GridWay

Installation and Basic Configuration
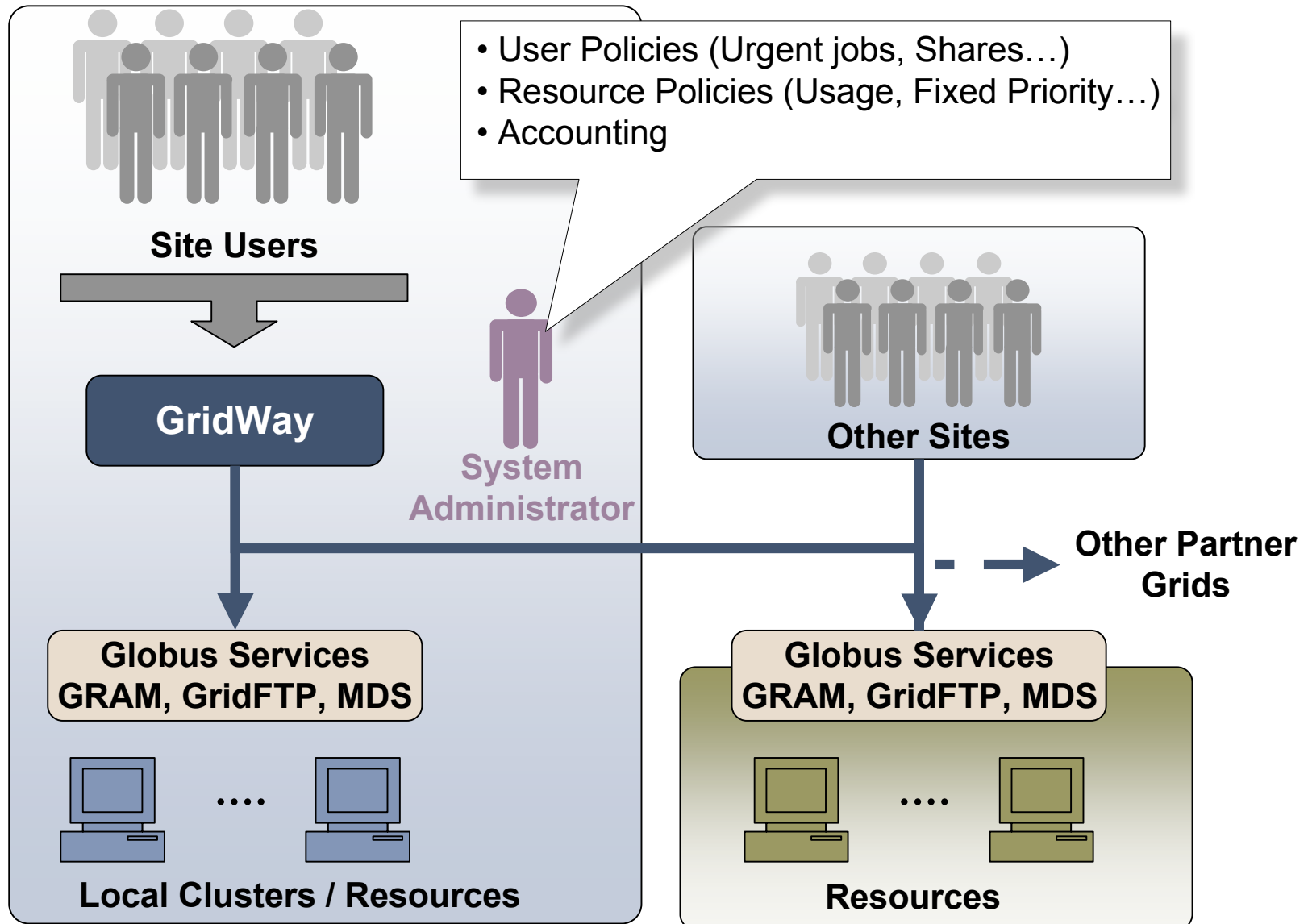
<EVENT>
<City>, <Country>
<Month> <day>, <year>

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Contents

GridWay

DSA Group

Roles

- User Policies (Urgent jobs, Shares…)
- Resource Policies (Usage, Fixed Priority…)
- Accounting

Site Users

GridWay

System Administrator

Other Sites

Other Partner Grids

Globus Services GRAM, GridFTP, MDS

Globus Services GRAM, GridFTP, MDS

Local Clusters / Resources

Resources

DSA Group

Philosophy

Alternative Interfaces

SSH

- Standard Deployment
- User access the GridWay host

GSISSH

- Standard Deployment + gsissh component
- User submit, control and monitor jobs from their computers

GridGateWay

- Standard Deployment + gridgateway component
- User access using any GRAM compatible client

Shared Homes

- Standard Deployment + NFS
- User submit, control and monitor jobs from their computers

