# SAM Test Scheduling:
# Today and Tomorrow

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## OUTLINE

- SAM test-framework
- Job submission tests timeout [1]
- SAM test-framework evolution

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[1] credits to Marian Babik for the help

# THE SAM TEST-FRAMEWORK

- SAM aims at monitoring the **quality of services** delivered by tiers and sites in WLCG
- The **SAM test-framework** is responsible to actively checking services status
- It is a **generic framework to schedule checks via dedicated plug-in (probes)** and to handle results
    - Nagios as checks scheduler
    - Probe: *any* script/executable
        - $\sim$ 30 probes provided by experiments, SAM and Product Teams
    - Custom configuration system, aims at hiding complexity to user

# SAM TEST FUNCTIONALITY

## 3 categories of test

1. **Public Grid services**
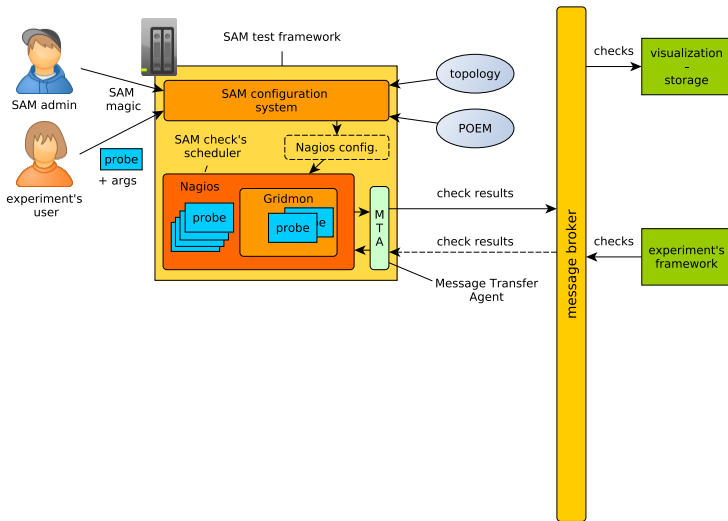   - Check service functionality via a custom probe (e.g. LFC, FTS, SRM, Proxy)
2. **Job submission**
   - Send a job **to a specific CE** and validate that is correctly executed in the expected timeout
3. **WNs**
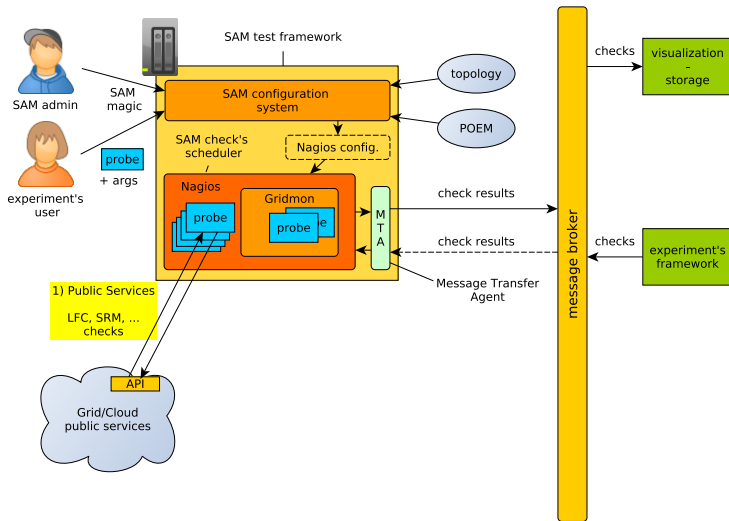   - Executes check(s) on a remote WN machine
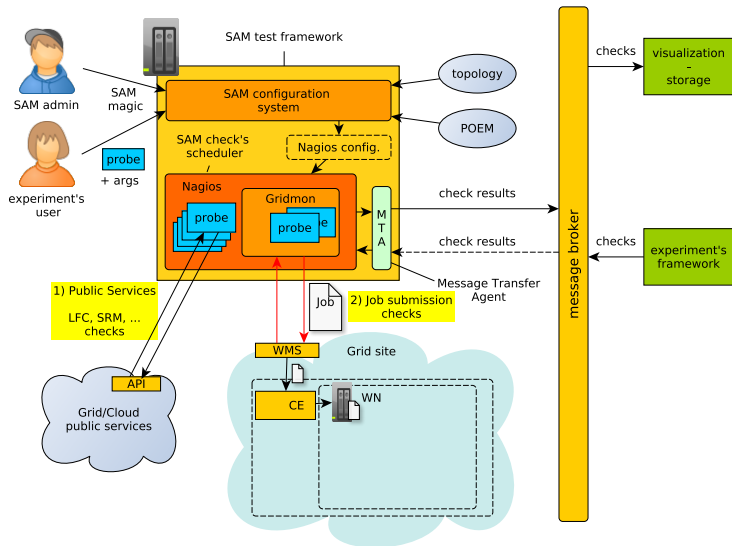   - e.g. validate glexec, check firewall configuration, copy a file

