

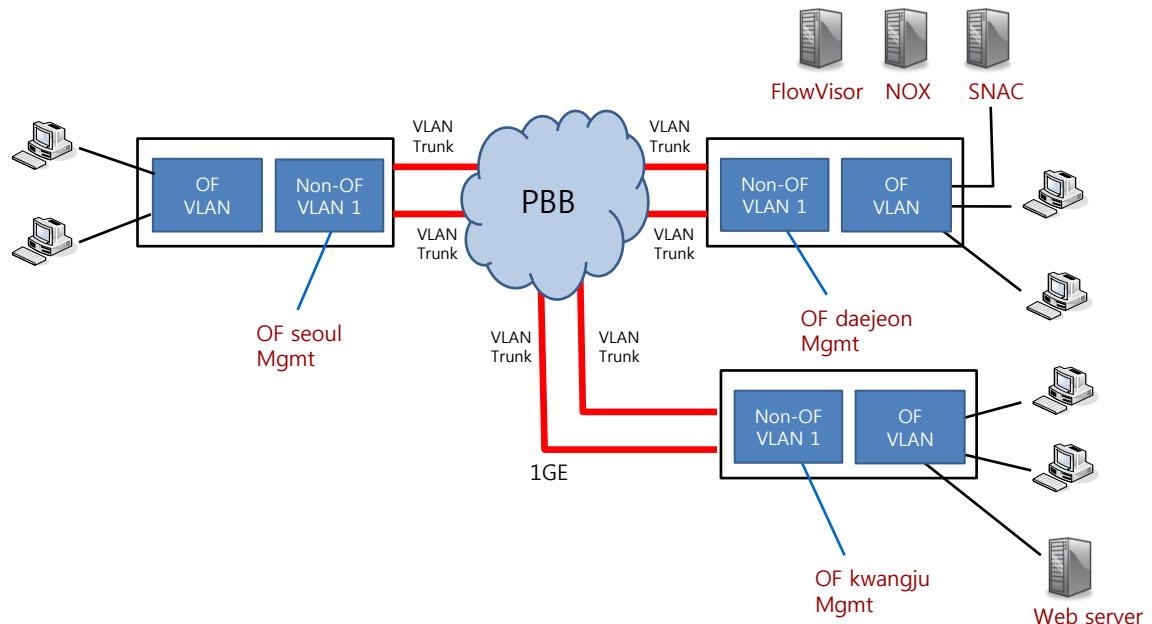
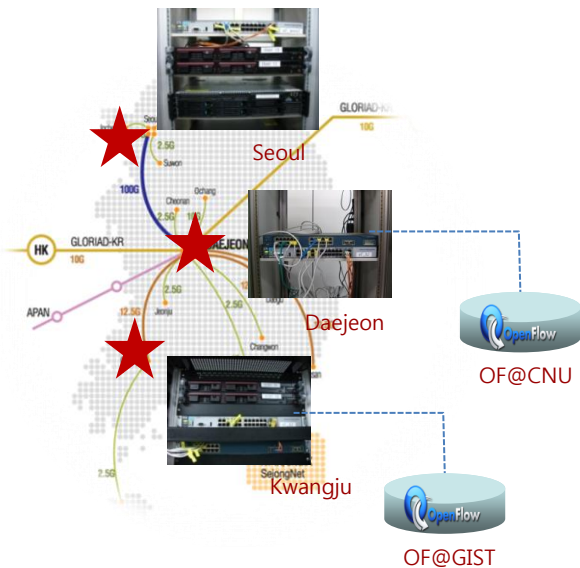
KREONET 기반의 OpenFlow 테스트베드(OF@KREONET)

