

Datacenter Traffic Monitoring Using Traffic Mirroring of Virtual Switch

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Introduction and Motivation

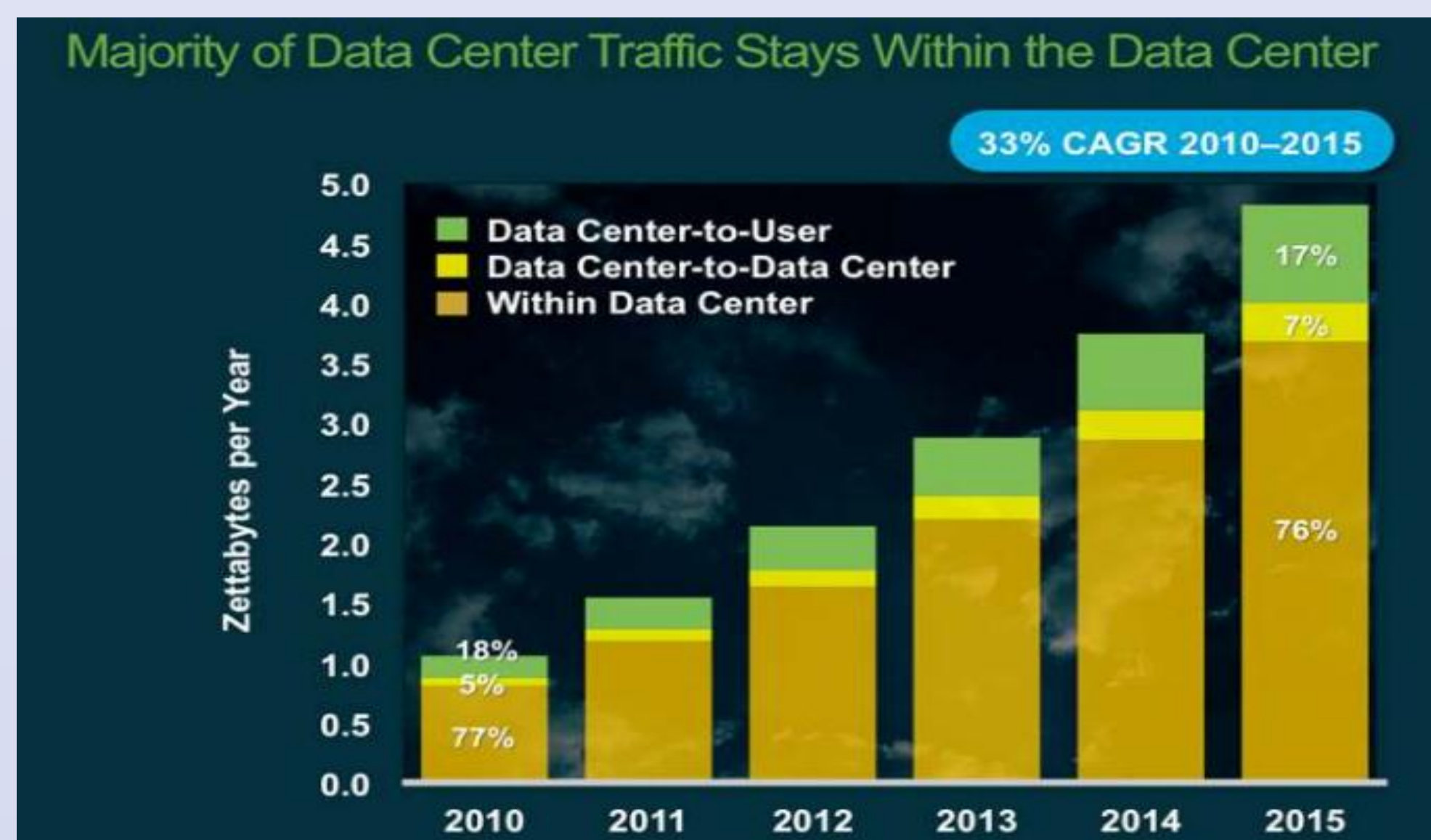
In these days, datacenter traffic has been increased rapidly. Monitoring datacenter traffic is more difficult than conventional Internet traffic monitoring. To monitor interactions among thousands of nodes, location of monitoring point is one of research challenges.