# SAM TEST-FRAMEWORK ARCHITECTURE
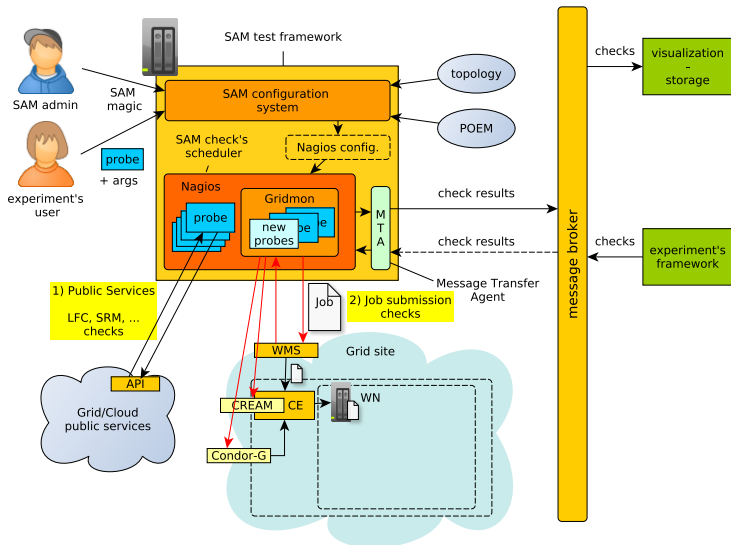
# SAM TEST-FRAMEWORK ARCHITECTURE

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SAM TEST-FRAMEWORK
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JOB SUBMISSION/WNS TESTS: TRADE-OFFS AND LIMITATIONS
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FUTURE DIRECTIONS
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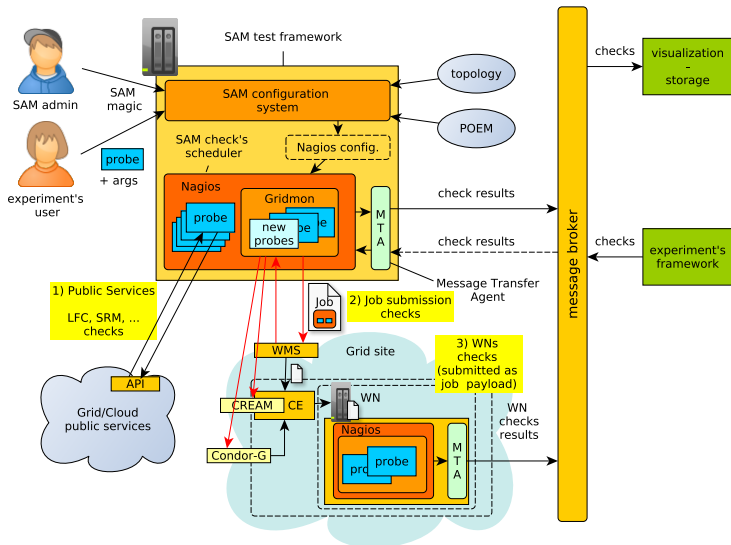
## WHERE THINGS GET COMPLICATED...

