Experience in CMS with the Common Analysis Framework

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- To develop a common system for submitting analysis jobs to the distributed infrastructure
  - Leveraging on the similarities of the experiments analysis workflows
- Using components from the PanDA workload management system, but integrated in the CMS analysis environment
  - Building on the proven scalability and stability of the PanDA system

core workflow engine

The Project

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*CMS Experience with the Common Analysis Framework*
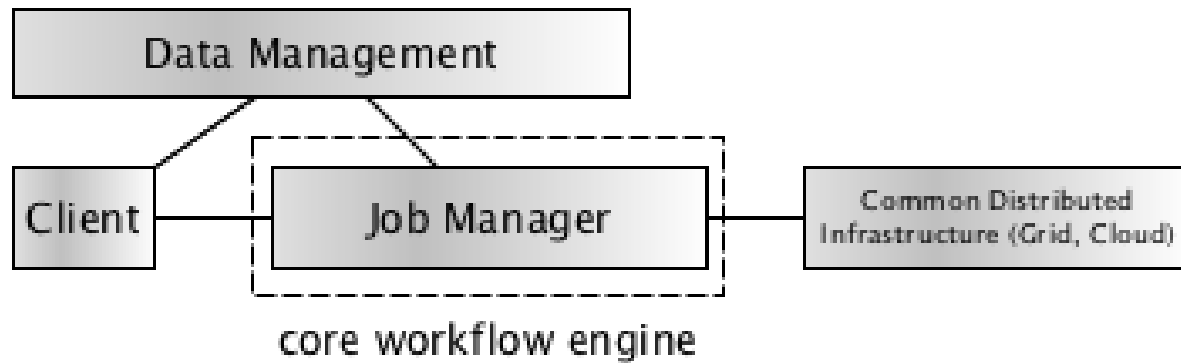
- A three phase project with a defined timeline
  - A Feasibility Study – presented in May 2012, at CHEP , New York [1]
  - A Proof of Concept Phase – June 2012 - December 2012
  - A Prototype Phase – January 2013 - September 2013

- Contributions from CERN IT, ATLAS and CMS
  - An opportunity for collaborative work

