Information System Tutorial

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Information Society and Media

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- MDS GRIS
- BDII
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- Clients
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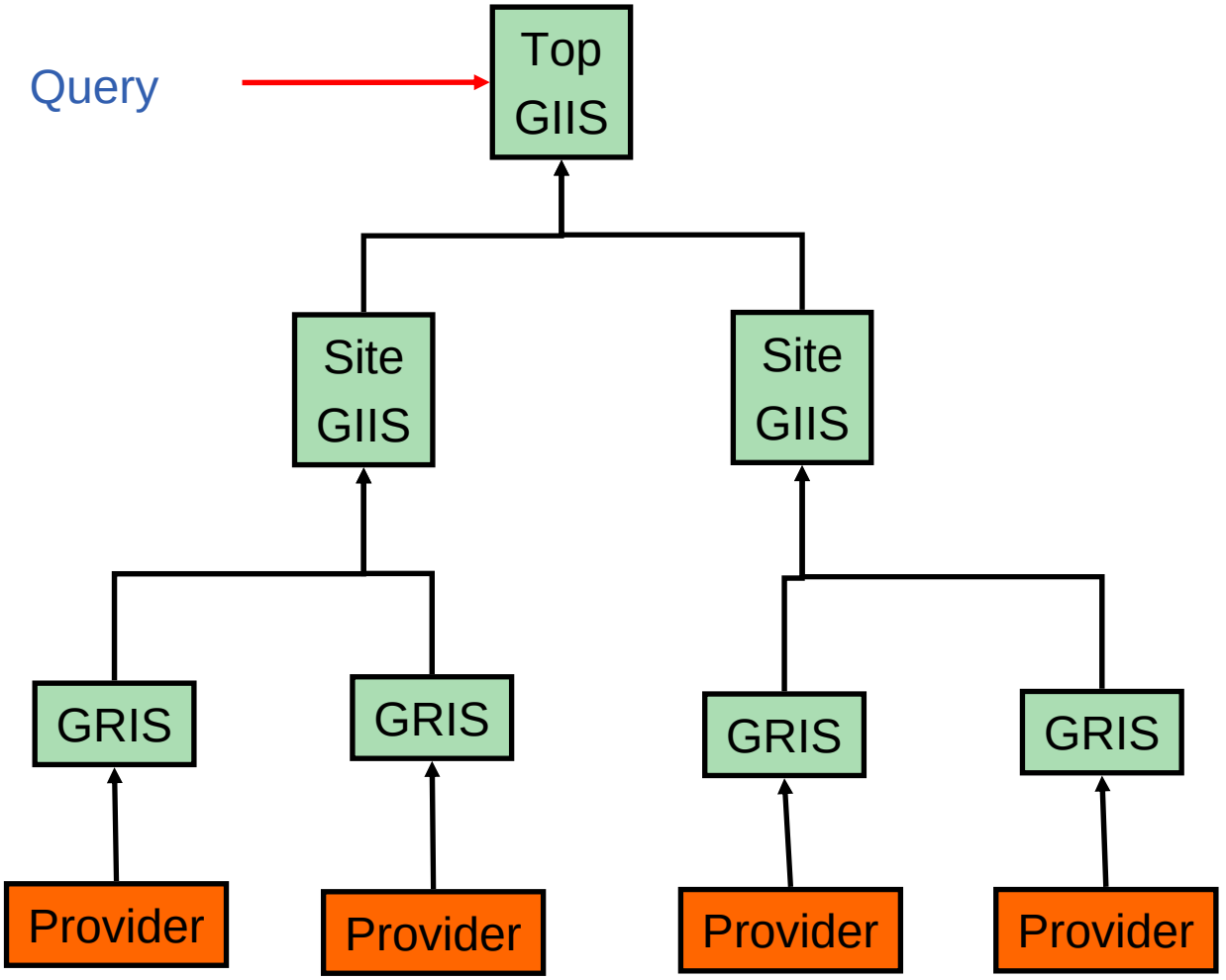
What is it?

