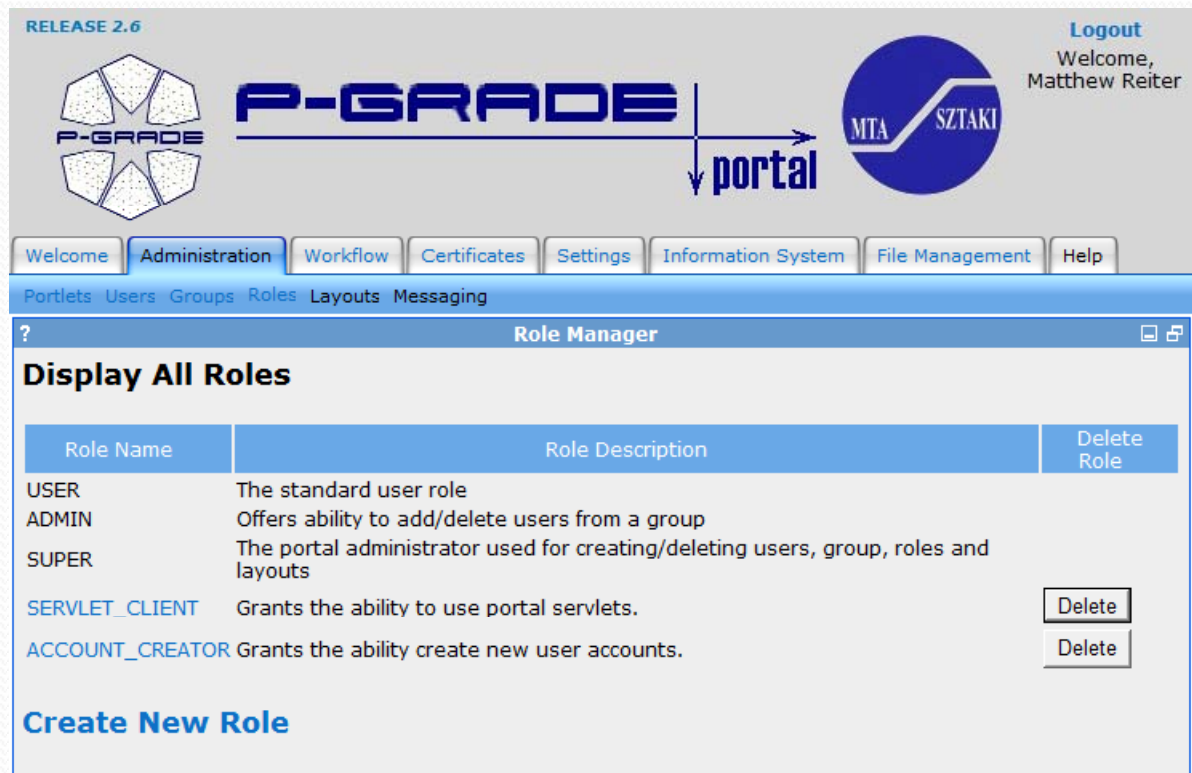


# Grid Portal Development

Authors: Josh Nedelka & Matthew Reiter  
Worcester Polytechnic Institute

# The P-GRADE Portal

- Web-based portal allowing access to multiple Grids
- Removes technical barriers for many users
- Provides utilities to easily create and execute workflows
- Recently made open source



RELEASE 2.6

**P-GRADE** portal

MTA SZTAKI

Logout  
Welcome,  
Matthew Reiter

Welcome Administration Workflow Certificates Settings Information System File Management Help

Portlets Users Groups Roles Layouts Messaging

? Role Manager

### Display All Roles

Role Name	Role Description	Delete Role
USER	The standard user role	
ADMIN	Offers ability to add/delete users from a group	
SUPER	The portal administrator used for creating/deleting users, group, roles and layouts	
SERVLET_CLIENT	Grants the ability to use portal servlets.	Delete
ACCOUNT_CREATOR	Grants the ability create new user accounts.	Delete

[Create New Role](#)



# Project Statement

- Analysis, design and implementation of two features for the P-GRADE Grid Portal
  - User account creation system
  - Notification system
- Systems serve to enhance a user's experience with the Portal.

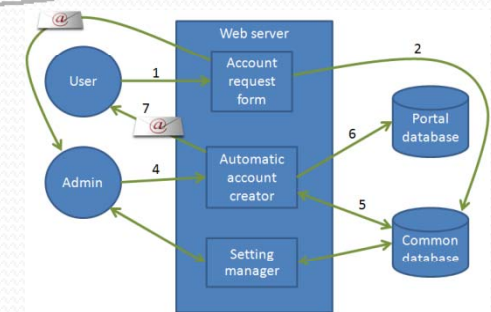
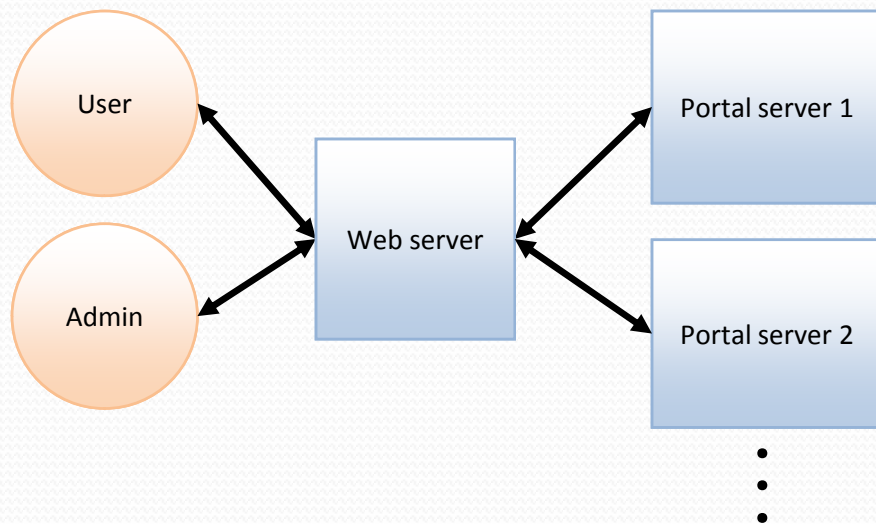


# Project Statement

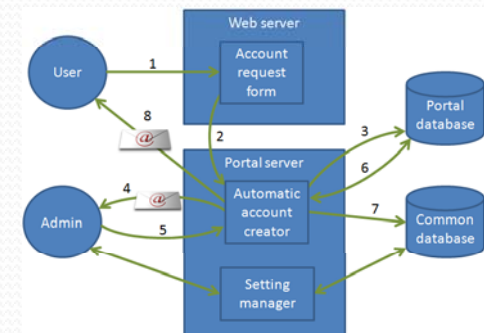
- User Account Creation System
  - Administrator must manually create user accounts
  - Task is to automate account creation
  - Administrator must approve account requests
- Email Notification System
  - Currently users must manually check statuses
  - Task is to integrate system that monitors workflows for status changes
  - When changes occur, send notifications

