

Monitoring IT infrastructure of Telekom Slovenia using Nagios

Agenda

- Telekom Slovenije Group
- Monitoring definition
- Which monitoring tool
- Our monitoring system
- Availability and performance monitoring
- Collecting and Presenting Results
- Using Measurement Results
- SMARTS umbrella system
- The future

Telekom Slovenije Group

Key Facts

- Telekom Slovenije is the leading Slovenian provider of electronic communications.
- Provides high-end mobile, fixed and IP communications, multimedia content, and services to residential and business users.
- Telekom Slovenije Group is present in several markets in SE Europe, in Macedonia, Bosnia and Herzegovina, Kosovo and Albania.
- Listed on the Ljubljana Stock Exchange.
- Stable ownership structure, with the Slovenian state as the majority shareholder (72,38%)



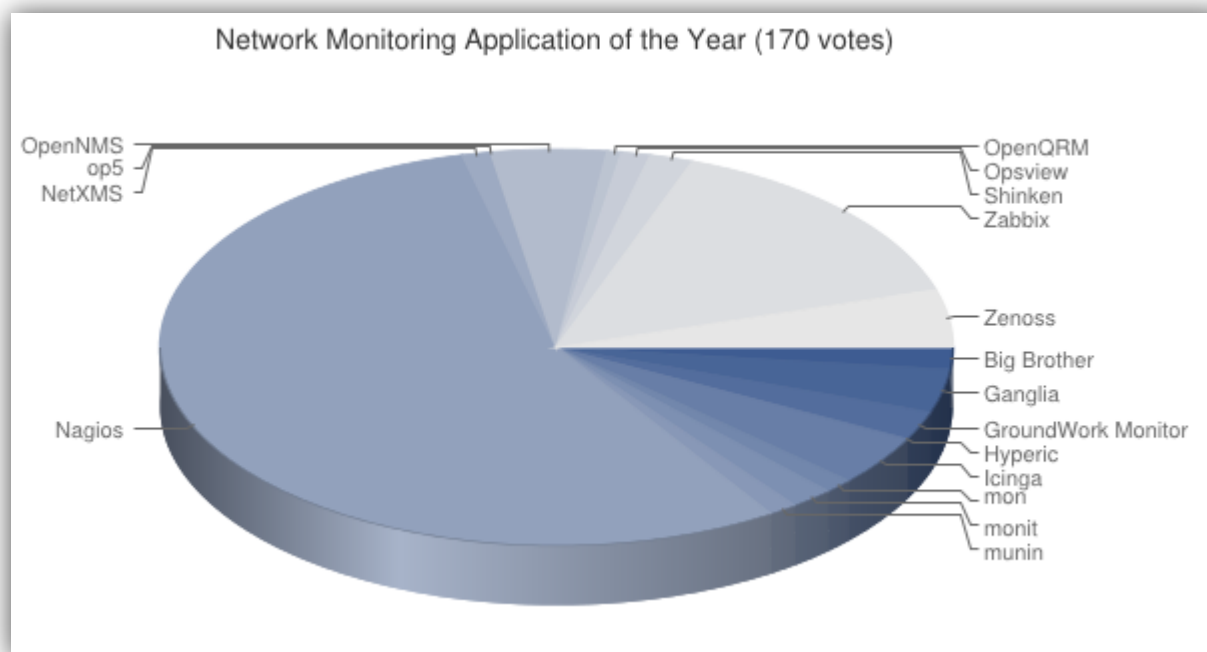
What is monitoring?

„Compare facts with expectations.“

Péter Koczkás
Solution Architect at IT Services Hungary Kft.

Nagios

- “Nagios Is The Industry Standard In IT Infrastructure Monitoring”



LinuxQuestions.org Members Choice Award 2013

5 years ago



- Slow
- Not scalable
- Limited use

Today

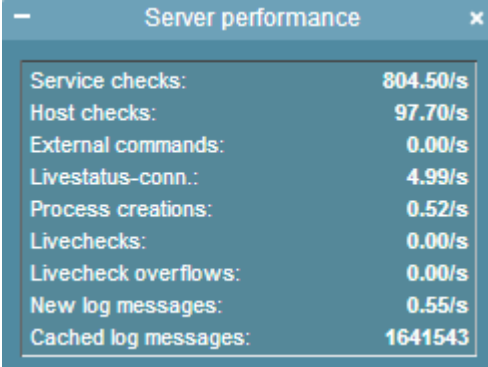
- Using Nagios Core 3
- IP/MPLS Core & Access
- +18 Nagios instances

- Summary:
 - 11500 hosts
 - 500 000 services



Our monitoring system

- Is fast
- Is scalable
- Reduces downtimes and bussines loss
- Monitors network and IT infrastructure
- Fault & performance management
- Fast and simple overview

