g-Eclipse

A GUI and toolkit for accessing Grids and Clouds

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on behalf of the
g-Eclipse Consortium

The idea

- Accessing a Grid is difficult
  - provide user-friendly UI for accessing Grids
- Many different middlewares are out there
  - provide extensible middleware-independent framework for accessing Grids
- Currently supported middlewares:
  - gLite - Batch oriented Grid for the scientific user
  - GRIA - Service-oriented infrastructure for industry and commerce
  - AWS elastic compute cloud EC2 and S3 storage – Cloud computing

gLite GRIA amazon webservices™

Some facts

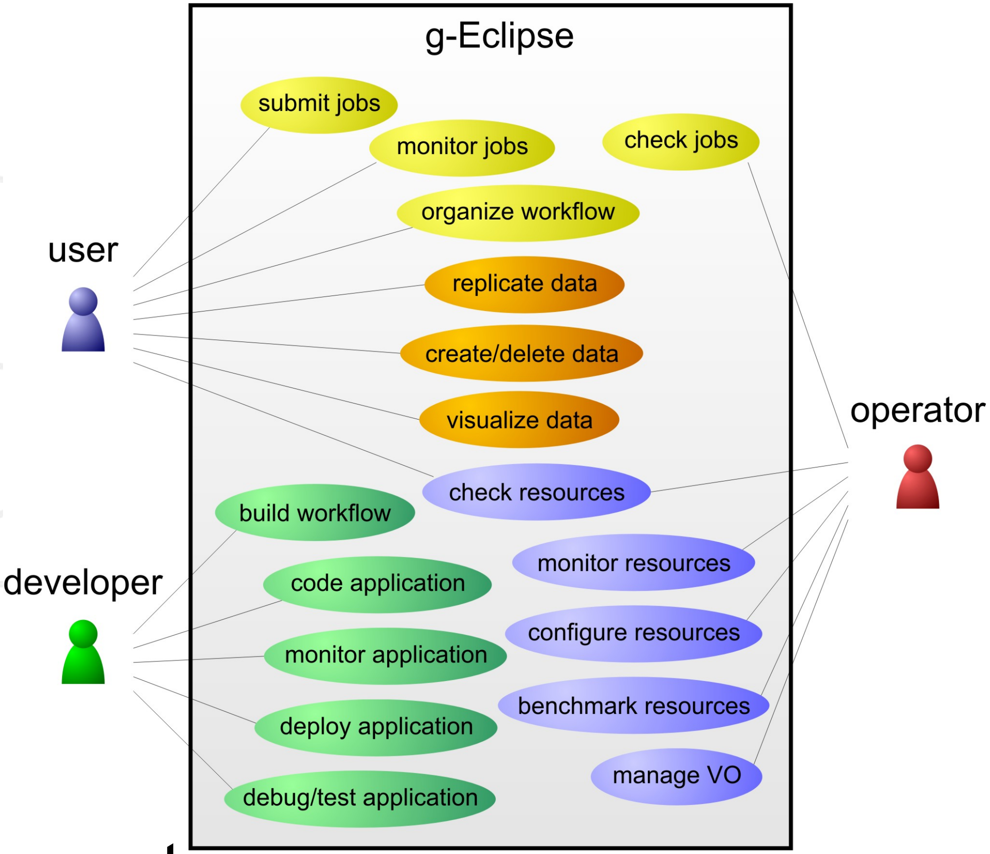
- Funded by European Commission, FP6
- Eclipse.org incubator project
  - 17 Eclipse committers
- 20+ developers, 8 partners from 5 EU countries
- Roughly 50 plug-ins, 2500 classes and interfaces, around 300.000 LOC
- Monthly release cycle
- Currently at 1.0 release track
  - release candidate RC0 in October 2008
  - Release 1.0 in December 2008

g-Eclipse domains

- User interface / Grid client
  - graphical user interface for accessing Grid infrastructures
- Framework / API
  - collection of pure Java classes for developing client- and server-side applications for the Grid

