



Enabling Grids for E-science

# EGEE Operational Procedures

*(Contacts, procedures, certification)*

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*Presented by Rolf Rumler - IN2P3-CC*

*Based on a presentation held in South Africa at the  
Meraka Institute, CSIR campus, Pretoria*

[www.eu-egee.org](http://www.eu-egee.org)



Information Society  
and Media



- **Extract from SA1 Operational Procedures Manual:**

*“Staff within SA1, responsible for the daily operations of the EGEE grid, are broken up into the following areas:*

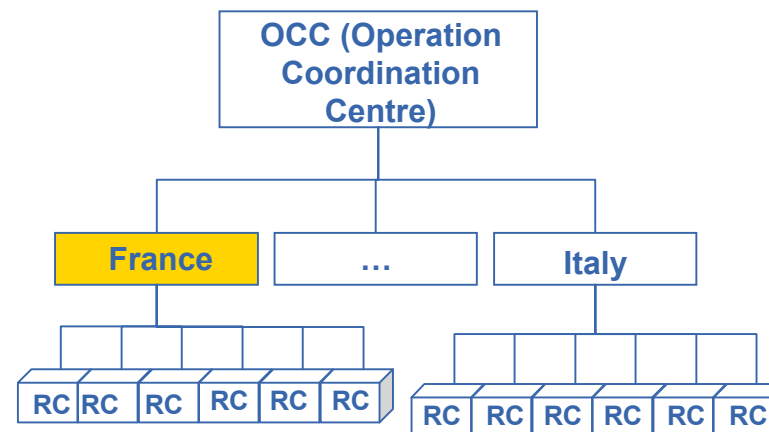
*Operations Team – COD and support tools developers  
Regional Operations Centre – ROC Managers, ROC support staff*

*Resource Centres (sites) – local support, site admins*

*The Operations team is responsible for detecting problems, coordinating the diagnosis, and monitoring the problems through to resolution. This has to be done in cooperation with the Regional Operations Centres to allow for a hierarchical approach and overall management of tasks.”*

<https://twiki.cern.ch/twiki/bin/view/EGEE/EGEEROperationalProcedures>

- **Site representative of a region/federation**
  - assistance to sites/RC in the region
  - site middleware deployment coordination
  - communication channel between project and sites
- **Regional security management**
- **Regional monitoring**
- **Incident support and follow-up**
- **Sites certification**
- **Users training**



- **Communication channel**
- **Incident support and follow-up**
- **Site creation**
- **Accounting**

- **Internal**

- Visio conferences (15 days)
  - French participants (SA1, NA4, RAG, etc.)
  - circulation of news
    - *exploitation coordination*
    - *minutes of EGEE meetings*
    - *etc.*
  - exchange area between French participants to EGEE
    - *specific topic meetings: security, certification authority, MPI, GGUS...*
- Mailing list EGEE SA1-Fr

- **External**

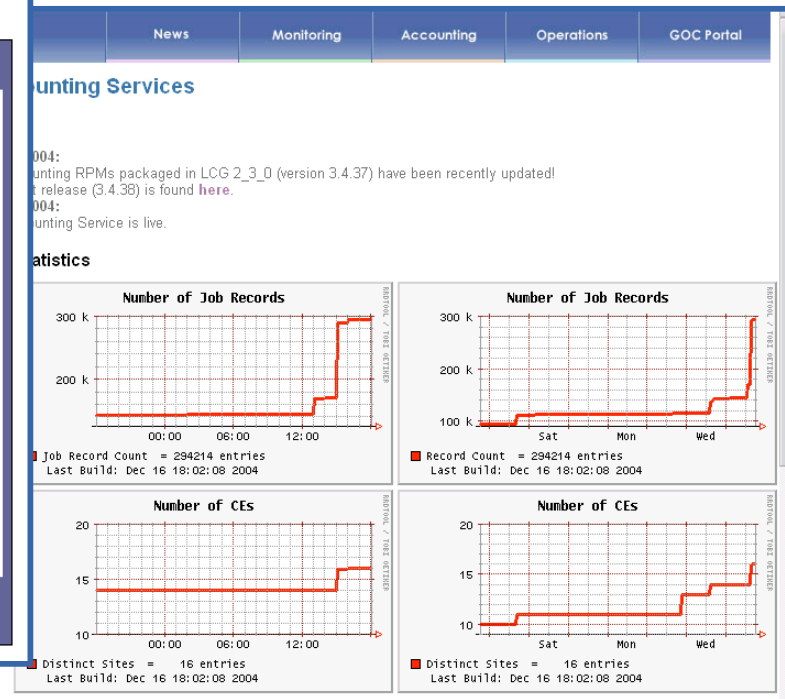
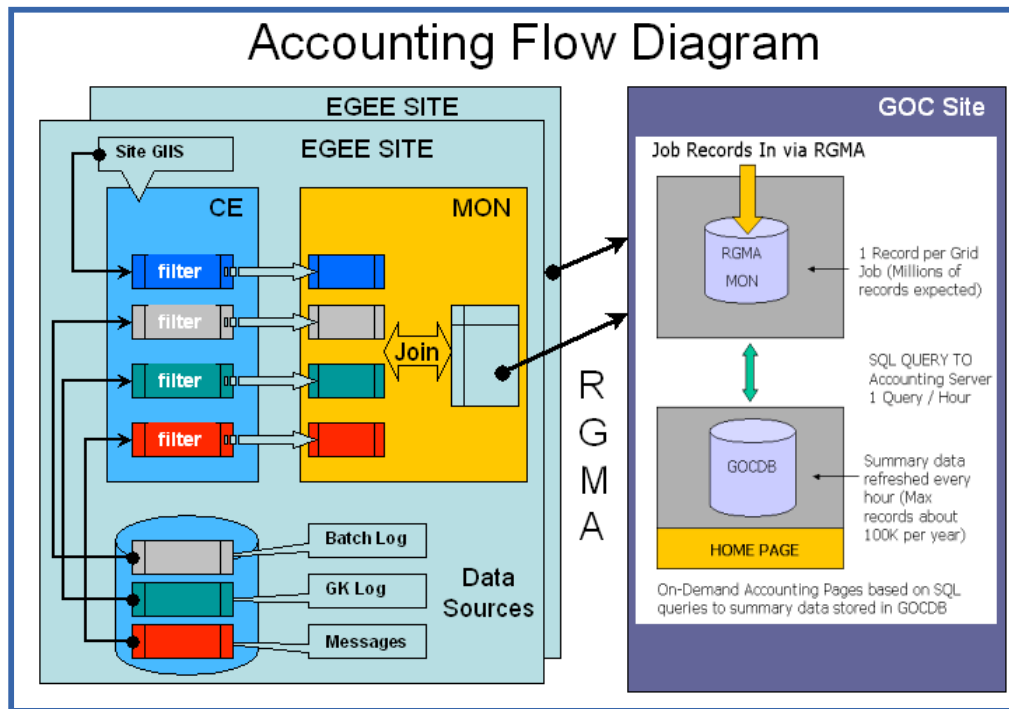
- “ROC Managers’ meeting” phone conference (15 days)
- “WLCG Weekly operation meeting” (weekly)
  - weekly report about French site status
- “All ROC managers meeting” (~ 3-4 months)