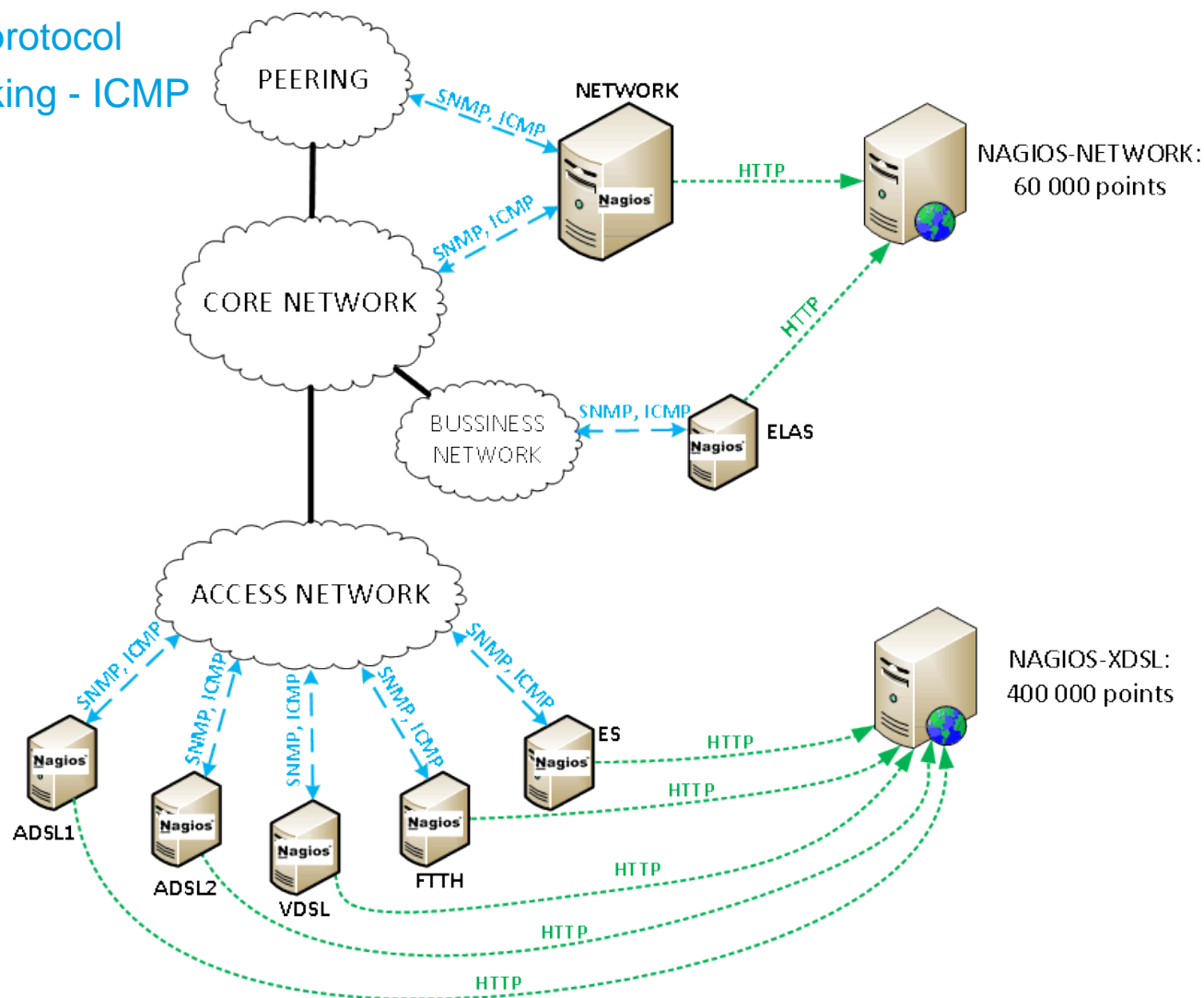


A screenshot of a Nagios server performance window titled "Server performance". The window displays a list of metrics and their current values per second. The metrics are: Service checks (804.50/s), Host checks (97.70/s), External commands (0.00/s), Livestatus-conn. (4.99/s), Process creations (0.52/s), Livechecks (0.00/s), Livecheck overflows (0.00/s), New log messages (0.55/s), and Cached log messages (1641543).

Service checks:	804.50/s
Host checks:	97.70/s
External commands:	0.00/s
Livestatus-conn.:	4.99/s
Process creations:	0.52/s
Livechecks:	0.00/s
Livecheck overflows:	0.00/s
New log messages:	0.55/s
Cached log messages:	1641543

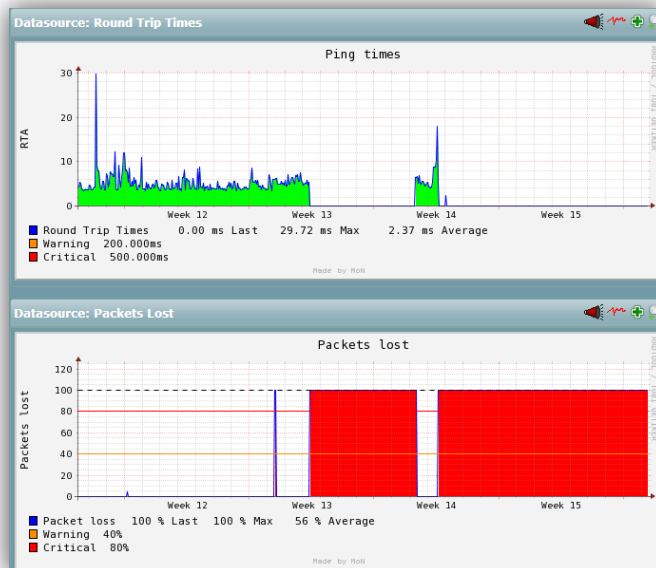
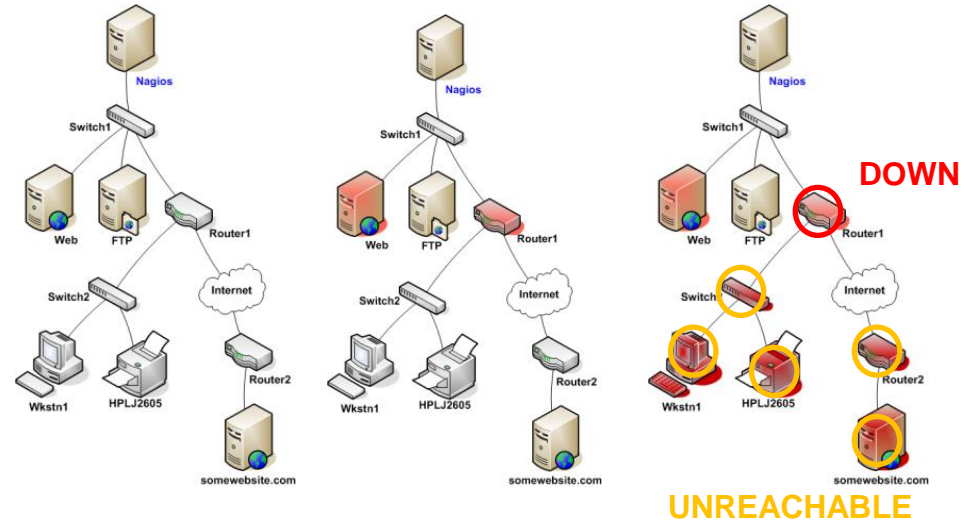
Monitoring Core and Access Network

