



eTICS2
The Grid Quality Process

SA1

Service Management

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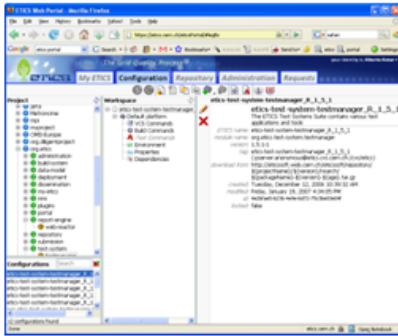
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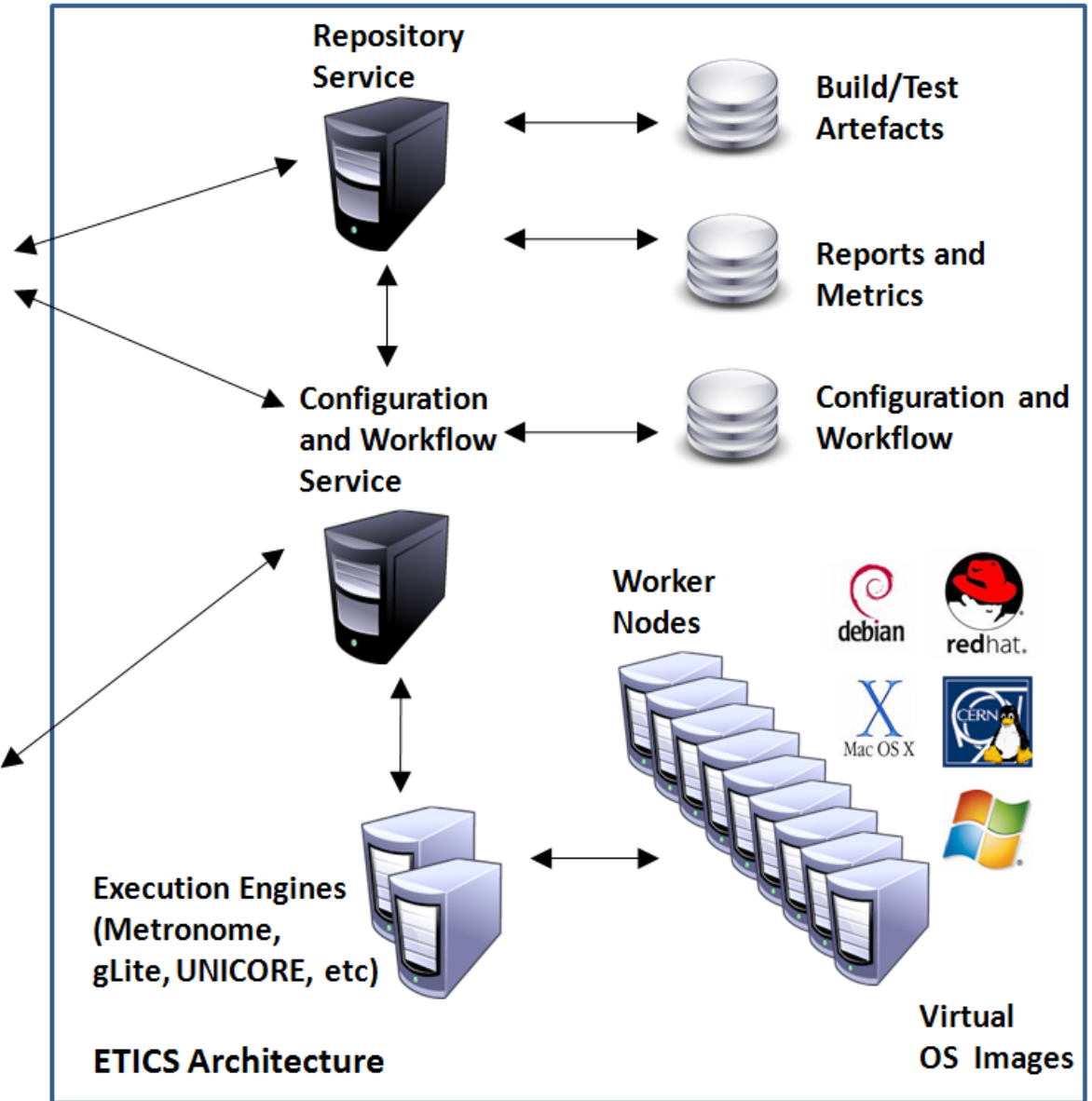


