Naložba v vašo prihodnost
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Evropski sklad za regionalni razvoj

KC Class
Cloud Assisted Services

Hybrid cloud monitoring

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UP IAM

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CLASS/Monitor

- Provides monitoring of IaaS by service provider and client
  - (internal and external monitoring)
- Provides tracking of adherence to SLA agreement
  - In real-time
  - notification by E-mail and SMS
- Supports hybrid cloud
- The observed cloud platforms:
  - VMWare
  - OpenStack
  - HyperV

CLASS/Monitor

- We implemented two monitoring systems:
  - BBmon
  - Cacti based solution (proof of concept)
- BBmon tested on three different IaaS – VMWare, OpenStack, and HyperV;
- Cacti based solution supports VMWare only

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CLASS/Monitor

- Encountered problems:
  - different degree of maturity of IaaS,
  - differences in supported functionality,
  - APIs are based on different concepts
  - OpenStack lacks monitoring of the host what we solved with Ganglia
- We plan to augment the system with failover servers for higher availability

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Monitoring properties comparison

- Reference feature set:
  - observed needed features
    - literature,
    - independent research.
- Observed feature sets (all platforms),
- intersection is almost full (except OpenStack).

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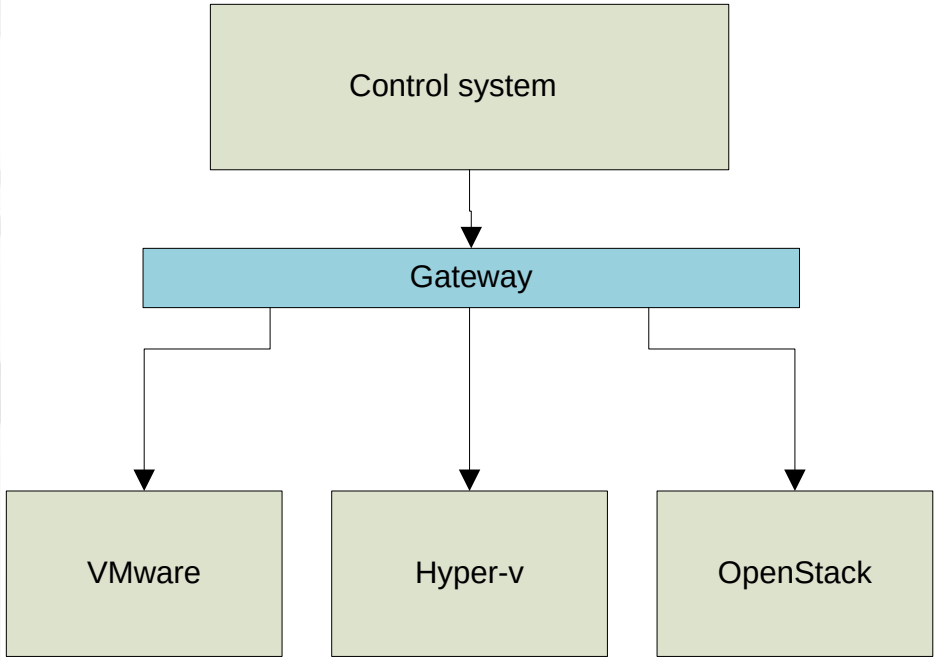
Monitoring properties comparison

- Openstack feature set
  - acceptable in all feature sets except:
    - low level (mostly hardware) monitoring.
- Proposed solution:
  - Ganglia monitoring system,
  - opensource,
  - simple interface,
  - vast palette of installations.

Consideration of possible architectures: using a gateway



Properties:

- The control system communicates via the same protocol with different virtual platforms.
- No need to install special software on each virtual platform.
- A Gateway (translation interface) has to be implemented for each virtual platform.

Consideration of possible architectures: using a gateway

Pros:

- all controlled systems are presented in the same way
  - easier to scale,
  - similar approach is known in network management (SNMP).

Cons:

- Complex implementation.