- Polling - SNMP protocol
- Availability checking - ICMP



Avalibility

- ICMP
Check devices avalibility

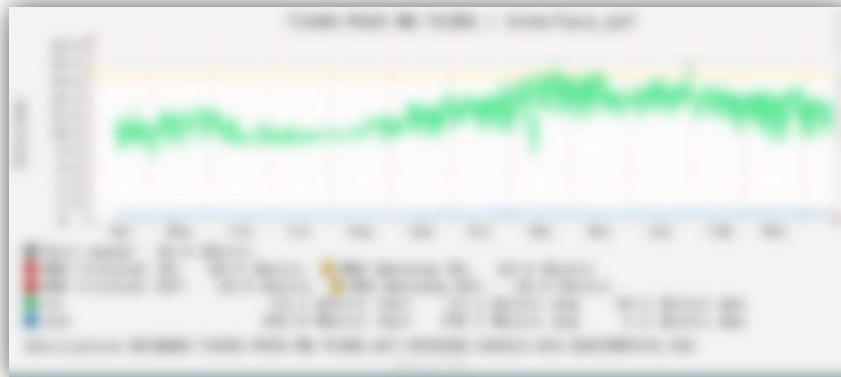


→ MS opens an alarm based on thresholds

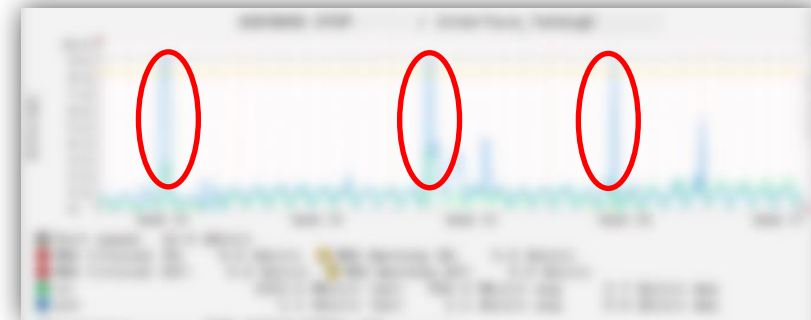
- Packet loss
- RTT

Performance monitoring

- SNMP polling



Collecting couter data
from monitored objects



MS opens an alarm
ticket based on
thresholds

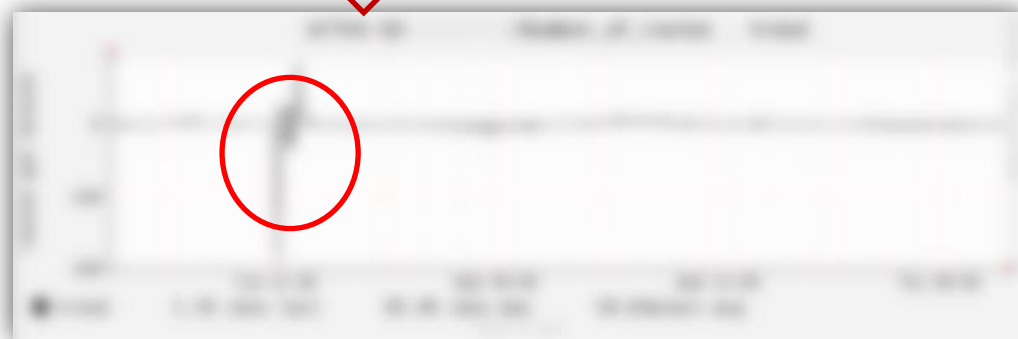
Presenting Results

- Calculated data presented **in a different way**



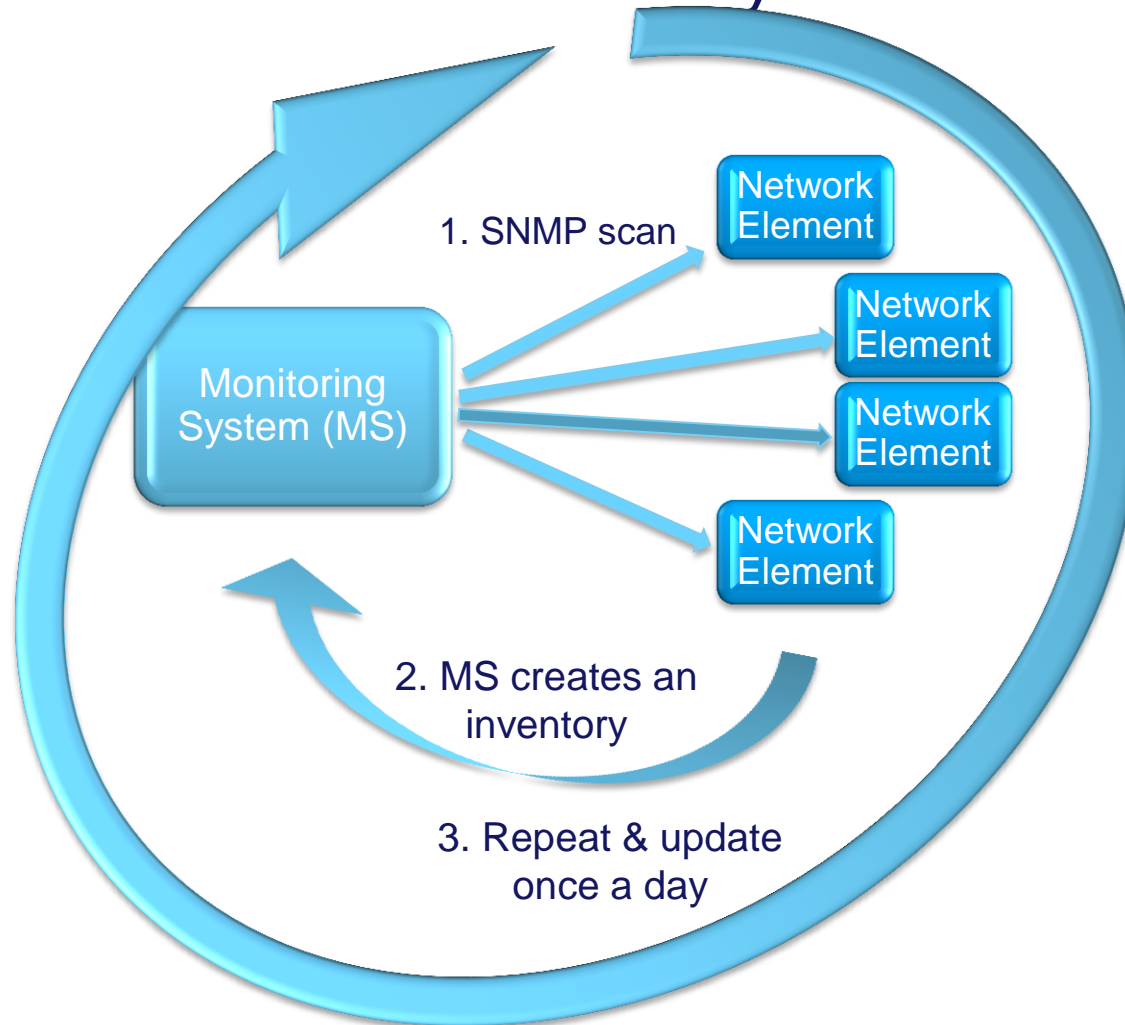
This does not look interesting?