# Account Creation System Implementation

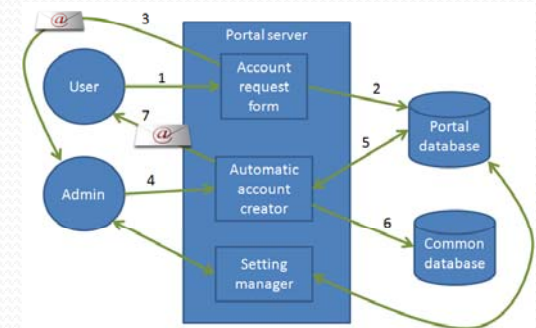
- Several implementations considered
- On web server:
  - Centralized account request form
  - Administration console
- Actual account creation done on portal servers



Impl 1: mostly on web server

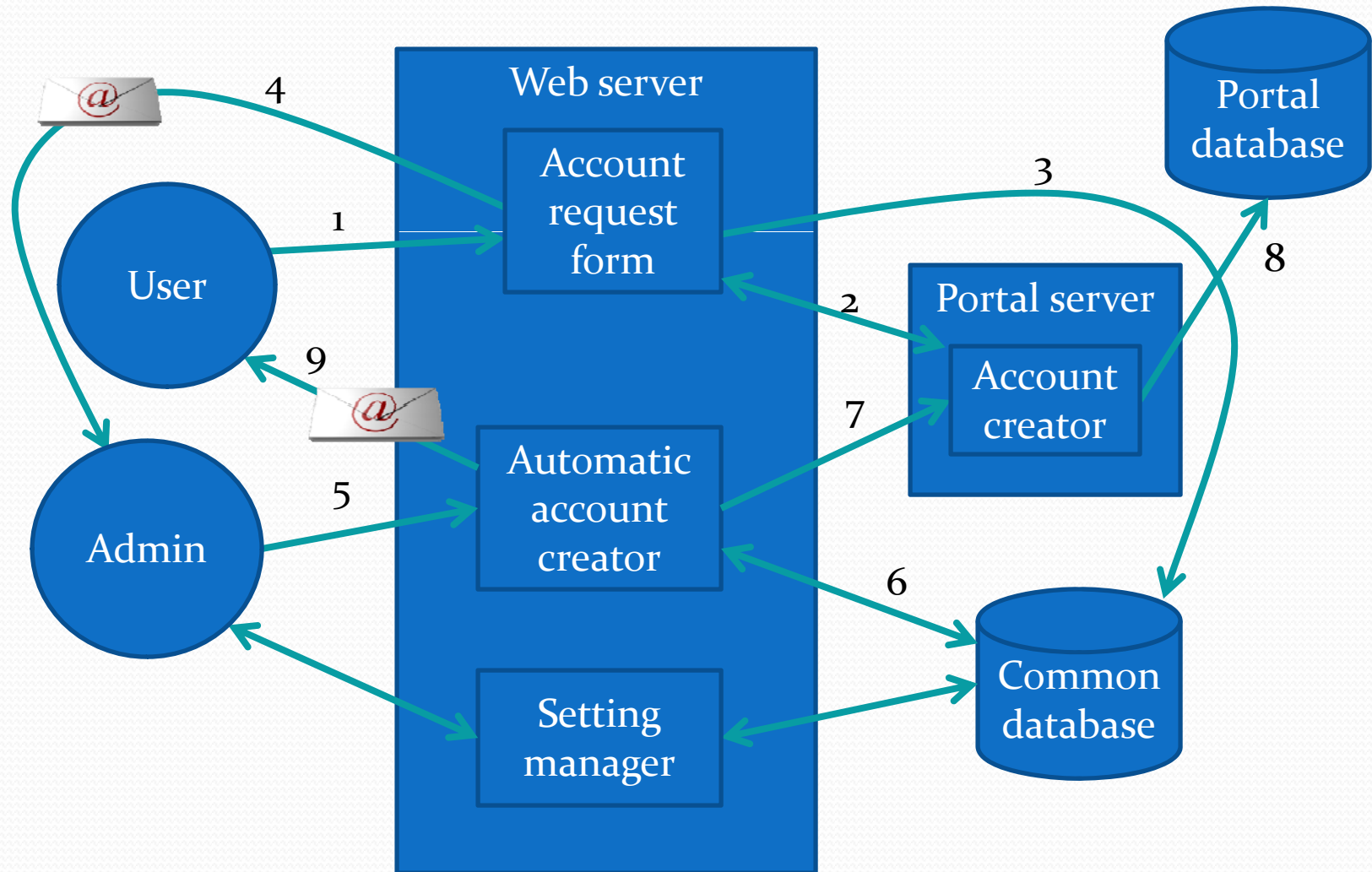


Impl 2: combination



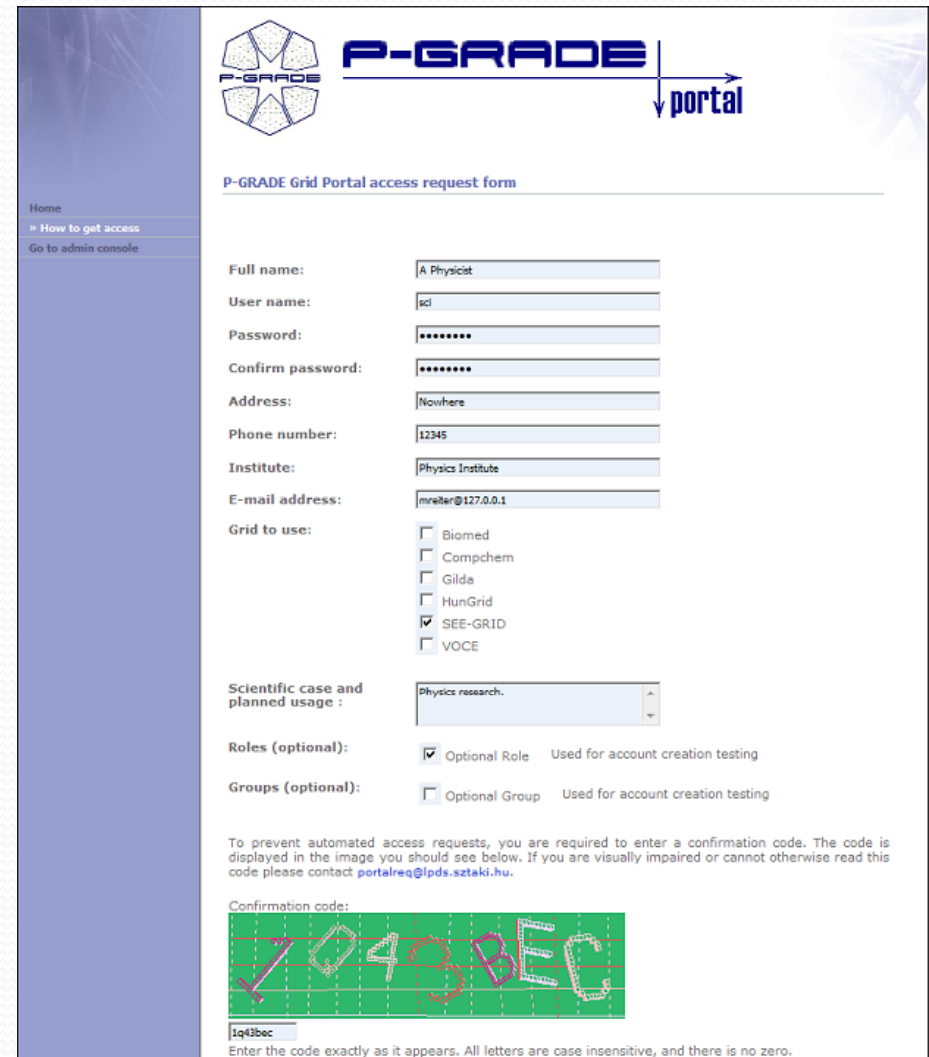
Impl 3: entirely on portals

# Account Creation System Data Flow

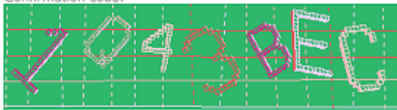


# Account Request Form

- Form for user to submit account requests
- Sends requests to admin for approval
- Image confirmation system to prevent spam



