iRODS@RENCI

Leesa Brieger, Jason Coposky, Vijay Dantuluri, Kevin Gamiel, Ray Idaszak, Oleg Kapeljushnik, Nassib Nassar, Jason Reilly, Michael Stealey, Lisa Stillwell
irods@renci

• A new initiative at the Renaissance Computing Institute (RENCI), a research unit of UNC
• An investment by UNC
• A step-up of the collaboration with DICE, already administratively tied to RENCI:
  ▪ DICE-UCSD: Institute of Neural Computing (INC)
  ▪ DICE-UNC: RENCI and the School of Information and Library Science (SILS)
• Stepping toward long-term sustainability
Agile Development Approach

• Incremental and iterative methodology
• Short development cycles (1-4 weeks)
• Whole team works through a full dev cycle:
  o planning - stakeholder needs taken into account
  o requirements analysis
  o design
  o coding
  o unit and acceptance testing
  o product demonstrated to stakeholders
• Iterate for next dev cycle, adapting to new requirements, technological constraints, etc
Agile: Not a Waterfall Model

- Waterfall Model:  
  good for manufacturing,  
  not for software dev

- Agile:  
  requirements and solutions evolve  
  in short-cycle collaboration between  
  self-organizing, cross-functional teams

- iRODS:  
  de facto Agile development driven by community  
  stakeholders; could never have evolved in a waterfall  
  model

- RENCI:  
  formalize an Agile approach in iRODS development for hardening,  
  community participation, and sustainability
Collaborative Development Environment

• Git – distributed revision control system
• GForge – project and software development management system:
  o hosting & version control
  o bug-tracking
  o messaging
• Hudson – continuous integration environment: incremental quality control
• Nexus – Maven repository that tracks dependencies and bundles for check-out (Java)
Infrastructure Overview
Supports community-based software development
Collaborative Dev Environment

• Starting out with Jargon to test the infrastructure
• Other iRODS clients hosted: PHP, Windows, Python, etc
• A full iRODS mirror will reside in this environment
• Provide automated continuous build and test for iRODS server and clients
GForge

Academic license: no limit on # of users

Community based plug-ins:
- Forums
- Trackers
- Document Managers
- News

File Release System
- Mailing lists
- Wiki
- Continuous Build

https://code.renci.org/gf:
# GForge

Projects in RENCI gforge

[https://code.renci.org/gf/project/](https://code.renci.org/gf/project/)

<table>
<thead>
<tr>
<th>Region III</th>
<th>region3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java Commons</td>
<td>commons</td>
</tr>
<tr>
<td>RODS PHP</td>
<td>irodsphp</td>
</tr>
<tr>
<td>RODS Jargon trunk</td>
<td>jargontrunk</td>
</tr>
<tr>
<td>RODS Jargon</td>
<td>jargon</td>
</tr>
<tr>
<td>iRODS iDrop</td>
<td>irodsidrop</td>
</tr>
<tr>
<td>RODS Fedora Repository Integration</td>
<td>irodsfedora</td>
</tr>
</tbody>
</table>

**iRODS iDrop**

iDrop consists of desktop and web GUI's for browsing and accessing iRODS data.

**gForge@RENCI**

Project for tracking bugs/issues with the gForge installation at RENCI.

**DROPS**

Orchestrating Distributed Resource Ensembles for Petascale Science. Sponsored by DOE ASCR.
# GForge

## Tracking Feature Requests in Jargon Trunk

<table>
<thead>
<tr>
<th>ID</th>
<th>Summary</th>
<th>Priority</th>
<th>Assignee</th>
<th>Submitted By</th>
<th>Status</th>
<th>Open Date</th>
<th>Close Date</th>
<th>Last Modified Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td><code>port over user modify password</code></td>
<td>3</td>
<td>Nobody</td>
<td>Mike Conway</td>
<td>Open</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
</tr>
<tr>
<td>55</td>
<td><code>Davis conn sharing probs using miscServerInfo heartbeat ping</code></td>
<td>3</td>
<td>Nobody</td>
<td>Mike Conway</td>
<td>Closed</td>
<td>2011-02-01</td>
<td>2011-02-07</td>
<td>2011-02-07</td>
</tr>
<tr>
<td>56</td>
<td><code>verify new performance query values</code></td>
<td>3</td>
<td>Nobody</td>
<td>Mike Conway</td>
<td>Open</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
</tr>
<tr>
<td>59</td>
<td><code>recursive metadata listing</code></td>
<td>3</td>
<td>Nobody</td>
<td>Mike Conway</td>
<td>Open</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
<td>2011-02-01</td>
</tr>
</tbody>
</table>
# GForge

