SEBA-in-a-Box

SEBA with PONSIM and Mininet

Andy Bavier / ONF

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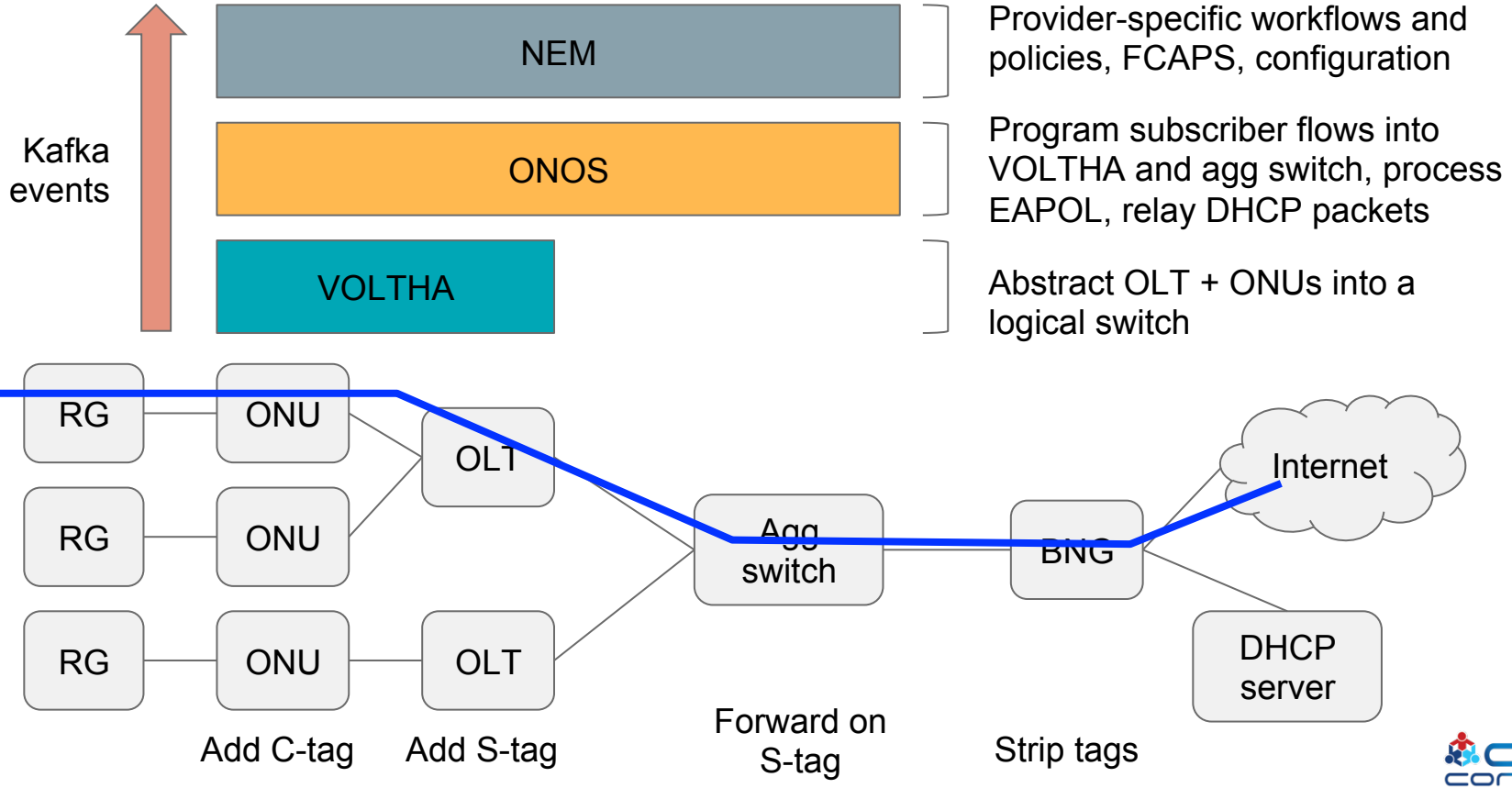
A high-level view of SEBA