The screenshot shows the P-GRADE Grid Portal access request form. The form is titled "P-GRADE Grid Portal access request form" and includes the P-GRADE logo and "portal" text. The form fields are as follows:

- Home
- » How to get access
- Go to admin console
- Full name: A Physicist
- User name: jcl
- Password: [masked]
- Confirm password: [masked]
- Address: Nowhere
- Phone number: 12345
- Institute: Physics Institute
- E-mail address: mreiter@127.0.0.1
- Grid to use:  Biomed,  Compchem,  Gilda,  HunGrid,  SEE-GRID,  VOCE
- Scientific case and planned usage: Physics research.
- Roles (optional):  Optional Role Used for account creation testing
- Groups (optional):  Optional Group Used for account creation testing
- To prevent automated access requests, you are required to enter a confirmation code. The code is displayed in the image you should see below. If you are visually impaired or cannot otherwise read this code please contact [portalreq@lpds.sztaki.hu](mailto:portalreq@lpds.sztaki.hu).
- Confirmation code: 
- lq43bec
- Enter the code exactly as it appears. All letters are case insensitive, and there is no zero.

# Account Request Verification

- Email sent to admin
- Three options:
  - Accept
  - Deny
  - Accept with defaults
- Links to account request dispatcher

## P-GRADE Portal Access Request Verification

P-GRADE Grid Portal Team [portalreq@lpds.sztaki.hu]

Sent: Tue 4/15/2008 2:24 PM

To: mreiter@127.0.0.1



**P-GRADE** | portal

### P-GRADE Portal Access Request Verification

Full name: A Physicist  
User name: sci  
Address: Nowhere  
Phone number: 12345  
Institute: Physics Institute  
E-mail address: mreiter@127.0.0.1  
Roles: Optional Role  
Groups:  
Grids: SEE-GRID  
Scientific case and planned usage:  
Physics research.

Date: 2008-04-15  
Time: 14:23:35

[Accept](#) | [Deny](#) | [Accept with default roles and groups](#)

# Account request dispatcher

- Part of admin console
- Forwards account requests to portals
- Displays account creation results
- On failure, provides option to retry

Account created on SEE-GRID.

The account request has been successfully processed.

Failed to create an account on SEE-GRID!

The account request was not successfully processed.

[Try Again](#)

# Account Creation Components on Portal

- Account Creation Servlet
  - Handles account creation and verification
- Information Query Servlet
  - Handles requests for user/role/group information
- Account Creator Service
  - Interfaces with built-in services
- Authentication Service
  - Verifies permission to use servlets

# Administration Console

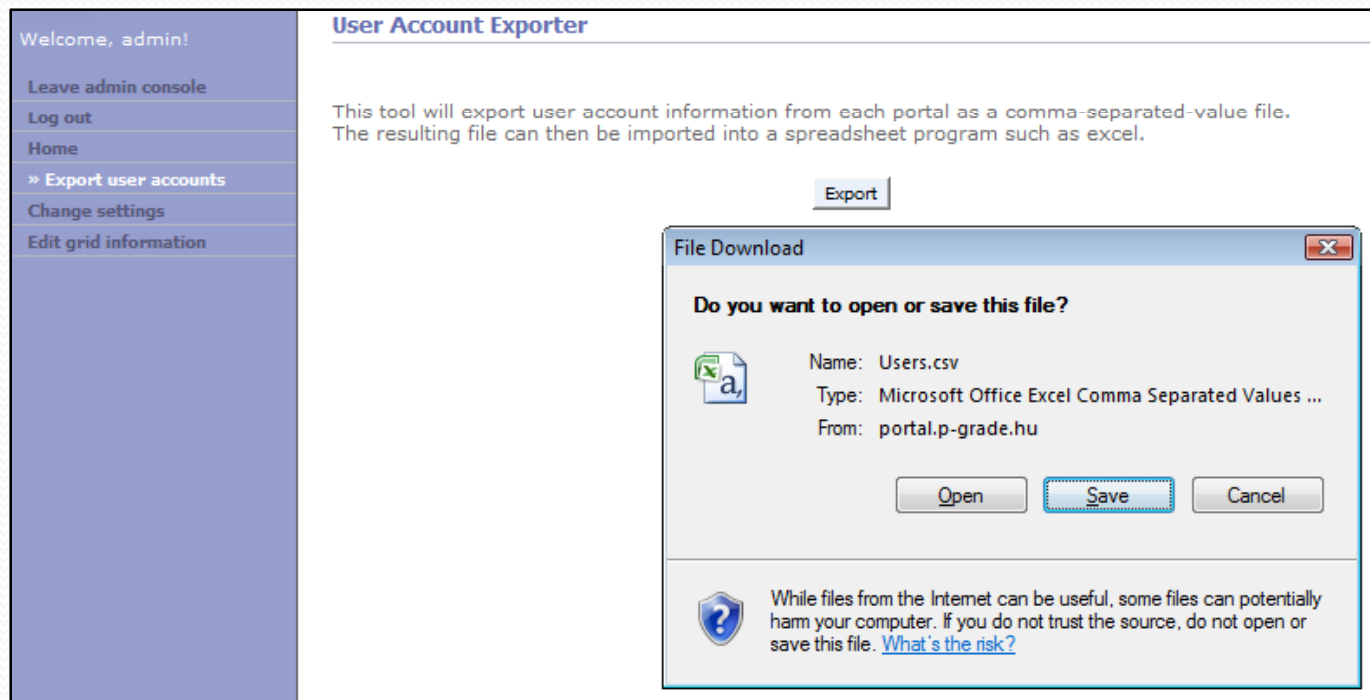
- Common login
- Provides access to:
  - User information exporter
  - Settings manager
  - Grid info editor



The screenshot shows the login interface for the P-Grade Administration Console. On the left is a vertical navigation bar with a blue gradient, containing the text "Leave admin console" and "» Log in". The main content area has a white background with a blue header. The header includes a logo consisting of a hexagonal grid pattern with the text "P-GRADE" below it, and the text "P-GRADE" in a large, bold, blue font. To the right of the "P-GRADE" text is a blue arrow pointing right with the word "portal" below it. Below the header, there is a "Log In" link. A horizontal line separates the header from the login form. The form contains the text "Please enter your user name and password." followed by two input fields: "User name:" and "Password:". Below the input fields is a "Log In" button.

