WLCG Monitoring Consolidation

ALICE Physics Analysis and T1-T2 Workshop

6th March 2014

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- WLCG Monitoring consolidation:
  - Definition of the project
  - How to do it
  - Current status
  - Impact on the experiments
  - Summary

WLCG monitoring consolidation group

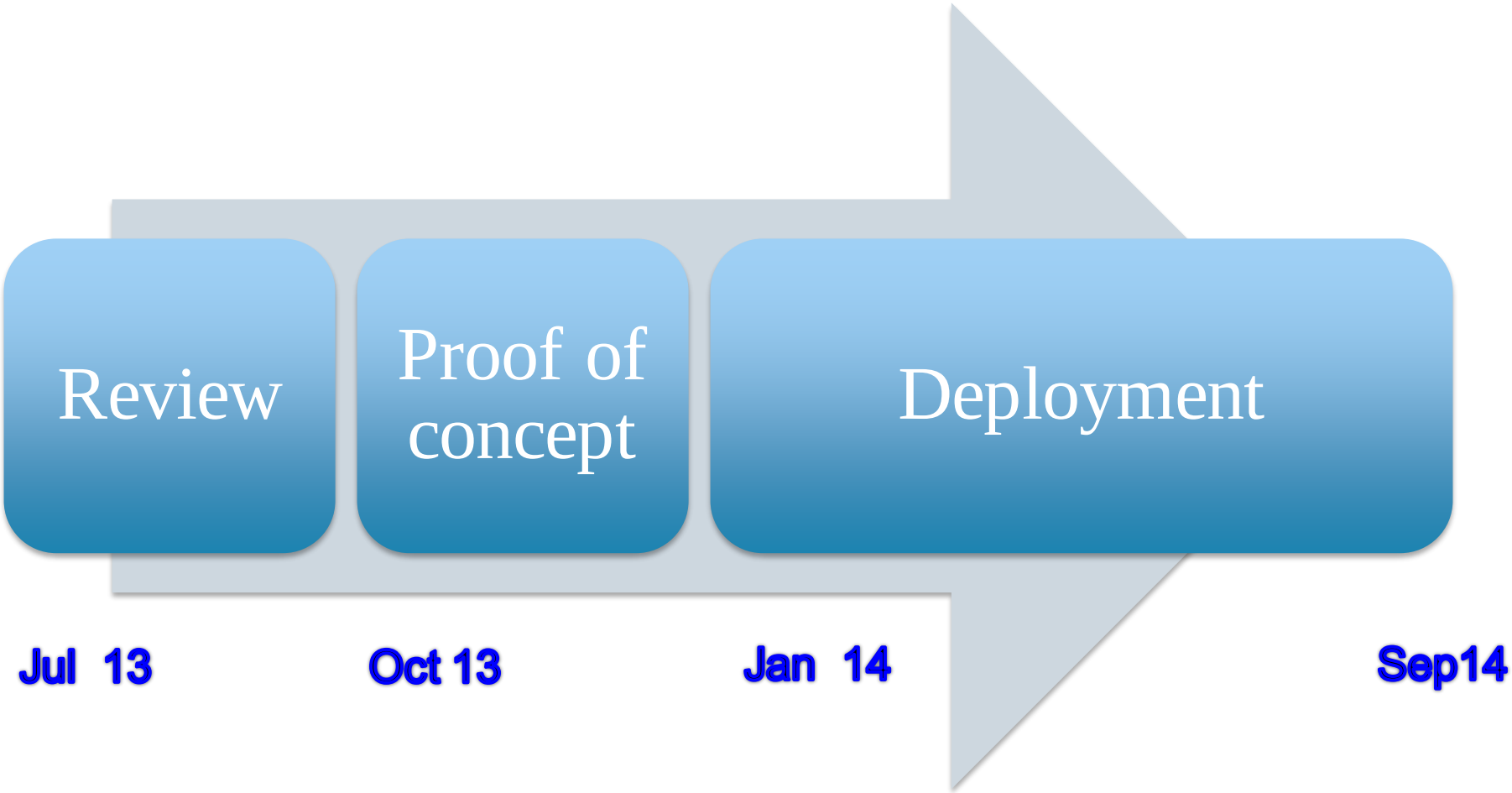
- Main goals:
  - Reduce complexity, modular design
  - Simplify operations, support and service
  - Common development and deployment
  - Unify, where possible, components
- We know we can monitor with the current system:
  - How can we do it with less resources?
- http://go.cern.ch/B6NS

