Centrum Kompetencji
w Zakresie Rozproszonych Infrastruktur
Obliczeniowych Typu Gridowrgo – PLGrid Core

High Performance Computing Resources over REST

Daniel Harężlak, Marek Kasztelnik, Maciej Pawlik, Bartosz Wilk

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Agenda

➢ Science gateways over HPC resources

➢ Computing infrastructure interaction scenarios

➢ Platform-independent development

➢ Rimrock service API

➢ Security

➢ Further developoments

➢ Conclusions

Science Gateways

➢   Development of science portals for different domains

–   No more console computing

➢   Usually similar requirements for the computing infrastructure

–   Job management

–   Data transmission

➢   Middleware integration required in each case

Web Development Frameworks

➢ Many web development frameworks
  – Server and client side implementation
  – Use different programming languages
  – Advanced client visualization (3D too!)
➢ But … is it easy to integrate them with the infrastructure middleware (Java, Python)?
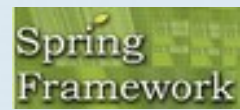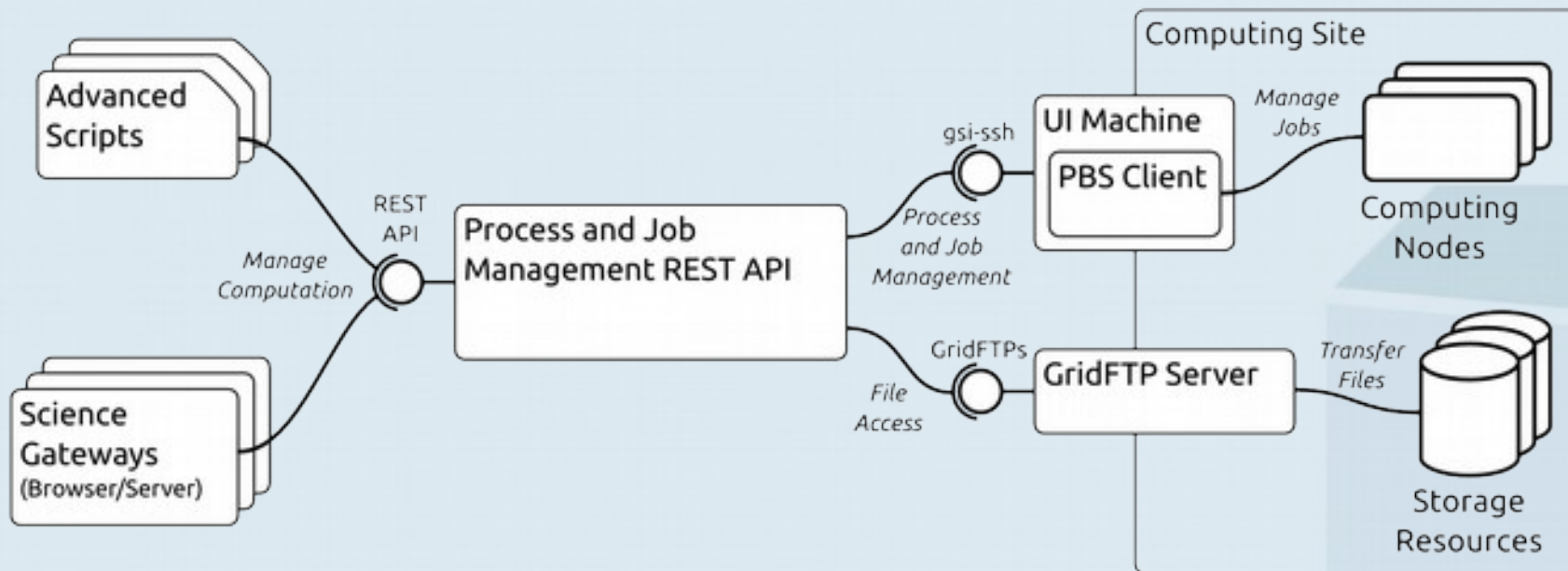
- ➢ Simple command execution on the UI machines
  - – Learn the modules with `module avail`
  - – Run your personal scripts or `zeus-*` tools
- ➢ Interactive process execution
  - – Experiment with `i*` (`irb`, `ipython`) interpreters
  - – This includes `Bash`
- ➢ Local job management (`qsub` and friends)
  - – Submit, monitor, abort, delete
  - – Transfer inputs and retrieve outputs

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> ➢ REST as the interoperability layer
> ➢ Reuse existing HPC entrypoints within the user space

Rimrock API – Process

➢ Available at **`https://submit.plgrid.pl/api/process`**

➢ Request

```
{
  "host": "zeus.cyfronet.pl",
  "command": "date"
}
```

➢ Response

```
{
  "status":"OK",
  "exit_code":0,
  "standard_output":"Fri Aug  1 14:33:55 CEST 2014",
  "error_output":"",
  "error_message":null
}
```

➢ Available at
`https://submit.plgrid.pl/api/iprocesses`

➢ Request

```
{
  "host": "zeus.cyfronet.pl",
  "command": "bash"
}
```

➢ Response

```
{
  "process_id":"25a6b082-7ef0-4ec7-8349-c3beb9b341a4",
  "status":"OK",
  "finished":false,
  "standard_output":null,
  "standard_error":null,
  "error_message":null,
  "tag":null
}
```

➢ Available at **`https://submit.plgrid.pl/api/jobs`**

➢ Request

```
{
  "host": "zeus.cyfronet.pl",
  "working_directory": "/people/username/testjob",
  "script": "#!/bin/bash\necho hello\nexit 0"
}
```

➢ Response

```
{
  "job_id":"50463091.batch.grid.cyf-kr.edu.pl",
  "stdout_path":"https://data.plgrid.pl/download//stdout/path",
  "stderr_path":"https://data.plgrid.pl/download//stderr/path",
  "status":"QUEUED",
  "tag":null
}
```

Rimrock Security

➢ Uses proxy certificate delegated from other services or scripts

➢ Integration with the PL-Grid portal allows for proxy retrieval

➢ Also typical `*-proxy-init` commands work as well

➢ Providing platform-independent API is good

… but we can do better

➢ Let's deliver everything except for the last pieces that are truly domain-specific

➢ app@plgrid.pl Builds on top of Rimrock

- – Ensures OpenID integration and a set of JavaScript libraries for core PL-Grid services including data and metadata management

- – Domain-specific views are generated with JavaScript in the user's browser

Conclusions

➢ Rimrock delivers a platform-independent process, interactive process and job management API

➢ Development of advanced HPC scripts and web science gateways is greatly improved

➢ Future work
  – Support Grid job submission (vo.plgrid.pl and others)