SDN Performance Monitoring

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SDN performance monitoring

- **At the control plane**
  - **performance monitoring of the SDN controller**
  - **Benchmarking Methodology for SDN Controller Performance draft-bhuvan-bmwg-sdn-controller-benchmark-meth-00**

- **At the data plane**
  - **performance monitoring of the network provided by the SDN**
  - **some recent frameworks being proposed to monitor QoS or other data plane related metrics**

SDN performance monitoring:
Some related works appearing in the last couple of years

- **PayLess: A Low Cost Network Monitoring Framework for Software Defined Networks**, S. Chowdhury et al., IEEE/IFIP Network Operations and Management Symposium (NOMS), 2014
- **OpenNetMon: Network monitoring in OpenFlow software-defined networks**, N. Van Adrichen et al., IEEE/IFIP Network Operations and Management Symposium (NOMS), 2014
- **Interactive Monitoring, Visualization, and Configuration of OpenFlow-Based SDN**, P. Isolani et al., IFIP/IEEE Symposium on Integrated Network and Service Management (IM), 2015
- **Scalable Software-Defined Monitoring**, P. Sköldström et al., presented at SDNRG in IETF 92, Dallas, TX, USA, March 2015.

Why SDN performance monitoring?

- Applications
  - QoS management
  - Link / flow usage
  - Anomaly detection
  - Traffic matrix estimation
  - Traffic engineering
  - ...

What to measure in SDN

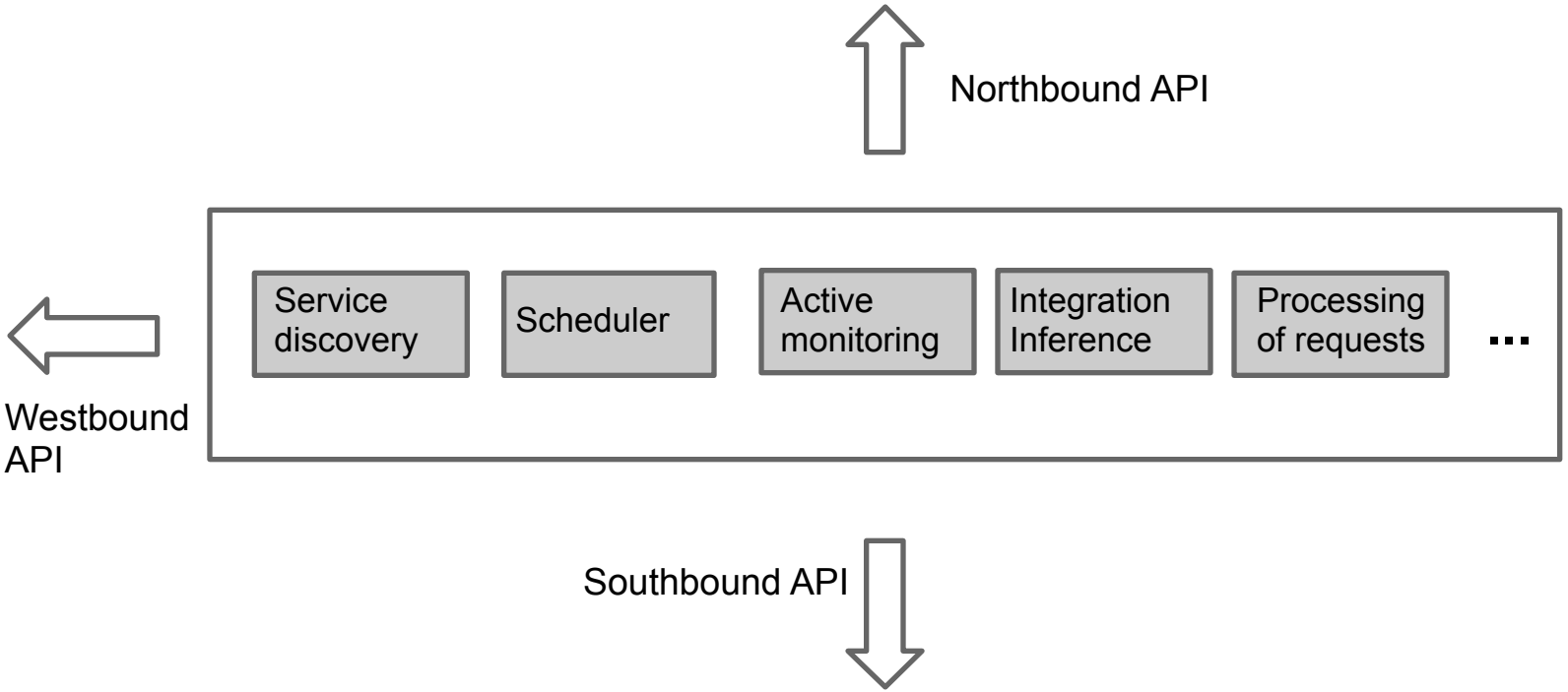
- Collect available data
  - From SDN switches / routers
  - From SDN controllers
  - From NFVs
  - From active measurements
  - …
- Use gathered data to infer other measures

A reference architecture for SDN performance monitoring?