The g-Eclipse client

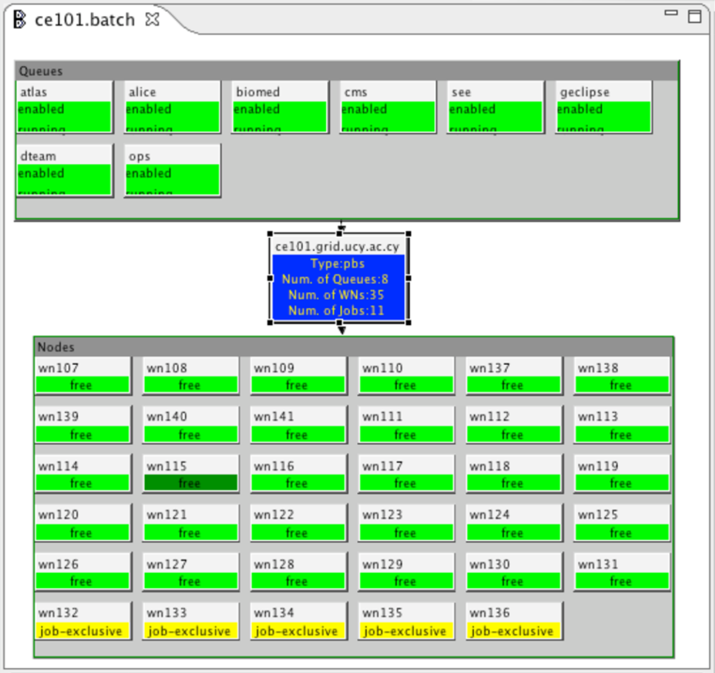
- Support for
  - Grid User
    - job management
    - data management
  - Grid Operator
    - site administration
    - user administration
  - Grid Developer
    - compile/debug apps.
    - deploy apps.
- Eclipse's perspective concept



The user perspective

- Data management
  - Files/folders create/save/copy/move/delete
  - 3rd party transfers, transfer manager
- Job management
  - Job description creation and editing
    - JSDL standard compliant editor
  - Job submission, status monitoring
  - Parametric jobs support
- Workflows
  - Dedicated workflow editor
  - Submission and status, just like ordinary job!
- Data visualisation
  - Using VTK (and SRS3D)

