



# SGI - Science Gateways Initiative

Delivering Science Gateway  
infrastructure components and  
solutions

Stephen Brewer, CERN, 3 November 2009 (with input from various colleagues & partners)

# Outline

- Concept
- Objectives and Aims
- Sustaining the DCI eco-system
- Science Gateway Lifecycle
- Gateway model
- Communication and development process
- Background, context and benefits

# INFRA-2010-1.2.1: Distributed computing infrastructure (DCI)

- the creation of **SW-component repositories** for subsequent maintenance by EGI (1.2.1.3)
- easier access to DCIs through **science gateways** and support for workflows combining capacity and capability computing as well as access to data and networks (1.2.1.4)
- the **extension to existing DCIs** to incorporate remote operation of scientific instruments such as those in the **ESFRI roadmap projects** (1.2.1.5)

# EGI Science Gateways Initiative: concept

- Establish and maintain a repository of reusable tools, plugins and other portlet components
- Design and implement Science Gateways for different science communities (ESFRI etc.) selected as a result of interviews with scientists
- rapidly assemble elements within repository to create new gateways for selected communities
- Collect, share and exploit knowledge and expertise

# Objectives

- SGI will reach out to the widest possible breadth and depth of communities through working with established large-scale groupings such as the ESFRI projects and the EGI SSCs.
- SGI will seek out research communities such as the digital humanities that are new to the DCI environment and adapt the existing technology to meet their requirements.
- SGI will deliver a series of implementations of an evolving SG model tailored to each community's needs and reqs.
- The SGI will share solutions, resources and reengineered components with the wider community through a repository that supports an open development model that will at the end of the project be taken up by EGI.eu.

# Sustaining the DCI ecosystem

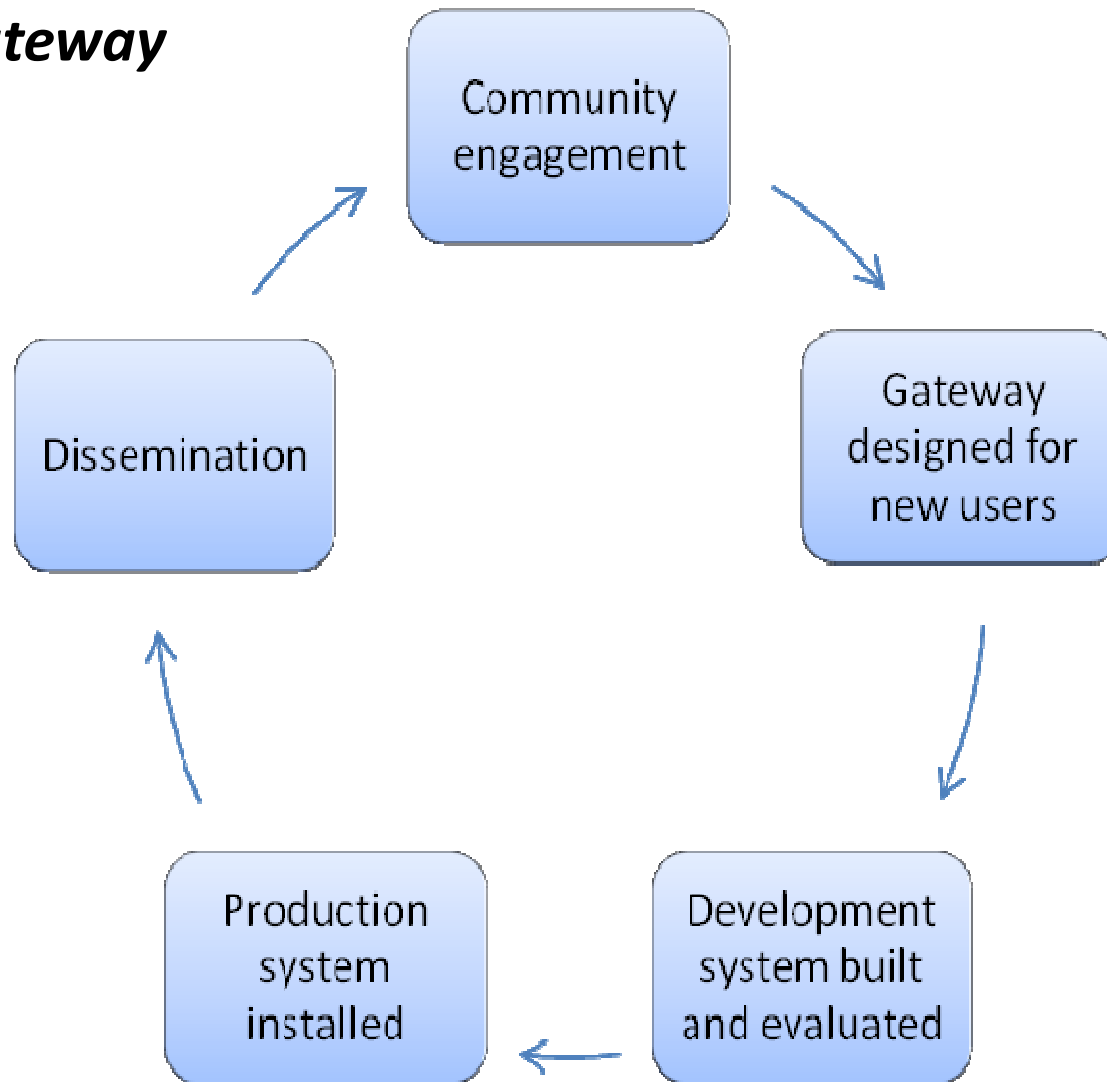
DCIs:

- inhabit a delicate and finely balanced ecosystem
- depend on technological foundations & user communities
- play an essential role in serving and preserving both.

The EGI Science Gateways Initiative will contribute to the sustainability of this ecosystem in three ways:

1. The science gateway lifecycle will be maintained
2. Essential gateway components will be cultivated, supported and maintained as appropriate
3. Knowledge and expertise will be captured and disseminated through repeated iterations

## *Science gateway lifecycle*



# ***The Gateway Model***

## ***(tool box, templates and solutions)***

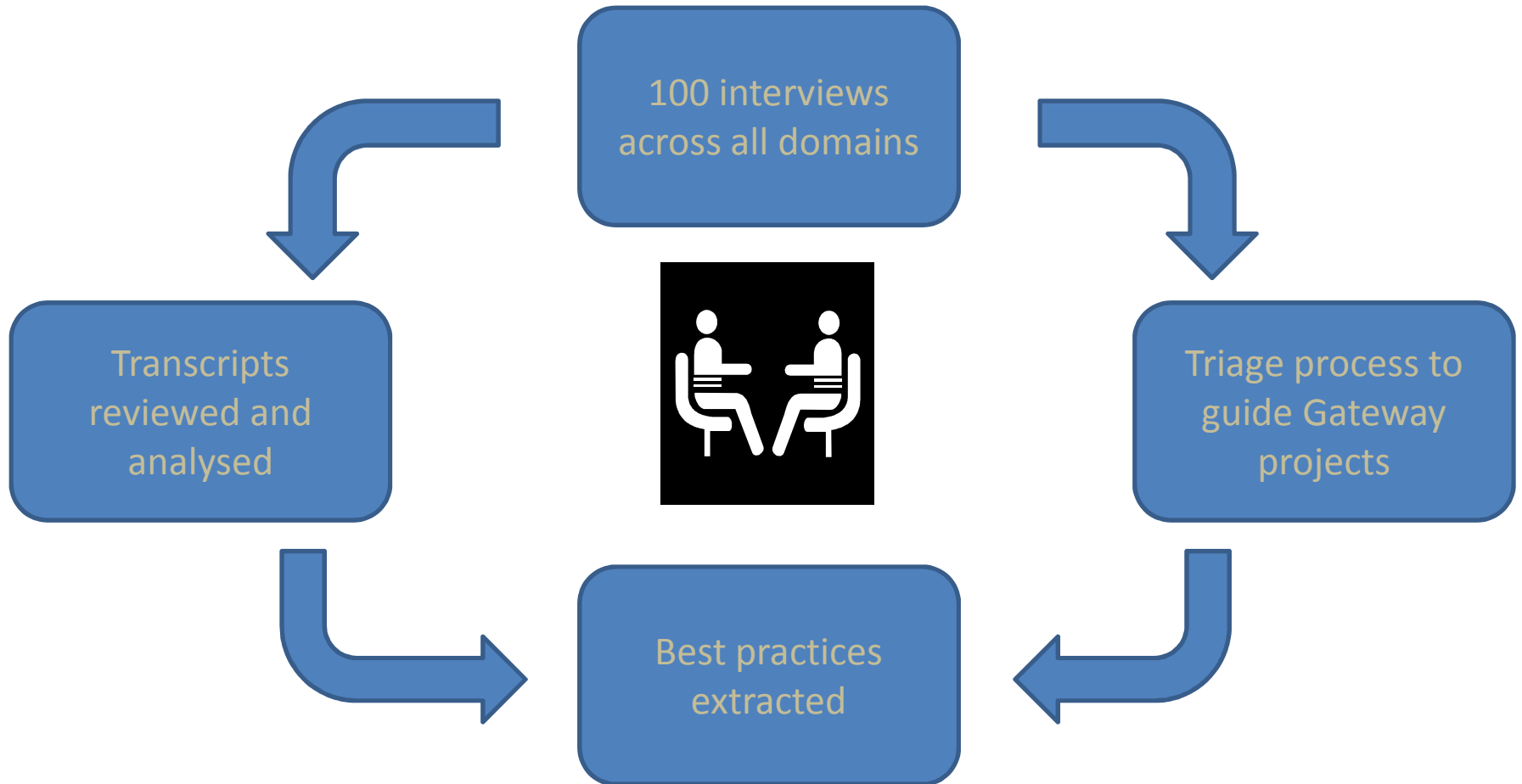
- Science gateway platforms (Portals)
  - P-Grade, NeuGrid platform, Liferay, HUBzero
- Portlets
  - Job management, Data management, Security, Information services, Visualisation and modelling
- Service Catalogue
  - Components, requirements and architectures
  - QoS properties, SLAs and negotiation framework



