

Distributed Monitoring of Resource Usage in a Virtual Lab

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UPC

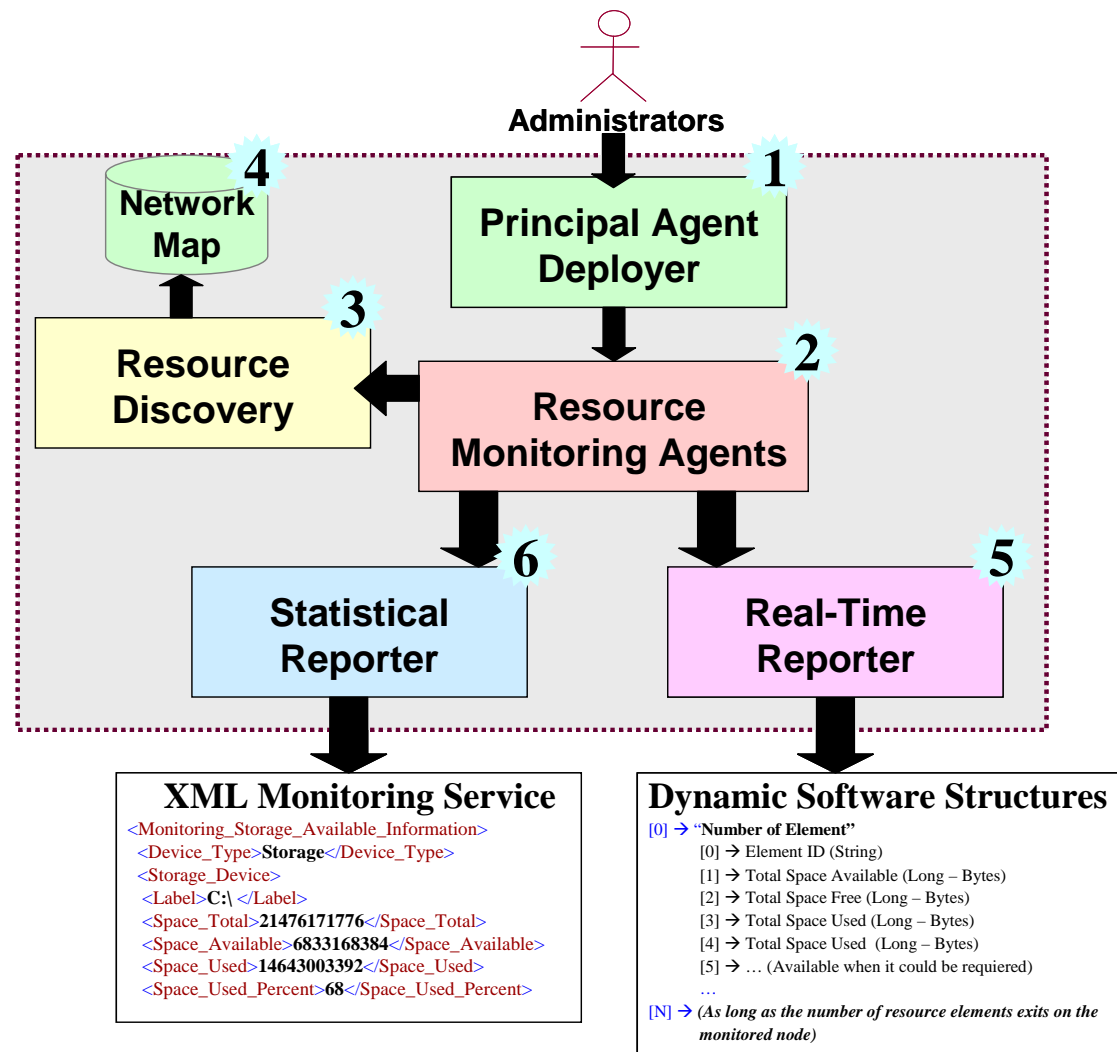
Problem statement

- Monitoring of large scale distributed heterogeneous environments
 - Examples: computational grids, virtual networks
- Requirements
 - Flexibility to deal with different operating platforms (Operative Systems) and different types of resources (computational resources and networking resources)
 - Real-time and statistical data
 - Low monitoring activity overhead and low probability of event misdetection

