

CTA Applications and Data in Science Gateway by Cyfronet

ACC Cyfronet AGH

<http://cta-sg.grid.cyfronet.pl>

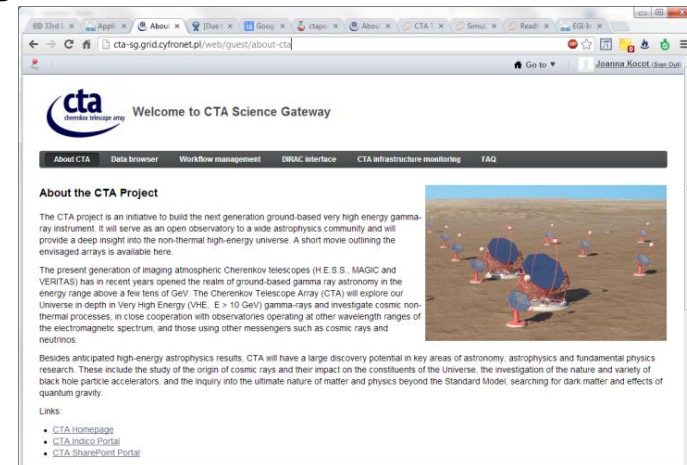
Science Gateway: Approach

- Developed in close cooperation with CTA members
 - For maximum utility and user-friendliness
 - Collaboration with Polish Trigger Group and Data Management project
- Developed in compliance with early requirements posed by CTA Data Management Group:
 - The „CTA Science Gateway: Roadmap and Technology” document (internal to CTA collaboration)
 - Checked against the requirements proposed by the CTA Virtual Team

