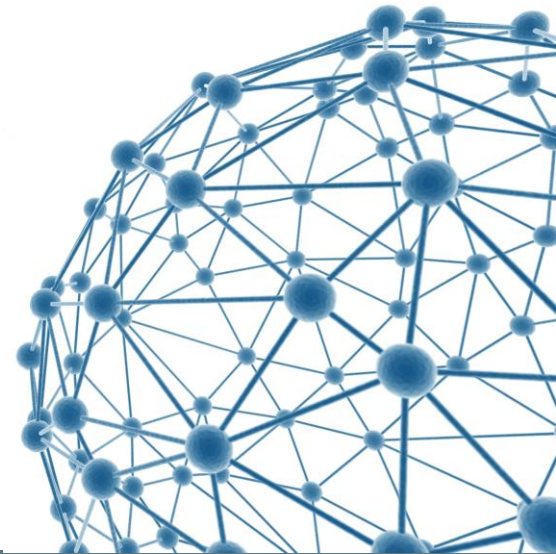




SAM Test Framework

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Outline

- SAM Test Framework
- Update on Job Submission Timeouts
 - Impact of Condor and direct CREAM tests
- SAM Test Framework Evolution

SAM test framework

- Aims at monitoring quality of services delivered by tiers and sites in WLCG
- Responsible to actively check service status
- Currently, main data source for SAM3 A/R computations and WLCG monthly reports
- Generic – schedule checks via dedicated plug-ins and handle results
 - Nagios as check scheduler
 - Checks are Nagios plugins - ~30 provided by experiments, SAM and PTs
 - Configuration system and Nagios to messaging bridge

SAM test functionality

- 3 categories of tests
 - Public Grid Services
 - Check service functionality via custom probes – storage probes (SRM)
 - Job Submission
 - Send job to a specific CE and validate that it correctly executed within the expected constraints
 - WNs
 - Execute checks on a remote WN machine
 - Check execution environment, security, core services

Recent changes

- Direct CREAM plugins in production since June
- Condor plugins in production since October
- VOMS/Proxy
 - Migration to new VOMS servers campaign run in pre-production in August
 - Entered production in September
 - Submissions with RFC proxies early next year
- HT-Condor backend support
 - Since November used to test several CMS OSG sites in production
- WebDAV plugin developed and tested
- Migration to UMD3
 - SAM Update-23 released by EGI – we'll merge the changes as both systems are still compatible

Probes/Plugins Status

Probes	Used by	Maintained by
Job Submission		
WMS CREAMCE CONDOR	LHCb, ALICE LHCb, ALICE ATLAS, CMS	SAM
Storage		
LFC	LHCb	LHCb (DPM)
SRM ¹	ATLAS, CMS, LHCb	ATLAS, CMS, LHCb
Worker Nodes		
ATLAS WN (4) ¹ CMS WN (11) ¹ LHCb WN (5) ¹	ATLAS CMS LHCb	ATLAS CMS LHCb
GLEXEC	ATLAS, LHCb, ALICE	GLEXEC PT + SAM
CMS-GLEXEC	CMS	CMS

¹ some parts/plugins are common, others are experiments specific

Job Submission Timeouts

- Follow up on status presented in February's [GDB](#)
- SAM can test Job submission with different credentials
- WNs tests may need specific group/role to be effective (e.g. glxec)
- WNs test inherits credential from Job
- Configurable timeouts for different states of particular backend
- Sites cannot prioritize SAM tests over normal jobs
- The problem: SAM tests may timeout because VO out of share
 - In February – certain timeouts were reported as critical and accounted for 38% in ATLAS, 33% in CMS of all critical states
 - Investigation has shown that this was caused by too short timeout on WMS waiting state