(last result) – (previous result) = **trend**



Fast change indicates problem in lower layers of the network

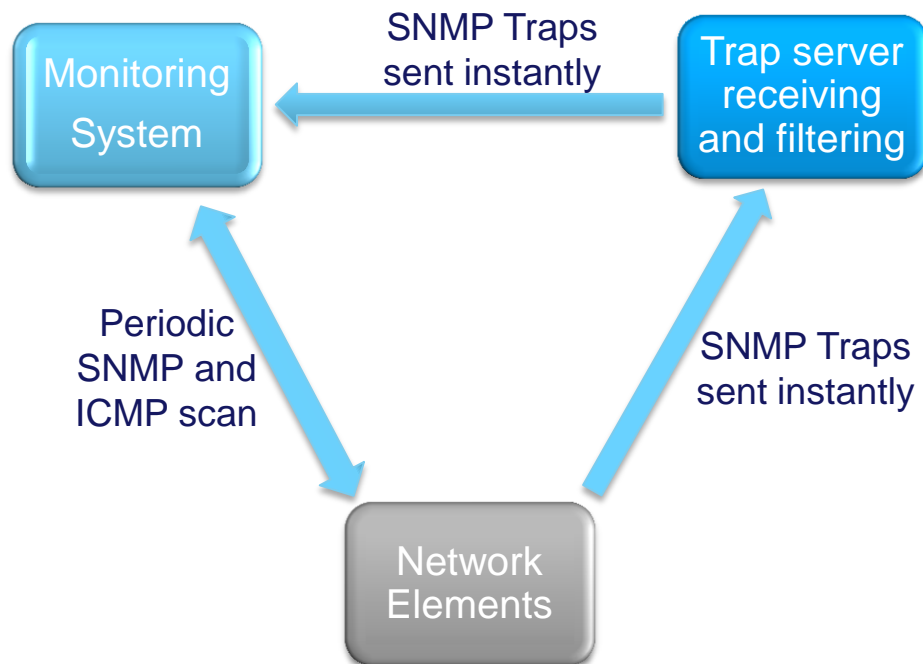
Built and Maintain Inventory



Result: Automatic updated MS!

SNMP Traps

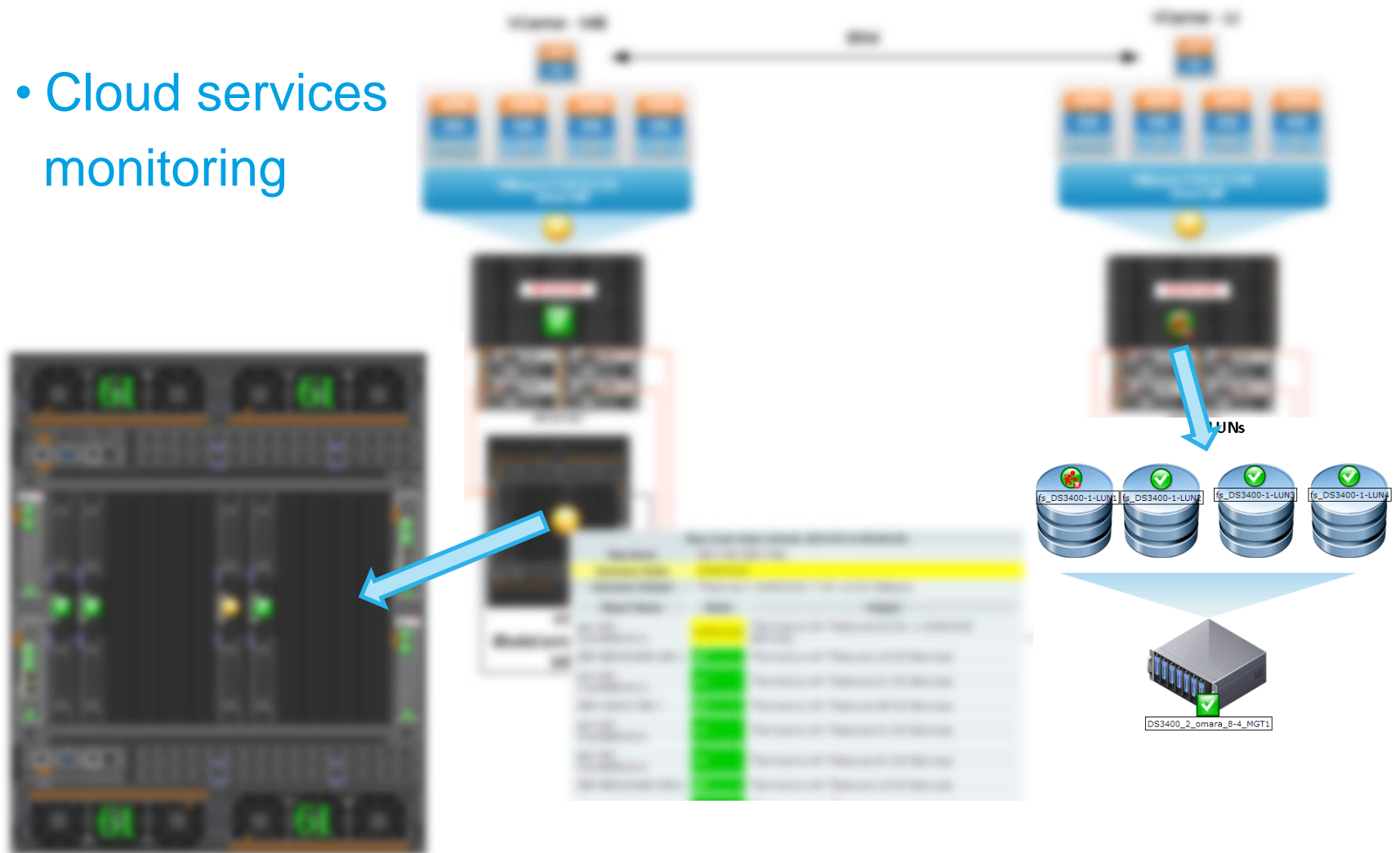
- Resolves problems with Collecting results and Processing results
- Using separate Trap server filtering traps avoids MS *event storms*