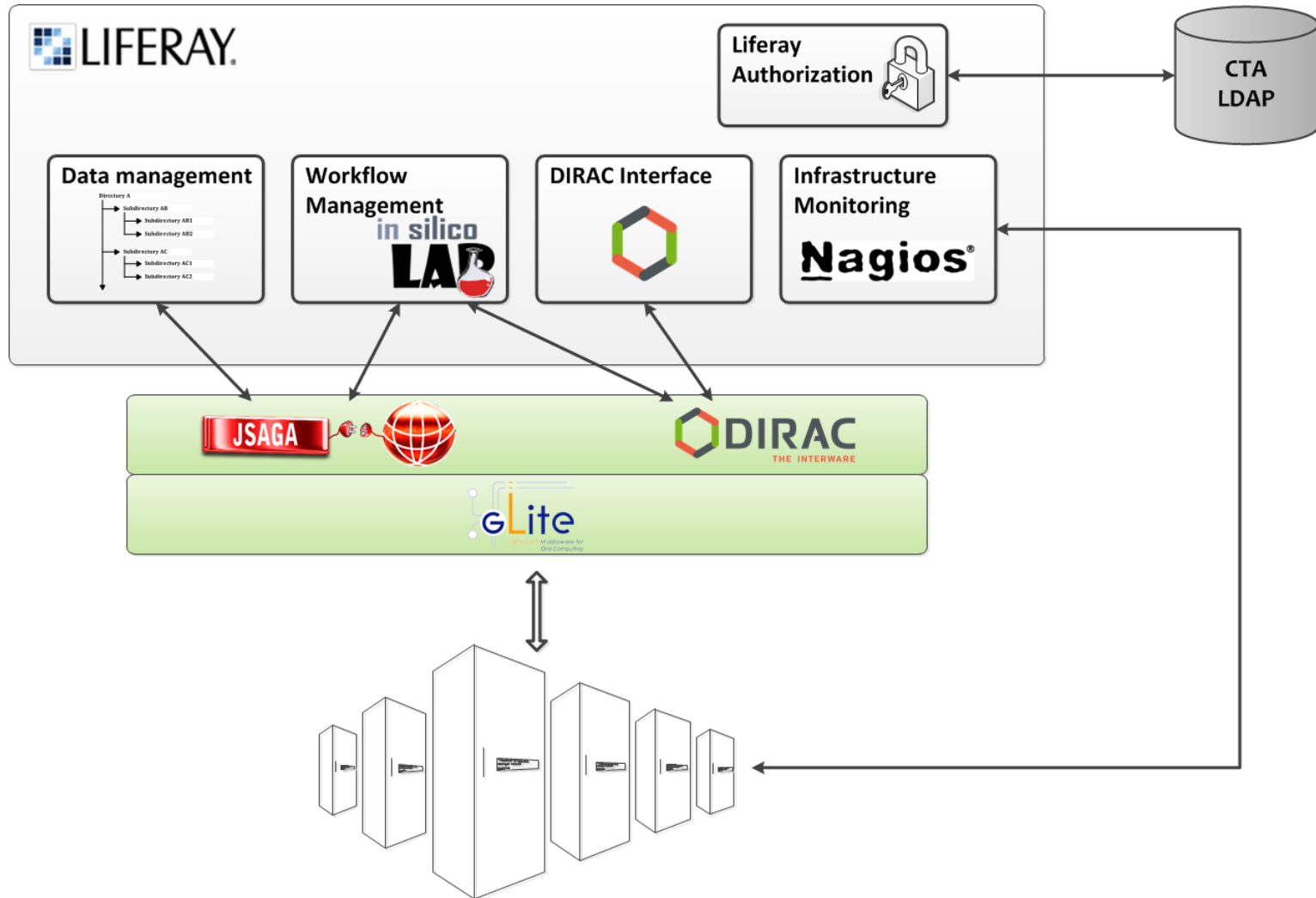


Science Gateway: Status

- Liferay environment integrating applications and tools for CTA
 - CTA applications embedded in ctaportal (based on InSilicoLab portal framework)
 - CTA data browsing
 - CTA infrastructure monitoring
 - DIRAC Grid engine and metadata interface
 - CMS and social networking functionality offered by Liferay
- Available to all registered CTA members
 - CTA LDAP integration
 - Anonymous access for external users
- <http://cta-sg.grid.cyfronet.pl>



Science Gateway: Architecture



Embedded CTA Applications

- First CTA applications integrated:
 - sim_telarray
 - read_hess
 - In progress: EventDisplay
- Applications can be organised in a pipeline
- Full support for the applications data format and result analysis



Embedded CTA Applications

- Telescope array simulation with *sim_telarray*

Input Data Specification

sim_telarray output file name:

Configuration files directory:

Default trigger: MAJORITY

Force sim_telarray stop after hours

Configuration parameters Add...

MIN_PHOTOELECTRONS: x

MIN_PHOTONS: x

Optimisation parameters

LINEAR DISCRIMINATOR_THRESHOLD: to step

LINEAR DISCRIMINATOR_GATE_LENGTH: to step

Showers

LFC location:

Type the file location:

Add file locations list:

Find by path fragments:

Advanced search...

Number of jobs to be run: 80

DISCRIMINATOR_THRESHOLD = 63.0

DISCRIMINATOR_THRESHOLD	Trigger Efficiency
40	0.18
44	0.55
48	0.85
52	0.95
56	0.98
60	0.99
63	1.00
64	1.00
66	1.00
68	1.00
70	1.00
72	1.00
74	1.00
76	1.00
78	1.00
80	1.00

Export data

Include headers

```
DISCRIMINATOR_THRESHOLD,DISCRIMINATOR_GATE_LENGTH,3,4
63.0,4.0,3000,469
63.0,8.0,3000,1657
63.0,12.0,3000,2523
63.0,16.0,3000,2853
63.0,20.0,3000,2974
63.0,24.0,3000,2998
63.0,28.0,3000,3000
63.0,32.0,3000,2999
63.0,36.0,3000,3000
63.0,40.0,3000,3000
63.0,44.0,3000,3000
63.0,48.0,3000,3000
63.0,52.0,3000,3000
63.0,56.0,3000,3000
63.0,60.0,3000,3000
63.0,64.0,3000,3000
63.0,68.0,3000,3000
63.0,72.0,3000,3000
63.0,76.0,3000,3000
63.0,80.0,3000,3000
```

Download as file Back Cancel Finish

Embedded CTA Applications

- DST calculation with *read_hess*

Input Data Specification

sim_telarray result file name: Regular expressions allowed - e.g. `.*.simtel.gz` (matching all file names ending with `.simtel.gz`). See [this page](#) for reference.

