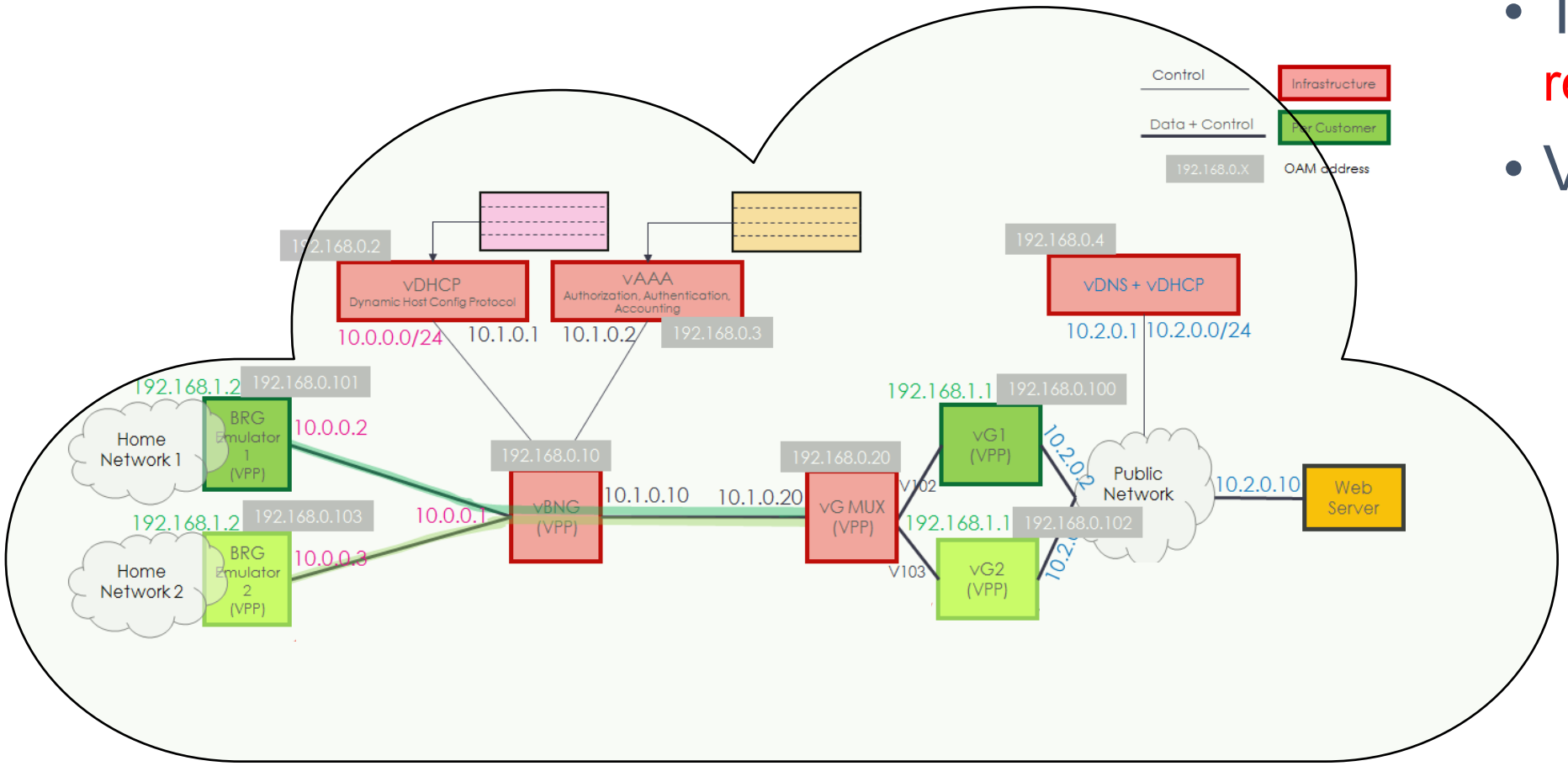
vCPE Use Case Deployment @ Intel / Windriver Lab Update



- The hardware is ready.
- VNFs
  - vDHCP, vAAA, vDNS are ready
  - The VPPs based VNFs are ready
  - End to end testing and integration without ONAP has done (not at this env).

