

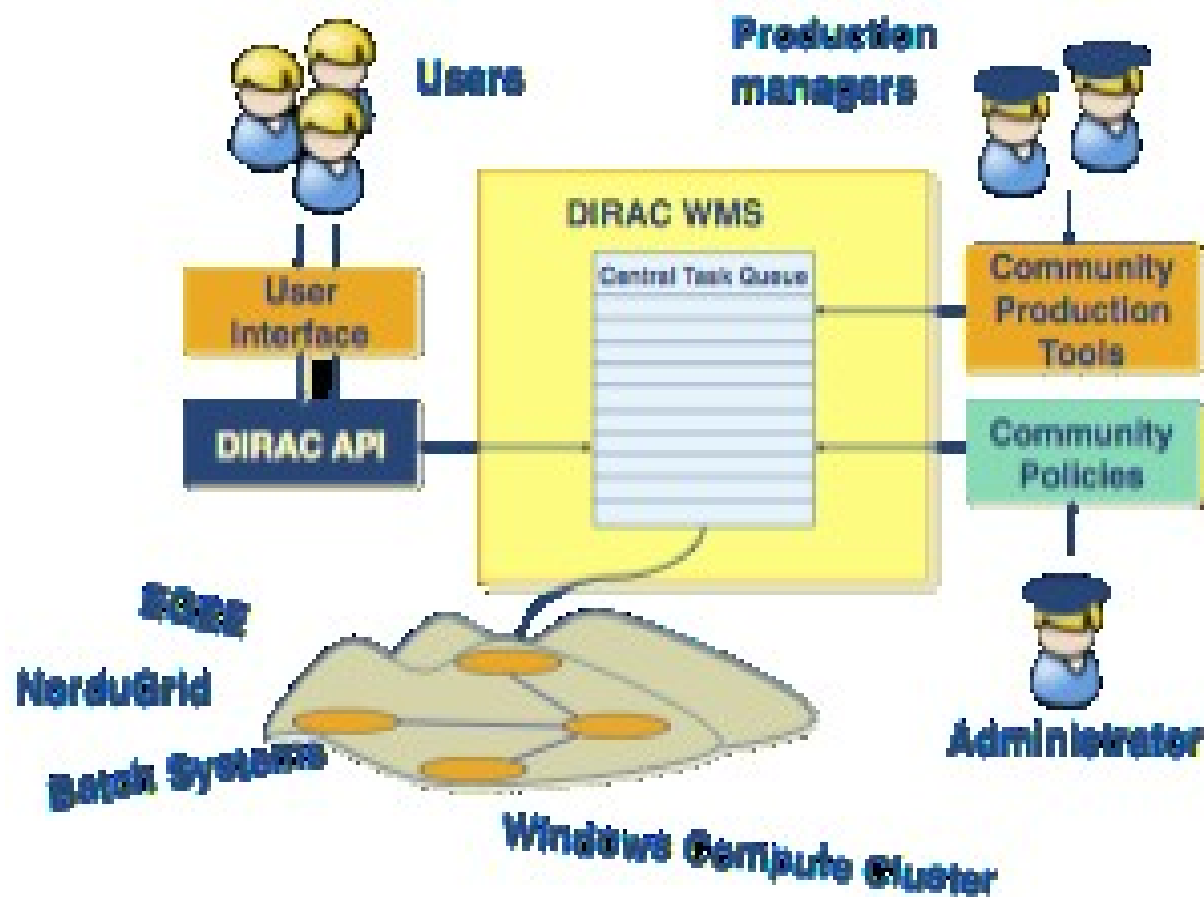
Ganga/DIRAC Overview Part 1: Introduction to Dirac



(Please note: I'm not an expert on DIRAC so there may be some inaccuracies in this talk – please refer to the website for up-to-date info!)

HEPSYSMAN, 13th January, 2014
Mark Slater, Birmingham University

DIRAC is Pilot based production management system that is designed to abstract the user from the various implementations of different sets of computing resources



The DIRAC (Distributed Infrastructure with Remote Agent Control) system is built on the idea of interconnecting:

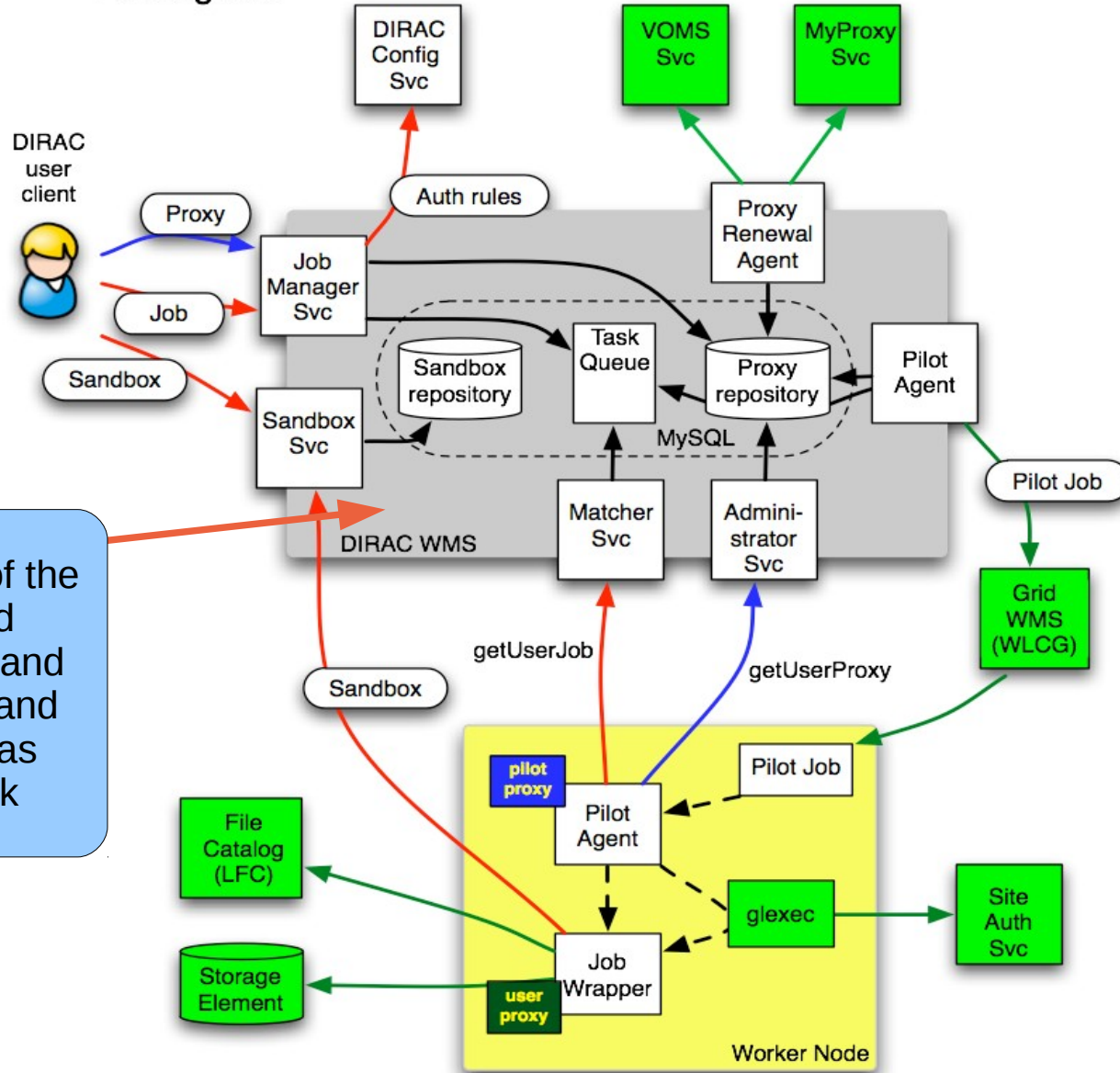
- Databases:** Used to persist the state of a system ●
- Services:** Passive, listen for reqs and serve/update the database ●
- Agents:** Active, Periodically performing tasks on the databases ●

These then combine to form *Systems*.

For example: The central Task Queue is the Database, a service shows the status of the task queue and updates it when requested and the Pilot agent queries what tasks are required and sends pilots to perform them