- Result: Real-Time monitoring!

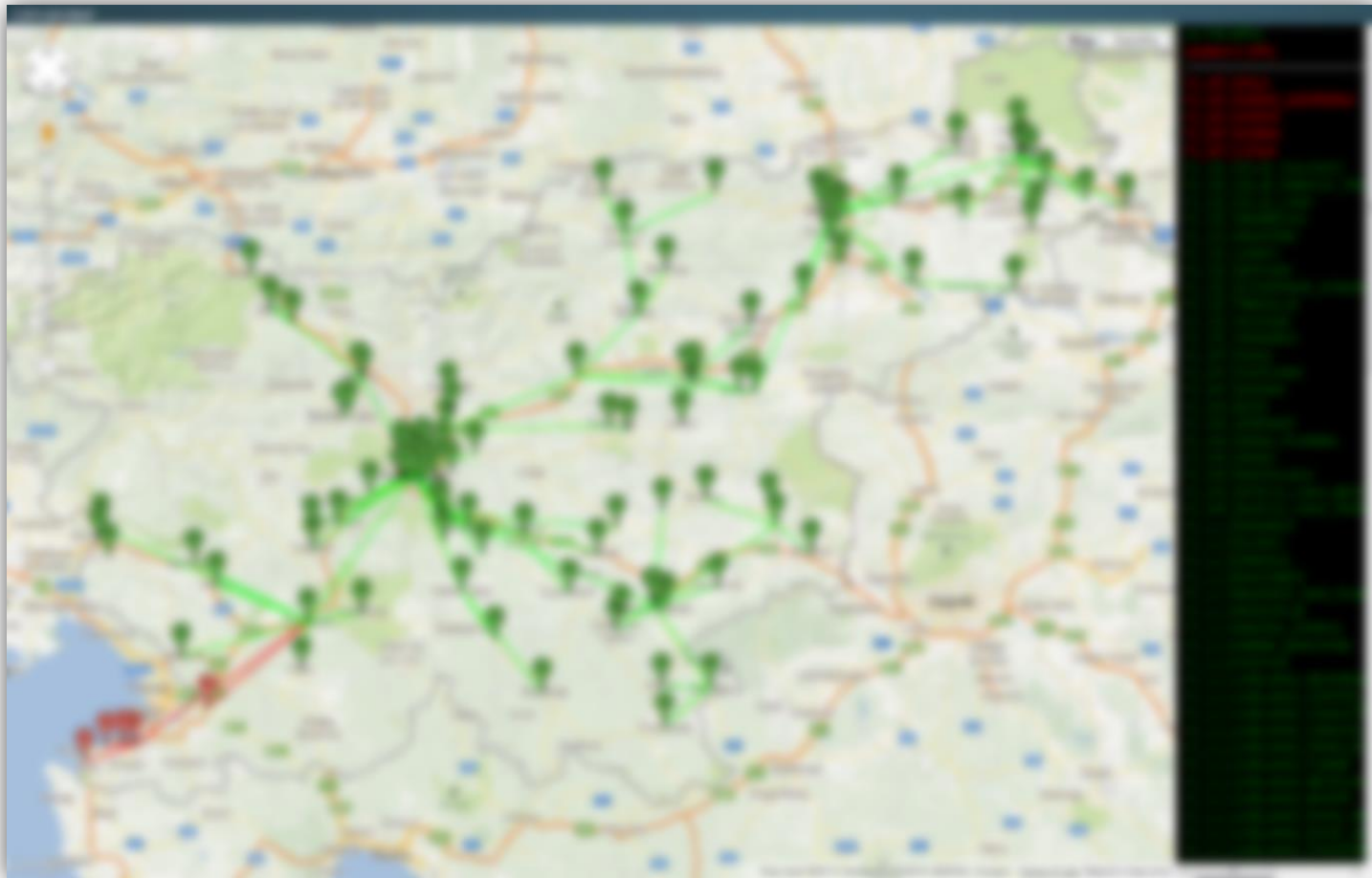
Weathermap

- Cloud services monitoring



Maps Integration

- Using maps to show status of hosts and services



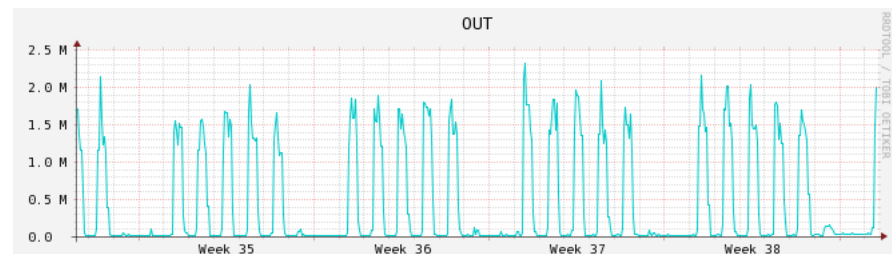
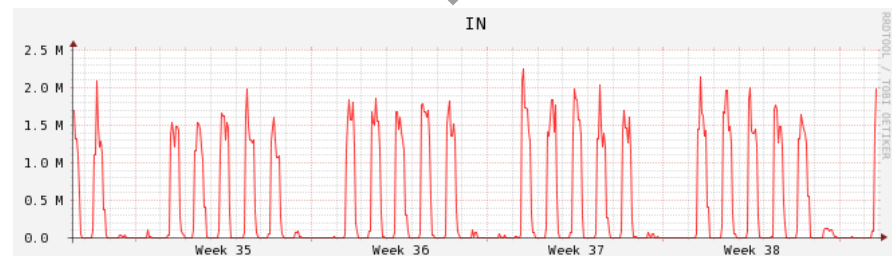
Traffic Engineering

