Overview about the SCI-BUS Project (Communities and sustainability)

http://www.sci-bus.eu

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MTA SZTAKI

Start date: 2011-10-01
Duration: 36 months

e-infrastructure

SCI-BUS is supported by the FP7 Capacities Programme under contract nr RI-283481

Motivations

- There are many user communities who would like to access several DCIs (grids, clouds, clusters) in a transparent way
- They do not want to learn the peculiar features of the used DCIs
- They want to concentrate their scientific application
- Therefore they need a science gateway

How to build a science gateway?

1. Build from scratch

- If the gateway is not extremely simple, it requires long time to develop a robust gateway
- Requires substantial manpower and development cost
- It is very specialized and as users start to use it and come up with new requirements it is difficult to extend in a scalable way
- Isolated development without belonging to an open source community => sustainability is difficult

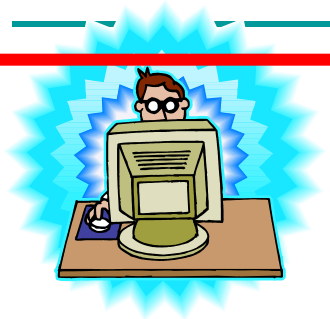
How to build a science gateway?

2. **Adapt and customize an existing gateway technology**

- Significantly reduces development time (e.g. Yuri Gordienko's talk)
- Requires limited manpower and development cost
- Produces a robust and usable service
- The **open source community** is driving force for further development and extensions

SCI-BUS provides the required core gateway and customization technology

Who are the members of an e-science community regarding Option 2?



Science Gateway (SG) Framework Developers (5-10)

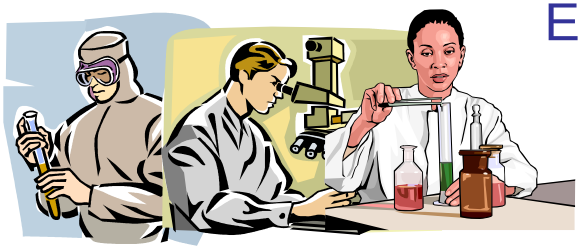
- Develop **generic** SG framework
- SCI-BUS project

SG Instance Developers (50-100)

- Develop **application domain specific** SG instance
- SCI-BUS project

WF (Application) Developers (500-1.000)

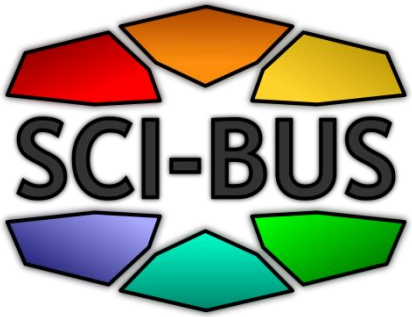
- Develop WF applications
- Publish the completed WF applications for end-users
- SHIWA project



End-users (e-scientists) (50.000-1.000.000)

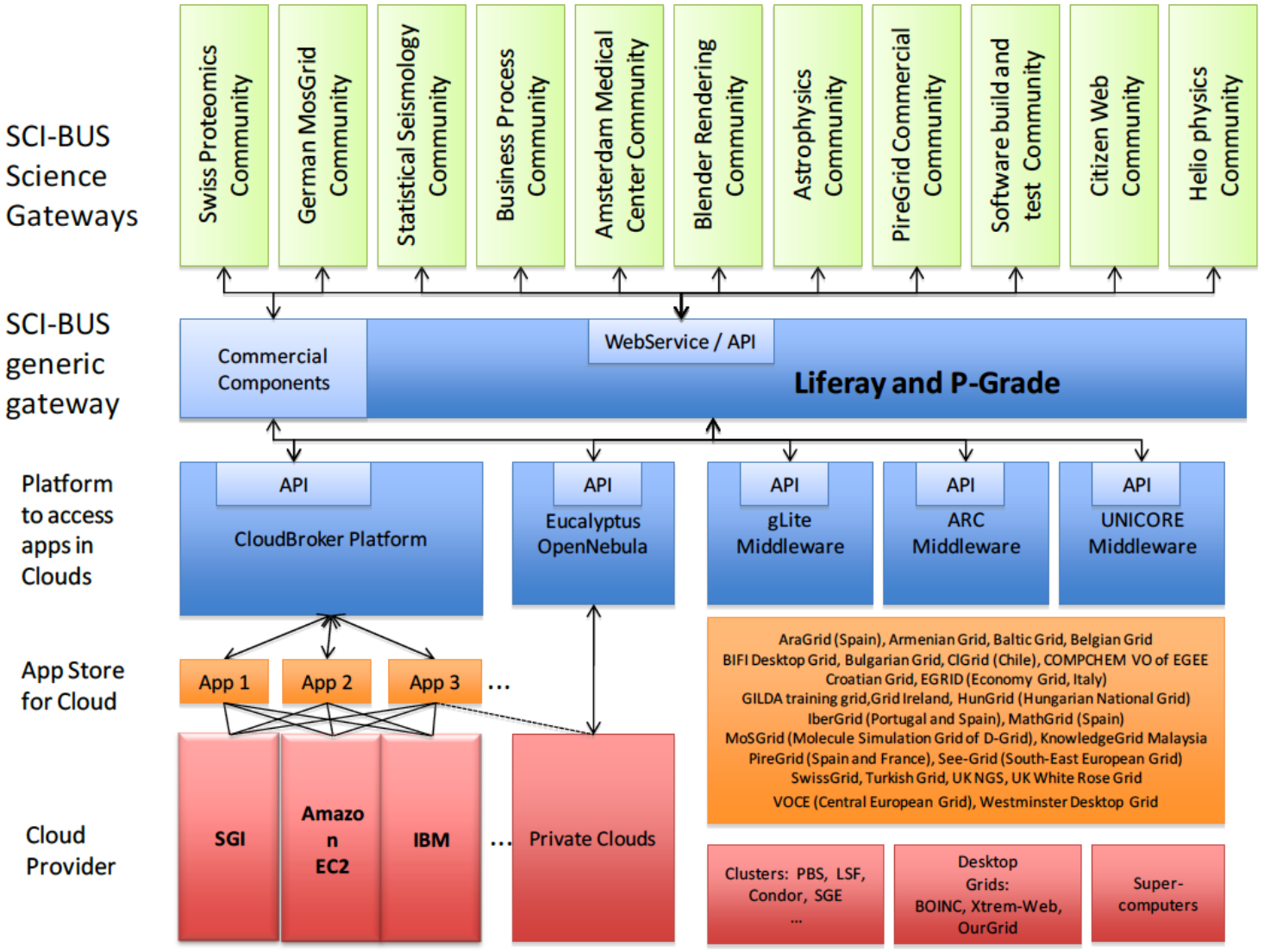
- Execute the published WF applications with custom input parameters by creating application instances using the published WF applications as templates