- **Support given by ROC is directly done through GGUS (Global Grid User Support) portal: <http://gus.fzk.de>**
  - ROC assigns GGUS ticket to concerned site support
  - Site support team need to be registered as “ROC support staff”
  - ROC is notified about tickets updates and can intervene when it is necessary
- **Interface between local helpdesk and GGUS is in progress**
- **Use of a specific mail address to be notified**
  - 4 people behind
  - first reader takes care of the ticket replying and/or assigning it to expert

- **Site candidate needs to contact its ROC**
- **ROC publish site candidature:**
  - creation of a new entry in the GOC DB
    - site status: “Candidate to production”
    - fact sheet to be filled by the new site
      - *site name on grid, site support and security contacts, etc.*
    - operational worksheet of site
      - *information system ldap URL of site, grid node list, “scheduled downtime” declaration, etc.*
      - ⇒ *used by grid tools: monitoring, information system, etc.*
      - ⇒ *to adapt functions of site status*
  - invitation to join SA1-Fr : visio conference, mailing list, etc.
- **Site deploys and configures the middleware,**
  - with ROC help if needed
  - can use tools provided by the project to test a site
    - **SAM Admin's Page** : <https://cic.gridops.org/index.php?section=roc&page=samadmin>
- **On site demand, ROC certifies the site**
  - use of tests framework provided by the project
    - **Service Availability Monitoring (SAM)** : <https://lcg-sam.cern.ch:8443/sam/sam.py>
  - when everything is OK, ROC pushes site in production
    - site status: “Certified for production”
- **If needed, ROC can take out of production a site changing its status in GOC DB.**

- Accounting

- [http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee\\_view.html](http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee_view.html)
- based on R-GMA (Relational Grid Monitoring Architecture)
- deployed on every RC/sites

