

# PCEI R5 Test Document

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## Introduction

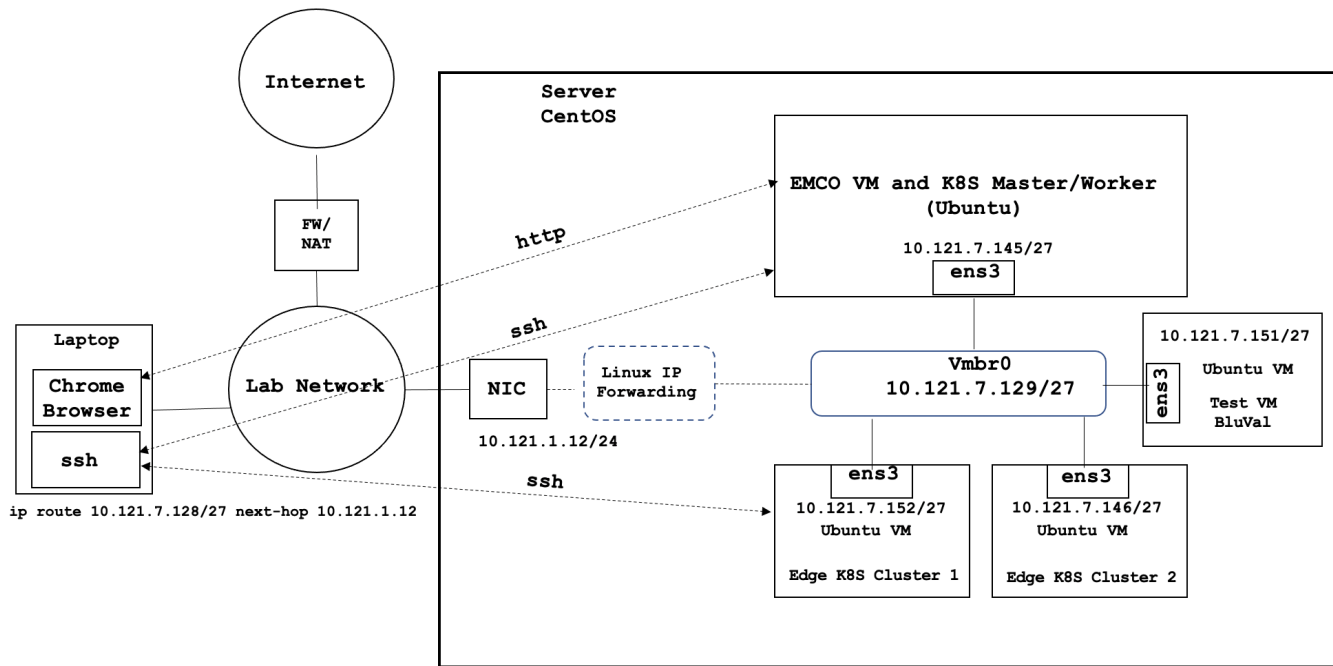
This document describes tests that were performed for PCEI R4:

1. PCEI Deployment Tests
2. PCEI End-to-End Validation Tests
3. BluVal Tests

## Overall Test Architecture

Describe the components of Test set up

### Test Bed



## Test Framework

# Traffic Generator

Test APIs NOT USED (except BluVal Robot)

Test	Description	Result	Reference
EMCO Deployment	Install EMCO Orchestrator	Pass	<a href="#">PCEI R5 Installation Guide</a>
Edge Cluster Deployment	Deploy Edge K8S Clusters	Pass	<a href="#">PCEI R5 Installation Guide</a>
EMCO UI Access	Access EMCO UI	Pass	<a href="#">PCEI R5 Installation Guide</a>
Register Edge Cluster	Register Edge K8S Cluster with EMCO	Pass	<a href="#">PCEI R5 End-to-End Validation Guide.</a>
Create Service/App	Create Service/App in EMCO for Azure IoT Edge, AWS GGC and PCEI Location API App	All PASS	<a href="#">PCEI R5 End-to-End Validation Guide.</a>
Deploy Apps onto Edge Clusters	Deploy Azure IoT Edge, AWS GGC and PCEI Location API Apps onto Edge K8S Clusters	All PASS	<a href="#">PCEI R5 End-to-End Validation Guide.</a>
Verify Azure IoT Edge with IoT Client	Start IoT Client, send messages to Azure IoT Edge. Monitor IoT Edge receive and decode messages	PASS	<a href="#">PCEI R5 End-to-End Validation Guide.</a>
Verify AWS GGC App	Confirm AWS GGC App registers with AWS IoT Coire	PASS	<a href="#">PCEI R5 End-to-End Validation Guide.</a>
Verify PCEI Location API App	Confirm PCEI Location API App is running and responding to requests	PASS	<a href="#">PCEI R5 End-to-End Validation Guide.</a>