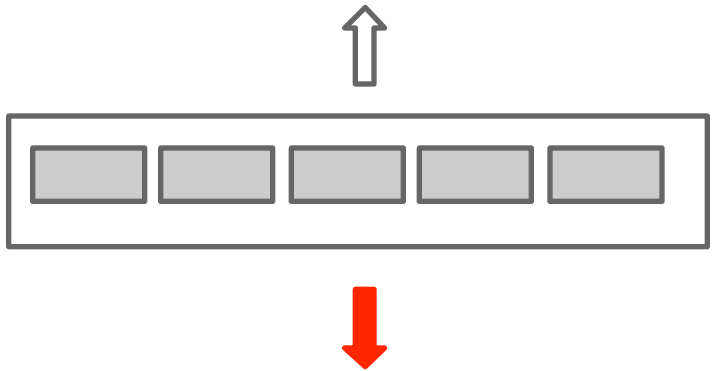
- Current SDN performance monitoring frameworks are ad hoc initiatives and typically OpenFlow oriented

- A general agnostic reference architecture for SDN performance monitoring may be useful

Reference architecture proposal

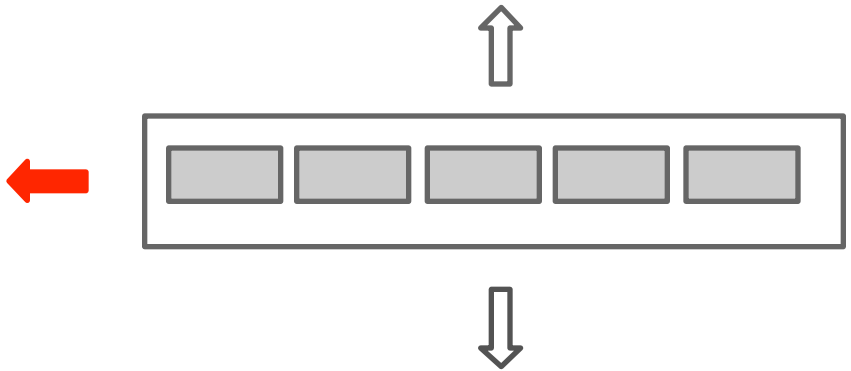


Reference architecture interfaces



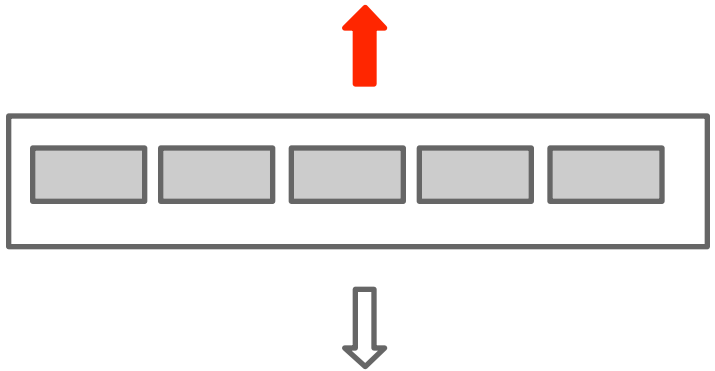
- Southbound interface
  - Collects monitoring data from the SDN data plane

Reference architecture interfaces



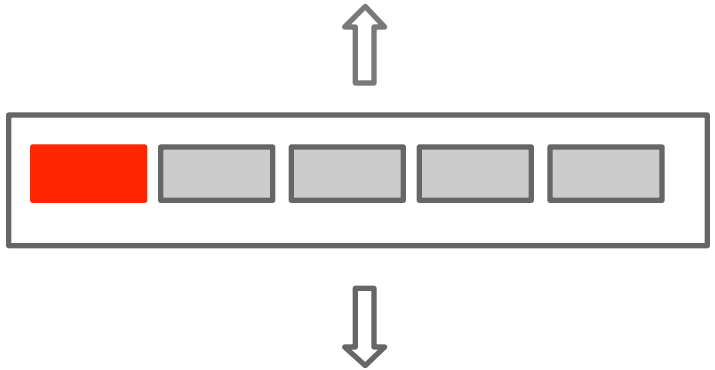
- Westbound interface
  - Collects monitoring data from the SDN control plane

