



Enabling Grids for E-scienceE

WMSMonitor: a tool to monitor gLite WMS/LB cluster status and job workflow

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- **Workload Management System (WMS) and Logging and Bookkeeping (LB) Service have a complex internal structure and knowing their status, who and how is using them is challenging**
- **A site can run many WMS/LB instances**
- **At the same time WMS/LB services are an interesting source of information about Job Lifecycle and resource usage by the VOs**
- **The middleware is not currently providing any monitoring facilities**



Importance of having an efficient monitoring system aggregating information from internal components and from various instances

- **WMS/LB administrators to check the cluster status, who is using it and how**
- **WMS developers and advanced users to benchmark the service performance and test its scalability**
- **Resource Center managers that need per-VO aggregated statistics on usage and service availability**
- **VO managers to obtain aggregated job statistics, e.g. to cross check their monitoring systems**



[WMS view](#) [VO view](#) [Documentation](#) [Credits](#)

WMSMonitor Main >> WMS view >> Overview::all

Select WMSs

	DATE	RUNNING JOBS	IDLE JOBS	WM QUEUE	JC QUEUE	VO VIEWS	LB EVENTS QUEUE	CPU LOAD	SANDBOX PARTITION	GENERAL STATUS	DAEMONS STATUS
wms001.cnaf.infn.it	2008-09-11 15:40:01	4	21	0	0	5838	12	0.95	8	✓	✓
wms002.cnaf.infn.it	2008-09-11 15:40:02	393	170	6	0	5839	0	1.14	29	✓	✓
wms004.cnaf.infn.it	2008-09-11 15:45:01	69	35	0	0	5822	0	0.73	4	✓	✓
wms006.cnaf.infn.it	2008-09-11 15:45:02	3	0	0	0	6001	0	0.23	10	✓	✓
wms009.cnaf.infn.it	2008-09-11 15:45:02	261	101	136	0	5839	19	1.5	81	⚠	✓
wms011.cnaf.infn.it	2008-09-11 15:45:02	400	3	0	0	5839	12	1.44	25	✓	✓
wms012.cnaf.infn.it	2008-09-11 15:40:02	113	22	1	0	5839	0	0.58	18	✓	✓
wms014.cnaf.infn.it	2008-09-11 15:40:02	103	22	0	0	5839	0	1.09	23	✓	✓
wms015.cnaf.infn.it	2008-09-11 15:40:02	669	222	1	0	5839	2	0.95	16	✓	✓
wms016.cnaf.infn.it	2008-09-11 15:40:02	164	1409	26	0	5839	0	0.52	10	✓	✗
wms017.cnaf.infn.it	2008-09-11 15:40:02	142	111	0	0	5839	12	0.59	22	✓	✓
egee-rb-02.cnaf.infn.it	2008-09-11 15:40:02	1566	1225	1409	0	5839	4	1.16	18	✗	✓
egee-rb-04.cnaf.infn.it	2008-09-11 18:45:01	109	365	1	0	5902	0	0.55	10	✓	✓
egee-wms-01.cnaf.infn.it	2008-09-11 18:45:01	3	2	0	0	5877	0	0.5	12	✓	✓
glite-rb-00.cnaf.infn.it	2008-09-11 18:45:01	73	0	0	0	5902	0	1.89	34	✓	✓
cert-rb-01.cnaf.infn.it	2008-09-11 18:40:01	0	0	0	0	410	0	0.07	5	✓	✓
egee-rb-05.cnaf.infn.it	2008-09-11 18:45:01	3	27	1	0	5849	0	4.19	51	✓	✓