DIRAC WMS with generic Pilot Agents



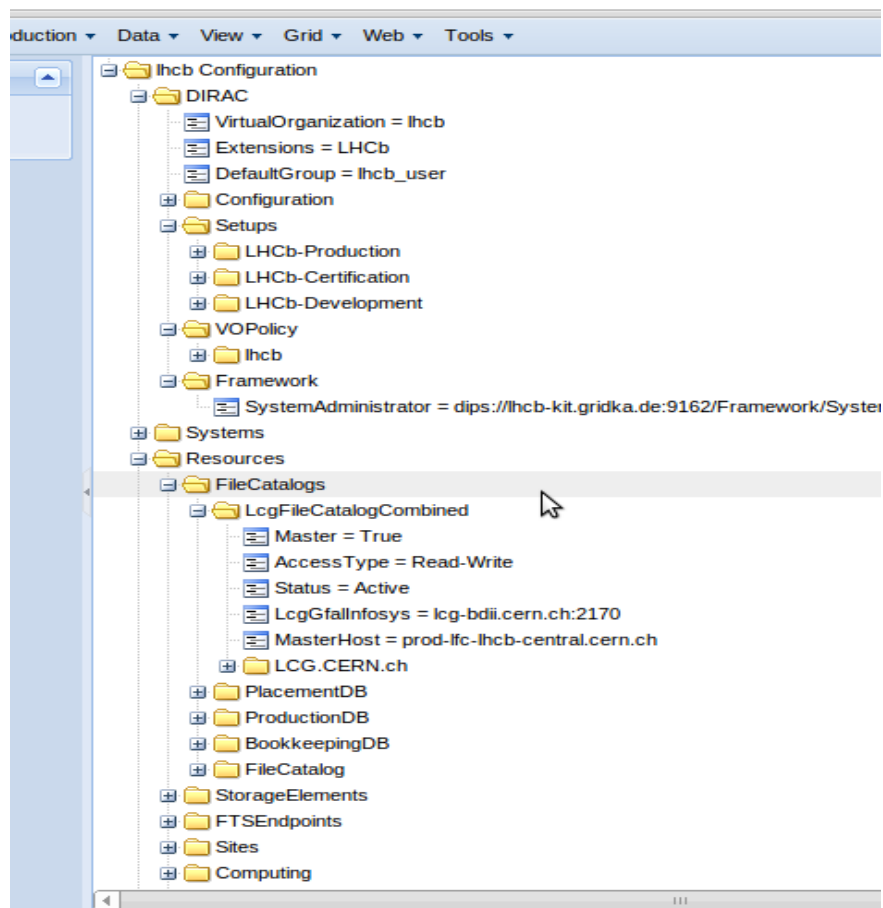
The DIRAC WMS contains the 'meat' of the job management and production handling and comprises Request and Transform Systems as well as the main Task Queue

- ➡ Proxy download over DISET secure connection
- ➡ DISET secure connection

The configuration system is a (nominally!) static description of resources, variables, etc. that is used by other systems

It is used as a global 'configuration file' with a service controlling the access to the data

```
/Resources/Sites
    /CERN.ch
    ...
    /IN2P3.fr
        /Domains = EGI, LCG
        /ContactEmail =
someone@somewhere
        /MoreDetails =
blah, blah, blah
        /Computing
            /...
        /Storage
            /...
    /PIC.es
    ...
```



The Resource Status System (RSS) is the way DIRAC keeps track of the status of sites, storage elements, Catalogs, etc. by working in conjunction with the Configuration Service that holds the definitions of the 'Grid Elements').

In order to have a more fine grained status than ON/OFF, 4 major statuses are possible for each Grid Element: Active, Degraded, Probing, Banned and even have multiple statuses

Monitoring Agents perform regular checks on each type of Grid Element and makes changes to the RSS in response to the policy settings stored in the CS

The Data Management System (DMS) together with the Storage Management System (SMS) provides the following:

Upload and manage files on SEs ●

DIRAC provides an abstraction of the normal SE interfaces to provide access through a single interface, the configuration of each is handled by the CS