# User Information Exporter

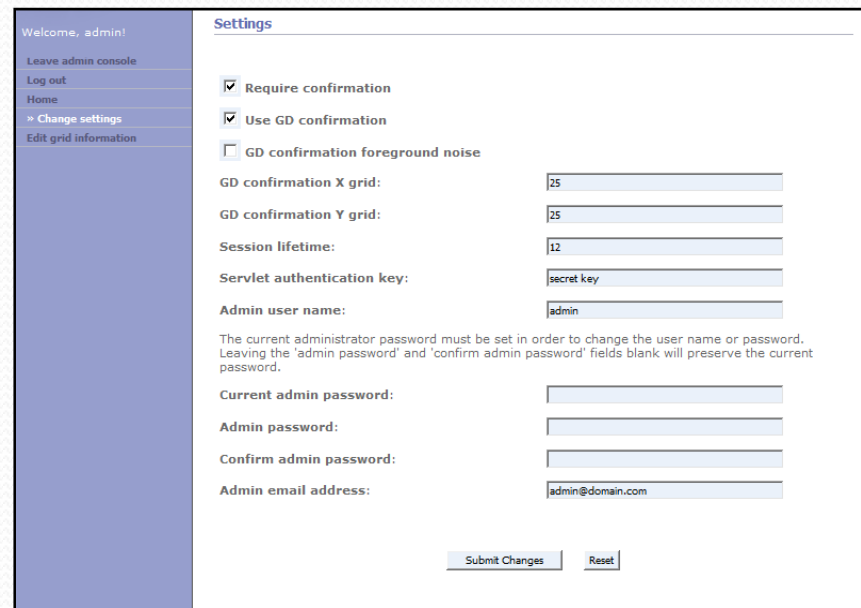
- Allows admin to download user information from all portals
- Uses CSV format for compatibility



The screenshot displays the 'User Account Exporter' web interface. On the left is a navigation sidebar with the following items: 'Welcome, admin!', 'Leave admin console', 'Log out', 'Home', '» Export user accounts', 'Change settings', and 'Edit grid information'. The main content area is titled 'User Account Exporter' and contains the text: 'This tool will export user account information from each portal as a comma-separated-value file. The resulting file can then be imported into a spreadsheet program such as excel.' Below this text is an 'Export' button. A 'File Download' dialog box is open in the foreground, asking 'Do you want to open or save this file?'. The dialog shows a file icon, the name 'Users.csv', the type 'Microsoft Office Excel Comma Separated Values ...', and the source 'portal.p-grade.hu'. It has 'Open', 'Save', and 'Cancel' buttons. At the bottom of the dialog, there is a warning icon and the text: 'While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. [What's the risk?](#)'

# Settings Manager

- Interface for changing settings:
  - Image confirmation
  - Authentication
  - User name
  - Password
  - Email address



The screenshot displays the Settings Manager interface. On the left is a navigation menu with the following items: "Welcome, admin!", "Leave admin console", "Log out", "Home", "» Change settings" (highlighted), and "Edit grid information". The main content area is titled "Settings" and contains the following configuration options:

- Require confirmation
- Use GD confirmation
- GD confirmation foreground noise
- GD confirmation X grid:
- GD confirmation Y grid:
- Session lifetime:
- Servlet authentication key:
- Admin user name:

A warning message states: "The current administrator password must be set in order to change the user name or password. Leaving the 'admin password' and 'confirm admin password' fields blank will preserve the current password."

Below the warning are the following password and email fields:

- Current admin password:
- Admin password:
- Confirm admin password:
- Admin email address:

At the bottom right, there are two buttons: "Submit Changes" and "Reset".

# Grid Information Editor

- Add/remove grids
- Edit grid information
  - ID
  - Name
  - URL
  - Servlet credentials
  - Account creator credentials

The screenshot shows a web application interface for editing grid information. On the left is a vertical navigation menu with the following items: 'Welcome, admin!', 'Leave admin console', 'Log out', 'Home', 'Change settings', and '» Edit grid information'. The main content area is titled 'Grid Information Editor' and contains a section for editing a grid named 'My Grid (mygrid)'. The grid is selected with a checkbox. Below the checkbox are several input fields: 'Grid ID' (value: mygrid), 'Grid name' (value: My Grid), 'Portal URL' (value: https://mygrid.org/supergrid), 'Servlet user name' (value: ServletUser), 'Servlet password' (value: some password), 'Account creator user name' (value: AccountCreatorUser), and 'Account creator password' (value: some other password). At the bottom of the form are four buttons: 'Add New Grid', 'Delete Selected Grids', 'Submit Changes', and 'Reset'.

# Administrator Manual

- Provides an overview of the system
- Instructions for:
  - Installation
  - Admin console

P-GRADE Multi-Portal Account Creation System  
Administrator Manual

☐ **Contents**

- Introduction
  - Account creation workflow
- Installation
  - Server topology
  - Prerequisites
    - Installing web server components
    - Configuring Apache
    - Configuring firewalls
  - Installing portal server components
- Administration console
  - Exporting user account information
  - Settings
  - Editing grid information

☐ **Introduction**

The purpose of this manual is to instruct administrators on how to install, configure, and maintain the P-GRADE Multi-Portal Account Creation System.

The account creation system is intended to provide a solution to the problem of a single organization administering multiple grid portals. Instead of forcing an administrator to manually create user accounts on each portal requested by a user, all of the work of creating an account is done automatically. The administrator merely has to approve or deny requests and perform occasional maintenance to keep the system running.


☐ **Account Creation Workflow**

☐ **Installation**

☐ **Administration Console**

The administration console serves as the portal for various administrative activities, including creating new user accounts and editing grid information.

The default administrator user name is "admin" and the default password is blank. It is recommended that you change the user name and password using the setting editor the first time you log in.





# Security

- Key requirement: prevent unauthorized account creation
- Only administrator can approve account requests
- Administrator must authenticate with web server
- Web server must authenticate with portal servers
- Servlet and account creator credentials stored in encrypted form
- Protection against SQL injection attacks