## Tracking Project Activity in Jargon Trunk

### Activity Type

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity Type</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-Feb-09</td>
<td>Tracker item &quot;io exception on rule execution&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>13:43:08</td>
<td>Tracker item &quot;move 2.5 nodes server level checks before release and test&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>2011-Feb-07</td>
<td>Tracker item &quot;亳州 2.5 nodes server level checks before release and test&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:54:08</td>
<td>Tracker item &quot;Davis conn sharing probes using miscServerInfo heartbeat ping&quot; changed status to Closed</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:52:31</td>
<td>Tracker item &quot;Davis conn sharing probes using miscServerInfo heartbeat ping&quot; changed status to Closed</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>2011-Feb-01</td>
<td>Tracker item &quot;irodsAccount mod password results in leaking db conn?&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>11:38:40</td>
<td>Tracker item &quot;recursive metadata listing&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>11:33:51</td>
<td>Tracker item &quot;recursive metadata listing&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>11:11:39</td>
<td>Tracker item &quot;verify new performance query values&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>11:02:48</td>
<td>Tracker item &quot;Davis conn sharing probes using miscServerInfo heartbeat ping&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>11:00:54</td>
<td>Tracker item &quot;pass over user modify password&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:50:09</td>
<td>Tracker item &quot;review permissions queries for file and dir/override on recursive set perm on coll&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:23:49</td>
<td>Tracker item &quot;Bug 120 - 10000 errors when using IRODSFile&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:16:51</td>
<td>Tracker item &quot;max parallel threads checks get/put&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:16:00</td>
<td>Tracker item &quot;fix client side get/put rule execution&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:14:46</td>
<td>Tracker item &quot;fix put to use single call if length &lt; max size for one buf&quot; opened</td>
<td>Mike Conway</td>
</tr>
</tbody>
</table>
GForge

iDrop Tracker Report Activity

Tracker Items By Priority

Tracker Items By Tracker

iRODS User Meeting
February 17-18, 2011
#### Project Summary for iRODS PHP

**Recent News**

**Now testing fix for "auth error using PRODS web browser"**
Lisa Stillwell  
2011-02-15

This fix involves a change to the PHP web client to require zone name when logging on. The fix is currently being tested and will be submitted soon.

**Activity**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity Type</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-Feb-15</td>
<td>Tracker item &quot;Max Results set too low when retrieving RODS File Stats&quot; opened</td>
<td>Lisa Stillwell</td>
</tr>
<tr>
<td>15:13:28</td>
<td>Tracker item &quot;Takes too long to populate pull-down menu of attribute names when collections with many AVUs&quot; opened</td>
<td>Lisa Stillwell</td>
</tr>
<tr>
<td>14:39:43</td>
<td>Tracker item &quot;Problem authenticating when federations exists with same user names&quot; deleted</td>
<td>Lisa Stillwell</td>
</tr>
<tr>
<td>2011-Feb-04</td>
<td>Commit: This is the initial commit to git. This code was pulled form here: svn checkout <a href="http://gxirods.openqacode.com/svn/trunk/extirods-read-only">http://gxirods.openqacode.com/svn/trunk/extirods-read-only</a></td>
<td>Lisa Stillwell</td>
</tr>
<tr>
<td>14:13:28</td>
<td>Tracker item &quot;auth error using PRODS web browser&quot; opened</td>
<td>Mike Conway</td>
</tr>
<tr>
<td>10:45:24</td>
<td>Tracker item &quot;auth error using PRODS web browser&quot; opened</td>
<td>Mike Conway</td>
</tr>
</tbody>
</table>

**Description**  
PHP client libraries and PRODS web browser for iRODS

**Developer Info**  
Mike Conway  
Lisa Stillwell

**Trove Categorization**
- Development Status: 1 - Planning
- Intended Audience: Developers, End Users/Desktop
- License: BSD License
- Programming Language: PHP
Hudson

Build automation:

• Continuous build/test of software projects
  o easier for developers to integrate changes to the project
  o easier for users to obtain a fresh build

• Notification of failures to help keep systems healthy

• Monitor executions of externally-run jobs
  o cron jobs and procmail jobs, even running remotely
  o Hudson keeps job outputs and makes it easy to notice when something is wrong

https://ci-dev.renci.org/hudson:
Sonatype Nexus

**Nexus** - Maven artifact repository

- Manages software artifacts for development, deployment, and provisioning
- Allows sharing of artifacts with other developers and end-users
- Centralized control of access and deployment of artifacts

https://ci-dev.renci.org/nexus/
Toward a Unified Cross-Platform Code

• Migrate platform-specific APIs and system calls away from server-level code
• Provide strategy for future support on other platforms
• Move to g++ for access to libraries such as Boost C++ libraries

Targeted APIs and Functions:
• Threading
• Regular Expressions
• Character Encoding
• Signals
• Fork

Current Status:
• Port to g++ is done and build is passing devtest
• Move to boost::thread is almost complete and also passing devtest
Windows Support

