



# The EPCC ePortal

*e-Science for the Scientists*

Dr Rob Baxter

Elson Mourão, Lindsay Pottage,

Adrian Jackson, Feng He

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- ▶ Some motivation
    - Is the Grid the New Web?
  - ▶ Making the Grid easier to use
    - An overview of the ePortal
  - ▶ How ePortal works
    - logon, service selection, job submission, status, visualisation, etc
  - ▶ Some implementation details
    - Java, XML etc.
  - ▶ Screenshots!
    - The MHD Portal prototype
  - ▶ Current status and future plans
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```
$ telnet some.host.out.there
Trying 129.215.56.2...
Connected to some.host
Escape character is '^]'

login: fred
password:
```

```
telnet$ find . -name interesting.file -print
```

```
$ gopher...
```

```
$ archie...
```

```
$ wais...
```

```
ftp> dir
200 PORT command successful
150 Opening ASCII mode data connectio
total 246
drwxr-xr-x  2 group      512 Mar 4 198
drwxr-xr-x  2 group      512 Mar 8 198
```

```
$ ftp ftp.some.host.out.there
Connected to some.host
220 ftp.some.host ftp server ready
name: fred
Password required for fred
Password:
220 Hello fred
ftp> cd /pub
```

▶ You can find it, but it's not easy...

### ▶ Web browser, the killer app





queues

data formats

non-portable code

compilers



system architecture

library paths



and finally... **e-Science**

- ▶ You can do it, but it's not easy



- ▶ The early Internet was for geeks
- ▶ The Web is for anyone with a browser
- ▶ Today, the Grid is for geeks...
- ▶ To be universal, its use must be **simplified**
- ▶ The Computational Grid must make e-Science easy
  - Hide the computing details
  - Allow scientists to do computational science, large-scale data analysis etc. without the pain