- **Provides data about grid services.**
  - Used for service discovery
  - Resource selection
  - Basic monitoring
- **Based on the Globus MDS 2 model**
  - LDAP
- **Information must agree with the Glue Schema**
  - Common schema for many Grid Projects.
  - And be accurate
- **Pre-requisite know LDAP ☺**
  - http://www.openldap.org/devel/admin/intro.html#What%20is%20LDAP

Globus MDS v2

- **Metadata Directory Service (MDS)**
  - http://www.globus.org/toolkit/docs/2.4/mds/
- **Information Providers (IP)**
  - Scripts that get the information and return LDIF
- **Grid Resource Information Service (GRIS)**
  - Daemon that runs the IP and answers LDAP queries
  - Register to a GIIS
- **Grid Information Index Service (GIIS)**
  - answers LDAP queries by querying registered GRIS's or GIIS's.
- **Both the GRIS and GIIS have a 30s cache**
  - To reduce load and improve performance

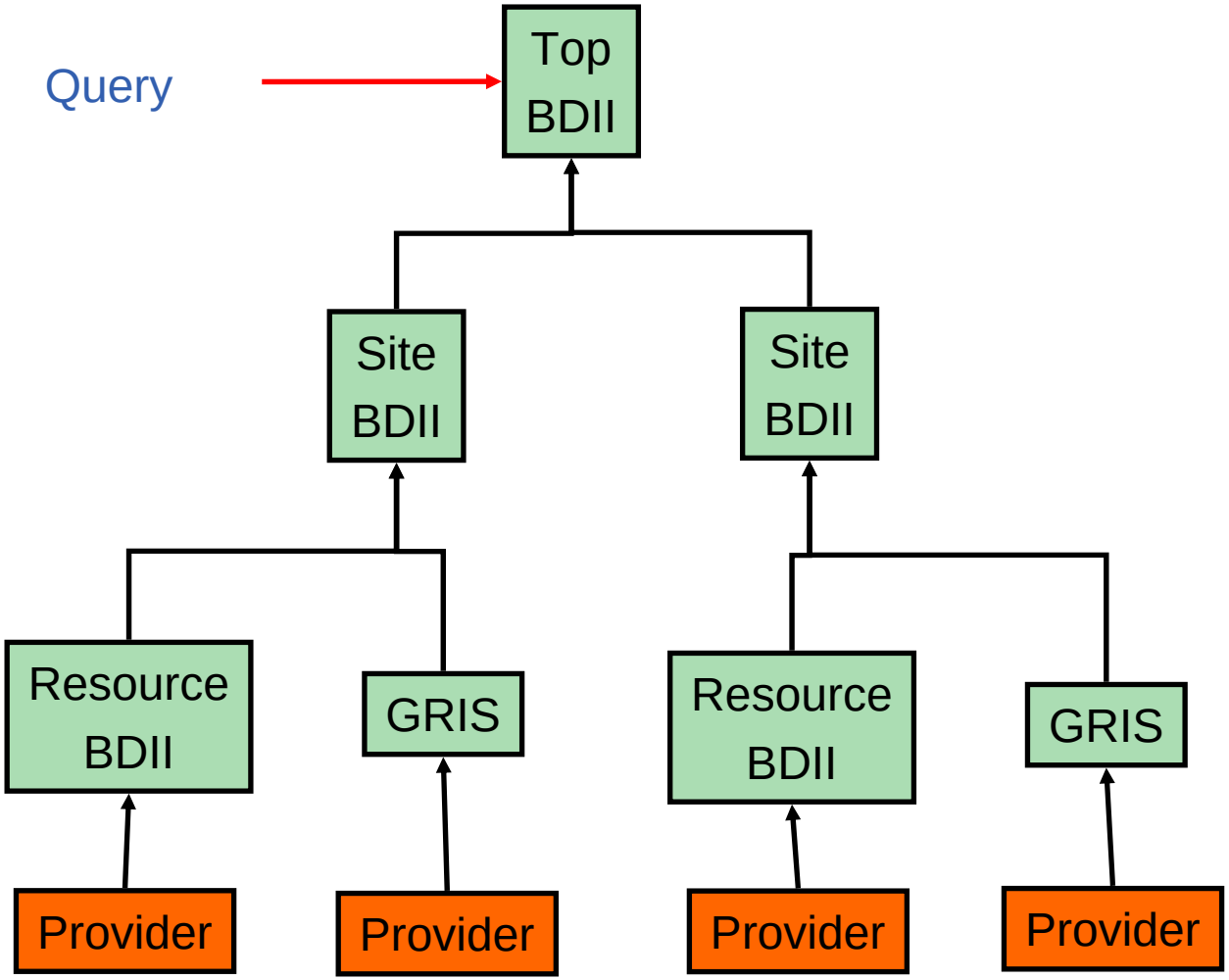
Original MDS Deployment



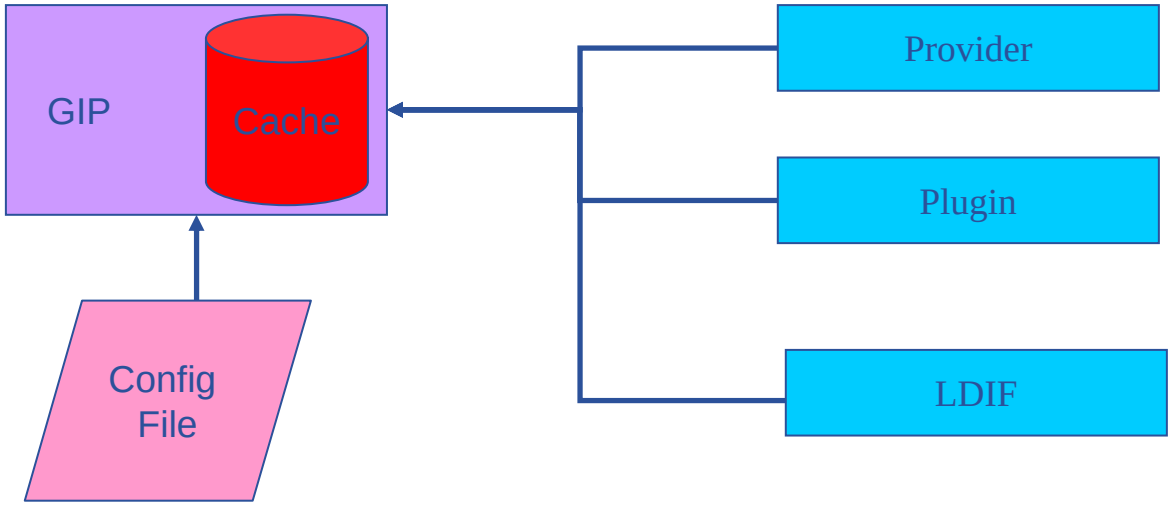
The BDII

- **Berkeley Database Information Index.**
  - Standard OpenLDAP server
  - Updated by a perl process.
    - Using LDAP URLs (ldapsearch) (GIIS mode)
    - From a script (Information Provider) (GRIS mode)
- **Why?**
  - Because MDS didn't work in a distributed environment.
    - Originally did not scale past 4 sites.
      - *1 broken work node could bring down the whole system!*
    - MDS was the problem not LDAP.
- **BDII first used as top-level GIIS**
  - Now used as site-level GIIS
    - Due to instability problem of the GIIS
  - Can also be used at the resource level