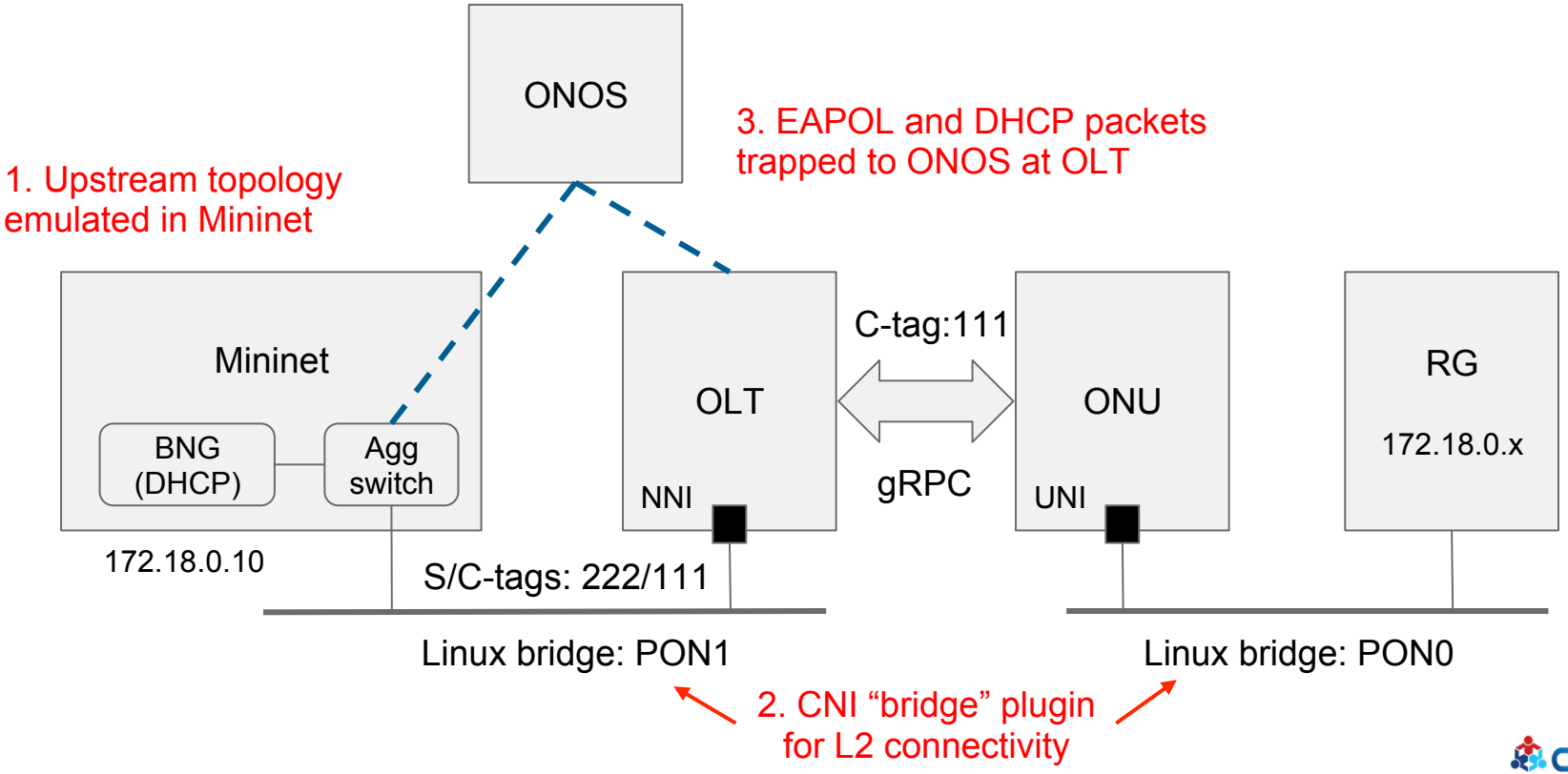
Lowering the bar through virtualization

- Emphasis: *integrate & operate* in production environ
- But suppose
  - A potential partner wants to get started with SEBA
  - A SEBA developer wants to run basic E2E tests on his code
  - The QA team needs to run integration tests per patchset
- Purchasing / managing / installing HW could be a bottleneck
- Not much value in real HW for these users
- With *virtual* HW, could run SEBA in a single server or VM
- Good enough for much development / testing / evaluation