Solution highlight

- System based on “autonomous” monitoring agents
 - In the whole system, agents operate independently of others
 - In each agent, resources are monitored independently of the others
 - Instantiation of as many agents as resources
 - Polling periods are adjusted based on the status of resources
- Use of SNMP for the monitoring process at the local level (inside each node)
- Formerly analyzed in Grid (Grid5000), EmanicsLab is offering the possibility to face virtual environment specific challenges

SBLOMARS architectural aspects



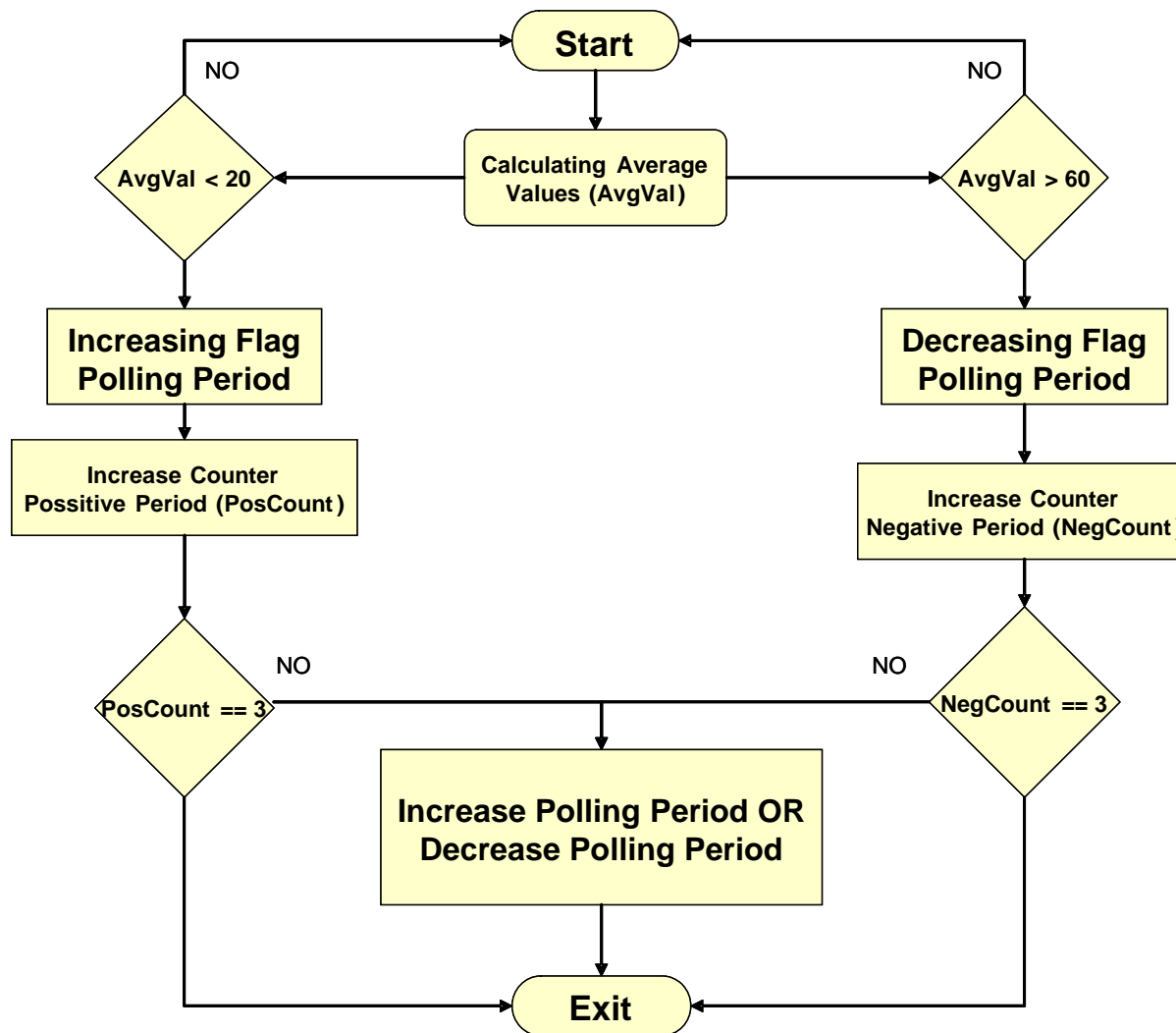
SBLOMARS distinguishing features

- SNMP-based interaction with devices
- Adaptability of polling periods
- Collection of information from the SBLOMARS agents