The operator perspective



ce101.batch

Queues

atlas enabled running

alice enabled running

biomed enabled running

cms enabled running

see enabled running

geclipse enabled running

dteam enabled running

ops enabled running

ce101.grid.ucy.ac.cy

Type:pbs

Num. of Queues:8

Num. of WNs:35

Num. of Jobs:11

Nodes

wn107 free

wn108 free

wn109 free

wn110 free

wn137 free

wn138 free

wn139 free

wn140 free

wn141 free

wn111 free

wn112 free

wn113 free

wn114 free

wn115 free

wn116 free

wn117 free

wn118 free

wn119 free

wn120 free

wn121 free

wn122 free

wn123 free

wn124 free

wn125 free

wn126 free

wn127 free

wn128 free

wn129 free

wn130 free

wn131 free

wn132 job-exclusive

wn133 job-exclusive

wn134 job-exclusive

wn135 job-exclusive

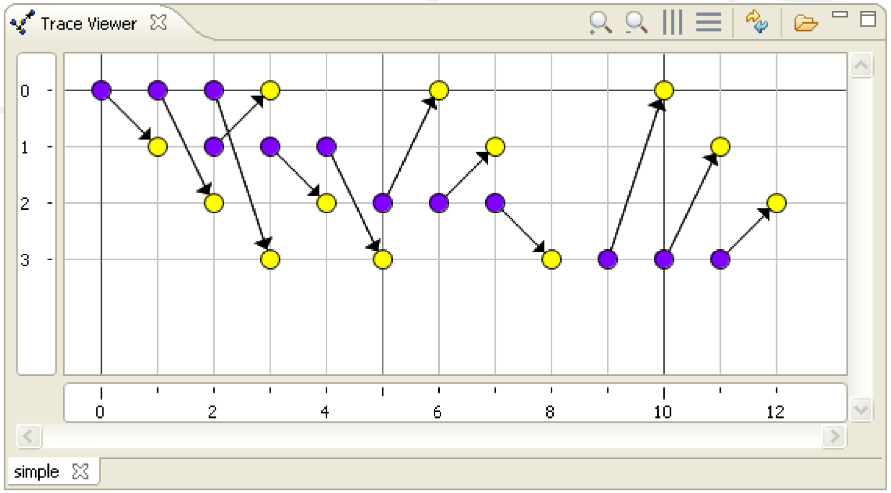
wn136 job-exclusive

- Site administration
  - Queue management
    - PBS/Torque
  - Job management
  - Infrastructure monitoring
  - Infrastructure testing
  - Infrastructure benchmarking
  - Service level agreement editor (in preparation)

- User administration
  - VO management (in preparation)

The developer perspective

- Application development
  - Remote compiling
  - Remote debugging
    - normal Eclipse debugging perspective!
  - Analyzing MPI applications
    - traceviewer
- Application deployment



How does it look like?