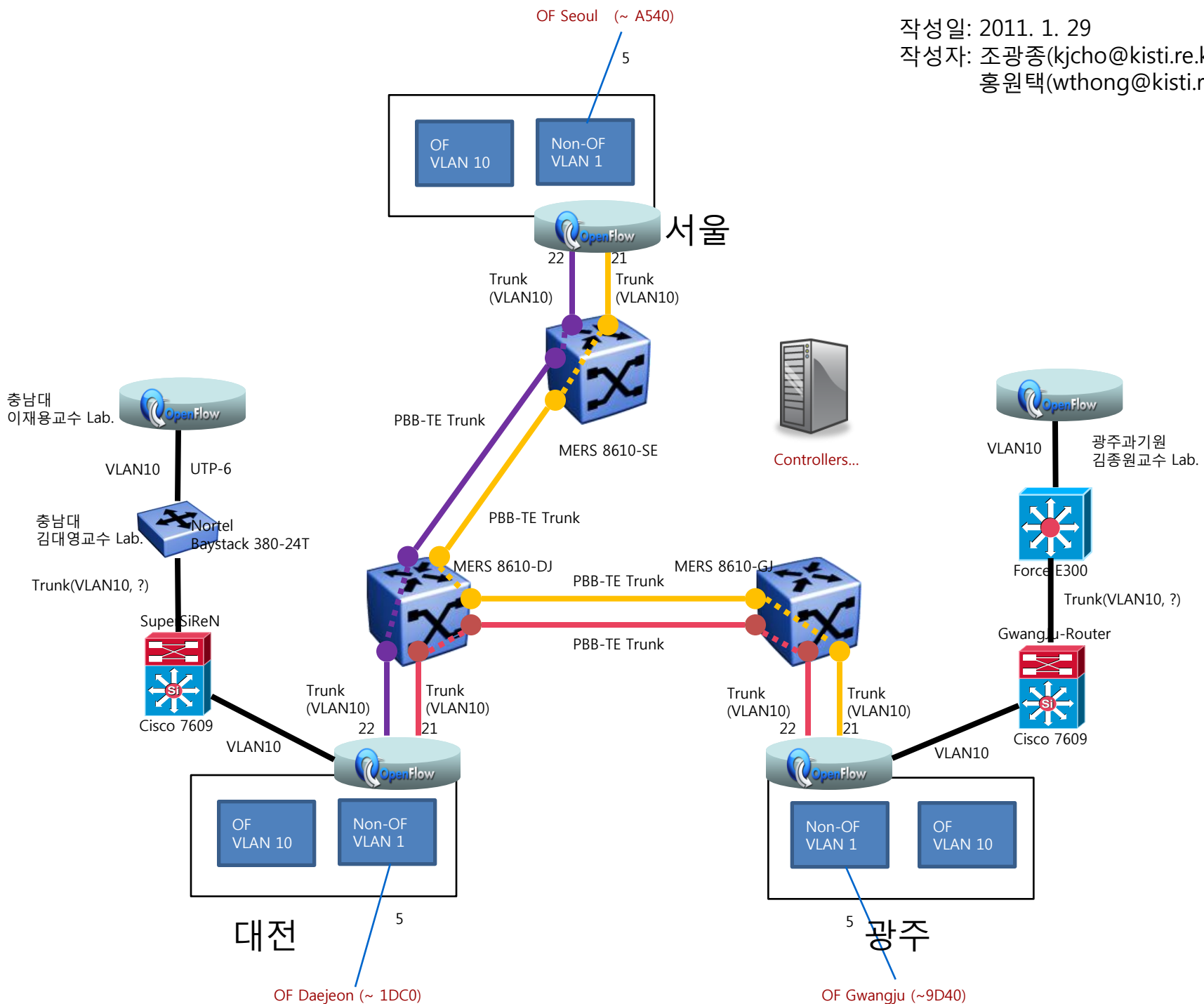
KISTI 후원택

2011.06.02

OF@KREONET 소개

- KREONET 기반의 광역 규모 OpenFlow 테스트베드
- OpenFlow switches
 - 3 HP Procurve 3500 switches (OF ver. 1.0)
 - Based on IEEE 802.1ah PBB(Provider Backbone Bridge), VLAN
- OpenFlow controllers
 - NOX (including a developed flow routing component)
 - FlowVisor, SNAC
- Campus OpenFlow networks(OF@GIST, OF@CNU)과 OF@KREONET의 연동