SNMP-based interaction with devices

- Advantages: general support of SNMP protocol
- MIBs used:
 - HOST-RESOURCES-MIB
 - UC-DAVIS-MIB
 - INFORMANT –MIB
 - CISCO-RTTMON-MIB
- Problems
 - Given MIB is implemented for certain operating systems only
 - Same requested values in different formats
 - Some object not implemented in some distributions of the same operating system
- Solutions
 - providing the same variables through different MIBs
 - cover all possible differences between values or formats
 - translators of the OID values formats to generic formats.

Adaptability of polling periods



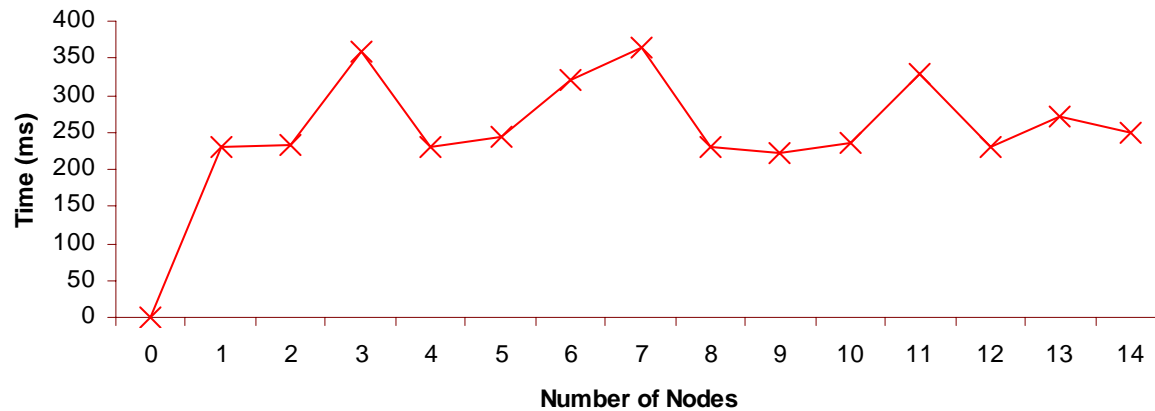
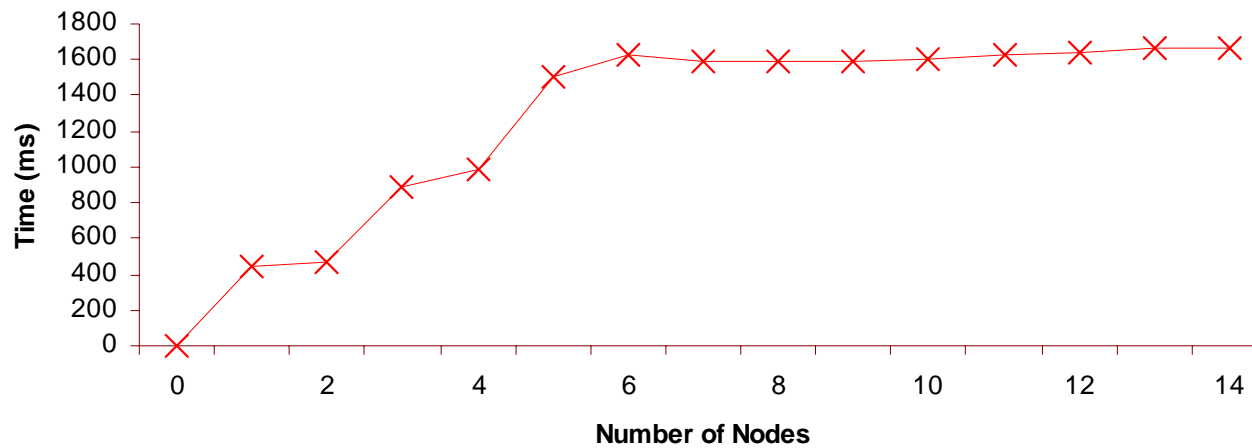
Collection of information

