GT4 Experiences

Migrating Gridcast from GT3 to GT4

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Talk Outline

1. Context
2. GT3-GT4 Migration
3. Gridcast
4. Observations on Migration and GT4
5. Where to next?
Context: Why GT3-GT4 Migration?

• **It sort of chose us.....** (Ron Perrott/Paul Donachy/me)
  - We decided against GT2 based projects
  - BeSC e-Science projects started in GT3 alpha 1.
    - All change...nothing is stable...we’ve been migrating for 3 years!
• BeSC has focused on niche commercial applications
  - we have a commercial interest
    - Gridcast: 300k Java GT3.0.2
    - Manifest: 100k Java GT3.0.2 and GT3.9.5
    - GridMIL: 50k Java GT3.2
    - Genegrid: 250k Java GT3.2
    - Geddm: 300k Java GT3.0.2 and GT3.2
    - RiskGrid: 100k Java GT3.0.2
    - PlanningGridGateway: ???k Java GT3.9.5
• BeSC has focused on commercial user groups and deployments
  - Gridcast: GT3.0.2 Test bed deployed since October 2003
  - Pilot user deployments within the BBC
... a slightly different emphasis?

• Our focus means that many grid technology issues may not be obvious in my discussion.

• Thus
  - We use discovery, registry .... Technology
  - We use job submission, management ... Technology
  - We use data management, transfer ... Technology
  - We use cycle stealing, utility computing ... Technology
  - ... ...
  - These are technologies which we use in our applications.

• The grid focus for us is its use as an integration fabric
  - Integrating current applications and work flows
  - Creating more flexible and reactive business models
GT4 Experiences

GT3.9.4 Experiences

GT3.9.2 Experiences

GT3.9.5 (GT4 Beta 1) Experiences

GT3.9.3 Experiences

GT3.9.1 Experiences
A Minimalist Migration Model

GT3 Java World

- Service WSDL
- Grid Service Java Implementation

GT4 Java World

- Service WSDL
- Web Service Implementation
- Grid Resource Implementation
- Resource Home Implementation

- Web service is minimalist
- Resource home is minimalist
- WSDL minimalist conversion of GWSDL
- Grid Resource is a minimalist conversion of GT3 service

- as systematically as possible
- as quickly as possible
- with as little effort as possible
- with as little re-testing as possible
Migration changes rely on automation

- **WSDL**
  - Include references to WS-.. Specifications
    - The WSDL template
  - Argument passing has changed and thus service definitions need to change.
    - Deal with wrapping and ordering arguments

- **WEB Service**
  - We use only to select the grid resource to invoke....it acts as a dispatcher...
Web Service

/*
   * Autogenerated by GWSDL->WSDL @ Thu May 12 10:57:44 2005
   * @author
   * @version 0
   * Modified:
   */

package uk.ac.qub.gridcast.transportFramework.gsiftp.impl.gsiftp;

...

public class gsiftpService extends BaseService
{

    /**
     * @param Transfer
     * @return TransferResponse
     * @throws RemoteException
     */
    public TransferResponse transfer(Transfer params)
        throws RemoteException
    {
        gsiftpResource serviceResource = (gsiftpResource) getResource();
        serviceResource.transfer(params.getCallingServiceEndPoint(),
                                  params.getFromURL(),
                                  params.getToURL(),
                                  params.getTransactionId());

        return new TransferResponse();
    }

    ............

}
Implementation Structure

- Base Web Service Implementation
- Service WSDL
- Base Resource Home Implementation
- Web Service Implementation
- Resource Implementation
- Resource Home Implementation

Mostly original GT3 service Converted by hand
Generated
common
Where are we....?

• Gridcast code base is converted
  - 300k of Java, 100+ services
  - 2-ish person effort

• We did not require significant changes to our GT3 services to make them GT4 resources.

• Deployed on our test grid
  - Real users since GT3.9.5

• Far from a completed GT4 system
  - Inclusion of notifications
  - Take advantage of features of WS-Notification
  - Integration of PIRMIS and CAS
Business Architecture
Service Architecture

Local Services

Domain Configuration Provider

Local Domains

Management GUI

Domain Index Services
Focus on real deployments

Figure 2: Gridcast connectivity
Conversion concerns - General

- **Stability**
  - Another GT release and yet another model
  - Standardisation process eases concern
  - To prove commercial application we need a period of stability

- **Documentation**
  - 3.9.2 documentation was sketchy
  - GT4 documentation is significant improvement on GT3
  - A service tutorial early in the development cycle was good

- **Support**
  - Stability would help
  - To permit focus on the applications rather than middleware
Conversion concerns

- **Container support**
  - Need deployable service environment
    - We have had problems with support for our platform of choice (Tomcat/Axis)
  - Cross platform/container support

- **More files to manage...resource, service, home**
  - Hasn’t proven to be that much of a problem
  - Additional files have been auto-generated

- **Effort in converting the GWSDL**
  - Perl script deals with that issue for us

- **Effort in converting the GT3 service**
  - This has not proven to be that much of an issue for us
Observations on migration

- **GT4** installation was straightforward with fewer installation problems than **GT2/3**.
  - Binary installation makes things much easier
  - Issue as to the level of expertise required to install the middleware
- **GT4** documentation a significant improvement
  - It was good to have a service primer early in the process.
- **GT4** services demonstrated *significant* improvements in performance over their **GT3** versions.
- **GT4** services demonstrated significantly better reliability than our **GT3** services.
- (UK ETF hat) need to address the migration of **GT2** to **GT4**.
What next...?

• Development
  - Development/Re-engineering to take advantage of developments
    • Significant work on data management.
      - RFT, GridFTP, specialist media servers
    • WS-Notification
    • Trigger service
    • Data replication
  - Deployment
    • BBC Broadcast

• Business
  - EBU middleware group
  - IBC Amsterdam (September)
  - Broadband – home delivery work (Autumn-Winter 2005)
  
  Commercialisation at some point in the future