ATLAS Oct/Nov Job Submission

ATLAS Oct/Nov 2014 / Job submission

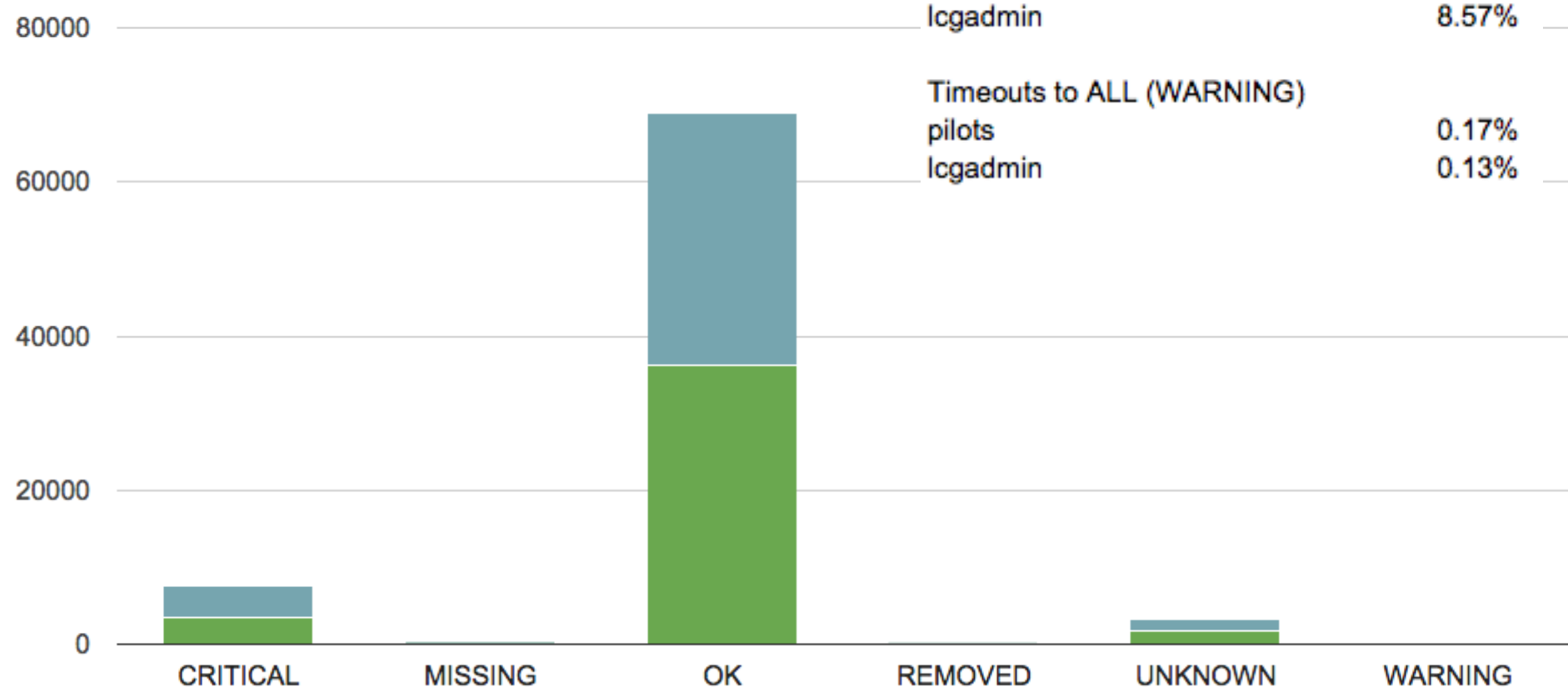
■ /atlas/Role=lcgadmin ■ /atlas/Role=pilot

CRITICAL to ALL

pilots 10.18%
lcgadmin 8.57%

Timeouts to ALL (WARNING)