- ▶ Application Service Provision model
  - Your application comes over the Grid, and it just works!

- ▶ The EPCC ePortal brings together

computational scientists

who want to use standard codes to generate science

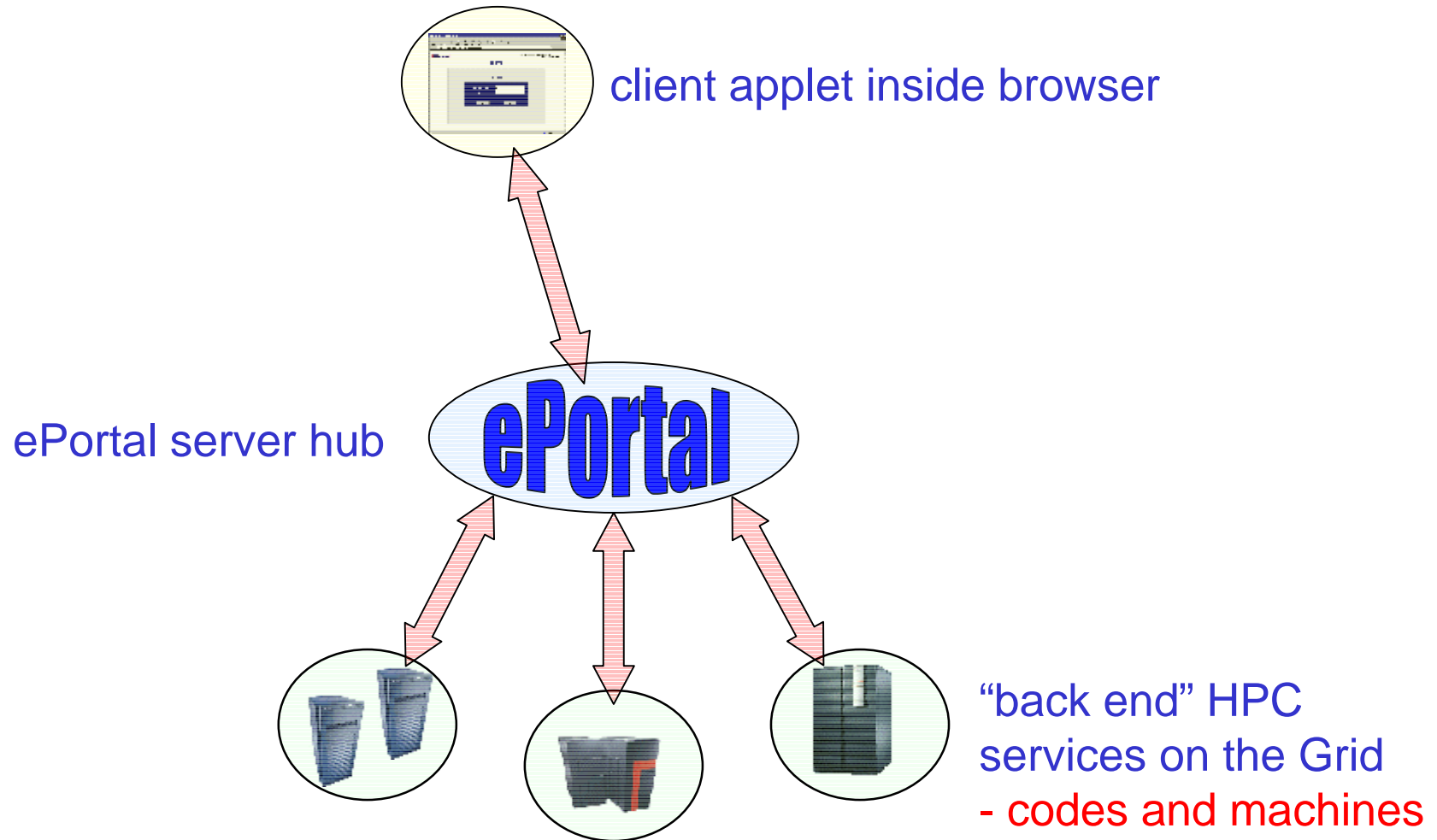
and

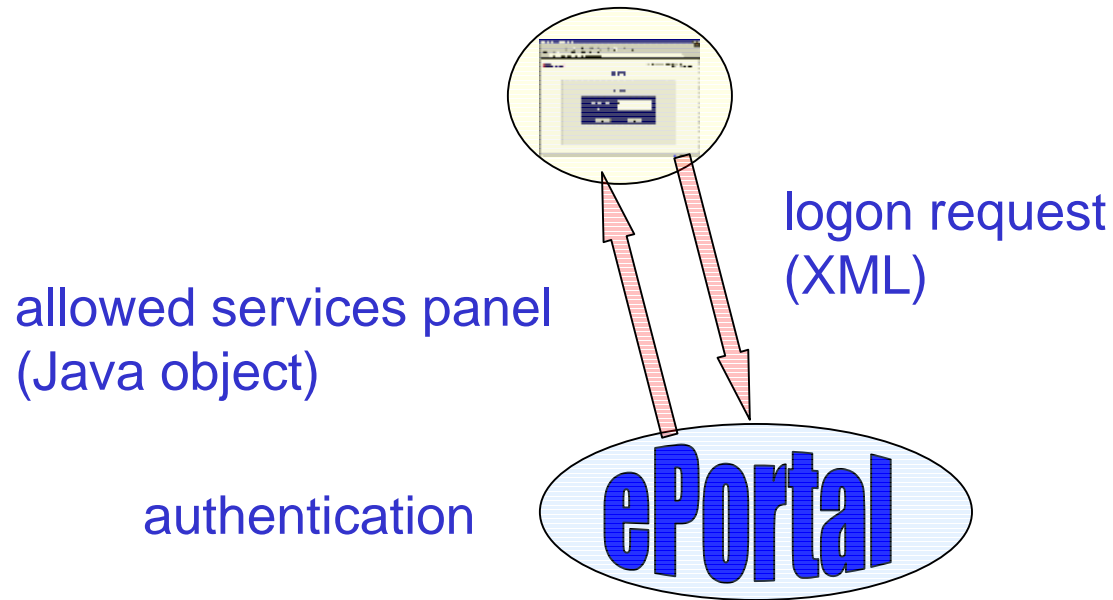
HPC service providers

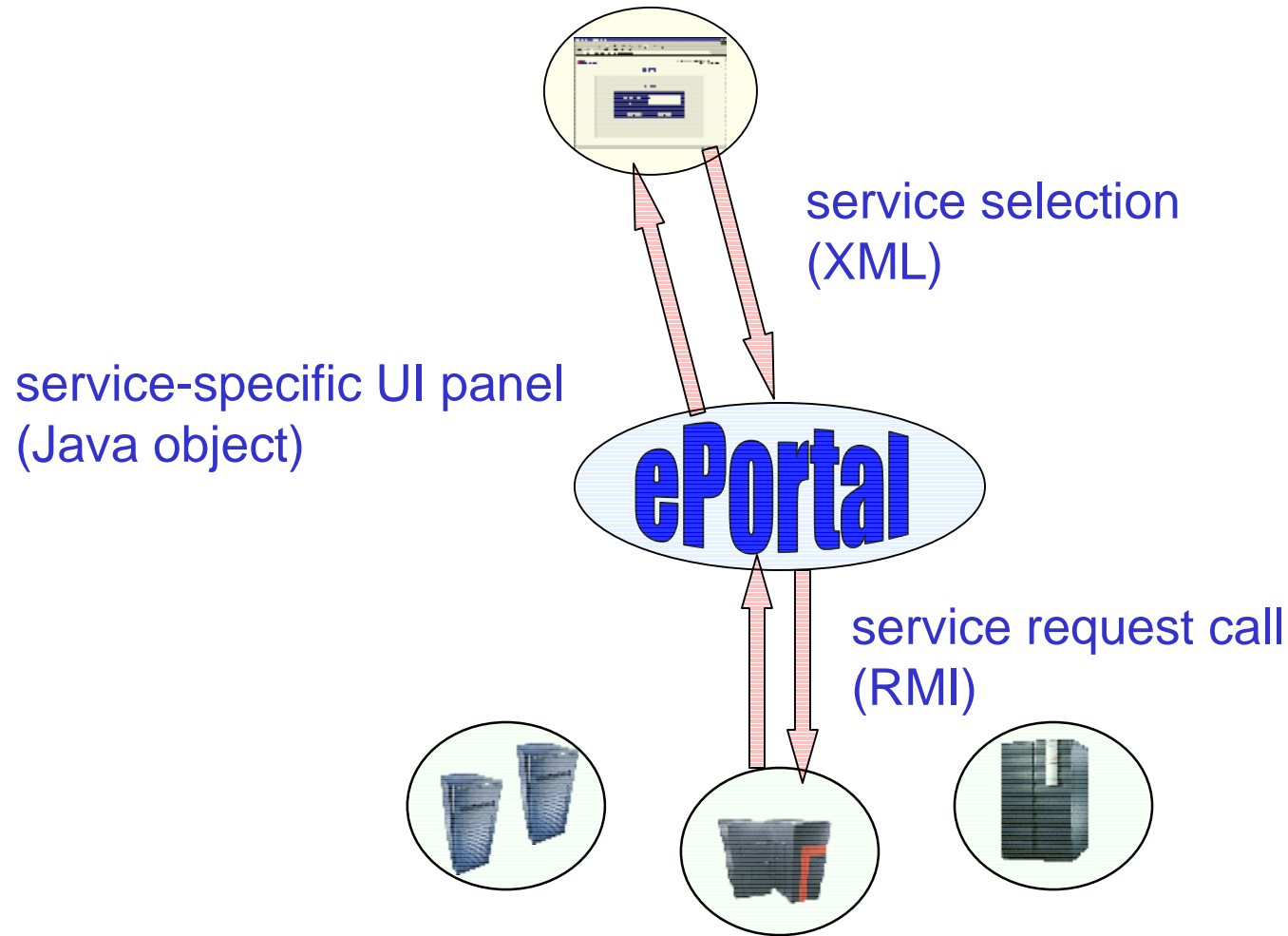
who support standard codes and have cycles to offer

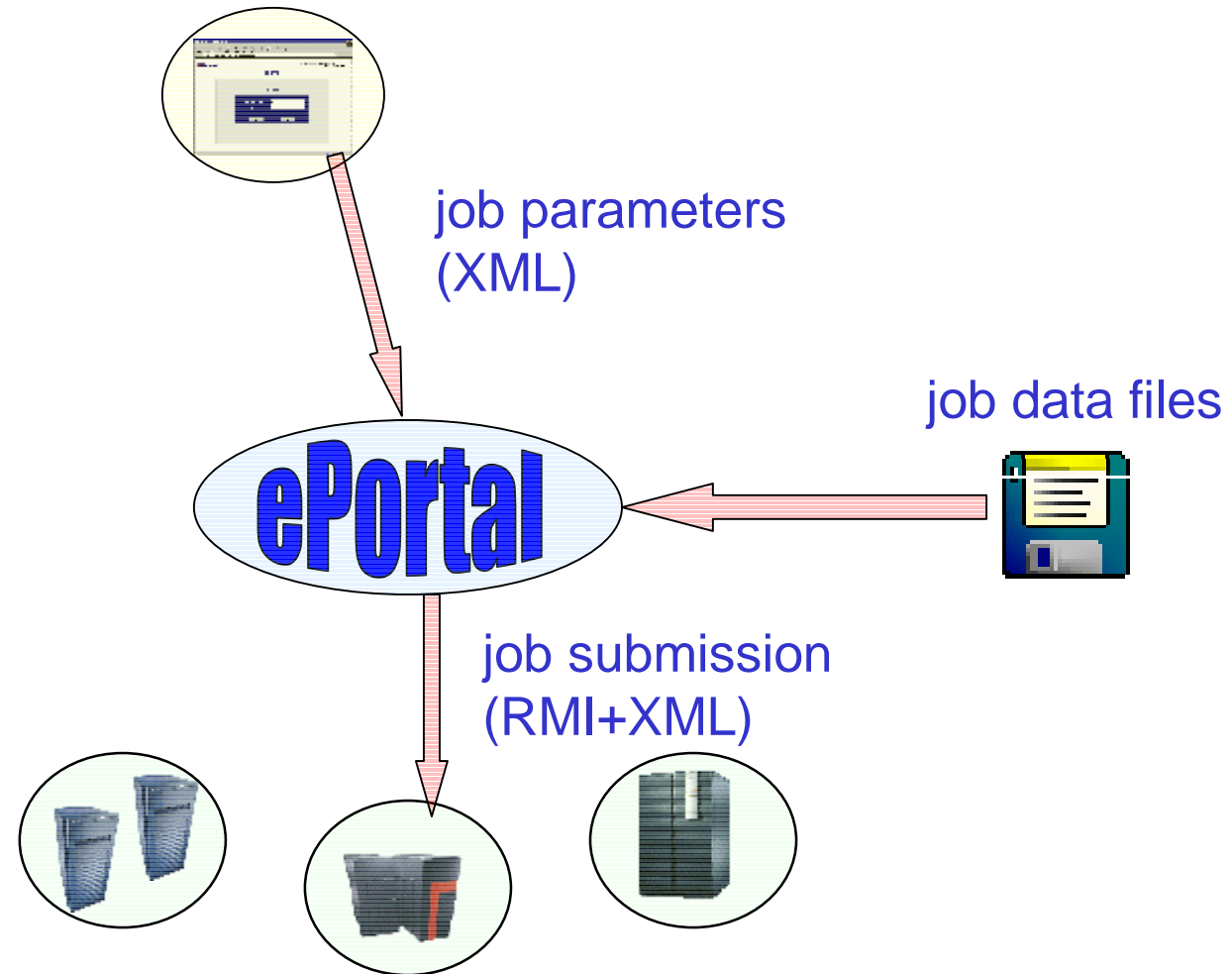
- ▶ by providing portable user interfaces through a single general portal

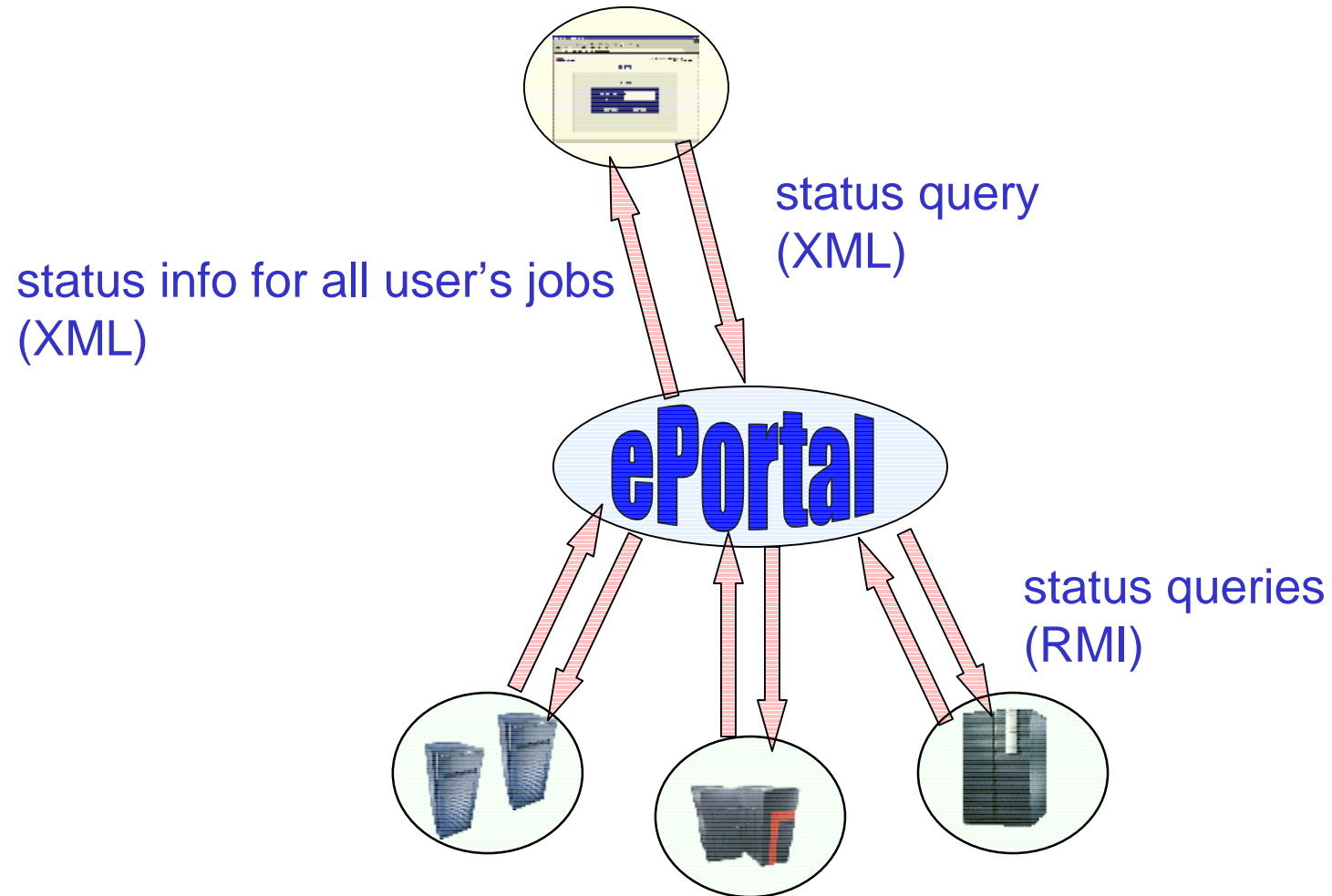
- ▶ The ePortal provides a toolkit of components
  - portal user authentication and login
  - “allowed services” management
  - dynamic user interface configuration
  - job request forwarding
  - status monitoring
  - job output marshalling
