Grid and Globus security

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AgentCities meeting

Lisbon, 9 September 2002
Agenda

- Grid and Globus concepts
- Why security is needed?
- Architecture
- Features
- Other sources...
Grid concept

- **hardware and software** infrastructure
- **provides** dependable, consistent, pervasive, and inexpensive
- **access** to high-end computational capabilities

Foster, Kesselman
Example: TeraGrid
Grid checklist

- coordinates resources that are not subject to centralized control
- using standard, open, general-purpose protocols and interfaces
- to deliver nontrivial qualities of service
Active actors - standards

- **Global Grid Forum (GGF)**
  - Grid protocols and interfaces
  - Working groups:
    - Applications (APME)
    - Architecture (ARCH)
    - Data
    - Information Systems and Performance
    - Peer-to-Peer
    - Scheduling and Resource Management
    - Security

- 6th GGF meeting: October, Chicago
Active actors - implementation

- Globus (www.globus.org)
  - Argonne National Laboratory
  - University of Chicago
  - University of Southern California
- Globus Toolkit version 2.0
- Next generation (version 3.0):
  - Open Grid Services Architecture (OGSA)
    - Grid + WebServices
    - IBM
- OGSA security architecture (draft)
Globus concept

- Middleware that support Grids
- Components:
  - Resource management
  - Data management
  - Information Services
  - Security

Middleware Components:
- GRAM
- GASS
- GridFTP
- GIIS
- GRIS
- GSI
- GSS-API
Security requirements

- single sign-on
- transparent interface with common tools: FTP, SSH and browsers
- provide standardized API's for external developers access to security functions
- interoperate with existent local security solutions
- site administrators must have control over access to their resources
Security features

- credential, with X.509 certificates, as the identity of each entity: user, resource or program
- authentication algorithm: SSLv3
- entity can delegate rights
- GSS-API provide access to security functions

One authentication to access all resource

Does not require change the local security infrastructure
Security architecture (GSI)

Proxies and Delegation

- Secure Single sign-on

PKI

(CA's and Certs)

SSL/TLS

Credentials

SSL for authentication and message
Proxies & Delegation

- proxy allows user access to each machine
- each machine, each proxy
- manually starting proxy
  - *grid-proxy-init*
- delegation= remote creation of a proxy
- second level proxy
- allows remote process to authenticate on behalf of the user
Secure Socket Layer (SSL)

- Authentication of one or both parts using certificates
- Message protection
  - Confidentiality (encryption)
  - Integrity
Public Key Infrastructure (PKI)

- asymmetric encryption
- x.509 certificate
- CA
  - Local CA
  - Commercial
- tools for PKI
  - user: request & management
  - administrator: manage CA
  - complemented by OpenSSL tools
Generic Security Service (GSS) API

- IETF draft standard for adding authentication, delegation, message integrity, ...
- GSS- API Extension defined in GGF draft
- Globus Toolkit components use GSS-API
- `globus_gss_assist` : simple wrapper around GSS- API
http://www.globalgridforum.org
http://www.globus.org

Thank you.

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