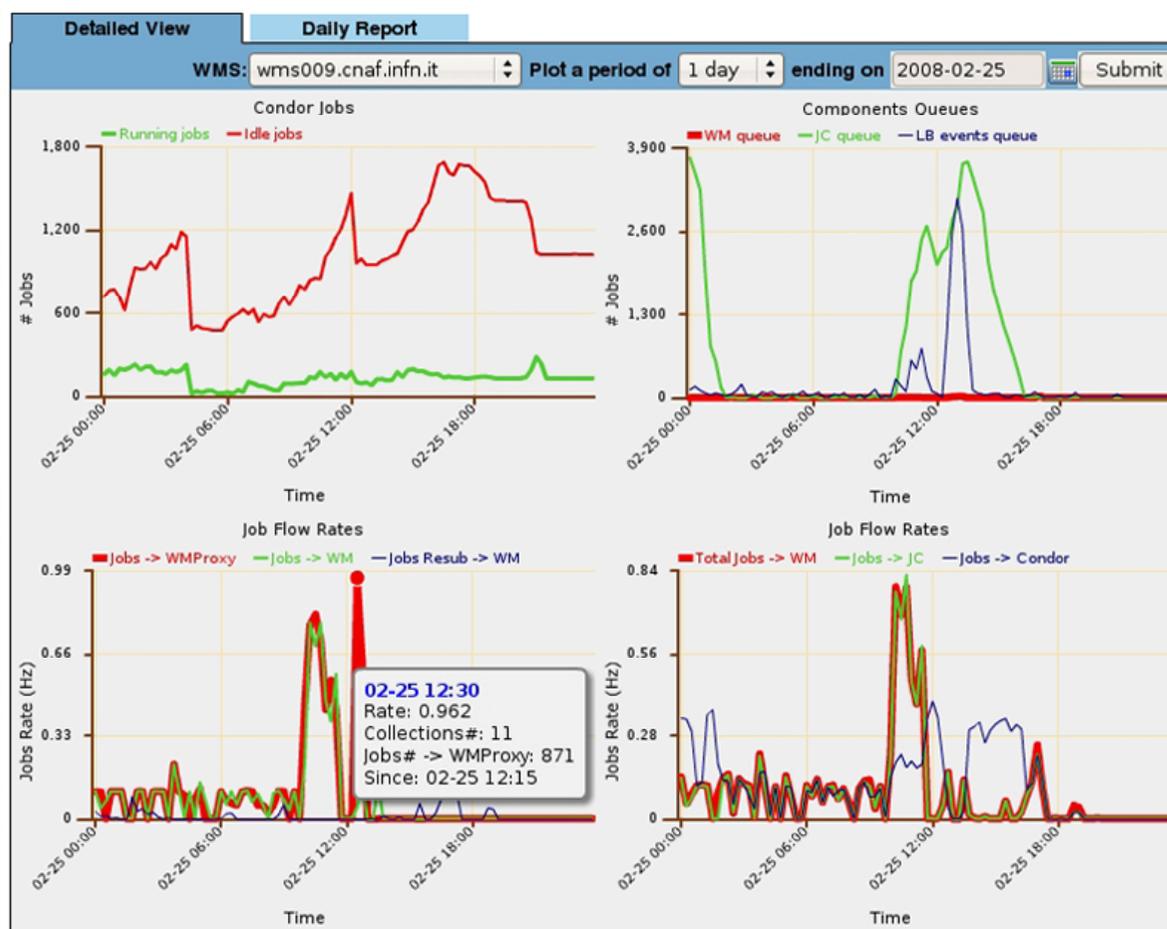


General Info at 2008-04-11 11:15:24		Lemon		Info from LB albalonga.cnaf.infn.it		Lemon	
WMS HW Status		Job Stats (Condor)		LB status			
Sandbox partition	81%	Running jobs	14	CPU load	0.21		
/tmp partition	81%	Idle jobs	651	/ partition	56%		
CPU load	0.52	Total Condor jobs	2496	LB connections	1		

- Textual boxes report latest series of acquired data

WMSMonitor Main >> Single instance >> Overview::wms009.cnaf.infn.it

Components Details	
from 2008-04-11 11:00:25 to 2008-04-11 11:15:24	
WM Proxy	✓
Jobs -> WMPProxy	1
Collections submitted	1
Mean nodes per coll.	1
Std nodes per coll.	0
Proxy Renewal	✓
Workload Manager	✓
WM file descriptors	9
WM queue	3
Jobs -> WM	2
Jobs Resub -> WM	0
VO Views	5365
Log Monitor	✓
LM file descriptors	10
Job Controller	✓
JC queue	0
JC file descriptor	4
Jobs -> JC	0
Jobs JC -> Condor	0
Local Logger	✓
LB events queue	69
LL file descriptor	5
LB Proxy	✓
Transfers	✓
gftp	1



