ARDA Experiment Dashboard

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on behalf of the Dashboard Team

www.eu-egee.org

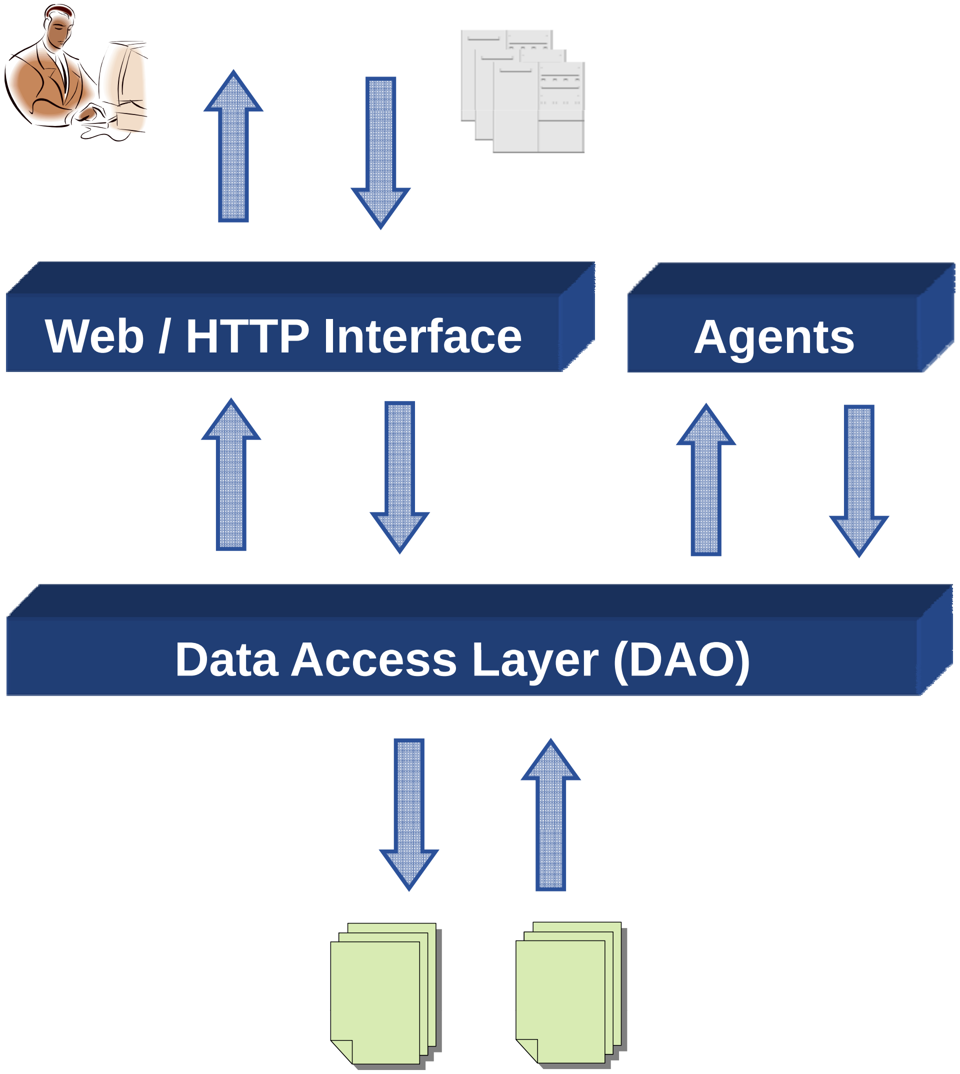
Outline

- **Background**
- **Dashboard Framework**
- **VO Monitoring Applications**
  - Job Monitoring
  - Site Monitoring / Efficiency
  - Data Management Monitoring
  - Additional Applications
- **Conclusion and Future Work**

Background

- **Started in 2005 inside the EGEE/ARDA group**
- **First application: Grid Job / Application Monitoring for the CMS experiment**
    - implementation in PHP / Python
- **Redesign early 2006**
    - fully python based solution
    - more modular / structured approach
    - easily extensible
- **Additional application areas: data management (ATLAS DDM), site efficiency monitoring, …**