1. Public Grid service (*easy*)
   - **Schedule check at regular intervals**
   - Take care of load distribution, check sandboxing, timeouts, retry, result propagation, etc. (Nagios's job)

2. Job Submission (*easy enough*)
   - **Scheduling + babysitting of job** status, errors handling and output retrieval
   - 1 probe for each submission systems is needed

3. WNs tests (*not easy*)
   - **Scheduling + babysitting + *custom machinery***
   - Checks scheduler on WN is needed
     - Bundle stripped-out Nagios + probes + configuration + MTA and send everything as job payload
   - Increase the complexity of job submission probes

# TRADE-OFF

- Technology trade-offs:
    - Remote testing for **time-based availability/reliability reports assumes deterministic execution**
        - (e.g. 1 check able to run every X hours, with X reasonably small for operations)
    - **Check granularity**: service-level (e.g. each CE in a site) vs site-level (e.g. ability to run a job in a site)
    - **Agreement** between sites and experiment views
        - e.g. Job submission timeout

# JOB SUBMISSION TIMEOUTS: THE THEORY

- SAM can **test Job submission with different credentials**

- WNs tests may **need specific group/role to be effective**

- WNs test inherits credential from Job

- 4 **configurable Timeout(s)** for job submission

- Sites cannot prioritize SAM job tests over normal job

- **The problem: SAM Job tests may timeout because VO out of share (e.g. no room for glexec/pilot during production)**
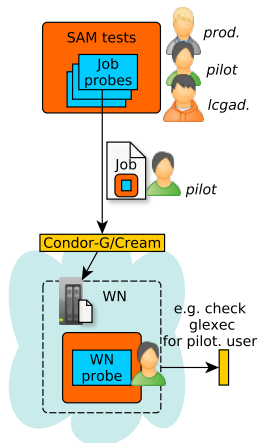
## IMPACT OF THE PROBLEM

- When a Job submission check timeouts:
  - JobSubmission metrics (e.g. *emi.cream.CREAMCE-JobState*) reported as CRITICAL
  - WNs metrics (e.g. *emi.cream.glexec.WN-gLExec*) associated with that submission reported as MISSING
- MISSING never affects site's availability
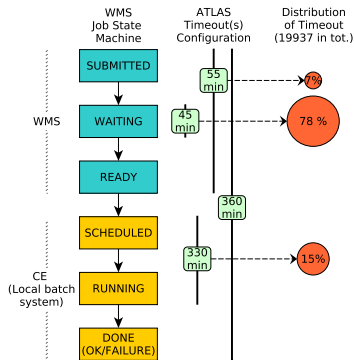- Impact on site's availability depends on experiment's critical profiles

# TIMEOUT ANALYSIS FOR ATLAS/ JAN 2014



**ATLAS Jan 2014 / Job submission results**

**Job Submission Timeout analysis**
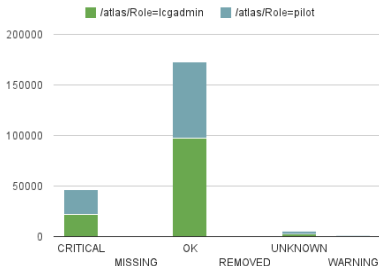
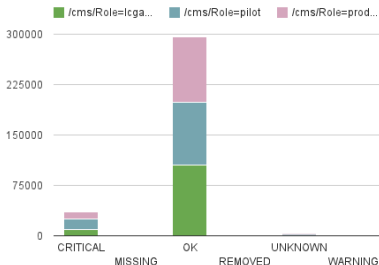■ CRITICAL causes: 58% Job discard, **38% Job Submission Timeout**, 4% Other