Portal

- Standard deployment + portal
- User access through a Web Page

Interoperability

- GridWay is also a tool for interoperability

- Documents available on how to configure GridWay to interface**:**

  ▪ **EGEE**

  ▪ **TeraGrid**

  ▪ **Open Science Grid**

  that can be found in http://www.gridway.org/documentation/guides.php

- Interoperability achieved through the use of *adapters.*

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2. **Installation Directories and their Meanings**

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6. Logging

7. Scheduling Policies

8. MAD Configuration

Installation Directories and their Meanings

- **$GW_LOCATION/**
  - **bin/** — executables
  - **doc/** — documentation (optional)
  - **etc/** — gwd and default job template
  - **share/** — license & usage examples (optional)
  - **include/** — header files
  - **lib/** — compiled libraries
  - **libexec/** — wrapper and monitor scripts
  - **test/** — test suite (optional)
  - **var/** — log, port and log files

Installation Procedure

- Uncompress gw_src.tar.gz

- Set $GW_LOCATION

- PATH = $PATH:$GW_LOCATION/bin

- ./configure --prefix=$GW_LOCATION
  - There are more options -- check them out in the manual

- make

- make install

√ Since June 2007, GridWay is included in Globus Toolkit 4.0.5+, and can be installed as part of Globus.

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Required Software

- **C Compiler**
  - Tested versions: gcc 3.4.2, 3.4.4, 4.0.3 and 4.1.2

- **Globus C Libraries**
  - globus_gram_client, globus_ftp_client and globus_gass_copy
  - $GLOBUS_LOCATION must be set

- **Globus JAVA Development Libraries**

- **J2SE**
  - Versions 1.4.2_10+ (Builds higher than 10) or 1.5.0+

- **GNU Make**

- **Sudo command**
  - Only required for multiple-user mode

- **Berkeley Database Library**
  - Version 4.4.20 (only required to compile the accounting module)

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GridWay

- **Fedora Core**
  - FC4 and Sun's Java 1.4.2: Upgrade to Java 1.5+
  - 32 bits JSDK binaries on AMD64 architectures

- **Debian Testing**
  - No known issues

- **Mac OS X**
  - No known issues
  - Tested on Mac OS X 1.4 (Tiger)

- **Solaris 10**
  - No known issues

- **Other Linux/UNIX flavours**
  - Should run smoothly
  - Have you tested GridWay on other flavours? Let us know!

DSA Group

Contents

Overview

- **$GW_LOCATION/etc/gwd.conf**
  - Configuration options for GridWay daemon (GWD)

- **$GW_LOCATION/etc/sched.conf**
  - Configuration options for GridWay built-in scheduling policies

- **$GW_LOCATION/etc/job_template.default**
  - Default values for job templates

- **$GW_LOCATION/etc/gwrc**
  - Default environment variables for MADs

```
<option> = [value]
```

Configuration

GWD Configuration

Connection Options

- **GWD_PORT:** TCP/IP port where GWD will listen for client requests.
    - **TCP/IP port being used by GWD can be found at $GW_LOCATION/etc/gwd.port**

- **MAX_NUMBER_OF_CLIENTS**: Max number of simultaneous client connections.

Pool Options

- **NUMBER_OF_JOBS**: Max number of jobs handled by GridWay.

- **NUMBER_OF_ARRAYS**: Max number of array-jobs handled by GridWay.

- **NUMBER_OF_USERS**: Max number of different users.

Intervals

- **SCHEDULING_INTERVAL**: Seconds between two scheduling actions.

- **DISCOVERY_INTERVAL**: Seconds between searches for new hosts on the Grid (Information Manager).

- **MONITORING_INTERVAL**: Seconds between host information updates (Information Manager).

- **POLL_INTERVAL**: Seconds between underlying Grid middleware queries for job state.

GridWay

DSA Group

the globus® alliance

GWD Configuration

Middleware Access Driver (MAD) Options

- **IM_MAD**: Information Manager MADs.

- **TM_MAD**: Information Manager MADs.

- **EM_MAD**: Execution Manager MADs.

- **MAX_ACTIVE_IM_QUERIES**: Max number (soft limit) of active IM queries
  - Each query spawns one process

Scheduler Options

- **DM_SCHED**: Scheduling module.

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Logging

•$GW_LOCATION/var/

- **gwd.log**: System level log
  - MADs
  - Jobs (coarse-grain)

- **sched.log**: Scheduler log
  - Fit scheduler policies to your organization needs

- **$JOBID/job.log**: Detailed job log information
  - Details of job resource usage and performance

- **acct**: Accounting information
  - *gwacct* accesses the databases (needs Berkeley DB Library version 4.4.20)

- **.lock**: Prevents from running more than one instance of GWD

- **gwd.port**: TCP/IP port listening for client connections

- **globus-gw.log**: Used to encapsulate GridWay in a GRAM service

Contents

Scheduling Policies

Jobs

Fixed Priority Policy (FP)

- Assigns fixed priority to each job (00 – 19).