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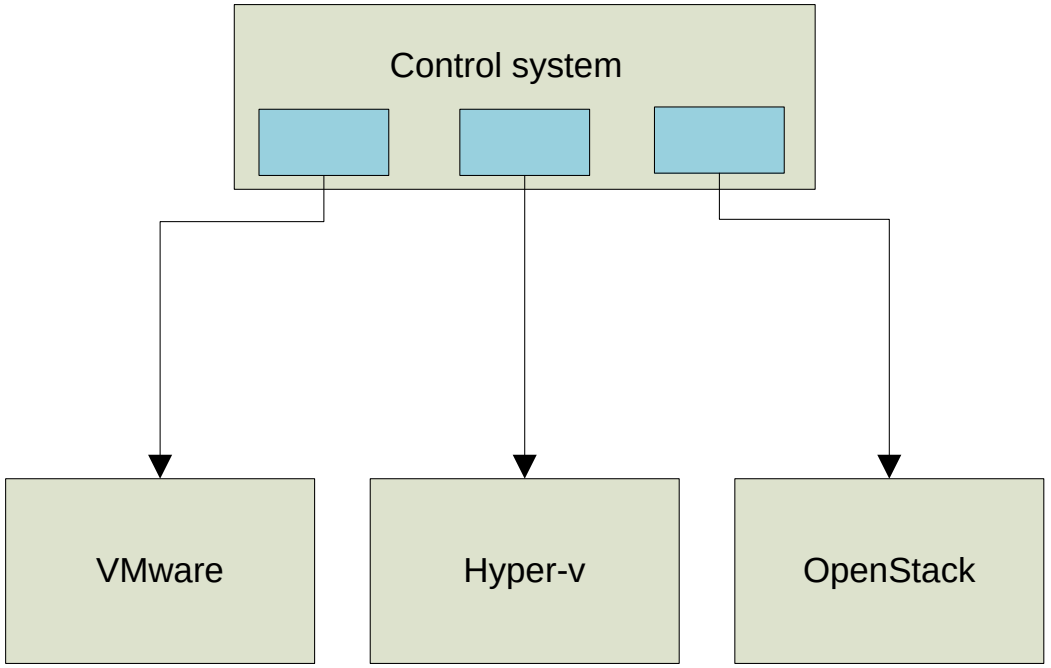
Consideration of possible architectures: using a direct interface



Properties:

- The control system communicates directly through the interface.
- The access to these interfaces is possible via additional software.
- Modules can also be implemented as plug-ins.

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Consideration of possible architectures: using a direct interface

Pros:

- easier debugging,
- better error control,
- simpler implementation.

Cons:

- difficult maintenance,
- poor scalability.

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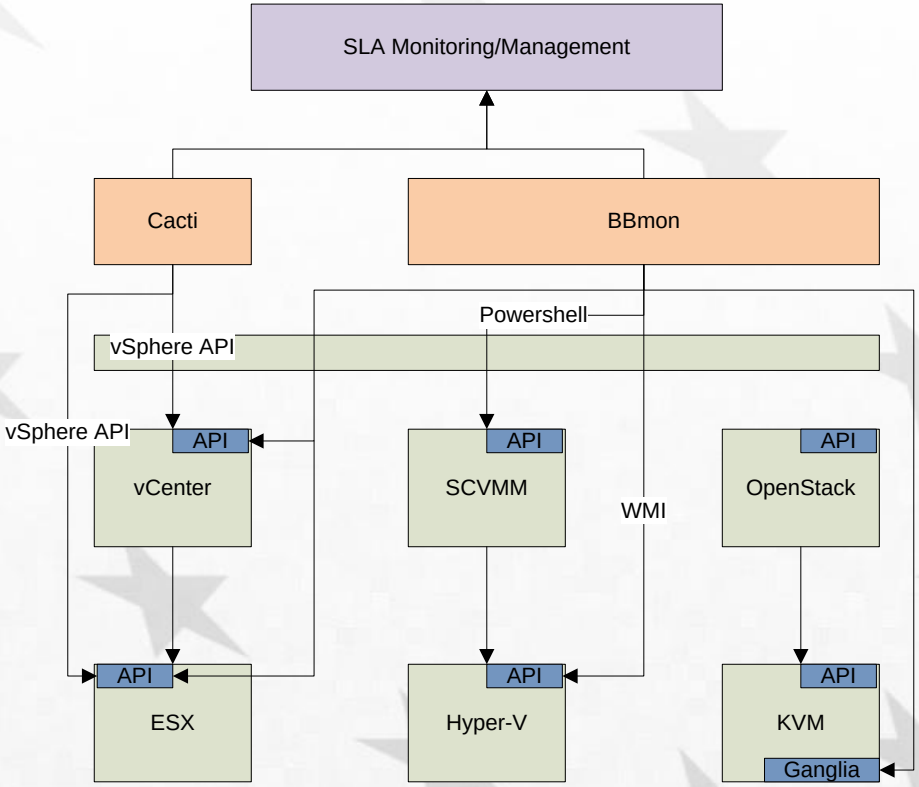
The implemented architecture of CLASS/Monitor