Please attend ”Residential vCPE Use Case Deep Dive” session for more details (by Yoav Kluger & Kang Xi)

vCPE Test Cases Draft

Category	Test Cases
External System Registration	T101: WindRiver OpenStack VIM Registration
VNF Onboarding and Service Creation	T201: Onboard vDHCP, vAAA, vDNS, WebServer, vBRG, vBNG, vGMux, vG T202: vCPE Service Creation T203: Closed Loop Configuration T204: Closed Loop Deployment
Service Instantiation and Monitoring	T301: vCPE Infrastructure Service Instantiation T302: vCPE Customer Service Instantiation
Closed Loop	T401: vCPE Auto-healing
Service Termination	T501: vCPE Service Termination

- Please give feedback: https://wiki.onap.org/display/DW/vCPE+Integration+Test+Case

ONAP Related vCPE Use Case

Projects Used by vCPE Use Case

- SDC
- SO
- AAI
- Policy
- SDNC
- DCAE
- APPC
- VNF SDK
- CLAMP
- MultiVIM
- DMaaP
- Integration

Other Assets for vCPE

	INT-58	VNF packaging & certification	IN PROGRESS	Marco Platania
	INT-63	VPP-based VNF development	IN PROGRESS	Danny Zhou
	INT-84	VNF onboarding	IN PROGRESS	Marco Platania
✓	INT-85	A&AI data model	DONE	Helen Chen
	INT-86	Closed loop design	TO DO	Ron Shacham
	INT-87	Test of generic service level and resource level workflows	TO DO	Kang Xi
	INT-88	SDNC artifacts	TO DO	Dan Timoney
	INT-89	APPC artifacts	IN PROGRESS	Kang Xi
	INT-90	Data analytics application	TO DO	Alexei Nekrassov
	INT-91	DCAE Collector	IN PROGRESS	Vijay Venkatesh Kumar
✓	INT-92	Robot design	DONE	Kang Xi
	INT-93	VNF TOSCA template development	TO DO	DeWayne Filppi
✓	INT-123	vCPE Test Case creation	DONE	Kang Xi
✓	INT-126	Infrastructure Service template creation	DONE	Marco Platania
✓	INT-127	Customer Service template creation	DONE	Marco Platania
✓	INT-147	Design and test of custom workflows	DONE	Kang Xi
	INT-215	SNIRO Emulator	IN PROGRESS	Geora Barsky

- All development tasks are on track to meet M4
- More details :https://wiki.onap.org/display/DW/vCPE+Design+and+Test+Cases

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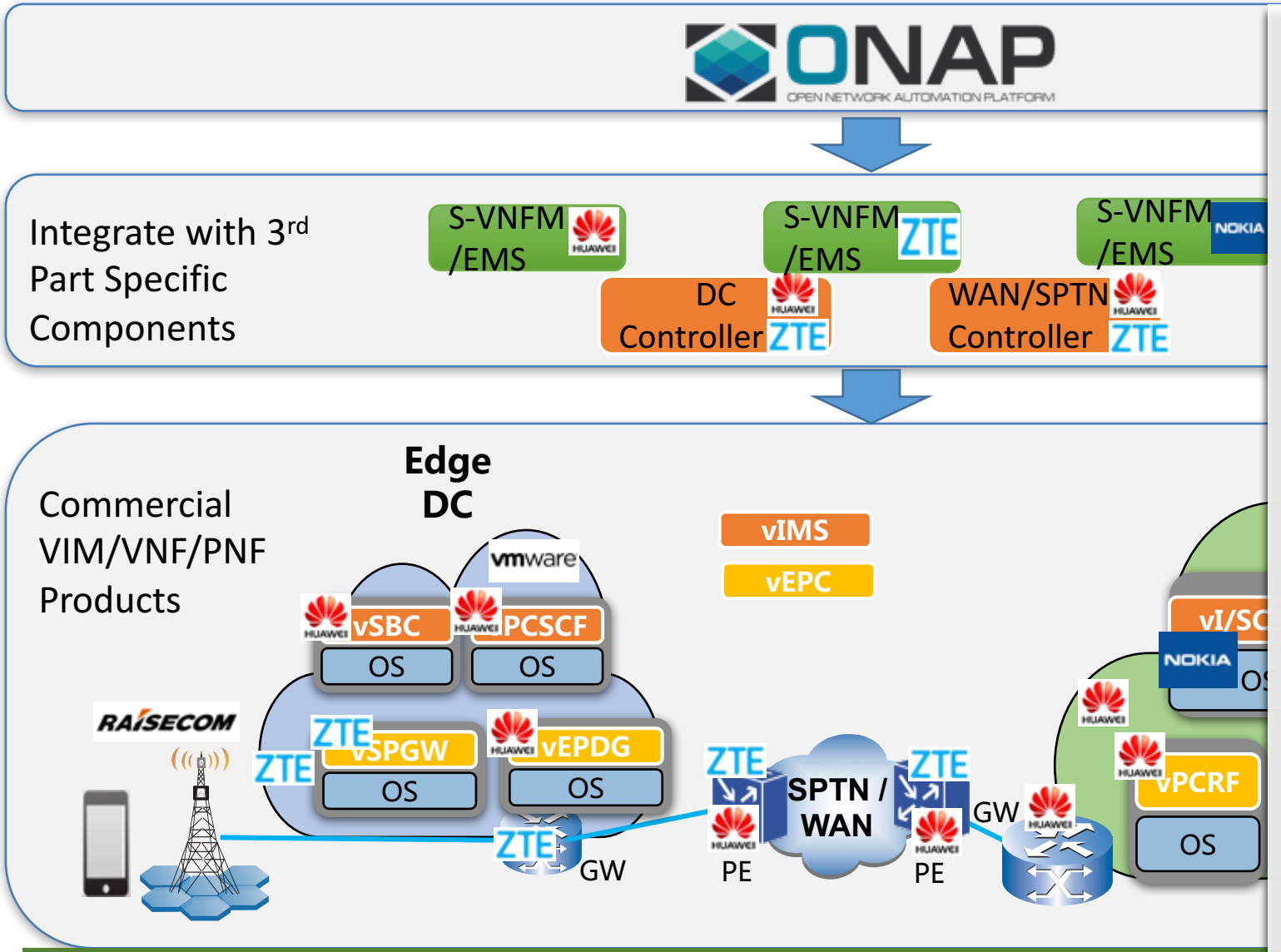
VoLTE Use Case Deployment @ CMCC Lab Update