SEBA-in-a-Box

- Leverage PONSIM and Mininet
  - VOLTHA's PONSIM module virtualizes the RG / ONU / OLT
  - Use Mininet to virtualize the agg switch / BNG / DHCP server
- **Fast**: Installs in 10 minutes
  - Downloads pre-built Docker images from Docker Hub
- **Easy**: Download a repo and run "make"
  - Sets up a single-node K8S cluster, VOLTHA, ONOS, XOS, Mininet
- **Lightweight**: run in a VM (on EC2 or a laptop)
  - m1.large VM on EC2: 8GB RAM, 2 vCPUs, 10 cents / hour
- **Customizable**: Use local copies of Helm charts, Docker images

SEBA-in-a-Box Dataplane



“Demo” outline

- Inspect:
  - K8S pods in *voltha* and *default* namespaces
  - Devices in ONOS and VOLTHA
  - Bridges: pon0 and pon1
  - XOS GUI: *AttWorkflowDriver Service Instance*
- Inside RG:
  - Run 802.1x authentication, *AWAITING => APPROVED*
  - Run DHCP client, get IP address
  - Ping BNG @172.18.0.10

Kubernetes pods - “voltha” namespace

```
cord@pod4-node1:~$ kubectl -n voltha get pod
NAME                                      READY     STATUS    RESTARTS   AGE
default-http-backend-796bff654f-rkbtv     1/1       Running   0          2d
freeradius-57768fb8d7-pjv4r               1/1       Running   0          2d
netconf-7b7db97b56-w6bm6                  1/1       Running   0          2d
nginx-ingress-controller-7cc4bb77f9-xqvkr 1/1       Running   0          2d
ofagent-fccdf9bfc-fl6st                   1/1       Running   0          2d
olt-5c956f9858-x7mqf                      1/1       Running   0          2d
onu-f94565547-5t2h4                       1/1       Running   0          2d
rg-5bf974486-swsmr                        1/1       Running   0          2d
vcli-6875544cf-5hsnp                      1/1       Running   0          2d
vcore-0                                   1/1       Running   0          2d
voltha-546cb8fd7f-7tvbg                   1/1       Running   0          2d
```