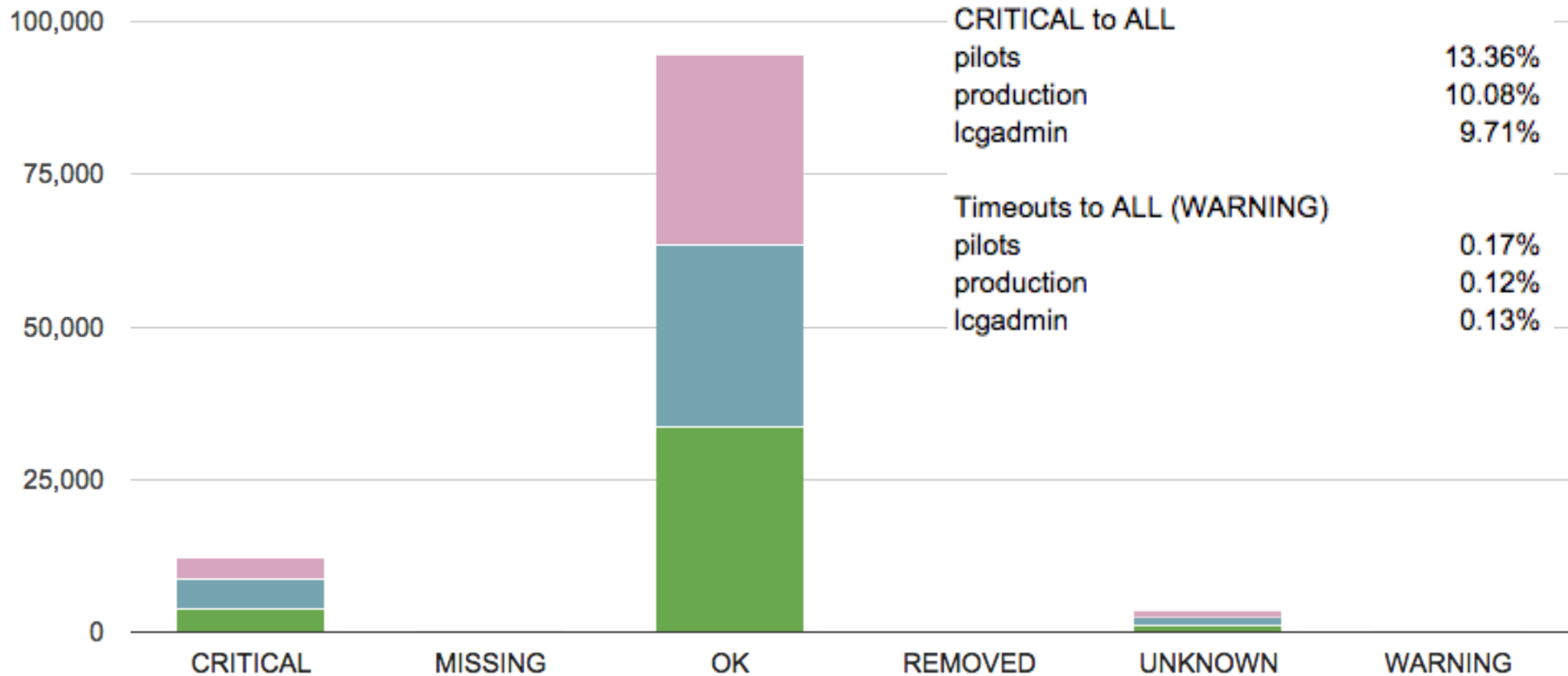
pilots 0.17%
lcgadmin 0.13%



CMS Oct/Nov Job Submission

CMS Oct/Nov 2014 / Job submission results

■ /cms/Role=lcgadmin
 ■ /cms/Role=pilot
 ■ /cms/Role=production



Job Submission Timeouts Summary

- Analysis of timeouts in February has shown that most timeouts were due to WMS
 - 45 minutes timeout too short causing job aborts by WMS
 - Small timeouts on site's side (0% CMS, 1% ATLAS)
 - It was proposed to focus on Condor/Direct CREAM
- Migration to Condor (ATLAS, CMS) was done on 1st of October
 - Currently all timeouts have warning status (not affecting site's A/R).
 - Small fraction of timeouts – all after 24 hours
 - In addition ATLAS moved to lcgadmin only tests for WLCG monthly reports
- Fundamental limitations didn't change
 - Remote monitoring requires a job to land on a site
 - However with SAM3 in production, alternative sources can be considered for A/R (accounting, experiment's sources, etc.)

Queue Selection

- Currently major source for UNKOWNs
- Queues discovered via BDII
 - For both Condor and CREAM probes
 - Correct setup of site BDII needed
- Algorithm
 - if FQAN look for resource with compatible access rule
 - (GlueCEAccessControlBaseRule=VOMS:/atlas/Role=pilot)
 - if no match then query for queues enabled for VO
 - ((GlueCEAccessControlBaseRule=VOMS:/atlas)(GlueCEAccessControlBaseRule=VO:atlas))
 - if multiple resources found – use ranking attribute – configurable
 - GlueCEStateEstimatedResponseTime
- Both LDAP filter and ranking attribute are reported in the detailed output

SAM Test Framework Evolution

- Probes/Plugins
- Test Submission Framework

Overview

- A generic test framework remains fundamental for WLCG monitoring
 - no major differences from current architecture
- Evolution
 - Overall simplification and reduction of complexity
 - Plugins – need to reflect changing technologies both in storage and job submission
 - Test Framework – keep up with changes in the technologies
 - Open Monitoring Distribution (OMD)
 - Broad range of new Nagios compatible systems (checkmk, Shinken, Icinga)
 - New features – scalability, high availability, higher frequency testing
 - Adopt new messaging libraries and clients
- Detailed technical proposal presented and discussed at [WLCG monitoring consolidation](#)