Information System Architecture

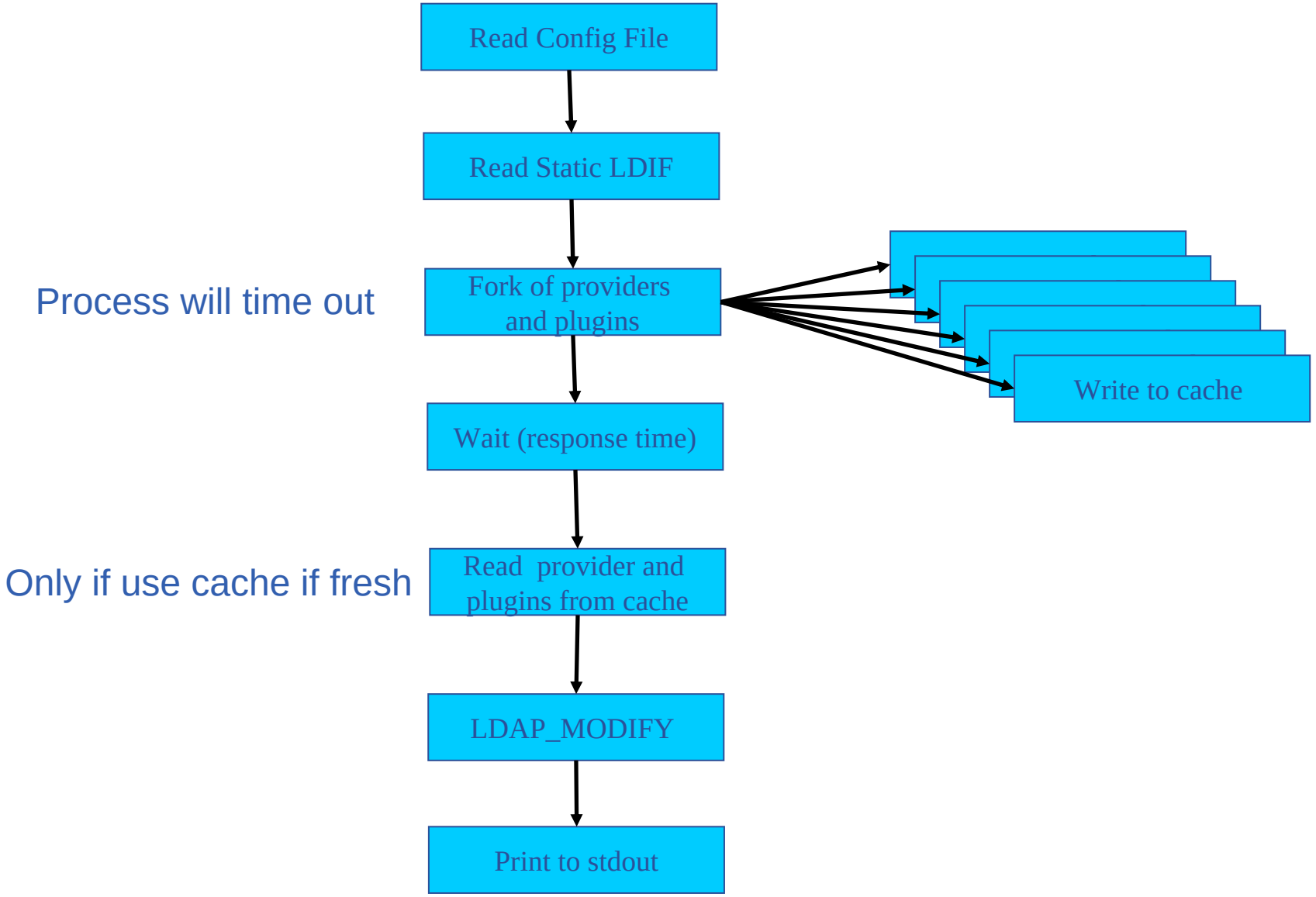


Generic Information Provider



- **Provides information about the grid service.**
  - Outputs LDIF information in accordance to the Glue Schema to stdout.
- **Information can be provided by,**
  - dynamic providers from the providers directory.
  - static files from the ldif directory.
  - dynamic plugins from the plugin directory.
- **Cache used to improve efficiency and reduce load.**

Generic Information Provider



GIP Configuration

Configuration file: /opt/lcg/etc/lcg-info-generic.conf

Parameter	Example	Description
temp_dir	/opt/lcg/var/gip/tmp	Location of the cache
plugin_dir	/opt/lcg/var/gip/plugin	Directory for plugins
Provider_dir	/opt/lcg/var/gip/provider	Directory for providers
static_dir	/opt/lcg/var/gip/ldif	Directory for LDIF files
freshness	20	provider and plugin max frequency (secs)
cache_ttl	300	Time to live for the cache (secs)
response	5	Time for the GIP to respond (secs)
timeout	150	Timeout for plugins and providers (secs)

GIP Configuration

- **Adding plugins and providers**
  - Create a wrapper script for the plugin or provider.
    - No args
  - Place this either the plugin or provider directory.
  - Mainly done by configuration scripts (eg YAIM)

- **GIP wrapper script (lcg-info-wrapper)**
  - Provides a clean interface to the information system.

- **Run it ☺**

GIP Troubleshooting

- **Run the wrapper script**
  - look for errors
    - | less
    - > /dev/null
- **Run the providers**
  - Run the script directly
    - Look for errors again
- **Run the plugins**
  - Run the scripts directly
    - Look for errors.
- **Read the static ldif files**
- **Note**
  - Static files and providers give entries
  - Providers modify values