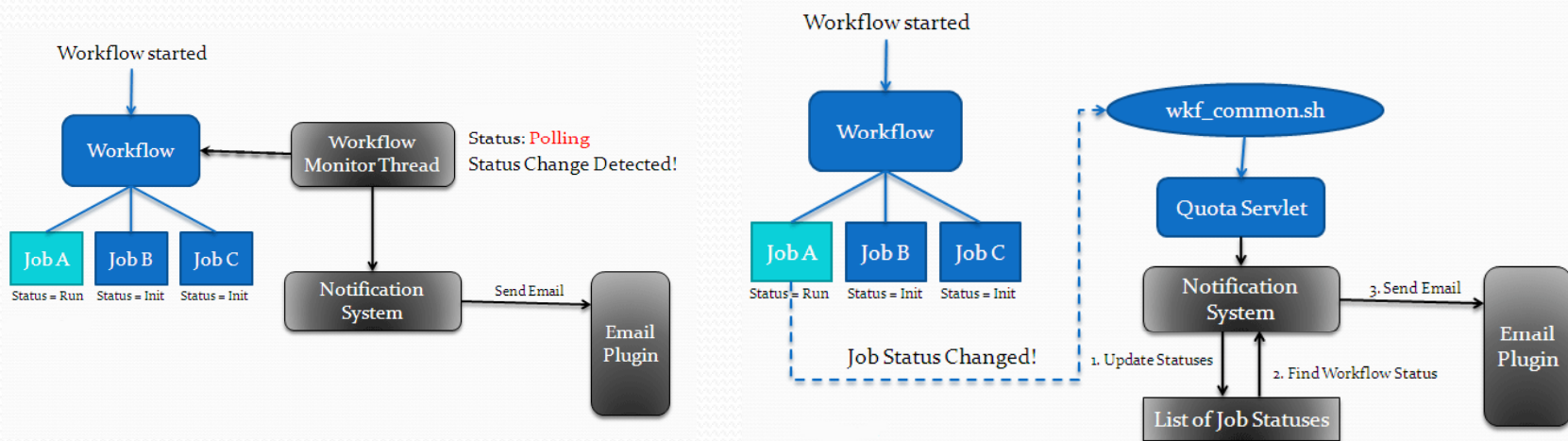


# Notification System Requirements

- ✓ Sends notification of status changes for normal or parameter study workflows
- ✓ User can specify when to receive notifications:
  - ✓ On workflow end
  - ✓ On any status change
- ✓ Handles aborting, rescuing and resubmitting of workflows
- ✓ Provides an easy to use interface for implementing new ways of notification

# Notification System Analysis

- Considered two main implementations
  - Event Driven – handle notification according to the internal events in the system
  - Polling – constantly query the system for changes
- Event Driven chosen for the system



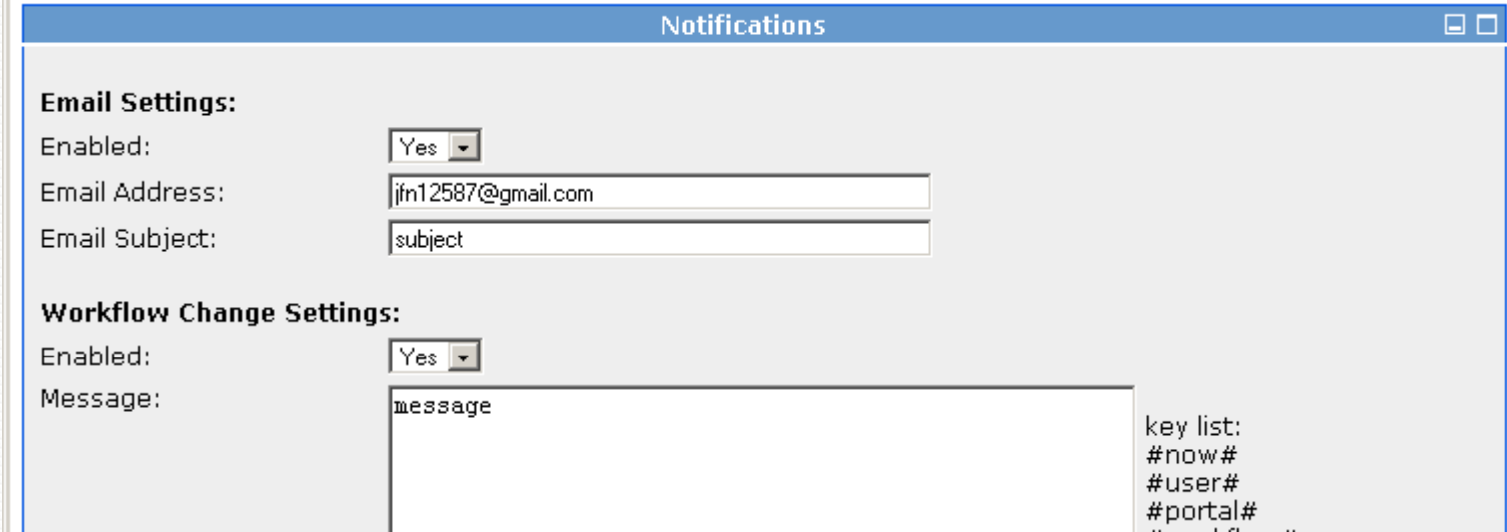


# Notification System Implementation

- Contains three distinct phases:
  1. Integrate notification portlet
  2. Duplicate GUI Functionality from WS-PGRADE
  3. Backend Integration

# Phase 1: Integrate Notification Portlet

- Rebuilt notification portlet from source
- Added to layout of P-Grade portal under “Workflows”



The screenshot shows a web-based configuration window titled "Notifications". It contains two main sections: "Email Settings" and "Workflow Change Settings".

**Email Settings:**

- Enabled: Yes (dropdown menu)
- Email Address: jfn12587@gmail.com (text input)
- Email Subject: subject (text input)

**Workflow Change Settings:**

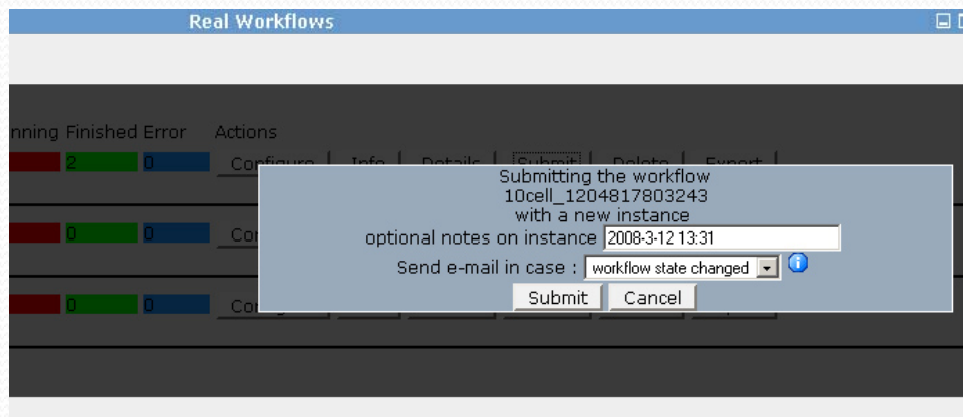
- Enabled: Yes (dropdown menu)
- Message: message (text input)

On the right side of the "Workflow Change Settings" section, there is a "key list:" with the following items:

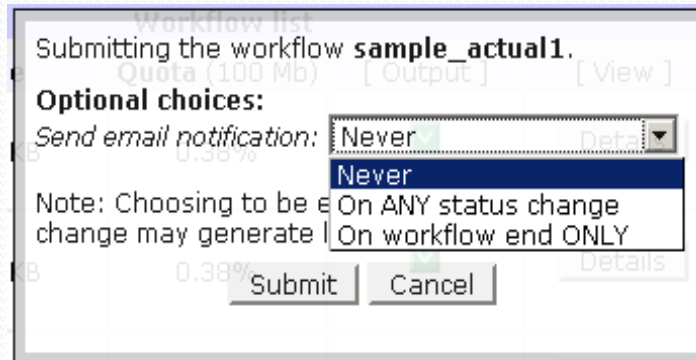
- #now#
- #user#
- #portal#
- #workflow#

