

# UNINETT OpenFlow testbed

## Terena Network Architecture Workshop, 13-14/11-2013

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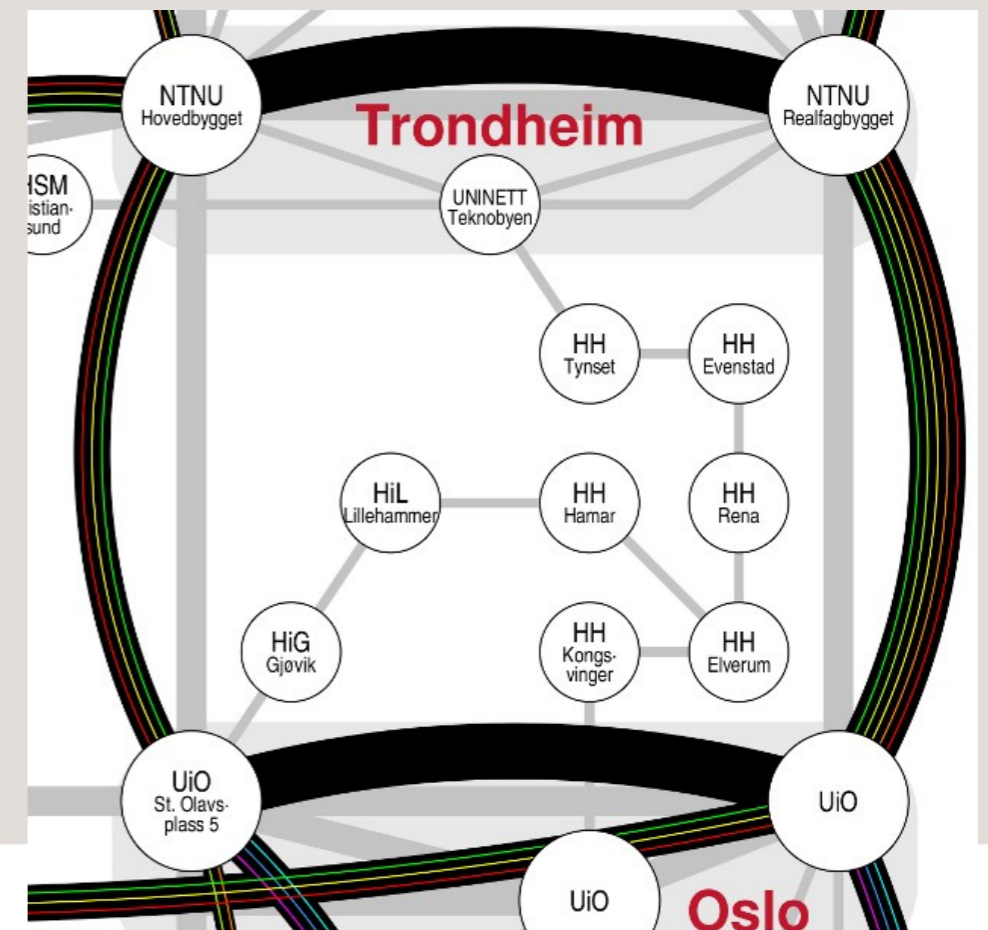
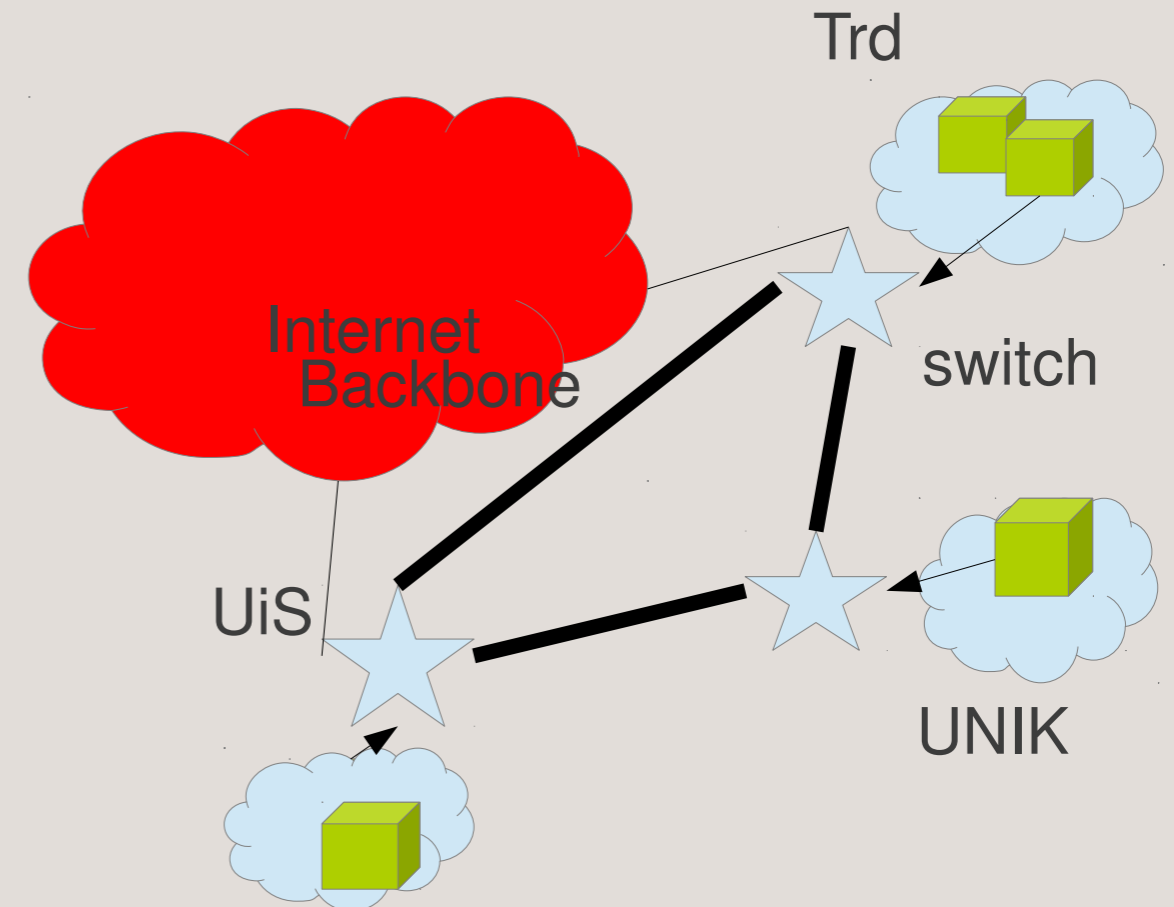