- On demand traffic summarization



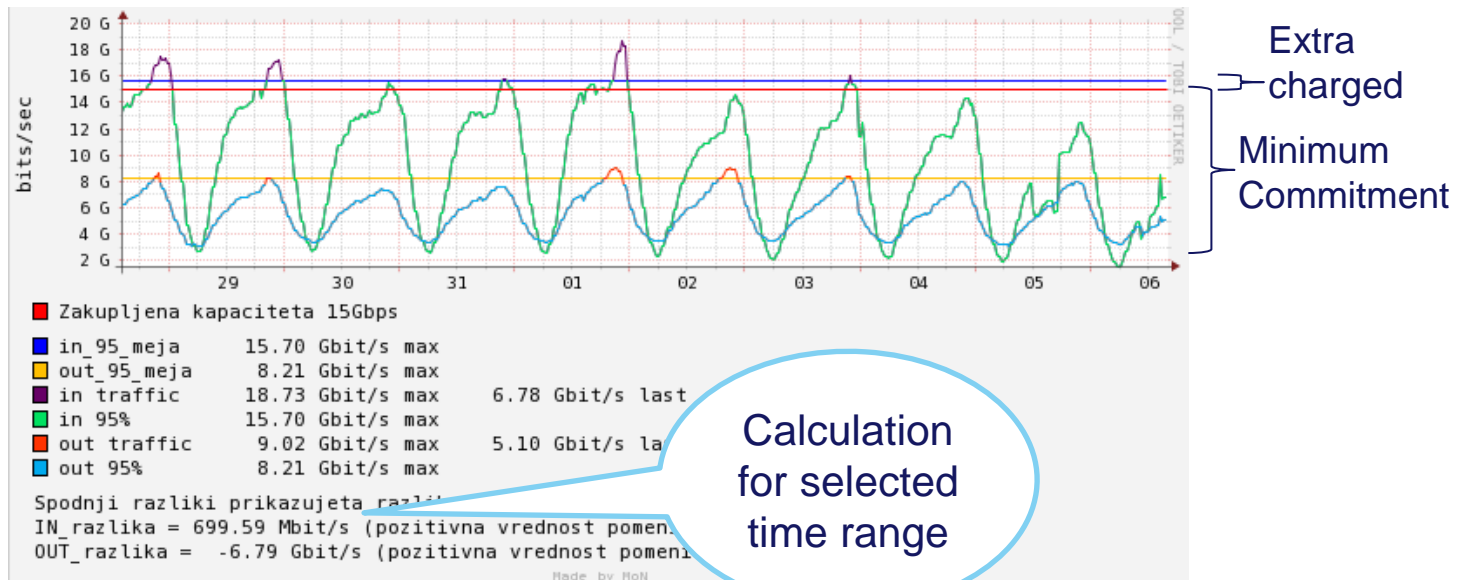
```

CRO09-LAR-KR-JEBENICE/Interface_DigabitEthernet3/17.910.64502/16-INC-C2960-VPN-GENERIK-SP-T-ACRONI-3M
CRO09-LAR-KR-RASNOVA_204/Interface_DigabitEthernet3/16.904.64502/12-8HD-VPN-GENERIK-SP-T-DOOK-JENKA-BENEDEK-1M
CRO09-LAR-LJ-CANKARJEVODM/Interface_DigabitEthernet3/12.910.64504/07-INC-C2960-VPN-GENERIK-SP-T-US-INSTITUT-JOZEF-STEFAN-PR
CRO09-LAR-LJ-CANKARJEVODM/Interface_DigabitEthernet3/12.910.64504/07-INC-C2960-VPN-GENERIK-SP-T-ADUIM
CRO09-LAR-LJ-CANKARJEVODM/Interface_DigabitEthernet3/12.910.64504/07-INC-C2960-VPN-GENERIK-SP-T-MALADINSKA-KOJUGA-TRGOVINA-DO
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/15.905.64504/13-8HD-VPN-GENERIK-SP-T-GADN-SKA-BROJICA-VUKOVA-2M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/15.905.64504/13-8HD-VPN-GENERIK-SP-T-ZRMC-HOLDING-DIMCEVA-2M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/15.905.64504/13-8HD-VPN-GENERIK-SP-T-VALETOV-1M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/15.907.64505/03-8HD-VPN-GENERIK-SP-T-ZAJRNOVALNICA-MERUR-1M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/15.907.64505/03-8HD-VPN-GENERIK-SP-T-642-3M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.904.64505/06-8HD-VPN-GENERIK-SP-T-FAKOLETA-ZA-UPRAVNO-DOSARUEVA-2M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.904.64505/06-8HD-VPN-GENERIK-SP-T-GENI-DUNAJSKA-15M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.909.64505/06-INC-C2960-VPN-GENERIK-SP-T-AC-MOBL-AMPOP-BARAGOVA-1M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.910.64505/06-INC-C2960-VPN-GENERIK-SP-T-CAK-ERIC-AMPOP-BARAGOVA-1M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.911.64505/10-INC-C2960-VPN-GENERIK-SP-T-AUTO-TRGLAVA-MPOP-BARAGOVA-1
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.912.64505/12-INC-C2960-VPN-GENERIK-SP-T-AUTOCOMMERCE-MPOP-BARAGOVA-2
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.913.64505/06-INC-C2960-VPN-GENERIK-SP-T-ERSTE-CARD-DOO-5M
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.917.64504/09-INC-C2960-VPN-GENERIK-SP-T-BANKA-VOLKSBANK-DUNAJSKA-12
CRO09-LAR-LJ-CIGALETOVA/Interface_DigabitEthernet3/16.909.64505/14-8HD-VPN-GENERIK-SP-T-TRINAV-VEROVSKA-3M
CRO09-LAR-LJ-CROKICE/Interface_DigabitEthernet3/13.902.64504/04-INC-C2960-VPN-GENERIK-SP-T-TOYOTA-ADRA-1M
CRO09-LAR-LJ-CROKICE/Interface_DigabitEthernet3/13.902.64504/04-INC-C2960-VPN-GENERIK-SP-T-4S-INSTITUT-JOZEF-STEFAN-8R
CRO09-LAR-LJ-CROKICE/Interface_DigabitEthernet3/13.902.64504/04-INC-C2960-VPN-GENERIK-SP-T-ODAST-CROSI-PLJE-4M
CRO09-LAR-LJ-CROKICE/Interface_DigabitEthernet3/13.902.64504/04-INC-C2960-VPN-GENERIK-SP-T-BAKOPOLIC-DOO-3M
CRO09-LAR-LJ-FRANCOVNA/Interface_DigabitEthernet3/17.903.65658/12-8HD-VPN-GENERIK-SP-T-ZAVOD-ZA-POSLOVANJE-LJMKARUEVA-2M
CRO09-LAR-LJ-VRNHNKA/Interface_DigabitEthernet3/18.902.64504/05-INC-C2960-VPN-GENERIK-SP-T-HALCON-TRIGLAVA-2M
CRO09-LAR-LJ-VRNHNKA/Interface_DigabitEthernet3/18.901.64503/32-INC-C2960-VPN-GENERIK-SP-T-FENOLIT-BOROVNICA-1M
  