- ▶ From this, we can build a generic portal offering a wide range of HPC services
  - HPC service = science consortium, provider site and application
  - Provider site could be “anywhere that has this application”

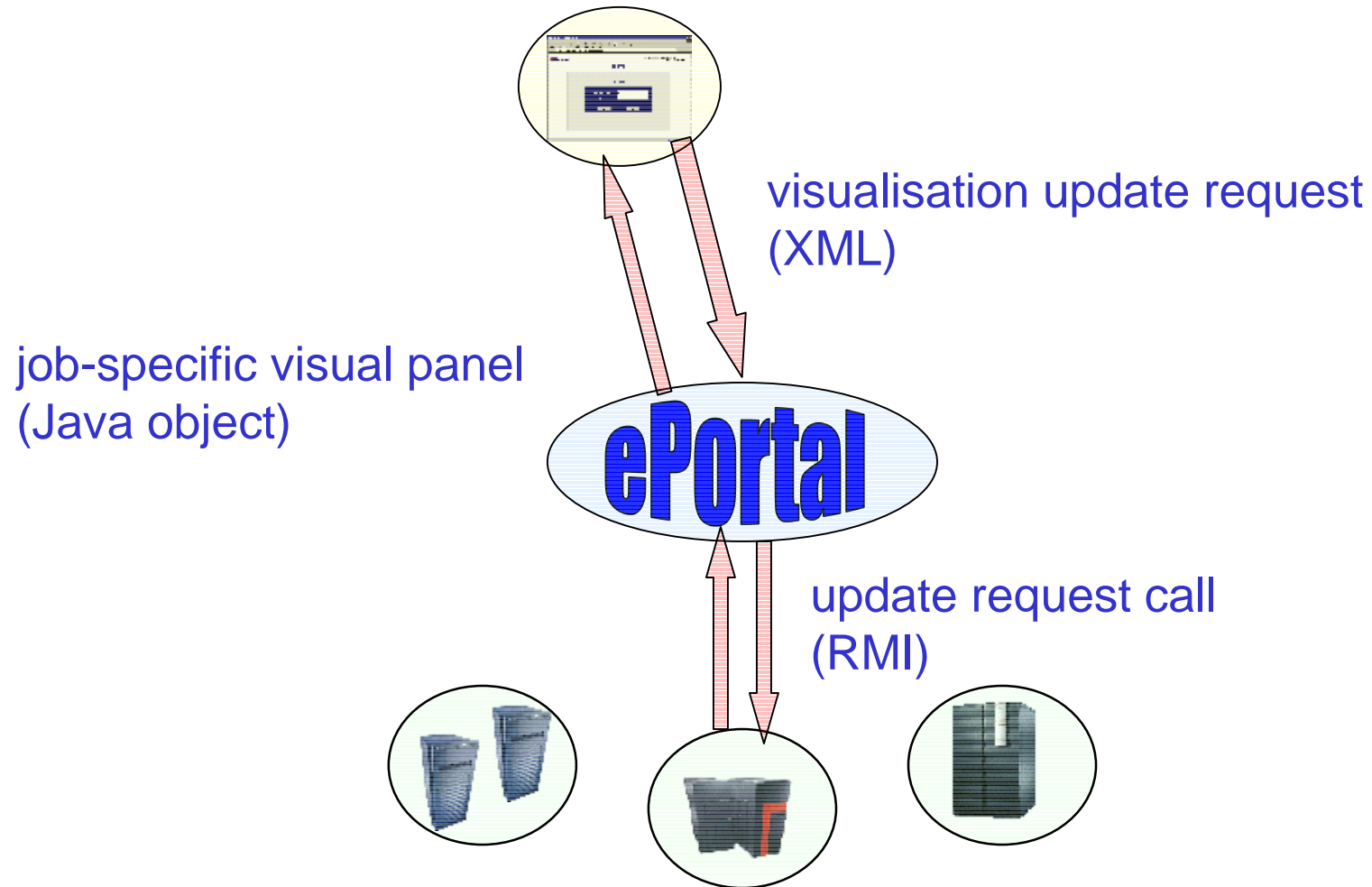


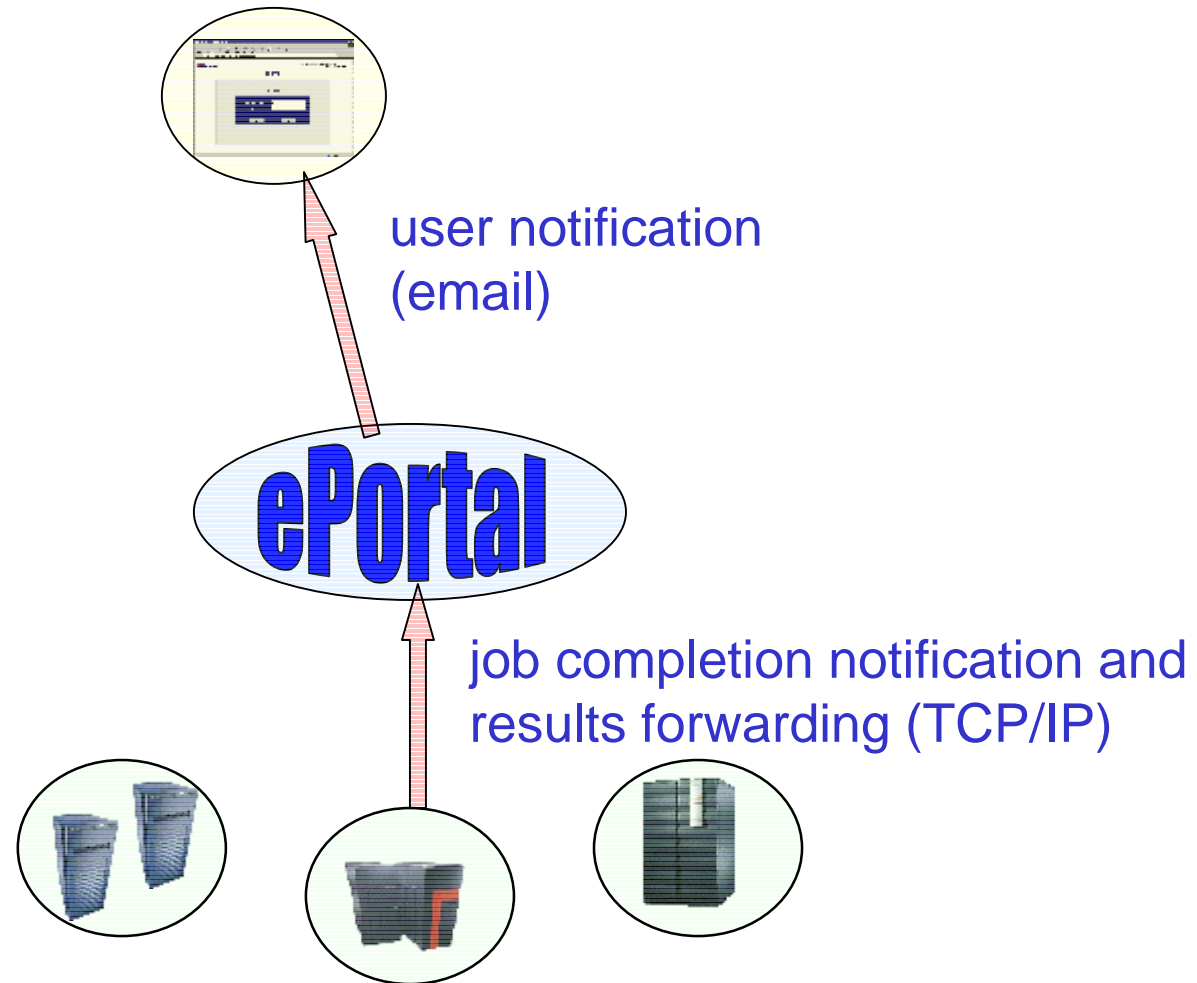












- ▶ Implementation is 100% Java
  - Base UI applet in a web page
  - UI components are loaded dynamically via RMI/serialisation
  - XML used for “downstream” messaging
  - Java serialisation used for “upstream” communication
- ▶ User interface applet
  - Single applet instance preserves session state and security
    - Persistent TCP connection
  - Provides generic control functionality
  - Sends user requests to ePortal core using XML
  - Service-specific *JPanels* loaded dynamically
  - Logon service supports a variety of authentication mechanisms

## ▶ ePortal Core and Service Manager

- Maintains database of users and services
