



**eTICS2**  
The Grid Quality Process

## **JRA 1**

# **Testbed Management Technologies**

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# Objectives



# Objectives

- **Objective 1**  
Development of technologies to allow efficient and secure federation of resource sites
- **Objective 2**  
Development or integration of virtualization technologies in the job management middleware
- **Objective 3**  
Modification of the job submission middleware and system management tools to run on IPv6 networks



# Major Achievements



# Achievement 1:

## Web services definition & implementation

- In service of Objective 1 (... to allow efficient federation of sites)
  - DJRA1.1 (Specification)
  - DJRA1.4 (Implementation)
- We developed a web service interface to Metronome
  - Allows straightforward remote access to Metronome, the underlying build and test framework
  - Covers access to all major Metronome functionality



## Achievement 2: Virtualization

- In service of Objective 2 (... integration of virtualization technologies)
  - DJRA1.3 (Prototype)
  - DJRA1.5 (Integration)
- Three major scenarios explored:
  - Integration in the middleware
    - Done in Condor
  - Integration in the ETICS client
    - ETICS VMLoader done in collaboration with SA1
    - Independent of the middleware implementation
  - Integration in the infrastructure
    - Amazon EWS connector done by SA2



## Achievement 3: IPv6 Compliance

- In service of Objective 3 (... modification ... to run on IPv6 networks)
  - DJRA1.2 (Analysis)
  - DJRA1.6 (Compliance)
- We analyzed IPv6 compliance
  - As much as we have control over, ETICS is IPv6 compliant: Metronome, ETICS, etc...
  - There are some underlying dependencies for which we do not have control, and are not yet IPv6 compliant (MySQL , Condor)
  - These are very complex, large code bases, and it's beyond the scope or ability of the ETICS 2 project to make them compliant
  - We informed EU Commission last autumn of this state of affairs, and it was considered acceptable





# Metrics and Statistics



# Metrics and Statistics (1/2)

- All deliverables completed, DJRA 1.1-1.6.
  - 1.6 defines the partially completed state, as described earlier.
- Metric: IPv6 coverage
  - Hard to evaluate: lines of code? Component count?
    - ETICS: Compliant
    - Metronome: Compliant
    - Condor: Not compliant
    - MySQL database: Not compliant
    - Underlying tools: compliant
      - Wget, cvs, Subversion, etc...
    - 30% - 50% compliant



# Metrics and Statistics (2/2)

- Metric: Requirement ratio
  - Requirements implemented over requirements collected
  - Two new requirements during ETICS 2:
    - Improve cross site submission: implemented
    - Job submission from Metronome to other batch systems: demonstrated with submission via Condor-G to Globus. Why Globus?
      - Mechanism (Condor-G) is applicable for wide set of systems
      - Easy to deploy at UW-Madison
      - Work in SA2 in ETICS 2 demonstrated submission to gLite—we wanted to show we could work with other systems as well
- Ratio is **100%**



# Further work and conclusions



# Lessons Learned

- A high-quality build and test environment is difficult to build, but an invaluable tool for developers
- Lesson learned: adding virtualization in a meaningful way is more work than it looks.
  - What is the right architecture to integrate them?
  - Who creates the VM? How?
  - Where do you store the VMs?
  - How do you get good performance from the VM?
- Lesson learned: IPv6 compliance is more than changing a few call sites



# Conclusions

- All objectives accomplished
- IPv6 compliance has been completed to the full extent of the ETICS 2 scope
- Improvements to virtual machine integration will continue via improvements to Metronome and further integration with emerging virtualization tools



# Thanks!



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