Project Definition Document

OSG Resource Selection Service (Phase II)

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1. *Approvals*

CMS VO Representative:	**Signature:**	**Date:**
	Print Name: Burt Holzman	
	Title:	

DES VO Representative:	**Signature:**	**Date:**
	Print Name: Nickolai Kouropatkine	
	Title:	

DZero VO Representative:	**Signature:**	Date:
	Print Name: Joel Snow	
	Title:	

Engagement VO Representative:	**Signature:**	**Date:**
	Print Name: Mats Rynge	
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FermiGrid Representative:	**Signature:**	**Date:**
	Print Name: Keith Chadwick	
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OSG Representative:	**Signature:**	**Date:**
	Print Name: Mats Rynge	
	Title:	

Sponsor:	**Signature:**	**Date:**
	Print Name: Gabriele Garzoglio	
	Title:	

Project Leader:	**Signature:**	**Date:**
	Print Name: Parag Mhashilkar	
	Title: Application Developer and System Analyst	

2. Document Change Log

Version	Date	Change Description	Prepared By	Approved By
V 1.0	11/28/2008	First Version of the Document	Parag Mhashilkar	Parag Mhashilkar

3. Project Proposal Lead

Project Leader   : Parag Mhashilkar
Department   : Computing Division
Group   : SCF/GRID/OSG

4. CD Strategy Document and Tactical Plans

OSG ReSS is covered in following documents found in Fermilab's docdb -
- Tactical plan for CD Grid Services FY 2009 - CD-doc-2794-v7
- GRID Strategic plan: CD-doc-2792-v2
- ReSS-HA is covered in tactical plan document FermiGrid - Tactical Plan Status Report - May 08 (CD-doc-2675-v2)
- Fermigrid Software Acceptance Process: CD-doc-2684-v4

5. Problem Statement

The Open Science Grid (OSG) is building a US national grid infrastructure for multiple scientific communities. Dozens of computing centers and Universities provide access to computing, storage, and network resources via standard grid interfaces and protocols. The OSG Resource Selection Service (ReSS) project was started in September 2005. Prior to ReSS, users submitted jobs directly to the OSG resources, selecting them before job submission and specifying all relevant resource attributes in the job description. One of the initial goals of the ReSS project was to provide a service that facilitates automatic selection of OSG resources by a user job based on the job/resource attributes. OSG Virtual Organizations (VO) like DZero, CMS, Engagement and DES now use services provided by ReSS to automate their job Match-making process.

The Phase – I of the project that ended in July 2008, primarily focused on the development and deployment of the required features to provide the resource selection service for the OSG. There is a need to extend the support for ReSS to the user community and improve the functionality and robustness of the service.

We propose that the ReSS project be moved into Phase – II with a major emphasis on supporting the ReSS infrastructure for the existing VOs that use the service and eventually transitioning the service to operations group. Phase – II of the project will continue to support the initial objectives of the project work on improving the robustness of the service and adapt as the OSG Information Services evolve.

6. Project Description and Goals

The ReSS project was started to automate the selection of OSG resources by user jobs over the OSG Grid infrastructure. New phase of this project will continue to support this primary objective. Currently, DZero, Engagement, CMS and DES VO use the services provided by ReSS. LIGO VO is also evaluating the use of ReSS for their resource selection needs.

Supporting OSG VOs to integrate their Job Management System with ReSS:
ReSS has been integrated with the SAM-Grid, the infrastructure used by the DZero VO for job, data and information management. The current integration scheme deployed by DZero should be enhanced to use new features/functionalities available to VOs to make efficient decisions while selecting OSG sites to run the DZero jobs.

Secure registration process for resources:
In the current state, OSG service providers can directly register their resources and VO job queues with the ReSS. The current scheme does not support robust authentication mechanism to validate the registered entities. One of the goals of this project is to make the resource registration process more secure and robust.

Improved support for Storage Elements registration with ReSS:
OSG has been working towards the publishing of Storage Element (SE) information to the Information Systems. This will enable the opportunistic use of SEs in the OSG. ReSS will continue its support in stabilizing the SE info published by the sites.