HP Procurve 3500: details

```
OF_SW_daejeon> show openflow 10

Openflow Configuration - VLAN 10

Openflow state [Disabled] : Enabled
Controller pseudo-URL : tcp:[REDACTED]
Listener pseudo-URL : ptcp:[REDACTED]
Openflow software rate limit [100] : 10000
Openflow connecting max backoff [60] : 5
Openflow hardware acceleration [Enabled] : Enabled
Openflow hardware rate limit [0] : 0
Openflow hardware stats max refresh rate [0] : 0
Openflow fail-secure [Disabled] : Disabled
Second Controller pseudo-URL :
Third Controller pseudo-URL :

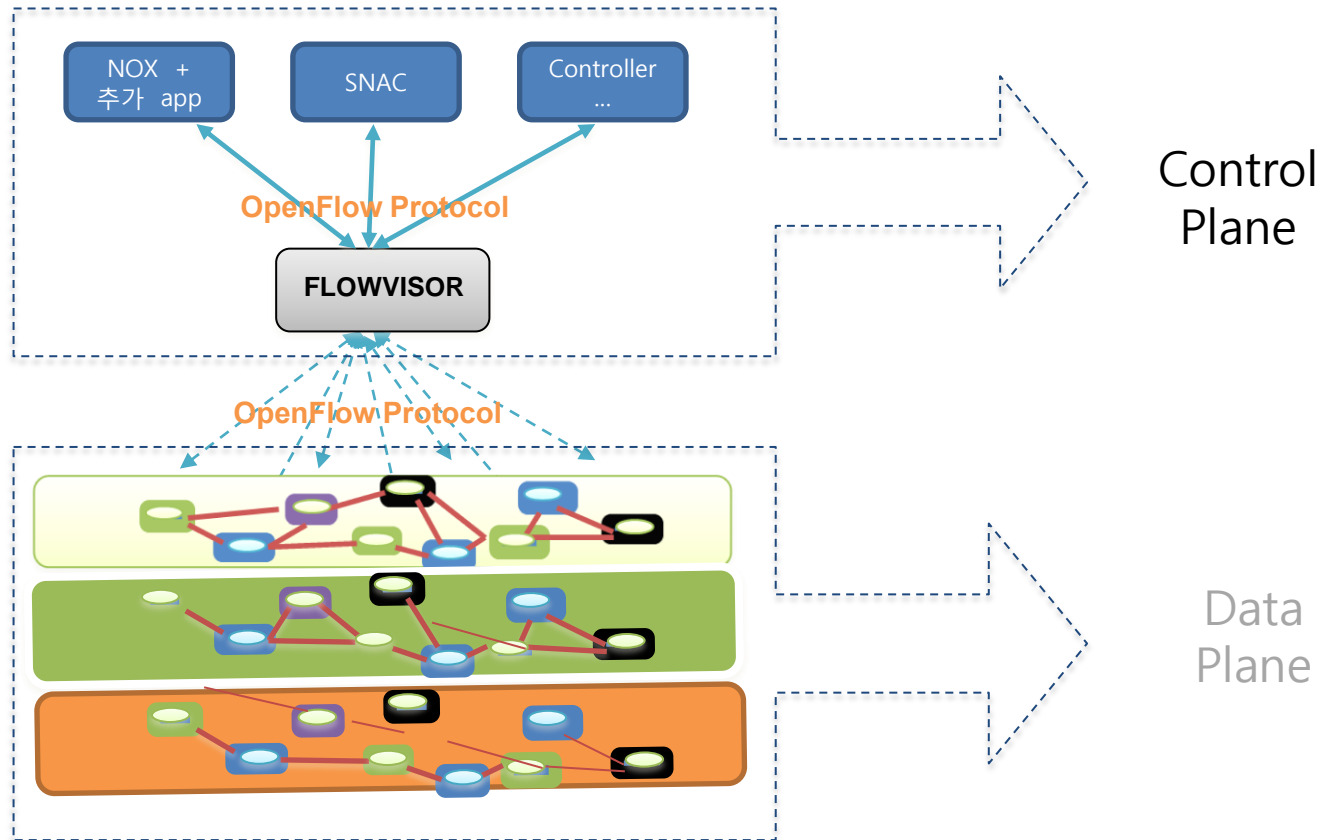
Openflow Status - VLAN 10

Switch MAC address : [REDACTED]
Openflow datapath ID : [REDACTED]
Controller connection status (1/1) : connected ; state: ACTIVE
Listening connection status : listening (1 connections)
SW Dpif n_flows: 0 ; cur_capacity:31 ; n_lost: 0
        n_hit: 253 ; n_missed: 7344899297 ; n_frags: 0
Number of hardware rules: 0
```