Dashboard Framework



- **Dashboard Clients**
  - Scripts: pycurl, …
  - Command line tools (optparser + pycurl)
  - Shell based: curl, …
- **Web Application**
  - Apache + mod_python
  - Model View Controller (MVC) pattern
  - multiple output formats: plain text, CSV, XML, XHTML
  - GSI support using gridsite
- **Agents**
  - collectors: RGMA, ICXML, BDII, …
  - stats generation, alert managers, …
  - *Service Configurator* pattern
  - common configuration (XML file) and management: *stop, start, status, list*
  - common monitoring mechanism
- **Data Access Layer (DAO)**
  - interfaces available to different backends (Oracle and PostgreSQL mainly, easy to add additional ones)
  - connection pooling

Dashboard Framework

- **Build and development environment**
  - based on python distutils (with several extensions)
  - covers code validation, binaries and documentation generation, unit testing and reports
  - automatic build for each of the release branches
  - packaging uses RPMs – APT repository available
- **Release procedure**
  - three main branches: nightly, unstable, stable
  - releases per component
  - enforced versioning scheme (no manual versioning or tagging, all done via distutils command extensions)
- **Interesting links**
  - Developers guide:
    - http://dashb-build.cern.ch/build/nightly/doc/guides/common/html/dev/index.html
  - Savannah Project
    - http://savannah.cern.ch/groups/dashboard

Job Monitoring

- **Real time and summary views over the virtual organization (VO) grid jobs**
- **Several instances in production serving different communities: CMS, ATLAS, LHCb, Alice, VLMED**
- **Various grid information sources used:**
    - RGMA
    - GridPP XML files collection
    - LCG BDII
- **Value added: VO specific information**
    - through job instrumentation. Using Monalisa's ApMon (CMS), Panda and Ganga monitoring (ATLAS)
    - directly querying VO databases (ex: ATLAS production database)
- **Key Features:**
    - sensible merging of information from different sources
    - advanced filtering for different usages (VO manager, site admin, community user)

Job Monitoring

- Real time and summary views over the virtual organization (VO) grid jo
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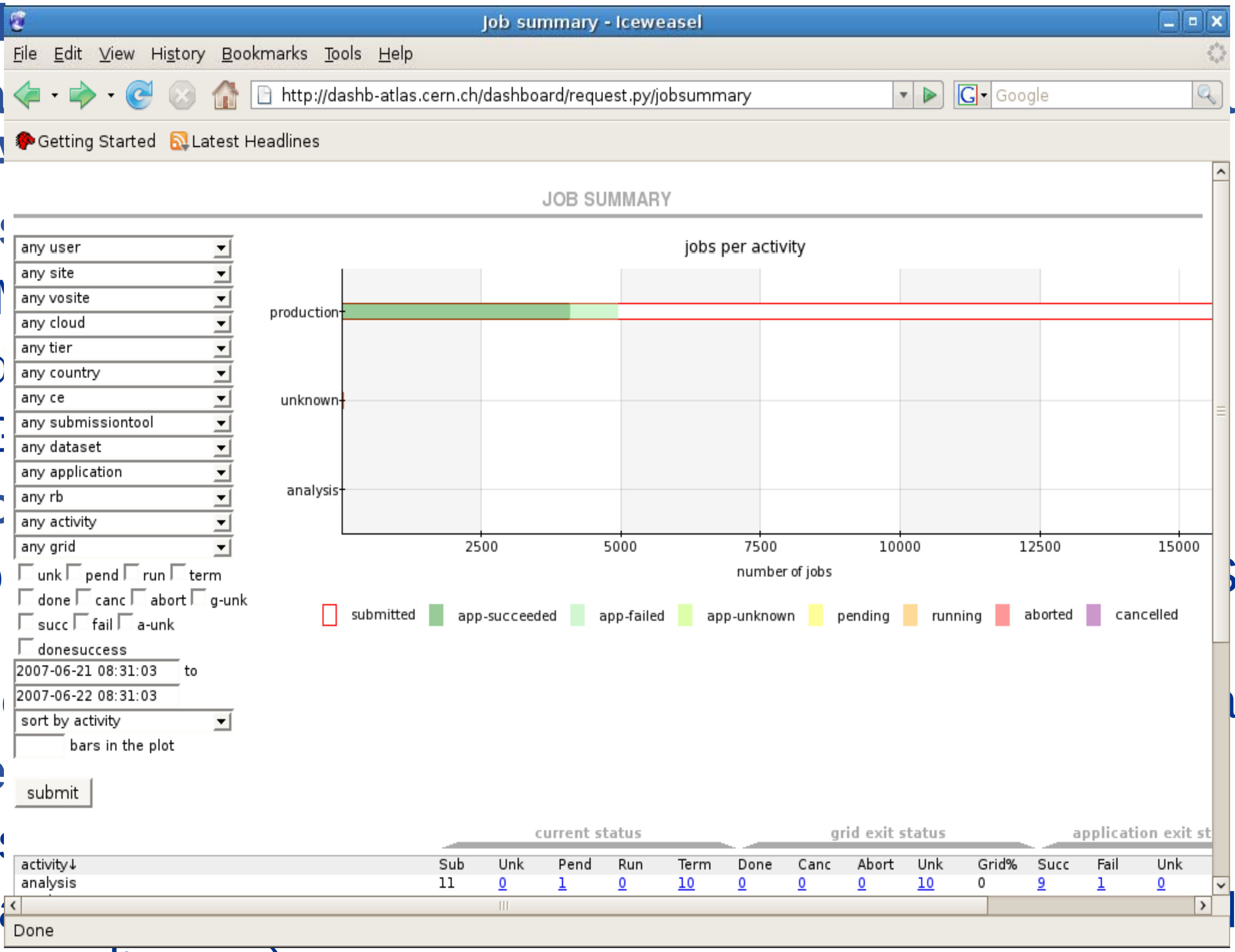
Job summary - Iceweasel
File Edit View History Bookmarks Tools Help
http://dashb-atlas.cern.ch/dashboard/request.py/jobsummary
Google
Getting Started
Latest Headlines
jobs per activity
production
unknown
analysis
2500
5000
7500
10000
12500
15000
number of jobs
submit
Done