# TIMEOUT ANALYSIS FOR CMS / JAN 2014

**CMS Jan 2014 / Job submission results**



**Job Submission Timeout analysis**



- CRITICAL causes: 62% Job discard, **33% Job Submission Timeout**, 5% Other
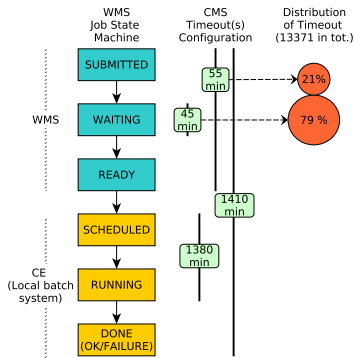
## SUMMARIZING

- Today, Job submission with different roles is needed to perform WNs checks with different credentials
- Sites cannot prioritize SAM tests over normal job without assumption on role
    - **Regardless of the job submission system used**
- Timeout analysis shows **most timeout are at WMS side**
    - 45 min timeout possibly too short, easy to change
    - Very small timeout on sites' side (0% CMS (24 hr timeout), ~1% ATLAS (6 hr timeout))
- In the future, decoupling JobSubmission (role) from WNs test may be beneficial. Some ideas:
    - glexec on WNs test
    - different submission systems to ship WNs tests (e.g. pilot)

SAM TEST-FRAMEWORK
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JOB SUBMISSION/WNs TESTS: TRADE-OFFS AND LIMITATIONS
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## SAM TEST-FRAMEWORK EVOLUTION

- A generic test framework remains fundamental for WLCG monitoring
    - with no major differences from today's architecture (SAM-Nagios)
- **Consolidation** (see Pablo's talk):
    - new Condor-G and CREAM probes for Job submission
- **Evolution**:
    - Simplification
        - To provide better user experience
        - To reduce effort needed
    - New features: (e.g. **higher test frequency**, **better scalability**, **on-demand check**)
    - Evaluate support for other test framework

# EVOLUTION: 3 AREAS OF WORK

- **New configuration**
    - Templates (to decouple SAM configuration from Nagios)
    - Provide web UI/API for users (lightweight NCG)
- **WNs checks**:
    - Simplification of the *bundle-machinery*
    - Evaluate custom scheduler
- **Checks scheduler**
    - Nagios-alternative (e.g. Icinga or Zabbix) may bring better scalability and performance
    - Easy when new configuration in place
    - Preserve probe compatibility

**Conservative/Iterative** approach for **smooth transition**:

- Make the current system evolve, component by component

# SUPPORT TEST SUBMISSION VIA OTHER FRAMEWORKS

- Investigation on going
- HammerCloud (HC) seems a first candidate
    - Stress/Functional Job-submission framework build upon exp. frameworks and workload management systems
- Interesting as alternative way to **ship WNs tests**
    - Bundle (scheduler, probes, etc.) as payload still required
    - Not adequate for Job submission checks with CE granularity
- Add dependency on experiment framework

# EXPERIMENT FEEDBACK

Discussion with experiments on-going to get feedback about
submission via other framework:

- ATLAS:
    - ATLAS in favour of hybrid scenario (WNs tests both from
      HC and as today from SAM-Nagios)
- CMS:
    - Currently not in favour of submitting WNs tests through
      condor glideins and the work load management systems
    - As a long term solution can be an approach worth
      considering

## CONCLUSION

- Future of SAM test-framework:
    - Similar architecture, better user interface, new features, smooth transition
    - Proposal will be presented in the WLCG Monitoring Consolidation forum
- On Job submission timeout:
    - Trade-off between Job submission roles and WNs tests
    - Appropriate timeout configuration will reduce most the effects, if not all
    - WMS decommissioning will change the picture
- SAM WNs test submission via other framework under investigation:
    - Tools as HC may offer alternative ways to ship WNs test
    - Big effort investment. Long term, after 2014

THANK YOU! ANY QUESTION?