## Test Procedure

[PCEI R5 Installation Guide](#)

[PCEI R5 End-to-End Validation Guide.](#)

## Expected output

All tests pass

## Test Results

Refer to sections of the following documents for detailed test results:

[PCEI R5 Installation Guide](#)

[PCEI R5 End-to-End Validation Guide.](#)

## Feature Project Tests

### NOT PERFORMED

#### The Test inputs

### Test Procedure

### Expected output

### Test Results

## BluVal Tests

### The Test inputs

BluVal Test Environment setup according to:

[Bluval User Guide](#)

### Test Procedure

1. Deploy a Test VM
2. Install Docker: <https://docs.docker.com/engine/install/ubuntu/>
3. Clone BluVal Validation Framework into the Test VM:
4. Copy SUT's .kube/config file and SSH key to the Test VM
5. Configure validation environment:

```
cd validation
vi bluval-pcei.yaml
```

```

blueprint:
  name: pcei
  layers:
    - os
    - docker
    - k8s
  # Any hardware some basic tests

os: &os_pcei
  -
    name: ltp
    what: ltp
    optional: "True"
  -
    name: cyclicttest
    what: cyclicttest
    optional: "True"
  -
    name: lynis
    what: lynis
    optional: "False"
  -
    name: vuls
    what: vuls
    optional: "False"

docker: &docker_base
  -
    name: docker_bench
    what: docker_bench
    optional: "True"

k8s: &k8s
  -
    name: conformance
    what: conformance
    optional: "False"
  -
    name: etcd_ha
    what: etcd_ha
    optional: "True"
  -
    name: kube-hunter
    what: kube-hunter
    optional: "False"

cd /home/onaplab/validation/bluval
vi volumes.yaml
volumes:
  # location of the ssh key to access the cluster
  ssh_key_dir:
    local: '/home/onaplab/.ssh'
    target: '/root/.ssh'
  # location of the k8s access files (config file, certificates, keys)
  kube_config_dir:
    local: '/home/onaplab/kube'
    target: '/root/.kube/'
  # location of the customized variables.yaml
  custom_variables_file:
    local: '/home/onaplab/validation/tests/variables.yaml'
    target: '/opt/akraino/validation/tests/variables.yaml'
  # location of the bluval-<blueprint>.yaml file
  blueprint_dir:
    local: '/home/onaplab/validation/bluval'
    target: '/opt/akraino/validation/bluval'
  # location on where to store the results on the local jumpserver
  results_dir:
    local: '/home/onaplab/results'
    target: '/opt/akraino/results'
  # location on where to store openrc file
  openrc:

```

```

        local: ''
        target: '/root/openrc'

# parameters that will be passed to the container at each layer
layers:
    # volumes mounted at all layers; volumes specific for a different layer are below
    common:
        - custom_variables_file
        - blueprint_dir
        - results_dir
    hardware:
        - ssh_key_dir
    os:
        - ssh_key_dir
    networking:
        - ssh_key_dir
    docker:
        - ssh_key_dir
    k8s:
        - ssh_key_dir
        - kube_config_dir
    k8s_networking:
        - ssh_key_dir
        - kube_config_dir
    openstack:
        - openrc
    sds:
    sdn:
    vim:

cd /home/onaplab/validation/tests
vi variables.yaml
### Input variables cluster's master host
host: 10.121.7.147          # cluster's master host address
username: onaplab          # login name to connect to cluster
password: onaplab          # login password to connect to cluster
ssh_keyfile: /root/.ssh/id_rsa    # Identity file for authentication