# Communication and requirements

- Interviews with cross-section of DCI practitioners: researchers, providers, pioneers
  - ESFRI project members
  - SSC members
- Transcripts and analysis phase – monthly meetings
- Triage and evaluation phase – evolving ranking of candidate intervention opportunities

# How do scientists use DCIs?



# Dissemination and Outreach

- Connections and communication will be maintained with:
  - EGI, EMI, SSCs, ESFRI, OGF working groups (PGI, GIN), Teragrid SGs and other International SG initiatives eg. New Zealand
- Presence at key EU events:
  - EGI User Forums, OGFs, ESFRI meetings, Subject specific events

# Science Gateway production process

- Team starts developing 3 gateways from day 1:
  - Life Sciences, Humanities, Medical...
- Examples will be based around:
  - P-Grade, NeuGrid and Liferay
- Interviews will commence – timetable and open invitation published
- Communication, dissemination and support channels will open for business

# Science Gateway development process

- Refactoring of portal applications
  - Work will commence on re-engineering of elements of identified and selected portals to ensure compatibility with EGI/UMD
- Re-engineering of portlets
  - make key portlets interchangeable between portal platforms
- Service Catalogue
  - Components, workflows, requirements and service component architectures

# Consortium

- University of Southampton, UK
- University of Edinburgh, UK
- Forschungszentrum Jülich, DE
- Engineering Ingegneria Informatica S.p.A. , IT
- Trust-IT, UK
- Magyar Tudományos Akademia Szamitastechnikai Es Automatizalasi Kutato Intezet, HU
- University of Westminster, UK
- Maat-G, FR
- Universidad Politécnica de Valencia, SP
- Centre national de la recherche scientifique, FR

# Gateways: background and context

- now used by many communities in order that researchers unversed in the complexities and formalities of the various middleware offerings can rapidly access distributed computing infrastructures (DCIs)
- rich collections of computational resources integrated within a portal tailored to a particular community's needs
- Web now enables rich internet applications, DCI resources, workflows and vizualisation tools to be tightly but cleanly integrated with scientists' own specialist tools.

We propose to develop and refine a model that has a generic core that can be customized for specific domain communities that can provide access to DCIs.

# EGI Science Gateways Initiative: Benefits

- The knowledge and experience contained within the consortium will be exploited to identify, refine and link established components into community-focused portals and application suits as required.
- The resulting gateways will provide access to profound computational capability, an open architecture that is both flexible and extensible, and an empathetic user engagement model that can be refined and repeated across the EGI landscape as the EGI itself grows and develops.



# Science gateway lifecycle 1/5

**Community engagement** takes place with a new or emerging user group previously identified. Interviews will be conducted with researchers and others within candidate research groups. Groups will be identified through contacts, the dissemination process and guidance from the wider project community. The interviews will be analysed and augmented to the technical needs used to form a rich picture of the researcher's needs:

- i/p: requirements gathered from interviews, existing prototype evaluations
- o/p: scenario analysis, existing prototypes extended

# Science gateway lifecycle 2/5

**New gateway designed:** the generic model will be used to integrate the new specialist tools with core components; specific components may be refactored if required and the generic model refined:

- i/p: new components tested and designs evaluated
- o/p: repository updated with refactored components as required

# Science gateway lifecycle 3/5

**Development system:** a development system will be built and tested in tandem with the new community; system developers will be embedded within the research groups where possible to refine the gateway:

- i/p: research community evaluation; technical tests
- o/p: development system available

# Science gateway lifecycle 4/5

**Production system:** the new system will be installed and tested on the EGI or other DCI platform as appropriate. A migration path to a full secure and supported environment will be carried out to fully hand over the new gateway:

- i/p: training evaluation results, gateway evaluation results
- o/p: trainers trained, Generic gateway model updated (following open dev model)

# Science gateway lifecycle 5/5

**Dissemination:** each new gateway will receive a deep publicity push into the specific domain in partnership between the project and the community itself; the new gateway will also feature in the wider project publicity process as a casestudy that may be of interest and relevance to the wider research community

- i/p: new/emerging user communities identified and approached
- o/p: success story and overall project publicity disseminated through stories, presentations, demonstrations and videos