- Remotely access: done
- All hardware needed by VoLTE case: on-site
- Re-adjust network topology : done
- Software deployment:
  - TIC Core (complain with Mitaka): done
  - TIC Edge (VIO 4.0 (complain with Ocata): done
  - ONAP deployment environment (WindRiver R4 compliant with Ocata, the same with Developer lab sponsored by Intel & WindRiver): done
  - All S-VNFMs from Huawei, Nokia, and ZTE are ready
  - All VNFs located in TIC core from HUAWEI/NOKIA/ZTE are successfully deployed manually, integration test with WindRiver Cloud is done
  - The VNFs, located in TIC Edge, integrate with VIO in TIC Edge is in process
- **Next Step(High Level)** :
  - Debug/configure IMS/EPC service, make a VoLTE call successfully
  - Debug SDN overlay/underlay solution manually
  - Deploy ONAP release candidate version to do the E2E integration test: targeting starts at 10/12/2017

Please attend ”VoLTE Use Case Deep Dive” session for more details (by Chengli Wang & Yang Xu)

VoLTE Test Cases Draft

Category	Test Cases
External System Registration	V00001~V00006: to register VIM, SDN Controllers, SVNFM, EMS
VNF Onboarding and Service Creation	V00007: VNFs onboarding V00008~V00010: vEPC, vIMS, WAN underlay and overlay service creation V00011: E2E VoLTE service creation V00012: Closed loop configuration by CLAMP
Service Instantiation and Monitoring	V00013: VoLTE service instantiation V00014: System performance and alarm monitoring
Data Collection and Closed Loop	V00015: Auto-healing
Service Termination	V00016: Service termination

Please give feedback: https://wiki.onap.org/pages/viewpage.action?pageId=11928104

ONAP Related VoLTE Use Case

Projects Used by VoLTE Use Case

- ✓ SDC
- ✓ Usecase UI
- ✓ CLAMP
- ✓ A&AI
- ✓ SO
- ✓ DCAE
- ✓ Policy
- ✓ MultiVIM
- ✓ SDNC
- ✓ VFC
- ✓ Holmes
- ✓ DMaaP
- ✓ ESR
- ✓ MSB
- ✓ VNF SDK

Other Assets for VoLTE

- ❑ Vendor VNF package (risk)
- ❑ SO workflow
- ❑ WAN underlay and overlay templates
- ❑ SDNC YANG and DG
- ❑ Holmes correlation rules
- ❑ Closed loop policy

- Integration between Holmes/DCAE/AAI, Integration between SDNC/SDN controller
- We need SDC finish its development before we can try vendor's VNF template.
- More details: https://wiki.onap.org/display/DW/VoLTE+Use+Case+Development+Tasks

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Integration: Feedbacks from Orange tests

- Internal lab platform based on Newton OpenStack solution
  - HP hardware
  - No controller
  - Based on OPNFV Installer

- Manually launch Heat Template on a (daily) basis
  - Platform constraints also used for other projects

Heat installation feedback

- Heat template: OK
  - No more Rackspace constraints
- Very easy to launch…
  - Just adapt environment variables => 10 minutes
  - `openstack stack create -e onap_openstack.env -t onap_openstack.yaml ONAP`
- Use a small script to clean DCAE artifacts (VM, keys, networks…)
- Launch manually robot health check after ~ one hour

Error detection

- Launch manually robot health check after one hour
  - Not always Green !
- Analysis
  - OpenStack VM logs (cloud-init)
  - Docker container logs in VM
- Detected some errors
  - Code bug in the components
  - Docker tags images
  - Shared with the community (with the PTL)
- Not a Heat template problem !
  - Most of problem comes from component code error
- Perfect to better understand the code !