# Phase 2: Duplicate GUI Functionality from WS-PGRADE

- WS-PGRADE Portal asks the user when they would like to be notified when submitting a workflow



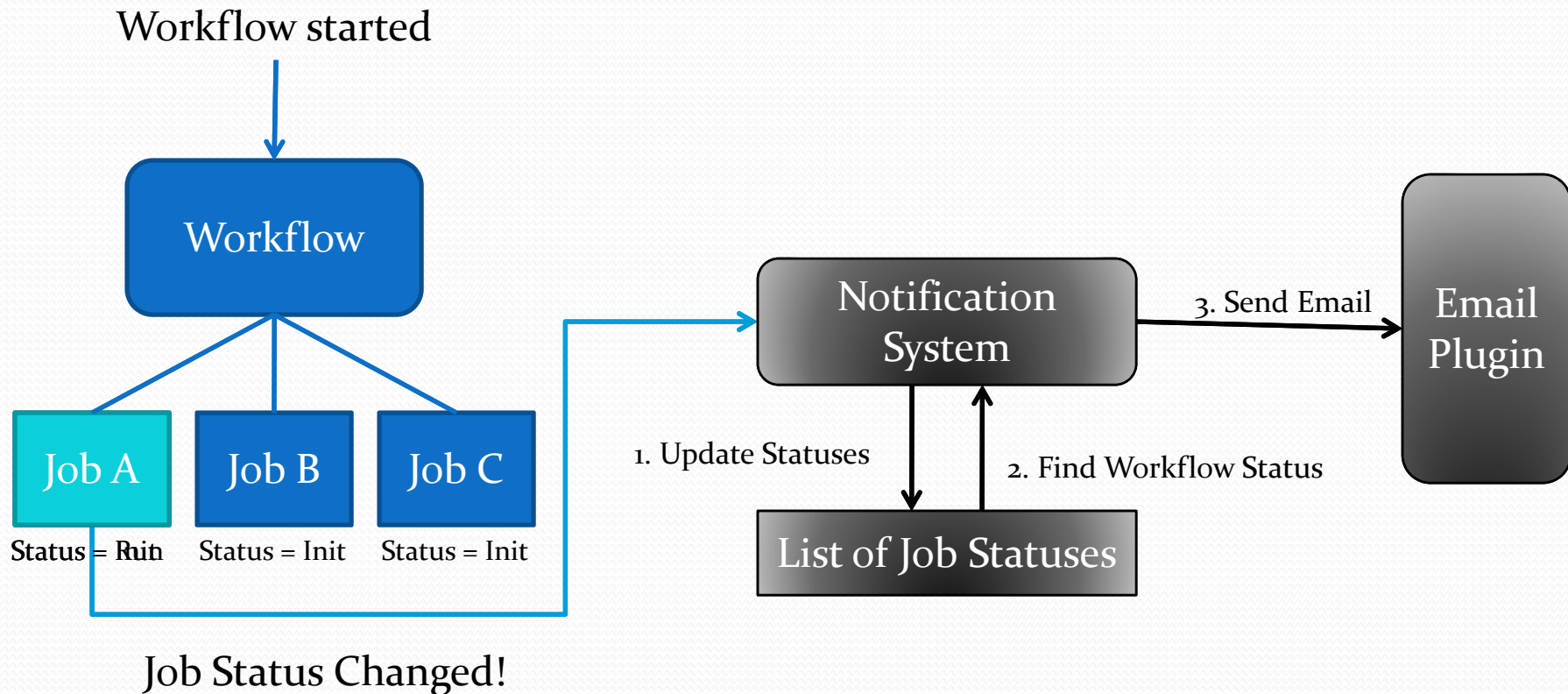
- Our implementation behaves similarly



# Phase 2: Duplicate GUI Functionality from WS-PGRADE

- Considerations:
  1. When should the user be allowed to choose this setting?
    - On submit
    - On rescue
    - Anytime
  2. How to handle “Submit All”
    - Choose a setting for each workflow
    - Single setting for all workflows
  3. How to handle Parameter Studies
    - Allow notifications for each workflow
    - Only allow for main workflow

# Phase 3: Backend Integration





# Phase 3: Backend Integration

- Analysis of Design
  - Disadvantages:
    - Has to connect to the existing portal in multiple places
    - Lots of code overlap with existing utilities and classes
  - Advantages:
    - Less overhead and more accurate than using polling to determine statuses
- Should prove capable of handling future improvements and enhancements



# Account Creation System Testing

- Functional Testing
  - Part 1: local testing
    - Done continuously throughout implementation
    - Requested/approved accounts and logged in to verify success
    - Changed settings in admin console and verified results
  - Part 2: production testing
    - Sent code to webmaster and portal developer for installation
    - Administrator conducted manual testing to ensure correct operation and functionality

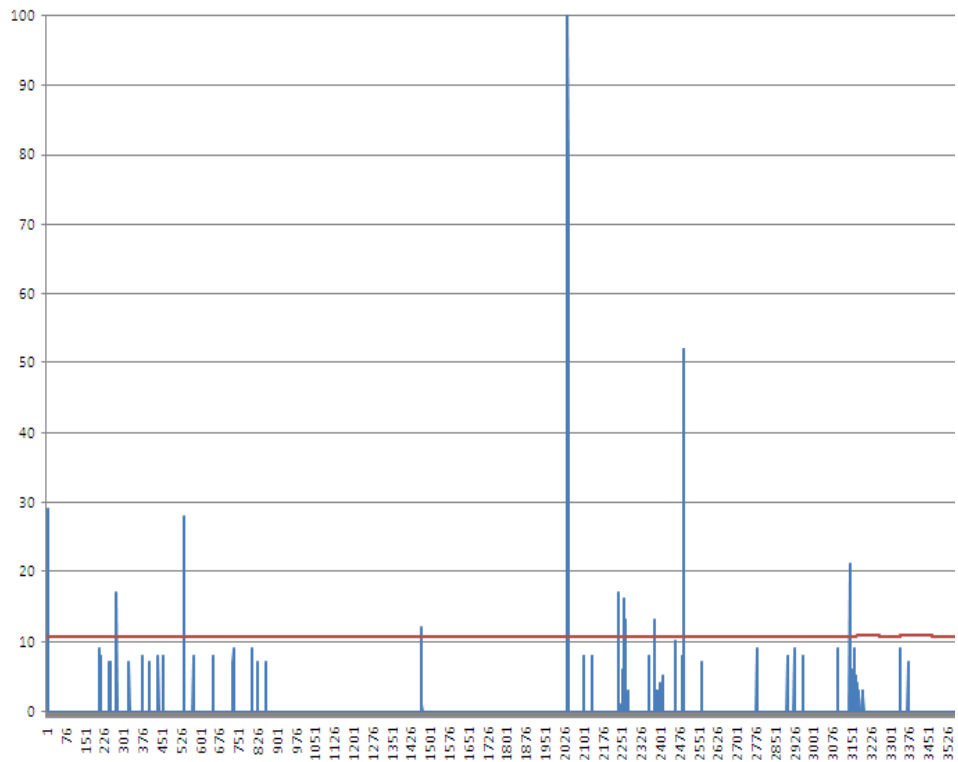


# Email Notification Testing

- Necessary to determine how the portal's performance would be affected by the new system
- Performance was tested in two ways:
  1. Scalability – how well does the system perform as more and more workflows are added?
  2. Versus a baseline portal – what performance impact does the notification system have compared to a portal without it?