```



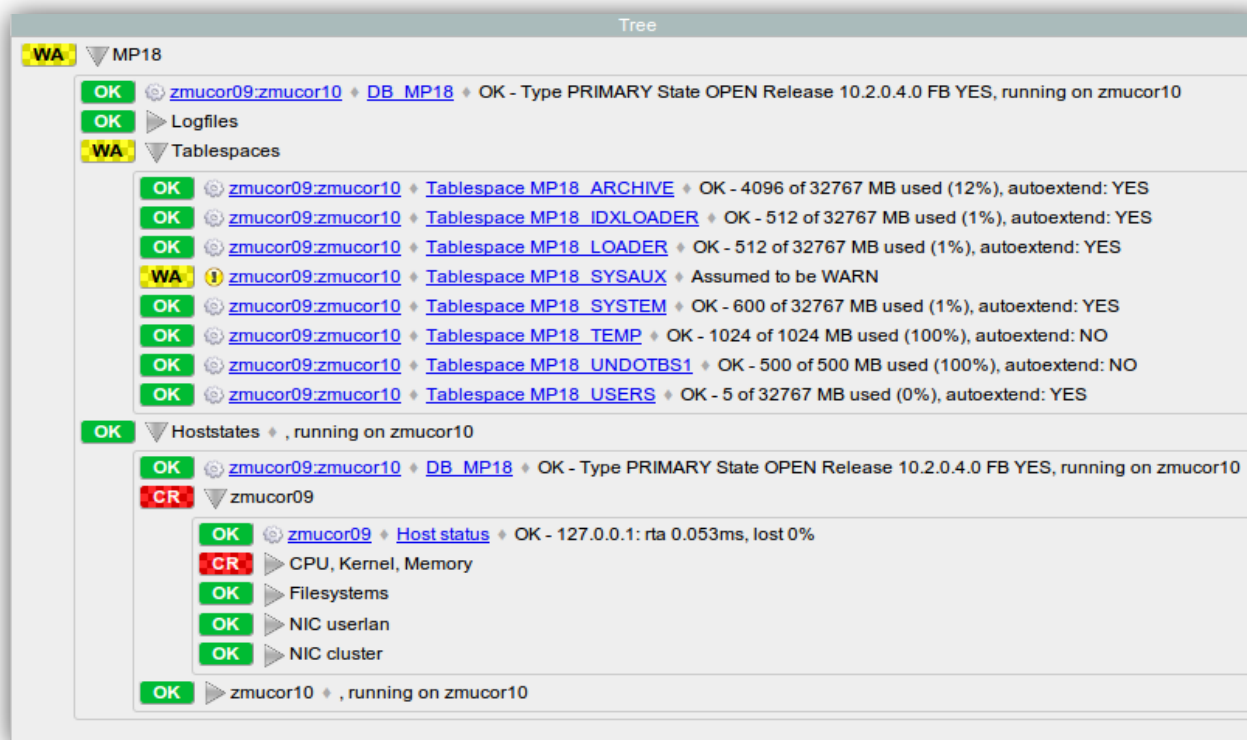
Burstable Billing

- Measuring bandwidth based on peak use
- Using 95th percentile to evaluate regular and sustained use of a network connection
- Avoid traffic burst on rented links



Service monitoring

- Top-level aggregated views
- Shows general status of service



Reporting

- Create SLA reports
- Custom email weekly reports
- Top utilization interfaces

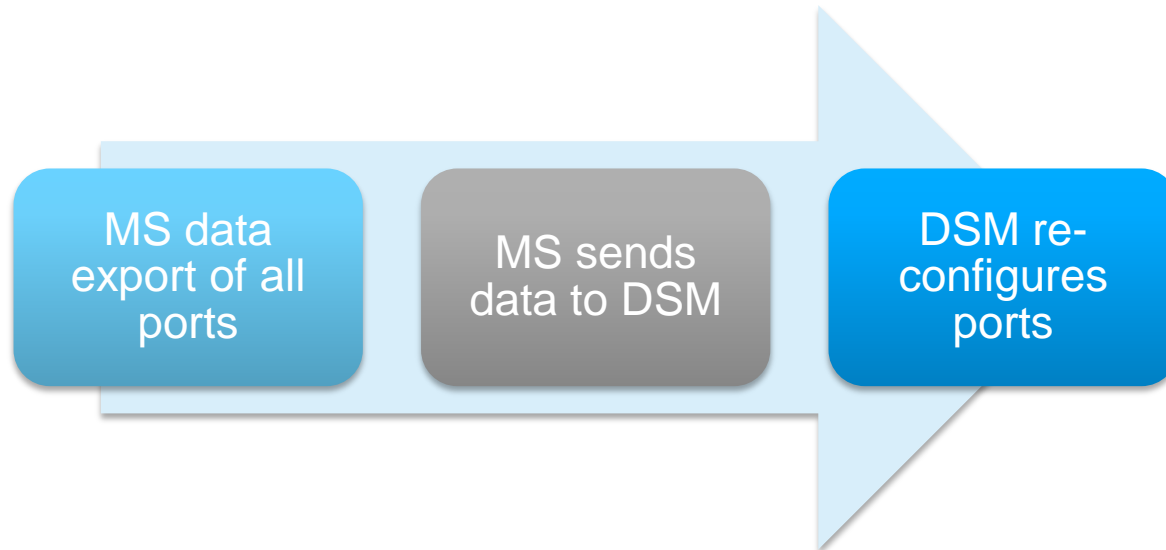
The screenshot displays two tables from the Nagios monitoring interface. The top table, titled 'Problemi in opozorila', lists services with columns for name, status, and other metrics. The bottom table, titled 'Problemi in opozorila (vse službe in naprave)', provides a more detailed view of service and device status, including columns for name, status, and various performance indicators.