<OpenFlow instance>

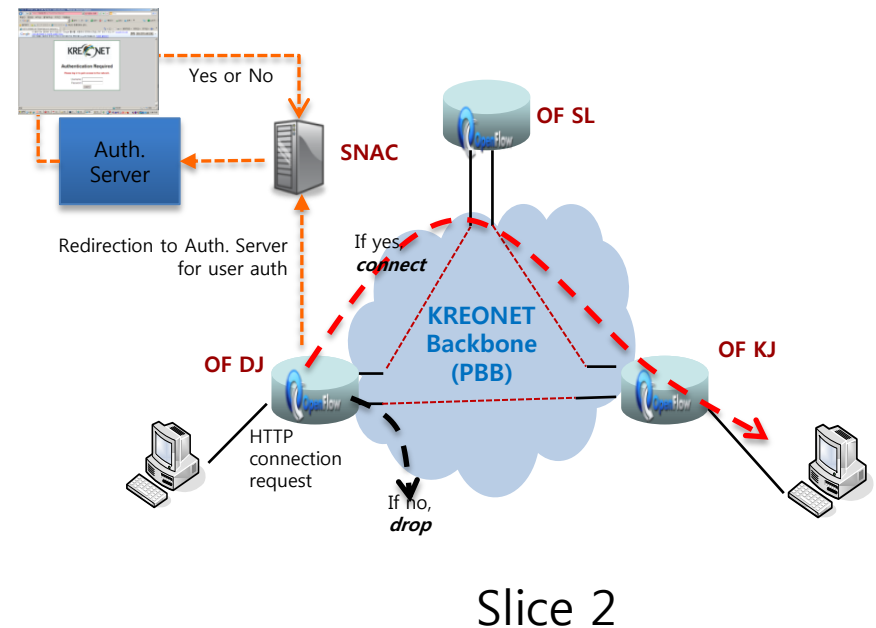
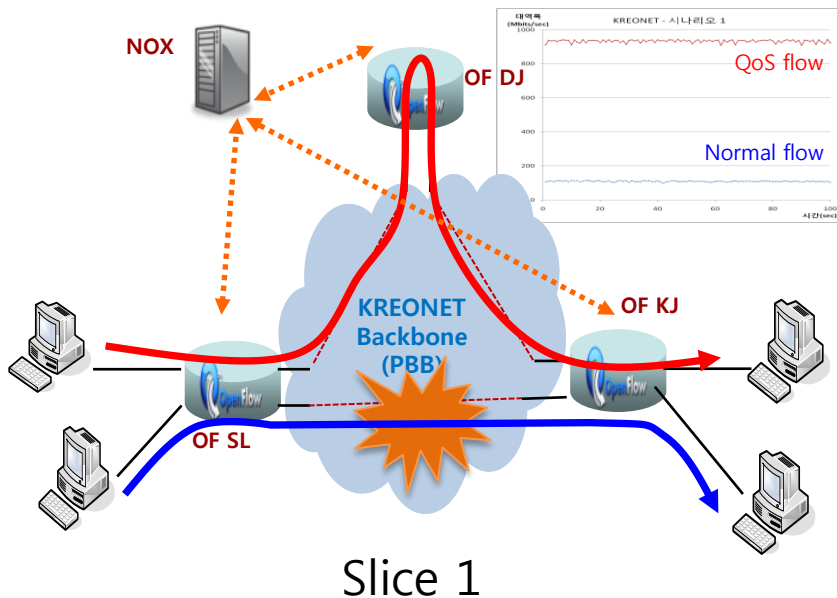
```
root@linux:~# dpctl dump-flows [REDACTED]
stats_reply (xid=0xaf22eaa): flags=none type=1(flow)
  cookie=0, duration_sec=29s, duration_nsec=661000000s, table_id=1, priority=327
  69, n_packets=29, n_bytes=98, idle_timeout=5,hard_timeout=0,icmp,in_port=21,dl_v
  lan=0xffff,dl_vlan_pcp=0x00,dl_src=00:30:48:b1:22:8d,dl_dst=a4:ba:db:3d:74:65,nw
  _src=10.0.0.31,nw_dst=10.0.0.21,icmp_type=0,icmp_code=0,actions=output:9
  cookie=0, duration_sec=29s, duration_nsec=736000000s, table_id=1, priority=327
  69, n_packets=29, n_bytes=98, idle_timeout=5,hard_timeout=0,icmp,in_port=9,dl_vl
  an=0xffff,dl_vlan_pcp=0x00,dl_src=a4:ba:db:3d:74:65,dl_dst=00:30:48:b1:22:8d,nw
  _src=10.0.0.21,nw_dst=10.0.0.31,icmp_type=8,icmp_code=0,actions=output:21
```