- (1) M Girone et al.., The common solutions strategy of the experiment support group at cern for the lhc experiments Journal of Physics: Conference Series, 396(3):032048, 2012.
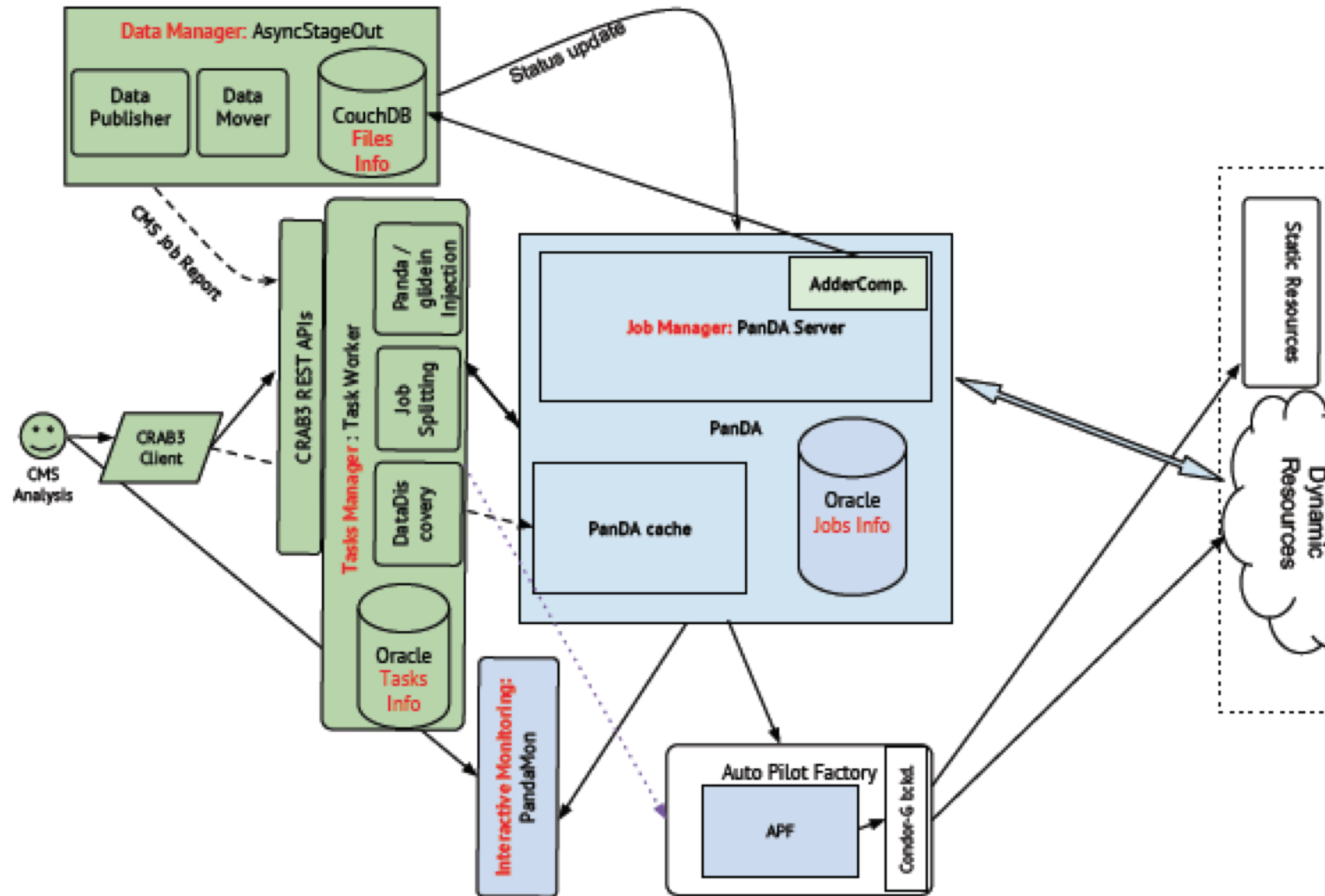
Components Overview
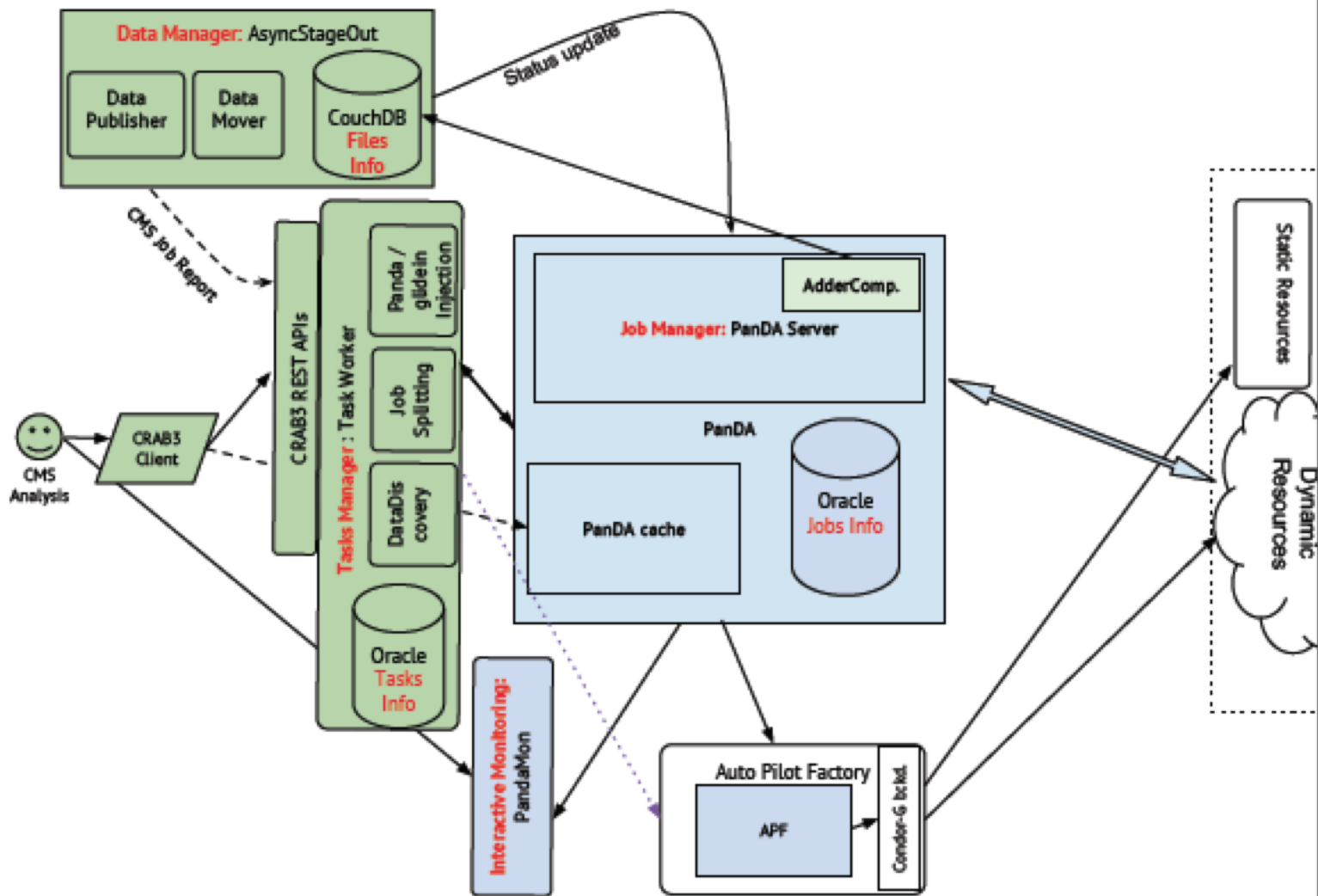
Status of the Test-Bed