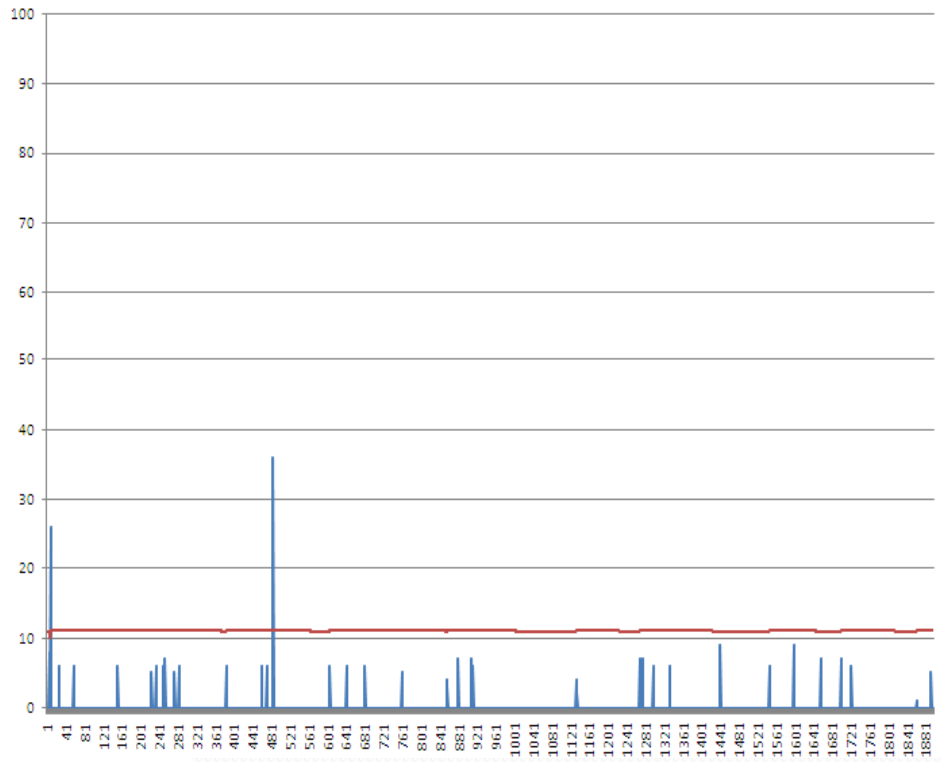
# Portal Performance: 1 Workflow

Java Process Statistics: 1 Workflow with Full Notification



With Notification

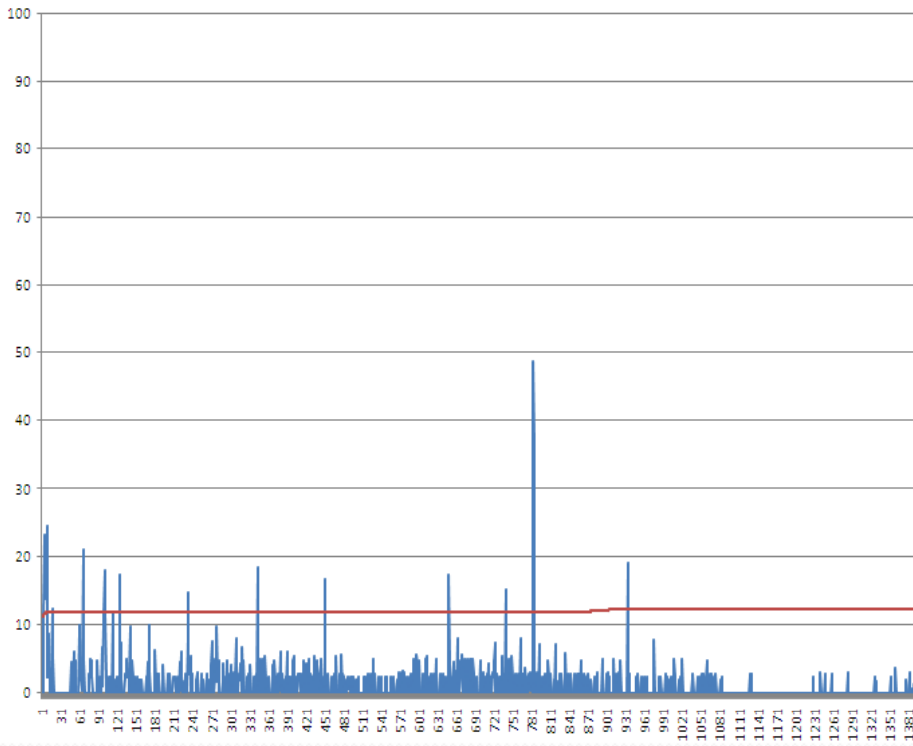
Java Process Statistics: 1 Workflow with No Notification