DST level:

DST file name:

PostScript images file:

read_hess parameters Add... Paste command...

powerlaw	<input type="text" value="-2,57"/>	×
r	<input type="text" value="0"/>	×
tail-cuts	<input type="text" value="0,0"/>	×
min-amp	<input type="text" value="30"/>	×
min-tel	<input type="text" value="2"/>	×

sim_telarray result files

LFC location:

Type the file location:

Add file locations list:

Find by path fragments:

Advanced search...

Results

Job No.	Result
1	Result files available result.simhess-dst.gz

[Download](#)

[Check for results](#)

```
× 1. /grid/vo.cta.in2p3.fr/MC/PROD2/Config_040213/prod-2_21122012_corsika/gamma/prod-2_21122012_simtel/Data/000xxx
```

Primary: gamma of 0.050 TeV energy at 298 m distance




Embedded CTA Applications

- VDST calculation with *Eventdisplay*
- Started: reconstruction of events with *Eventdisplay*

Input Data Specification

Contents of the Array file

0 10.0



sim_telarray result files

LFC location

Type the file location

Add file locations list

Find by path fragments

Advanced search...

```
x 1. /grid/vo.cta.in2p3.fr/insilicolab-  
test/c.PL_o.GRID_o.Cyfronet_cn.Maciej_Golik/gammas.dat
```

Results

▲ Job No.	Result
1	Result files available gammas.dat.root

Check for results



Job and Workflow Management

- Predefined workflows for each application – including:
 - Data preparation – with parallelisation
 - Execution and monitoring of parallel jobs
 - On-line result analysis and summary view

Optimisation parameters

LINEAR 100 to 2000 step 500

LINEAR 100 to 2000 step 500

Showers

1. /grid/vo.cta.in2p3.fr/ctaptrigg/gamma/gamma_E000.10_IP400_N400000_TS.COR.iact.gz
2. /grid/vo.cta.in2p3.fr/ctaptrigg/gamma/gamma_E000.05_IP300_N500000_TS.COR.iact.gz

Parameters legend

Index 1

Job ID <https://lb02.grid.cyf-kr.edu.pl:9000/4ZrH1C6abGnZfthWhd1HLW>

Status finished

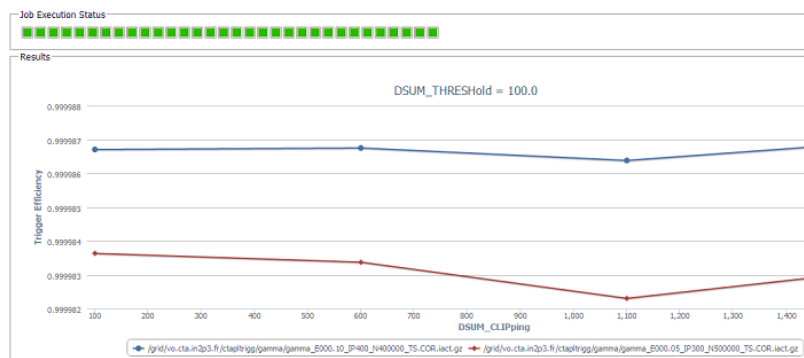
Additional status JSAGA:RUNNING_POST_STAGING

Live log <http://chemportal.grid.cyfronet.pl:8080/livelogging/view.php?id=1364311581220-job1>

LFC location /grid/vo.cta.in2p3.fr/insilicolab-test/c.PL_o.GRID_o.Cyfronet_cn.Joanna_Kocot_-_PL-Grid/experiments/experiment-1364311581220/job-01