Importance of Datacenter Traffic Monitoring

- Understanding network status
- Charging tenants' cost
- Optimizing performance

Research Goals

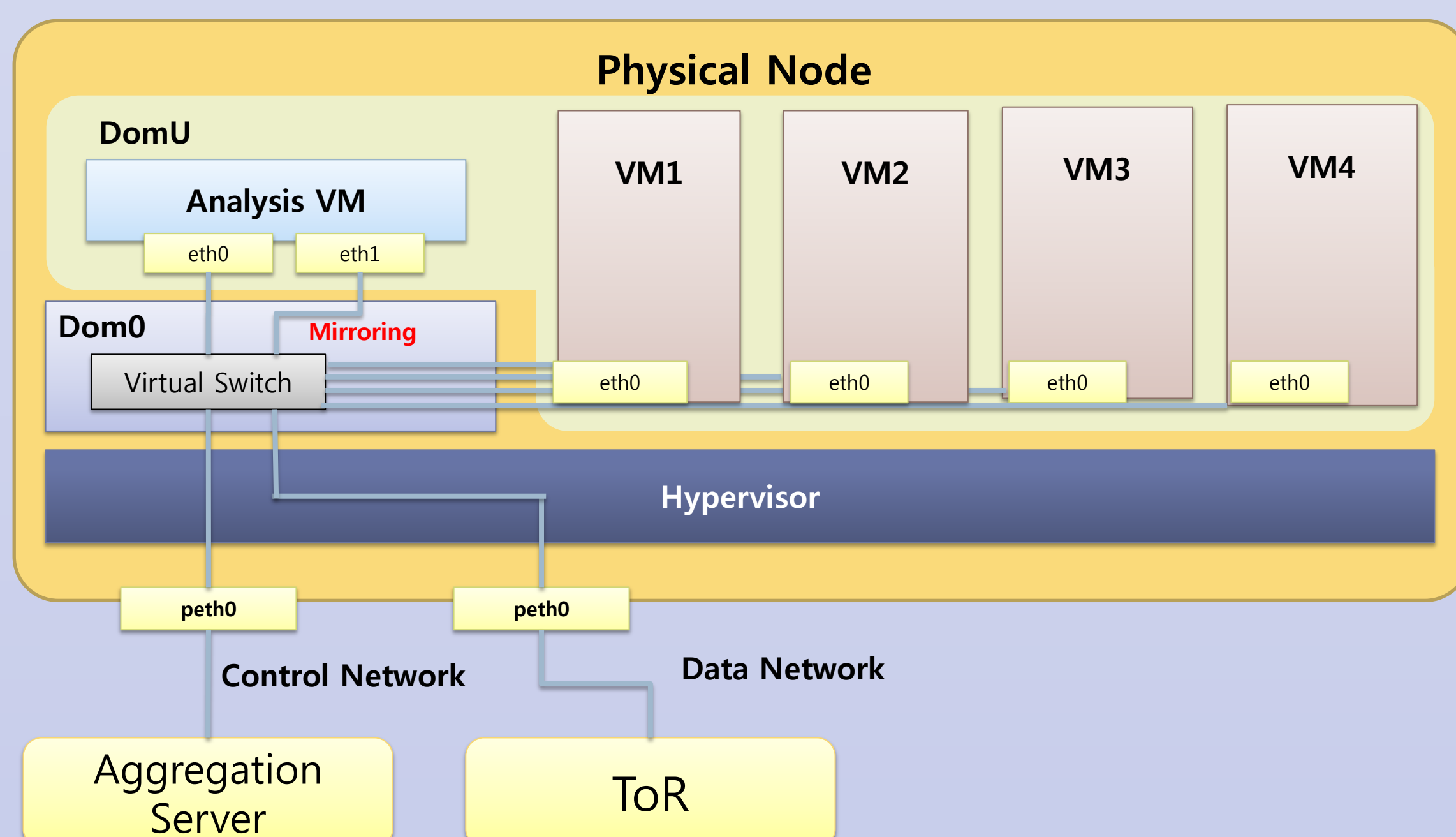
- Abstract network monitoring system from tenants
- Provide packet-level traffic monitoring while minimizing overload of hypervisor