Compliance with GIP to support Glue Schema V2:
The GLUE Schema group is working on version 2 of the schema. New version of the Generic Information Provider (GIP) which supports Glue Schema V2 will be released in OSG v1.2. In order to support the user community, ReSS functionalities need to be changed as the Generic Information Provider (GIP) evolves to support GLUE Scheme V2.

Tool(s) to identify installation/deployment issues:
One of the others goals of this project is to implement a tool that validates the installation of CEMon on the OSG CE. Such a tool will be very useful to the site administrators as they can validate and troubleshoot the CEMon installation in case of any problems.

Compliance with Fermigrid Operational Model and running in HA mode:
Another goal of this project is to perform required testing to comply with the Fermi Grid Software Acceptance Process.

7. Project Scope

7.1   What is in Scope

Scope of the project includes,
- Support for software developed by ReSS group as a part of the ReSS project

- Adapting to changes as OSG Information Services (IS) evolve based on Glue Schema V2 and new GIP versions
- Maintenance of osg-ce plug-in which is distributed as a part of the CEMon software.
- Providing customer support to the existing VOs
- Bootstrapping new VOs to adopt ReSS.
- Development of features to improve robustness
- Transition of ReSS to operations

7.2   What is out of Scope

Out of scope items are mentioned below,

- Development/Changes/Support to core CEMon software except the osg-ce plug-in.
- Development/Changes/Support to GIP software.
- The ReSS project does not provide job scheduling and will not provide one in future. The resource selection recommendations can be made available via internal interfaces to standard scheduling systems, such as Condor-G.
- The ReSS project will not provide resource selection algorithm beyond match making or ranking functionalities provided by Condor.

8. Project Deliverables and Milestones

Some of the high level milestones and deliverables for the project are –

Milestones/Deliverables	Date
Support for MPI users ➢ Successful implementation and deployment of features in resource publishing mechanism in CEMon that allows the OSG sites to advertise Glue attributes that enable match making for MPI jobs.	12/31/2008
Improved support for Storage Elements registration with ReSS ➢ Successful implementation and deployment of features in resource publishing mechanism in CEMon to enable Storage elements associated with a site to advertise storage related information separately from computing elements.	12/31/2008
Test suite to identify installation/deployment issues ➢ Successful implementation of the test suite to identify deployment and configuration issues (on limited scale concerned with CEMon) related issues. ➢ Deployment of the test suite on the OSG sites via the OSG stack.	02/28/2009
Compliance with the Generic Information Services for OSG 1.2 ➢ Successful implementation and deployment of changes to ReSS to comply with GIP for OSG 1.2	02/28/2009
Compliance with the Generic Information Provider to support Glue Schema V2 ➢ Successful implementation and deployment of changes to ReSS to comply with GIP that supports Glue Schema V2	TBD (Based on GIP

	schedule)
Improved security for resource registration with ReSS	02/28/2009
Support to run ReSS services in High Availability deployment mode ➢ Support in ReSS to run under HA mode	03/31/2009
Compliance of ReSS with the FermiGrid Software Acceptance Process	04/30/2009

Supporting users improving or bootstrapping the integration of ReSS with their job management systems
Metrics of Evaluation:
   ➢ Improved performance/utilization of ReSS by VO's
   ➢ User feedback
	Ongoing

Maintaining and supporting the infrastructure
Metrics of Evaluation:
   ➢ Number of bugs reported
   ➢ Turn around time of the tickets
	Ongoing

9. Project Organizational Structure

The program of work and efforts for this project in phase II will be sponsored by the Fermilab Computing Division.

9.1　Sponsor(s)

- Fermilab Computing Division : Gabriele Garzoglio

9.2　Stakeholders

- CMS VO　　　　　　　　: Burt Holzman
- DES VO　　　　　　　　: Nickolai Kouropatkine
- DZero VO　　　　　　　: Joel Snow
- Engagement VO　　　　: Mats Rynge
- FermiGrid　　　　　　　: Keith Chadwick
- Open Science Grid (OSG)　: Mats Rynge

9.3　Responsible/Host

- Fermilab Computing Division

9.4　Project Organization Structure

- CD Leader: Eileen Berman
- Project Leader: Parag Mhashilkar

10. Preliminary Project Plan / Statement of Work

10.1   WBS

Time line for the activities and the deliverables for various activities is mentioned in Section 8.