JOB SUMMARY

any user
any site
any vosite
any cloud
any tier
any country
any ce
any submissiontool
any dataset
any application
any rb
any activity
any grid
☐ unk ☐ pend ☐ run ☐ term
☐ done ☐ canc ☐ abort ☐ g-unk
☐ succ ☐ fail ☐ a-unk
☐ donesuccess
2007-06-21 08:31:03 to
2007-06-22 08:31:03
sort by activity
bars in the plot

☐ submitted 🟩 app-succeeded 🟩 app-failed 🟨 app-unknown 🟨 pending 🟧 running 🟥 aborted 🟪 cancelled

		current status				grid exit status					application exit st		
activity↓	Sub	Unk	Pend	Run	Term	Done	Canc	Abort	Unk	Grid%	Succ	Fail	Unk
analysis	11	0	1	0	10	0	0	0	10	0	9	1	0

Job Monitoring

- **Task Monitoring**
  - deployed and used in CMS
- **Integration with SAM tests**
  - already using the new LCG standards
  - prototype in place
- **Alert mechanism**
  - in development
- **HTTP API for publishing job information**
  - very easy to integrate with existing tools
  - similar to the mechanism used for data management

Grid / Site Efficiency

- **Built on top of the job monitoring data**
- **Main goal: identify reasons for job failures in sites**
- **Uses the information coming from RGMA**
- **Available today for the same set of communities: ATLAS, CMS, LHCb, Alice, VLMED**
- **Provides both summary and detailed information**
- **Current ongoing work**
  - provide generic (non VO) specific view over the data