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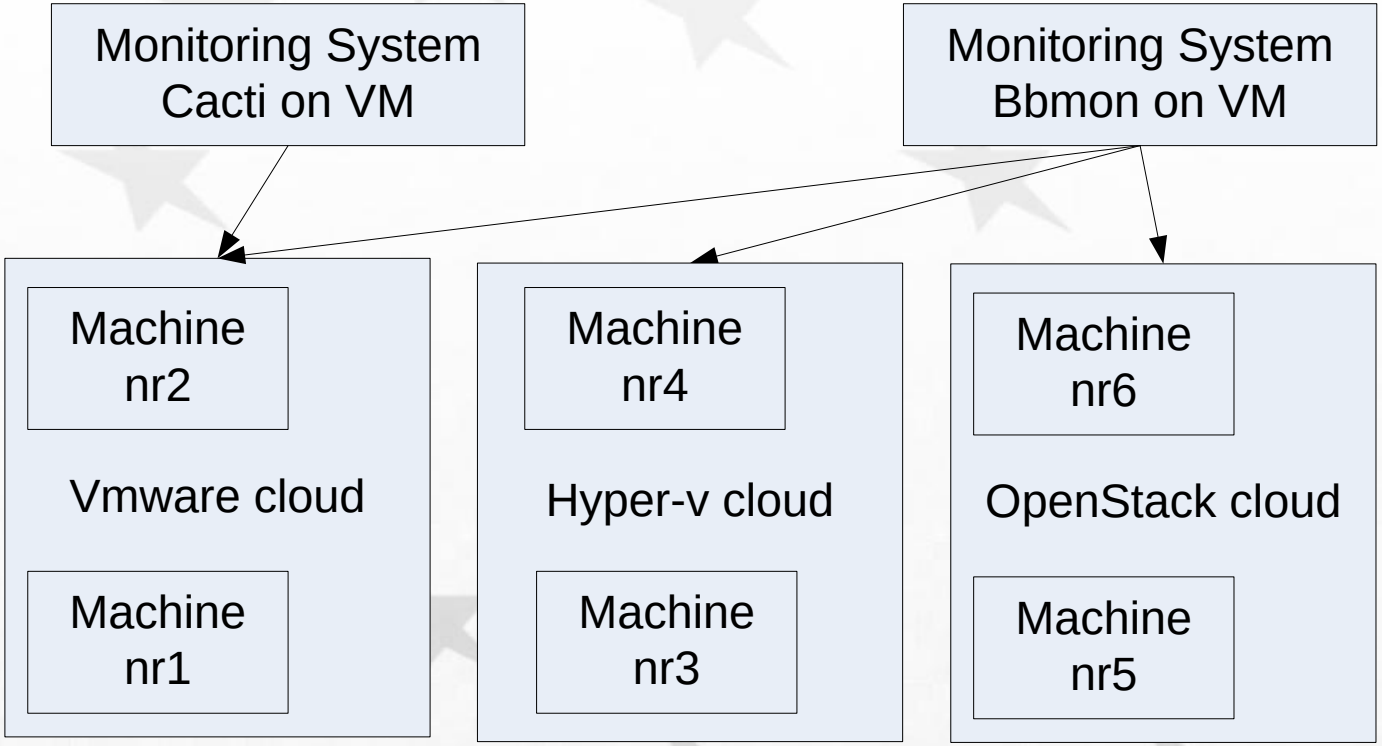
The testing environment



