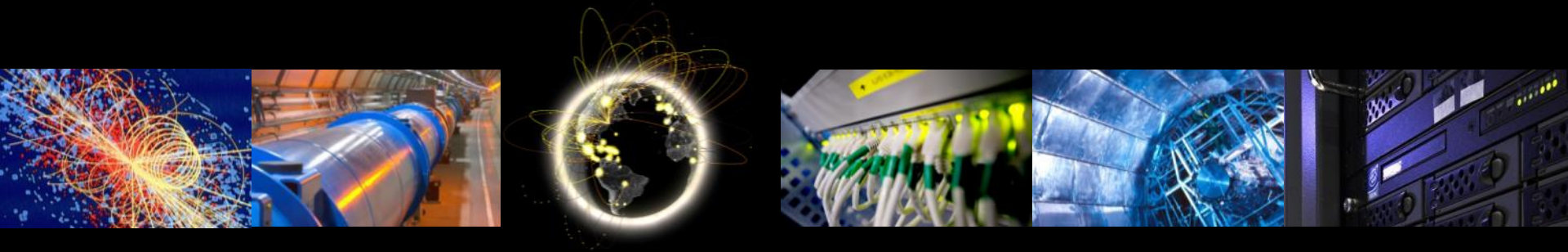


# WLCG Experiments Test Framework (ETF)

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IPv6 pre-GDB  
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# ETF

- ETF is a test framework = measurement service
  - Responsible to actively check services status
  - Focusing on functional (remote) testing of services
  - Generic framework to schedule tests via dedicated Nagios plugins (probes) and to handle/publish results to higher level services
- Replaces SAM/Nagios
- Publishes results to SAM3:
  - Aggregation, visualization and reporting
  - Supports multiple sources of metrics

# Motivation

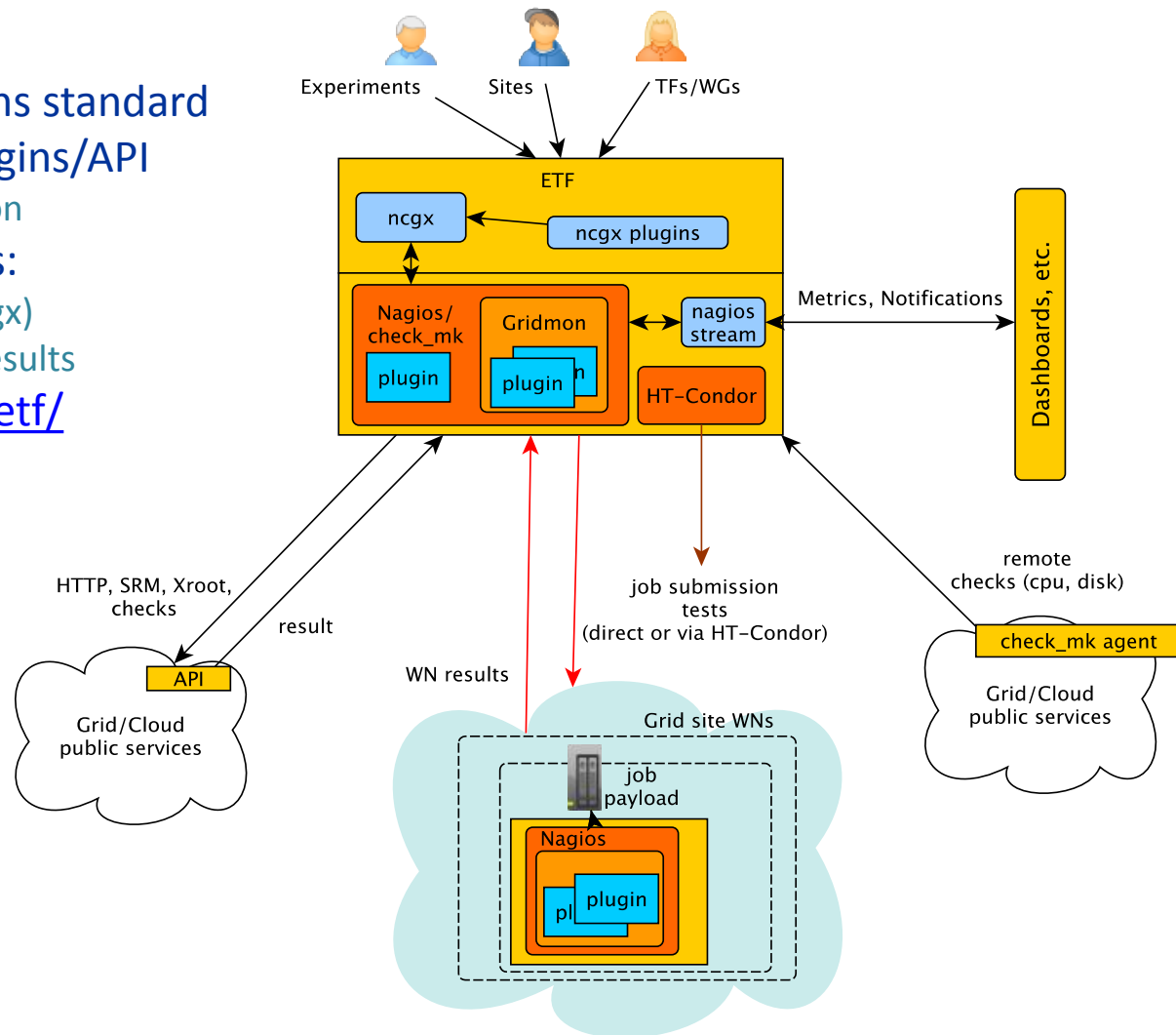
- A generic test framework remains fundamental for WLCG monitoring
  - Keeping track of sites availability/reliability
  - Running deployment campaigns
- Evolution
  - Overall simplification and reduction of complexity
  - New features – scalability, high availability, higher frequency testing, standalone deployment, streamline topology processing
  - Test Framework – keep up with changes in the technologies
    - Broad range of new Nagios compatible systems
      - Check\_MK, Shinken, Icinga
    - Open Monitoring Distribution (OMD)
    - Adopt new messaging libraries and clients
  - Migrate to the new service management technologies
    - OpenStack, Puppet