- **User**: All jobs of a user are given a fixed priority.

- **Group**: All jobs of a user in the specified group are given a fixed priority.

- User priority prevails over group priority.

- Users can set priority of their own jobs without exceeding the limit
  - gwsubmit -p

- Urgent Job Policy
  - Grid administrator can set a fixed priority of 20 to a job.
    - This job becomes *urgent and bypasses all scheduling policies.*

DSA Group

Jobs

Fair-Share Policy (SH)

- Allows to establish a dispatching ratio among users of a scheduling domain.

- Job submission considered, not resource usage.

- SH_WINDOW_DEPTH: Time intervals considered for evaluation.

- SH_WINDOW_SIZE: Duration of each interval (day).

Waiting-time Policy (WT)

- Allows to prevent low-priority jobs to starve.

- Jobs with long pending state will be eventually submitted to the Grid.

Deadline Policy (DL)

- Job **submission** deadlines may be specified.

- Job priority will be increased when deadline approaches.

- **DL_HALF:** When half of the max priority should be assigned (days)

Scheduling Policies

Resources

Fixed Resource Priority Policy (FP)

- Assigns fixed priority to each resource (01 – 99).

- **Example:** Resources of *intranet are used more than those from grid.*

- Priority 00 bans a resource.

Rank Policy (RA)

- Prioritizes resources suitable for a job from its point of view.

- Configured via the **RANK** attribute in job template.

Usage Policy (UG)

- Reflects behavior of Grid resources based on job execution statistics.
  - History contribution**:** During a period of time.
  - Last job contribution**:** Considering last job on that resource.

- **UG_HISTORY_WINDOW:** Days used for statistics in history contribution.

- **UG_HISTORY_RATIO:** Weight of history contribution statistics

Resources

Failure Rate Policy (FR)

- Exponential linear back-off strategy in case of resource failure.

- Resources with persistent failures are discarded (for a given user).

- **FR_MAX_BANNED_TIME**: Max time a resource can be banned.

- **FR_BANNED_C**: Constant that sets how fast the max banned time is reached.

RESCHEDULING POLICIES

A better resource is discovered.
A job has been waiting in the remote queue system more than a given threshold.
Requirements changed by application.
Performance degradation is detected.

Contents

Execution Driver

- Job **execution** and **management**.

- Provided MADs:
  - **Pre-WS GRAM (>GT 2.4).**
  - **WS GRAM (GT 4.0).**

- $GW_LOCATION/var/gwd.conf

```
EM_MAD = <mad_name>:<path_to_mad>:<args>:<rsl|rsl_nsh|rsl2>
```

- **mad_name:** tag for identifying MAD. Useful for logging.
- **path_to_mad:** name of MAD executable. Must be placed in $GW_LOCATION/bin/.
- **args:** additional arguments to be passed to MAD.
- **rsl|rsl_nsh|rsl2:** Language used for describing job requests.
  - **rsl**: Pre-WS GRAM.
  - **rsl_nsh**: Pre-WS GRAM non-shared home directories (i.e. LCG).
  - **rsl2**: WS GRAM.

MAD Configuration

File Transfer Driver

- File **staging**, remote working **directory set-up** and remote host **clean up**.

- Provided MADs:
    - GridFTP server (>version 1.1.2).
    - Dummy Transfer driver (clusters without shared home).

- $GW_LOCATION/var/gwd.conf

```
TM_MAD = <mad_name>:<path_to_mad>:[args]
```

- **mad_name**: tag for identifying MAD. Useful for logging.
- **path_to_mad**: name of MAD executable. Must be placed in $GW_LOCATION/bin/.
- **arg**: additional argument to be passed to MAD.

MAD Configuration

Information Driver

- Host **discovery** and **monitoring**.

- Provided MADs:
    - Static host information data.
    - MDS2 with MDS schema (GT 2.4)
    - MDS2 with GLUE schema (GT 2.4 and LCG middleware)
    - MDS4 (GT 4.0)

- $GW_LOCATION/var/gwd.conf

```
IM_MAD = <mad_name>:<path_to_mad>:[args]:[nice]:<tm_mad_name>:<em_mad_name>
```

- **mad_name**: tag for identifying MAD. Useful for logging.
- **path_to_mad**: name of MAD executable. Must be placed in $GW_LOCATION/bin/.
- **args**: additional argument to be passed to MAD.
- **nice**: integer to be added to RANK (i.e. for prioritizing resources).
- **tm_mad_name**: File Transfer driver to be used by managed hosts.
- **em_mad_name**: Execution driver to be used by managed hosts.

GridWay

Thank you
for your attention!