PONSIM pods

Kubernetes pods - “default” namespace

```
cord@pod4-node1:~$ kubectl get pod
NAME                                                              READY     STATUS      RESTARTS   AGE
att-workflow-att-workflow-driver-6f64d965bb-n2jdd                 1/1       Running     0          2d
att-workflow-fabric-9d5bffdf-8jvjr                                1/1       Running     0          2d
att-workflow-fabric-crossconnect-68f485484c-gh8lw                 1/1       Running     0          2d
att-workflow-onos-service-7679995db7-hdxh4                        1/1       Running     0          2d
att-workflow-rcord-6cb59d7585-dcgdc                               1/1       Running     0          2d
att-workflow-tosca-loader-qvhhg                                   0/1       Completed   5          2d
att-workflow-volt-64b985455c-479q6                                1/1       Running     0          2d
base-kubernetes-kubernetes-74f7c59c6c-2x2jh                       1/1       Running     0          2d
base-kubernetes-tosca-loader-9dd4d                                0/1       Completed   5          2d
cord-kafka-0                                                      1/1       Running     1          2d
cord-kafka-zookeeper-0                                            1/1       Running     0          2d
etcd-cluster-5ghnb44zfj                                           1/1       Running     0          2d
etcd-operator-etcd-operator-etcd-backup-operator-7b888b9b8cz56s   1/1       Running     0          2d
etcd-operator-etcd-operator-etcd-operator-896895ddc-kl7fg         1/1       Running     0          2d
etcd-operator-etcd-operator-etcd-restore-operator-9d7cb559fggjn   1/1       Running     0          2d
mininet-668cd5c449-dxdhj                                          1/1       Running     0          2d
onos-7bbc9555bf-c5dqf                                             2/2       Running     0          2d
ponsim-pod-ponsim-pod-62x56                                       0/1       Completed   0          2d
sadis-server-b87df69b9-rz25g                                      1/1       Running     0          2d
xos-chameleon-6d9959c76f-cblfv                                    1/1       Running     0          2d
xos-core-8d877585f-tv4sd                                          1/1       Running     0          2d
xos-db-7ffc6f5674-hhzrs                                           1/1       Running     0          2d
xos-gui-5c79878bc4-4cqdx                                          1/1       Running     1          2d
xos-tosca-7fc86c8bf6-rxclt                                        1/1       Running     0          2d
xos-ws-64cf9c8b6f-xlr95                                           1/1       Running     0          2d
```

Loads SiaB-specific TOSCA into XOS

Devices in ONOS and VOLTHA

```
onos> ports -s
id=of:0000000000000001, available=true, role=MASTER, type=SWITCH, driver=ofdpa-ovs
  port=LOCAL, state=disabled, type=copper, speed=0 , adminState=disabled, portMac=56:a7:9d:d6:dd:4b, portName=s1
  port=1, state=enabled, type=copper, speed=10000 , adminState=enabled, portMac=36:48:4f:b7:6f:1e, portName=s1-eth1
  port=2, state=enabled, type=copper, speed=10000 , adminState=enabled, portMac=0a:58:0a:17:02:5e, portName=eth1
id=of:0000aabbccddeeff, available=true, role=MASTER, type=SWITCH, driver=voltha
  port=2, state=enabled, type=fiber, speed=0 , adminState=enabled, portMac=00:00:00:00:00:02, portName=nni
  port=128, state=enabled, type=fiber, speed=0 , adminState=enabled, portMac=00:00:00:00:00:80, portName=PSM012345678
```

Agg switch (OVS in Mininet)