Probes/Plugins Evolution

- Storage probes (based on GFAL2)*
 - GFAL2-based python APIs used for Put-Get-Del basic SE tests
 - Tests storage on endpoints is transparent with respect to protocols (SRM, HTTPS, xRootD) via GFAL2 suited plug-ins
 - Developed by/for ATLAS, but implemented in VO-independent fashion
 - Tested endpoints paths are the only VO-related component which are to be externally fed
 - Currently tested in ATLAS pre-production
- Direct ARC probe**
 - support for SAM payload and multiple FQANs
 - currently in testing

Probes/Plugins Evolution

- Job Submission plugins – provide an open platform with support for various backends
 - Condor (HT-Condor, CREAM, ARC, GRAM), CREAM, ARC, WMS
 - Queue selection directly from experiment sources
 - Based on new Nagios plugin library
- Storage plugins
 - Update to support other protocols (FTS, xRootD, HTTP)
 - Improve integration with experiment sources
- Worker node plugins/framework
 - Refactor current bootstrapping script – streamline configuration of the environment and propagation of command line arguments
 - Introduce possibility to have multiple Nagios binaries
 - Migrate to new messaging clients (stompctl) and add new authentication methods

Test Framework Evolution

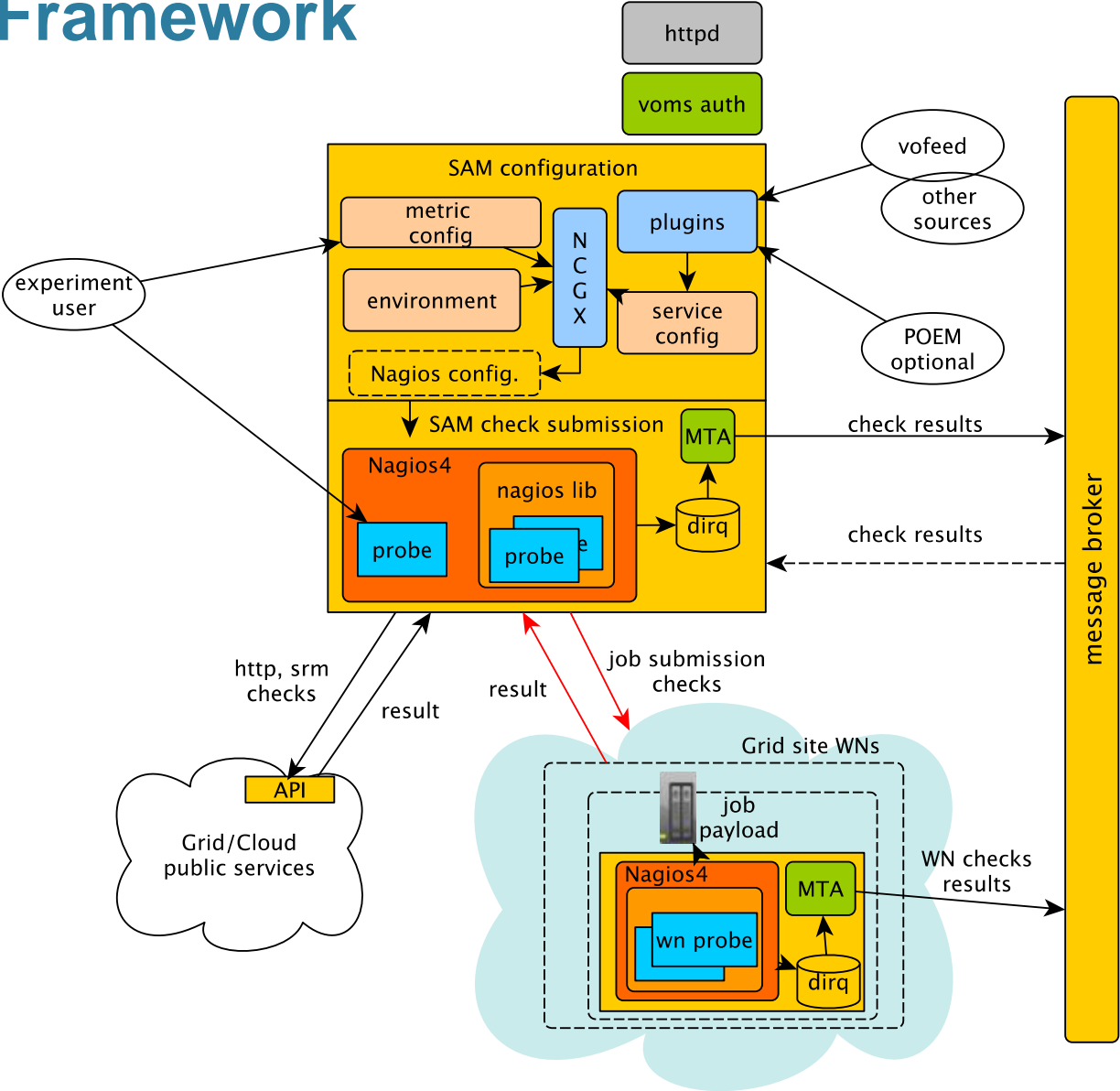
- Nagios-compatible system and Messaging will be kept
- Site and service managers notifications via Nagios will be kept
- New SAM test framework configuration will be introduced
 - Auto-generation of the Nagios configuration
 - Create separation between input sources (topology, metrics) and Nagios core configuration concepts.
- Messaging changes
 - Refactoring current Nagios-Messaging-Nagios bridge
 - Migration to new messaging libraries
- New authorization service Nagios access
- Migration to Open Monitoring Distribution
- Moving SAM/Nagios specific packages to EPEL