SCI-BUS EU FP7 project

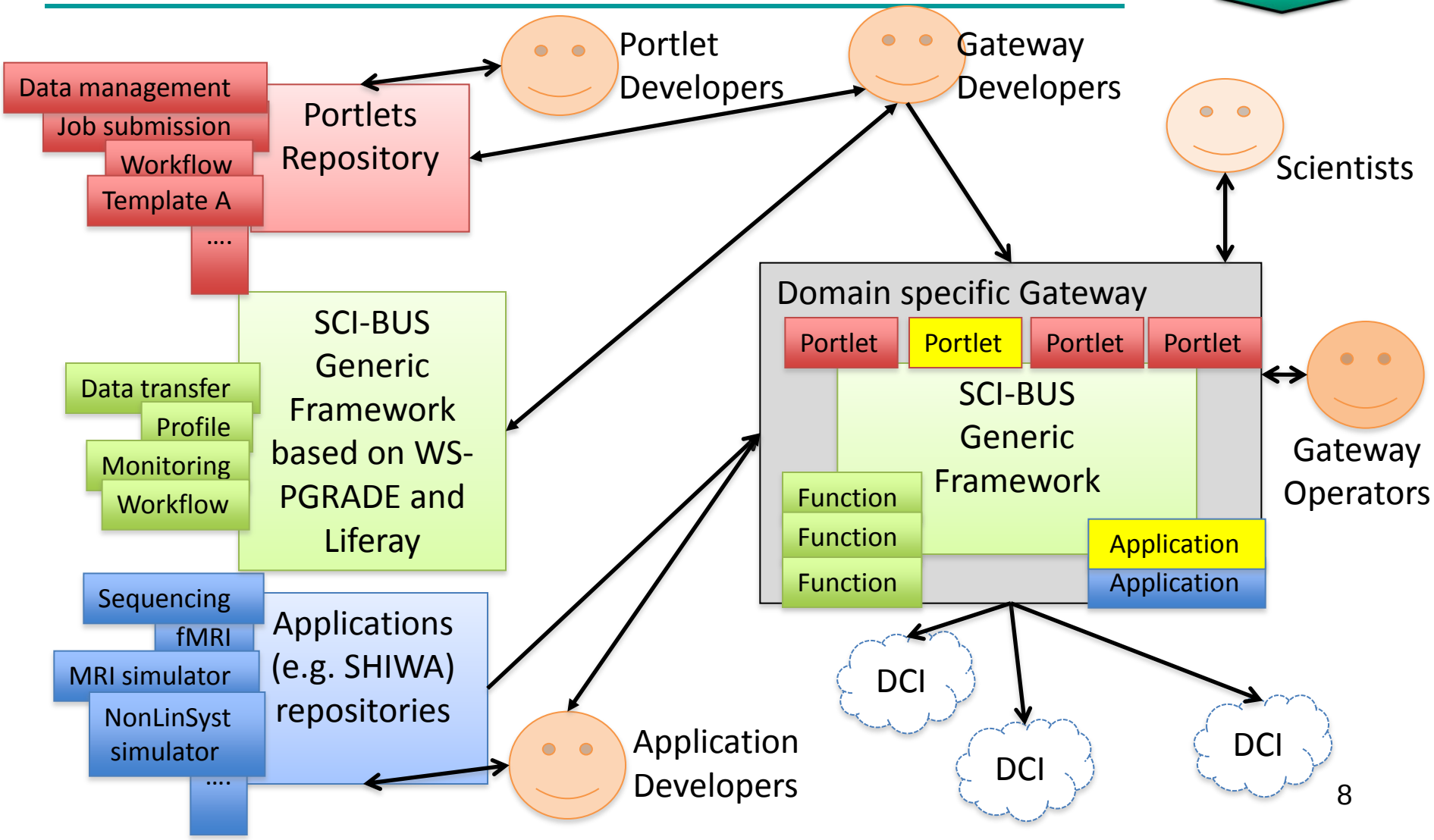


- SCI-BUS (SCIence gateway Based User Support) provides gateway framework and science gateway building technology
- 3-year project: 1 Oct 2011 – 30 Sep 2014
- Objectives of SCI-BUS
  - Support both WF developers and end-user scientists
  - Create a **generic-purpose science gateway framework**
  - Elaborate a **science gateway instance development technology**
  - Establish **production SG instance services** both for national grids (horizontal user communities) and various science communities (vertical user communities)
  - Develop **business models to guarantee sustainability** and commercial exploitation

SCI-BUS Architecture



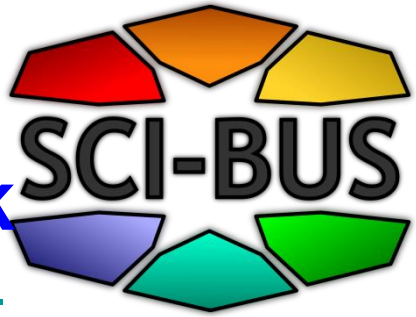
Community tools and user roles in SCI-BUS



Project partners

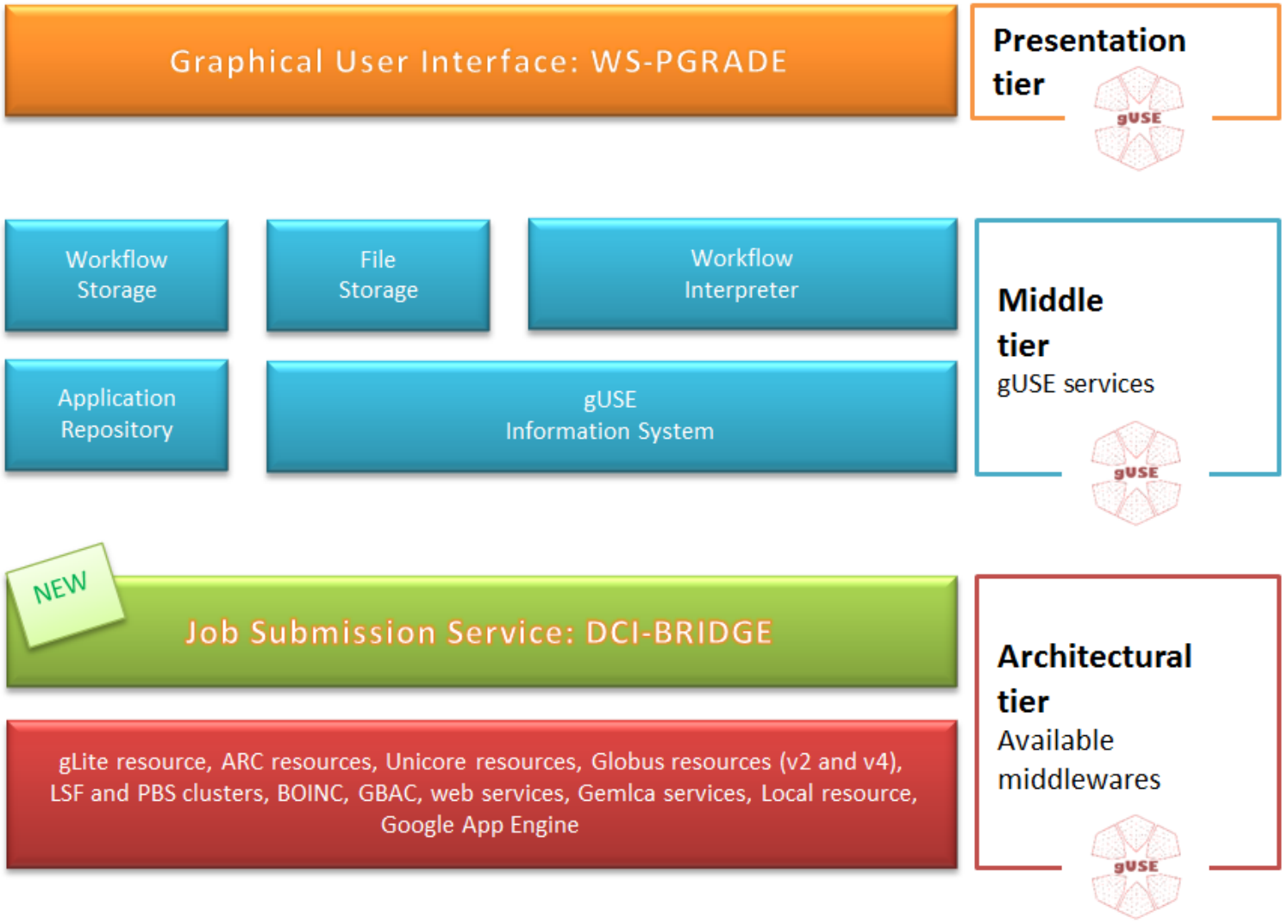
No	Participant organisation name	Part. short name	Country	Expertise & Experience
1	Magyar Tudomanyos Akademia Szamitastechnikai es Automatizalasi Kutato Intezet	MTA SZTAKI	Hungary	Coordinator in EDGeS, EDGI, SHIWA, developer of WS-PGRADE
2	Academisch Medisch Centrum bij de Universiteit van Amsterdam	AMC	The Netherlands	Gateway developer for the medical user community
3	Simsoft Bilgisayar Teknolojileri Ltd. Sti.	SIMSOFT	Turkey	Gateway developer for business process modeling
4	E-GROUP Ict Software Informatikai Zrt	EG	Hungary	Gateway developer for Web 2.0
5	Eidgenössische Technische Hochschule **Zürich**	ETH Zurich	Switzerland	Gateway developer for bioscience
6	Middle East Technical University	METU	Turkey	Gateway developer for seizmology
7	Scaletools Ltd.	ST	Switzerland	Gateway developer for clouds
8	Eberhard Karls Universität Tübingen	EKUT	Germany	Gateway developer for computational chemistry
9	University of Westminster	UoW	UK	Developer of UK NGS P-GRADE
10	Universidad de Zaragoza	Unizar	Spain	Gateway developer for PireGrid SMEs
11	CloudBroker GmBh	CB	Switzerland	Gateway developer for clouds
12	4D SOFT SZAMITASTECHNIKAI KFT	4D SOFT	Hungary	Gateway developer for ETICS-2
13	Istituto Nazionale di Astrofisica	INAF	Italy	Gateway developer for astrophysics
14	Laurea-ammattikorkeakoulu oy	Laurea	Finnland	Gateway developer for Blender
15	The Provost Fellows & Scholars of the College of the Holy and Undivided Trinity of Queen Elizabeth near Dublin	TCD	Ireland	Gateway developer for helio-physics