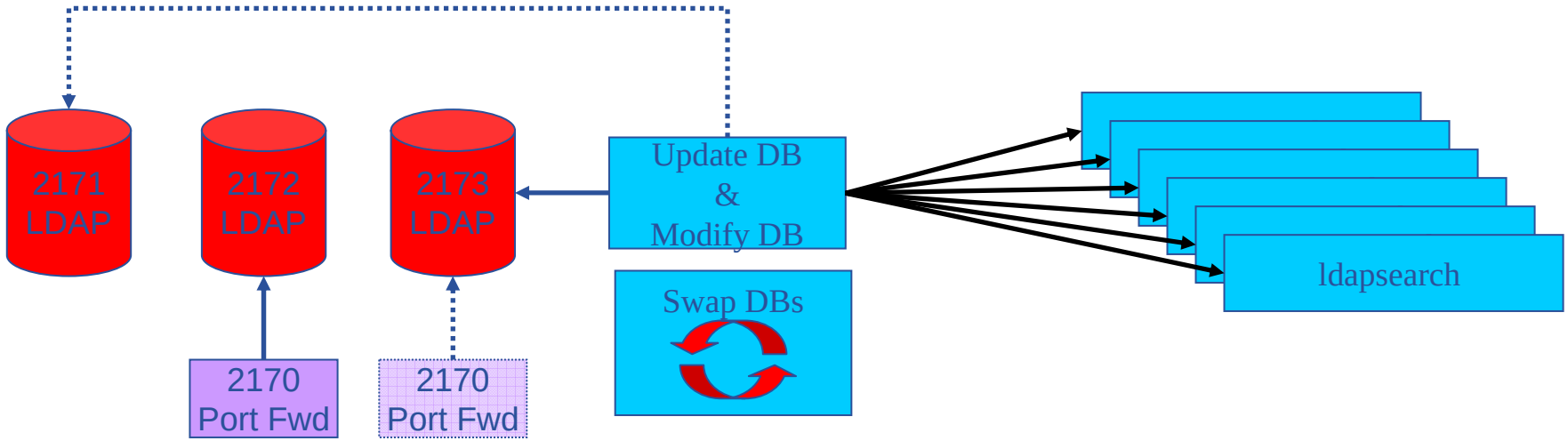
Common GIP Problems

- **Permissions problems.**
  - Does not work for the information system user.
    - Set in bdii.conf or globus.conf
    - Executing as root might have caused the problem!
- **Plugin/provider error**
  - Troubleshoot independently, no overall guide.
- **Cache State**
  - Remove cache
    - All files in the temp_dir
- **Default values are returned and not the dynamic value**
  - Problem is the dynamic plugin
    - LDAP DN s might not be identical

MDS GRIS (in 1 slide!)

- **Important files**
  - Daemon Script
    - /etc/rc.d/init.d/globus-mds
  - Log File
    - /var/tmp/edginfo-globus-mds.log
  - Configuration file for providers
    - /opt/globus/etc/grid-info-resource-ldif.conf
- **Common Problems**
  - GRIS does not show new values and MDS fails to start/restart
    - Stale slapd process that will not exit, force with kill –9
  - No information returned from search
    - Is the provider correctly defined in the grid-info-resource-ldif.conf?
    - Does the provider work when run as the MDS user?
  - Unreadable attribute value
    - Bad white space character in value (Information Provider Problem).
- **Start MDS in debug mode**
  - /opt/globus/libexec/slapd -h ldap://`hostname –f`:2135 -f /opt/globus/etc/grid-info-slapd.conf -d 0 -u edginfo
    - Change –d option for different debug option
      - *man slapd.conf, see loglevels for more details*

BDII



- **Multiple DBs instances used to increase performance**
  - Read only, write only and one spare for queries to finish.
  - This functionality is enabled by the port forwarder.
- **List of sources to query from local file**
  - Can be updated from a web page.
  - More than one DBs is used, separate read and write.
- **Can also use a local LDIF file to modify DB after population.**
  - Can be updated from a web page.

BDII Configuration File

- /opt/bdii/etc/bdii.conf

Parameter	Example	Description
BDII_PORT_READ	2170	Port used to query.
BDII_PORTS_WRITE	“2171 2172 2173”	Ports of the databases
BDII_USER	edguser	Unix user bdii run with
BDII_BIND	o=grid	Top point of the LDAP DB
BDII_PASSWD	Tzdxh6fH5	slapd password
BDII_SEARCH_FILTER	‘*’	Search filter used by ldapsearch
BDII_SEARCH_TIMEOUT	30	Time out for ldapsearches
BDII_BREATHE_TIME	60	Time between updates
BDII_AUTO_UPDATE	Yes	Update LDAP URLs from the web
BDII_AUTO_MODIFY	No	Update LDIF file from the web
BDII_DIR	/opt/bdii	Location of the BDII
BDII_UPDATE_URL	http://	URL for LDAP URLs
BDII_UPDATE_LDIF	http://	URL for LDIF file
SLAPD	/usr/sbin/slapd	Slapd to use
SLAPADD	usr/sbin/slapadd	Slappadd to use