VOLTHA logical device

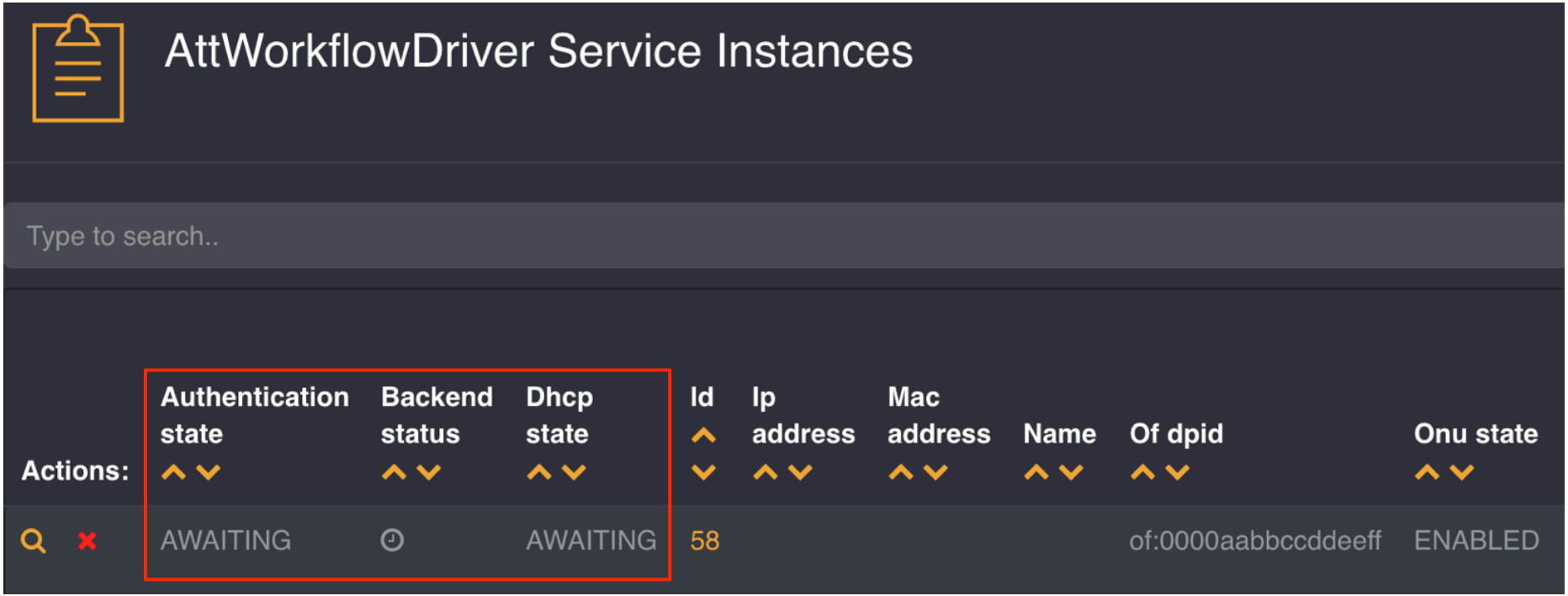
UNI port

```
(voltha) devices
Devices:
+------------------+------------+------+------------------+--------------------+------+-------------+------------+----------
------+---------------+----------------------+------------------------+--------------------------+
|               id |       type | root |        parent_id |      serial_number | vlan | admin_state | oper_status | connect_s
tatus | parent_port_no |        host_and_port | proxy_address.device_id | proxy_address.channel_id |
+------------------+------------+------+------------------+--------------------+------+-------------+------------+----------
------+---------------+----------------------+------------------------+--------------------------+
| 00016b0e9d008091 | ponsim_olt | True | 0001aabbccddeeff | olt.voltha.svc:50060 |      |     ENABLED |      ACTIVE |      REAC
HABLE |               | olt.voltha.svc:50060 |                        |                          |
| 00013f5d2cd59b05 | ponsim_onu |      | 00016b0e9d008091 |         PSM012345678 |  128 |     ENABLED |      ACTIVE |      REAC
HABLE |             1 |                      |        00016b0e9d008091 |                      128 |
+------------------+------------+------+------------------+--------------------+------+-------------+------------+----------
------+---------------+----------------------+------------------------+--------------------------+
```

Linux bridges: pon0 and pon1

```
cord@pod4-node1:~$ brctl show
bridge name     bridge id               STP enabled     interfaces
docker0         8000.0242790378e6       no
pon0            8000.1241f133d5ab       no              veth20a627b1
                                                        veth6346063f
pon1            8000.0a580a170001       no              vethab70b945
                                                        vetheb034add
```