Components API tests

- API tests on various components
  - SDC
  - AAI
  - SO
  - APPC
- To test API, check the documentation
- No yet automated

Towards full automation

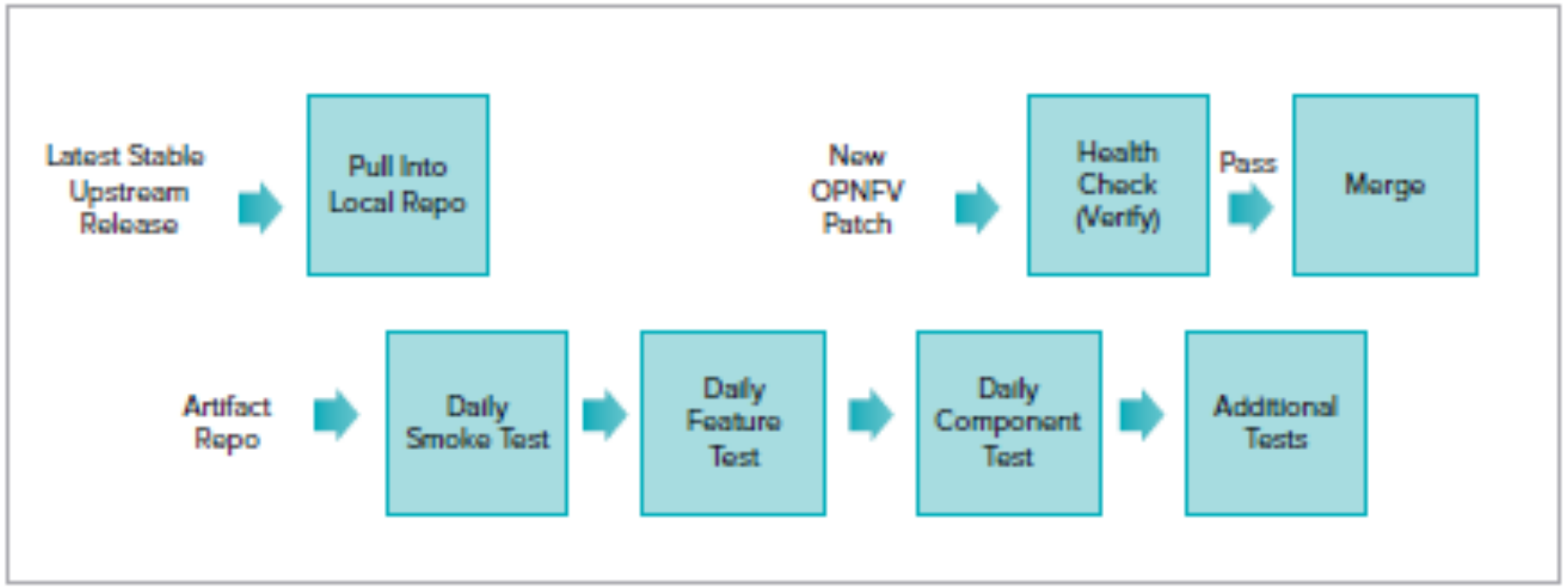
- Leveraging OpenLab platform
  - Using OPNFV X-CI Installer

- Objective:
  - Automatically launch ONAP installation + tests
  - Test internally and then to be included in the ONAP Jenkins
  - Detect problems as fast as possible to get a R1 “working”

- How ?
  - Ansible playbook to both launch OpenStack Heat (or OOM ?) + Robot Docker container