SA1 Services

Web Application



Command Line User Interface



Objectives and Results



SA1 Objectives

from the ETICS2 Technical Annex

- Maintain and extend existing ETICS core functionality
- Deliver federated and secure repositories and release mgmt tools
- Provide second level user support with tracking of support tickets
- Assess and implement scalable strategies
- Ensure high availability of core services and infrastructure
- Automate core service monitoring (e.g. alerts triggered, thresholds)
- Review and integrate extensions from SA2 and from JRA activities
- Improve core services, sites autonomy and preserve security
- Apply ETICS Certification Process to ETICS Services



SA1 Objectives and Results (1/3)

Maintain, extend existing ETICS core functionality

The ETICS services and infrastructure reliability always above targets
Improved Service, User Interfaces (both CLI, WUI), QA Metrics, Reports

Deliver federated secure repositories, release tools

Moved to High Availability secure storage for all repositories (AFS)
Automated generation of packaging for RPM, APT, YUM, TAR, etc

Provide second level user support , tracking tickets

Second level support fully integrated with the SA2 support
Using the GGUS ticketing system for all user support activities



SA1 Objectives and Results (2/3)

Assess and implement scalable strategies

Moved from local disk servers to central scalable storage

Moved from physical to virtual worker nodes, static and on demand

Ensure high availability core services/infrastructure

All Services are on high availability systems, with defined procedures

Automated installations, backup and restore of servers and nodes

Automate core service monitoring, alerts, thresholds

Implemented verification sensors, integrated monitoring systems

Alerts/diagnostics are immediately propagated by email and sms



SA1 Objectives and Results (3/3)

Review and integrate extensions from SA2, JRA activities

SA2 job submission engines (gLite, UNICORE, Amazon) integrated
JRA2 metrics plugins, test and plugin designers integrated

Improve services, autonomy and preserve security

ETICS services successfully installed in many partner sites

Security assessed. Access to services allowed only to registered users

Apply ETICS Certification to ETICS Services

AQCM reports generated and applied to the ETICS services

Services certified with the AQCM evaluation modules available (DSA1.5)



Major Achievements



Major Year 1 Achievements

Monitoring and Alarms System

Integrated Monitoring System (web, sms, messaging, etc) at CERN

Client Performance

Improved performance for users and usage of the available hardware (200% to 900% better, gLite < 4h)

Web Interface

Better launch, information and control on the jobs

Runs on IE, Firefox, Chrome on Windows, OS X, Linux

Repository

Major important improvements, scalable and much faster

New browser interface and addressing based on URLs

Expanded Infrastructure

High Availability and scalable resources (AFS, VM, etc)

All ETICS Worker Nodes are Virtual Machines

Added platforms SL5 and Debian 5, 32 and 64 bits

Automated generation of packaging for RPM, APT, YUM, TAR, etc



Improved Alarms and Monitoring in Year 2

INFSO-RI-223782

Added NAGIOS Sensors

Integrated using the Nagios Monitoring System

Widely used in grid and industry

Nagios

General

- Home
- Documentation

Current Status

- Tactical Overview
- Map
- Hosts
- Services
- Host Groups
 - Summary
 - Grid
- Service Groups
 - Summary
 - Grid
- Problems
 - Services (Unhandled)
 - Hosts (Unhandled)
 - Network Outages

Quick Search:

Reports

- Availability
- Trends
- Alerts
 - History
 - Summary
 - Histogram
- Notifications
- Event Log

Current Network Status
 Last Updated: Thu Feb 25 17:29:03 CET 2010
 Updated every 90 seconds
 Nagios® Core™ 3.2.0 - www.nagios.org
 Logged in as *eticsop*

[View Service Status Detail For All Host Groups](#)
[View Status Overview For All Host Groups](#)
[View Status Summary For All Host Groups](#)
[View Status Grid For All Host Groups](#)

Host Status Totals

Up	Down	Unreachable	Pending
78	15	0	0

[All Problems](#) [All Types](#)

15	93
----	----

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
9	1	0	0	0

[All Problems](#) [All Types](#)