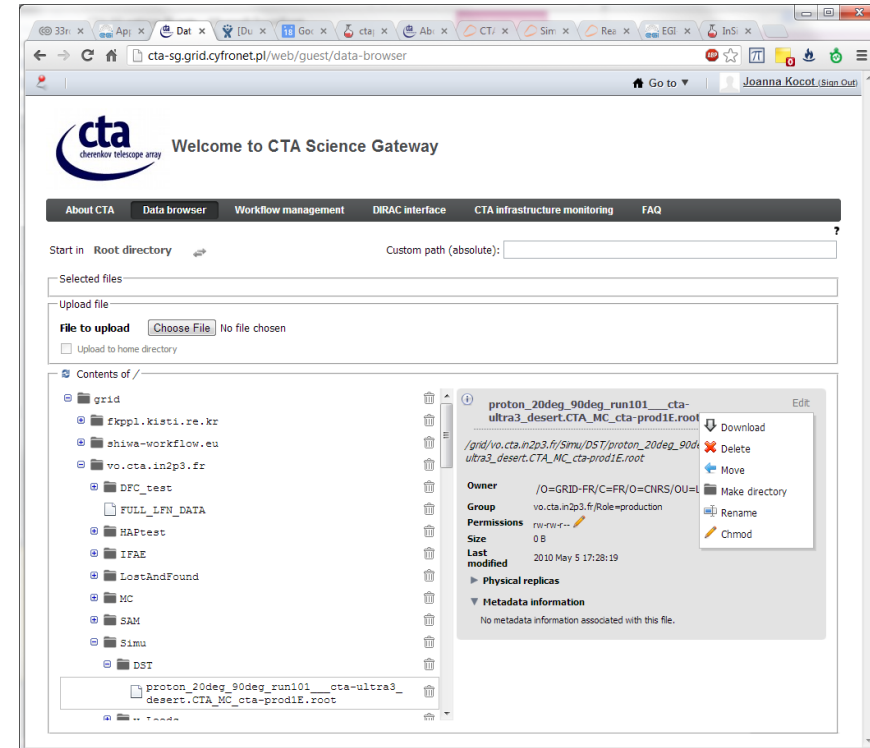
Download job files

- background_rate.txt
- effective_area.dat
- error.txt
- output.txt
- parsed_data.xml
- sim_tel.dat
- sim_telarray.out
- simtel.hdata



Accessing CTA Simulations Data

- Embedded LFC browser
 - Enables browsing through all the data gathered by vo.cta.in2p3.fr (the CTA Virtual Organisation)
 - Enables upload, download and modification of the existing files
 - Enables file permission control
 - In progress: searching through the data gathered in LFC
- Planned: access to other storage implementations



Integration with DIRAC

- DIRAC is used in the consortium for running massive computations producing simulation data
 - The data produced are described with metadata enabling search through DIRAC
- DIRAC metadata integration
 - The results of metadata search run through the DIRAC interface can be imported to the CTA-SG
 - Direct search – to be implemented in the nearest future (waiting for DIRAC team to provide API)



Integration with DIRAC

- The simulations run through the CTA-SG can be executed either with JSAGA (gLite) or DIRAC
 - In the latter case, the jobs and their data can be accessed also through the DIRAC interface
 - The use of middleware is transparent to the user

Job Execution Status

	P1	P2	Input File
Job 01: FINISHED	63.0	4.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 02: FINISHED	63.0	8.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 03: FINISHED	63.0	12.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 04: FINISHED	63.0	16.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 05: FINISHED	63.0	20.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 06: FINISHED	63.0	24.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 07: FINISHED	84.0	4.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 08: FINISHED	84.0	8.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 09: FINISHED	84.0	12.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz
Job 10: FINISHED	84.0	16.0	gamma_E050.00_IP900_N3000_TS.COR.iact.gz