- Top charts represent status history of Condor Jobs (left) and WMS internal components queues (right)

- Bottom charts represent history of job flow rates between components

- A CMS use case using collections and BulkMM



Instance overview

Custom charts

Documentation

Credits

WMSMonitor Main >> Single instance >> Overview::devel07.cnaf.infn.it

Component Details
from 2008-08-06 17:15:01
to 2008-08-06 17:30:01

WM Proxy ✓
Jobs -> WMProxy 1
Collections submitted 0
Mean nodes per coll. 0
Std nodes per coll. 0

Proxy Renewal ✓

Workload Manager ✓
WM file descriptors 9
WM queue 42
Jobs -> WM 1
Jobs Resub -> WM 0
VO Views 5902

Log Monitor ✓
LM file descriptors 9

Job Controller ✓
JC queue 0
JC file descriptor 4
Jobs -> JC 1
Jobs JC -> Condor 1

Local Logger ✓
LB events queue 0
LL file descriptor 4

LB Proxy ✓

Tranfers ✓
gftp 29

General Info at 2008-08-06 17:30:01 [Lemon](#)

WMS HW Status		Job Stats (Condor)	
Sandbox partition	62%	Running jobs	3
/tmp partition	62%	Idle jobs	66
CPU load	0.79	Total Condor jobs	211
/var/log partition	62%		
/var/lib/mysql partition	62%		

Info from LB devel08.cnaf.infn.it [Lemon](#)

LB status	
CPU load	0.01
/ partition	12%
LB connections	0
/var/lib/mysql partition	12%