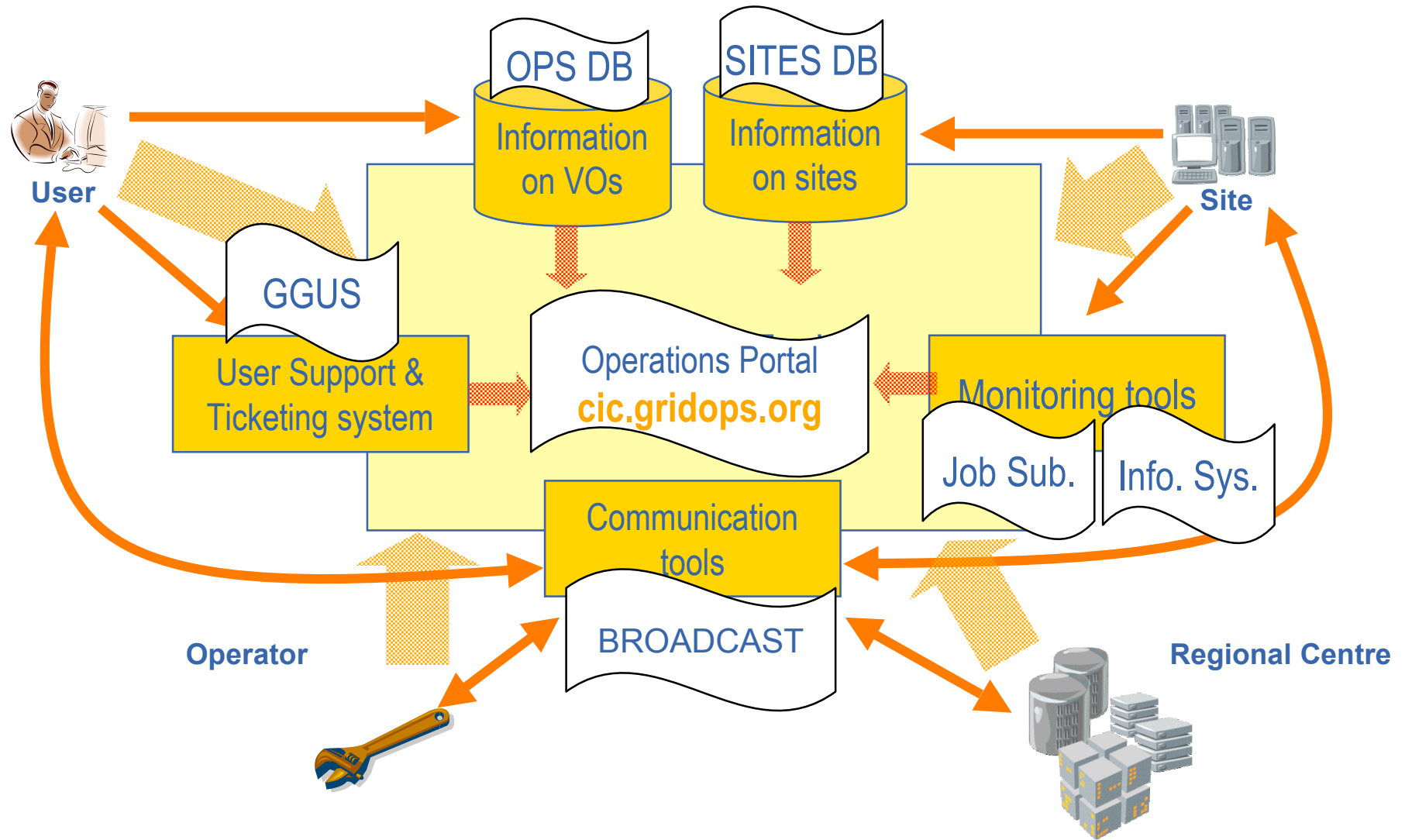


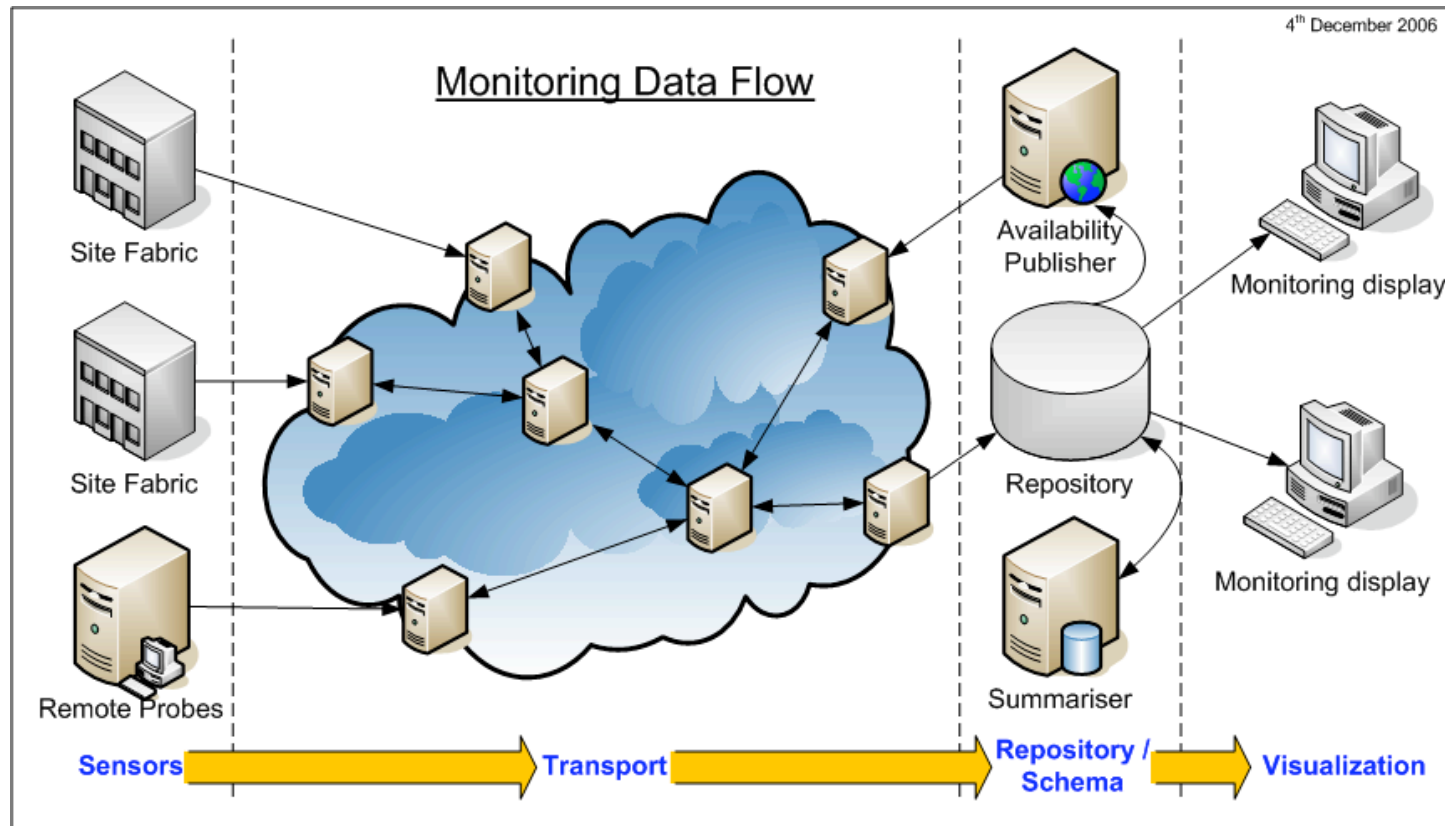


- **Source: GII monitor** (data retrieved on 29th April 2008)

ROC	Sites	Countries	Estimation Total CPU
CERN	14	8	8779
UKI	25	2	10985
Italy	36	1	7615
GermanySwitzerland	17	2	12686
France	14	1	16167
SouthEasternEurope	40	9	3782
CentralEurope	25	8	5297
NorthernEurope	28	9	4191
AsiaPacific	22	10	3490
SouthWesternEurope	20	2	2418
Russia	16	1	1657

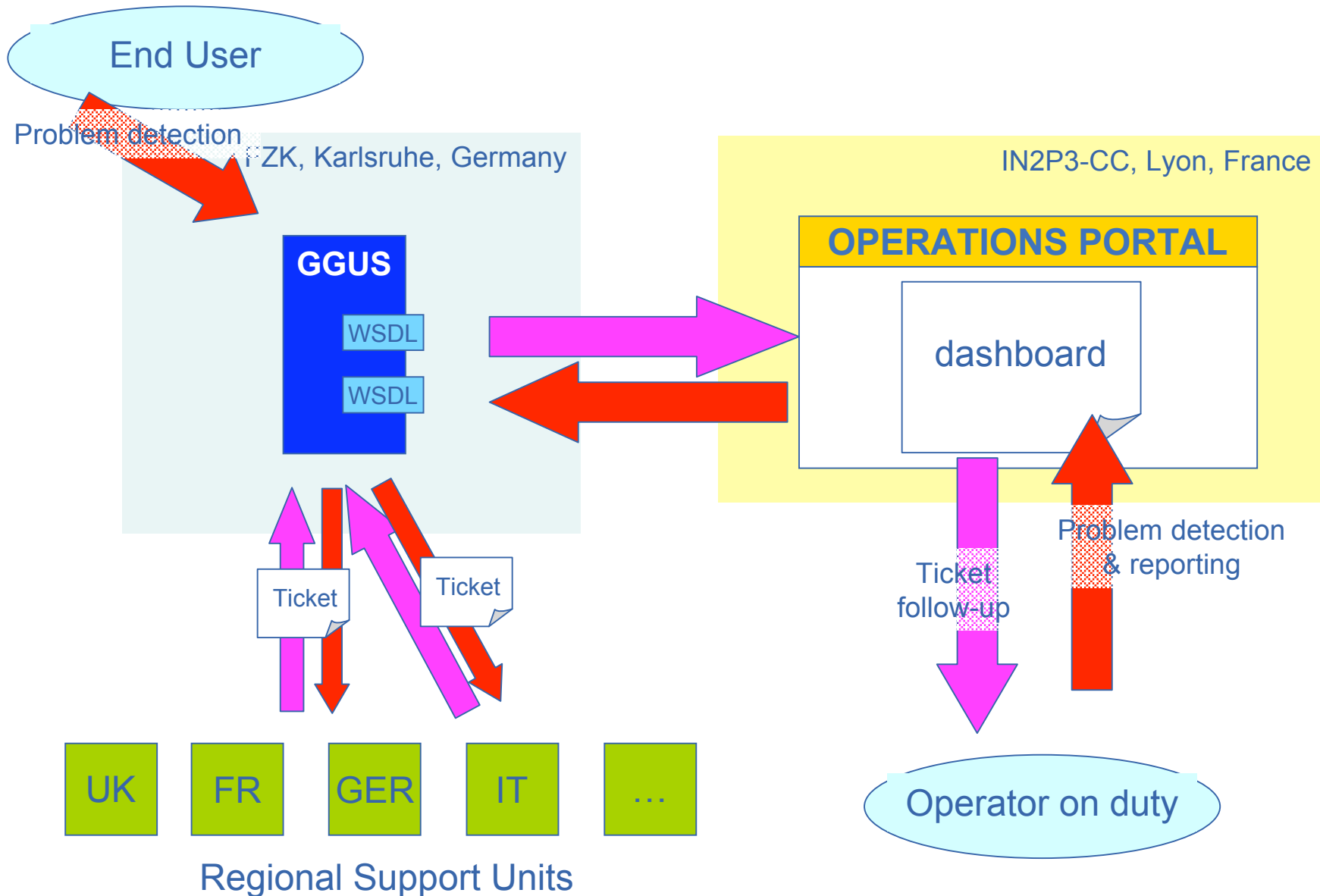
- <https://goc.gridops.org/>
- **Central repository of site information (a.k.a. Grid Operations Centre) developed and operated by Rutherford Appleton Laboratory (RAL), UK.**
- **Keep a central repository of information on the components of the grid**
  - Site registry (name, location, contact information, administrator contact, security contact, ...)
  - Site status (candidate, uncertified, production, suspended, ...)
  - History of scheduled unavailability of the site
  - Grid services operated by the site: computing elements, storage elements, file catalogue services, virtual organization management services, resource brokers, etc.
  - Services that sites want to be monitored by the grid operators  
By default, all nodes in a production site are monitored.
- **Updating this information is a shared responsibility between the site operator and the federation manager**