WS-PGRADE/gUSE
Generic-purpose gateway framework

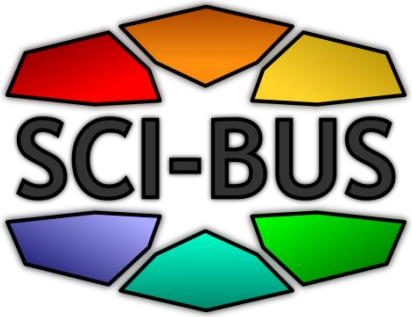


- Based on Liferay
- **WS-PGRADE** (Web Services Parallel Grid Runtime and Developer Environment)
- **gUSE** (Grid User Support Environment) architecture
  - General purpose
  - Workflow-oriented portal framework
  - Supports the development and execution of workflow-based applications
  - Enables the multi-DCI execution of any WF
  - **Support the fast development of SG instances by a customization technology**

Scalable architecture based on collaborating services



Flexibility of using various DCIs by WS-PGRADE/gUSE

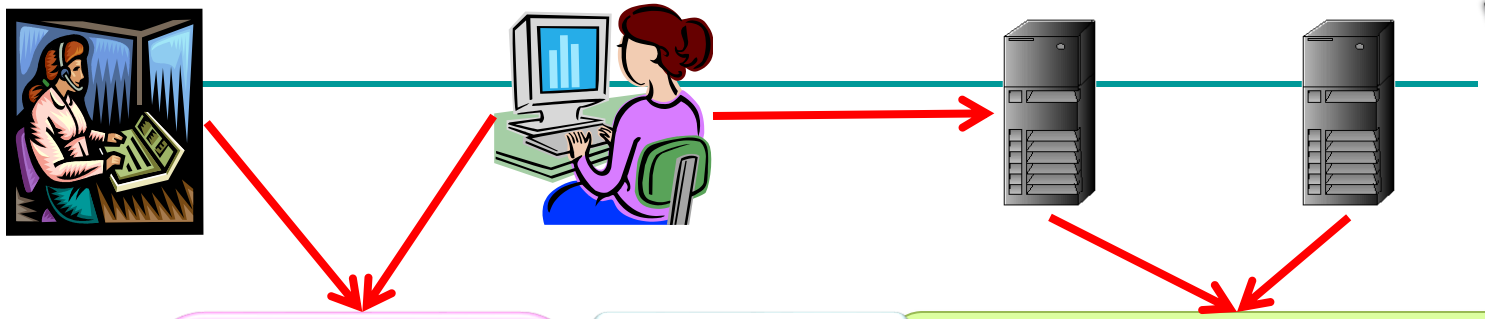


- Seamless access to various types of DCIs:
  - Clusters (PBS, LSF, MOAB, SGE)
  - Cluster grids (ARC, gLite, GT2, GT4, GT5, UNICORE)
  - Supercomputers (e.g. via UNICORE)
  - Desktop grids (BOINC)
  - **Clouds (Via CloudBroker Platform)**

CloudBroker Platform

- Web-based application store for the deployment and execution of scientific and technical software in the cloud
- On demand, pay per use, browser / programmatic / command-line access, cross-domain
- Uses infrastructure as a service **(IaaS)** from resource providers and offers these IaaS resources for users
- Offers software as a service **(SaaS)** for end users
- Easy to use, speeds up time to market, no need for own HPC infrastructure

CloudBroker Platform Architecture



Web Browser UI

CLI

User Tools

Java Client Library

REST Web Service API

Chemistry Appli-cations

Biology Appli-cations

Health Appli-cations

Engineering Appli-cations

... Appli-cations

CloudBroker Platform

Amazon Cloud

IBM Cloud

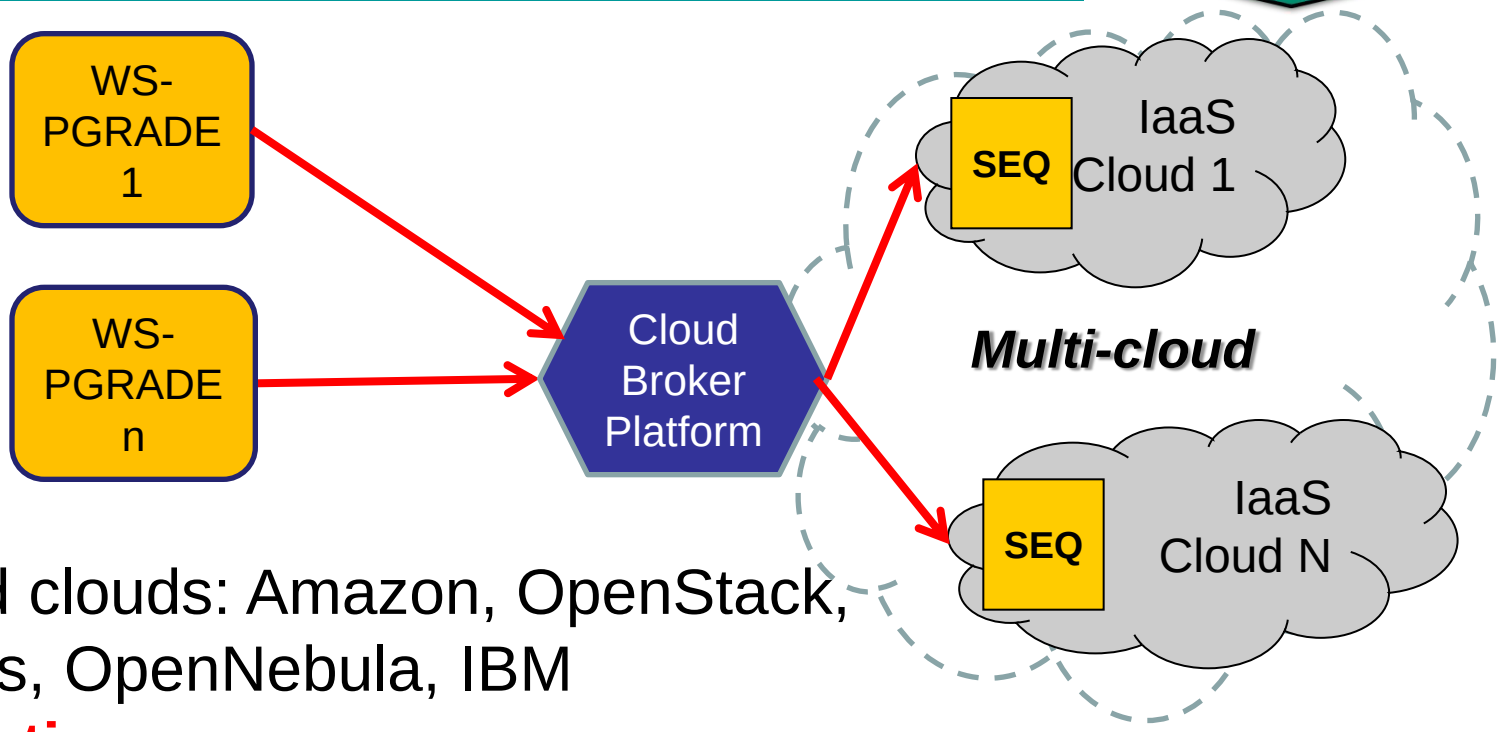
Open-Stack Cloud

Euca-lyptus Cloud

Open-Nebula Cloud

CloudBroker Integration

Integrated WS-PGRADE/CloudBroker Platform to access multi-clouds



- Supported clouds: Amazon, OpenStack, Eucalyptus, OpenNebula, IBM
- **SaaS solution:**
  - Preregistered services/jobs can run from WS-PGRADE Supported from gUSE 3.5.0
- **IaaS solution:**
  - any services/jobs (e.g. BoT jobs) can run from WS-PGRADE Supported from gUSE 3.5.1

WS-PGRADE UI to configure nodes for cloud services

Configure

Job's name: AutoDock

Optional note: Description of Job

[Job Executable] [Job I/O] [JDL/RSL] [History]

