



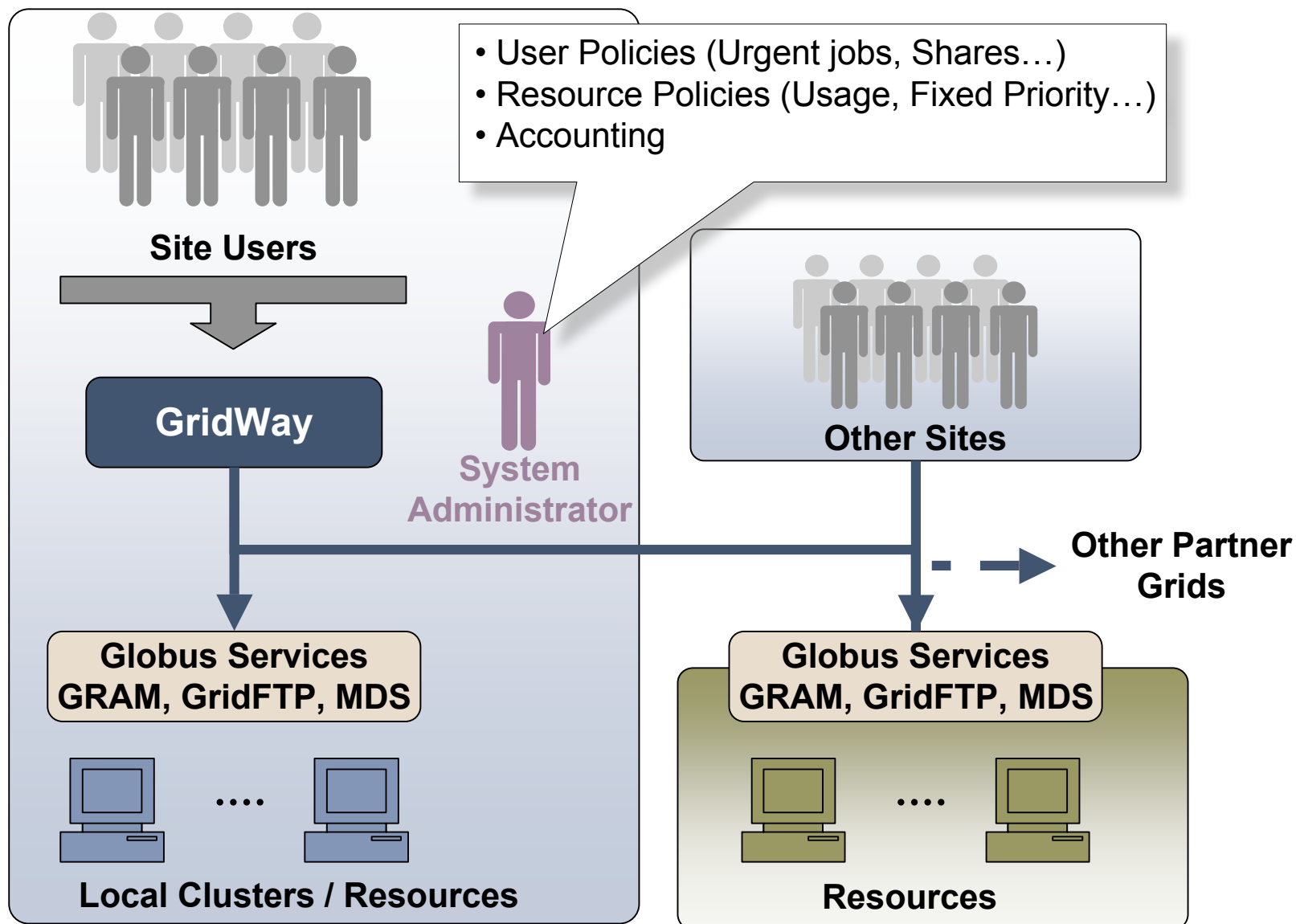
Installation and Basic Configuration

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- 1. Philosophy**
2. Installation Directories and their Meanings
3. Required Software
4. Platform Notes
5. Configuration
6. Logging
7. Scheduling Policies
8. MAD Configuration



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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•\$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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- **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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- **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!

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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]`

GridWay Daemon (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 Daemon (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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• **\$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

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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
 - `gws submit -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*.

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)

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.

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6. Basic Troubleshooting
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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.

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.

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.

**Thank you
for your attention!**