- Parses XML requests from UI applet (SAX model)
- Each connected user session runs as a separate thread
- Forwards requests using XML or RMI to HPC Remote Services
- Stores job results and notifies user

## ▶ HPC Remote Services

- Receive XML task data/RMI calls from ePortal
- Run tasks via an *abstract batch queue*
  - Mappings on to LSF, Sun GridEngine
- Provide application-specific visualisation routines
  - Return serialised *JPanels* to the ePortal

- ▶ Generic base architecture
- ▶ Prototype portal for PPARC MHD Consortium
  - Small number of codes
    - 2 & 3D magnetohydrodynamics simulations
  - Small number of HPC machines
    - PPARC funded Compaq cluster at St Andrews
    - Sun HPC cluster at EPCC
    - Linux Beowulf cluster at EPCC
- ▶ Basic password authentication
- ▶ Basic “visualisation”
  - Generic “text view” (for ‘tail’-ing logfiles :-)

**ePortal Login**

Please enter user name:	<input type="text"/>
Please enter password:	<input type="password"/>
<input type="button" value="OK"/>	<input type="button" value="Clear"/>

**Status**
Navigate the ePortal: **ePortal Home** ▼

## Welcome adrianj to the EPCC ePortal

To use the ePortal please complete the following tasks:

- First        Select the relevant scientific consortium
- Second     Select the scientific code you wish to run
- Third       Select the HPC environment on which you wish to run the code

Press Continue

Scientific Consortium	St_Andrews Information
<b>MHD Consortium</b> ▼	Hardware: Six Compaq ES40s (each with 4 Digital ev6 CPU's and 4Gbytes of RAM).
Scientific Code	
<b>Lare2d</b> ▼	Software Installed: f77, f90, HPF, MPI, OpenMP, c, c++.
HPC Environment	
<b>St_Andrews</b> ▼	

Results will be emailed to: adrianj@epcc.ed.ac.uk