Cloud selection

Workflow Service Binary

Type: cloudbroker

Name: platform

Software: AutoDock 4.2.3

Executable: AutoDock 4.2.3 autodock4

Resource: Amazon EC2 CloudBroker GmbH

Region: Amazon EC2 CloudBroker GmbH EU (Ireland)

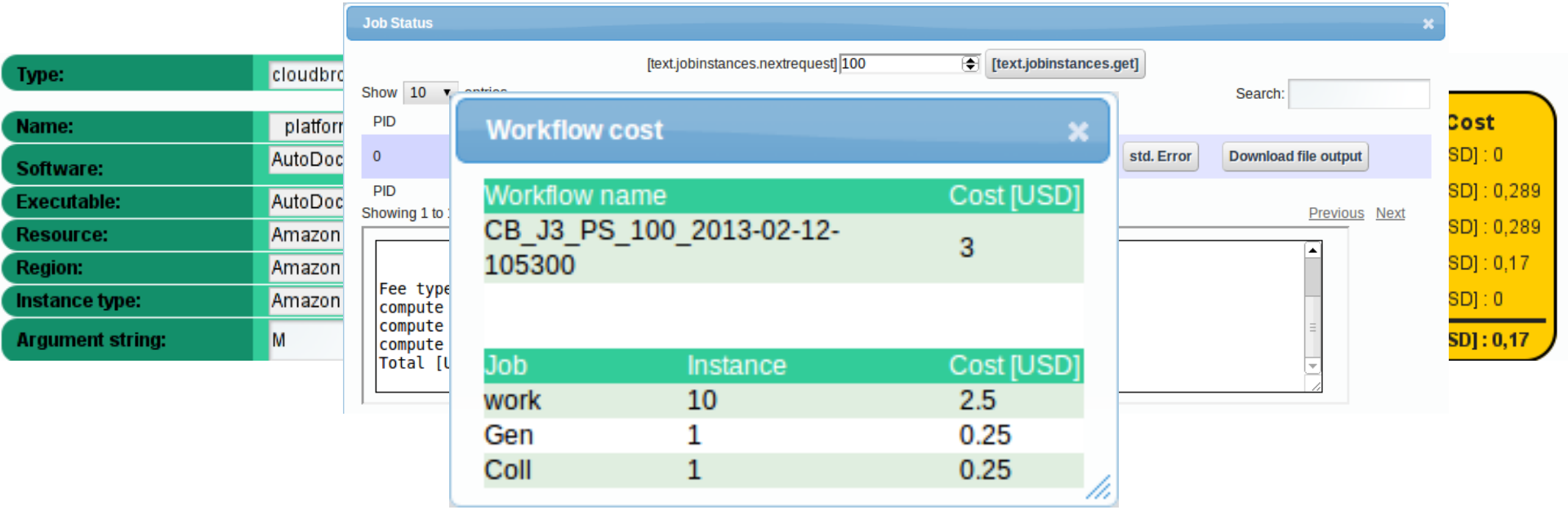
Instance type: Amazon EC2 CloudBroker GmbH Micro - 64 bit

Argument string:

During configuration WS-PGRADE queries the software list

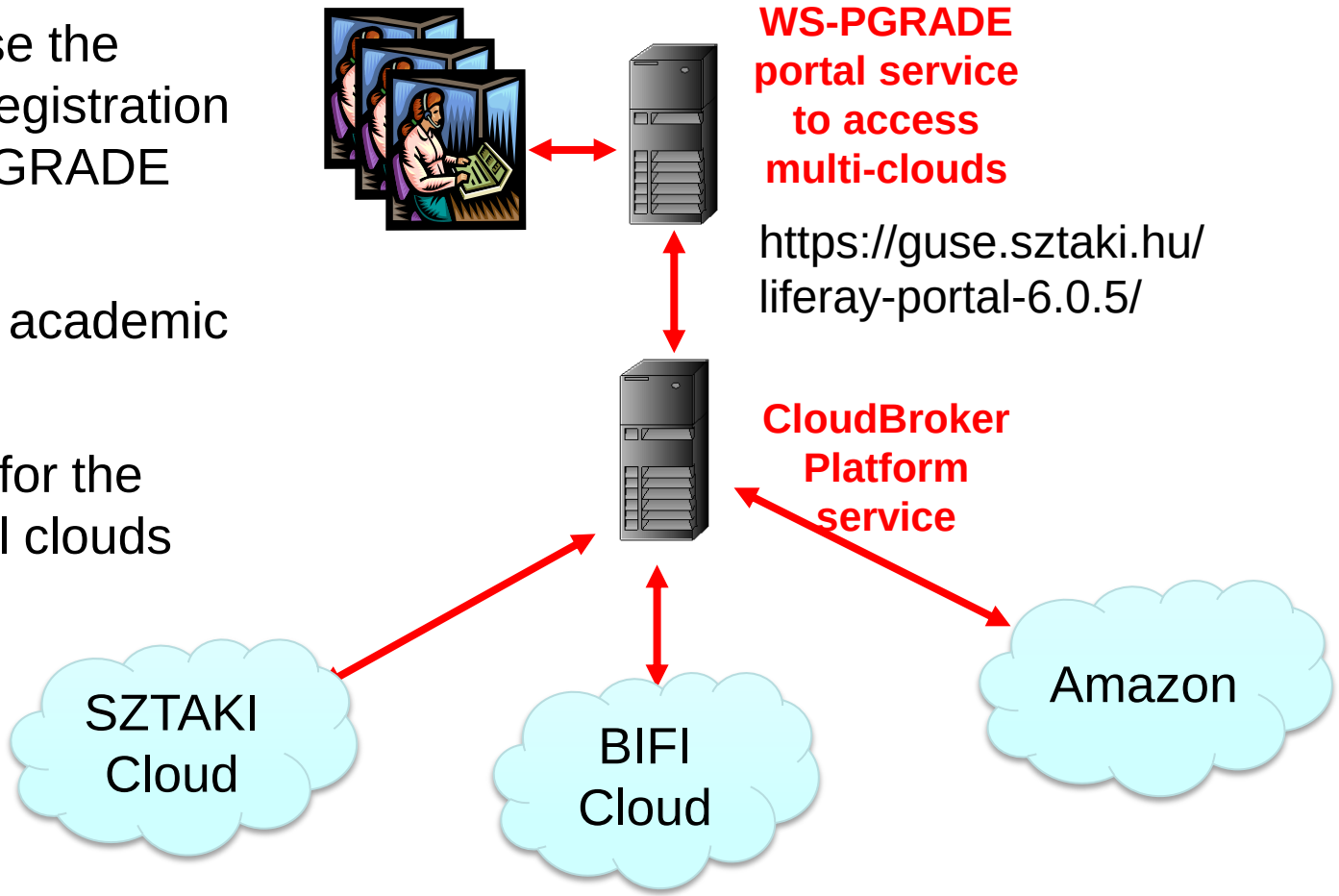
Integration features

- Support for commercial clouds with costs (prices configured in CloudBroker Platform):
  - Estimated job cost before submission
  - Actual job and workflow cost after execution



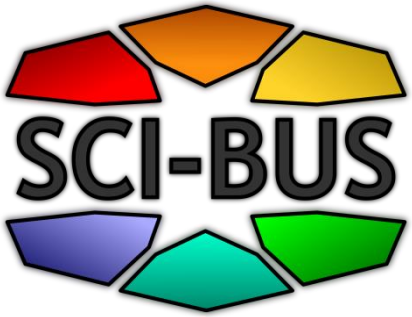
Multi-cloud access service

- Anyone can use the system (after registration both for WS-PGRADE and CBP:
  - free for the academic clouds
  - To be paid for the commercial clouds