Parameters legend

- Show / hide all
- P1 DISCRIMINATOR_THRESHOLD
- P2 DISCRIMINATOR_GATE_LENGTH

Index 19

Job ID 465247

Status finished

Additional status Execution Complete

Live log <http://chemportal.grid.cyfronet.pl:8080/livelog?id=1360684868375-job19>

LFC location /grid/vo.cta.in2p3.fr/insilicolab-test/c.PL_o.Cyfronet_cn.Joanna.Kocot_-_PL-Grid/experiments/1360684868375/job-19

Download job files

cta Welcome to CTA Science Gateway (prototype)

Workflow management Data browser Job monitoring CTA infrastructure monitoring

JobID	Status	MinorStatus	ApplicationStatus	Site	JobName	LastUpdate [UTC]	LastSignOff [UTC]	SubmissionTime	Owner
304594	Done	Execution Comp...	Unknown	LOG_MSPFC #	Unknown	2012-10-19 15:20	2012-10-19 15:20	2012-10-19 15:17	ymkocot
304593	Done	Execution Comp...	Unknown	LOG_GRP #	Unknown	2012-10-19 15:21	2012-10-19 15:21	2012-10-19 15:17	ymkocot
304598	Done	Execution Comp...	Unknown	LOG_GRP #	Unknown	2012-10-19 15:05	2012-10-19 15:05	2012-10-19 15:01	ymkocot
304597	Done	Execution Comp...	Unknown	LOG_GRP #	Unknown	2012-10-19 15:05	2012-10-19 15:05	2012-10-19 15:01	ymkocot
304581	Running	Application	Unknown	LOG_RDP3-CC #	Unknown	2012-10-19 14:48	2012-10-19 14:48	2012-10-19 14:44	ymkocot
304580	Done	Execution Comp...	Unknown	LOG_UNIV-LLE #	Unknown	2012-10-19 14:47	2012-10-19 14:47	2012-10-19 14:44	ymkocot
304577	Done	Execution Comp...	Unknown	LOG_MSPFC #	Unknown	2012-10-19 14:30	2012-10-19 14:30	2012-10-19 14:25	ymkocot
304576	Done	Execution Comp...	Unknown	LOG_UNIV-LLE #	Unknown	2012-10-19 14:30	2012-10-19 14:30	2012-10-19 14:25	ymkocot
304275	Done	Execution Comp...	Unknown	LOG_MSPFC #	Unknown	2012-10-09 08:44	2012-10-09 08:44	2012-10-09 08:42	ymkocot
203535	Done	Execution Comp...	Unknown	LOG_PC.es	DIRAC_ymkocot...	2012-09-12 16:11	2012-09-12 16:11	2012-09-12 16:08	ymkocot



CTA Infrastructure Monitoring

- Based on Nagios
- Monitoring of the resources in vo.cta.in2p3.fr
- Access with X509 certificate registered in the vo.cta.in2p3.fr

The screenshot displays the Nagios monitoring interface for the CTA Science Gateway. The page title is 'Welcome to CTA Science Gateway' and the URL is 'cta-sg.grid.cyfronet.pl/web/guest/cta-infrastructure-monitoring'. The interface includes a navigation menu on the left with sections like 'General', 'Current Status', 'Reports', and 'System'. The main content area shows 'Current Network Status' and 'Service Status Details For All Hosts'. The 'Service Status Details' table lists various hosts and services, including their status, last check, duration, and attempt counts. The table shows that most services are in an 'OK' state, but one service, 'org.oidat.SambaCheck', is in a 'CRITICAL' state.