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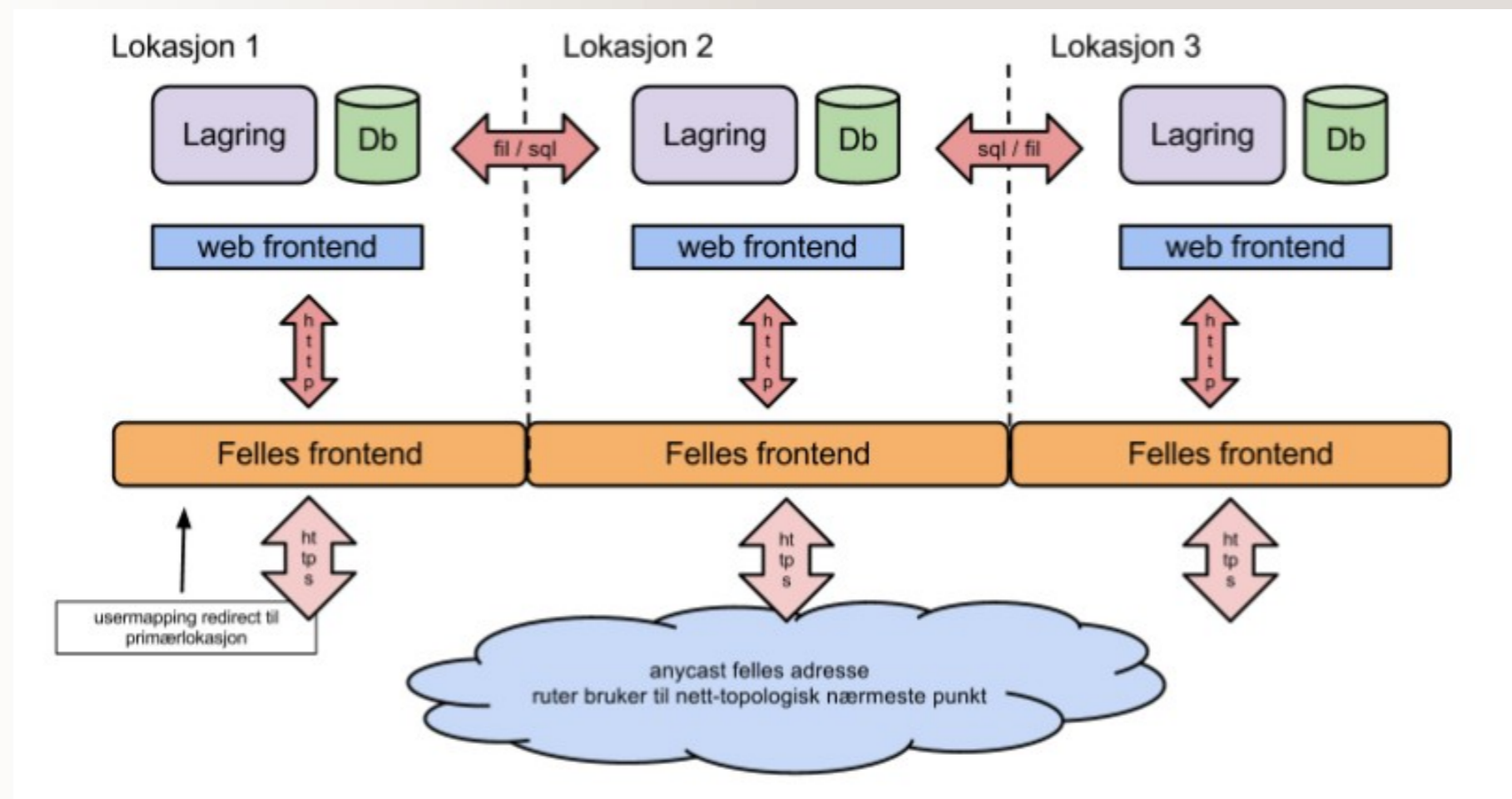
# The testbed scenario