- When ?
  - This week

OPNFV Existing CI Pipeline

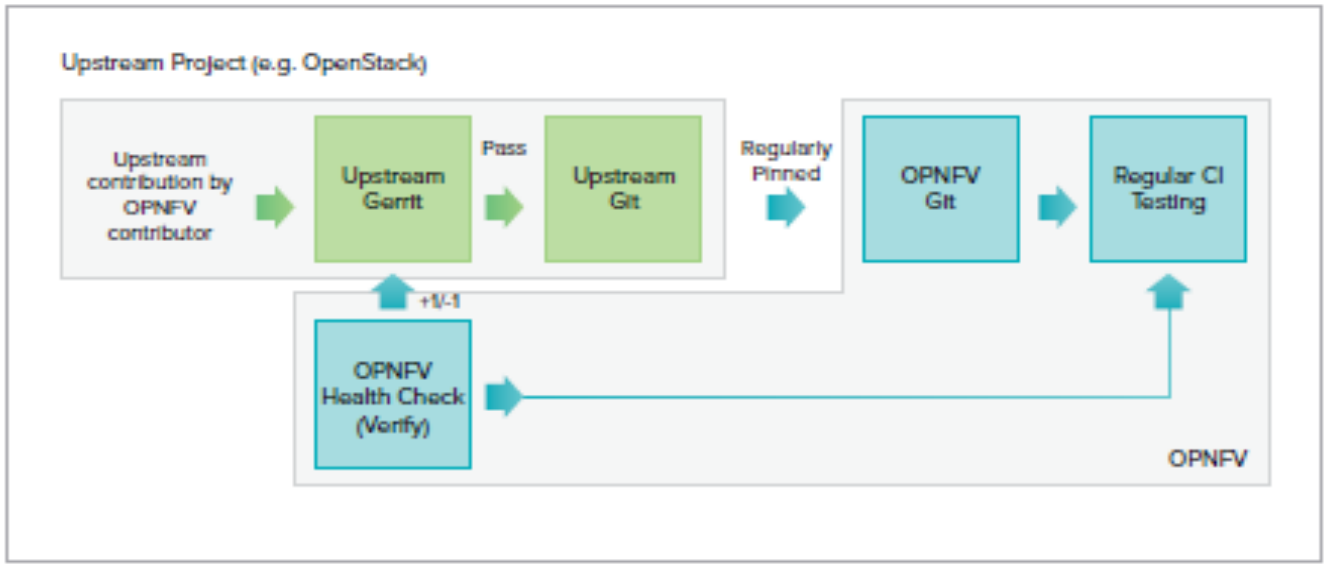


Simplified View of the OPNFV CI Pipeline

https://www.opnfv.org/wp-content/uploads/sites/12/2017/08/OPNFV_SolutionBrief_XCI_080617.pdf

OPNFV XCI Objective

The XCI initiative integrates the latest from all supported branches of select upstream projects on a periodic basis instead of waiting for a major release. The initiative will start with regular integration of OpenStack, OpenDaylight[1] (ODL) SDN controller and the FD.io virtual switch. The below diagram shows how this works:



XCI Integration Tasks

Lessons Learnt

- Community
  - Some minor corrections can take time to be merged => review process to be improved with more reviewers
- E2E integration is key
  - Detect tests are key to detect side-effects
  - Concentrate on ONAP components installation
- Need to get a “stable version”

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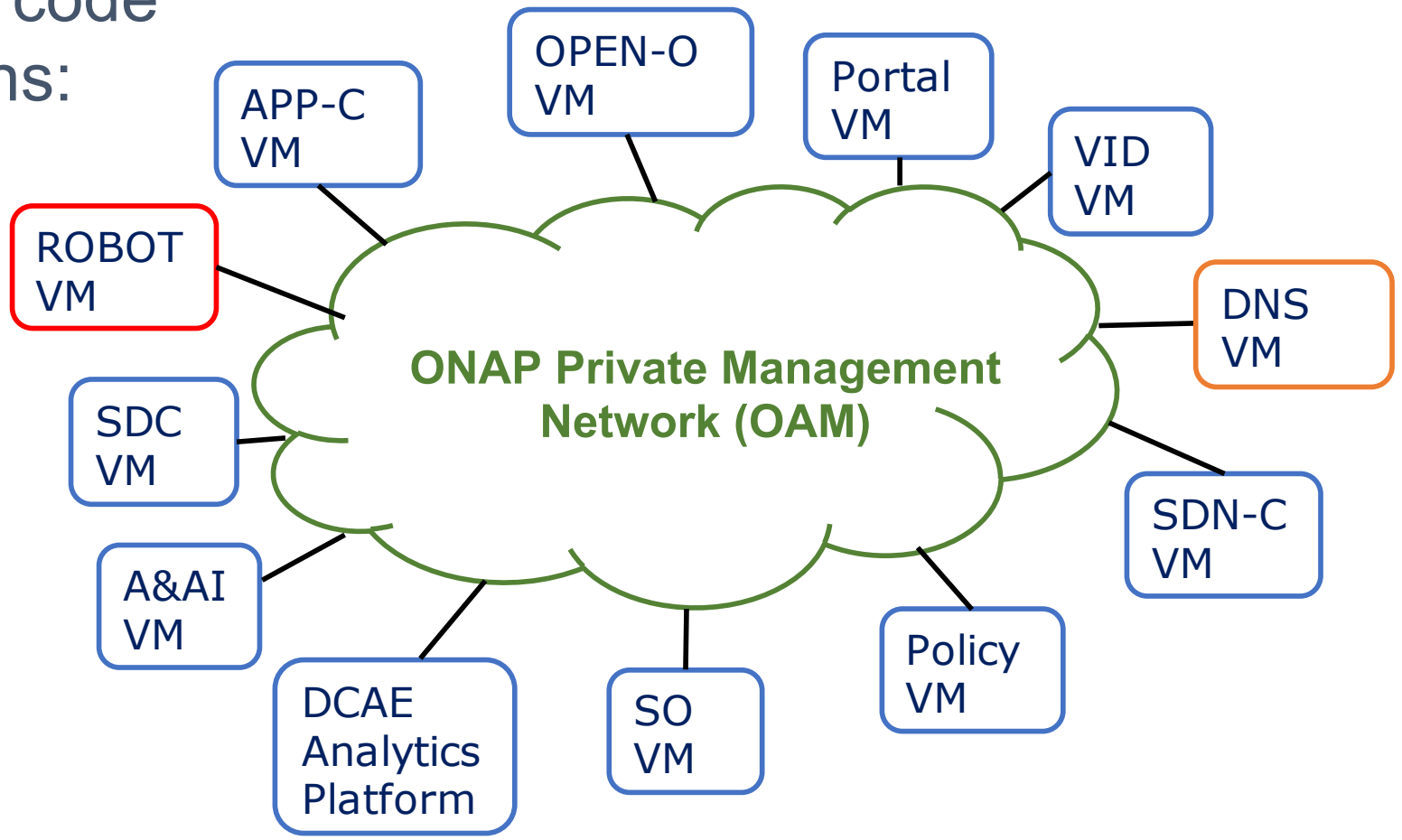
Deployment Topology with Heat Template