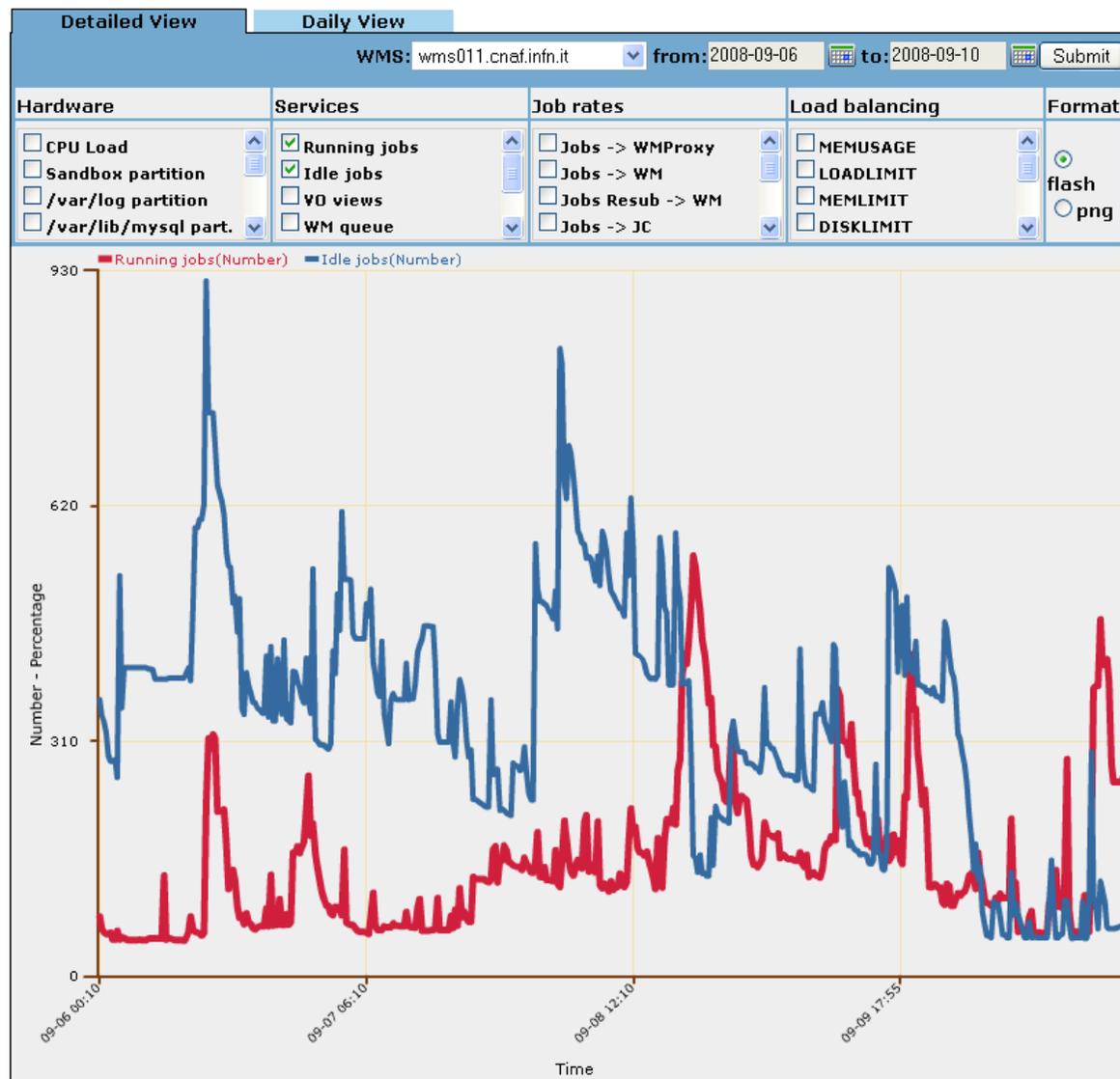


- Daily summary of Job flow through the WMS components, including:
 - Resubmission of failed jobs
 - Number of jobs in successful final state
 - Number of jobs in aborted final status.