BDII Configuration

- **Important files**
  - Daemon
    - /etc/rc.d/init.d/bdii
  - Configuration file
    - /opt/bdii/etc/bdii.conf
  - Log file
    - /opt/bdii/var/bdii.log
- **Format of bdii-update.conf**

Site1 ldap://<hostname>:2170/mds-vo-name=site1,o=grid

Resource1 ldap://<hostname>:2170/mds-vo-name=resource,o=grid
Resource2 ldap://<hostname>:2135/mds-vo-name=local,o=grid

Resource3 file://opt/lcg/libexe/lcg-info-wrapper

BDII Trouble Shooting

- **No information found in BDII**
  - Is the URL that provides this information in the bdii-update.conf?
  - Does this URL return the required information?
    - The URL could time out , (check the bdii log file).
- **Entry's missing in the BDII**
  - They entry could be rejected if the LDIF is invalid, (check the bdii log)
- **Top-level BDIIs must all use the web based config file.**
  - This is automatically generated from the GOC DB.
    - Must ensure that the site URL in the GOC DB is correct.
- **It takes ages to do an ldapseach**
  - Slapd cache size could be too small

Freedom of Choice

- **Developed to meet a requirement from the VOs.**
  - Modifies the information to their liking
    - White list and black list services.
  - Only the VO manger can white list and black list the services.
- **Generates an LDIF modify file.**
  - Web based.
- **BDII can be configured to use this file**
  - Will modify the database after population
  - For use only with top-level BDIIs
- **Linked with the Site Functional Tests Portal**
  - Can automatically remove a site if it fails a functional tests
    - It's the VOs choice.

Information

- **It is important that the information is correct**
  - Miss configured sites have in the past
    - Stopped services to to run grid wide!
    - Caused black holes for job submission.
- **Information must agree with the GlueSchema**
  - http://infnforge.cnaf.infn.it/glueinfomodel/
  - http://infnforge.cnaf.infn.it/glueinfomodel/uploads/Spec/GLUEInfoModel_1_2_final.pdf
- **And be accurate**
  - Grid Status (gstat) does basic sanity checks for the each site
  - http://goc.grid.sinica.edu.tw/gstat/
  - Grid Wiki gives solutions to common problems
  - http://goc.grid.sinica.edu.tw/gocwiki/FrontPage

Solving Tricky Problems

- **Is the is LDIF valid?**
  - Try inserting it into and LDAP DB
- **How do I do that?**
  - Use this script.
  - http://lfield.web.cern.ch/lfield/info-test
- **How do I use the script?**
  - Create a file contining the LDIF (| > output.ldif)
  - Usage: ./info-test <file>
- **Solving standard LDAP errors.**
  - Is the problem/solution in the GOC wiki?
  - Google ☺

User Tools

- **lcg-infosites and lcg-info**
  - Can be used to query the information system
  - For more information see the User Guide
    - https://edms.cern.ch/file/722398//gLite-3-UserGuide.pdf
- **lcg-ManageVoTag**
  - Used by the Vos to publish software environment tags
  - Publishes to /opt/edg/var/info/<VO>/<VO>.list
    - Ensure the VO can write here!
  - Used by plugin lcg-info-dynamic-software-wrapper

Future Work

- **Replacing all GRIS's with BDIIs**
  - Need to improve the use of mds-vo-name
- **Merging of the BDII and GIP**
  - Both do LDAP_ADD and LDAP_MODIFY
    - Single method
      - *Use of common plugins*
  - BDII turns the GIP into a daemon
- **Fixing the Schema**
- **Improve Service publishing**
  - Merge of GIP and rgma-servicetool
- **Rollout of Service Discovery.**

Links

- http://www.cern.ch/lfield/bdii
- http://www.cern.ch/lfield/gip
- http://infnforge.cnaf.infn.it/glueinfomodel/index.php/Main/HomePage
- **http://lfield.home.cern.ch/field/trouble.html**
- **https://edms.cern.ch/file/722398//gLite-3-UserGuide.pdf**