Summary

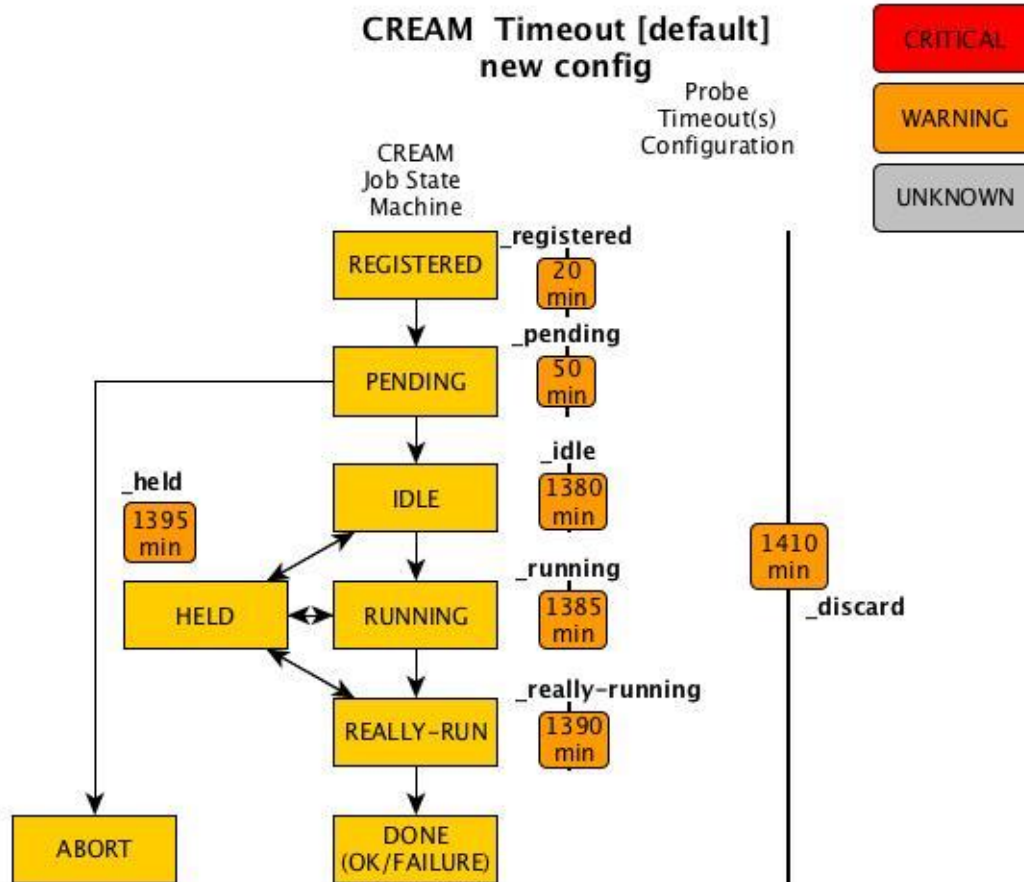
- SAM test framework
 - Many operational and development changes done this year
 - Introduced support for job submission via Condor, CREAM and ARC*
 - Significantly improved situation with scheduling timeouts
- Future of the framework
 - Similar architecture, new features
 - More open and reusable, smooth transition