Grid / Site Efficiency

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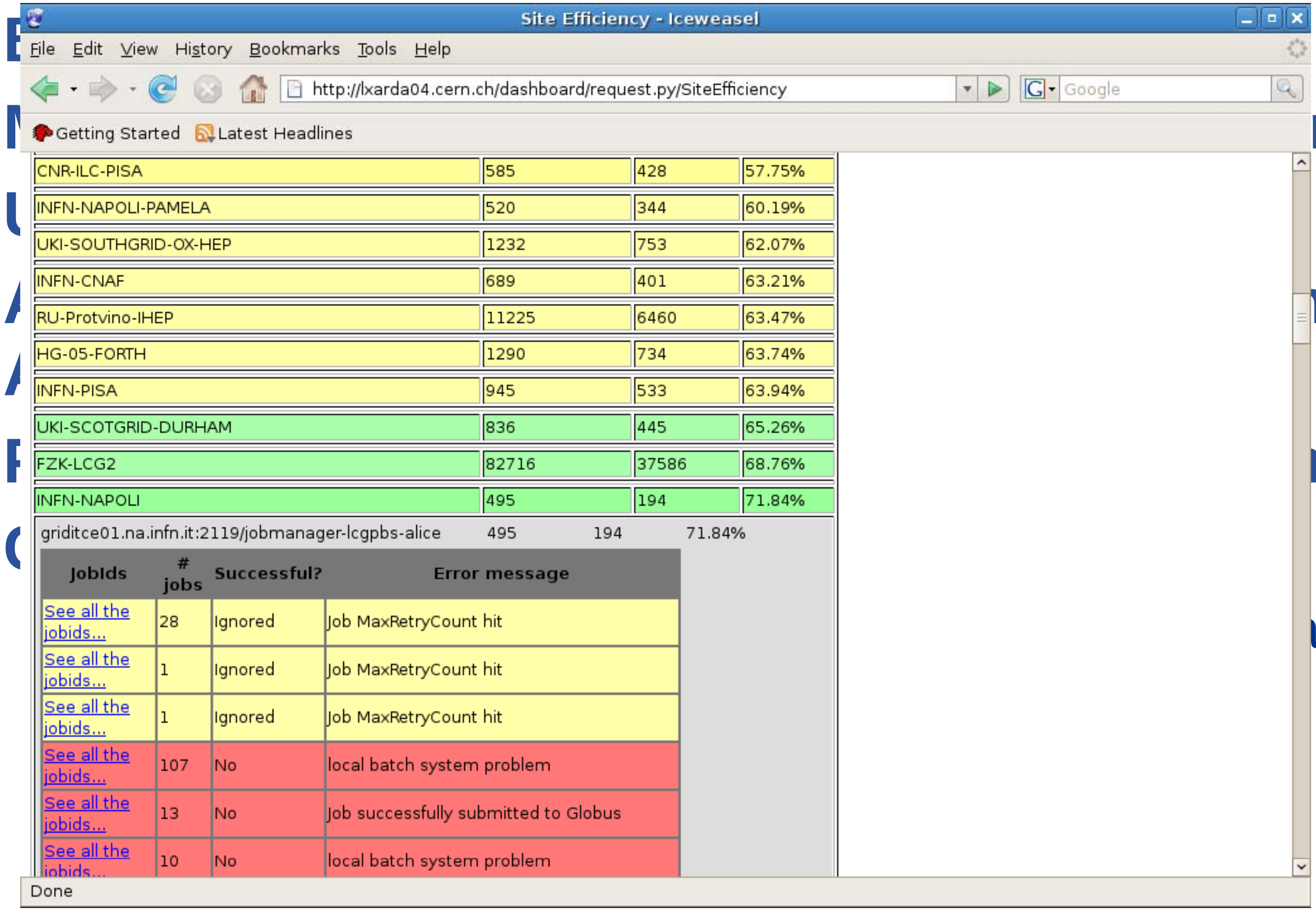
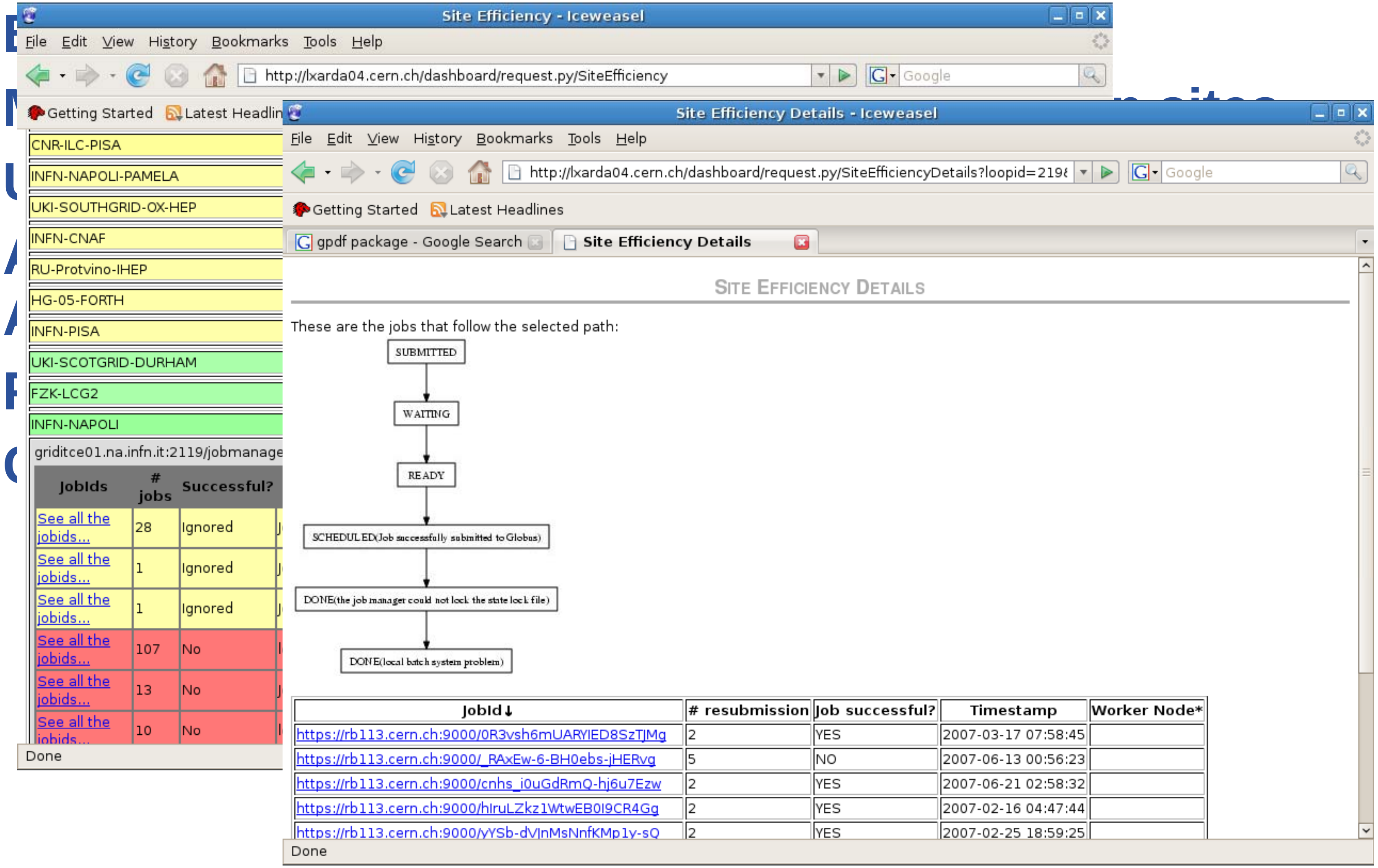