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Cloud Assisted Services

KC Class SLA Monitoring

BBmon Monitoring and BBmonSLA

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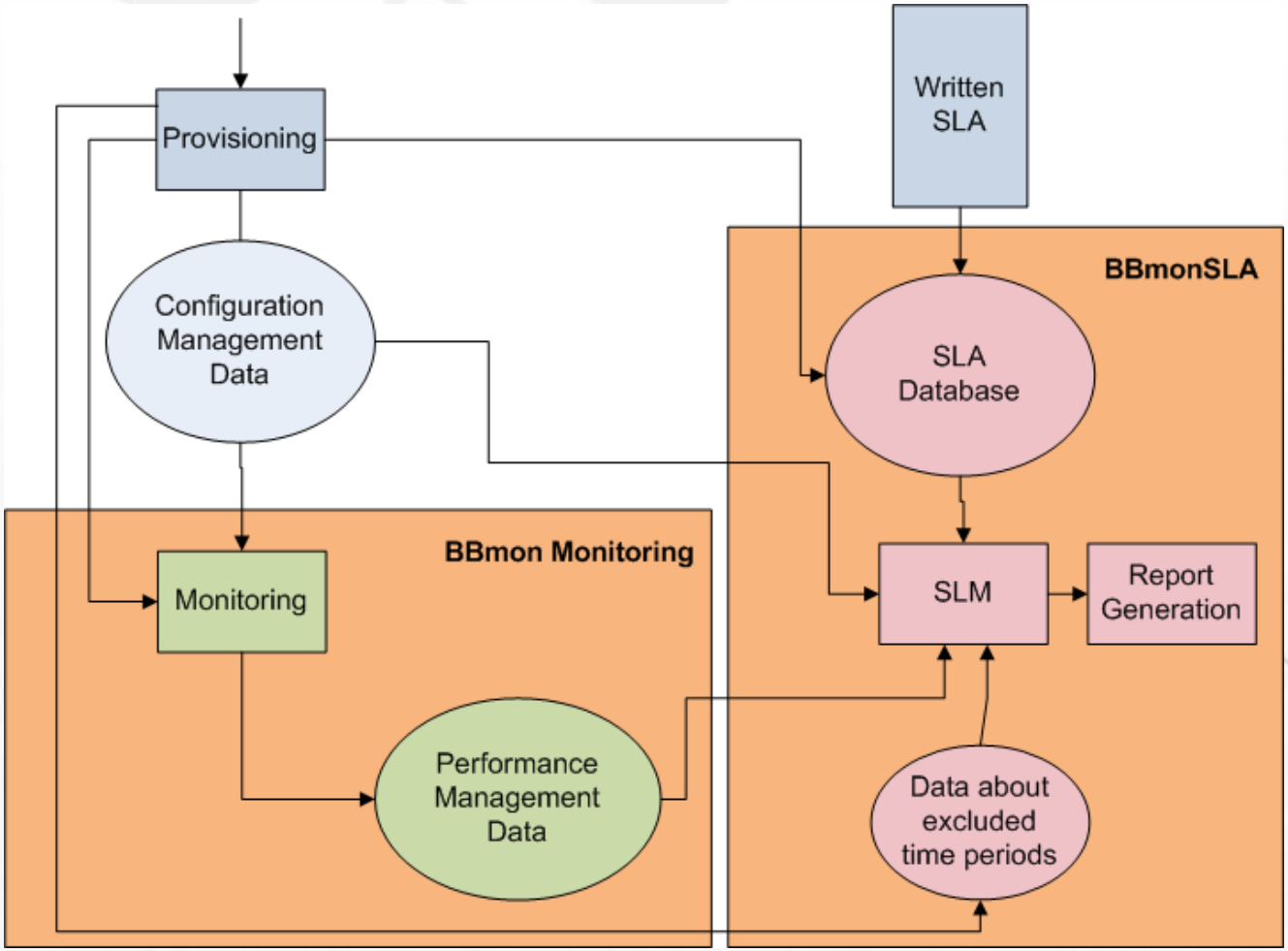
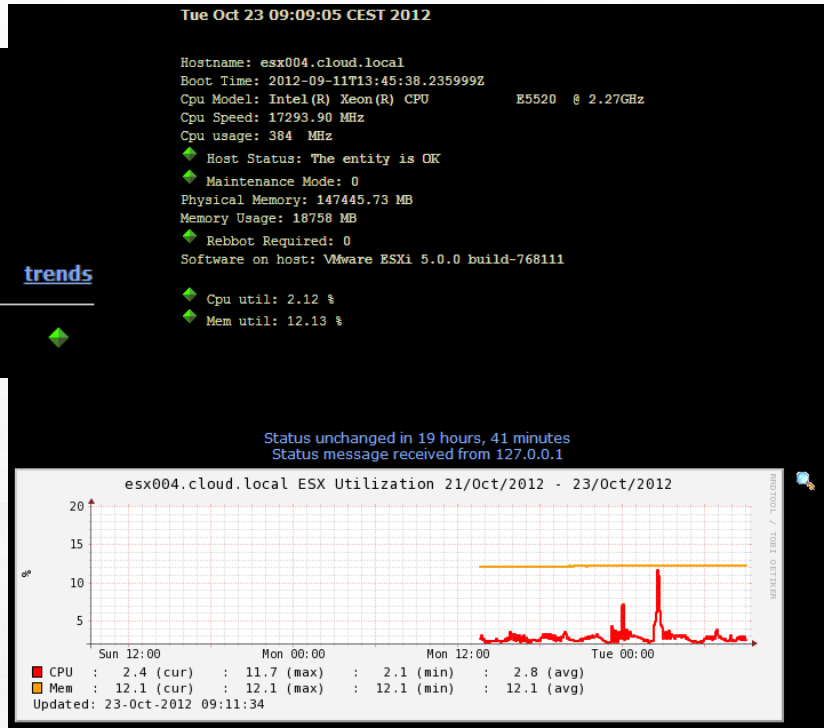
KC Class SLA Monitoring