• Update of non-iCAT iRODS server

• Implementation of iCAT-enabled iRODS server:
  o Integration of MS SQL Server with iRODS
  o Builds of supported iCAT DBs for Windows

• Support of Windows iExplorer client
iRODS.NET Client

• Connect to iRODS server from .NET platform
  o iRods.NET Client will perform most of the iRODS client operations
  o Native integration with .NET Framework
  o Supports .NET 3.5 and up

• Usage scenarios for iRODS.NET Client
  o LinqToIRods development to query iRODS server
  o Powershell commands to simulate icommands
  o Drive or folder mounted to iRODS
  o .NET web and windows application development
Database Activities

• Database Resources Testing
  o DBR interaction with database instances: MySQL, Oracle, Postgres on Ubuntu 10.10
    ▪ Local to iRODS server
    ▪ Remote to iRODS server

• Developing MS SQL Server Interface to support iCAT Windows Implementation

• iCAT data redundancy and failover mechanisms

• iCAT Special Query Usage and Applicability with examples

• iCAT database performance tuning and recommended enhancements
Java Rule Engine

• Analyze design and resource requirements for a Java-based rule engine
  o Determine best inter-process communication method between (next-gen) C engine and Java
  o Semantic synchronization with C engine
  o Integration with Jargon

• Analysis complete by summer 2011
iRODS Clients: PHP API & Web Browser

iRODS@RENCI Start-up:

- Assist DICE with ongoing support
- Monitor Chat discussion (already fixed 1 issue!)
- Pull most complete & up-to-date versions from DICE/Google Code/Community and merge
- Put in GForge, Git repository.
- Incorporate PHPUnit and Hudson continuous integration
Community Involvement:

- Who is using PHP API/Web Browser?
- Who is contributing to source?
- Who would like to help maintain?
- What new features are needed?
PHP API & Web Browser

Long-Term Planning:

• Determine new feature set
• Investigate implementation technologies (i.e. PHP in JAVA VM)
• Standardization among client APIs (i.e. iRODS Server/Client compatibility versioning, and standardize function & parameter naming
• Hardening
Special Projects

- NCDC use cases
- Hadoop driver - genomics
- TUCASI project – federated environment for the 3 Triangle universities (Duke, NCSU, UNC)
- Shibboleth Authentication – map external authenticated user to iRODS user (TUCASI project)
- NARA – Cyberinfrastructure for Billions of Records
- NC Bio Preparedness – distributed data access
Sustainability – the Community Architecture Model

• Support and formalize the collaborative model for iRODS
  o Collaborative development environment
  o Agile development approach

• Red Hat Fedora model (Fedora Linux, not Fedora Digital Repository)

• Develop service level agreements for targeted user groups
irods@renci

Building a RedHat Fedora Model

Community Contributions and Requests

Funded Development

iRODS community code

3-4 month release schedule; current user support model

DICE-driven

iRODS hardened code

18-month release schedule; commercial support model

irods@renci-driven
## Differences Between Community and Hardened Releases

<table>
<thead>
<tr>
<th></th>
<th>Community Code</th>
<th>Hardened Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Users</strong></td>
<td>Technical enthusiasts using iRODS in non-critical computing environments</td>
<td>Users looking for stable, supported, and certified iRODS (business, government, etc)</td>
</tr>
<tr>
<td><strong>Primary Benefits</strong></td>
<td>Bleeding-edge technology released early and often.</td>
<td>Stable, reliable, and broadly supported. Easy to deploy and manage. Many certified applications available.</td>
</tr>
<tr>
<td><strong>Feature Selection</strong></td>
<td>DICE and developer community</td>
<td>DICE and irods@renci</td>
</tr>
<tr>
<td><strong>Development Model</strong></td>
<td>Open Source</td>
<td>Open Source</td>
</tr>
</tbody>
</table>
## Community Release vs. Hardened Release

<table>
<thead>
<tr>
<th></th>
<th>Community Code</th>
<th>Hardened Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certifications</td>
<td>None</td>
<td>Hardware, software</td>
</tr>
<tr>
<td>Support Options</td>
<td>None (community supported)</td>
<td>Many, including 24x7 with 1 hour response. Unlimited incidents. Include upgrades</td>
</tr>
<tr>
<td>Maintenance &amp; Updates</td>
<td>Community &amp; 3rd party driven</td>
<td>Complete update and management</td>
</tr>
<tr>
<td>Testers</td>
<td>Developer Community</td>
<td>irods@renci, DICE, partners, beta team</td>
</tr>
<tr>
<td>Price</td>
<td>Free download</td>
<td>Annual subscription, multiple offerings</td>
</tr>
</tbody>
</table>
Service Level Agreements

The extension of the community code

- hardened code base
- certifications
- specialized services for target groups

will lead to service level agreements tailored to target user needs.