Already presented at Sep. GDB http://cern.ch/go/XZ8t

Organization of work

- Small core team:
  - Monitoring development teams
  - LHC experiment representatives
  - WLCG operations representative
  - Agile Infrastructure Monitoring representative
- Even smaller taskforces on dedicated subjects
- Mailing list: wlcg-mon-consolidation@cern.ch
- Fortnightly meetings with summary reports
  - http://go.cern.ch/6XQQ

Timeline


Review
Proof of concept
Deployment
Jul 13
Oct 13
Jan 14
Sep14

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How to reduce complexity

1. Remove applications/functionality
2. Reduce scope
3. Modular design
4. Take existing solutions
5. Merging applications

1. Identify applications no longer needed

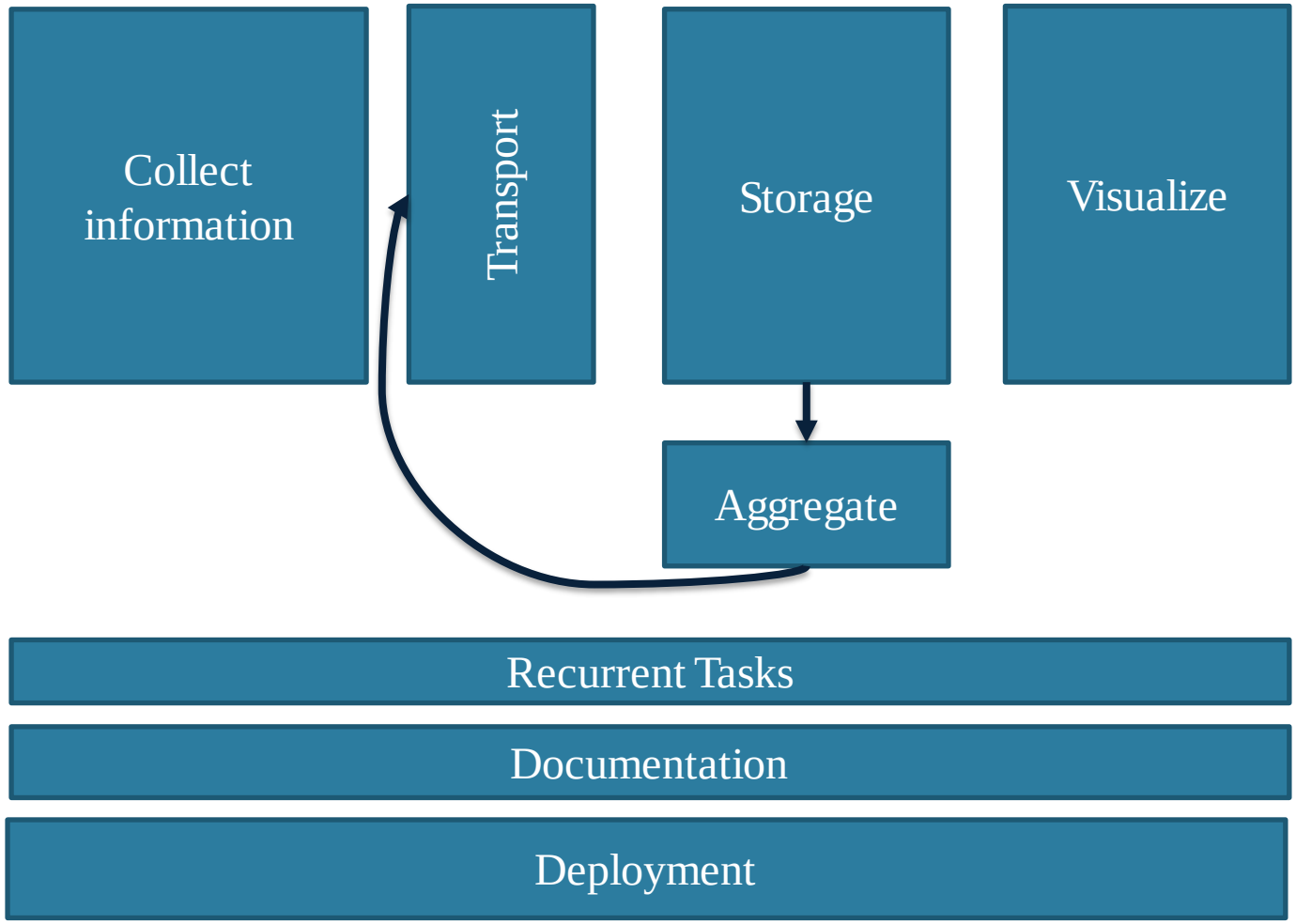
- Used
- nice to have
- not used

Category	ALICE	ATLAS	CMS	LHCb	Comments
Job Monitoring					
Current view		Interactive View	Interactive view		
		Task Monitoring	Task Monitoring, Task Monitoring on Android		
Accounting		Historical View	Historical view		
WLCG job trends			Dashboard Service Status		
Data Management					
Current view		DDM	PhEDEx Dashboard		
Accounting		DDM Accounting			
Transfers			WLCG Transfer Dashboard		
	FTD efficiency	FAX		AMS	
			WLCG GridFTP Transfer		
Site/Service Monitoring					
VO Feed	ALICE vo feed		CMS vo feed		
SSB	ALICE SSB	ATLAS SSB	CMS SSB	LHCb SSB	
SUM	ALICE SUM	ATLAS SUM	CMS SUM	LHCb SUM	