Site Efficiency - Iceweasel
File Edit View History Bookmarks Tools Help
http://lxarda04.cern.ch/dashboard/request.py/SiteEfficiency
Google
Getting Started
Latest Headlines
Done

CNR-ILC-PISA	585	428	57.75%
INFN-NAPOLI-PAMELA	520	344	60.19%
UKI-SOUTHGRID-OX-HEP	1232	753	62.07%
INFN-CNAF	689	401	63.21%
RU-Protvino-IHEP	11225	6460	63.47%
HG-05-FORTH	1290	734	63.74%
INFN-PISA	945	533	63.94%
UKI-SCOTGRID-DURHAM	836	445	65.26%
FZK-LCG2	82716	37586	68.76%
INFN-NAPOLI	495	194	71.84%

griditce01.na.infn.it:2119/jobmanager-lcgpbs-alice 495 194 71.84%

JobIds	# jobs	Successful?	Error message
See all the jobids...	28	Ignored	Job MaxRetryCount hit
See all the jobids...	1	Ignored	Job MaxRetryCount hit
See all the jobids...	1	Ignored	Job MaxRetryCount hit
See all the jobids...	107	No	local batch system problem
See all the jobids...	13	No	Job successfully submitted to Globus
See all the jobids...	10	No	local batch system problem

Grid / Site Efficiency


Site Efficiency - Iceweasel
File Edit View History Bookmarks Tools Help
http://lxarda04.cern.ch/dashboard/request.py/SiteEfficiency
Google
Getting Started
Latest Headlin
Site Efficiency Details - Iceweasel
File Edit View History Bookmarks Tools Help
http://lxarda04.cern.ch/dashboard/request.py/SiteEfficiencyDetails?loopid=219
Google
Getting Started
Latest Headlines
gpdf package - Google Search
Site Efficiency Details
SUBMITTED
WAITING
READY
SCHEDULED(Job successfully submitted to Globus)
DONE(the job manager could not lock the state lock file)
DONE(local batch system problem)
Done
Done

CNR-ILC-PISA
INFN-NAPOLI-PAMELA
UKI-SOUTHGRID-OX-HEP
INFN-CNAF
RU-Protvino-IHEP
HG-05-FORTH
INFN-PISA
UKI-SCOTGRID-DURHAM
FZK-LCG2
INFN-NAPOLI

griditce01.na.infn.it:2119/jobmanage

JobIds	# jobs	Successful?
See all the jobids...	28	Ignored
See all the jobids...	1	Ignored
See all the jobids...	1	Ignored
See all the jobids...	107	No
See all the jobids...	13	No
See all the jobids...	10	No