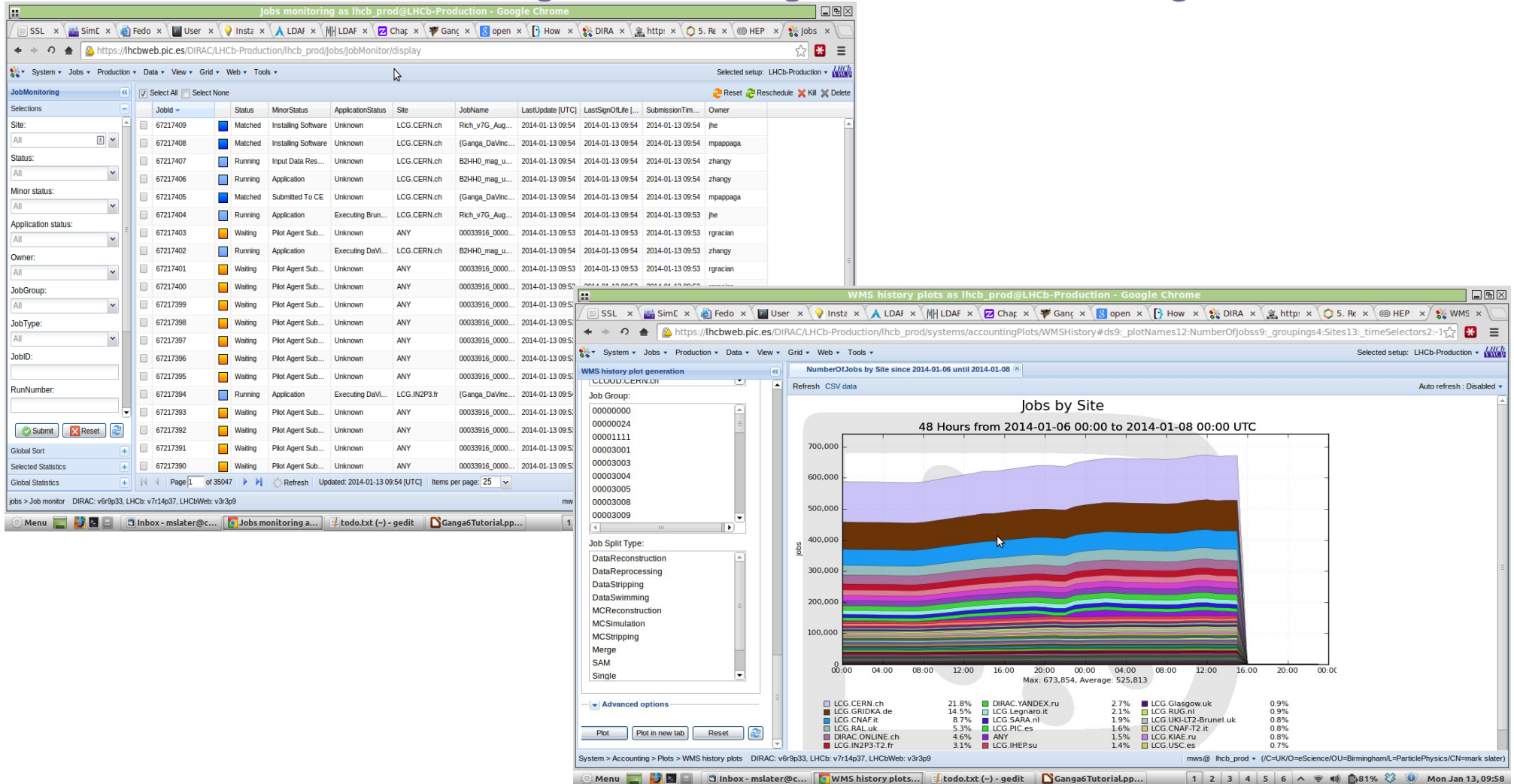
Manage FTS requests ●

The DMS agents interface with the FTS servers assigned to your VO to manage any FTS requests. After setting the channels up in the CS, retrievals, transfers and removals can all be added to the Task Queue

Interface to the LFC ●

(I believe!) DIRAC doesn't supply it's own File Catalog but it does provide an interface to the current LFC (or other FC as required). Through this both users and agents have access to Registrations, replica management, etc.

DIRAC provides a fully-featured web portal to handle all aspects of the DIRAC instance from Job Monitoring, Data Management to Accounting



The screenshot displays two web browser windows from the DIRAC web portal.

The top window, titled "Jobs monitoring as lhcb_prod@LHCb-Production", shows a table of job details. The table has columns for JobID, Status, MinorStatus, ApplicationStatus, Site, JobName, LastUpdate [UTC], LastSignOffLife, SubmissionTime, and Owner. The jobs listed include various statuses such as "Matched", "Running", "Waiting", and "Executing".

The bottom window, titled "WMS history plots as lhcb_prod@LHCb-Production", displays a "Jobs by Site" plot. The plot is a stacked area chart showing the number of jobs over a 48-hour period from 2014-01-06 00:00 to 2014-01-08 00:00 UTC. The y-axis represents the number of jobs, ranging from 0 to 700,000. The x-axis represents time in UTC. The plot shows a significant increase in job volume starting around 2014-01-07 00:00 UTC. A legend below the plot lists various sites and their corresponding job counts, such as LCG CERN.ch (21.8%), DIRAC.YANDEX.ru (2.7%), and LCG Glasgow.uk (0.9%).

The Main DIRAC Website

[*http://diracgrid.org/files/docs/index.html*](http://diracgrid.org/files/docs/index.html)

Administrators Guide

[*http://diracgrid.org/files/docs/AdministratorGuide/index.html*](http://diracgrid.org/files/docs/AdministratorGuide/index.html)

Overview of DIRAC Systems

[*http://diracgrid.org/files/docs/AdministratorGuide/Systems/index.html*](http://diracgrid.org/files/docs/AdministratorGuide/Systems/index.html)