Regional/Experiments SAM/Nagios	ALICE nagios	ATLAS nagios	CMS nagios	LHCb nagios	Other 35 regional instances (NGIs, ROCs, CERN)
VO SAM/Nagios		MIDMON			Middleware Nagios, Security Nagios, former gLExec Nagios, SuperB Nagios, etc.
SAM Operational Monitoring (ops-monitor)		OPS-MONITOR			Monitors sam-atlas/alice/lhcb/cms prod and preprod SAM, SAM central, etc.
SAM central service		CMS SAM GridMon			Web API, myWLCG A/R,
SAM WLCG Reports		ATLAS CMS Monthly reports			
SAM A/R Trends		A/R Trends			
SAM T0/1 SiteView		Not installed			
SAM Tree Map		Not installed			
SAM Site Nagios		SAM Nagios installation			
Critical Services		ATLAS might be interested (the application has not been setup)	CMS Critical Services		
SAM Probe Development Framework and SAM probes		Probe development documentation			
Personalized Dashboard		Personalized dashboard			
Dissemination					
Google Earth		Web interface to Google Earth			Also installed at Globe, CC, CMS Centre Meyrin
Siteview		CMS ATLAS from site admin POV (tbd)? SiteView			
Development Management					
SAM Nightly Validation Framework			SAM Validation		Used to run sam-*-dev boxes and CI

2. Reduce scope

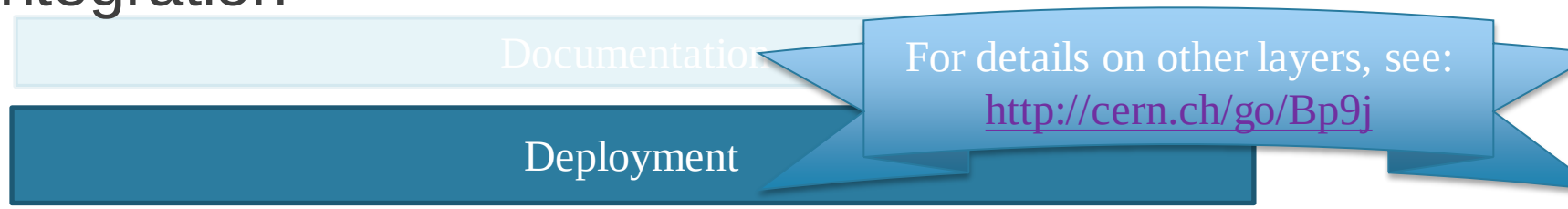
- Concentrate on WLCG
  - From distributed to centralized deployment
  - Moving SAM central service to France/Greece/Croatia
- Removing 'OPS' Virtual Organization
  - From January, WLCG reports based on experiment metrics
  - Experiments do not depend on OPS test