SITE EFFICIENCY DETAILS

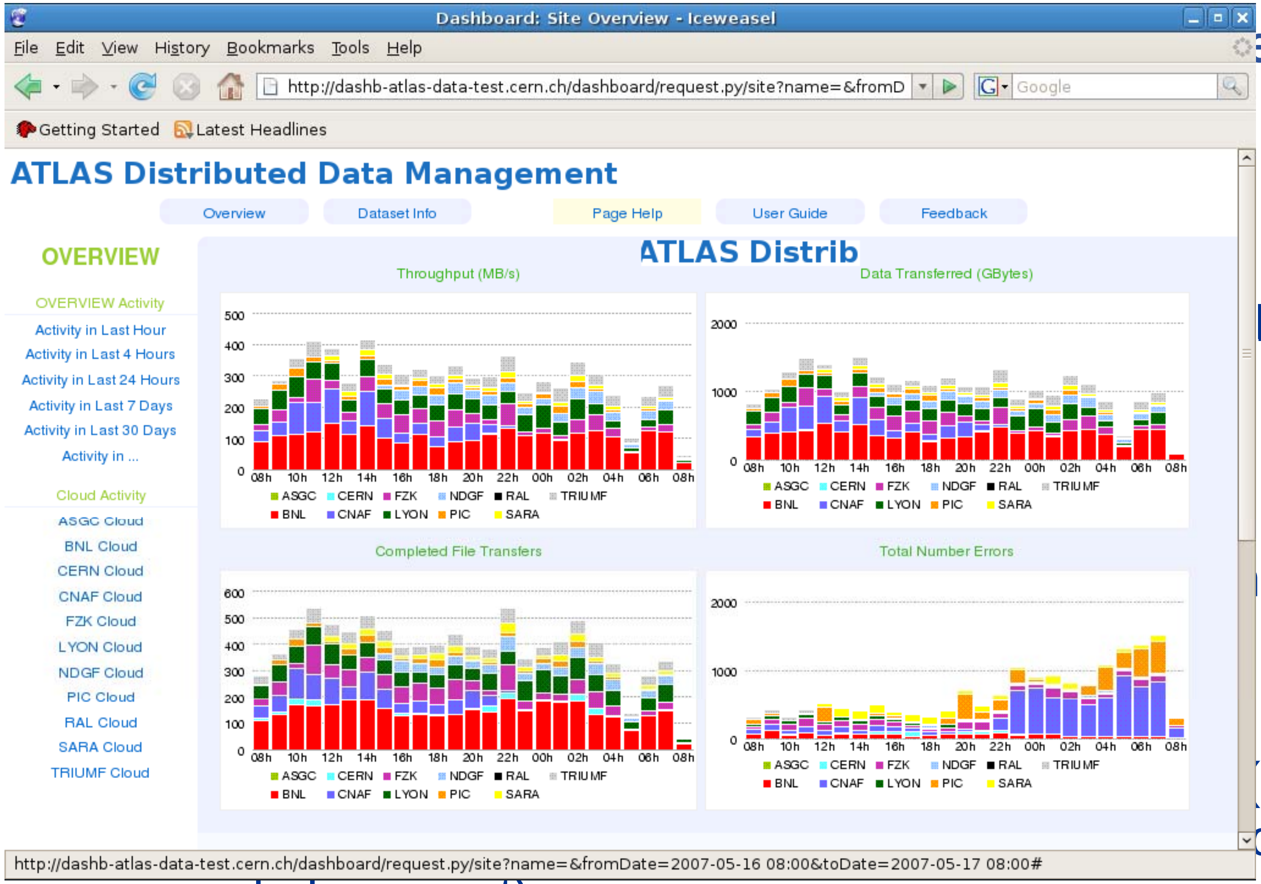
These are the jobs that follow the selected path:

JobId↓	# resubmission	Job successful?	Timestamp	Worker Node*
https://rb113.cern.ch:9000/0R3vsh6mUARYIED8SzTJMg	2	YES	2007-03-17 07:58:45	
https://rb113.cern.ch:9000/_RAxEw-6-BH0ebs-jHERvg	5	NO	2007-06-13 00:56:23	
https://rb113.cern.ch:9000/cnhs_i0uGdRmQ-hj6u7Ezw	2	YES	2007-06-21 02:58:32	
https://rb113.cern.ch:9000/hIruLZkz1WtwEB0I9CR4Gg	2	YES	2007-02-16 04:47:44	
https://rb113.cern.ch:9000/yYSb-dVJnMsNnfKMp1y-sQ	2	YES	2007-02-25 18:59:25	