1	10
---	----

Host Status Details For All Host Groups

Host ↑↓	Status ↑↓	Last Check ↑↓	Duration ↑↓	Status Information
etics	UP	02-25-2010 17:28:32	9d 3h 19m 50s	PING OK - Packet loss = 0%, RTA = 0.22 ms
etics-bud	UP	02-25-2010 17:26:12	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 2.01 ms
etics-dev	UP	02-25-2010 17:27:52	0d 6h 23m 21s	PING OK - Packet loss = 0%, RTA = 0.20 ms
etics-dev-repository	UP	02-25-2010 17:26:32	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 0.75 ms
etics-hd	UP	02-25-2010 17:26:02	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 3.65 ms
etics-int	UP	02-25-2010 17:28:02	0d 14h 23m 41s	PING OK - Packet loss = 0%, RTA = 3.14 ms
etics-int-repository	UP	02-25-2010 17:27:42	0d 14h 24m 1s	PING OK - Packet loss = 0%, RTA = 3.46 ms
etics-repository	UP	02-25-2010 17:26:42	9d 5h 25m 40s	PING OK - Packet loss = 0%, RTA = 0.39 ms
etics-test	UP	02-25-2010 17:26:12	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 1.11 ms
etics-test-repository	UP	02-25-2010 17:26:12	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 4.42 ms
etics-uow	UP	02-25-2010 17:26:42	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 3.64 ms
etics1-repository	UP	02-25-2010 17:26:42	1d 0h 20m 3s+	PING OK - Packet loss = 0%, RTA = 0.80 ms
etics2	UP	02-25-2010 17:28:32	9d 3h 19m 50s	PING OK - Packet loss = 0%, RTA = 0.54 ms


Done



Metrics Disseminator and Project Dashboard

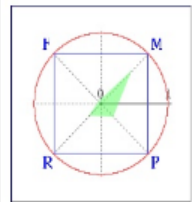
Every project, subsystem, component has metrics collected, nicely presented
 Can be grouped in a dashboard for a comprehensive view on the status and metrics of the software and of the whole project

Project Summary



Project Name : org.etics
 Description : The ETICS System

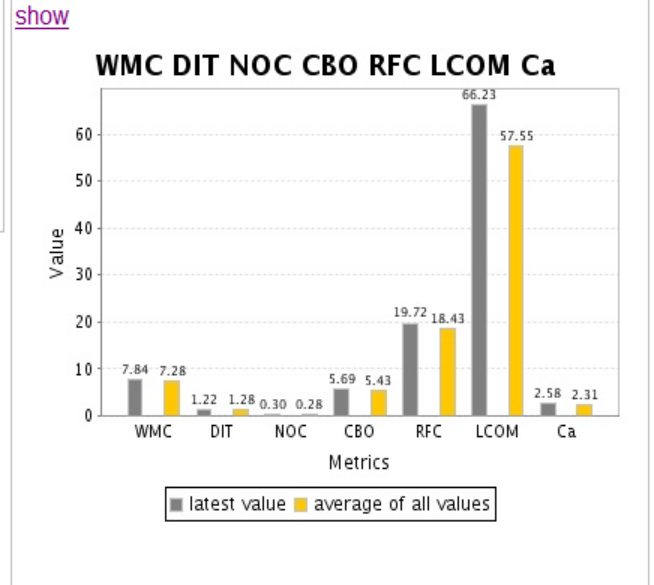
ETICS
[VCS](#)
[Repository](#)
[Homepage](#)
 Created : Wed Mar 22 08:51:42
 Modified : Sat Aug 01 01:15:06



AQCM Results :

- Maintainability 0.6553551
- Portability 0.2694004
- Reliability 0.2694004
- Functionality 0.04082789

[Complete Report](#)



Portability Per Platform

Configurations: **slc4_ia32_gcc346**

[Refresh](#)

Configuration	Status
etics-dev 20 October 2009 10:08:23	Success
etics_int 20 October 2009 02:01:56	Success
etics_R_2_4_4_RC3 06 August 2009 20:38:52	Success