3. Modular design

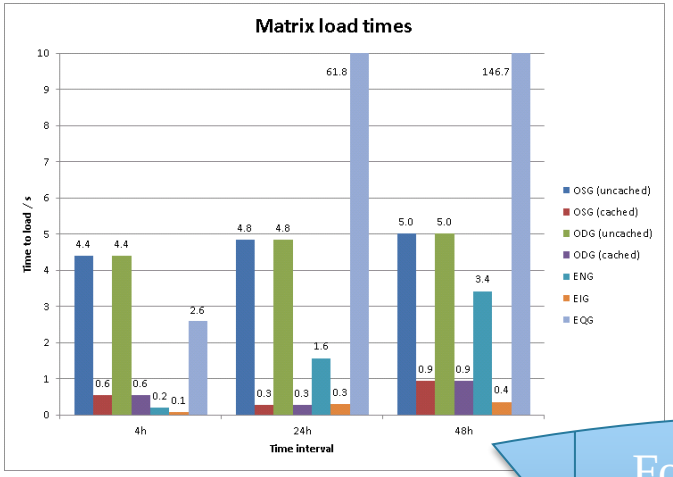


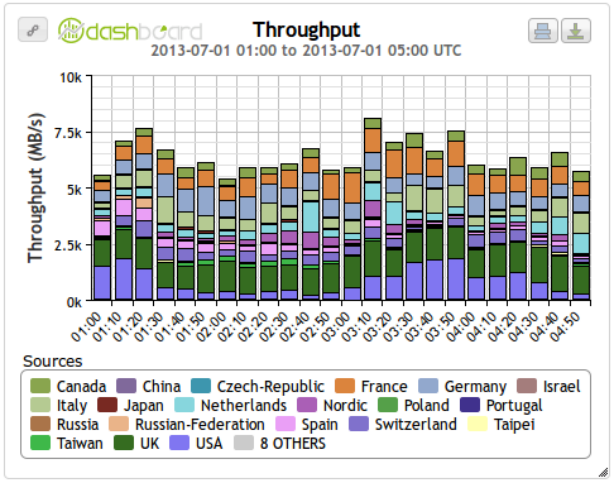
4a. Deployment

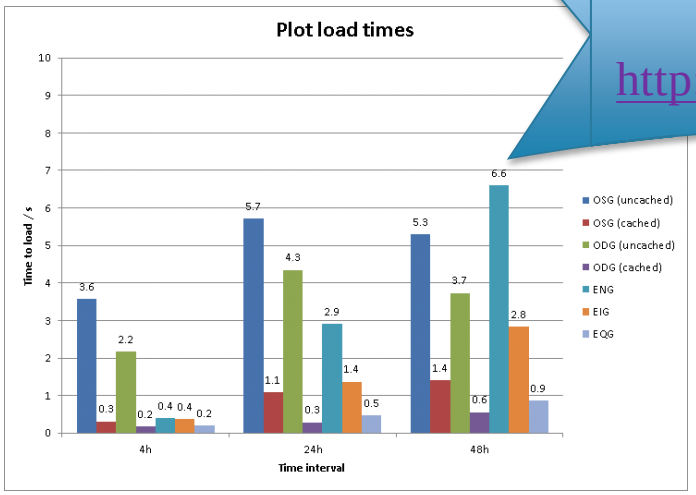
- Using openstack, puppet, hiera, foreman
  - Quota of 100 nodes, 240 cores
  - 28 hostgroups already created
    - Development machine (8 nodes)
    - Web servers (SSB, xrootd, WLCG transfers, Job: 40 nodes)
    - Elastic Search (6 nodes), Hadoop (4 nodes)
    - Nagios with info from vofeed.
- Migrating machines from quattor to AI
- Koji and Bamboo for build system and continuous integration