BBmon Monitoring

- Each or group of metrics represent BBmon test (different states)



Virtual Infrastructure Monitoring

- Vmware: Perl SDK API
- OpenStack: XML-RPC with Ganglia
- HyperV: WMI and client with PowerShell

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Monitoring

- State
- Metrics with trends
- Thresholds

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BBmonSLA

- SLA reports
- SLO objects
- Time periods exclusion
- Scheduling

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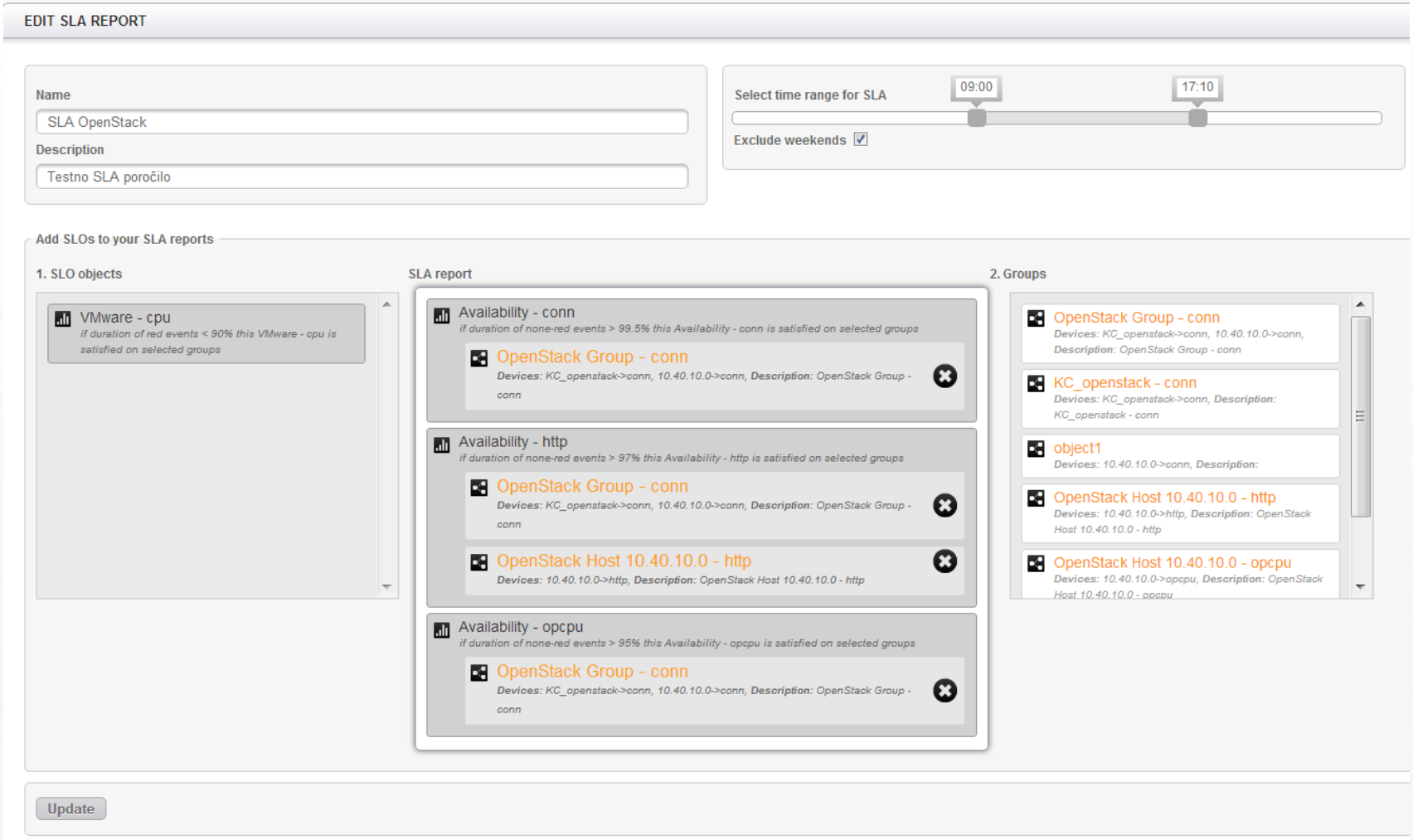
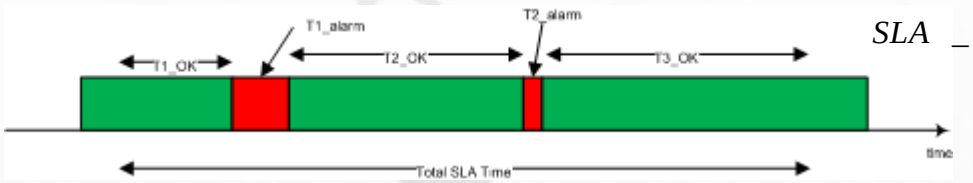
BBmonSLA – SLA Report Configuration