Host	Service	Status	Last Check	Duration	Attempt	Status Information
abaddon.hec.lanica.ac.uk	hr.srce.CREAMCE-CertLifetime	OK	06-18-2013 12:28:59	534 18h 9m 28s	1/2	CERT_LIFETIME OK - Certificate will expire in 79.20 days (Sep 15:13:19 2013 GMT)
apcoream1.atlas.unimib.edu.au	hr.srce.CREAMCE-CertLifetime	OK	06-18-2013 12:44:01	566 14h 24m 32s	1/2	CERT_LIFETIME OK - Certificate will expire in 35.58 days (Jul 2 00:36:07 2013 GMT)
agh3.atlas.unimib.edu.au	hr.srce.SRM2-CertLifetime	OK	06-18-2013 12:28:59	566 14h 39m 32s	1/2	CERT_LIFETIME OK - Certificate will expire in 208.74 days (Ma 04:17:44 2014 GMT)
agpate.atlas.unimib.edu.au	org.bdi.Entries	OK	06-18-2013 12:44:06	566 14h 24m 32s	1/4	OK: time=1.00s, entries=4
	org.bdi.Freshness	OK	06-18-2013 12:44:07	284 3h 20m 21s	1/4	OK: freshness=00s, entries=1
	org.gatst.SambaCheck	OK	06-18-2013 12:44:06	566 14h 24m 31s	1/4	OK - errors 0, warnings 0, info 1
	org.nagios.BDI-Check	OK	06-18-2013 12:44:07	566 14h 39m 31s	1/4	LDAP OK - 1.095 seconds response time
alex4.nipne.ro	hr.srce.CREAMCE-CertLifetime	OK	06-18-2013 12:44:01	134 19h 40m 56s	1/2	CERT_LIFETIME OK - Certificate will expire in 99.05 days (Sep 11:57:42 2013 GMT)
alibox.to.infn.it	org.nagios.gsissh-Check	OK	06-18-2013 12:44:07	204 22h 19m 28s	1/4	SSH OK - OpenSSH_5.0p1-hpn13v1 NCSA_GSSAPL_GPT_4: (protocol 2.0)
alice.grid.cyf-kr.edu.pl	org.nagios.gsissh-Check	OK	06-18-2013 12:44:07	566 14h 24m 29s	1/4	SSH OK - OpenSSH_5.0p1-hpn13v1 NCSA_GSSAPL_GPT_4: (protocol 2.0)
alice003.nipne.ro	hr.srce.SRM2-CertLifetime	OK	06-18-2013 12:29:01	134 18h 5m 13s	1/2	CERT_LIFETIME OK - Certificate will expire in 99.06 days (Sep 11:58:33 2013 GMT)
	org.bdi.Entries	OK	06-18-2013 12:44:07	114 22h 34m 40s	1/4	OK: time=0.10s, entries=5
	org.bdi.Freshness	OK	06-18-2013 12:44:07	134 20h 47m 55s	1/4	OK: freshness=20s, entries=1
	org.oidat.SambaCheck	CRITICAL	06-18-2013 12:44:07	566 14h 24m 28s	4/4	CRITICAL - errors 8, warnings 0, info 0



Compliance with Requirements:

EGI Virtual Team

- Compliance status key:
 - **[DONE]** – the requirement is fulfilled completely in the current Science Gateway instance
 - **[READY]** – the Science Gateway is able to fulfil this requirement and proves it for the current applications and tools; but, for complete fulfilment, some external (to the Gateway) services or applications are required (the Gateway will fulfil this requirements as soon as they are ready)
 - **[IN PROGRESS]** – the requirement is partly fulfilled now, work is on-going to make it fulfilled in the nearest future
 - **[FUTURE]** – the requirement is not fulfilled now, work on fulfilling it was not started, often because of the prototype nature of the Gateway at present –
 - **[EXTERNAL DEPENDENCY]** – fulfilment of the requirement depends on external (to the Gateway) factors – e.g. existence of a certain application or policy
 - **[CLARIFICATION NEEDED]** – the requirement needs further clarification



Compliance with Requirements:

EGI Virtual Team

- Capability requirements:
 - **[READY] UR-SG-0010: Capabilities** – done for the current CTA applications
 - **[READY] UR-SG-0020: Data access** – done for LFC catalogue and DIRAC metadata
 - **[EXTERNAL DEPENDENCY] UR-SG-0030: Applications access**
 - **[READY] UR-SG-0040: Data Management Monitoring Applications access** – done for monitoring of the data processing in existing applications
 - **[EXTERNAL DEPENDENCY] UR-SG-0045: Privileged Applications access**
 - **[EXTERNAL DEPENDENCY] UR-SG-0050: Documentation access**
 - **[IN PROGRESS] UR-SG-0055: Science Gateway documentation** – „About” page and FAQ available
 - **[EXTERNAL DEPENDENCY] UR-SG-0060: User support**
 - **[FUTURE] UR-SG-0065: Help-desk** – requires a support team, now only the developers team serve as a contact
 - **[FUTURE] UR-SG-0070: Community feedback** – functionality available in Liferay, presently no content available
 - **[READY] UR-SG-0080: Resource discovery service** – the applications run only on the resources to which the user has access rights (decided on VO membership basis)
 - **[READY] UR-SG-0090: Job execution service** – done for jobs executed on Grid infrastructure (two middlewares available: gLite and DIRAC)
 - **[READY] UR-SG-0095: Data for local computing** – the applications’ products may be downloaded to a local computer
 - **[READY] UR-SG-0100: Input/output transfer between applications** – for existing applications transfer is possible
 - **[IN PROGRESS] UR-SG-0110: Application workflow management** – execution of predefined workflows is possible
 - **[FUTURE] UR-SG-0150: Simultaneous users performance** – Liferay and underlying technologies enables proper setup



Compliance with Requirements:

EGI Virtual Team

- Constraint requirements:
 - **[READY] UR-SG-0200: Internet Service Providers support** – hosted in Cyfronet with very good Internet connection
 - **[FUTURE] UR-SG-0300: User devices support** – mobile support is future work
 - **[READY] UR-SG-0400: Web browser support** – supporting Firefox, Google Chrome, Safari and Internet Explorer (newer versions)
 - **[READY] UR-SG-0410: User device Operating system dependency** – independent of client OS
 - **[DONE] UR-SG-0500: Web portal** – see UR-SG-0400
 - **[DONE] UR-SG-0510: Science Gateway language**
 - **[READY] UR-SG-0600: Maintainability over 30-40 years** – the Gateway's architecture is modular and will ensure it
 - **[READY] UR-SG-0610: Existing framework use** – uses Liferay, LDAP, GWT, SAGA etc., components reuse is possible
 - **[CLARIFICATION NEEDED] UR-SG-0620: Existing standards compliance** – what kind of standards should be considered?
 - **[CLARIFICATION NEEDED] UR-SG-0630: Applications & tools software development policy**
 - **[FUTURE] UR-SG-0700: Availability>98%** - in production phase; the current Gateway instance will soon be monitored
 - **[READY] UR-SG-0800: Portability over 30-40 years** – the Gateway is built from standard technologies which are expected to be maintained in foreseeable future
 - **[FUTURE] UR-SG-0910: Supported simultaneous user profiles** – depends on access policy
 - **[EXTERNAL DEPENDENCY] UR-SG-0915: Restricted network access**
 - **[FUTURE] UR-SG-0916: Specific access rights per application** – see UR-SG-0910
 - **[EXTERNAL DEPENDENCY] UR-SG-0920: CTA data collection access rights**
 - **[EXTERNAL DEPENDENCY] UR-SG-0930: CTA access policy**
 - **[DONE] UR-SG-0940: Public access**



Comments to the VT

- Some of the requirements need further clarification (namely, UR-SG-0620 and UR-SG-0630)
- Some of the requirements apply more to the applications integrated in the Gateway than the Gateway (or SSO) itself
- Minor issues:
 - Title „Software interfaces” is inadequate to the content
 - UR-SG-0095 is missing from the short requirements table
 - UR-SG-0200 rename short name to „Response time” or equivalent



<http://cta-sg.grid.cyfronet.pl>

See also demonstrations on Youtube:

http://www.youtube.com/watch?v=VxiLaTk18eo&list=PLiGFqUuSx8UQlr7Sy48Wr6_9yjmTEWfMd