Backup slides

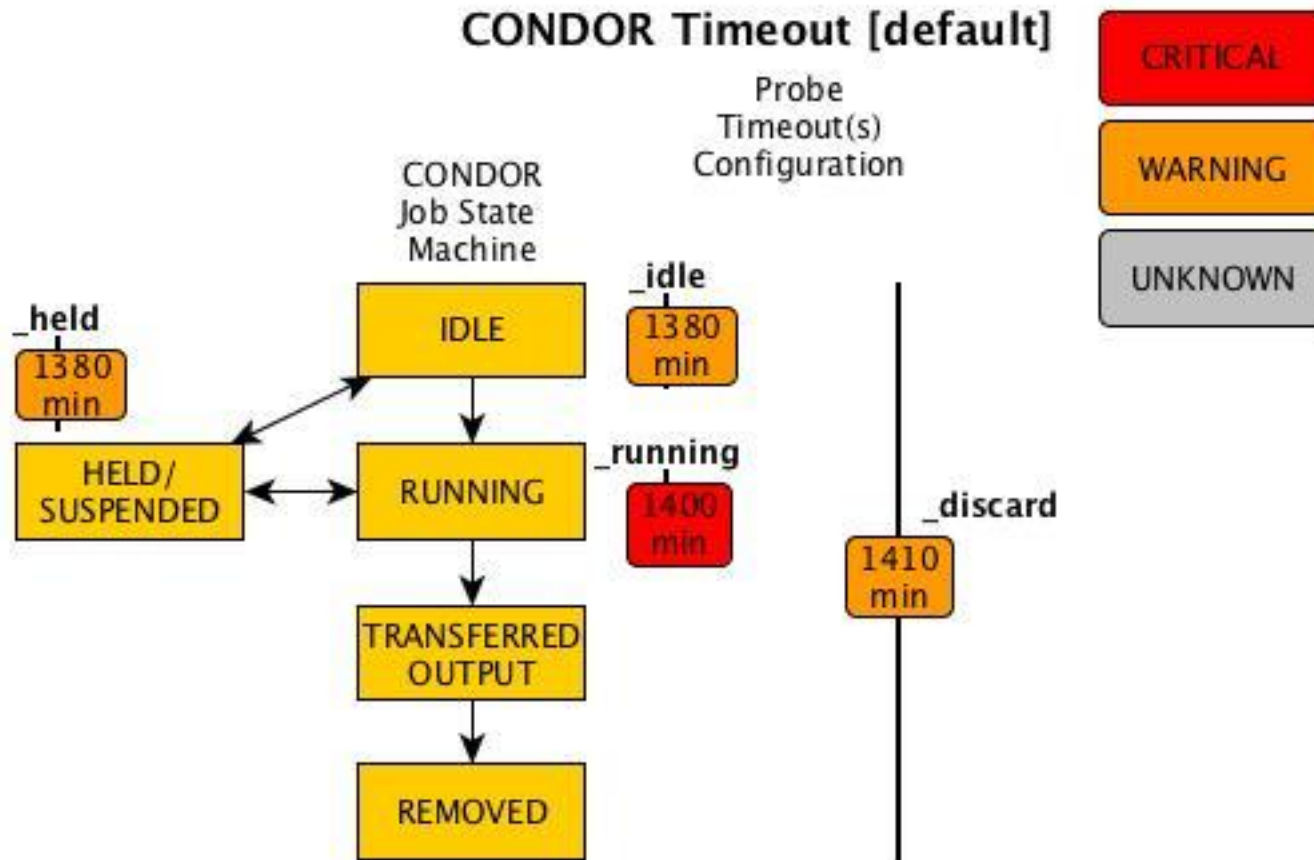
SAM Test Framework



CREAM Timeouts LHCb/ALICE



Condor Timeouts ATLAS/CMS



CRITICAL states

ATLAS lcgadmin

```
HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local user
4660 id via glexec: glexec error: [gLExec]: LCMAPS failed. The reason can be found in the syslog."
HoldReason = "CREAM error: CREAM_Job_Register Error:
3297 N5glite2ce16cream_client_api16cream_exceptions30JobSubmissionDisabledExceptionE"
HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause: FaultString=
[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] - FaultDetail=
1708 [Connection timed out]"
1241 HoldReason = "Unspecified gridmanager error"

693 HoldReason = "CREAM_Delegate Error: CN=Robot: ATLAS Data
Management,CN=531497,CN=ddmadmin,OU=Users,OU=Organic Units,DC=cern,DC=ch not authorized for
693 {http://www.gridsite.org/namespaces/delegation-2}getProxyReq
566 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause:
FaultString=[command category \\\"DELEGATION_MANAGEMENT\\\" not found!] - FaultCode=[SOAP-
566 ENV:Server] - FaultSubCode=[SOAP-ENV:Server]"
24203 CRITICAL states in total for lcgadmin
```

CMS lcgadmin

6363 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local user id via glxexec: glxexec error: [gLExec]: LCAS failed. The reason can be found in the syslog.
3759 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local user id via glxexec: glxexec error: [gLExec]: LCAS failed. The reason can be found in the logfile."
2466 HoldReason = "CREAM error: Transfer failed: GRIDFTP_TRANSFER timed out"
1473 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause: FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] - FaultDetail=[Connection timed out]"
1313 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause: FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] - FaultDetail=[Resolver internal error]"
1026 HoldReason = "CREAM error: CREAM_Job_Register Error:
N5glite2ce16cream_client_api16cream_exceptions30JobSubmissionDisabledExceptionE"
715 HoldReason = "Globus error 111: the job manager timed out while waiting for a commit signal"
530 HoldReason = "Globus error 22: the job manager failed to create an internal script argument file"
25548 CRITICAL states in total for lcgadmin

CMS prod

6365 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local user id via glxexec: glxexec error: [gLExec]: LCAS failed. The reason can be found in the syslog.