- **Grid operators have a global view of the status of the infrastructure**
  - Service of probes sent to every site to check it on a regular basis
  - Service for regularly testing the consistency of the dynamic information published by the site in the grid information system
  - Information on the result of those tests is available to grid operators, site managers and end-users
  - Virtual Organization managers can use this information to select a set of sites they intend to use
  - Monitoring services developed and operated by CERN, Academia Sinica (Taiwan), GridPP (UK) and INFN (Italy)
- **Sites failing the tests receive a problem ticket**
  - Escalation procedure for solving site-related problems
  - Involves the regional operator and the site operator

- <https://gus.fzk.de/>
- **Central incident tracking tool developed/operated by Forschungszentrum Karlsruhe (DE)**
  - Unique channel for opening tickets (e-mail and web interface)
    - End-users : e.g. job submission failures, data transfer failed
    - Operators : e.g. job submission failures
  - Classification and 1<sup>st</sup> assignment done by the Ticket Process Manager (TPM)
  - Tickets are assigned to support units - one per domain of expertise
    - Grid operators, applications, federations, m/w experts, ...



- <http://cic.gridops.org/>
- **Developed and operated by CC-IN2P3, failover instance at CNAF**
- **Web portal for integrating all the tools and sources of operations-related information into one single place**
  - Provides and maintains an integrated operations dashboard for grid on duty operator
  - Provides mechanisms for keeping information needed for appropriate hand over between operators on duty
  - Easy access to appropriate contact information on every actor involved in the operations of the grid
  - Provides communication tools



<https://cic.gridops.org/index.php?section=cod&page=coddashboard>

Enabling Grids for E-scienceE

Identified with the following certificate : /D=GRID-FR/C=FR/O=CNRS/OU=CC-LYON/CN=David Bouvet  
 You have been recognized as : Site Administrator, Deputy Regional Manager, CIC ONDUTY.

[Home](#) [VO](#) [RC](#) [ROC](#) [COD](#)

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- Downtime Procedure
- CIC Portal Documentation

**CIC Tools**

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- Resource Comparator
- Resources distribution
- VO information

**External Tools**

- Enoc Network Operation

**Communication**

- Broadcast Information
- Broadcast Retrieval
- Downtime Notification

**Links**

- PPS Information

**Hello David!**  
 You are on duty this week as **Lead Team**

User: David Bouvet  
 Identified as COD team for France

On Duty this week:  
 Lead team: France - Backup team: NDGF-Tier-1

[Home](#) [Tickets](#) [Alarms](#) [SD](#) [SAMAP](#) [Other Tools](#) [Handover](#) [IRC Chat](#) [Doc](#) [Preferences](#)

**New alarms (Lead team regions only)**

Today is 29/04/2008, it is 14:21 UTC  
 Currently 19 New alarms

⚠️ **MAINT** - Node or site is currently in Downtime  
 ⚠️ **INREG** - Node is not registered in the GOC-DB, or has monitoring switched off

ID	Test	Node	Network	status
<input type="checkbox"/>	146961	CE-stf-job	ce1.egee.fr.cgg.com	error
<input type="checkbox"/>	146491	LFC-host-cert-valid	rb1.egee.fr.cgg.com	error
<input type="checkbox"/>	146486	RB-host-cert-valid	rb1.egee.fr.cgg.com	error
<input type="checkbox"/>	146498	RGMA-host-cert-valid	mon1.egee.fr.cgg.com	error
<input type="checkbox"/>	146497	LFC-host-cert-valid	lfo.egee.fr.cgg.com	error
<input type="checkbox"/>	146990	CE-stf-lcg-rm	gridoe.ilo.cnr.it	ok
<input type="checkbox"/>	147053	CE-stf-lcg-rm	sbgoe1.in2p3.fr	error
<input type="checkbox"/>	147037	SE-lcg-cp	pooms2.cmsfarm1.ba.infn.it	error
<input type="checkbox"/>	147054	CE-stf-lcg-rm	t2-ce-01.inl.infn.it	error
<input type="checkbox"/>	146966	CE-stf-job	gridoe2.pi.infn.it	error

Set status to "off"

All alarm with last test status =

**Top of page**

**Open GGUS tickets (Lead team regions only)**

View ticket id:

List updated on Tue, 29 Apr 2008 16:20:11 CEST

ID	Node	Alarm	test status	Gstat	Last escalation	Expires on
7916	beagle14.ba.itb.cnr.it	143914	maint	OFF	Solved by ROC	2008-04-30
7893	fusce.frascati.enea.it	143195	maint	OK	1st mail to site admins	2008-04-30
7873	grid001.fi.infn.it	141854	maint	MAINT	Quarantine	2008-04-30
7808	grid-mon.physik.rwth-aachen.de	137848	ok	WARN	Quarantine	2008-04-30
7798	dpm.grid.hku.hk	136937	error	NOTE	Quarantine	2008-04-30
6062	armgrid3.yerphi.am	70567	error	OK	Case transferred to political instances	2008-04-30
7933	hephygr.oeaw.ac.at	145582	ok	OK	1st mail to site admins	2008-05-01
7932	grid-ce.lns.infn.it	144723	error	OK	Solved by ROC	2008-05-01
7931	diana.zwitech.ch	145271	ok	ERROR	Solved by ROC	2008-05-01
7930	lcg002.ihep.ac.cn	145407	ok	INFO	Solved by ROC	2008-05-01
7929	wormhole.westgrid.ca	145210	ok	ERROR	Solved by ROC	2008-05-01
7928	grid-se.lns.infn.it	144706	ok	OK	Solved by ROC	2008-05-01
7926	gridbdl1.pi.infn.it	143876	warn	ERROR	1st mail to site admins	2008-05-01
7925	grid01.ge.infn.it	143757	error	OK	1st mail to site admins	2008-05-01
7924	io-kit.logoe.rz.uni-karlsruhe.de	143415	ok	ERROR	Solved by ROC	2008-05-01
7923	lfo.sdfarm.kr	145212	error	ERROR	1st mail to site admins	2008-05-01
7922	testbed002.phys.sinica.edu.tw	145517	ok	INFO	1st mail to site admins	2008-05-01
7921	atlasse01.ihep.ac.cn	142230	error	INFO	1st mail to site admins	2008-05-01
7673	grid-srm.physik.rwth-aachen.de	132640	error	WARN	2nd mail to site admins	2008-05-01
7948	egoeaix.frascati.enea.it	146170	ok	OK	1st mail to site admins	2008-05-02
7947	log-se.rcf.uvic.ca	145891	error	OK	1st mail to site admins	2008-05-02
7946	grid002.ca.infn.it	145965	maint	MAINT	1st mail to site admins	2008-05-02
7945	logoe.ijs.si	145727	ok	OK	Solved by ROC	2008-05-02
7944	bdiisrv.gridcenter.or.kr	145866	error	ERROR	1st mail to site admins	2008-05-02
7892	lfo-hcb-ro.cfnaf.infn.it	143077	error	OK	1st mail to site admins	2008-05-02
7834	gridoe.sns.it	140048	ok	OK	Unsolvable	2008-05-02

https://cic.gridops.org/index.php?section=cod&page=coddashboard&subpage=monitoring&viewalarm=147037

**EGEE** Enabling Grids for E-science

**CIC OPERATIONS PORTAL**

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Identified as: User: David Bouvet, On Duty this week: Lead team: France - Backup team: ND@F-Tier-1  
 Identified as COD team for France

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**Alarm #147037**

**Alarm details**

Impacted node	pccms2.cmsfarm1.ba.infn.it
Belongs to site	INFN-BARI
Test that failed	SE-Icg-cp
Tested for VO	OPS
Tested on	14:04:05 (UTC)
Current test status	error
Alarm status	new
Alarm last updated on	14:04:18 (UTC)

**Alarm history**

Modification time (UTC)	Alarm Status	Parent Alarm
2008-04-29 14:04	new	

**Actions**

Set alarm status to "off"

Mask this alarm by alarm:

**Related information**

**Related alarms**

ID	Test	Alarm Status	Test status	link
----	------	--------------	-------------	------

**Tickets already opened for INFN-BARI**

ID	GGUS ID	Node	Type of problem	Last escalation	Expires on	Priority
----	---------	------	-----------------	-----------------	------------	----------

**Notes about INFN-BARI** (Last modified on 08/04/2008 00:00)

```
They publish a CREAM CE with the tcp port 8443. GIS expect port 2119 and gives a syntax error even the value is correct for cream.
```

**Gstat status for INFN-BARI:**  
OK

**Network problems for node and site**  
 Node status (pccms2.cmsfarm1.ba.infn.it): no problem reported  
 Site status (INFN-BARI): no problem reported  
[View history](#)  
[View network status of all nodes on this site](#)

**Create GGUS ticket and contact INFN-BARI (SE problem on pccms2.cmsfarm1.ba.infn.it)**

Subject: SE follows pccms2.cmsfarm1.ba.infn.it (INFN-BARI) ... GGUS ticket number will automatically be added.

https://cic.gridops.org/index.php?section=cod&page=coddashboard&subpage=downtimes

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**Scheduled downtimes (Lead team regions only)**

View GOC downtimes page [on the GOC portal](#)

**Following sites are currently in scheduled maintenance:**

*Note : in grey are infinite downtimes, or scheduled downtimes that could be bad declared (with a weird duration)*

At Site level (all site in SD) :

