Towards a Framework for Monitoring and Analyzing QoS Metrics of Grid Services

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Many works discussed about how to utilize QoS metrics in the Grid

- Yet how to monitor and provide QoS metrics is a challenging task
- Lack of generic/integrated QoS monitoring frameworks
- Lack of analysis for interdependent Grid services

Our objective:

- Develop a scalable, generic framework that is able to monitor, provide and manage QoS metrics of Grid services
Our Approach

- Select and classify measurable QoS metrics of Grid services
- Develop sensors for monitoring and providing data that can be used to determine QoS metrics
- Provide and manage QoS metrics of various types of monitored resources
- Online modelling, monitoring, and analyzing interdependent Grid services

→ All implemented in an integrated framework
Measurable QoS Metrics

- Select and classify measurable QoS metrics of Grid services
  - Based on various existing QoS metrics, performance metrics, and QoS, dependability and security taxonomies
- Develop sensors for monitoring and providing relevant data that can be used to determine these QoS metrics
Collecting monitoring data for determining QoS metrics

- **Diverse monitored resources:**
  - Include machines (computational services), network paths, Grid middleware and applications
    - Focusing on Web services and WSRF, utilizing WSDM (Web Services Distributed Management)

- **No single measurement technique**
  - Different methods for different types of monitored resources
    - Direct measurement, accessing data from existing monitoring data providers (Ganglia, Nagios, etc.), parsing log and configuration files
    - Focusing on remote monitoring of services in an non-intrusive way, using publicly accessible interfaces.

- **Trade-offs:** accuracy versus perturbation, generic versus specific
P2P-based Framework for Monitoring and Providing QoS related data

- Data is published in P2P-based Grid services
- WSRF-based service providing QoS metrics
Online Modelling and Analyzing Non-functional Metrics of Interdependent Grid services
Online Modelling and Analyzing Non-functional Metrics of Interdependent Grid services
Conclusions and Future Work

- Current implementation
  - Based on Globus Toolkit 4.0

- At this time not all metrics in the tree supported
  - Mostly availability, reliability, performance
  - Machines and network paths (IP/ICMP, TCP, HTTP)
  - Grid applications and middleware:
    - WSDM-based, Web Services, WSRF, GridFTP, GRAM, etc.

- Support modeling, online monitoring and analysis of non-functional parameters of Grid services in a single tool
  - Functional and/or operational, local view or global view

- Future works
  - Working on obtaining data from log files, storing QoS metrics
  - Self-management based on QoS metrics and WSDM
  
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