4b. Storage evaluation: Elasticsearch







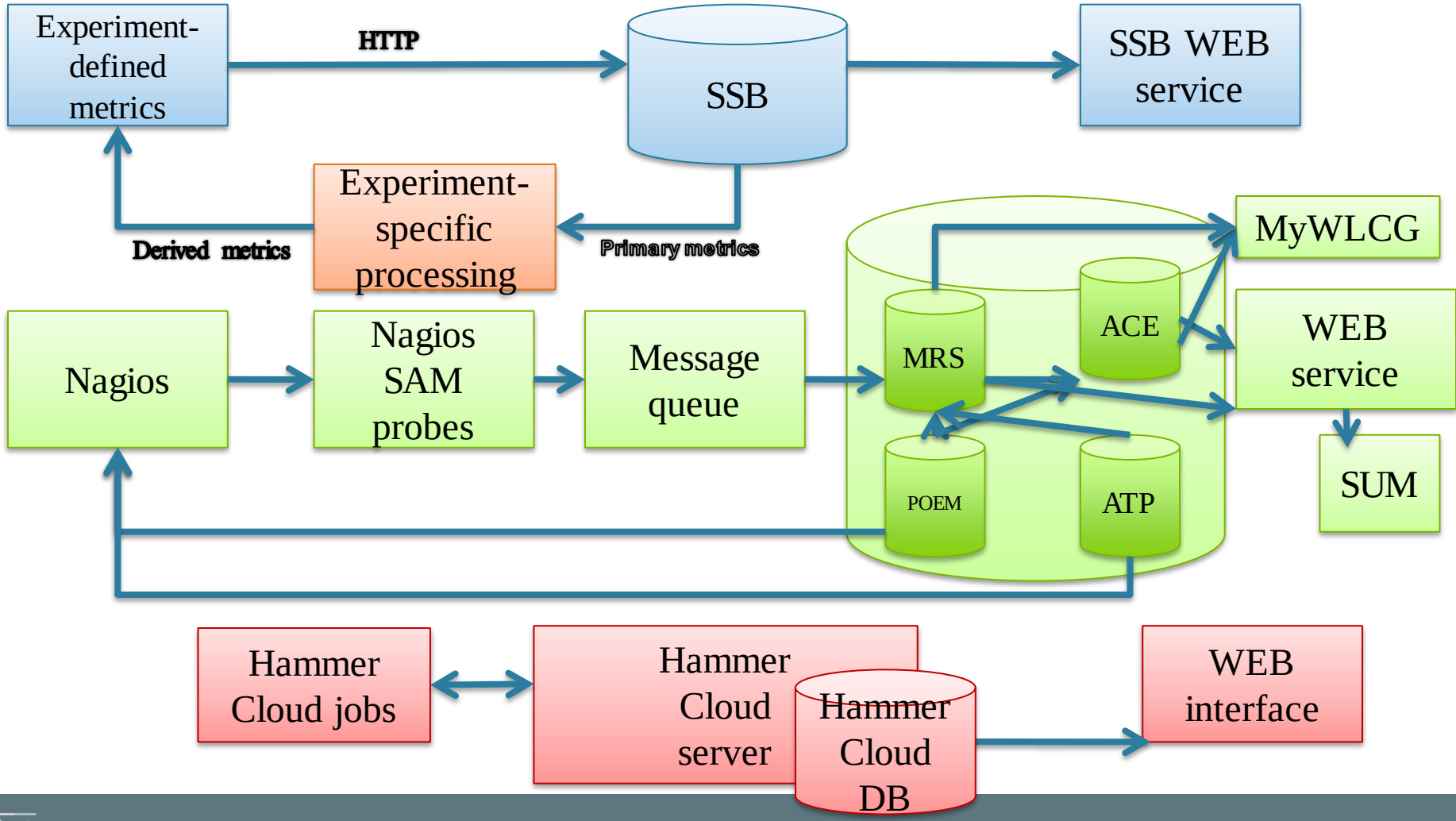
For details on other layers, see: http://cern.ch/go/pw7F

