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A Lightweight Framework for Implementing Grid Portals

Jonas Lindeman and Göran Sandberg



LUNARC



- 3 Production level clusters
 - Milleotto 1008 cores (x86_64)
 - Docenten 210 cores(x86_64
 - Sigrid 100 cores (32-bit) part of SweGrid
- ~50-80 active users
- All machines have GRID-frontends





What are people running

- "Home grown" code compiles before each run 70% of the usersbase
- Packaged application 30%
 - MATLAB
 - MOLCAS Quantum Chemistry code
 - ABAQUS Finite Element Code
 - NASTRAN Finite Element Code
 - FLUENT

- ...



"Packaged applications" on the Grid

- Good candidate for the Grid
- No need to transfer sources/binaries for execution, only input files
- Used by many (new/novice) users at Lunarc
- Published on the grid-infosystem using runtimeenvironments
- Main target of the Lunarc Application Portal

Providing user interfaces for Grid applications

- No "standard" way
- Must provide user interfaces for
 - The application
 - job submission, job control and monitoring
- For web-based portals
 - Libraries for web user interfaces
- For Window-based applications
 - Libraries for user interfaces
- ... A lot of work ...



The Lunarc Application Portal

- Provide an easy to use interface for a number of commonly used applications
 - Add new users of Lunarc resources
 - Simplify for existing users
- Provide a lightweight developer interface and installer for modifying, extending and setting up portals
 - Enable larger groups of users to create custom portals, without a lot of coding knowledge

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The two faces of the Lunarc Application portal





User

Developer



The user side of LAP

- Provides the user with an easy to use interface for
 - Certificate management
 - Authentication
 - Job creation and management
 - Storage (Under development)

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LUNARC Application Portal											
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Welcome to the LUNARC application portal

LAP Version 0.8.0 (Currently undergoing revision... Please have patience.) Copyright © 2004-2006 LUNARC, Lund University Distributed under the GNU Public License version 2 or later Written by: Jonas Lindemann

Credits:

Web application developed in WebWare for Python Grid access though NorduGrid/ARC middleware (arclib) HyperText HTML code generation library by John A. (Andy) Dustman jsDOMenuBar by Toh Zhiqiang

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DETAILS REGARDING ACTUAL SOLUTION WAVEFRONT REQUESTED

Implementation

- Web-application is implemented in Python using WebWare for Python
 - Integrated in the Apache Webserver
- Grid middleware
 - Advanced Resource Connector (ARC)
 - Arclib python interface to ARC
- Additional applications can be added using a Plugin-based architecture



The developer side of LAP

- Lightweight framework for implementing user interfaces for grid-enabled applications
 - Implemented in Python
 - Web user interface library
 - Base classes for job definitions and job user interfaces → Plugin
 - Framework handles submission, management and monitoring

Implementing Plugins







LAP installer



- Many packages
- Dependencies
- Configuration files
- ...

LAP installer

- Python based install script
 - Single file download
 - GUI/Command line interface
- Checks for prerequisites
- Downloads all necessary packages
- Configures and installs packages
- Installs and configures the portal



LAP installer

[bmjl@docenten lap-installer]\$./setup-lap.py

Checking for prerequisites.

Checking for wget. Found. Checking for tar. Found. Checking for uname. Found. Checking for gunzip. Found. Checking for ARC client tools. Found. Checking for Apache Extension Tool (APXS). Found. Checking for ARC installation dir. Found. Checking for Python based ARCLib. Found.

Lunarc Application Portal - Setup 0.1

Please set the installation options:

- 1. Portal application directory name : lap
- 2. Portal version
- 3. Target installation directory : ./opt
- 4. WebWare version

- : tap : 0.8.0-20061026 : ./opt
- : 0.9.2

Enter option to change. (Enter = accept, 0 = quit) :



Ongoing projects

- Lund
 - User interface to the StarSim simulation package (Parallel) – Simulating large telescopes
 - User interface for the MOLCAS chemistry package
- Uppsala
 - User interface to a bioinformatics code
 - QTL analysis

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StarSim implementation process

- Structuring of existing code
- Parallelised version of code
- Setting up the code as a runtime-environment (STARSIM-X.Y)
- Implementation of LAP-plugin, generating input for the STARSIM-X.Y runtime-environment



What is currently being developed

- Job Submission Service (JSS) WS
 - Middleware neutral job submission
 - Automatic job recovery and resubmission
- Simplified plugin definition (No coding)
- More interactive user interfaces
 - AJAX based using the ExtJS library



Concluding remarks

- The Lunarc Application Portal
 - Provides a common user interfaces for job submission, management, monitoring etc...
 - Is a lightweight framework (Python), enabling quick grid user interface development
 - Provides a plugin architecture enabling easy extensibility
 - Available to download
 - http://sourceforge.net/projects/laportal