Access and usage control in Grid

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Thesis Statement

to propose the design of a novel authorization framework to provide fine-grained and continuous usage control on digital resources in open, distributed computer environment

... Grid was chosen as such environment
Access and usage control in Grid:

- Grid services (e.g. Globus GRAM Service)
  - Submitted applications are potentially malicious
  - Usually long-live services – hours, days, more ...
- Grid security peculiarities and limitations
  - Resource providers and VO must agree on authorization policy (policy integration)
  - No predefined trust relationships. Identity-based access control is useless
  - Only right to invoke a service is checked (coarse control)
  - Access decision is evaluated only once
    - No history or context aware
    - No continuous usage control
Our framework:
Access and usage control on different levels of granularity and its integration:

- Coarse-grained level to access service instances
- Fine-grained level to monitor service execution on resource level
- Usage control on network level
- Access rights are assigned based on user's trust rather than identity
- Bilateral dynamic trust negotiations on coarse-grained level through certificates exchange (H. Koshutanski et al)
- Risk Assessment and continuous usage control
- History-based behavioural access control utilizing POLPA policy language (F. Martinelli et al)
- U-XACML policy language to write high-level policy
- Active PDP and continuous policy evaluation - based on Usage Control (UCON) model (R. Sandhu et al)
- Integration and implementation in Globus Toolkit
Current bibliography

Journal paper:


• M. Colombo, A. Lazouski, F. Martinelli, P. Mori, "Controlling the usage of Grid services", under publication in IJCS, 2009


Book chapter:

• M. Colombo, F. Martinelli, P. Mori, A. Lazouski, "Access and usage control in Grid", Springer LNCS

Conference/workshop:

• D. Fais, M. Colombo, A. Lazouski, "An Implementation of Role-Base Trust Management Extended with Weights on Mobile Devices", International Workshop on Security and Trust Management (STM08)

• M. Colombo, F. Martinelli, P. Mori, A. Lazouski, "On Usage Control for GRID Services", IEEE International Workshop on HPC and Grid Applications (IWHGA2009)

• M. Colombo, F. Martinelli, P. Mori, A. Lazouski, "A proposal on enhancing XACML with continuous usage control", Workshop on Grids, P2P and Service computing (CoreGrid2009)