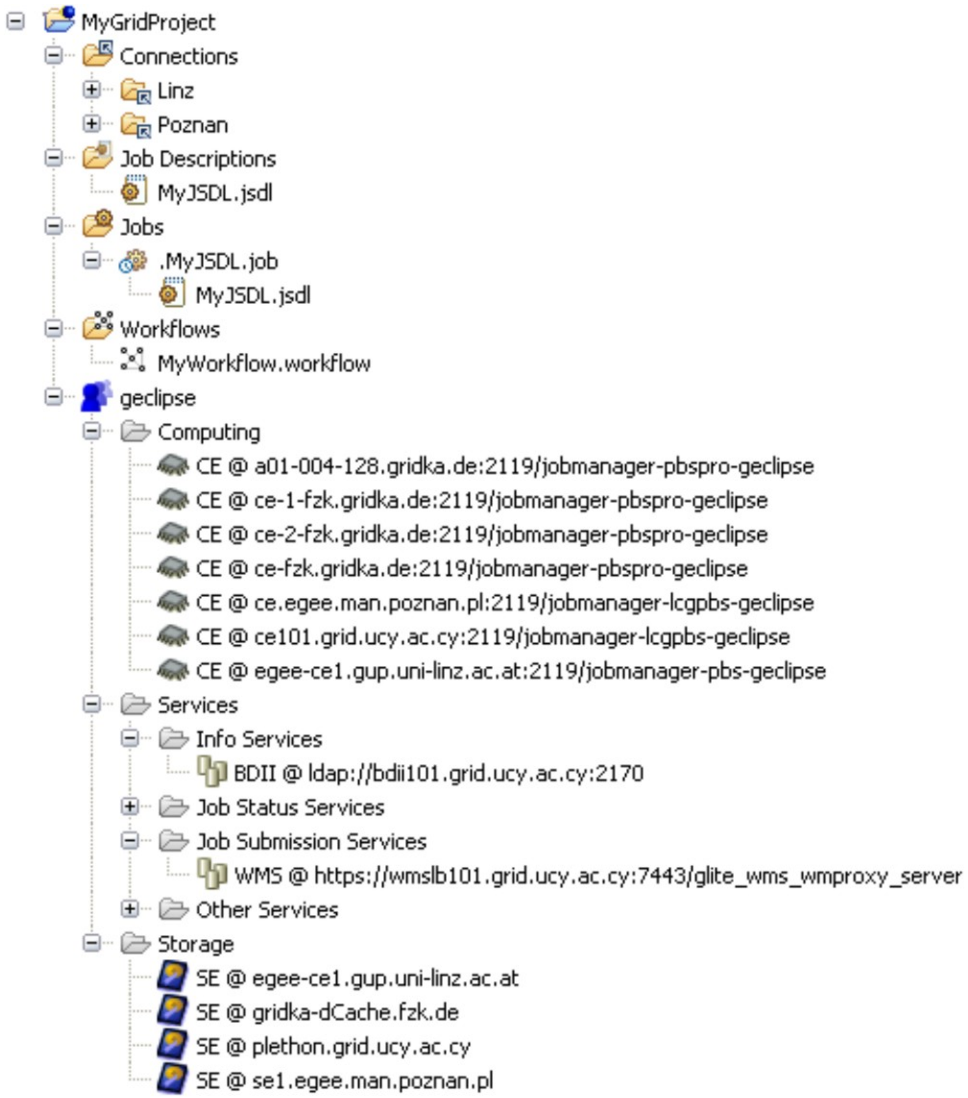
Mounted File Systems

Virtual Organisation

Computing Elements

Services

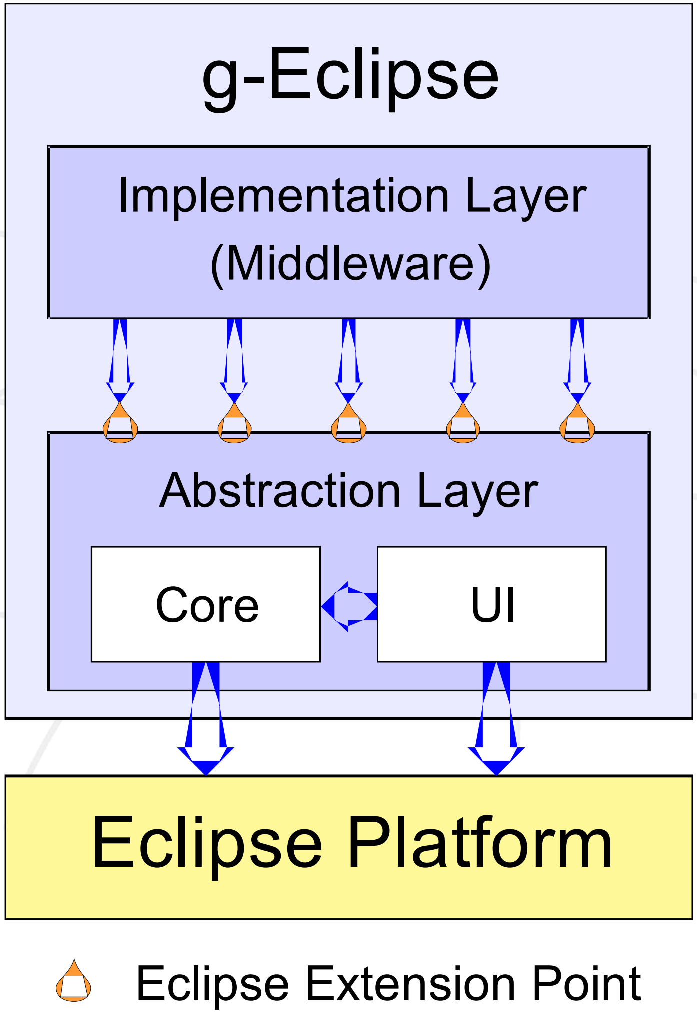
Storage Elements



```
MyGridProject
  Connections
    Linz
    Poznan
  Job Descriptions
    MyJSDL.jsdl
  Jobs
    .MyJSDL.job
      MyJSDL.jsdl
  Workflows
    MyWorkflow.workflow
  geclipse
    Computing
      CE @ a01-004-128.gridka.de:2119/jobmanager-pbspro-geclipse
      CE @ ce-1-fzk.gridka.de:2119/jobmanager-pbspro-geclipse
      CE @ ce-2-fzk.gridka.de:2119/jobmanager-pbspro-geclipse
      CE @ ce-fzk.gridka.de:2119/jobmanager-pbspro-geclipse
      CE @ ce.egee.man.poznan.pl:2119/jobmanager-lcgpbs-geclipse
      CE @ ce101.grid.ucy.ac.cy:2119/jobmanager-lcgpbs-geclipse
      CE @ egee-ce1.gup.uni-linz.ac.at:2119/jobmanager-pbs-geclipse
    Services
      Info Services
        BDII @ ldap://bdii101.grid.ucy.ac.cy:2170
      Job Status Services
      Job Submission Services
        WMS @ https://wmslb101.grid.ucy.ac.cy:7443/glite_wms_wmproxy_server
      Other Services
    Storage
      SE @ egee-ce1.gup.uni-linz.ac.at
      SE @ gridka-dCache.fzk.de
      SE @ plethon.grid.ucy.ac.cy
      SE @ se1.egee.man.poznan.pl
```