Site	start date	end date	description
AMD64.PSNC.PL	12/03/2008 10:09	12/03/2009 10:09	This is going to be shut down and replaced with PSNC.
AUVERGRID	29/04/2008 14:50	29/04/2008 17:50	Network Maintenance on Auvergrid Site
egee.grid.niif.hu	25/04/2008 08:00	06/05/2008 12:00	WN upgrade to 3.1.
egee.man.poznan.pl	07/04/2008 09:05	08/04/2009 15:00	This site is going to be shut down and replaced by PSNC.
FMPH-UNIBA	01/04/2008 03:01	01/05/2008 12:00	Still experiencing problems with configuration
INFN-CAGLIARI	29/04/2008 11:41	07/05/2008 11:41	Site close
INFN-FERRARA	24/04/2008 07:23	05/05/2008 15:23	maintenance
INFN-FIRENZE	28/04/2008 23:03	15/06/2008 23:03	Site support temporary unavailable
INFN-NAPOLI-CMS	25/03/2008 11:01	07/05/2008 11:01	farm upgrade
INFN-PERUGIA	24/04/2008 17:00	02/05/2008 17:00	Farm software upgrades
ITB-BARI	28/04/2008 09:27	05/05/2008 09:27	maintenance cooling system
SPACI-CS-IA64	29/04/2008 12:14	05/05/2008 12:14	site unattended
SPACI-NAPOLI	07/04/2008 18:00	06/05/2008 18:00	Power interruption for extraordinary maintenance
Taiwan-PPS	28/04/2008 08:00	30/04/2008 08:00	This downtime is just for GStat test purpose
TW-THU-HPC	17/04/2008 15:06	30/04/2008 15:06	need time to solve firewall issue

At node level (only one node in SD) :

Site	Node	start date	end date	description
DESY-ZN	globe-ce1.ihf.de	14/01/2008 10:13	01/01/2011 00:00	This is just a test CE!
IBCP-GBIO	grive12.ibcp.fr	02/04/2008 14:16	10/05/2008 12:00	SRM failure
egee.man.poznan.pl	ce.egee.man.poznan.pl	08/04/2008 13:55	01/03/2009 11:55	This site is going to be shut down and replaced by PSNC site.
HEPHY-UIBK	test-gliteCE.uibk.ac.at	08/04/2008 14:00	07/05/2008 13:00	Testbed
HEPHY-UIBK	test-icgCE.uibk.ac.at	08/04/2008 14:00	07/05/2008 13:00	Testbed
HEPHY-UIBK	test-dpm.uibk.ac.at	08/04/2008 14:00	07/05/2008 13:00	Testbed
CERN-PROD	ce112.cern.ch	17/04/2008 11:26	10/05/2008 11:26	draining for hardware replacement

## Service Availability Monitoring - gRB

rb118.cern.ch - CERN-PROD (CERN)

2007/06/20 - 04:58:01

Tests Displayed

ops

gRB-host-cert-valid

show ops critical tests

Display limit (days):

ShowHistory

show	stat	description	sum
<input checked="" type="checkbox"/>	NA	no status available	0
<input checked="" type="checkbox"/>	OK	normal status	100
<input checked="" type="checkbox"/>	INFO	useful information	0
<input checked="" type="checkbox"/>	NOTE	important information	0
<input checked="" type="checkbox"/>	WARN	subject may fail soon	0
<input checked="" type="checkbox"/>	ERROR	subject has failed and problem is localized	1
<input checked="" type="checkbox"/>	CRIT	subject has failed and problem is fatal	0
<input checked="" type="checkbox"/>	MAINT	subject is under maintenance	0

No	Timestamp (submission time)	Status	ops
			cert
1	20-Jun-2007 04:14:13	OK	<a href="#">ok</a>
2	20-Jun-2007 03:11:53	OK	<a href="#">ok</a>
3	20-Jun-2007 02:18:42	OK	<a href="#">ok</a>
4	20-Jun-2007 01:19:07	OK	<a href="#">ok</a>
5	20-Jun-2007 00:23:30	OK	<a href="#">ok</a>
6	19-Jun-2007 23:20:50	ERROR	<a href="#">error</a>

testname	desc	ops tests
cert	<a href="#">Test if the service host certificate is valid.</a>	CT

[Home](#)

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SAM test: gRB-host-cert-valid  
 Submitter VO: ops  
 Node: rb118.cern.ch  
 Execution time: 19-Jun-2007 23:20:50

Current time: Tue, 19 Jun 2007 23:19:50 +0000

Checking rb118.cern.ch (128.142.173.154/2811) using GSIFTP protocol  
 Timeout after 60 seconds

Contact: SAM Support Mailing List ([sam-support@cern.ch](mailto:sam-support@cern.ch))

Last modified: May 24 2007, 16:28

[Download](#)  
**VOMS server certificate DIT**  
 /O=GRID-FR/C=FR/O=CNRS/OU=CC-LYON/CN=cclgvomsli01.in2p3.fr/O=GRID-FR/C=FR/O=CNRS/OU=CC-LYON/CN=cclgvomsli01.in2p3.fr  
**This certificate expires on:** 15/02/2009 09:42

**VOMS Groups and Roles ?**

Group/role	Description	Is this group used for configuration
/biomed/Role=VO-Admin	administrator	yes
/biomed/bioinformatics	gene sequences analysis related applications	yes
/biomed/drug_discovery	in silico drug discovery related applications	yes
/biomed/tcg1	default group	yes
/biomed/medical_imaging	medical image processing related applications	yes

**CONTACTS**

**Generic contacts**

Generic contact for VO admins	egee-biomed-vo-manager@healthgrid.org	?
Operational contact		?
Contact for User Support	biomed-grid-support@cern.ch	?
Mailing list for VO Users	project-eu-egee-na4-biomed-applications@cern.ch	?