1. Define Project
    1.1. Project Definition Document
        1.1.1.   Charter
        1.1.2.   Stakeholder Analysis
        1.1.3.   Identify Resources
        1.1.4.   WBS
    1.2. Project Execution Document
        1.2.1.   Investigate the required changes
        1.2.2.   Statement of Work / Architecture
2. Support MPI users
    2.1. Understand the requirements from the MPI users
    2.2. Identify and Investigate available options in Glue Schema V1.3 to support MPI attributes
    2.3. Implement the changes to support Glue Attributes for MPI
    2.4. Test the changes
    2.5. Release the changes and make them available in OSG-VDT stack
    2.6. Deploy them via OSG-VDT stack
3. Improved Support for advertising storage elements
    3.1. Work with the GIP group to come up with a document on how they plan to address this in coming future
    3.2. Implementation the required support in CEMon to comply to the changes in GIP
    3.3. Test the changes
    3.4. Release the changes and make them available in OSG-VDT stack
    3.5. Deploy them via OSG-VDT stack
4. Compliance of ReSS with the FermiGrid Software Acceptance Process
    4.1. Understand the requirements enforced by FermiGrid on a service to comply to FermiGrid standards
    4.2. Implement the changes to the ReSS to confer to the FermiGrid compliance requirements
    4.3. Test the changes
    4.4. Deploy the changes via OSG-VDT stack if necessary
5. Test Suite to identify deployment issues with CEMon for ReSS
    5.1. Understand the possible failure modes and how they are capture in existing tools.
    5.2. Implement the checks
    5.3. Test the test suite
    5.4. Release the changes and make them available in OSG-VDT stack
    5.5. Deploy them via OSG-VDT stack
6. Compliance with the Generic Information Services for OSG 1.2
    6.1. Communicate with the GIP group to understand how they plan to address this in coming future.

6.2. Implementation the required support in CEMon to comply to the changes in GIP
6.3. Test the changes
6.4. Release the changes and make them available in OSG-VDT stack
6.5. Deploy them via OSG-VDT stack

7. Compliance with the Generic Information Services for OSG 1.2 to support Glue Schema V2
    7.1. Communicate with the GIP group to understand how they plan to address this in coming future.
    7.2. Implementation the required support in CEMon to comply to the changes in GIP
    7.3. Test the changes
    7.4. Release the changes and make them available in OSG-VDT stack
    7.5. Deploy them via OSG-VDT stack

8. Improved security for resource registration with ReSS
    8.1. Understand the problem and requirements to enforce resource to register with the ReSS using secure means
    8.2. Investigate the available technologies
    8.3. Investigate resource registration services available on OSG
    8.4. Identify and implement means to securely get resource registration information from the OSG registration services.
    8.5. Test the changes.
    8.6. Release the changes
    8.7. Help in deployment of new resource registration policies with ReSS.

9. Support to run ReSS services in High Availability deployment mode
    9.1. Identify the critical components in ReSS
    9.2. Investigate how to run the critical components in HA mode
    9.3. Implement the changes to support HA mode
    9.4. Test the changes
    9.5. Deploy the changes in production.

10. Support users and VOs in improving and bootstrapping the integration of ReSS with their job management systems
    10.1. Enhancing the DZero VO's usage of ReSS via Samgrid
        10.1.1. Document the existing use case for DZero VO
        10.1.2. Write a proposal suggesting improvements to the DZero Job Management System
        10.1.3. Implement the changes
        10.1.4. Test the changes
        10.1.5. Identify the hardware to deploy new services for production
        10.1.6. Deploy the services in production

11. Maintain and support the infrastructure
    11.1. Address and respond to the issues related to ReSS

10.2   Computer Security Considerations

Hardware and software/services required for the project will be hosted at Fermilab and will follow the Computer security policies of Fermilab. The ReSS services do not run user jobs thus minimizing possible exploits done by running non-ReSS

executables. There is a task in the task-list to strengthen the security in the resource registration process thus preventing unauthenticated and unauthorized resources as part of the system.

