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Introduction to Science Gateways

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Background

- **Usage of research infrastructures is still difficult**
    - Data
    - Computation
    - Collaboration
    - Coordination

- **Science gateways represent attempts to reduce this difficulty**

Goal of this lecture

- **Introduce basic concepts of science gateways**

- **Present briefly selected existing science gateways and provide pointers to further information**

What is a Science Gateway?

❑ **Interface to an e-infrastructure**

❑ **community-developed set of tools, applications, and data**

❑ **integrated via a portal, usually in a graphical user interface**

❑ **customized for a specific community**

❑ **Also known with other terms**

▪ Portal, Virtual research environment, collaboratory, Virtual laboratory, problem solving environment, …

Types of Science Gateways

❑ **Depending on functionality that is offered:**

❑ **Generic**

  ▪ Run jobs, access to files, grid authentication, status, …

  ▪ Example: WS-PGRADE, Chain Science Gateway, GISELA Gateway, etc.

❑ **Dedicated to some scientific area**

  ▪ Neuroscience, protein docking, astrophysics, document analysis, …

  ▪ Normally involve access to data + compute

Types of Science Gateways

- **Depending on the technology used:**

- **Custom**
  - Scripts, workflow systems
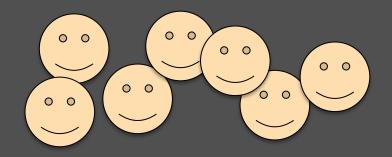 - php, web applications, …

- **Based on framework**
  - Portal/web framework, e.g. Liferay, Google toolkit
  - SG framework, e.g. WS-PGRADE, Catania SG Framework, HUBZero

Typical Functions offered by a SG

❏ **Data management**
- Storage, transport, lifecycle management
- Metadata, provenance

❏ **Processing**
- Capacity, throughput

❏ **Community**

Science Gateway

Scientific applications

Data metadata

Generic vs. Customized SG

	Generic	Customized
Target user	Advanced users with programming knowledge	Scientists that want to perform pre-defined tasks
Programmability	User can program what to do	Pre-defined actions only
User interface	Detailed, many alternatives and possible choices	Simple, few alternatives and decisions to take
Data management	Typically poor (low level, files)	Typically good (knows about objects of interest for the scientific problem)
Collaboration facilities	Normally absent	Normally present

Science Gateways: more information

❑ **Information about on-going initiatives, tools, SG**

- Registry maintained by EGI
    - ✓ http://www.egi.eu/services/researchers/science-gateways/index.html
- Available gateways
    - ✓ http://www.egi.eu/services/researchers/science-gateways/available_science_gateways.html
- Gateway enabling technologies
    - ✓ http://www.egi.eu/services/researchers/science-gateways/gateway-techs.html

❑ **Projects**

- XSEDE: Extreme Science and Engineering Discovery Environment
    - ✓ https://www.xsede.org/gateways-overview
- SCI-BUS: Scientific gateway Based User Support
    - ✓ http://www.sci-bus.eu/

Wrap-up

- **Science gateways are tools to facilitate access to e-infrastructures**

- **Many science gateways exist**
  - For running computations on various types of infrastructures
  - For accessing data and methods for specific scientific problems

- **Some examples will be seen in this course as "Use cases"**
  - **Astrophysics VisiVO**
  - **Virtual Imaging Platform**

Acknowledgements

SCIentific gateway Based User Support
http://www.sci-bus.eu/

Building an European Research community
through interoprable WorkFLOWs and Data
http://www.erflow.eu/

e-infrastructure

SEVENTH FRAMEWORK PROGRAMME

Thanks!