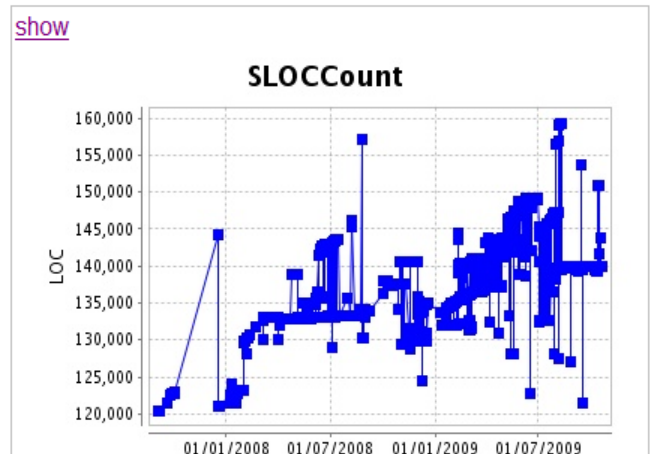
[Refresh](#)

Jobs History

[Refresh](#)

	Type	Date	User	Project	Configuration	Platform	Status
1	build	20 October 2009 18:46:53	ETICS Scheduler	org.etics	etics_branch_2_5_0	Submitting	Submitting
2	build	20 October 2009 12:46:53	ETICS Scheduler	org.etics	etics_branch_2_5_0	Submitting	Submitting
3	build	20 October 2009 10:08:23	Marco Canaparo	org.etics	etics-dev	slc4_ia32_gcc346	Success
4	build	20 October 2009 06:46:53	ETICS Scheduler	org.etics	etics_branch_2_5_0	Submitting	Submitting
5	build	20 October 2009 02:01:56	ETICS Scheduler	org.etics	etics-dev	slc4_ia32_gcc346	Success
6	build	20 October 2009 02:01:56	ETICS Scheduler	org.etics	etics_int	slc4_ia32_gcc346	Success
7	build	20 October 2009 00:46:51	ETICS Scheduler	org.etics	etics_branch_2_5_0	Submitting	Submitting
8	build	19 October 2009 18:46:54	ETICS Scheduler	org.etics	etics_branch_2_5_0	Submitting	Submitting
9	build	19 October 2009 15:01:12	Marco Canaparo	org.etics	etics-dev	slc4_ia32_gcc346	Success
10	build	19 October 2009 14:10:21	Marco Canaparo	org.etics	etics-dev	slc4_ia32_gcc346	Success

[Refresh](#)



Multi-Node Dynamic Testing

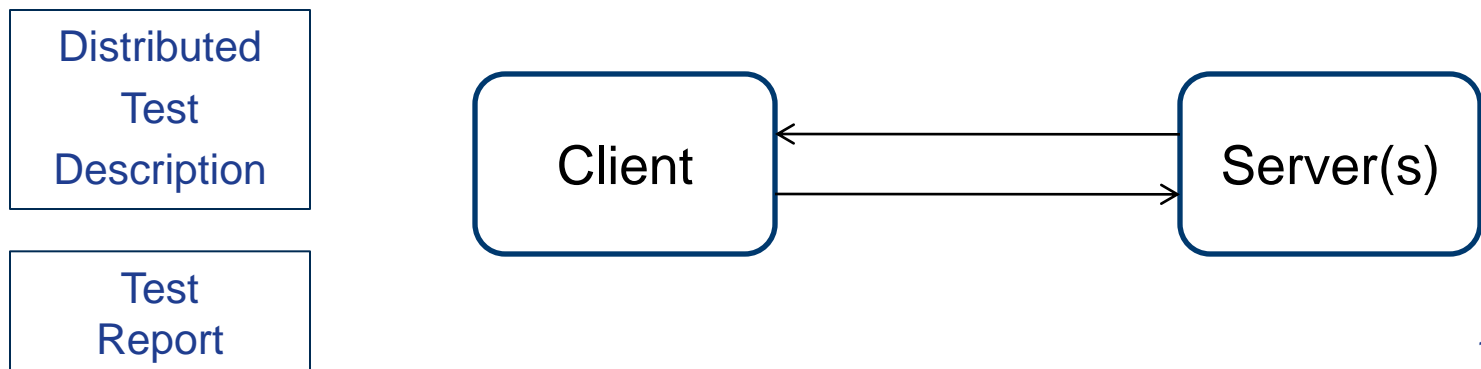
Ability to setup scenarios where multiple services are automatically deployed and started on multiple nodes