- The Heat template creates one VM per component for components from OpenECOMP seed code
- The OPEN-O VM contains:
  - MSB
  - Multi-VIM
  - VNFSDK
  - VF-C
  - UUI
- Robot is used for testing



Resource Requirements

Nr.	VM	FLAVOR	CPU	RAM (GB)	DISK (GB)
1	dns	SMALL	1	2	20
2	aai (2 VMs)	XLARGE	8 x 2	16 x 2	160 x 2
3	so	LARGE	4	8	80
4	mrouter	LARGE	4	8	80
5	robot	SMALL	1	2	20
6	vid	MEDIUM	2	4	40
7	sdnc	LARGE	4	8	80
8	sdc	XLARGE	8	16	160
9	portal	LARGE	4	8	80
10	dcae_c	MEDIUM	2	4	40
11	policy	XLARGE	8	16	160
12	appc	LARGE	4	8	80
13	open-o	XXLARGE	12	64	80
Total	**14 (exclude dcae's extra VMs)**	**.....**	**70**	**180**	**1240**

NOTE: It uses standard OpenStack flavors. It is possible to create custom flavors that require less resources, CPU, RAM and Disk. (Targeting for post Amsterdam)

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Preparing ONAP Heat Template

Wiki Instruction to install ONAP HEAT:
https://wiki.onap.org/display/DW/ONAP+Installation+in+Vanilla+OpenStack

```
> source v2_ONAP-openrc.sh
> git clone http://gerrit.onap.org/r/demo
> vi demo/heat/ONAP/onap_openstack_float.env
```

HEAT Environment File

```
parameters:

  ################################################
  #                                              #
  # Parameters used across all ONAP components #
  #                                              #
  ################################################

  public_net_id: d18c6fe9-5108-4d5f-a8bb-33861b95f38e

  public_subnet_id: f9b30be1-83ac-473a-a943-5273200610ed

  router_gateway_ip: 172.21.5.79

  ubuntu_1404_image: ubuntu_14.04_password

  ubuntu_1604_image: ubuntu_16.04_netplugd_password

  flavor_small: m1.small
  flavor_medium: m1.medium
  flavor_large: m1.large
  flavor_xlarge: m1.large
  flavor_xxlarge: m1.xlarge

  vm_base_name: vm1

  key_name: onap_key

  pub_key: ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDHQhH2sCpd7vkaf+HurxP8kwQ+fkTlyKybZ0rUIbGjAB
UrNUJSOR6EYZXxpKhRdbeiizysdgfHhWSNZK39qsxTgYs2RkPbXiNbZ6P2tVZb7AE5+rznk92eWxTv36t67MNHrI+uYyD
pn2Rdv8Ee80wbq/Wj0FhTcNlrio5d6yc4lk0nxSDtVkdXz2PueSZgodDWRTghW4mt0F58y7CQHKL0w7IBVCNBmk4U8MUE
OycwE6ChunF3mF1HpHvaGWsMHb5cBPZe5IKcB6Mh7u+9zPKW+wYgYBvnJ40LvDiSoqPpiaEbs0ioPp/SHLwsv3hMgfpI0
2GHe0mEMLHuScFtp2jP Generated-by-Nova

  openstack_tenant_id:

  openstack_username:

  openstack_api_key:

  horizon_url: http://172.21.5.4

  keystone_url: http://172.21.5.4:5000/v2.0

  dns_list: 8.8.8.8
  external_dns: 8.8.8.8
  oam_network_cidr: 10.0.0.0/16

  ### Floating IP addresses ###

  aai1_float_ip: 172.21.5.64
  aai2_float_ip: 172.21.5.61
  appc_float_ip: 172.21.5.22
  dcae_float_ip: 172.21.5.23
  dcae_coll_float_ip: 172.21.5.98
  dcae_db_float_ip: 172.21.5.80
  dcae_hdp1_float_ip: 172.21.5.81
  dcae_hdp2_float_ip: 172.21.5.82
  dcae_hdp3_float_ip: 172.21.5.83
  dns_float_ip: 172.21.5.25
  so_float_ip: 172.21.5.34
  mr_float_ip: 172.21.5.27
  policy_float_ip: 172.21.5.28
  portal_float_ip: 172.21.5.29
  robot_float_ip: 172.21.5.62
  sdc_float_ip: 172.21.5.36
  sdnc_float_ip: 172.21.5.63
  vid_float_ip: 172.21.5.52
  clamp_float_ip: 172.21.5.53
                                                                    1,1           Top
```