Sources: Cisco Global Cloud Index: Forecast and Methodology, 2010-2015

Proposed Methodology

Datacenter Traffic Monitoring Architecture



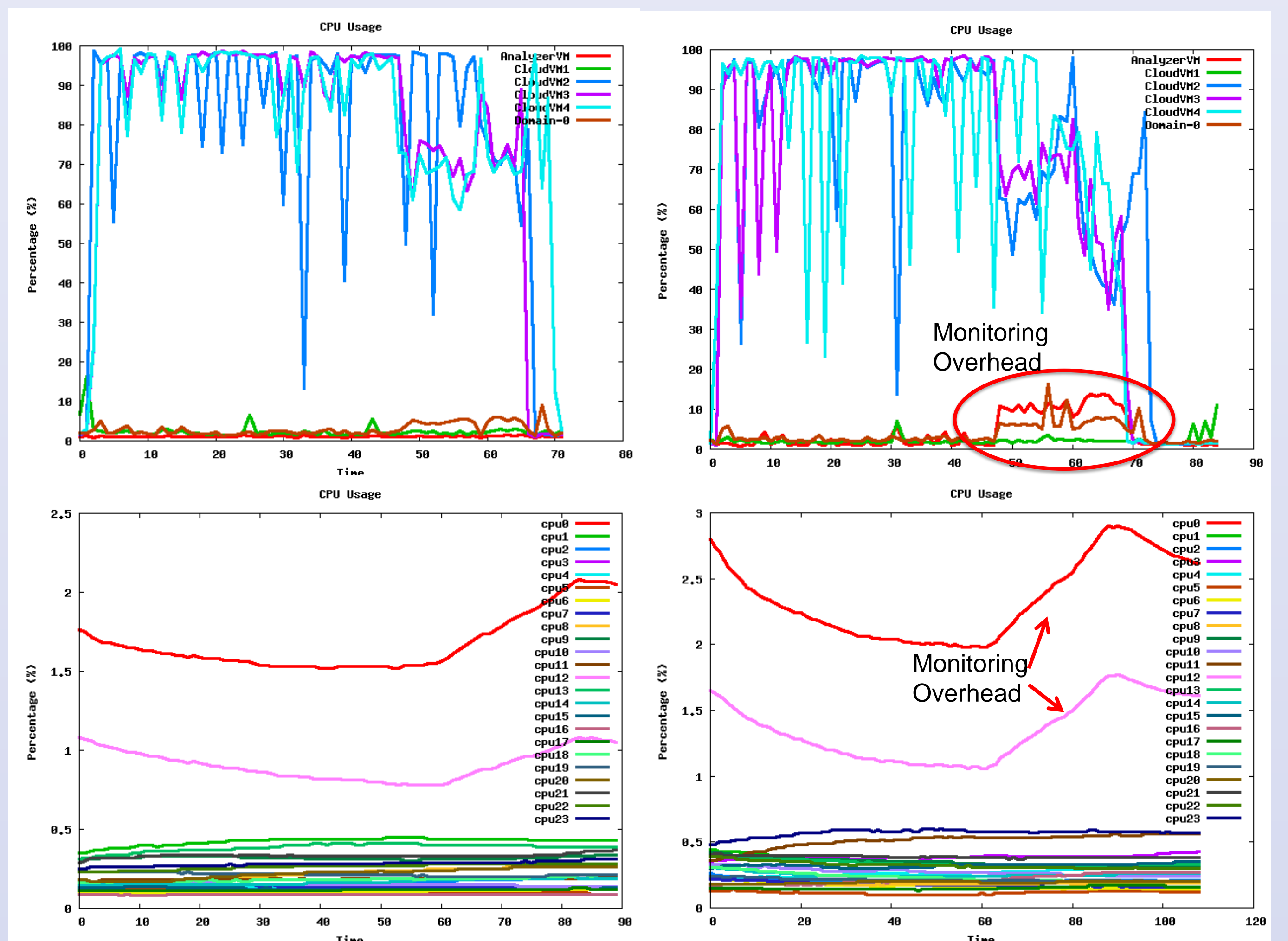
- Analysis VM:** To minimize overload of hypervisor, traffic analysis process is performed on **Analysis VM** which is allocated in user domain (DomU).
- Traffic Mirroring:** While hypervisor can access entire HW resources, a VM in user domain cannot access virtual HW allocated to the other VMs. To avoid computation on hypervisor for traffic analysis, we use **traffic mirroring** technique to forward traffic directing to VMs into Analyzer VM.