These services must be able to work as if they would be installed performing any operation in the required order

Multi-node distribute testing is crucial for grid services

Very important (and unique) feature of ETICS
Is that AUTOMATICALLY

- Start the test nodes
- Synchronize them
- Run the distributed test
- Collect and report the test results



Project

- All ETICS Projects
 - ARC
 - multinode
 - arc-multinode-test
 - arc-client-test
 - arc-server-test
 - arc-budapest
 - arc-client
 - arc-servers
 - arc-test
 - arc0
 - my_playground
 - test2
 - test3
 - test4
 - castor
 - Condor
 - dicom
 - EGRID
 - etics-contrib
 - etics-test-project
 - ETICSVMLibrary
 - externals
 - glite-release
 - gLite_ipv6
 - Grid-Ireland
 - gridice
 - gridtestbed
 - gridway

Workspace

- My Workspace
 - arc-multinode-test_1_0_0
 - arc-client-test_R_1_0_0_1
 - Scientific Linux 5 (ia32) with gcc 4.1.2
 - Test Commands
 - Properties
 - Environment
 - Deployed Software
 - arc-server-test_R_1_0_0_1
 - Scientific Linux 5 (ia32) with gcc 4.1.2
 - Test Commands
 - Properties
 - Environment
 - Deployed Software
 - arc-servers_NOX_1_0_0
 - torque-deployment_2_4_7_1

Configurations Filter

arc-multinode-test_1_0_0

1 configurations found

Submit Remote Test for 'arc-multinode-test_1_0_0'

General

logging: verbose

Checkout

environment: Propagate environment and properties from **ARC.HEAD**

checkout: Use custom checkout behaviour: **possibly** build from **bin**

Test Execution

execution: Do not stop on errors

Host

host selection

- Same platform for all nodes:
 - RedHat AS 4 (ia32) with gcc 3.4.6
 - RedHat Linux 4 (x86_64) with gcc 3.4.6
 - Scientific Linux 5 (ia32) with gcc 4.1.2**
 - Scientific Linux 5 (x86_64) with gcc 4.1.2
 - SUSE Linux 11 (x86_64) with gcc 4.4.1
- Select platform for each node:
 - arc-server-test **CERN Scientific Linux 3 (ia32) with gcc 3.2**
 - arc-client-test **CERN Scientific Linux 3 (ia32) with gcc 3.2**

privileges: Run as Root

Private Results

Use private resources

Enable IPv6

freeze: Freeze the node for **10** minutes

requirements: Append Requirements:

Submission Parameters

Checkout Command: etics-checkout --config "arc-multinode-test_1_0_0" --forcecheckout arc-multinode-test

Test Command: etics-test --config "arc-multinode-test_1_0_0" --forcecheckout arc-multinode-test

Platforms: sl5_ia32_gcc412,

Requirements: runasroot;

Integration of External Repositories

Developers have access to the external standard repositories from within the ETICS Portal

The screenshot shows the ETICS Portal interface. At the top, there is a navigation bar with tabs: Welcome, Submissions, Configuration, Repository, QA, TestSystem, and Administration. The 'Repository' tab is selected. On the left, a 'Tree' view shows a hierarchy of repositories including CERN SLC4, DAG EL4, DAG EL5, and EPEL 4, along with various software packages like clamav, geos, and python-pea. The main content area displays a 'Welcome to the ETICS Repository' message, an ETICS Repository logo, and a list of statistics: 37 Projects, 1516 Modules, 75215 Packages, 3366 Main Reports, 59199 Module Reports, and 62 Packages. Below the statistics is a table with columns for Namespace, Project, Module, Configuration, Platform, and Date.

Welcome

Submissions

Configuration

Repository

QA

TestSystem

Administration

Tree



Details

- ETICS Repository
 - Registered
 - Volatile
 - CERN SLC4 (i386)
 - CERN SLC4 (x86_64)
 - CERN SLC5 (i386)
 - CERN SLC5 (x86_64)
 - DAG EL4 (i386)
 - DAG EL4 (x86_64)
 - DAG EL5 (i386)
 - DAG EL5 (x86_64)
 - EPEL 4 (i386)
 - debug clac-004-1
 - clamav-0.9 duplicity-
 - dvdisaster geomview-d
 - geos-2.2.3 globus-gsi
 - globus-gsi gromacs-co
 - gromacs-cs lcgdm-deve
 - lcms-1.15- libsieve-2
 - libsieve-d moodle-af-
 - moodle-ar- mydns-pgsq
 - myproxy-5. nut-2.2.0-
 - nut-cgi-2. perl-Class
 - perl-Class perl-HTML-
 - perl-HTML- perl-Pod-S
 - perl-Proc- php-spyc-0
 - phpldapadm python-pea
 - python-pea rsstool-1.
 - rtpproxy-1 svnmailer-