- XML-based Monitoring Reports
 - format designed to be compatible with external systems such as resource schedulers, systems for information forecasting, and resource analyzers.
- Dynamic Software Structures
 - consist of data structures of real-time resource behaviour information, which are kept in the memory buffer from the last polling period. This information remains in memory until the next resource availability request.

SBLOMARS deployment in EmanicsLab (process)

- Software distribution
- Configuration of ports
- Parameters setup
 - initial polling period,
 - the activation of the adaptability mechanism
 - the number of variable values needed to generate a statistical
- SBLOMARS starts working

SBLOMARS deployment in EmanicsLab (evaluation)



Resource usage trials

- Experiment description:
 - Processes created by a simulator are assigned to EmanicsLab nodes
 - A) randomly
 - B) under a scheduler control that makes use of SBLOMARS data
- Aim: determine the reliability of data provided by SBLOMARS

Resource usage trials

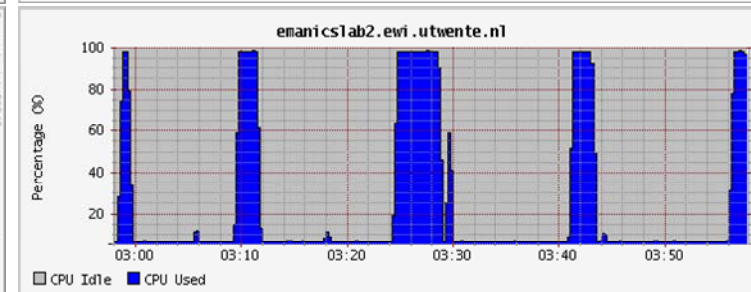
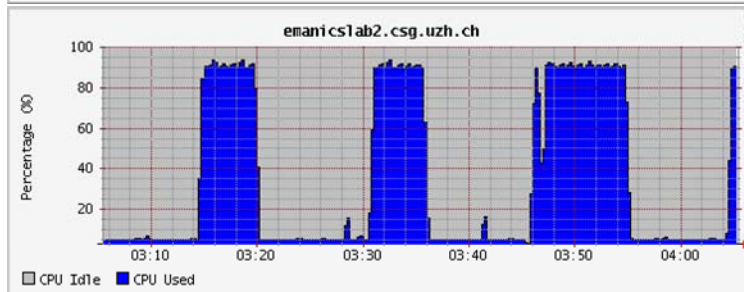
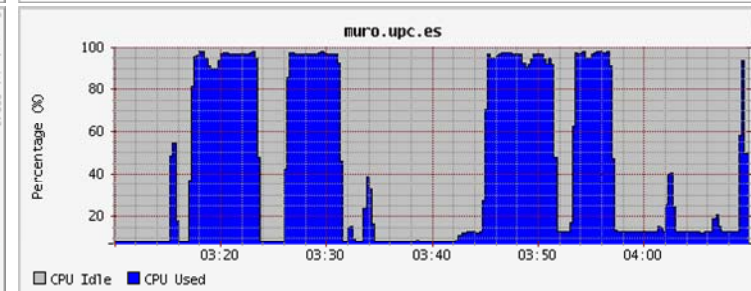
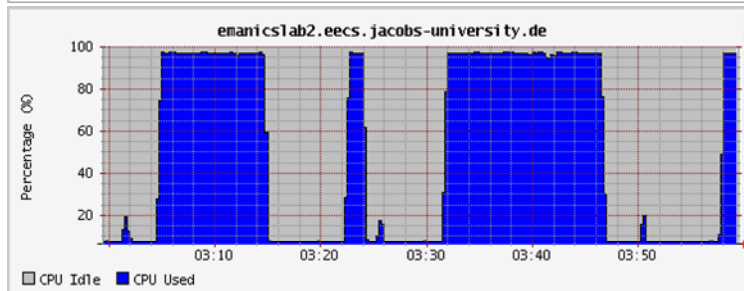
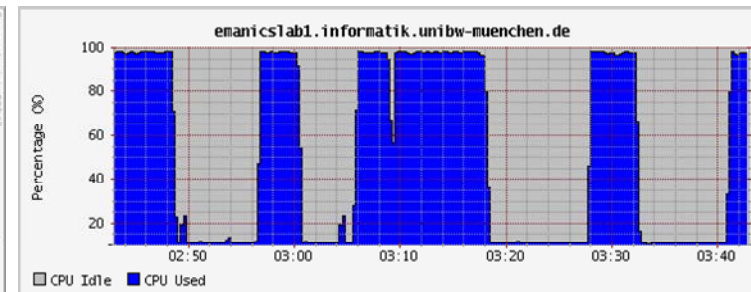
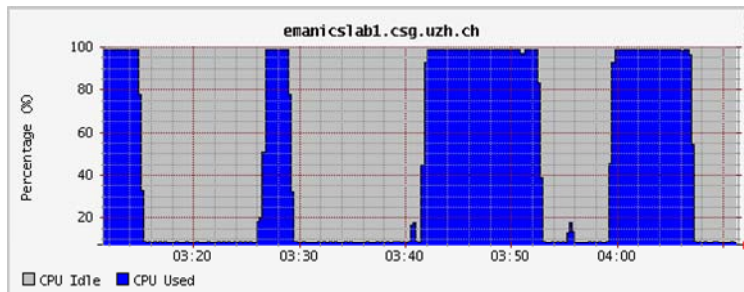


Emanics-Lab Resources Performance

Monitoring by SBLOMARS



Frame Time: [Full Time](#) [Last Day](#) [Last Hour](#)