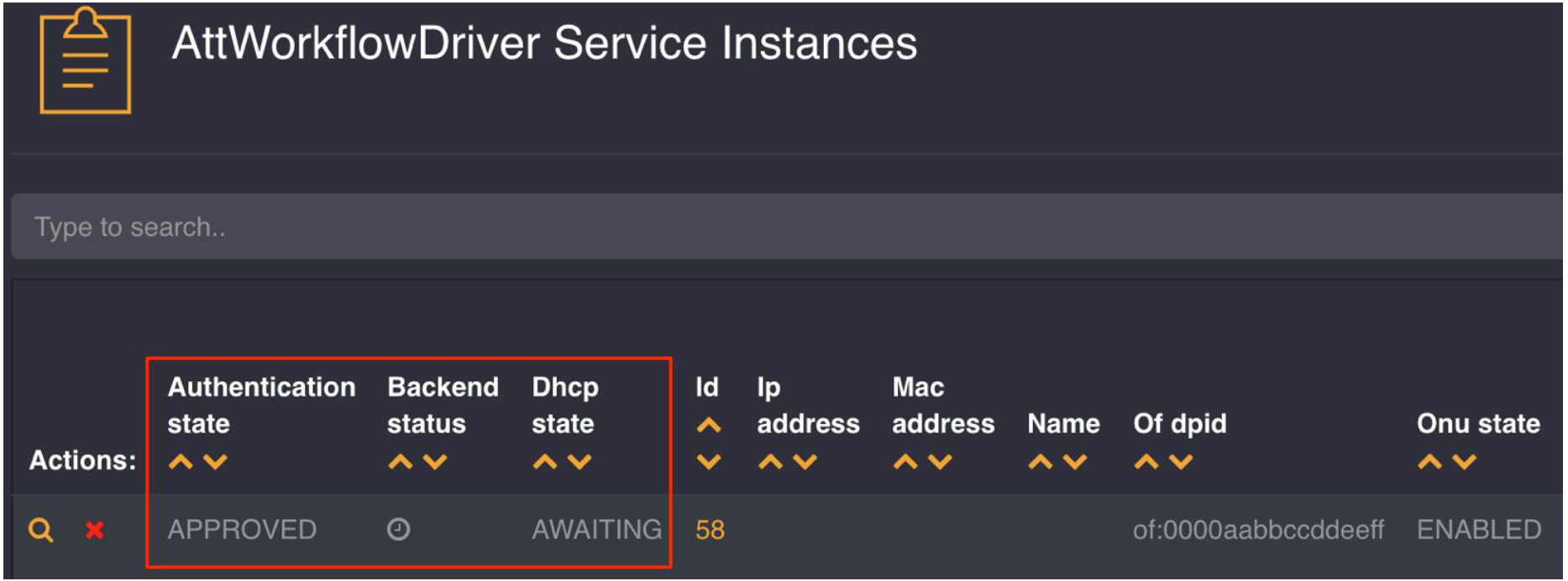
XOS GUI - before subscriber auth



802.1x Authentication

```
cord@pod4-node1:~$ kubectl -n voltha exec -ti rg-5bf974486-swsmr bash
root@rg-5bf974486-swsmr:/# wpa_supplicant -i eth0 -Dwired -c /etc/wpa_supplicant/wpa_supplicant.conf
Successfully initialized wpa_supplicant
eth0: Associated with 01:80:c2:00:00:03
WMM AC: Missing IEs
eth0: CTRL-EVENT-EAP-STARTED EAP authentication started
eth0: CTRL-EVENT-EAP-PROPOSED-METHOD vendor=0 method=4
eth0: CTRL-EVENT-EAP-METHOD EAP vendor 0 method 4 (MD5) selected
eth0: CTRL-EVENT-EAP-SUCCESS EAP authentication completed successfully
^Ceth0: CTRL-EVENT-DISCONNECTED bssid=01:80:c2:00:00:03 reason=3 locally_generated=1
eth0: CTRL-EVENT-TERMINATING
root@rg-5bf974486-swsmr:/#
```