# Software Structure

- Core framework
  - Redesigned, still based on Nagios-core, integrated with [check\\_mk](#) and [OMD](#)
  - Schedule checks via dedicated plug-ins and handle results
- Plugins/Probes
  - Unchanged
- Worker node micro-framework
  - Runs tests on the worker nodes
  - Test results now taken directly from JS output

# Architecture (2)

- Based on open-source
- Pluggable using Nagios plugins standard
- Introducing frontend ETF plugins/API
  - Topology, Plugins configuration
- Just two custom components:
  - Rule-based configuration (ncgx)
  - Nagios-stream – publishing results
- Code: <https://gitlab.cern.ch/etf/>



# Plugins Status

Plugins	Used by	Maintained by
<b>Job Submission</b>		
CREAM, ARC CONDOR (CREAM, ARC, CONDOR-CE, GLOBUS)	LHCb, ALICE ATLAS, CMS	ETF
<b>Storage</b>		
GFAL2 (SRM, xRootD, etc)	ATLAS	ATLAS
SRM <sup>1</sup>	CMS, LHCb	CMS, LHCb
HTTPS/WebDAV	HTTP TF (ATLAS, LHCb)	HTTP TF
<b>Worker Nodes</b>		
ATLAS WN (4) <sup>1</sup> CMS WN (11) <sup>1</sup> LHCb WN (5) <sup>1</sup>	ATLAS CMS LHCb	ATLAS CMS LHCb
CMS-GLEXEC	CMS	CMS
<b>Network</b>		
perfSONAR	perfSONAR WG	perfSONAR WG
IPv6	IPv6 WG	IPv6 WG

# IPv6

- Production ETF should eventually be dual-stack
  - No ill effects on any site, transparent to both sites and experiments
  - Results used for the official WLCG reports
  - Timescale? April 2017? Before?
- A dedicated ETF service for IPv6 testing
  - **Prototype running since December** but needs to be integrated with Puppet management
  - Only CMS tests running on the IPv6 WG testbed nodes
  - **Other experiments interested in running their probes?**
  - **Do we want to have an IPv6-only ETF host**, given that there are ways (e.g. via env variables) to force IPv6?
    - IPv6-only not officially supported at CERN
  
- [etf-ipv6-dev.cern.ch](http://etf-ipv6-dev.cern.ch) demo



# Demo notes



# ETF for IPv6 results

- ETF for IPv6 dual stack but configured to force IPv6 (also for WN tests)
- Runs the CMS tests
- Test results mostly OK for storage (using lcg\_utils)
- Test results for CEs and WNs less OK
  - Frontier doesn't work
  - CVMFS doesn't work (most squids and Stratum-1's are IPv4-only)
  - Job submission via HTCondor works
  - Local stageout works in some (but not all) sites
  - Xrootd test failures under investigation

# Summary

- ETF in production since beg. of May
  - OpenStack/Puppet cluster
    - 4 production instances, one per VO
  - Additional instances for WLCG TFs/WGs on request
  - Stand-alone deployments possible
- IPv6 dev instance started Nov last year
  - Significantly contributed to CMS IPv6 readiness
- Possible roadmap wrt IPv6
  - Dual-stack vs IPv6 only ?
  - Adding other VOs ?
  - Moving to production ?
  - Publishing to SAM3 (and WLCG reports) ?