From Openstack console -> Network -> Networks

From Openstack console -> Compute > Images

From Openstack console -> System -> Flavors

From Openstack console -> Access & Security -> Key Pairs

From Openstack console -> Identity -> Projects & Users

From Openstack console -> Compute -> Access & Security -> API Access

From Openstack console -> Compute -> Access & Security -> Floating IPs, find IPs that are in public net and are not being Used. Ping those IPs to make sure no one is using the IP

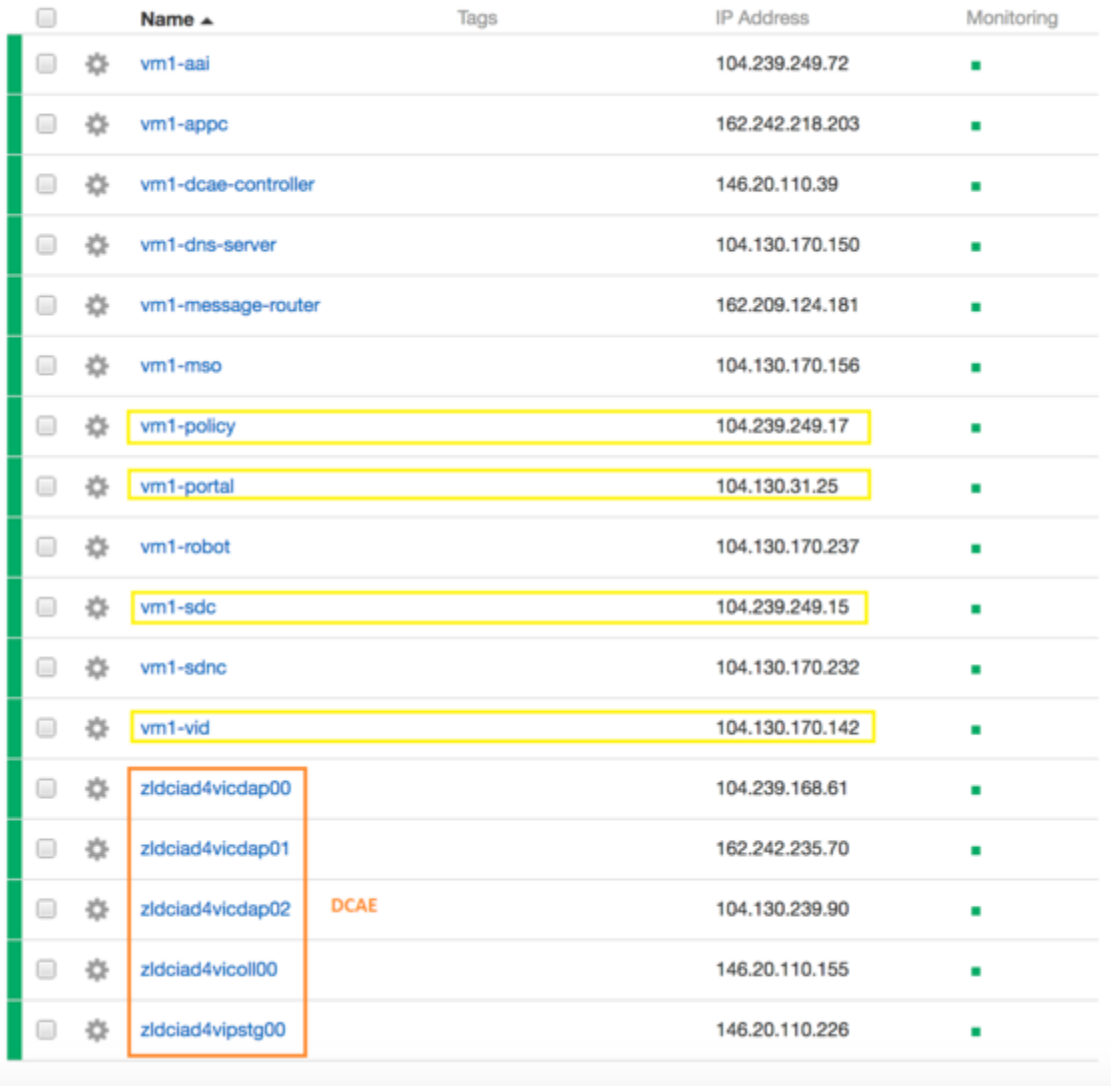
ONAP Installation - Stack Creation

- The ONAP stack is created via the OpenStack CLI tools installed before
  - `openstack stack create -t onap_openstack.yaml -e onap_openstack.env ONAP`