Data Management

- **Tied to the ATLAS Distributed Data Management (DDM) system**
- **Used successfully both in the production and Tier0 test environments**
- **Data sources:**
  - DDM site services: the main source, providing all the transfer and placement information
  - SAM tests: for correlation of DDM results with the state of the grid fabric services
  - Storage space availability: from BDII but soon including other available tools
- **Views over the data:**
  - Global: site overview covering different metrics (throughput, files / datasets completed, ...); summary of the most common errors (transfer and placement)
  - Detailed: starting from the dataset state, to the state of each of its files, to the history of each single file placement (all state changes)

Data Management


Dashboard: Site Overview - Iceweasel
File Edit View History Bookmarks Tools Help
Google
Getting Started
Latest Headlines
ATLAS Distributed Data Management
Overview
Dataset Info
Page Help
User Guide
Feedback
OVERVIEW
OVERVIEW Activity
Activity in Last Hour
Activity in Last 4 Hours
Activity in Last 24 Hours
Activity in Last 7 Days
Activity in Last 30 Days
Activity in ...
Cloud Activity
ASGC Cloud
BNL Cloud
CERN Cloud
CNAF Cloud
FZK Cloud
LYON Cloud
NDGF Cloud
PIC Cloud
RAL Cloud
SARA Cloud
TRIUMF Cloud
ATLAS Distrib
Throughput (MB/s)
Data Transferred (GBytes)
Completed File Transfers
Total Number Errors
08h 10h 12h 14h 16h 18h 20h 22h 00h 02h 04h 06h 08h
ASGC CERN FZK NDGF RAL TRIUMF
BNL CNAF LYON PIC SARA

http://dashb-atlas-data-test.cern.ch/dashboard/request.py/site?name=&fromD

http://dashb-atlas-data-test.cern.ch/dashboard/request.py/site?name=&fromDate=2007-05-16 08:00&toDate=2007-05-17 08:00#

ent (DDM) system

Tier0 test

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– Detailed: starting from the dataset state, to the state of each of its files, to the history of each single file placement (all state changes)

Data Management

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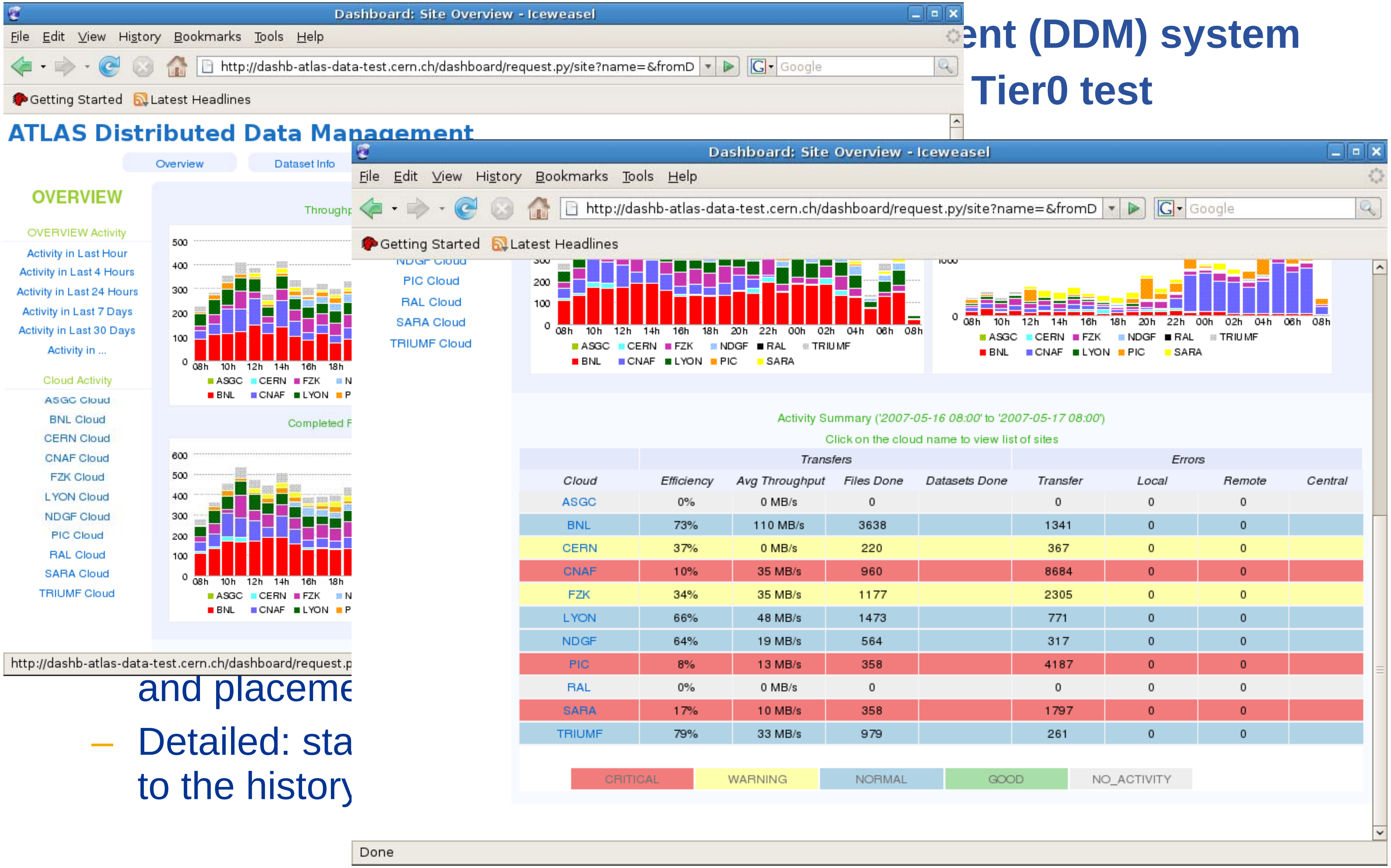
Tier0 test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Overview
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08h 10h 12h 14h 16h 18h 20h 22h 00h 02h 04h 06h 08h
1000
http://dashb-atlas-data-test.cern.ch/dashboard/request.p
Done