Resource usage trials

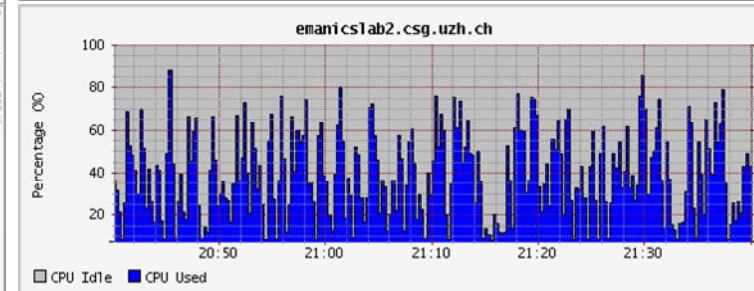
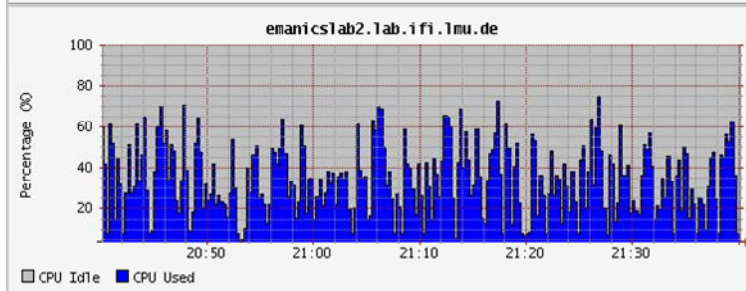
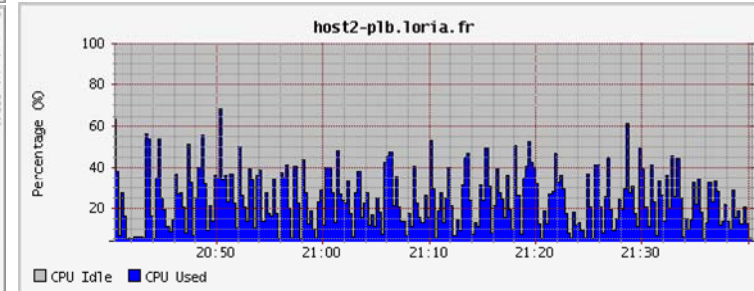
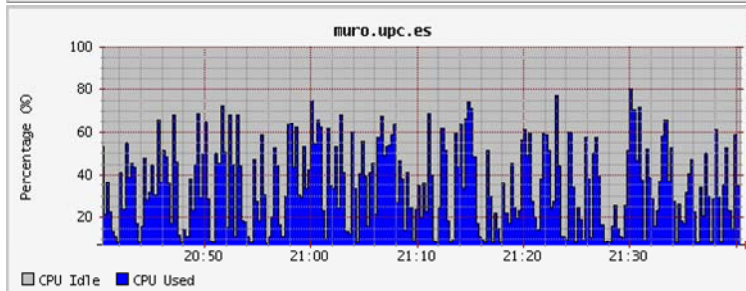
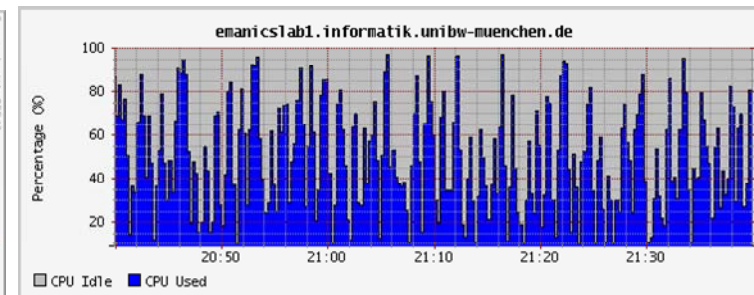
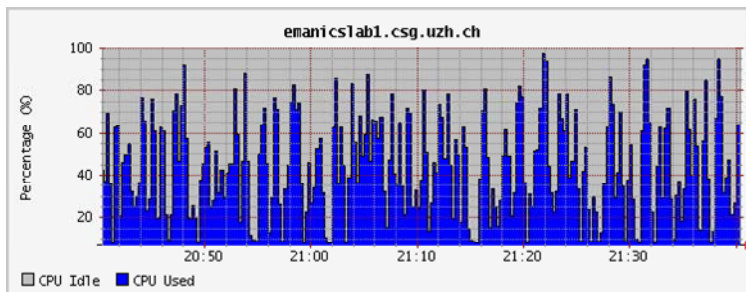


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EmanicsLab realtime monitoring

- Permanently available at <http://alcudia.upc.es:8080/emanics/>

Conclusions

- Initially conceived for Grid networks, SBLOMARS has been adapted to work in virtual environments making use of EmanicsLab
- Distinguishing features make SBLOMARS a scalable system
 - configuration and activation of SBLOMARS is practically independent of the size of the network.
 - the time needed to perform a full information collection cycle is also not impacted by the number of network nodes
- adaptation of SBLOMARS to virtual environments has not been straightforward. We faced several problems especially with the use of SNMP
- Future work: protocol more integrated in the virtualization process with the aim to be able to obtain data at slice level and VM level
- Further reading:
http://emanics.org/component/option,com_openwiki/Itemid,144/id,edgar_magana/