Welcome to the ETICS Repository



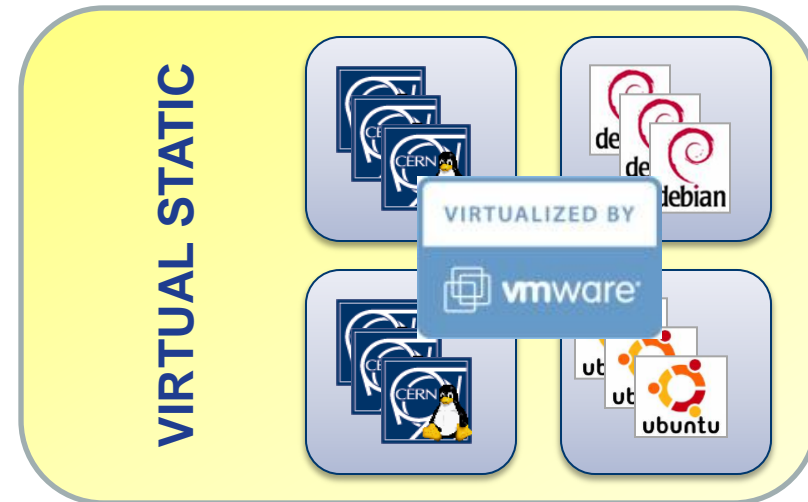
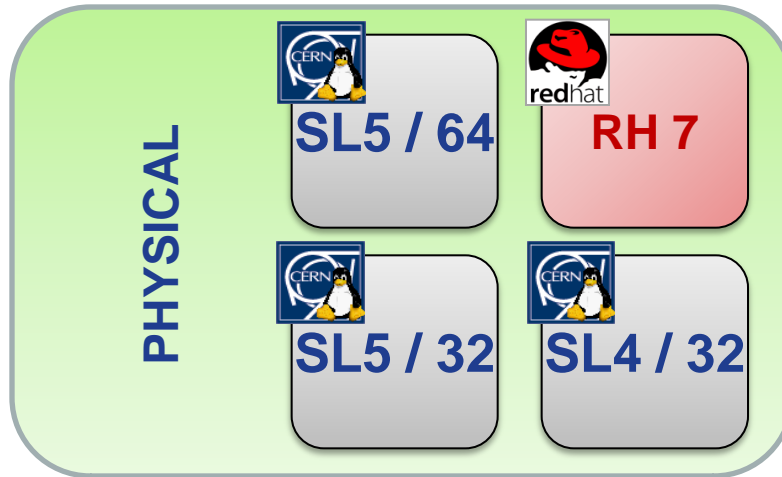
The ETICS repository is the standard location where all the software artefacts from the ETICS Build and Test System: **packages, metrics, build** and **test reports** are made publicly available.

The repository also gathers **third part packages** (externals) that are used by the Build and Test System as dependencies to build the software.

37 Projects, 1516 Modules, 75215 Packages, 3366 Main Reports, 59199 Module Reports, 62 Packages

Main Build Reports		Module Build Reports	Main Test Reports	Module Test Reports	Packages
Namespace	Project	Module	Configuration	Platform	Date
default	org.etics	org.etics.nmi.scripts	etics-nmi-scripts_R_1_6_0_1	sl5_x86_64_gcc412	10/05/20
default	org.glite	org.glite	glite_3_2_cert	sl5_x86_64_gcc412	29/04/20
default	org.glite	org.glite.wms	glite-wms_R_3_1_96	sl5_x86_64_gcc412	29/04/20