EGEE WMS instance details/ Custom Plot

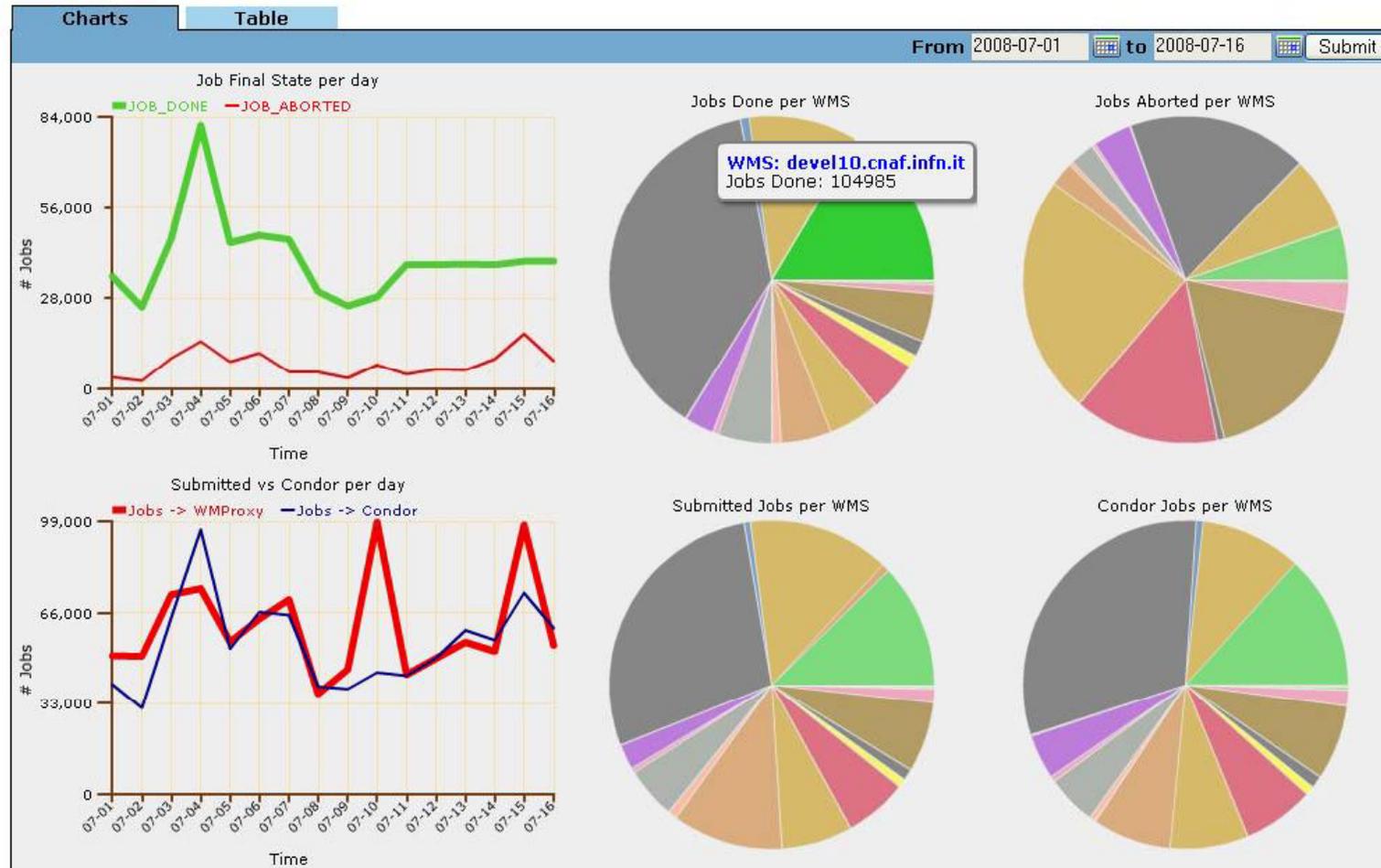
Enabling Grids for E-science

WMSMonitor Main >> WMS view >> Single instance >> Custom charts::wms011.cnaf.infn.it



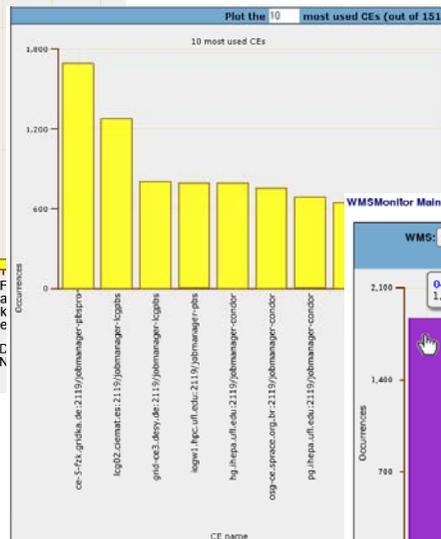
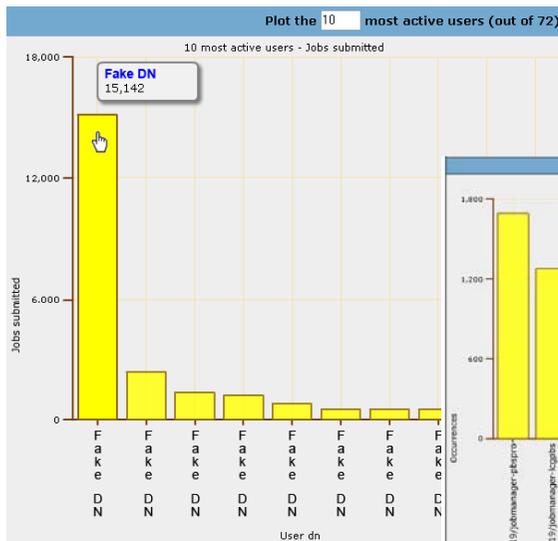
WMSMonitor Main >> Cluster >> Statistics for VO::all

Select



- Statistics on per WMS usage by a single VO (chart or tabular format). Time interval is configurable