Reference architecture interfaces



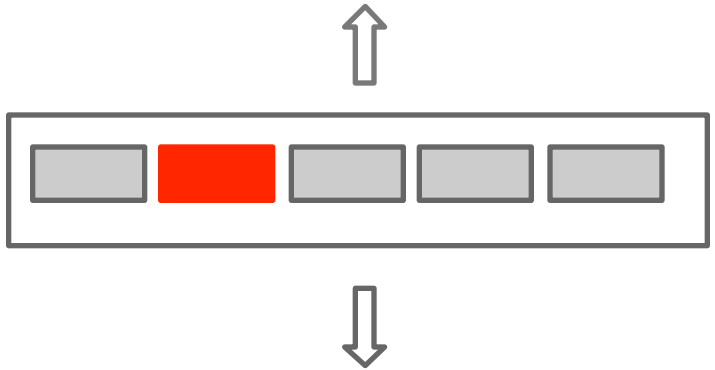
- Northbound interface
  - Provides performance measurements for SDN applications

Reference architecture interfaces



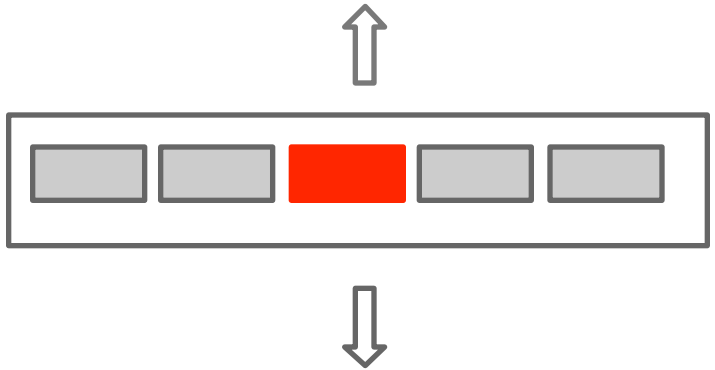
- Service discovery
  - Discovery of available monitored devices and data provided by them
  - Selection of data needed for performing the desired monitoring functions

Reference architecture interfaces



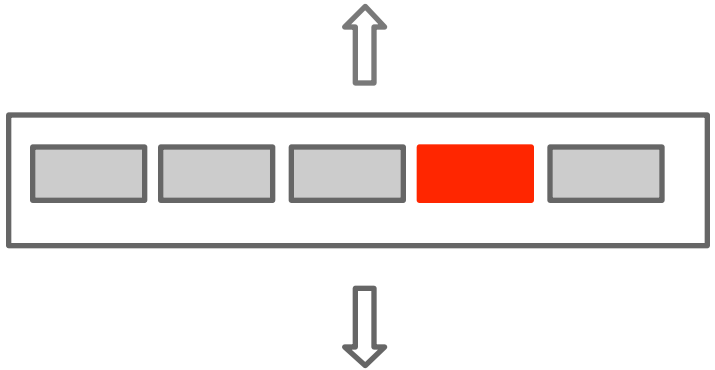
- Scheduler
  - Scheduling of data pull and push (if available) from devices
  - Scheduling of active measurements

Reference architecture interfaces



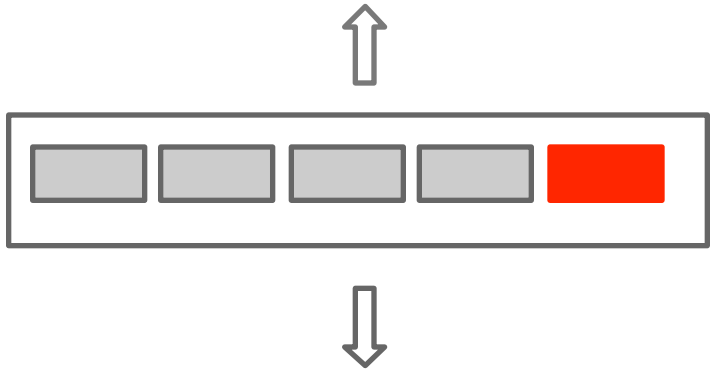
- Active monitoring
  - Execution of active measurements

Reference architecture interfaces



- Integration and inference
  - Integration of data received from all devices by passive and active measurements
  - Inference of indirect measures from the available data

Reference architecture interfaces



- Processing of requests
  - Analysis of the monitoring requests received
  - Configuration and scheduling of measurements required to fulfil the requests received from client applications

Next steps

- We believe it is worth addressing these issues by working in a draft like
  - “A Reference Architecture for SDN Performance Monitoring”
- Suggestions are, of course, welcome!

Thanks!

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