ETICS Infrastructure - Static Worker Nodes



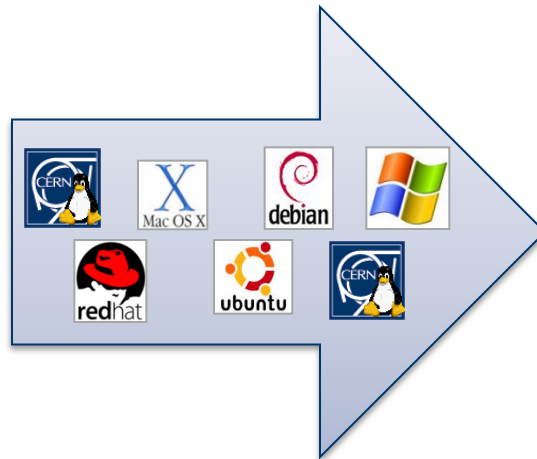
With a STATIC set of worker nodes the composition of the pool is fixed (SL4, SL5, Deb4, Deb5, etc)

Rarely used platforms are IDLE most of the time (ex. RH 7)

Any new platform image or worker node must be created and started by a system administrator's intervention before is used.



Virtual Dynamic Worker Nodes



Increase availability and scalability
Reduce maintenance

Offer privileged access to the VM
(not to the host)
Enable post build analysis
(VM snapshots)

Virtual machine image customization
Provide reproducible environments



A-QCM Report Generation

Reports are now generated for the projects for the trial certifications (see NA2)

A-QCM Report

good (0.03)

n/a

good (0.0)

Quality Aspect: Maintainability

Component: org.etics.repository.client-java



QA formula:

$\min(\text{StaticAnalysis}, \text{CodeAnalysis})$

StaticAnalysis is calculated as **correlation** of the following metrics:

Metric	Value	Report	Details
com	19.0	ckjm	doc
wmc	7.0	ckjm	doc
cbo	14.0	ckjm	doc
rfc	34.0	ckjm	doc

CodeAnalysis is calculated as **avg** of the following metrics:

Metric	Value	Report	Details
--------	-------	--------	---------



Remote Jobs Submission

Submit to WNs resources on remote Sites (see SA2)

General plugins already implemented: NMI/Condor, gLite, unicore, Amazon

Important feature for scalability and adaptability to projects needs

The Grid (The Grid Quality Process) Process

your identity is: **Alb**

ETICS Welcome Submissions Configuration Repository QA TestSystem Administration Requ

Project

- OpenCms@ENG
- org.dcache
- org.diligentproject
- org.etics
- org.etics.testsuites
- org.gcore
- org.gcube
- org.glite
- amga
- apel
- ar
- authz
- bar
- ce
- condor-utils
- data
- data-legacy
- deployment
- dgas
- e2emonit
- gcm
- gpbox
- gridview
- gstat
- info
- jdl
- jobid

Workspace

- My Workspace
 - glite-ce_R_1_7_6
 - Default platform
 - glite-ce-blahp_R_1_7_7
 - glite-ce-build_R_1_7_10
 - glite-ce-ce-plugin_R_1_7_4
 - glite-ce-common-java_R_1_7_4
 - glite-ce-cream-api-java_R_1_7_4
 - glite-ce-cream-cli_R_1_7_5
 - glite-ce-cream-client-api-c_R_1_7_5
 - glite-ce-cream_R_1_7_4
 - glite-ce-gridice-plugin_R_1_7_4
 - glite-ce-job-plugin_R_1_7_4
 - glite-ce-monitor-api-java_R_1_7_4
 - glite-ce-monitor-client-api-c_R_1_7_5
 - glite-ce-monitor_R_1_7_4
 - glite-ce-osg-ce-plugin_R_1_7_4
 - glite-ce-wsdl_R_1_7_4

Submit Remote Build for 'org.glite.ce v. 1.7.6'

General

logging: verbose

Checkout

environment: Ignore Locking
 Propagate environment and properties from
 glite_3_2_cert

checkout: Use custom checkout behaviour: possibly build from bin

Build Execution

execution: Do not stop on errors

Packaging & Repository

repository: Register artefacts in the Permanent Repository
 Publish artefacts to a Custom Volatile Area: aimar
 Generate YUM (REPOMD) repository