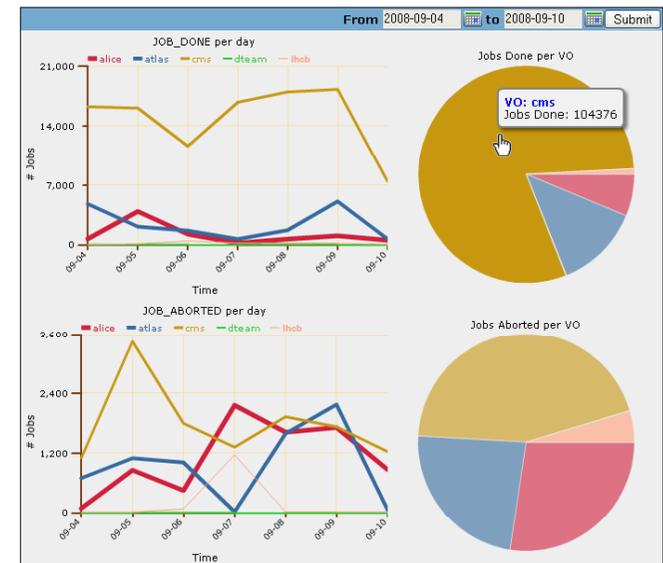
- User level statistics → Dynamical VO discover
- Resource Usage Statistics:
 - Destination CE
 - Number of matched CE per job
- DB redesign
- Distributed instances monitoring

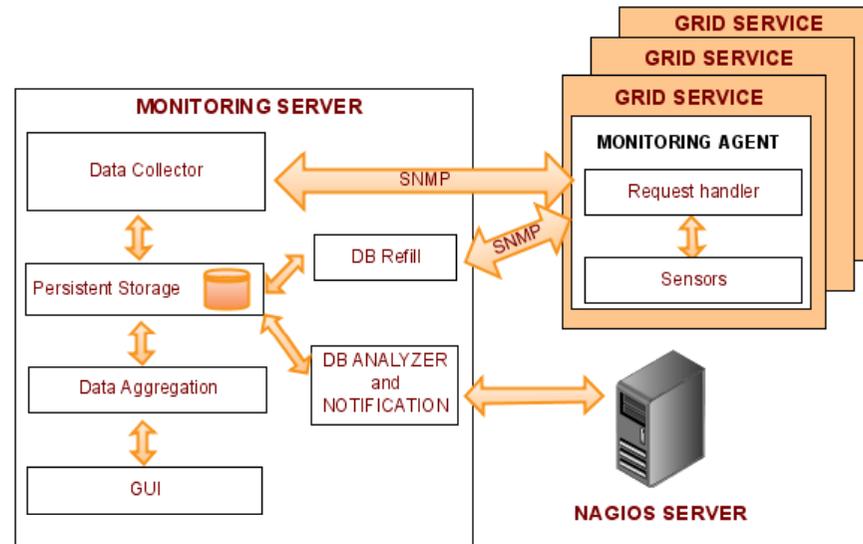


WMSMonitor Main >> Single Instance >> CE Matchmaking:wms002.cnaf.infn.it



WMSMonitor Main >> VO view >> chart for VO::all





- **SNMP based data transport**
- **MySQL backend**
- **Sensors and data collector written mostly in PYTHON**
- **Web interface developed in PHP**
- **Open Flash Chart libraries based plots**
- **Periodically sends information to a NAGIOS server which acts as a notification system**