```

## 6. Run BluVal Robot:

```

cd
bash validation/bluval/blucon.sh pcei

```

## 7. Install LFTOOLS:

```

sudo apt install python3-pip
sudo python3 -m pip install -U pip
sudo python3 -m pip install -U setuptools
sudo -H pip3 install --ignore-installed PyYAML

pip3 install lftools

```

## 8. Push BluVal Results to Akraino Nexus

```
# Create .netrc file
vi .netrc
machine nexus.akraino.org
login <LF ID>
password <Password>

# Archive log files
zip -r results.zip ./results

# Push logs to Nexus
NEXUS_PATH="/pcei/job/v2"
NEXUS_URL="https://nexus.akraino.org/"
/home/onaplab/.local/bin/lftools deploy nexus-zip $NEXUS_URL logs $NEXUS_PATH results.zip
```

## Expected output

## Test Results

<https://nexus.akraino.org/content/sites/logs/pcei/job/v2/results/>

Vuls

# Vuls Report

Generated  
20210108 16:07:57 UTC-05:00  
2 days 1 hour ago

## Summary Information

<b>Status:</b>	All critical tests passed
<b>Start Time:</b>	20210108 16:07:30.825
<b>End Time:</b>	20210108 16:07:57.888
<b>Elapsed Time:</b>	00:00:27.063
<b>Log File:</b>	<a href="#">log.html</a>

## Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
<b>Critical Tests</b>	0	0	0	00:00:00	
<b>All Tests</b>	1	0	1	00:00:25	

Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
<b>non-critical</b> (non-critical)	1	0	1	00:00:25	

Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
<b>Vuls</b>	1	0	1	00:00:27	
<b>Vuls . Vuls</b>	1	0	1	00:00:27	

CVEs Found:

CVE	CVSS	URL	Exception
CVE-2016-1585	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2016-1585">https://nvd.nist.gov/vuln/detail/CVE-2016-1585</a>	Requested by another BP
CVE-2017-18342	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2017-18342">https://nvd.nist.gov/vuln/detail/CVE-2017-18342</a>	Requested by another BP
CVE-2017-8283	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2017-8283">https://nvd.nist.gov/vuln/detail/CVE-2017-8283</a>	Requested by PCEI. Approved
CVE-2018-20839	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2018-20839">https://nvd.nist.gov/vuln/detail/CVE-2018-20839</a>	Requested by another BP
CVE-2019-17041	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2019-17041">https://nvd.nist.gov/vuln/detail/CVE-2019-17041</a>	Requested by another BP
CVE-2019-17042	9.8	<a href="https://nvd.nist.gov/vuln/detail/CVE-2019-17042">https://nvd.nist.gov/vuln/detail/CVE-2019-17042</a>	Requested by another BP
CVE-2019-19814	9.3	<a href="https://nvd.nist.gov/vuln/detail/CVE-2019-19814">https://nvd.nist.gov/vuln/detail/CVE-2019-19814</a>	Requested by PCEI. Approved

Lynis

# Lynis Report

Generated  
20210108 16:07:30 UTC-05:00  
2 days 1 hour ago

## Summary Information

**Status:** All critical tests passed  
**Start Time:** 20210108 16:06:01.263  
**End Time:** 20210108 16:07:30.383  
**Elapsed Time:** 00:01:29.120  
**Log File:** [log.html](#)

## Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
Critical Tests	0	0	0	00:00:00	
All Tests	1	0	1	00:01:25	

Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
non-critical (non-critical)	1	0	1	00:01:25	

Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
Lynis	1	0	1	00:01:29	
Lynis.Lynis	1	0	1	00:01:29	

## Test Details

Totals Tags Suites Search

Type: ☐ Critical Tests  
☐ All Tests

Fixes for Lynis:

BOOT-5122  
<https://vineetcic.medium.com/how-to-set-grub-password-in-ubuntu-18-03-password-protect-boot-loader-ecb5db184054>

PASS\_MAX\_DAYS  
<https://askubuntu.com/questions/424216/what-is-password-aging-limits>

```
vi /etc/login.defs
change
PASS_MAX_DAYS 1500
UNMASK 027
```

**NOTE: changing the UNMASK value from default 022 to 027 resulted in the Lynis test suite erroring out.** Requested Exception.

