EMI Inter-component and Large Scale Testing Infrastructure

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Outline

• Background on EMI certification and testing process:
  o Role of Testing Infrastructure within Quality Assurance
  o Product Team (PT) – centric model

• Product Inter-Component Testing Infrastructure:
  o Interaction zone across PTs components
  o Approach, solutions and remarks

• Large Scale testing
  o Interaction zone between PTs and production environment
  o Approach, solutions and remarks

• Conclusion
EMI Release Cycle

- Major Releases (1/year, backward-compatibility may be broken)
- Minor Releases (no backward-compatibility broken), Revision, Emergency
Role of Quality Assurance and Testing Infrastructure

Policy Definition on Release and Change management, Testing, Packaging, Documentation…

+ Providing Common Infrastructure and Operational resources for:
  Inter-Component Testing
  Interoperability Testing
  Performance Testing
  Scalability Testing

Monitor

Improve
Testing and Certification Process

Component in Certification

Component Cx
Testing in isolation performed by Product Team PTx

QC Verification

Release Candidate:
Successful tests (Unit, Functionality, Regression…) & QC Verified:

DEPLOYED ON EMI TESTING INFRASTRUCTURE TO PERFORM:

Inter-Component Testing Cx vs Cy, Cz performed by PTx,y,z (MANDATORY)

Large Scale Testing Cx in production like environment performed by PTx and participating user communities

Release Manager

Released

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EMI Testing Infrastructures

I

Inter-Component Testing $C_x$ vs $C_y$, $C_z$ performed by $PT_{x,y,z}$

- In place since EMI II quarter, already working and in use

II

Large Scale Testing $C_x$ in production like environment performed by $PT_x$ and participating user communities

- Under construction as approaching EMI-1 release, preliminary contacts with sites
**Inter-component Testing Infrastructure**

**PT X:**
*Compute Element* is Ready for Production… well to assure that I need a preview of other components *CE* interacts with to run some inter-component tests

**PT Y:**
*Storage Element* is Ready for Production… but I need a preview of *CE* to run integration tests…

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Provide common infrastructure for inter-component tests, i.e. functionality tests focusing on the interaction among different client and provider components provided from different Product Teams

**GOAL:**
Inter-component Testing Scenarios

Inter-component testing for a minor/major release imply to deploy for all Releases/Platforms/Components:

- **Production Versions**, i.e. released versions (for backward-compatibility too..)
- **Release Candidate Versions**, i.e. pre-intercomponent testing successful and verified

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**EMI Release 1.0**

- **SW Product X**
  - Production Version 1.0

- **SW Product Y**
  - Production Version 1.0

- **SW Product Z**
  - Production Version 1.0

- **SW Product X**
  - Release Candidate Version 1.1

- **SW Product Z**
  - Release Candidate Version 1.1

**EMI Release 2.0**

- **SW Product X**
  - Release Candidate Version 1.1

- **SW Product Y**
  - Release Candidate Version 2.0

- **SW Product Z**
  - Release Candidate Version 2.0

**INTEGRATION TEST**
Inter-component Testing Infrastructure: this is in place

HW Resources ~90 instances deploying pre-EMI + EMI1 RC versions

- ARC (Kosice, NIIF)
- dCache (DESY)
- UNICORE (Juelich)
- gLite (CERN, INFN, CESNET)

Monitoring: Nagios, service availability, service probes not for all services

Testers VO: testers.eu-emi.eu

Support: GGUS, with EMI-Testbed Support Unit

Documentation: https://twiki.cern.ch/twiki/bin/view/EMI/TestBed
Inter-component Testing
Infrastructure: usage

- **Access:**
  - Middleware **User Interface** + testers.eu-emi.eu certificate needed
  - HOWTO see Resources
    - ARC: `ldapsearch -h arc-emi.grid.upjs.sk -p 2135 -x -b 'mds-vo-name=ARC-EMI,o=grid' -s base giisregistrationstatus`
    - gLite + dCache: `ldapsearch -x -H ldap://certtb(rc)-bdii-top.cern.ch:2170 -b mds-vo-name=local,o=grid`
    - UNICORE: [https://zam052v01.zam.kfa-juelich.de:8080/EMI-REGISTRY(-DEV)/services/Registry?res=default_registry](https://zam052v01.zam.kfa-juelich.de:8080/EMI-REGISTRY(-DEV)/services/Registry?res=default_registry)

- **Availability:**
  - II - EMI Quarter (avg > 89.7%) ; III - EMI Quarter (avg > 98.3%)