- Community cloud services
- Natural resources
  - Fibers/lambda
  - Routing control - anycast
- Distributed computing centers
  - Intersite traffic
  - Replication and migration of data
  - Elephant flows - separate from normal traffic
- Traffic separation
  - IP routing by dual address scheme
  - Openflow routing overturn

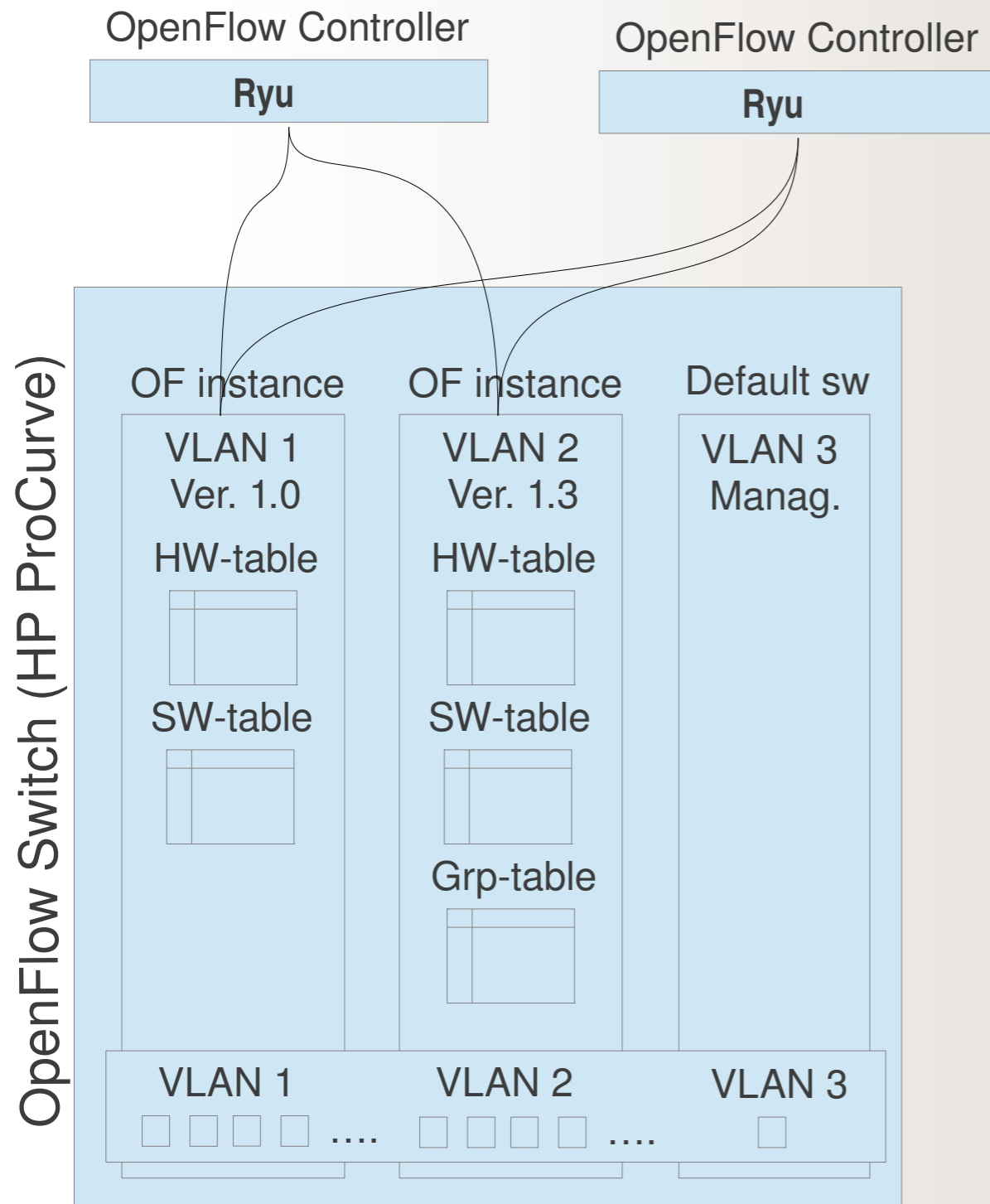
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## High availability (reliability and flexibility)



