



Porting Globus to Linux on S/390

Session L202

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Handouts

- Handouts for this session are not on the CD but are available for download at:

<http://www.sinenomine.net/downloads/lahulpe/L202.pdf>

Agenda

- What Is Globus?
 - Why Should I Care About It?
 - What Services are Included?
 - What Does “Grid Services” Do For Me?
 - How Tough Was Porting It?
 - Miscellaneous Observations
 - Q&A
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What Is Globus?

- Globus is a software toolkit for building distributed applications that share a set of common services.
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Globus Services

Resource
Mgmt



Info Svs
Mgmt



Data
Mgmt



Common Toolkit Services (GSI, etc)

Resource Management

■ GRAM

- Resource Specification Language
- Local AND Global Resource Allocator
- Resource Coordinator (DUROC)

Detail Descriptions:

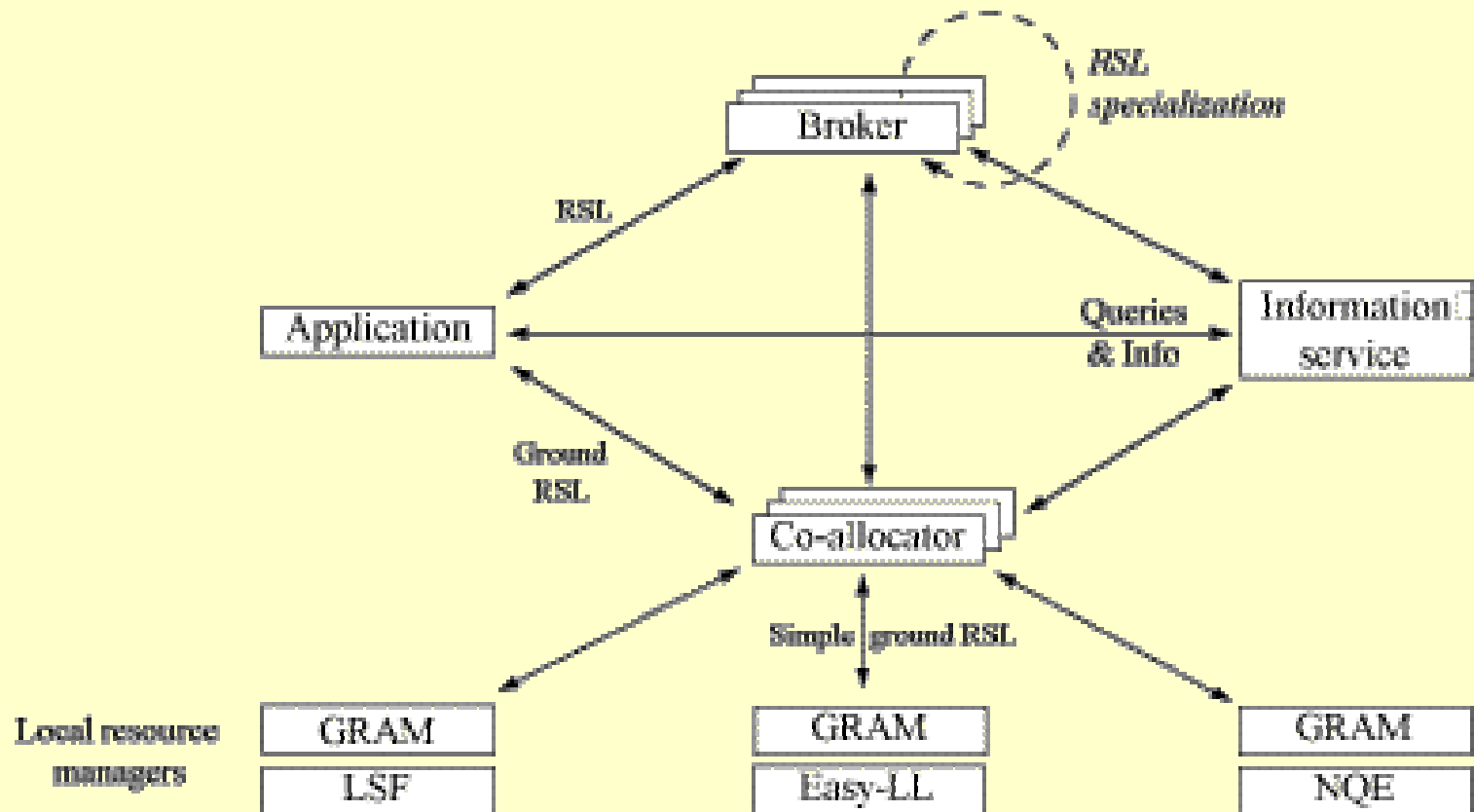
http://www.globus.org/gram/rsl_spec1.htm