- **Current Usage:**
  - Snapshot of pre-EMI + EMI1 RC (work-in-progress) middleware
  - EMI-1 RC testing
  - EGI training partially on these resources (future pre-view activity??)
Integration Testing infrastructure: remarks

- First *real* meeting place for components
- Fast **growing** and **varying** snapshot of “Maintained Releases” components:
  - No redundancy, most common deployment
  - Not fit for performance/scalability tests
- Coordination in deployment schedule is needed
- Cross middleware integration in initial phase
- Who run the tests?
  - PT do not want to run other clients tests and do not want their certification to depend on others…
  - Use automatic probes (Nagios ?) will help in future…
Large Scale Testing Infrastructure

EMI:
CE, SE, Information Authorization Systems... passed certification and inter-component tests: Ready for Production... well, testing it on a larger scale would better validate!

User Community:
I want EMI Components to work in my usual production environment whatever I do

GOAL:
Provide an infrastructure for large scale acceptance, scalability and interoperability testing of EMI components. The focus is on stressing the service reproducing real production environment.

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Large Scale Testing

Relevant Questions:

How large is large enough?  -> Need to be specific in defining the scale

What makes a testbed representative of production environment?  -> Need to involve User Community / Sites

How do we want to stress the service?  -> Need to take into account PT test plans and consistently define test cases

Which particular combination of services do we need to test?  -> Need a flexible infrastructure adaptive to complex testing scenarios
Large Scale Infrastructure Scenarios

a) Pre-Deployment:

- Deployment: common deployment on voluntary sites of RC versions
- Usage: service exposition to usage in production environment.
- Expected Results: get early feedback and large scale validation.

b) Demand and Supply:

- DEMAND: Product Teams / Technical Area Leaders submit a request describing the test and testing scenario.
- SUPPLY: A community of EMI partners available to participate to specific tests campaigns with X effort, Y resources for Z time to test P1, P2,.., PN product.
- Expected Results: implement complex large scale testing scenarios
### Example of on Demand Testbed: Argus testing case

| **Testing Use Case**                          | Evaluate Argus integration in CREAM CE and SEs (optional)  
|                                               | Scalability under concurrent requests from WNs, CEs  
|                                               | Global banning list + VO level (Optional) across multiple sites |
| **Testbed Required Resources**                | Minimal number of sites: 2 |
| **EMI Components involved (EMI-1 RC, SL5 /64, EPEL)** | ARGUS (1 /site; Top-level PAP , Site-level PAP , VO-level PAP (optional); VOMS (1- central EMI) ; CREAM (2/site); Glexec -Enabled WN(2 /CE); SE (optional); |
| **Configuration Requirements**                | CREAM, gridftp, gLexecWM callout to Argus (site level)  
|                                               | Argus site PAP policy import from Top-level Argus PAP  
|                                               | Fake CA (generated with https://arc-emi.grid.upjs.sk/instantCA) testers.emi-eu.emi enabled |
Large Scale Testing Infrastructure (we’re working on it…)

• We have:
  - Increasing list of component to deploy CE, SE, WMS/LB, ARGUS…
  - Catch-All VO for testing purposes testers.emi-eu.eu
  - Operational + Central services (voms, information system)
  - Documentation and process description: https://twiki.cern.ch/twiki/bin/view/EMI/LargeScaleEMITestbed

• We look for:
  - Volunteer sites to deploy products
  - User communities for testing
Large Scale Infrastructure: remarks

- **Not mandatory part of Release Process**

- **Adverts for Sites and User Communities:**
  - JOIN US !!! mail-to: emi-sa26@eu-emi.eu
  - CO-INTEREST: looking for motivated contributors bringing real use cases experience

- **VOs and Information system:**
  - testers.emi-eu.eu VO + shared pool of VO (??) on the testbed
  - central information system to publish resources
Conclusion

• Inter-component testing Infrastructures (PT<->PT):
  ➢ Fast growing and changing snapshot of the Maintained Releases
  ➢ ~90 instances in place, pre-EMI + EMI-1 RC
  ➢ Access: UI + testers.emi-eu.eu VO + information systems (prod.+ RC)
  ➢ Future work on automation of basic inter-component testing

• Large Scale Testing Infrastructures (EMI-product<->User Community):
  ➢ We have: increasing list of products to deploy + operational tools
  ➢ We look for volunteer sites to deploy products and user communities experience to test them
  ➢ Representativeness of production environment and scale is the key aspect
  ➢ Demand/Supply model provides flexibility to implement complex testing scenarios

• Product quality also results from coordination/cooperation in testing between (providers <-> clients)
Thank you!

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