# Uninett's Open Flow Testing - Summer 2013

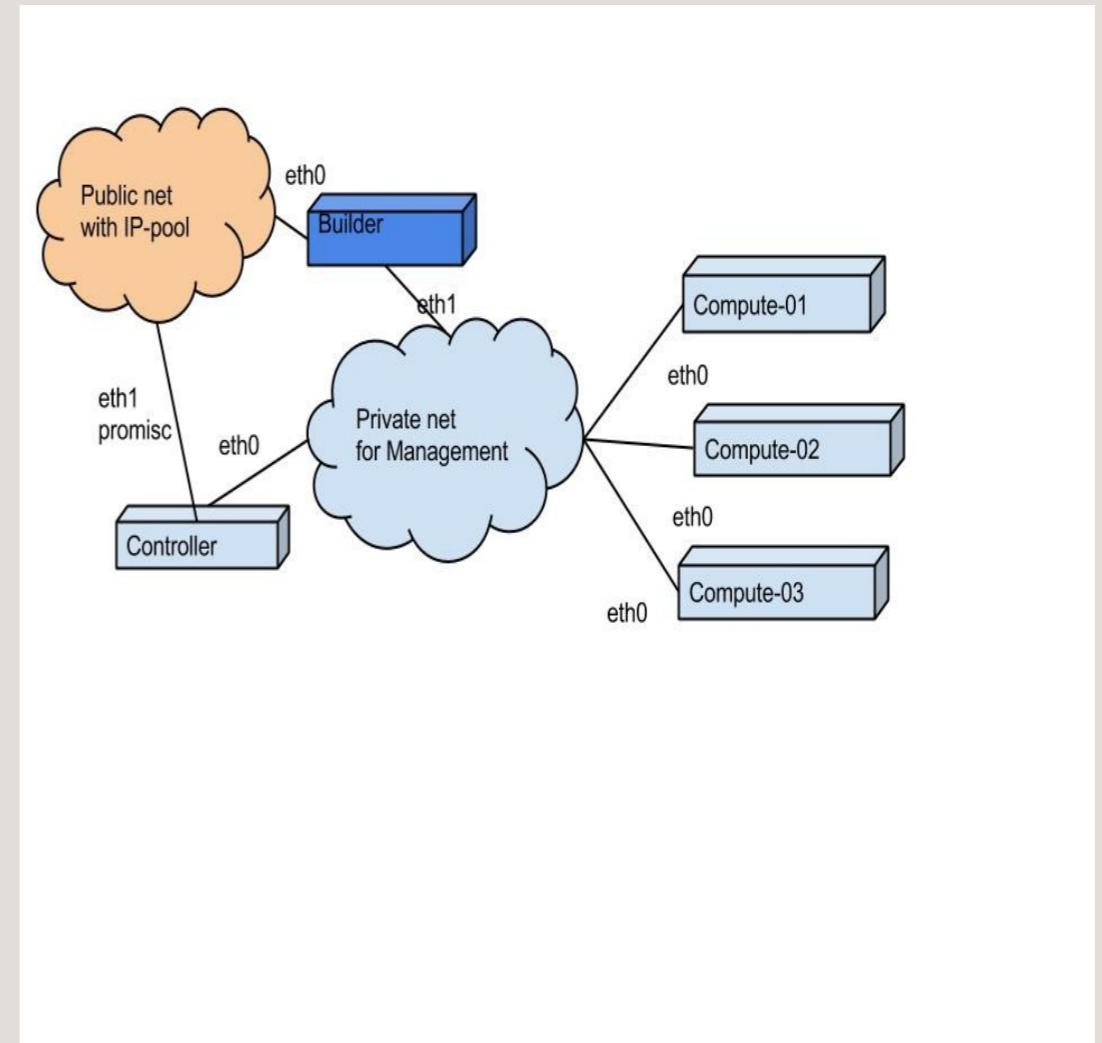


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- Joined HP's Open Flow 1.3 beta program
- 1.3 dependability features investigated
  - Groups + Preconfigured fast failover
  - Groups + Load balancing
  - Groups + «Multicast»
  - Auxiliary connection (traffic to ctrl. distributed to multiple ctrls)
  - Multi-controller setup (Roles: Master, slave, equal)
- Experiences
  - Features are stable 😊
  - Features are implemented in SW => max 120Mbps load on OF instance in Gigabit switch. 😞

# OpenStack clusters

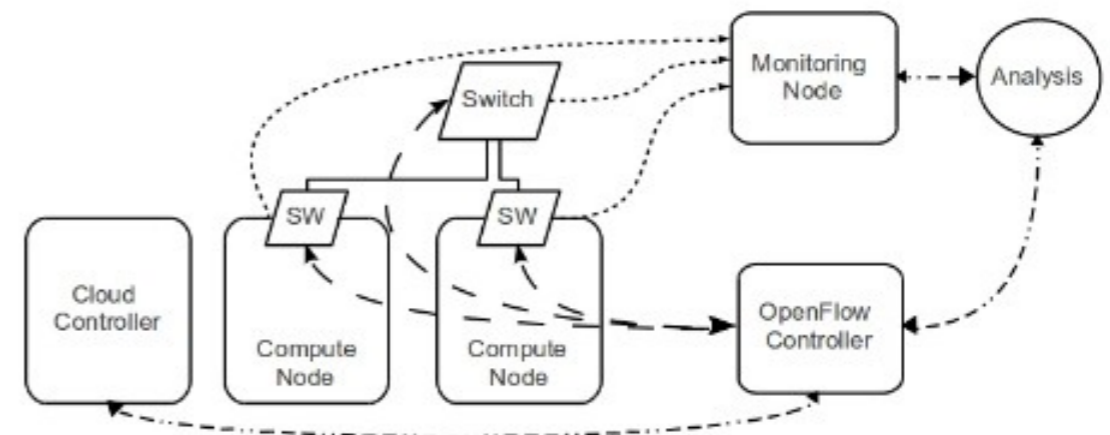
- OpenStack experience
  - Grizzly/spring edition
  - Cobbler as a deployment tool
  - Puppet for configuration management
  - GRE tunnels for network virtualization
  - Works well to manage and deploy (at lab scale)
- Integrating multiple OpenStack clusters
  - Bigger failure domain vs transparent use
  - Keep clusters independent
  - Make applications infrastructure aware
  - High level networking API can be exposed to be utilized by the application layer