This screenshot shows a table of service status in the Nagios interface. A prominent vertical green bar highlights a specific service or device, indicating a healthy or low-priority status. The table includes columns for service names and their corresponding status.

This screenshot displays a table of service status in the Nagios interface. A prominent vertical orange bar highlights a specific service or device, indicating a warning or high-priority status. The table includes columns for service names and their corresponding status.

Automatic Re-configuring User ADSL Ports

- Connecting Access Network MS with DSM
- Eliminates Near-End-Crosstalk (NEXT)



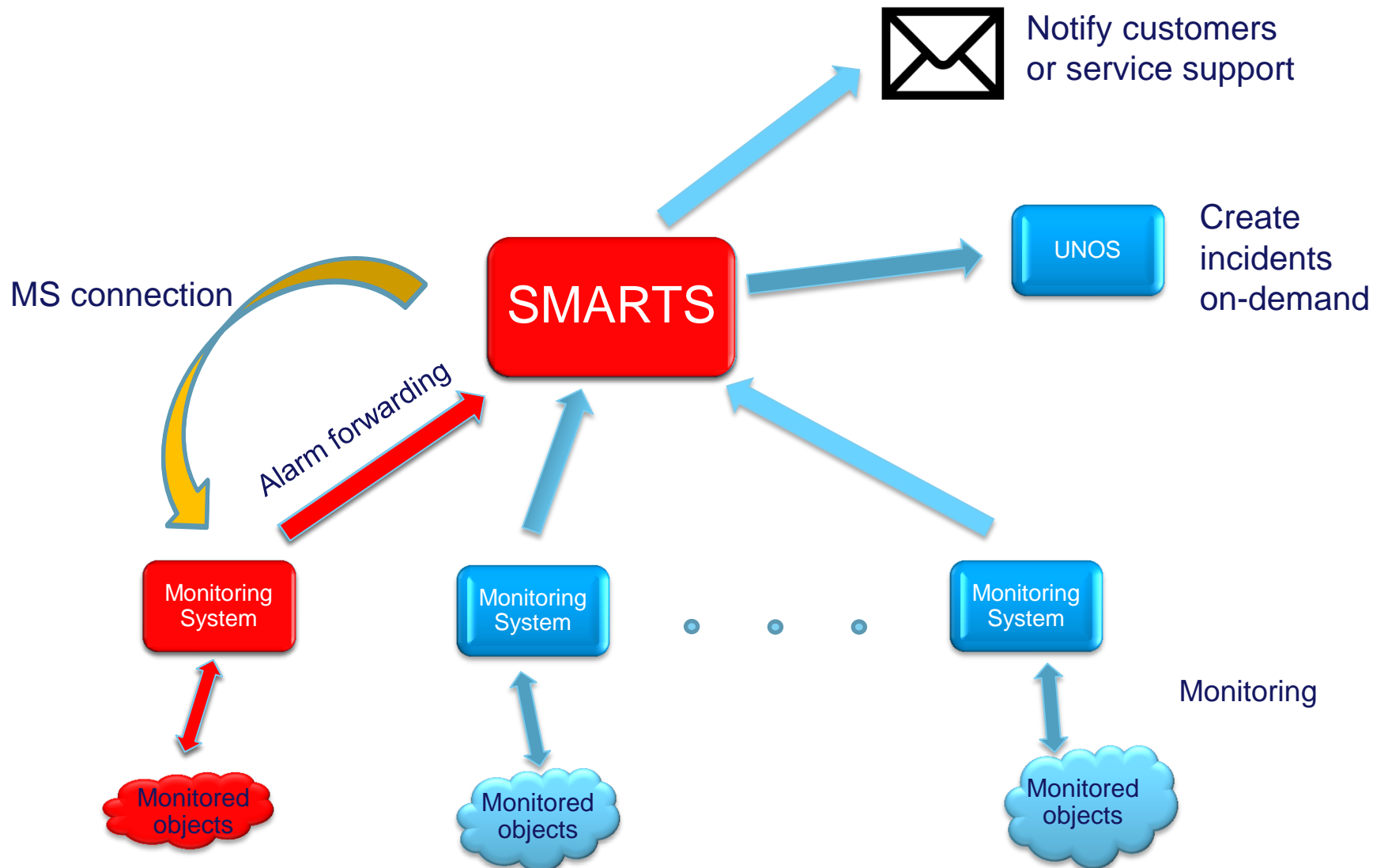
- Long term result: Better IPTV-user experience!

Introducing SMARTS

- Fast&Stable umbrella monitoring system
- Scalable
- In-House development

- Features:
 - Open incidents on-click
 - Notify customer
 - Acknowledge events
 - Can easily handle 1000 alarm msg/s
 - Fast webinterface

SMARTS: alerting



Tomorrow

- Using SMATS as umbrella monitoring system
- Monitor TS Group IT infrastructure
- 10+ starting projects for monitoring clients IT and network infrastructure
- Goal:
 - Reduce number of MS in TS group
 - Use Nagios for every system devices that supports ICMP/SNMP or agent monitoring

„Network monitoring is far more strategic than its name implies. It involves watching for problems 24/7, but it's also about optimizing data flow and access in a complex and changing environment.“ (cio.com)

Thank you

peter.groselj@telekom.si
mon.ip@telekom.si