ATLAS Distributed Data Management

OVERVIEW

OVERVIEW Activity
Activity in Last Hour
Activity in Last 4 Hours
Activity in Last 24 Hours
Activity in Last 7 Days
Activity in Last 30 Days
Activity in ...

Cloud Activity
ASGC Cloud
BNL Cloud
CERN Cloud
CNAF Cloud
FZK Cloud
LYON Cloud
NDGF Cloud
PIC Cloud
RAL Cloud
SARA Cloud
TRIUMF Cloud

Activity Summary ('2007-05-16 08:00' to '2007-05-17 08:00')

Click on the cloud name to view list of sites

	Transfers				Errors			
Cloud	Efficiency	Avg Throughput	Files Done	Datasets Done	Transfer	Local	Remote	Central
ASGC	0%	0 MB/s	0		0	0	0	
BNL	73%	110 MB/s	3638		1341	0	0	
CERN	37%	0 MB/s	220		367	0	0	
CNAF	10%	35 MB/s	960		8684	0	0	
FZK	34%	35 MB/s	1177		2305	0	0	
LYON	66%	48 MB/s	1473		771	0	0	
NDGF	64%	19 MB/s	564		317	0	0	
PIC	8%	13 MB/s	358		4187	0	0	
RAL	0%	0 MB/s	0		0	0	0	
SARA	17%	10 MB/s	358		1797	0	0	
TRIUMF	79%	33 MB/s	979		261	0	0	

CRITICAL	WARNING	NORMAL	GOOD	NO_ACTIVITY

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– Detailed: sta
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Data Management

- **Other features**
  - periodic site behavior reports (sent by email)
  - alerts (on specific errors, when a site goes below a certain threshold, ...)
- **Coming soon**
  - user specific views (authentication via X509 certificates) – “my datasets”
  - better site summary data: overview of dataset / file states in the site (radar plots), average time in each placement step, additional error summaries
  - python *query* API module
  - python *publish* API module (open the tool to other applications / communities)

Conclusion

- **The Dashboard monitors the grid from the point of view of its communities**
  - and focuses on the different user's interests (managers, admins, end users)
- **Grid information is not enough (additional VO information is invaluable)**
- **Framework**
  - Flexible and stable: proven by the variety of applications available in production
  - Effort put into install / packaging paid off: first external installation has already been done (VLMED)
- **Future work**
  - integration with local monitoring systems (feed summaries back to the site admins)
  - improved alert system
  - adapt to recently defined data exchange / query standards
- **http://dashboard.cern.ch**