**Continue**
**Clear**
**Cancel**

Status
Navigate the ePortal: Lare2d/St\_Andrews ▼

**St Andrews HPC Environment**

**MHD Consortium**

**Lare2d Scientific Code**

Version: 1.0  
 Author: Tony Arber  
 Description: Numerical Simulation of Solar Coronal Loops.

To run the Lare2d scientific code please complete the following tasks:

First        Select the number of processors: 8 cpu ▼

Second      Select total run time: 4 hours ▼

Press Submit

Results will be emailed to: [adrianj@epcc.ed.ac.uk](mailto:adrianj@epcc.ed.ac.uk)
Submit
Clear
Cancel

Status

Navigate the ePortal: Status

### ePortal Status Panel

To obtain Status and Data Information for an executing job,

Select the job and Press the relevant button.

Service: 1035 created at: Mon Sep 10 15:56:01 BST 2001 and submitted to: mhd0.st-and.ac.uk:8002

**Display Status** **Visualise Data**

Results will be emailed to: adrianj@epcc.ed.ac.uk **Cancel**

- ▶ Extend status visualisation to real time graphical snapshots
- ▶ Add Globus/X.509 certificate authentication
  - Kerberos also possible using ePortal generic framework
- ▶ Incorporate SRB as a file service
- ▶ Implement 'federated ePortals'
  - Peer-to-peer service discovery?
- ▶ More codes, more services...
  - Support for PBS, Condor, other science consortia, ...?

- ▶ The Grid today is for geeks!
- ▶ Usage must be simplified to facilitate e-Science
  - The job of the National and Regional e-Science Centres
- ▶ HPC application portals are one way
- ▶ The EPCC ePortal offers
  - Ease of use through browser/applet
  - Application and science-oriented UIs, hiding the system details
  - General, service-based architecture
  - Portability from front to back through Java and XML
  - Ease of extension