5. Merging applications

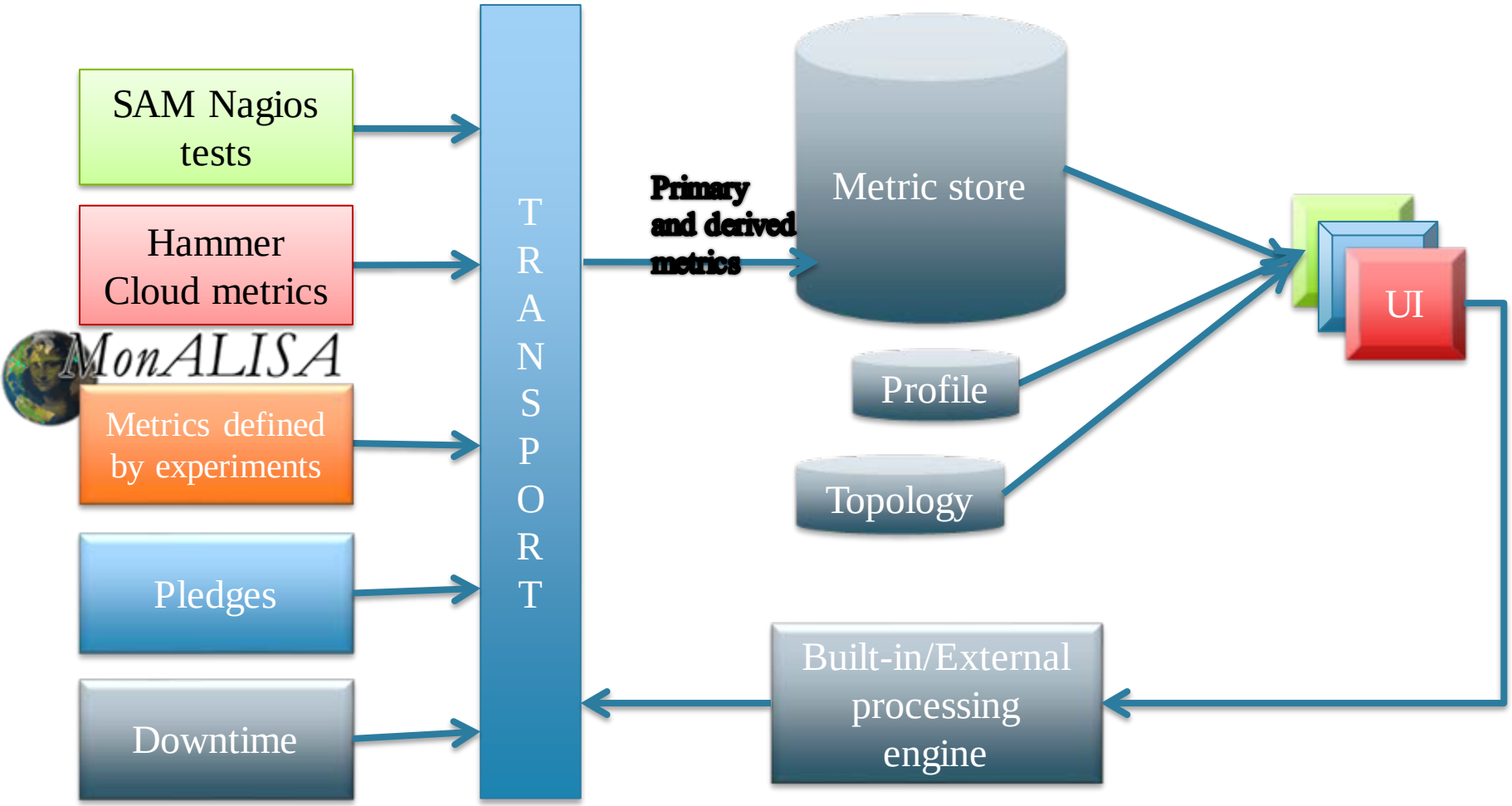
- Categories:
  - Job Monitoring
  - Data Management /Transfers
  - Infrastructure Monitoring
  - Dissemination