Evaluation

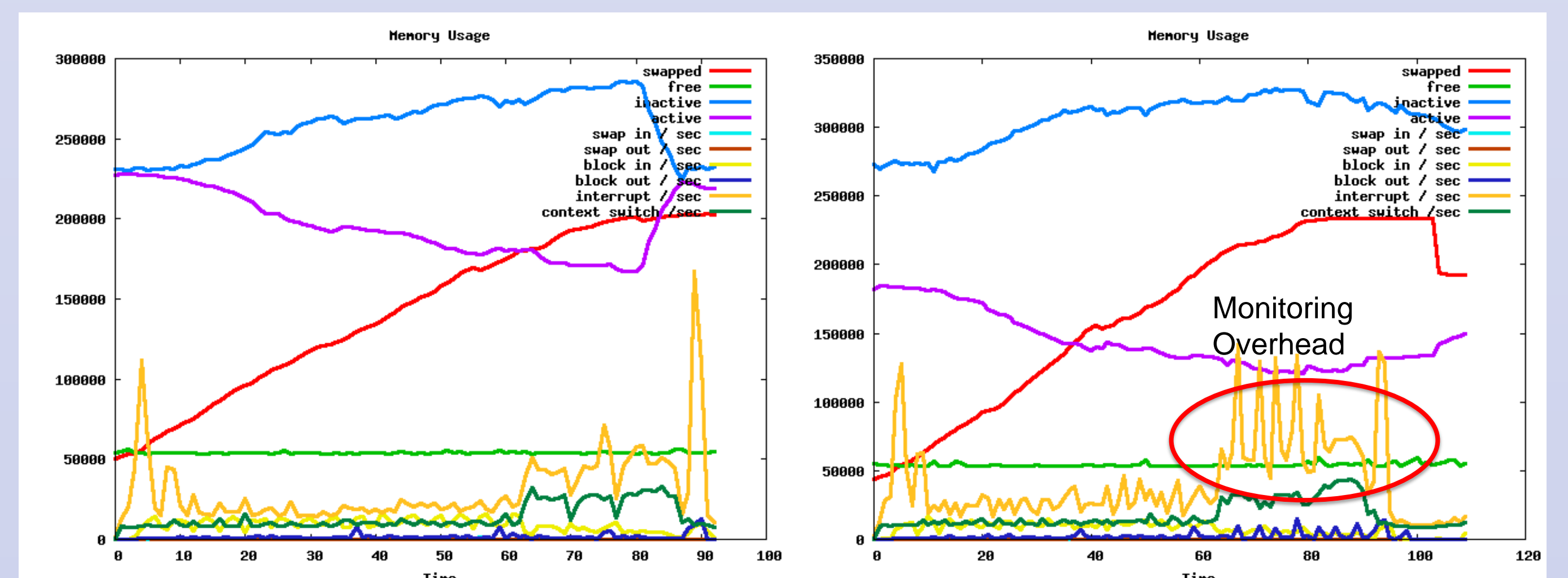
Job Completion Time

- Only 5% additional time is required until finishing Map-Reduce task.
- To count words in 7.3 GB dataset, the job completion time of the baseline configuration and traffic monitoring configuration is 909 seconds and 949 seconds respectively.

CPU Utilization



Memory Utilization



Conclusion

Summary

- Proposed datacenter traffic monitoring methodology using traffic mirroring of virtual switch
- Monitored VM-to-VM communication in datacenter
- Packet-level traffic monitoring
- Abstracted monitoring system from tenants

Future Work

- Aggregate traffic information of datacenter
- Perform stress test and show robustness
- Run system benchmark tool to measure the performance of the proposed datacenter traffic monitoring methodology