The g-Eclipse framework

- Abstraction layer
  - core functionality, e.g.
    - authentication/authorization
    - VO management
    - data management
    - job submission
  - common user interface, e.g.
    - views
    - wizards
    - dialogs
    - preference pages
- Implementation layer
  - implementing core functionality
  - middleware specific functionality



Virtual Organization setup

- VO support
  - **VOMS (gLite) VOs**
  - GRIA VOs, single resources or registry
  - AWS VOs, user account

```
VomsVoCreator creator = new VomsVoCreator();
creator.setVoName( "geclipse" );
creator.setVoHost( "dgrid-voms.fzk.de" );
creator.setVoPort( 15009 );
creator.setVoHostDN(
    "/O=GermanGrid/OU=FZK/CN=host/dgrid-voms.fzk.de" );
creator.setVoInfoService(
    URI.create( "ldap://iwrbdii.fzk.de:2170" ) );

IVoManager manager = GridModel.getVoManager();
IVirtualOrganization vo
    = ( IVirtualOrganization ) manager.create( creator );
```

Authn. and authz.

- AAI support
  - Globus proxies (X509)
  - **VOMS proxies**
  - GRIA keystores
  - AWS tokens
  - trusted certificates management

```
VomsProxyDescription desc = new VomsProxyDescription();
desc.setVo( vo );
desc.setCertFile( "/home/user/.globus/usercert.pem" );
desc.setKeyFile( "/home/user/.globus/userkey.pem" );
desc.setLifetime( 86400 );

AuthenticationTokenManager manager =
    AuthenticationTokenManager.getManager();
IAuthenticationToken token = manager.createToken( desc );
token.validate();
token.setActive( true );
```

Data management

- Purely EFS based
- File transfer protocols
  - **GridFTP**, based on cog-kit
  - SRM (WS standard)
  - LFC, own native Java implementation
  - GRIA data stagers
  - AWS S3
- 3rd party transfers, transfer manager

```
String url = "gsiftp://se.reef.man.poznan.pl:2811/home/geclipse/";
IFileStore parent = EFS.getStore( URI.create( url ) );

IFileStore[] children = parent.childStores( EFS.NONE, null );

IFileStore newFile = parent.getChild( "newFile" );
OutputStream oStream = newFile.openOutputStream( EFS.NONE, null );
oStream.write( "Initial content".getBytes() );
```

Job management

- Job description languages
  - JSDL (XML standard), full support
  - JDL supported (gLite)
- Job submission services
  - WMS/Cream (gLite)
  - JobService (GRIA)
- Job status monitoring

```
WMSClient wmsClient = WMSClient.getClient( wmsClientUri );
JobIdStructType jobId = wmsClient.submitJob( my_jsdl, null );
LBClient lbClient = LBClient.getLBClient( lbClientUri );
JobStatus status = lbClient.getJobStatus( jobId.getId() );
```

Collaboration

- We welcome collaboration
  - new middleware implementations
  - new components
  - use of g-Eclipse as a library
    - for RCP applications
    - for server-side services which need Grid access
    - SLA editor?
    - ...
- EU project ends in 2008
  - ongoing proposals
  - BUT keeps going as Eclipse project
    - ongoing support
  - gathering community, users & developers

The end

Thank you for listening!

Questions?