- Infrastructure monitoring is currently the area with more applications
  - And where we can benefit the most from common components

Infrastructure monitoring (Current state)



Infrastructure monitoring (Goal)



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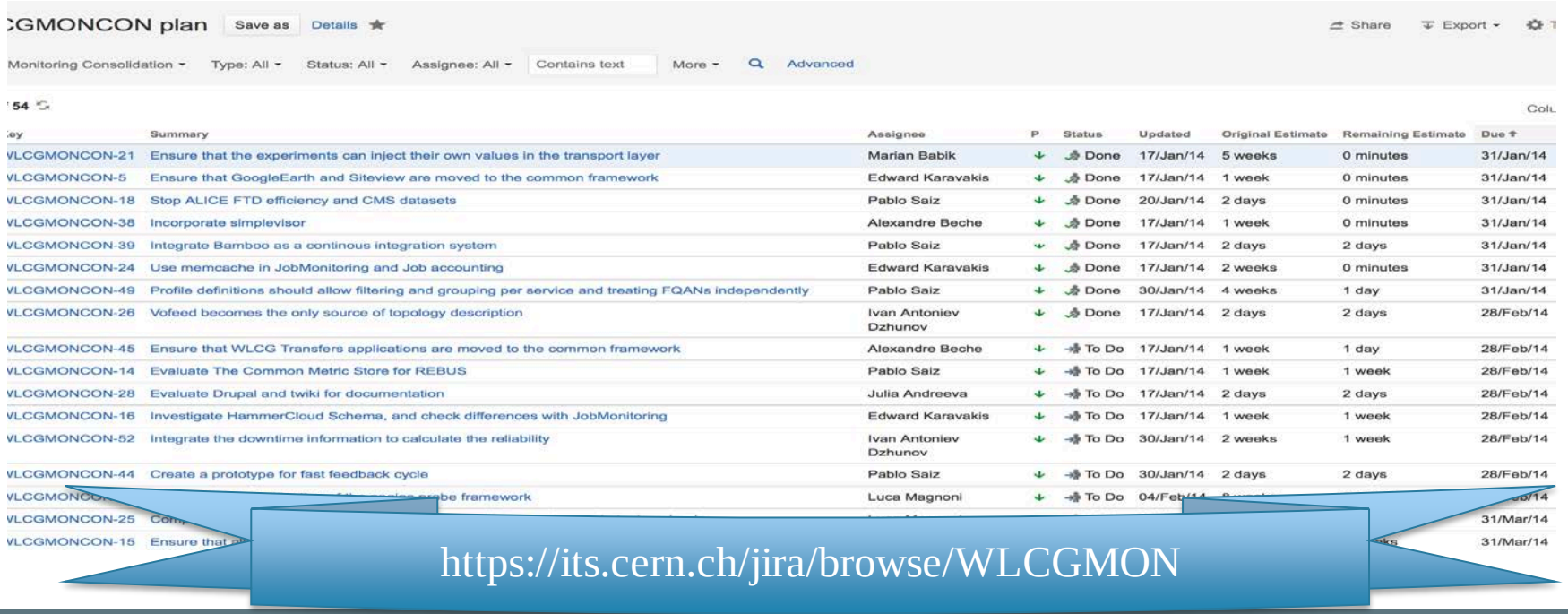
Project plan

Report with the evaluation created.

Tasks identified and inserted in JIRA



https://its.cern.ch/jira/browse/WLCGMON

Different set of tasks

1. Application support
   - Job, Transfer, Infrastructure, GoogleEarth
2. Running the services
   - Moving to AI, EGI transition, Koji, SLC6, …
3. Merging applications
   - SSB and SAM, SSB and REBUS, HammerCloud and Nagios (still under discussion)
4. Technology evaluation
   - ElasticSearch, Testing framework (see Luca's Feb GDB presentation), PostgreSQL, Django, Drupal…

1. Application support

- Support the current system
- Multiple applications identified by users/developers as under control
  - Already modular design
  - Hit the spot
- Introduce some new functionality
  - Not covered by the consolidation project
  - Example: Alexandre's Feb GDB talk 'The new WLCG Transfer dashboard'