KRNL-6000  
<https://linux-audit.com/understand-and-configure-core-dumps-work-on-linux/>  
echo "fs.suid\_dumpable=0" >> /etc/sysctl.conf  
sysctl -p

```
sysctl -w kernel.dmesg_restrict=1
```

```
sysctl -w net.ipv4.conf.all.accept_source_route=0
```

K8S Conformance

# Conformance Report

Generated  
20210108 16:09:33 UTC-05:00  
2 days 1 hour ago

## Summary Information

Status:	1 critical test failed
Start Time:	20210108 16:08:04.419
End Time:	20210108 16:09:33.681
Elapsed Time:	00:01:29.262
Log File:	<a href="#">log.html</a>

## Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
Critical Tests	1	0	1	00:01:29	
All Tests	1	0	1	00:01:29	

Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
non-critical (non-critical)	0	0	0	00:00:00	

Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
Conformance	1	0	1	00:01:29	
Conformance.Conformance	1	0	1	00:01:29	

## Test Details

TotalsTagsSuitesSearch

Type:

☐ Critical Tests

☐ All Tests

Exception Requested:						
Sonobuoy/Conformance	PCEI	Ubuntu 18.04	Getting error message from BluVal robot: level=error msg="could not get tests from archive: failed to find results file \\"plugins/e2e/results/global/junit_01.xml\\" in archive" does not contain 'failed tests: 0'	@Oleg Berzin	oberzin@equinix.com	Further troubleshooting shows the Docker image for Sonobuoy does not get pulled:  message": "Back-off pulling image \\"akraino/validation:kube-conformance-v1.14\\""  The Docker Hub does not have the image tagged akraino/validation:kube-conformance-v1.14



# Kube-Hunter Report

Generated  
20210108 16:09:59 UTC-05:00  
2 days 2 hours ago

## Summary Information

**Status:** All critical tests passed  
**Start Time:** 20210108 16:09:34.205  
**End Time:** 20210108 16:09:59.328  
**Elapsed Time:** 00:00:25.123  
**Log File:** [log.html](#)

## Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
Critical Tests	2	2	0	00:00:02	<div><div></div></div>
All Tests	3	2	1	00:00:25	<div><div></div></div>

Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
non-critical (non-critical)	1	0	1	00:00:23	<div><div></div></div>

Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
Kube-Hunter	3	2	1	00:00:25	<div><div></div></div>
Kube-Hunter . Kube-Hunter	3	2	1	00:00:25	<div><div></div></div>

## Test Details

Totals Tags Suites Search

Type: ☐ Critical Tests  
☐ All Tests

### Vulnerabilities found

ID	Status
KHV002	Fixed
KHV005	Fixed
KHV050	Fixed
CAP_NET_RAW	Pending

Fix for KHV002:

On SUT K8S Cluster:

```
kubectl replace -f - <<EOF
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  annotations:
    rbac.authorization.kubernetes.io/autoupdate: "false"
  labels:
    kubernetes.io/bootstrapping: rbac-defaults
  name: system:public-info-viewer
rules:
- nonResourceURLs:
  - /healthz
  - /livez
  - /readyz
  verbs:
  - get
EOF
```

Fix for KHV005, KHV050

On SUT K8S Cluster:

```
kubectl replace -f - <<EOF
apiVersion: v1
kind: ServiceAccount
metadata:
  name: default
  namespace: default
automountServiceAccountToken: false
EOF
```

## Test Dashboards

Single pane view of how the test score looks like for the Blue print.

Test Group	Total Tests	Pass	Fail
Blueprint Extension Tests	9	9	0
Vuls	1	1	0
Lynis	1	1	0
K8S Conformance	1	0	1
Kube-Hunter	1	1	0

## Additional Testing

None

## Bottlenecks/Errata

Please refer to [PCEI R5 Release Notes](#)