<Flow table entries>

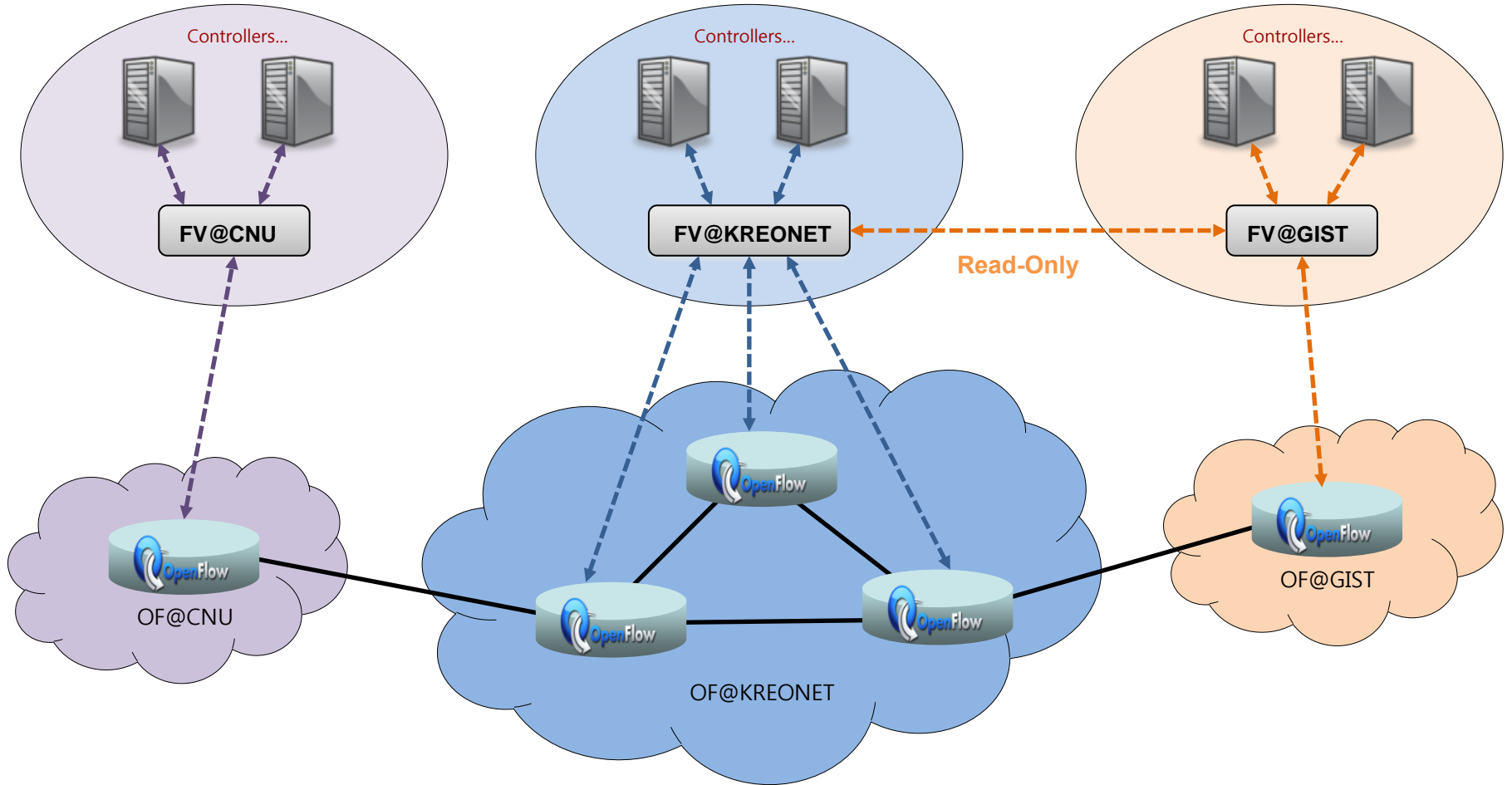


Experiments over OF@KREONET

- Development of a flow routing technique based on traffic load
 - Selection of normal routing or CSPF-based QoS routing
 - Periodically gathering topology and bandwidth information
- Deployment of SNAC controller
 - User authentication through captive portal mechanism
 - Useful to provide admission control for new users



FlowVisor 기반 연동 관련



향후 계획

- FV 기반의 대역폭 제어 기술 개발
 - OF@KREONET 상에서 다수 컨트롤러 반영 시, Vlan pcp 필드를 활용하여 차별화된 대역폭 제공을 목표로 함
- OF@KREONET 활용
 - OF@KREONET은 과학기술자원융합망의 한 부분인 PBB 망 관점에서 독립된 논리 망 형태로 존재
 - HPDMnet 과의 OF 기반 협력 모색
 - OF@GIST, OF@CNU 등의 First@PC 미래 인터넷 응용 연구 커뮤니티와 협력