3197 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local user id via glxexec: glxexec error: [gLExec]: LCAS failed. The reason can be found in the logfile."
2453 2453 HoldReason = "CREAM error: Transfer failed: GRIDFTP_TRANSFER timed out"
1399 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause: FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] - FaultDetail=[Connection timed out]"
1309 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause: FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] - FaultDetail=[Resolver internal error]"
1035 HoldReason = "CREAM error: CREAM_Job_Register Error:
N5glite2ce16cream_client_api16cream_exceptions30JobSubmissionDisabledExceptionE"
717 717 HoldReason = "Globus error 111: the job manager timed out while waiting for a commit signal"
503 503 HoldReason = "Globus error 22: the job manager failed to create an internal script argument file"

6410 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local
6410 user id via glexec: glexec error: [gLExec]: LCAS failed. The reason can be found in the syslog.
3943 3943 HoldReason = "CREAM error: reason=127"
3791 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local
3791 user id via glexec: glexec error: [gLExec]: LCMAPS failed. The reason can be found in the syslog."
3764 HoldReason = "CREAM_Delegate Error: Authorization failure: Authorization error: Failed to get the local
3764 user id via glexec: glexec error: [gLExec]: LCAS failed. The reason can be found in the logfile."
2437 2437 HoldReason = "CREAM error: Transfer failed: GRIDFTP_TRANSFER timed out"
1340 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause:
FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] -
1340 FaultDetail=[Connection timed out]"
1313 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause:
FaultString=[connection error] - FaultCode=[SOAP-ENV:Client] - FaultSubCode=[SOAP-ENV:Client] -
1313 FaultDetail=[Resolver internal error]"
946 HoldReason = "CREAM error: CREAM_Job_Register Error:
946 N5glite2ce16cream_client_api16cream_exceptions30JobSubmissionDisabledExceptionE"
718 718 HoldReason = "Globus error 111: the job manager timed out while waiting for a commit signal"
509 509 HoldReason = "Globus error 22: the job manager failed to create an internal script argument file"
429 HoldReason = "CREAM_Delegate Error: Received NULL fault; the error is due to another cause:
FaultString=[java.lang.OutOfMemoryError: unable to create new native thread] - FaultCode=[SOAP-
429 ENV:Server] - FaultSubCode=[SOAP-ENV:Server]"