<http://www.globus.org/gram/>

<http://www.globus.org/duroc/frames.html>

Resource Broker Not Yet Available

GRAM Architecture



Info Svc Mgmt

- MDS

- MDS uses the LDAP protocol as a uniform means of querying system information from a rich variety of system components, and for optionally constructing a uniform namespace for resource information across a system that may involve many organizations.
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GRIS (Grid Resource Info Service)

- GRIS provides a uniform means of querying resources on a computational grid for their current configuration, capabilities, and status. Such resources include, but are not limited to:
 - computation nodes
 - data storage systems
 - scientific instruments
 - network links
 - databases

GRIS can be easily extended to provide additional information.

GIIS (Grid Index Info Service)

- GIIS) provides a means of knitting together arbitrary GRIS services to provide a coherent system image that can be explored or searched by grid applications.
 - GIISes provide a mechanism for identifying "interesting" resources, where "interesting" can be defined arbitrarily.
 - Example:, a GIIS could list all of the computational resources available within a confederation of laboratories, or all of the distributed data storage systems owned by a particular agency. A GIIS could pool information about all of the grid resources (computation, data, networks, instruments) in a particular research consortium, thus providing a coherent system image of that consortium's computational grid.
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MDS Information

- MDS services are used to support security interfaces and resource location.

Detailed Description:

<http://www.globus.org/gt2/admin/guide-configure.html>

Data Mgmt Services

- Currently concentrated on data transfer and location
 - Area for significant investigation
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GridFTP

- Enhanced version of common FTP with “improvements”
- Areas of improvement:
 - Common security model on control and data channels
 - Multiple data channels for parallel transfers
 - Partial file transfers
 - Third-party (direct server-to-server) transfers
 - Authenticated data channels
 - Reusable data channels
 - Command pipelining

Detailed Description:

<http://www-fp.mcs.anl.gov/dsl/GridFTP-Protocol-RFC-Draft.pdf>

General System Services

- GSI (General Security Infrastructure)

The primary motivations behind the GSI are:

- The need for secure communication (authenticated and perhaps confidential) between elements of a computational Grid.
 - The need to support security across organizational boundaries, thus prohibiting a centrally-managed security system.
 - The need to support "single sign-on" for users of the Grid, including delegation of credentials for computations that involve multiple resources and/or sites.
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GSI Implementation

- GSI is based on public key encryption, X.509 certificates, and the Secure Sockets Layer (SSL) communication protocol. Extensions to these standards have been added for single sign-on and delegation.
 - The Globus Toolkit's implementation of the GSI adheres to the Generic Security Service API (GSS-API) promoted by the Internet Engineering Task Force (IETF).
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User Tools

- Miscellaneous tools for submitting and scheduling jobs and checking status.

Detailed Description:

<http://www.globus.org/gt2/admin/guide-user.html>

So What Does All This Do?

- Provides the ability to securely distribute applications to grouped resource “pools” w/o explicit machine selection.
 - Works across organizational boundaries
 - Begins a “standard data model” definition for cross-OS, cross-platform data management and manipulation.
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Nice for Scientists, But Why Me?

- Fully defined interface within/outside organization – extranets, supplier networks, etc
 - Manipulation of system resources across environments
 - Secure cross-platform authentication
 - Single-sign-on finally works
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Porting Globus

- Two parallel projects:
 - Linux for S/390 and zSeries (31-bit, 64-bit)
 - USS for OS/390 and z/OS
 - Port primarily to take advantage of the S390 storage management capabilities
 - Not really a good match for computational use
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First, the Good News...

- The port to Linux for S390 and zSeries was straightforward:
 - Globus is user-space code; no kernel hooks
 - Porting process:

Download the code

Fix some “architecture-dependent” definitions
in build scripts

Build it

- `make >/tmp/globus-build.txt;make install > /tmp/globus-install.log`

Linux Notes

- The automated install scripts do not understand S390 as a platform target
 - Submitted as fix and included in Globus 2.0.
 - Some minor assumptions in GRAM about certificate byte ordering.
 - Fixed in Globus 2.0
 - Use of the PCI crypto card is helpful
 - Depends on the availability of the PCI crypto driver and virtualization of feeding the VM simulation of the HW.
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USS Port

- Difficult
 - Ugly
 - Slow
 - Still in progress....
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Issues

- Dataset migration difficult to manage from HFS
 - Limited/no tape integration
 - Development pain is substantial
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Summary

- Basis of next generation of computing models
 - Building the tools provides a number of basic services that start in the direction of common utility services
 - Linux brings the 390 into the game for basic services
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