10.3   Operations Responsibilities at Close of Project

Hardware and software/services required will be hosted at Fermilab and will follow the Computer security policies imposed by Fermilab. Hardware for the ReSS services is supported by the FermiGrid operations group and will continue to remain the same. After the closeout, hardware, maintenance and deployment of the central ReSS service will be supported by FermiGrid. Any bug fixes and critical updates will be addressed by the ReSS group. A different project should be opened to address the bug fixes and updates to the ReSS.

11. Estimated Resource Requirements

11.1   Personnel Cost

- 20% FTE for Project Leadership + 30% FTE for development, integration and support of project related activities

11.2   Hardware Cost

- 3 machines to act as production, integration, and development platforms for ReSS; FermiGrid provided 4 such machines during the phase I. FermiGrid has proposed the acquisition of two (2) systems as part of the FY09 budget request. If approved, these two systems will host the production and ITB ReSS-HA services and also provide development hosts for ReSS software development (if necessary). The system deployment will utilize the standard FermiGrid Xen Dom-0 and Dom-U approach coupled with a dedicated LVS front end.

12. Project Planning Process

Phase II of the project will work towards achieving the deliverables and goals set in this document. If any major changes to the initial list of tasks for the project are deemed necessary, the originator of the request should communicate this to the ReSS team via a *"Change Request Form"* The template for the change request form is provided in Appendix – A of this document. This process will ensure that the changes are well documented along with the impact of these changes to the original plan. The Approved change request form should be appended to the Project Execution Document for the project.

13. Project Communication Plan

Project status will be communicated to the stakeholders monthly via email. If the email is deemed insufficient at times, the email can be followed by a meeting. There will be a semi-

annual stakeholders meeting to evaluate the progress of individual activities mentioned in the deliverables and milestones.

GOC ticketing system will be an official means of communicating any issues related to ReSS to the ReSS team. Tickets will be answered promptly and the prioritized appropriately.

14. Supporting Documentation

This section lists supporting documentation released during the Phase – I of the ReSS project.

The project web home page:
https://twiki.grid.iu.edu/twiki/bin/view/ResourceSelection/
This link includes documentation for:
1. Project definitions, including charter, user requirements, initial plan and architecture;
2. System and component evaluations
3. Design and development documentation
4. User and administrator documentation;
5. System deployment and monitoring tools
6. List of related publications
7. Phase – I closeout document

15. Project Risks, Issues, and Assumptions

Risk	Impact Level	Risk Plan Actions
Support for CEMon dropped by GLite	High	This will need working closely with GIP group to find an alternative means to achieve the functionality provided by CEMon in case this happens. Chance of support for CEMon being withdrawn by the CEMon group is minimal but the impact on OSG IS could be significant.
Delay in adaptation to GLUE Schema V2	Medium	Timeline for the adaptation and deployment for the Glue Schema V2 is around December 2009. The changes could be complex and might need additional man power to the project based on the complexity. Phase – II of the ReSS project will continue with the transition of operations to FermiGrid if the adaptation to the Glue Schema V2 is delayed.

16. Appendix – A (Change Request Form)

Change Request Form

Project Name:	OSG Resource Selection Service	CR Number:	
Project Leader:	Parag Mhashilkar	Process Owner :	Parag Mhashilkar
Change Request Title:			
Originator:		Date Created:	

1. Proposed Change Description

The originator should describe the proposed changes here.

2. Justification

The originator should describe why the change is necessary and weather is it an addition, deletion or change to the original plan

3. Benefits

What are the benefits of making this change? Who benefits from it?

4. Impact Statement

What are the implications if the change is not implemented? What are the known impacts of the change on the existing system?

5. Approvals

Approver Signature	Print Name	Date
Client Signature	Print Name	Date