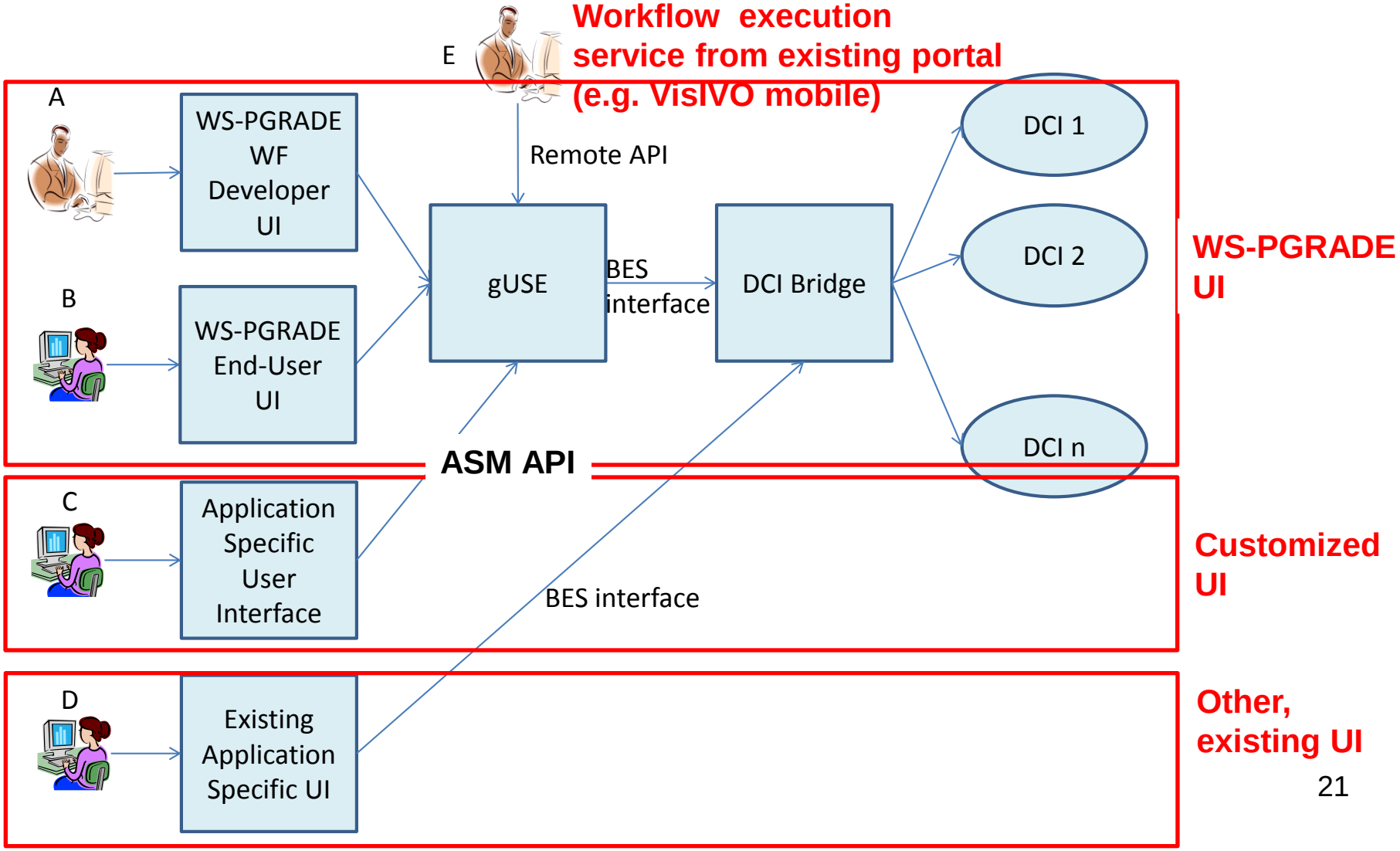
Multi-cloud access service portal

Flexible usage scenarios/business models by WS-PGRADE/gUSE



- **Workflow developer view** and support (full gateway framework view)
- **End-user view** and support (limited portlets)
- **Customized user interface** to support the creation of domain specific gateways (ASM API)
- Provide **workflow execution service** on top of many different DCIs (Remote API)