Host

submitter: glite

host selection: Private/StoRM-SL4 ia32 gcc 3.4.6
 RedHat AS 4 (ia32) with gcc 3.4.6
 RedHat Linux 4 (x86_64) with gcc 3.4.6
 Scientific Linux 5 (ia32) with gcc 4.1.2
 Scientific Linux 5 (x86_64) with gcc 4.1.2

privileges: Run as Root
 Private Results

Metrics and Statistics



SA1 Deliverables

DSA1.1 - Execution plan for first 12 months of infrastructure operation	RELEASED
DSA1.2 - ETICS Core Services Design Specification	RELEASED
DSA1.3 - ETICS Site Service Level Agreement	RELEASED
DSA1.4 - Execution plan for second 12 months of infrastructure operation	RELEASED
DSA1.5 - ETICS core services certification and usage report	RELEASED



Metric: Usage of the Resources

Build/test type	Q1	Q2	Q3	Q4
Build	20315	13703	17121	22035
Test	~1500	~600	~3000	~7700

Project	Q1	Q2	Q3	Q4
org.glite	10382	7464	3423	3415
org.glite.testsuites	3215	2154	2221	2255
org.gcube	115	135	521	485
Torque maui	9	35	132	42
externals	148	34	68	79
unicore	-	33	131	87
ARC	-	-	-	86

Platform Y2	%
SLC4 (32-bits)	35
SLC4 (64 bits)	19.6
Debian (32 bits)	12.9
SL5 (32 bits)	12.4
SLC3 (32 bits)	10.1
SL5 (64 bits)	8.2
RH4	0.5
Others	1.3

Tests have increased 10 folds in the last year

SLC4 32-bit and SL5 64-bit are the main gLite supported platforms



Metric: Service Level

Availability and Reliability Targets

For accessing different artefacts and the Build and Test processes

Service	Expected Reliability	YEAR 2 Reliability	Expected Availability	YEAR 2 Availability
Access to Project Binary packages	99%	99.3%	98%	99.1%
Access to Build Reports and Metrics Repository	99%		97%	
Build and Configuration Portal	97%		95%	

Year 1+2 Downtimes

Scheduled: 15h servers, 7h repository

Unscheduled: 3 days (+3 for AFS)

Reliability is determined by taking into account issues due to the ETICS Services functions; but not those caused by the services used by ETICS. E.g. no network for 2h, will not be considered as an ETICS unreliability



Challenges



Challenges and Achievements

The SA1 collaboration with other activities was very productive

New Submission Engines	SA2
Documentation & Support	SA2
New plug-ins + Integration	JRA2
Multi-node Distr. Testing	JRA2
Cross Submission	JRA1
A-QCM + Metrics	NA2
Dissemination Material	NA2

Maintain a Service highly available while adding fundamental new features requires process, infrastructure and testing

Established validation release processes, automated procedures, added virtualization for better resource management

Establish ETICS Services for build/testing of middleware

ETICS is now a recognized and established Platform as a Service (PaaS) for middleware projects

Foundation for build and testing of the EMI project



Lessons Learned and Conclusions



Lessons Learned

Complementary research vs. commercial and current users vs. long term plans must coexist in your development priorities and release process

But always maintain and give priority to provide a top quality PaaS with incremental improvements.

Collect frequent feedback, provide preview installations to users, refocus the priorities frequently (as needed)

Plan and develop entry and exit tools from the beginning

Established projects need to feel comfortable with getting easily into ETICS and also easily out if needed. No mature project accepts locking-in solutions

Follow development of technologies you depend on

Move to new versions of technology asap (e.g. Clouds, Java, GWT, etc) or you will be forced to do it when you do not expect it, and maybe you are not ready

Example: A new version of the browser is adopted immediately by the users.

Be ready in advance, participate to Beta programs. Otherwise you will stop everything and migrate to the new technology even if is not the good moment.



Conclusions

Achieved Main Objectives (and more)

Automation, performance, metrics, high availability, A-QCM, remote submissions

Improved and Upgraded the Services

Several platforms and updates, better monitoring, based on virtual images

ETICS Services are ready for EMI

Selected as foundation of EMI build and test system

- Configuration for EMI quality metrics and reports
- Definition of EMI compliance and multi-node tests

ETICS Software is published as Open Source

ETICS available on Sourceforge

Production version: <https://etics.cern.ch>

Release candidate: <https://etics-rc.cern.ch>



Thanks!



eTICS2
The Grid Quality Process

<http://www.eticsproject.eu>