2. Running the services

- Most of the machines moved already to openstack, puppet, SLC6
  - More will be done before end of March
  - Thanks to the Agile Infrastructure Team

- Transition of SAM EGI to consortium GRNET, SRCE and CNRS
  - Coordinated by Marian
  - See his Feb 14 Mon Consolidation talk

3. Merging applications

- Goal: reduce number of applications to maintain.
- Infrastructure monitoring:
  - Testing framework
    - Can the Nagios tests and HC Functional tests be combined
  - SAM & SSB:
    - storage and visualization already done
  - REBUS & SSB
    - Prototype ready. Still to investigate how to populate

4. Technology evaluation

- Most of the work done during the review & prototype phase
  - Effort still necessary to keep up to date
- Close collaboration with AI Monitoring

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Impact on the experiments

- Main impact on Infrastructure monitoring
  - Transition for other applications should be transparent
- Consistent data across all system
- Reduced number of UI

Topology

- Vofeed becomes single authority of topology
  - Any service, any instance
    - Also “meta” services, like the AliEn CE, CM, …
  - No cross-check with GOCDB/BDII
- Content and format will be revised

Collecting information

- Nagios
  - Optional component
    - If experiment wants it, there will be a Nagios
  - CREAM CE probe with payload
  - CondorG probe
  - Each FQAN treated as a different metric
- Injecting metrics
  - Any metric published in the transport with the correct format will be collected
  - Dynamic definition of metrics
  - Metrics could be anything:
    - Status, # successful jobs, downtime info, # transfer errors

Metric store

- Solution already existing (SSB)
- Access to current state and historical data
- Stores only status changes
- Combining metrics into views
- Used for operations by ATLAS and CMS
  - Deployed for LHCb and ALICE

- A common metric store:
  - Simplifies current architecture
  - Allows evaluation of new technologies
  - Allows concept of usability (Site Readiness)

Aggregation of metrics

- Horizontal

Site Name	cms topology	
	cms topology (flavour)	cms topology (site)
CREAM-CE ce10.pic.es	CREAM-CE	T1_ES_PIC
CREAM-CE ce11.pic.es	CREAM-CE	T1_ES_PIC
CREAM-CE ce2.particles.ipm.ac.ir	CREAM-CE	T3_IR_IPM

CMS CRITICAL (Service CE)			
org.sam.CREAMCE-JobSubmit (_cms_Role_lcgadmin)	org.sam.CREAMCE-JobSubmit (_cms_Role_production)	org.cms.WN-env (_cms_Role_lcgadmin)	org.cms.glexec.WN-gLExec (_cms_Role_pilot)
OK	OK	OK	OK
OK	OK	OK	OK
OK	OK	OK	WARNING

- Vertical

Site Name
T0_CH_CERN
T1_DE_KIT
T1_ES_PIC

CMS_CRITICAL (CE) Expand the details
OK
OK
OK

- And another horizontal

More options for aggregation

- Filtering:
  - Combine metrics depending on the value of another metric:
    - Use different profile for T1 sites
    - Take values only for one service
- Other base algorithms:
  - Currently: AND, OR
  - Still to be developed: SUM, AVG, downtime, sliding window
- Multiple levels of aggregation:
  - Queue Name → CE → Site → VO

Definition of profiles

- Experiments can define multiple profiles
  - Include list of metrics
  - Filtering
  - Topology
  - Algorithm

Site readiness

- Define status of the site, defining if the site ‘can be used by the experiment’
  - Different from Site Availability
  - Issues might be experiment specific
    - Or from a different site
- Current approach of ATLAS and CMS:
  - Read data from SSB
  - Apply their own algorithm (sliding window, depending on tier structure, granularity)
  - Inject a new metric in SSB

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WLCG Monitoring Consolidation Group

- Simplify scope/tools/maintenance to support it with half of the resources

less than half

- Prototype already deployed
  - Now, 'just' evolve it production

- Very good progress on moving to common infrastructure, and merging applications
- And plenty of work still ahead of us…