- There are three different templates:
  - **onap_openstack.yaml**: uses floating IPs, assigned by OpenStack
  - **onap_openstack_float.yaml**: uses floating IPs, the user decide the IP of each VM (requires OpenStack admin permissions)
  - **onap_openstack_nofloat.yaml**: no floating IP is specified, each VM has two vNICs (one public IP assigned by OpenStack and one private IP)
- The user is free to choose the template that they prefer

Post Installation

- SSH access to a VM:
  - `ssh -i private_key root@IP_ADDR`
- List all containers
  - `docker ps -a`
- Print container logs
  - `docker logs <container ID>`
- Access a container
  - `docker exec -it <container ID> /bin/bash`



ONAP Health Check

- To assess the health status of the ONAP platform, the user can login to the Robot VM and run health checks against all components
  - `ssh -i private_key root@ROBOT_IP`
  - `cd /opt`
  - `./ete.sh health`

- Output of health check available at `/opt/eteshare/logs/ETE_X`

```
==============================================================================
OpenECOMP ETE.Robot.Testsuites.Health-Check :: Testing ecomp components are...
==============================================================================
Basic DCAE Health Check                                               | PASS |
------------------------------------------------------------------------------
Basic SDNGC Health Check                                              | FAIL |
400 != 200
------------------------------------------------------------------------------
Basic A&AI Health Check                                               | PASS |
------------------------------------------------------------------------------
Basic Policy Health Check                                             | PASS |
------------------------------------------------------------------------------
Basic MSO Health Check                                                | FAIL |
503 != 200
------------------------------------------------------------------------------
Basic ASDC Health Check                                               | PASS |
------------------------------------------------------------------------------
Basic APPC Health Check                                               | FAIL |
501 != 200
------------------------------------------------------------------------------
Basic Portal Health Check                                             | PASS |
------------------------------------------------------------------------------
Basic Message Router Health Check                                     | PASS |
------------------------------------------------------------------------------
Basic VID Health Check                                                | PASS |
------------------------------------------------------------------------------
OpenECOMP ETE.Robot.Testsuites.Health-Check :: Testing ecomp compo... | FAIL |
10 critical tests, 7 passed, 3 failed
10 tests total, 7 passed, 3 failed
==============================================================================
OpenECOMP ETE.Robot.Testsuites                                        | FAIL |
10 critical tests, 7 passed, 3 failed
10 tests total, 7 passed, 3 failed
==============================================================================
OpenECOMP ETE.Robot                                                   | FAIL |
10 critical tests, 7 passed, 3 failed
10 tests total, 7 passed, 3 failed
==============================================================================
OpenECOMP ETE                                                         | FAIL |
10 critical tests, 7 passed, 3 failed
10 tests total, 7 passed, 3 failed
==============================================================================
```

Frequently Asked Questions From Developers

- How to install only my own components?
  - Go to delete the definition of the rest from the heat template
- How my daily deployment experience like?
  - You just need to run ??_vm_init.sh, which automatically pull the necessary new docker/resources images from nexus server

Agenda

- Integration Testing and Status
  - Unit Testing (UT)
  - Continuous System Integration Testing (CSIT)
  - Integration Lab Testing
    - How do we track the test issues
    - The Latest Status
    - How to Use Integration Lab for Pair / Integration Testing Proposal
  - End to End lab deployment status overview
    - vCPE
    - VoLTE
- Integration Testing Practice and Results from Orange Open Lab
- Integration Deployment with Heat Template
  - Assets Requirement and Deployment topology,
  - A Quick Overview of How to Use Heat Template to Deploy ONAP in Integration Lab
- **Needs**

Needs

- Integration, Integration, Integration
  - Please start the integration testing as earlier as possible
  - Leverage the Integration Lab, right now we only use very little of it
  - Planning to have an Integration day each week, Friday? (10/6/2017)
    - IRC channel
    - Zoom bridge
    - On site (?)
      - California
      - New Jersey
  - Could we have an Integration testing session this Thursday afternoon?
- Please response to those issues “blocking” integration as soon as possible
  - https://wiki.onap.org/display/DW/Integration+Test+Blocking+Issues
  - If we don’t see those jira tickets been handled, someone from Integration team will contact you, please don’t get annoyed. ☺

Merci