Typical usage scenarios of WS-PGRADE/gUSE

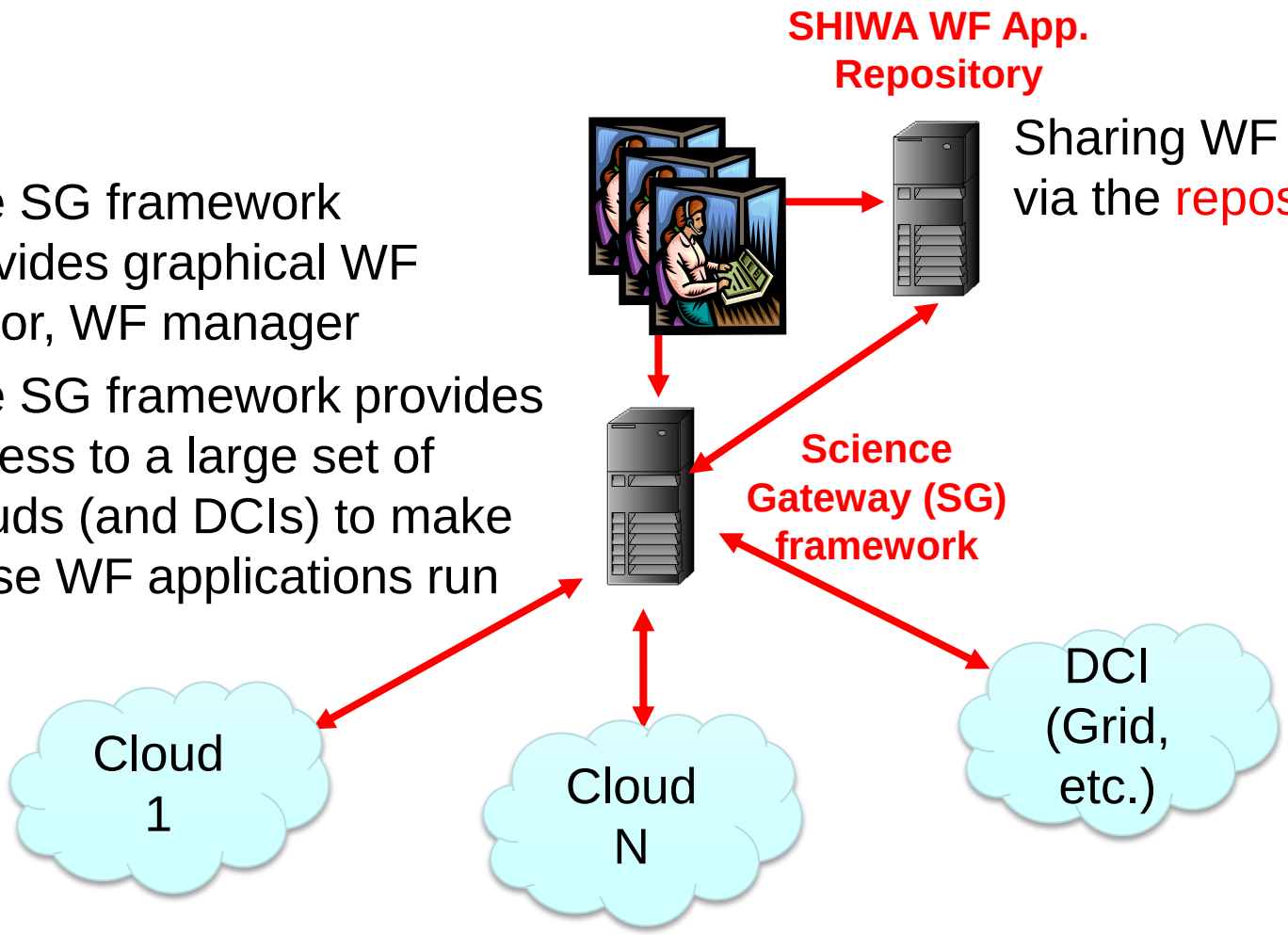


The flexibility of using WS-PGRADE/gUSE

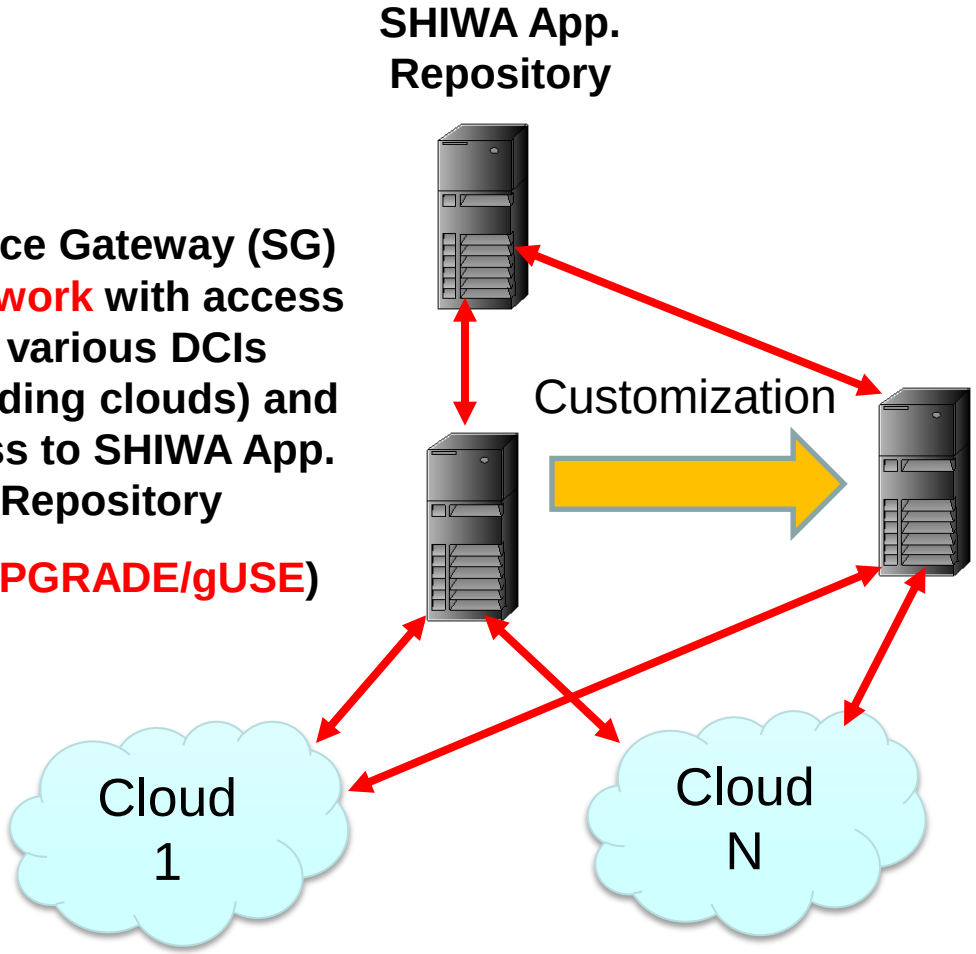
- Security: Flexible management of
  - Individual users' certificate
  - **Robot certificates**
- **Data bridge** (coming feature)
  - to access data storages in different DCIs
  - To transfer files among different DCIs
- Support for **workflow interoperability** based on SHIWA technology
  - CGI approach for integrating many different type of workflows as meta-workflows
  - Using other workflows available in IWIR format in the SHIWA repository

Support for workflow developers in collaboration with ER-flow based on SHIWA technology

- The SG framework provides graphical WF editor, WF manager
- The SG framework provides access to a large set of clouds (and DCIs) to make these WF applications run



Support for science gateway instance developers



Science Gateway (SG) framework with access to various DCIs (including clouds) and access to SHIWA App. Repository

(WS-PGRADE/gUSE)

Science Gateway (SG) Instance with inherited access to App. Repo, clouds and DCIs

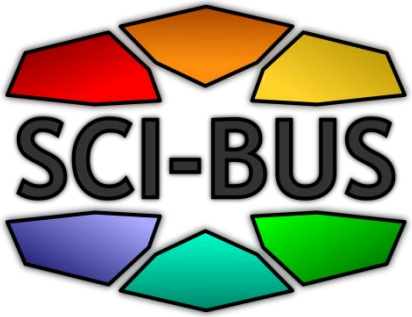
17 different SG instances for biologists, chemists, etc.

Types of gateways to be developed from the core WS-PGRADE/gUSE framework

1. Generic purpose
   - Core WS-PGRAD
2. Generic purpose
   - EDGI gateway b
3. Generic purpose technologies
   - SHIWA gateway interoperation
4. Domain specific
   - Swiss proteomics
   - Autodock gatew

Adria Science portal	RBI	CRO-NGI	Generic-purpose	Geo-science, meteorology	3.5.2	1	1	Dec 2012	
AEGIS CMPC Portal	IPB	AEGIS, cmpc.aegis.rs	Application Specific	Condensed Matter Physics Community	3.5.2	1	3	Nov 2012	10
agINFRA Science Gateway	agINFRA project	agINFRA VO	Generic-purpose	Agricultural Community	3.5.1	1	2	Dec 2012	10
AutoDock portal	MTA SZTAKI LPDS, developed by UoW	EDGeS@home	Application-specific	bioinformatics (molecular docking)	3.4.3	2	3	May 2012	~110
BIFI-Unizar portal	BIFI-Unizar	AraGRID, PireGRID			3.4.2				23
Citizen Web Community Gateway	E-Group	CloudBroker	Application specific	Public administration/government	3.5.1	1	2	Dec 2012	10
AMC e-BioInfra Gateway	AMC e-BioScience Group	BiGGrid via gLite, VL-e Med (vlemed) VO, local clusters	both	bioinformaticians, neuroscientists, biochemists	3.5.2	1 HW 1 Virtual	3 1	Nov 2012 Mar 2013	34
Etics Portal	4D Soft	-			-				
jportal (internal access only)	ETH Zürich	Local cluster	Application Specific	Life Science / Proteomics	3.4.4	1	3	Jun 2012 3.4.4 Jan 2012 3.4 Nov 2011 3.3.3.1	~50

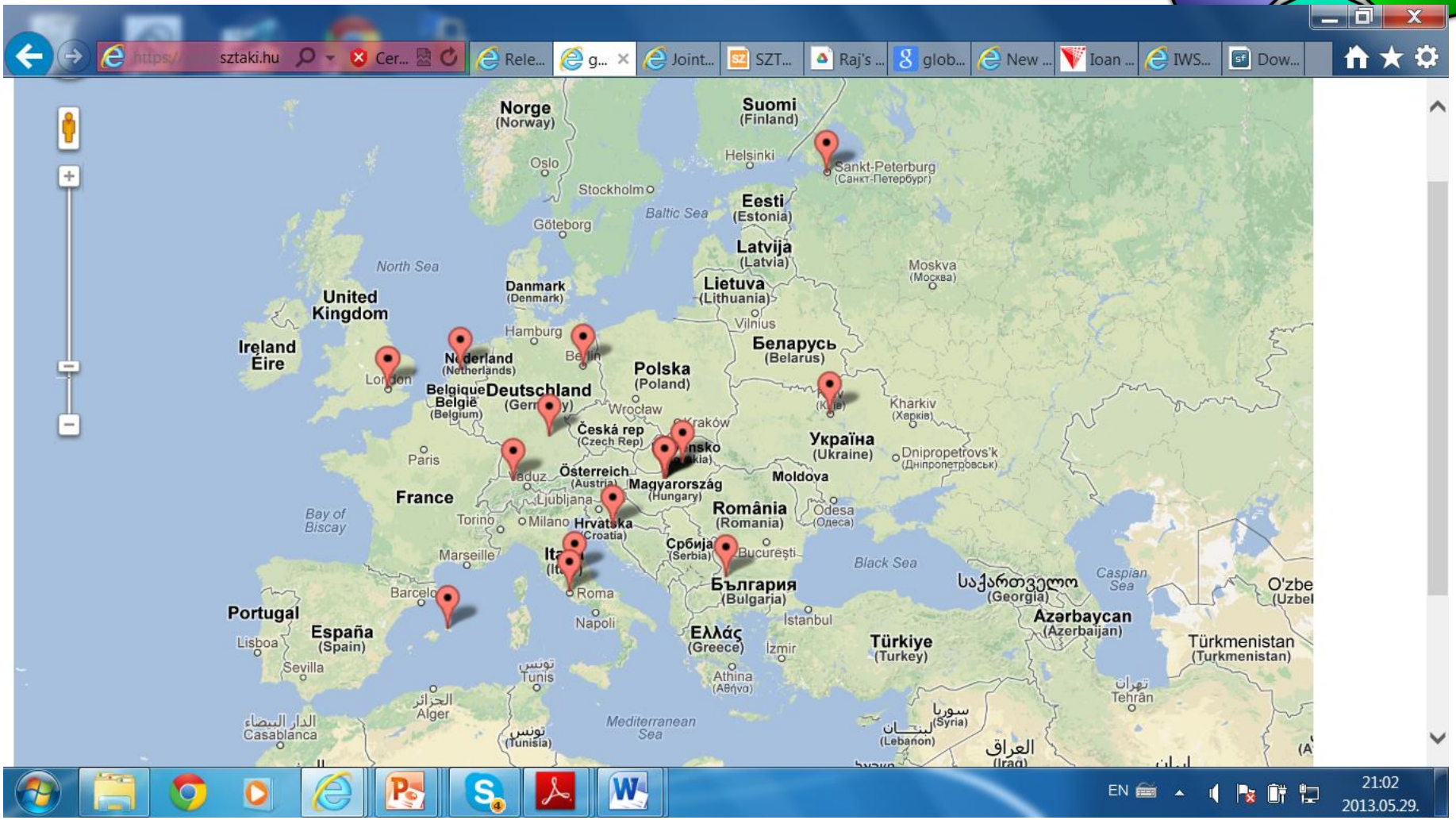
Communities developing WS-PGRADE/gUSE based gateways