- **CNAF Production Instance:**

<https://cert-wms-01.cnaf.infn.it:8443/wmsmon/main/main.php>

- **PADOVA/EU-INDIA Production Instance:**

<https://eu-india-01.pd.infn.it:50080/wmsmon/main/main.php>

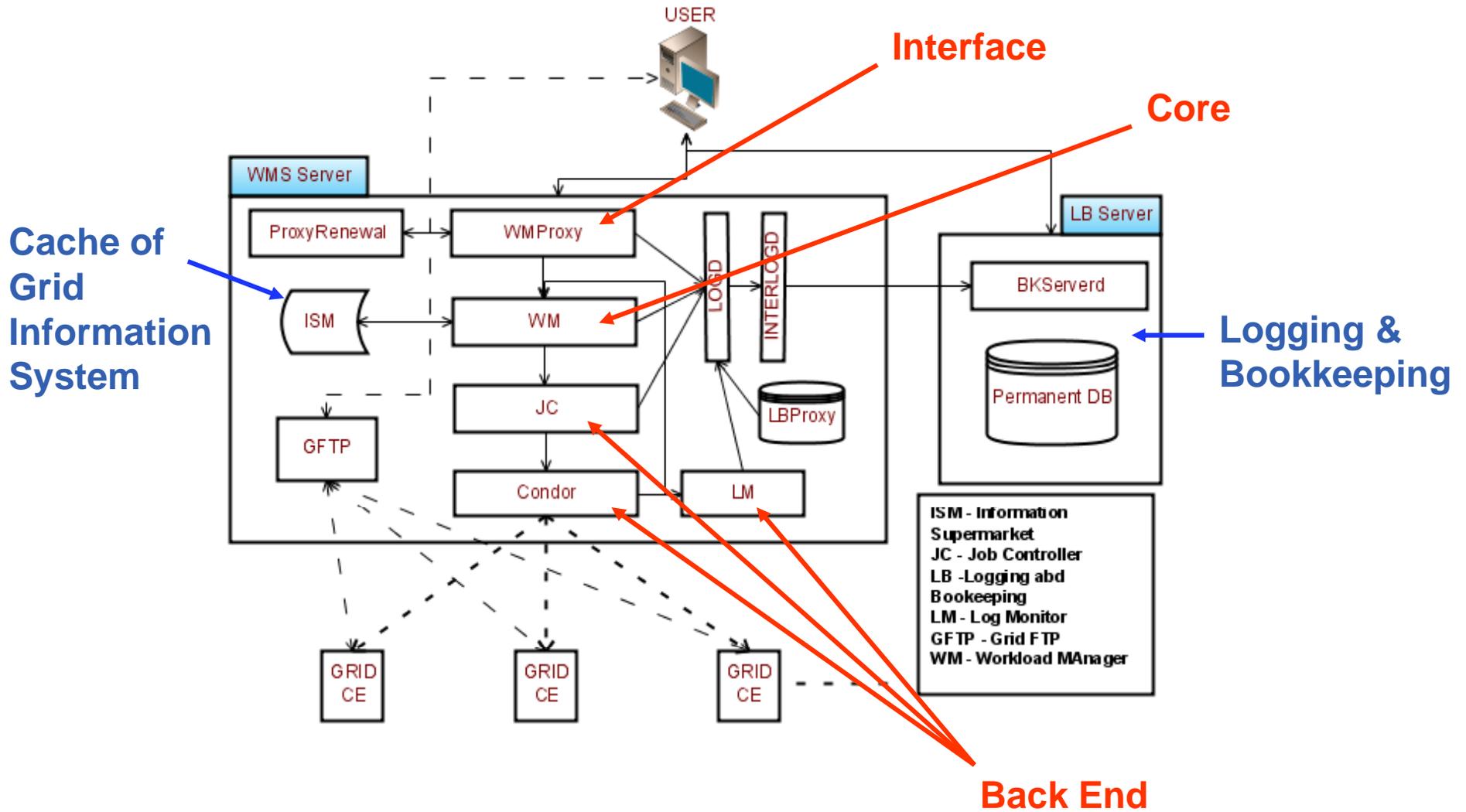
- **Wiki, Documentation, Download, Support:**

<https://twiki.cnaf.infn.it/cgi-bin/twiki/view/WMSMonitor/WebHome>

wms-support<at>cnaf.infn.it

Special Thanks to all gLite WMS / LB developers

Backup slides



- **Adopted metrics are of three types:**
 - **Grid service metrics:** daemons status, number of opened file descriptors, entries in component queues, number of available CE queues, open connections on ports, Condor Job stats
 - **System metrics:** CPU load average, % occupancy of disk partitions
 - **Job flow metrics:** Job submitted from users, Job Input/Output for each component in the WMS, Job Successfully Completed / Aborted

WMS Service Component