# Backup slides

# Introduction

- Current SAM structure
- SAM3
  - Aggregation, visualization and reporting
  - Supports multiple sources of metrics
- SAM/Nagios Test Framework
  - Measurement middleware based on Nagios
  - Active testing of services and publishing the results to SAM3
  - Common to all experiments
  - Main source of metrics for WLCG A/R reports
- WLCG Experiments Test Framework (ETF) is the new SAM/Nagios Test Framework
  - Follow up on a discussion at [GDB](#) and [technical specification](#)

# VO feeds

- ATLAS
  - <http://atlas-agis-api.cern.ch/request/atp/xml>
- CMS
  - <http://wlcg-sam-cms.cern.ch/dashboard/request.py/cmssitemapbdii>
- LHCb
  - [http://lhcb-web-dirac.cern.ch/topology/lhcb\\_topology.xml](http://lhcb-web-dirac.cern.ch/topology/lhcb_topology.xml)
- Alice
  - <http://wlcg-sam-alice.cern.ch/dashboard/request.py/alicesitemap>

# Changes and Impact

- ETF is still based on Nagios-core using exact same Nagios plugins, but brings several updates:
  - Middleware updated to the latest baseline versions (UMD, HT-Condor 8.4 and GFAL2 2.9.3)
  - Nagios-core updated to 3.5
- Additional changes that could impact sites, announced back in Feb at the WLCG ops coordination:
  - Testing with RFC proxies (coordinated by RFC TF)
  - All services in the VO feeds will be tested (see backup slides)
    - Experiments can filter, which services go into reports
  - New HTTP tests (coordinated by HTTP TF)
- Production
  - CMS, LHCb and Alice entered production on April 25<sup>th</sup>
  - ATLAS entered production on May 10<sup>th</sup>
    - validation of the GFAL2 probes

# Open Monitoring Distribution














- Open-source, bundles common monitoring components
- Features
  - Bundles Nagios-core and Check\_MK
  - New web interface (Check\_MK)
  - Livestatus JSON API – compiled as part of the Nagios-core (very fast) – easy to get snapshot of all states
  - Additional 400 plugins
  - Support for distributed deployment (via gearman)
  - Remote metrics readout via dedicated agent check\_mk-agent
    - Supports auto-discovery of remote metrics
  - Supports running multiple instances on one box
    - Sandboxed environment, easy to run in a container
  - Advanced notifications
    - Configurable via web interface

# Check\_MK

- New web interface (check\_mk) available with many new features
  - Full text quick search
  - More polished, contains mobile version

Clearly indicates which tests can be rescheduled

Metric is OK since 14th January 10:28

State	Service	Icons	Status detail	Age	Checked	Perf-O-Meter
OK	emi.cream.glexec.WN-gLExec-/atlas/Role=pilot	 	atlas-wn-806.roma1.infn.it: OK: Success	2016-01-28 04:12:07	5 hrs	
OK	org.atlas.WN-cvmfs-/atlas/Role=lcgadmin		atlas-wn-801.roma1.infn.it: OK	2016-01-14 10:28:17	71 min	
OK	org.atlas.WN-FrontierSquid-/atlas/Role=lcgadmin		atlas-wn-801.roma1.infn.it: OK	2016-01-14 09:28:17	71 min	
OK	org.atlas.WN-swspace-/atlas/Role=lcgadmin		atlas-wn-801.roma1.infn.it: OK	2016-01-14 09:28:17	71 min	
OK	org.atlas.WN-swspace-/atlas/Role=pilot	 	atlas-wn-806.roma1.infn.it: OK	2016-01-14 09:35:43	5 hrs	
OK	org.sam.CONDOR-JobState-/atlas/Role=lcgadmin	 	>>> Discover CE resource endpoint in BDII	62 sec	62 sec	
OK	org.sam.CONDOR-JobState-/atlas/Role=pilot		OK: [IDLE] 822937	9 hrs	2 min	
UNKN	org.sam.CONDOR-JobSubmit-/atlas/Role=lcgadmin		UNKNOWN: No compatible resource found in BDII	16 min	16 min	
OK	org.sam.CONDOR-JobSubmit-/atlas/Role=pilot	 	OK: COMPLETED	9 hrs	5 hrs	

Indication of stale metrics (last updated 5 hrs ago)

- Legacy Nagios web interface is still supported
  - Available at <https://<host>/etf/nagios>



# Check\_MK central

- Centralized web interface based on check\_mk
  - Provides site view summaries
  - Beta-testing at <http://etf.cern.ch>

The screenshot displays the Check\_MK central interface for a host search of 'pic.es'. The interface includes a sidebar with navigation options like 'Overview', 'Hosts', 'Host Groups', and 'Services'. The main content area shows a 'Host search pic.es' header with 26 rows of results, categorized into ATLAS, LHCb, and CMS. Each category contains a table of host status and metrics.