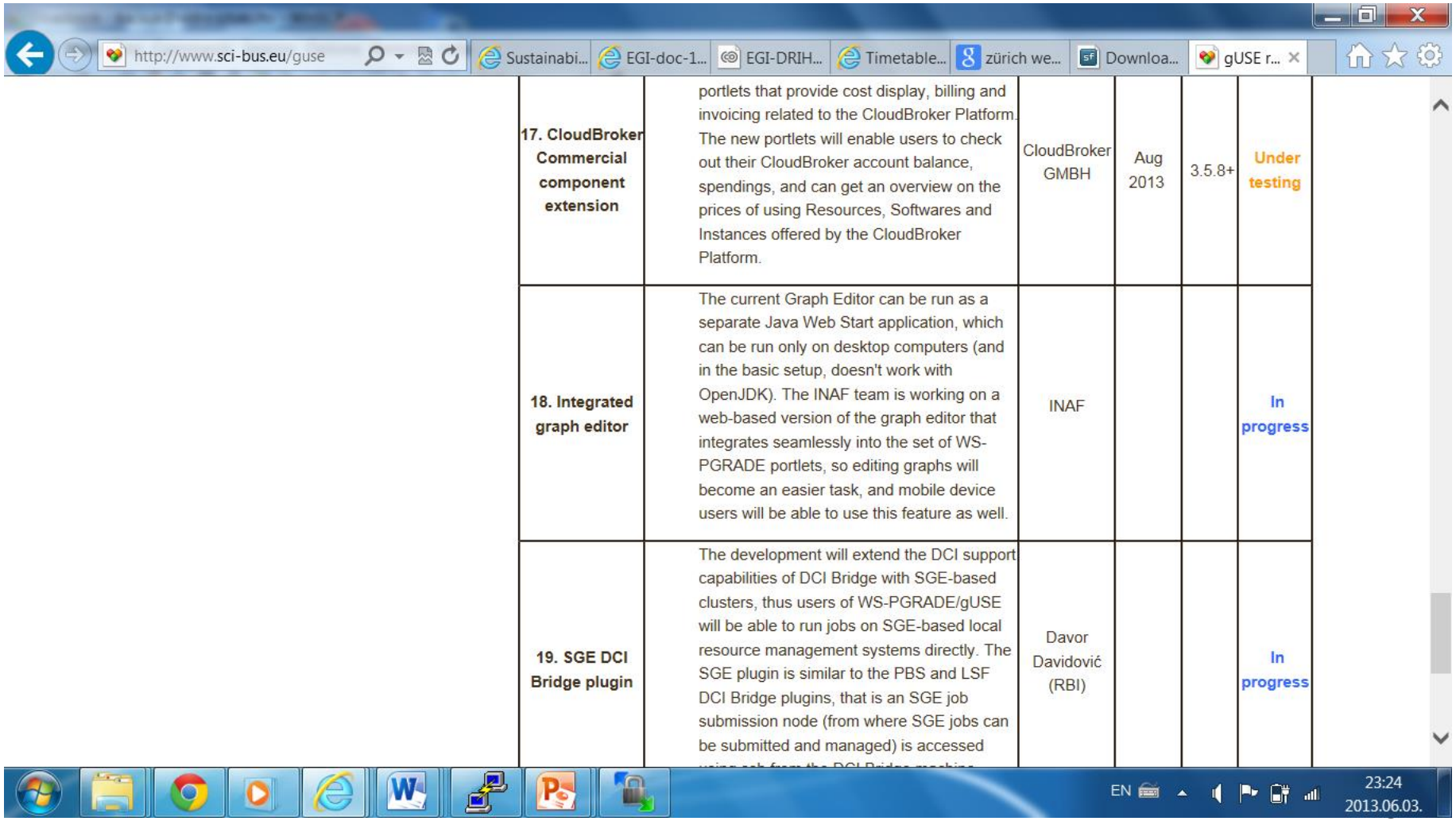
- 11 partner communities
- 6 subcontractors
- 4 associated members
- EU projects
  - agINFRA, DRIHM,
  - VERCE, VIALACTEA,
  - EDGI, IDGF-SP,
  - SHIWA, ER-Flow,
  - CloudSME

ИНСТИТУТ МЕТАЛЛОФИЗИКИ	G.V. Kurdyumov Institute for Metal Physics	(Ukraine)
INSTITUTE OF PHYSICS BELGRADE IPB	Institute of Physics Belgrade (IPB)	(Serbia)
Universiteit Leiden	Leiden Institute for Advanced Computer Science	(Netherlands)
NovaGlobal Pte Ltd Green & Scientific Computing Solutions	NVG Scientific Sdn Bhd	(Malaysia)
RB	Ruđer Bošković Institute	(Croatia)
Santander Meteorology Group IFCA	The Meteorology Group of Universidad de Cantabria	(Spain)