XOS GUI - after subscriber auth



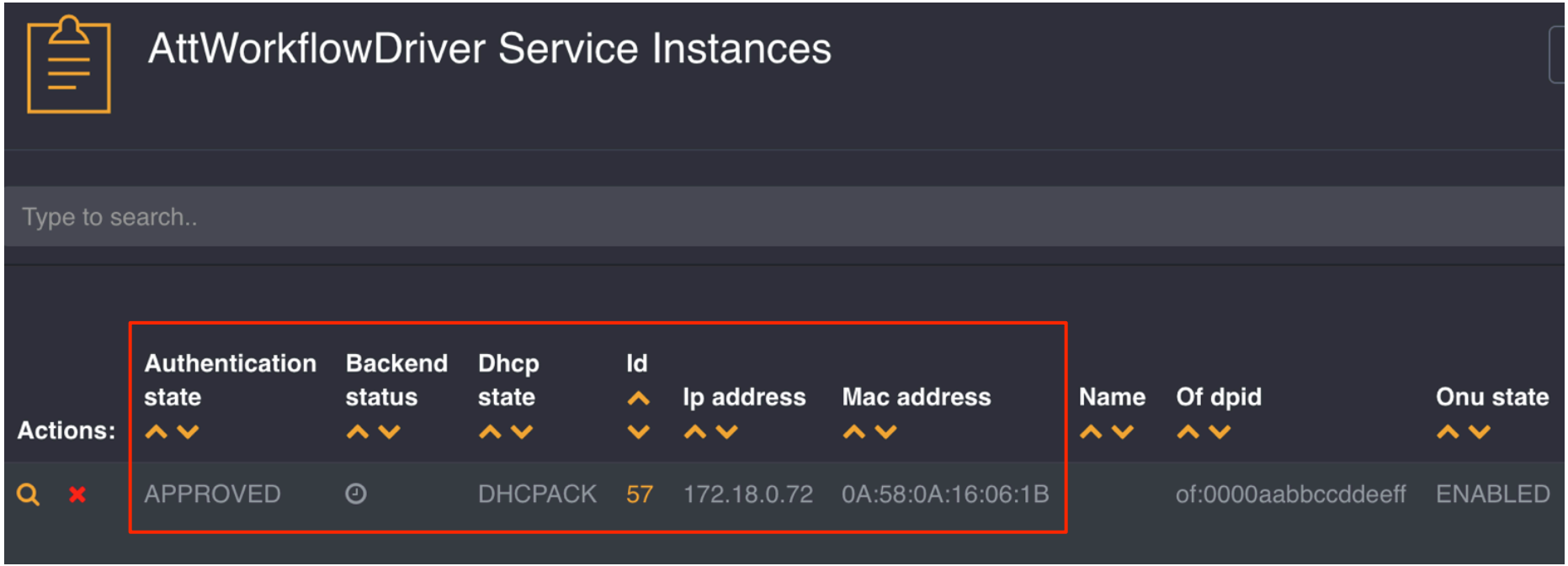
Run DHCP client

```
eth0: CTRL-EVENT-TERMINATING
root@rg-5bf974486-vt86c:/# ifconfig eth0 0.0.0.0
root@rg-5bf974486-vt86c:/# dhclient
mv: cannot move '/etc/resolv.conf.dhclient-new.35' to '/etc/resolv.conf': Device or resource busy
root@rg-5bf974486-vt86c:/# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 0a:58:0a:16:06:1b
          inet addr:172.18.0.72  Bcast:172.18.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:71 errors:0 dropped:44 overruns:0 frame:0
          TX packets:7 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:7012 (7.0 KB)  TX bytes:1153 (1.1 KB)
```

Erase K8S-assigned address

Don't worry about this!

XOS GUI - after DHCP



Ping to BNG works now

```
root@rg-5bf974486-vt86c:/# ping -c 3 172.18.0.10
PING 172.18.0.10 (172.18.0.10) 56(84) bytes of data.
64 bytes from 172.18.0.10: icmp_seq=1 ttl=64 time=32.5 ms
64 bytes from 172.18.0.10: icmp_seq=2 ttl=64 time=27.6 ms
64 bytes from 172.18.0.10: icmp_seq=3 ttl=64 time=22.4 ms

--- 172.18.0.10 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 22.424/27.513/32.514/4.119 ms
root@rg-5bf974486-vt86c:/#
```

Summary

- SiaB is a real SEBA pod with virtual hardware
- Good on-ramp for the community
  - About half the questions on Slack are in context of SiaB
  - => SiaB is doubling SEBA's popularity
- Community contributions to SiaB
  - Use real OpenFlow switch + server instead of Mininet
  - Support for multiple ONUs / RGs (in progress)

https://guide.opencord.org/profiles/seba/siab.html