- We have integrated the CMS specific components and exposed them for validation to power users

- We have deployed the CMS instance
  - Oracle DB cloned from the PanDA production database
  - 10 machines installed for all services
  - 47 CMS sites added to the APF configuration
  - Configuration of the APF done through the ATLAS Grid Information System
    - Was not easy to separate

- Next step is to demonstrate the compatibility of the experiment specific components to the currently used CMS production scheduler (based on Condor and GlideInWMS)
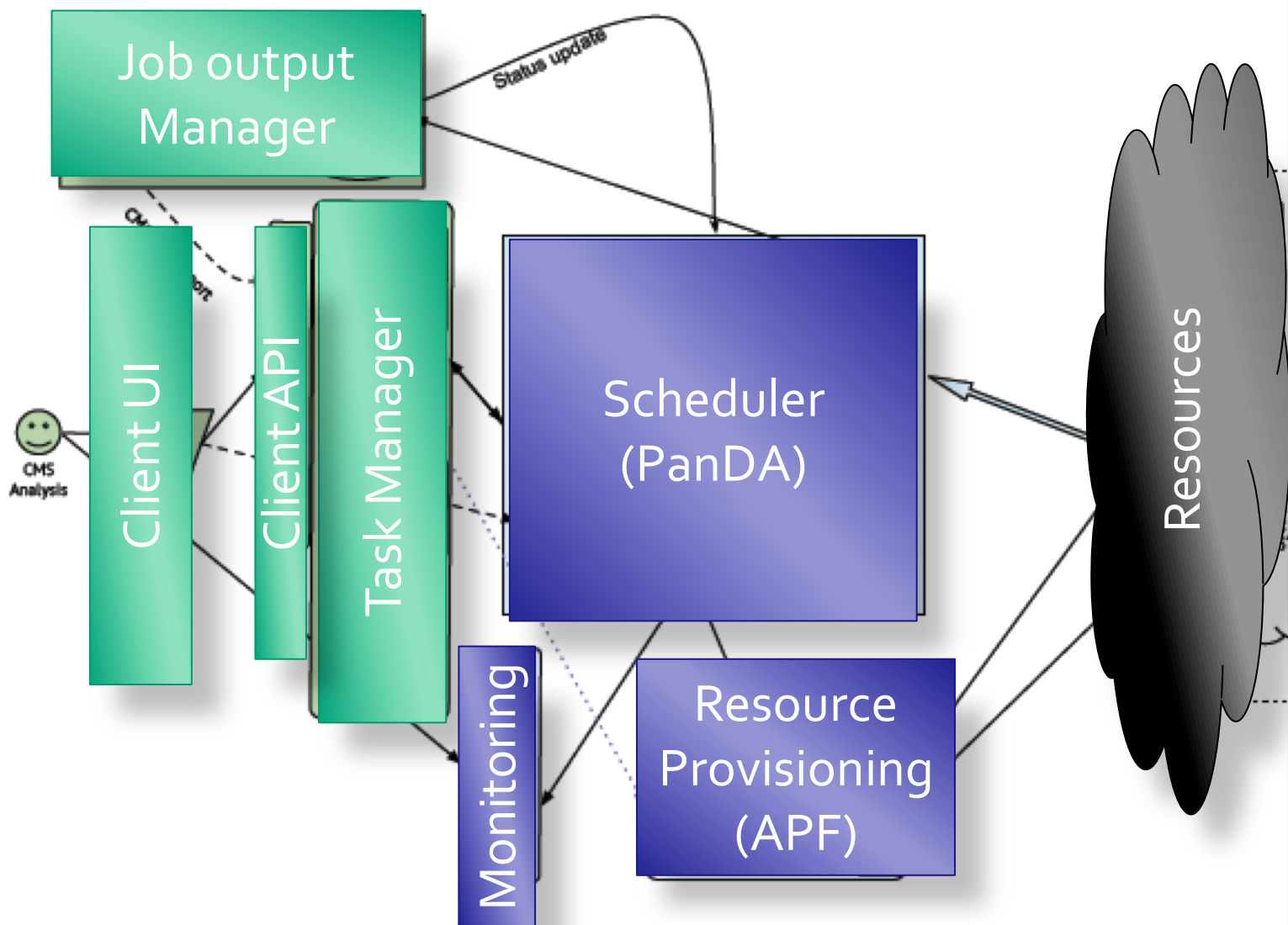 - Completing the original test-bed plan for CMS needs