**Managers, Deputies and Experts list ?**

Last name	First name	E-mail	Profile	Role/comments
Legre	Yannick	legre@clermont.in2p3.fr	VO MANAGER	
Blanchet	Christophe	Christophe.Blanchet@lbcf.fr	VO EXPERT	
Montagnat	Johan	johan@3s.unice.fr	VO EXPERT	

**RESOURCES AND OTHER INFORMATIONS**

Number of Users	135	?
Job CPU limit	min/1000S12K	?
Job Wall Clock Time Limit	mn	?
Job Scratch Space (GB)	GB	?
Per-SE Storage Space (GB)	GB	?
RAM per CPU core (MB)	MB	?
Minimum number of job slots needed		?

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CIC OPERATIONS PORTAL

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- Contact us - Feedback
- Getting started with Grid

Procedures / Documentation

- Downtime Procedure
- Security Issues
- Site Procedure
- CIC Portal Documentation

CIC Tools

- Daily Report Archive
- Pre Report
- Regional Dashboard
- Resource Comparator
- Resources Distribution
- User Tracking
- VO supported

External Tools

- Bazaar Homepage
- Enoc Network Operation
- Freedom of choice FCR
- SAM Admin Page
- Yaim Configurator

Communication

- Alarm Notification
- Broadcast Information**
- Broadcast Retrieval
- Downtime Notification

Links

- Find a User Support
- PPS Information

## EGEE BROADCAST

PLEASE, DON'T USE ANY MORE THE EGEE BROADCAST FOR DOWNTIME ANNOUNCEMENTS.  
 General details on the new downtime procedure are available Here

Sender Information : RC MANAGER / ADMINISTRATOR

Name:

e-mail address:

Name of your site:

BROADCASTING INFORMATION

News publication in all CIC portal views:  NO  YES

Add the broadcast in the public archive:  NO  YES

TARGET(s) :	DATA TO PUBLISH	RECIPIENT(s)		
<input type="checkbox"/> WLCG Tier-1 contacts <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>	<p style="font-size: 10px;">Send me a confirmation <input checked="" type="checkbox"/></p> <p style="font-size: 10px;">Cc*: <input style="width: 150px;" type="text"/></p> <p style="font-size: 10px;">Bcc*: <input style="width: 150px;" type="text"/></p> <p style="font-size: 10px; color: red;">* Warning : if you use the Cc/Bcc field you should separate each user with a comma</p> <p style="font-size: 10px;">News title / mail subject: <input style="width: 150px;" type="text"/></p> <div style="border: 1px solid black; height: 100px; width: 100%; margin-top: 5px;"></div> <p style="font-size: 10px;">News contents / mail body "":</p>			
<input type="checkbox"/> CIC-on-duty mailing list <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>		<p style="font-size: 10px;">To ROC Managers</p> <p><input type="checkbox"/> <input type="button" value="Customize your Request"/> ALL</p> <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>		
<input type="checkbox"/> OSG (Open Science Grid) <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>			<p style="font-size: 10px;">To VO managers</p> <p><input type="checkbox"/> <input type="button" value="Customize your Request"/> ALL</p> <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>	
<input type="checkbox"/> To ROC Managers <input type="checkbox"/> <input type="button" value="Customize your Request"/> ALL <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>				
<input type="checkbox"/> To VO Users <input type="checkbox"/> <input type="button" value="Customize your Request"/> ALL <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>	<p style="text-align: center; font-size: 12px;"> <input type="button" value="RESET"/> <input type="button" value="Publish and send"/> </p> <p style="font-size: 10px; color: red;">** Be careful the size of mail is limited to 3900 characters</p>			
<input type="checkbox"/> To Production Site Admin <input type="checkbox"/> <input type="button" value="Customize your Request"/> ALL <span style="font-size: 10px; font-weight: bold;">[RSS Feed]</span>				

- **COD operators**
  - weekly rota on ROC to give an operator team (CIC On Duty)
- **User support : GGUS**
  - <https://gus.fzk.de/pages/home.php>
- **Monitoring tools:**
  - CIC portal
    - <http://cic.gridops.org/>
      - *entry point to the other tools*
      - *integrated view for COD operator use*
  - Service Availability Monitoring (SAM)
    - <https://lcg-sam.cern.ch:8443/sam/sam.py>
  - Grid Operations Centre Core Database (GOCDB)
    - <https://goc.gridops.org/>
  - GUIS monitor (Gstat)
    - <http://goc.grid.sinica.edu.tw/gstat>
  - GOC monitoring tools
    - [http://www.gridpp.ac.uk/wiki/Links\\_Monitoring\\_pages](http://www.gridpp.ac.uk/wiki/Links_Monitoring_pages)
  - GOC job real time monitor
    - <http://gridportal.hep.ph.ic.ac.uk/rtm/>
- **Accounting**
  - [http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee\\_view.html](http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee_view.html)