# Big data applications

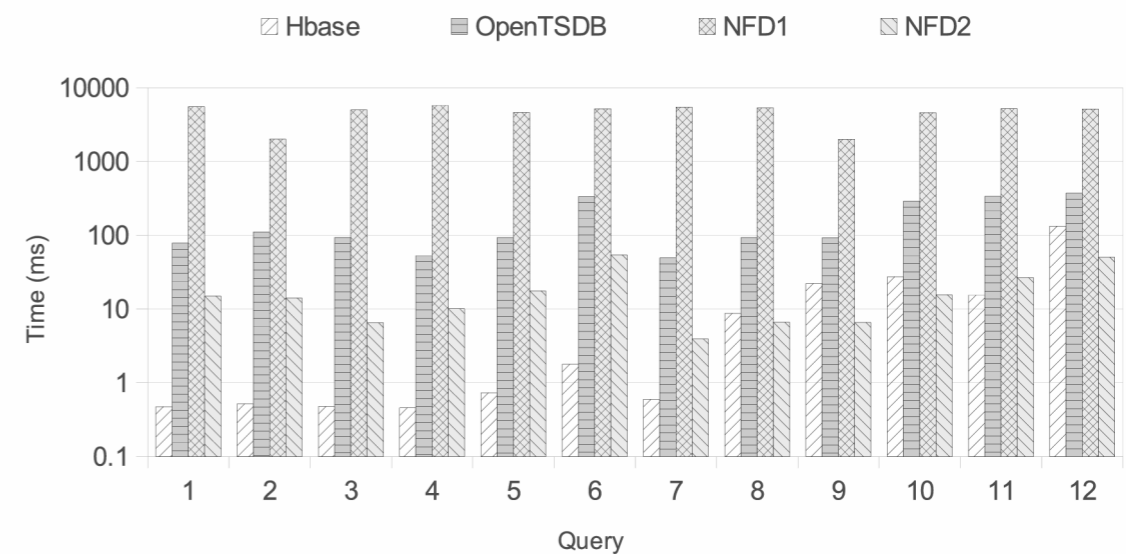
- Traffic analysis and feedback loop
  - Analysis of NetFlow data in Hadoop:
  - A novel mechanism for scalable storage and real-time processing of monitoring data
  - a processing mechanism which is about 4000 times faster than NFDump.
  - On IEEE CloudCom 2013 in december.
- Nosql system (Cassandra)
  - Store and search federated login data (FEIDE)
  - Compare to present memcached :
    - Better resilience and scalability
    - Slower response (1<->5 ms)

## Cloud Infrastructure Monitoring 2



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Software Defined Networking and Network Virtualization



# Conclusions

- Openflow immature - changes fast - 1.4 is coming
  - Lacks interdomain, inter-controller
- OpenStack maturing fast
- Lambdas not tested yet due to
  - Unavailability to one site
  - Shortcutting campuses challenges security policy
- Multiple options to OpenFlow for virtualization..
  - VLAN - just 4k numbers but can be stacked and traffic engineered
  - GRE tunnels - transparent to network and qos
  - Openflow - (de)central traffic engineering capabilities
- Next year
  - Big data,
  - OpenFlow orchestration
  - Cooperate with Transpacket on OF-switch ?
    - .. with you ?