Components Overview

Experiment Components

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- Experiment specific elements are in these layers
  - Allowing for interface to other scheduling services
  - Task Manager is potentially a generic service
    - (Run A before 10 Bs and then run a C)

Client UI

**Client API**

Task Manager

- Job Output manager was written for CMS to avoid integrating the entire ATLAS data management solution into the workflow
  - It can be seen as a general component and used by other experiments

Job output Manager

Scheduler

- Scheduling element enforces experiment policy and will have experiment specific elements
  - The PanDA approach to configuration/scheduling policy changes involves a new release

Scheduler (PanDA)
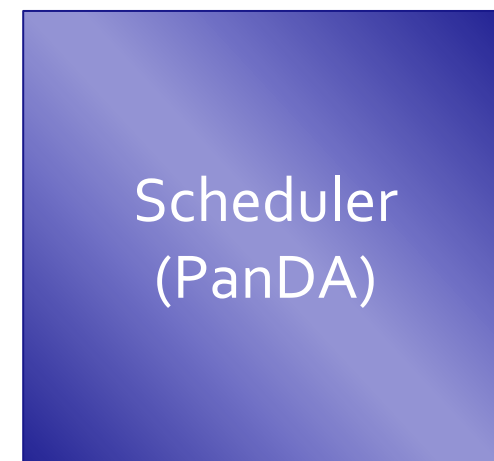
Resource Provisioning and Monitoring

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- Resource provisioning should be entirely independent of the experiment. A generic component for specific resources
  - Most obvious for a common component or service

Resource Provisioning (APF)

- Monitoring is potentially a passive service and may have experiment specific views and projections, but does not obviously require experiment specific services

Monitoring

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CMS Experience with the Common Analysis Framework

- CMS wants to capitalize on the architecture of the CRAB3-PanDA test-bed
  - Next important step is to validate the test-bed architecture with the CMS production scheduler (Condor/GlideIn
  - This will demonstrate that we fully understand the separation of the interface between the experiment specific services and the scheduling services
- Today CMS uses the same scheduler for production and analysis
  - Moving to PanDA for analysis would add increased scalability but also complexity to the system (two independent schedulers)
- Before CMS embarks on such a system we need to understand the concrete benefit and improvements to sustainability
  - A direct comparison is only possible after demonstrating the current testbed with the production scheduler, work ongoing with first results expected in November