BBmonSLA – SLO Objects

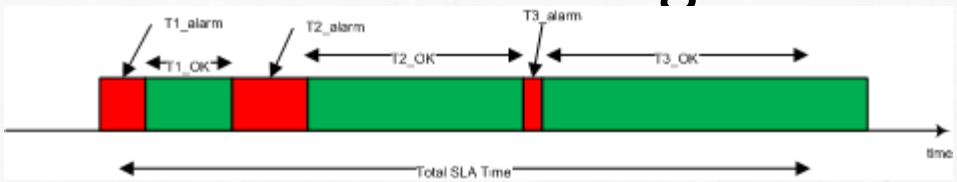
- Duration of events:



$$SLA\_level = \frac{T1\_OK + T2\_OK + T3\_OK - T2\_alarm}{Total\_SLA\_Time - T2\_alarm}$$

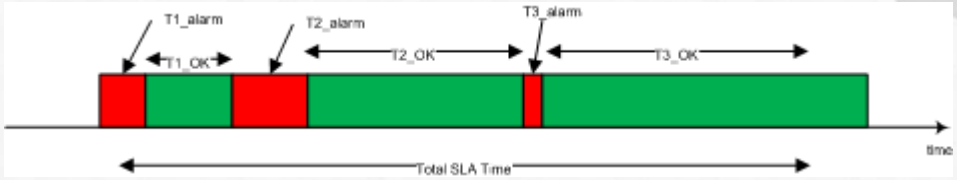
T2_alarm - excluded

- Duration of single event:



$T2\_alarm$ is the *longest*

- Number of events:



3 alarms

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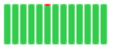
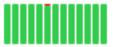
BBmonSLA – SLA Report

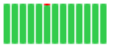
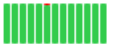
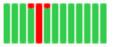
SLA report

Report time: 23.10.2012, 08:32

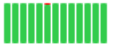
SLA OPENSTACK - FROM: 01.08.2012, 01:00:00 TO: 17.08.2012, 18:00:00

SLO	Object	Interval	Duration	Measured Value	Threshold	Status	Timeline
Availability - conn	KC_openstack - conn	382200 s	117 s	99.97%	99.5%	OK	
Availability - conn	OpenStack Host 10.40.10.0 - conn	382200 s	118 s	99.97%	99.5%	OK	

SLA OPENSTACK - FROM: 01.08.2012, 01:00:00 TO: 17.08.2012, 18:00:00

SLO	Object	Interval	Duration	Measured Value	Threshold	Status	Timeline
Availability - http	KC_openstack - conn	382200 s	117 s	99.97%	97%	OK	
Availability - http	OpenStack Host 10.40.10.0 - conn	382200 s	118 s	99.97%	97%	OK	
Availability - http	OpenStack Host 10.40.10.0 - http	382200 s	34876 s	90.87%	97%	ALERT	

SLA OPENSTACK - FROM: 01.08.2012, 01:00:00 TO: 17.08.2012, 18:00:00

SLO	Object	Interval	Duration	Measured Value	Threshold	Status	Timeline
Availability - opcpu	KC_openstack - conn	382200 s	117 s	99.97%	95%	OK	
Availability - opcpu	OpenStack Host 10.40.10.0 - conn	382200 s	118 s	99.97%	95%	OK