gUSE based gateways

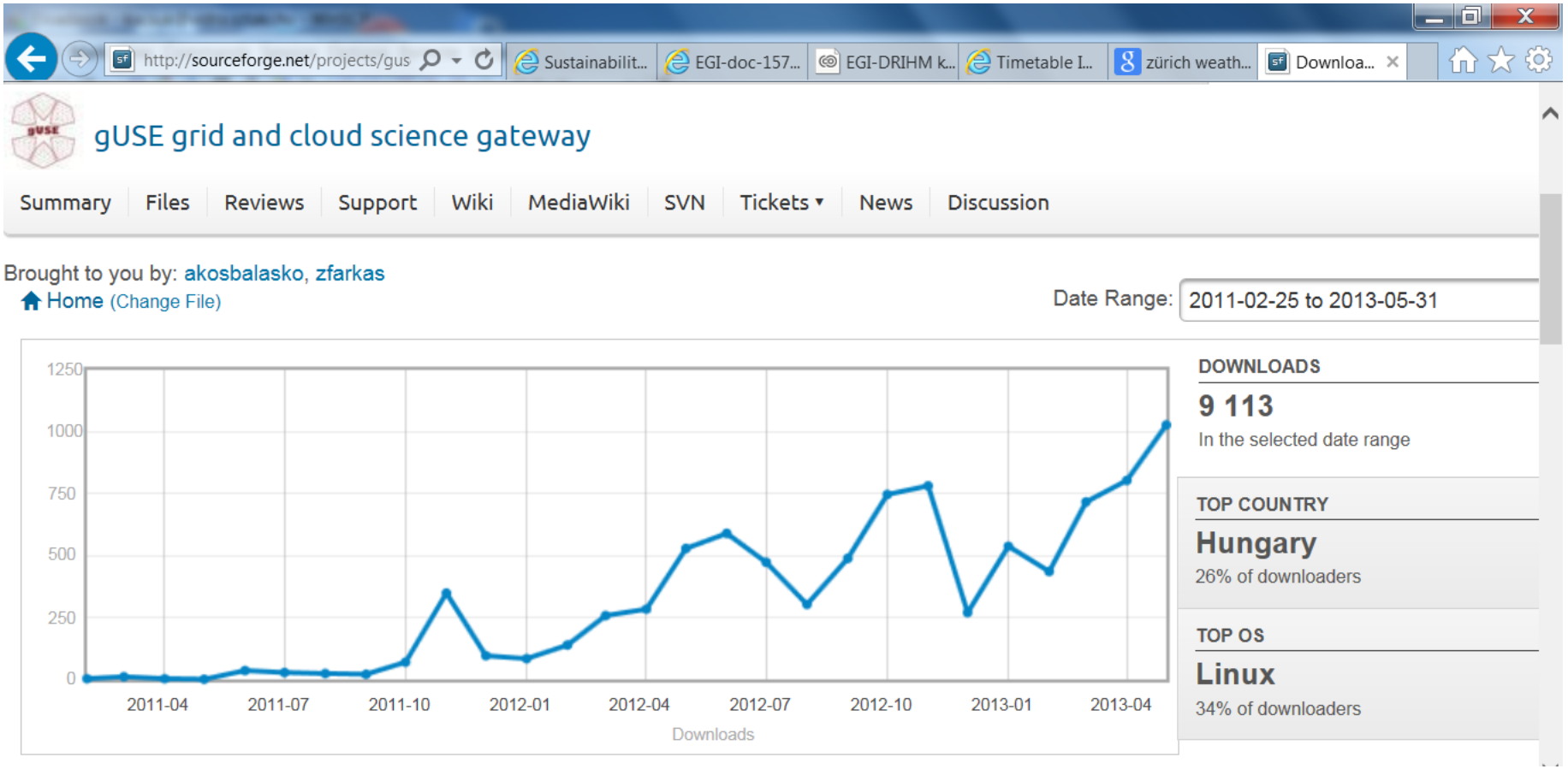


gUSE Roadmap based on community effort

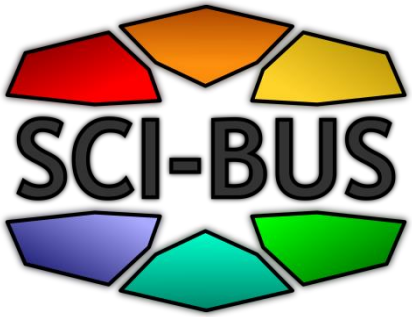


17. CloudBroker Commercial component extension	portlets that provide cost display, billing and invoicing related to the CloudBroker Platform. The new portlets will enable users to check out their CloudBroker account balance, spendings, and can get an overview on the prices of using Resources, Softwares and Instances offered by the CloudBroker Platform.	CloudBroker GMBH	Aug 2013	3.5.8+	Under testing
18. Integrated graph editor	The current Graph Editor can be run as a separate Java Web Start application, which can be run only on desktop computers (and in the basic setup, doesn't work with OpenJDK). The INAF team is working on a web-based version of the graph editor that integrates seamlessly into the set of WS-PGRADE portlets, so editing graphs will become an easier task, and mobile device users will be able to use this feature as well.	INAF			In progress
19. SGE DCI Bridge plugin	The development will extend the DCI support capabilities of DCI Bridge with SGE-based clusters, thus users of WS-PGRADE/gUSE will be able to run jobs on SGE-based local resource management systems directly. The SGE plugin is similar to the PBS and LSF DCI Bridge plugins, that is an SGE job submission node (from where SGE jobs can be submitted and managed) is accessed	Davor Davidović (RBI)			In progress

gUSE download statistics at sourceforge



Where to find further information?



- SCI-BUS web page:
  - http://www.sci-bus.eu/
- gUSE/WS-PGRADE:
  - http://www.guse.hu/
- gUSE on sourceforge
  - http://sourceforge.net/projects/guse/
  - http://sourceforge.net/projects/guse/forums/forum/
  - http://sourceforge.net/projects/guse/develop

Summer School 2013

Summer School on Grid and Cloud Workflows and Gateways

1-6 July 2013, Budapest, Hungary

SCI-BUS

Home | Venue | Program committee | Local organisers | Programme | Posters | Social Program | Accomodation | Payment information | Registration | Registered participants | Downloads | Picture galleries

SCI-BUS

ER-flow

SZTAKI CLOUD

NEWS

02-05-2013 - Poster contest is open

08-04-2013 - Registration has been opened

07-04-2013 - The event's flyer is available for download

27-03-2013 - Registration will open 8 April, 2013

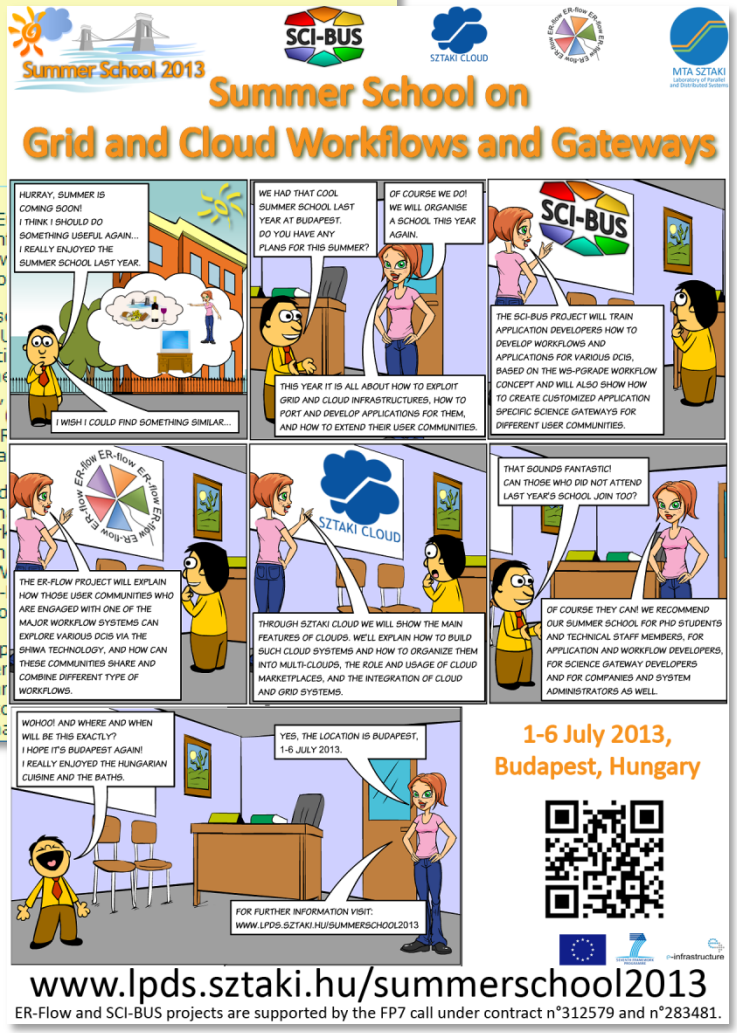
Scope

There are already several well established grid and cloud infrastructures in E
exploit these infrastructures, how to port and develop application for these in
their user communities. The main goal of this summer school is to give ansv
promote best practice examples for potential application developers and users o

Two current FP7 projects and the SZTAKI Cloud project organize this summer s
user support for the European grid and cloud infrastructures. The SCI-BU
developers how to develop workflows and parameter sweep applicati
infrastructures (DCIs) based on the WS-PGRADE workflow concept and the
environment that enables transparent access to various DCIs like grids (ARC,
(OpenNebula, Openstack, Amazon, Google Application Engine), desktop grids
supercomputers. SCI-BUS will also show how to customize the generic WS-PGR
the needs of various user communities and create application-specific science ga

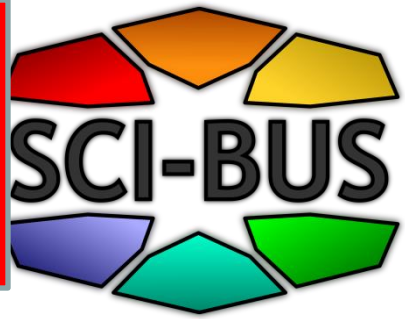
The ER-flow project will explain how those user communities who are engaged
systems (ASKALON, Galaxy, GWES, Kepler, MOTEUR, Pegasus, Taverna, Trian
various DCIs mentioned above via the services of gUSE. The SHIWA work
supported and disseminated by ER-flow enables sharing workflows between
combining different type of workflows to build meta-workflows via the SHIWA W
and SHIWA desktop technologies. The SHIWA portal is also based on the WS-
good case study how to customize the WS-PGRADE/gUSE gateway for specific co

The SZTAKI Cloud project establishes a production level institute wide p
OpenNebula. This cloud is actively used in the SCI-BUS project and many other
projects. Through this cloud we will show the main features of clouds and par
lectures will include explaining how to build such cloud systems and how to
systems. The role and usage of cloud marketplaces will also be covered. Fina



Conclusions

Join SCI-BUS as associated member



Why to select WS-PGRADE/gUSE and join the SCI-BUS community?

1. Robustness
   - Already large number of gateways used in production
2. Sustainability
   - The SCI-BUS project and its sustainability and commercialization plan guarantees it
3. Functionalities
   - Rich functionalities that are growing according to the SCI-BUS and sourceforge community needs
4. How easy to adapt for the needs of the new user community?
   - Already large number of gateways customized from gUSE/WS-PGRADE
5. You can influence the progress of WS-PGRADE/gUSE