**Host search pic.es** 26 rows /DC=ch/DC=cern/OU=Organic Units/OU=Users/CN=mbabik/CN=555091/CN=Marian Babik (admin) 10:34

**Tactical Overview**

Hosts	Problems	Unhandled
1099	2	2
Services	Problems	Unhandled
13781	2210	2210

**Quicksearch**

pic.es

**Views**

- Overview
  - Host & Services Problems
  - Main Overview
  - Network Topology
- Hosts
  - All hosts
  - All hosts (Mini)
  - All hosts (tiled)
  - Favorite hosts
  - Host search
- Host Groups
  - Host Groups
  - Host Groups (Grid)
  - Host Groups (Summary)
- Services
  - All services
  - Favorite services
  - Recently changed services
  - Serv. by host groups

**ATLAS**

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce07.pic.es		9	0	0	0	0
UP	ce10.pic.es		9	0	0	0	0
UP	ifaece03.pic.es		9	0	0	0	0
UP	webdav-at1.pic.es		13	0	0	0	0

**LHCb**

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce01.pic.es		10	1	0	0	0
UP	ce09.pic.es		10	1	0	0	0
UP	srmhcb.pic.es		7	0	0	0	0

**CMS**

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce01.pic.es		17	0	1	0	0
UP	ce09.pic.es		18	0	0	0	0
UP	srmcms.pic.es		8	0	0	0	0

**Summary Tables (Right Side)**

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce08.pic.es		9	0	0	0	0
UP	ce11.pic.es		9	0	0	0	0
UP	ifaece02.pic.es		9	0	0	0	0
UP	srmifae.pic.es		16	0	0	0	0

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce07.pic.es		10	1	0	0	0
UP	ce10.pic.es		9	1	1	0	0
UP	webdav-lhcbt1.pic.es		12	0	0	0	0

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce08.pic.es		10	1	0	0	0
UP	ce11.pic.es		10	1	0	0	0

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce07.pic.es		18	0	0	0	0
UP	ce10.pic.es		18	0	0	0	0

state	Host	Icons	OK	Wa	Cr	Un	Pd
UP	ce08.pic.es		18	0	0	0	0
UP	ce11.pic.es		18	0	0	0	0

refresh: 60 secs

# Roadmap

- Notifications and site-based host groups
- Refactoring of worker node framework
  - Investigate if we could migrate to standardized agents: collectd, ganglia, check\_mk
- Refactoring of job submission plugins
  - Consolidate existing code-base
- Investigate cloud-based service availability monitoring
  - Build up on existing FedCloud plugins
    - OpenStack - basic VM lifecycle
  - Support for cloud-based models w/o remote API (VAC)
- Prepare for upcoming CentOS 7 and IPv6

# Links

- Documentation:  
<http://etf.cern.ch/docs>
- Deployment/Users:  
<http://cern.ch/go/7Hjs>
- Code:  
<https://gitlab.cern.ch/etf/>
- Support channels (unchanged):
  - GGUS ticket to WLCG Grid Monitoring
  - 3<sup>rd</sup> level SU: WLCG Experiments Probe Submission Framework

Users	Instance(s)
ATLAS, HTTP, RFC TFs	<a href="http://etf-atlas-prod.cern.ch">etf-atlas-prod.cern.ch</a>
CMS, RFC TF	<a href="http://etf-cms-prod.cern.ch">etf-cms-prod.cern.ch</a>
LHCb, HTTP, RFC, MJF TFs	<a href="http://etf-lhcb-prod.cern.ch">etf-lhcb-prod.cern.ch</a>
Alice, RFC TF	<a href="http://etf-alice-prod.cern.ch">etf-alice-prod.cern.ch</a>
IPv6 WG	<a href="http://etf-ipv6-dev.cern.ch">etf-ipv6-dev.cern.ch</a>
perfSONAR*	<a href="http://psomd.grid.iu.edu">psomd.grid.iu.edu</a>

# ETF Architecture