Without Notification

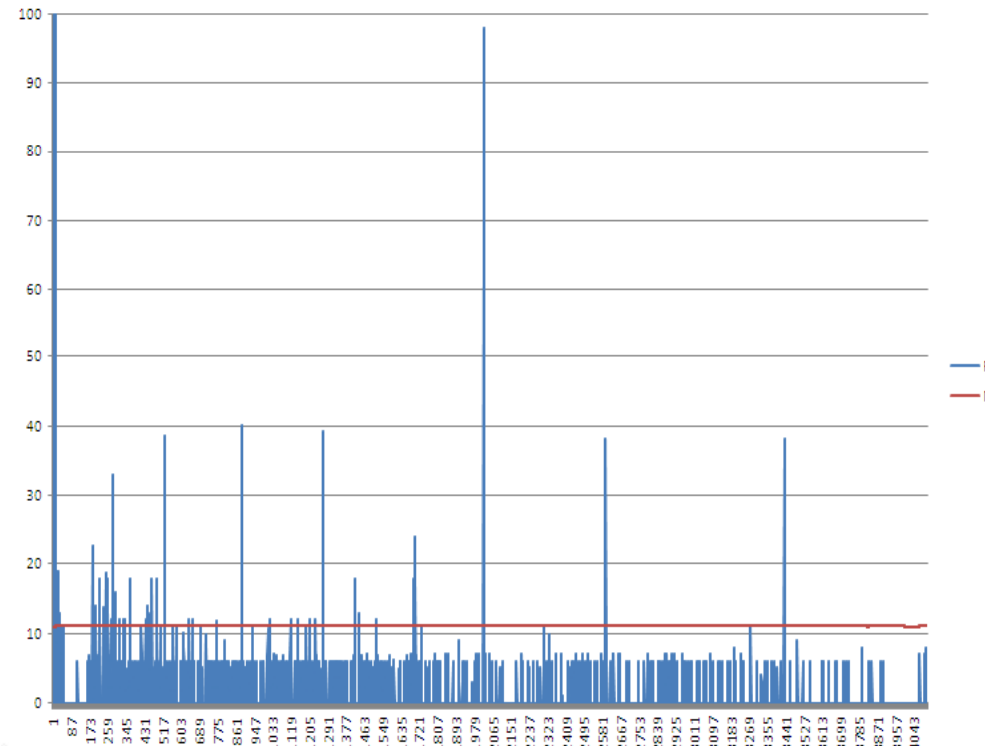
# Portal Performance: 20 Workflows

Java Process Statistics: 20 Workflows with Full Notification



With Notification

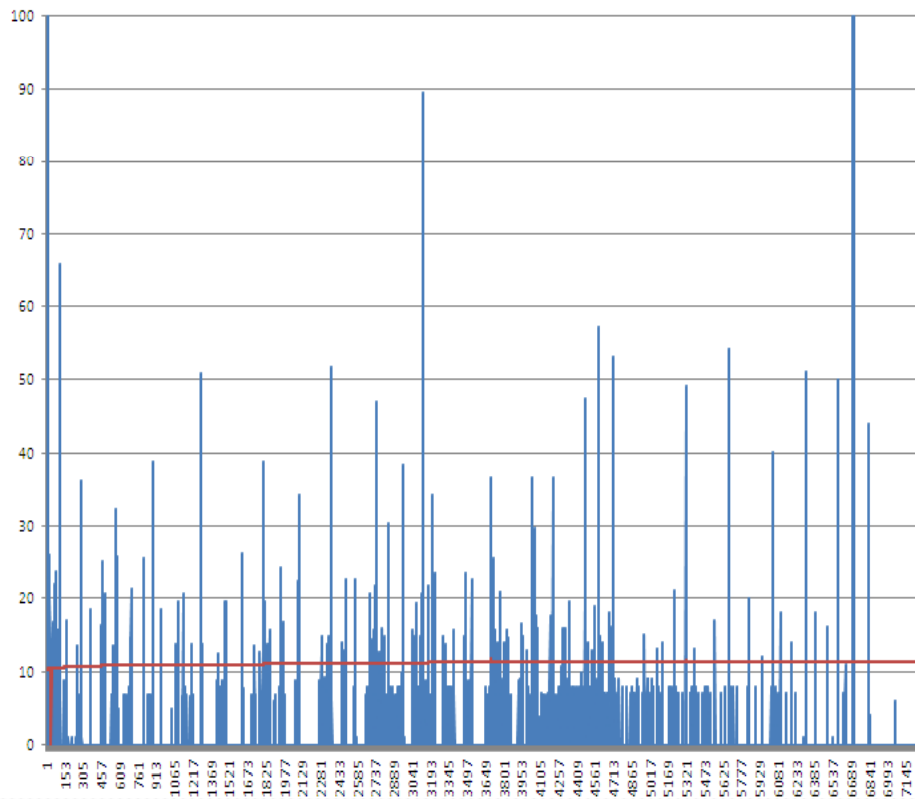
Java Process Statistics: 20 Workflows with No Notification



Without Notification

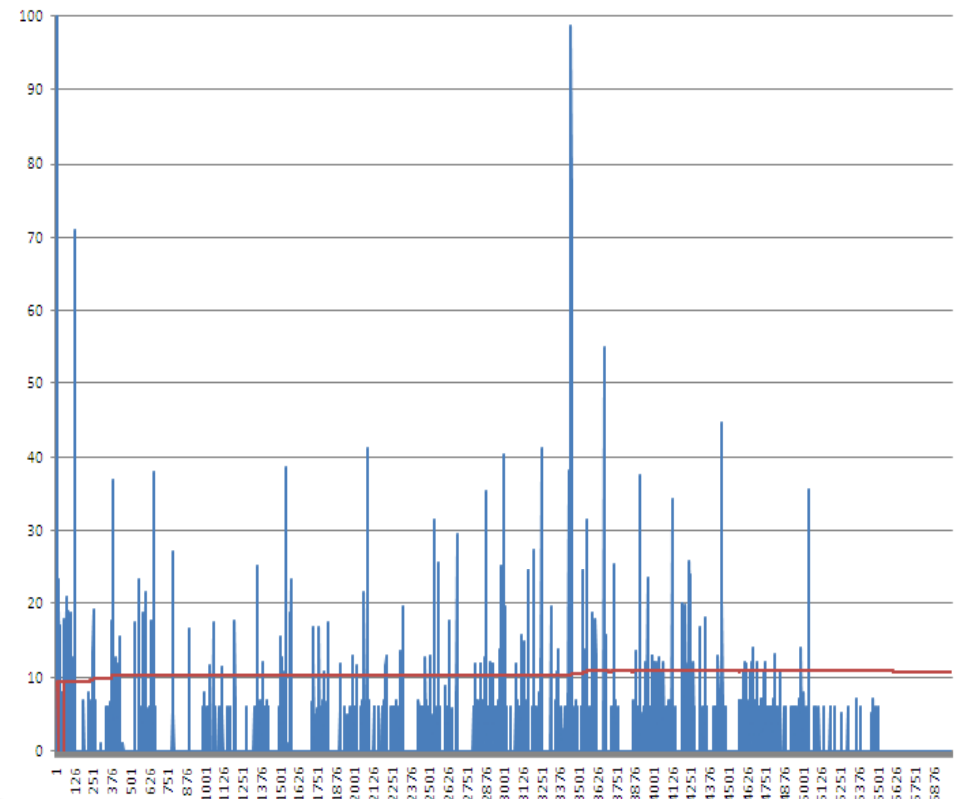
# Portal Performance: 50 Workflows

Java Process Statistics: 50 Workflows with Full Notification



With Notification

Java Process Statistics: 50 Workflows with No Notification



Without Notification



# Current State

- Both systems integrated into the P-GRADE Portal
  - All features successfully tested by the LPDS
- Can be downloaded now from the P-GRADE

SourceForge project



# Future Work: Account Creation

- Bulk Account Creator
  - Reduces time to create multiple users
- Improved Database Support
  - Support for more databases
- Account Request Viewer
  - List of pending requests
- Testing of Portal Information
  - Simplifies verifying that information in portal info editor is correct



# Future Work: Notification System

- Additional Plugins
  - SMS Messaging
  - Phone Call Messaging
- More Monitoring
  - Finer granularity
  - More types of monitoring
  - Parameter Study Workflows



# Acknowledgements

- MTA SZTAKI
  - Ákos Balaskó
  - Zoltán Farkas
  - Károly Göschl
  - Gábor Hermann
  - Péter Kacsuk
  - Ádám Kornafeld
  - Miklós Kozlovszky
  - András Schnautigel
  - Gergely Sipos
- WPI
  - József Patvarczki
  - Gábor Sárközy
  - Stanley Selkow



# Grid Portal Development

Authors: Josh Nedelka & Matthew Reiter