

## Testbed for Validating the LHC Controls System Core Before Deployment

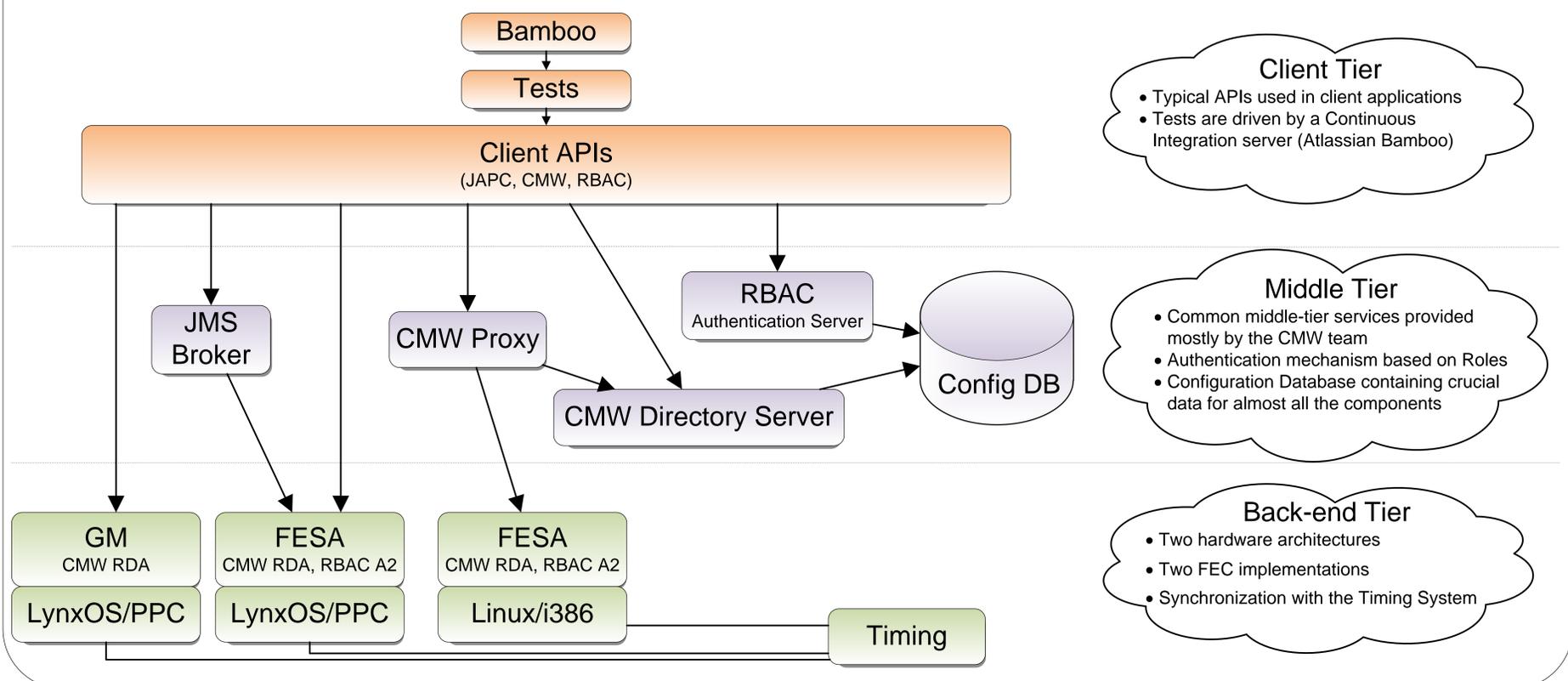
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### Introduction

Since the start-up of the LHC, it is crucial to carefully test core controls components before deploying them operationally. The Testbed of the CERN accelerator controls group was developed for this purpose. It contains different hardware running various operating systems and core software components running on front-ends, communication middleware and client libraries. The Testbed is part of the official Controls System development process wherein new releases of the Controls System have to be validated before being deployed operationally.

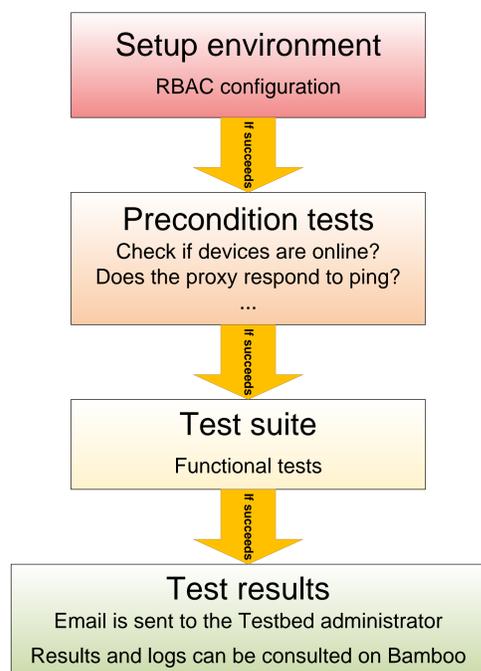
### Testbed structure

The Testbed is a replica of the operational environment. The core components were selected for the Testbed.



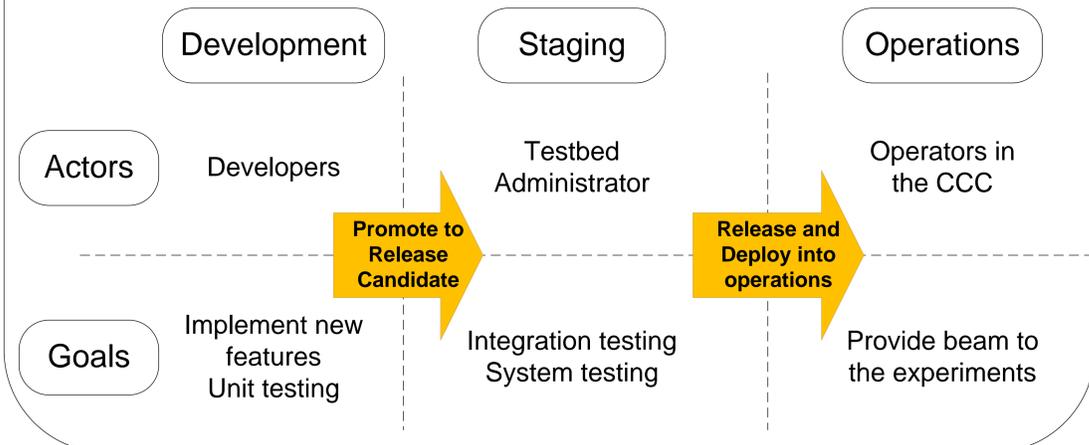
### Execution of tests

Before running the core functional tests, setup tests are executed to configure certain components. Afterwards precondition tests are performed to check if all the components are responding correctly.



### Staged development process

The Testbed is part of our software development process. Before going into production products are validated by the Testbed.



### Conclusions

Integration and system tests are an important complement to the unit tests previously executed in the teams. The Testbed has been running for one year and has already caught serious bugs that were not discovered by the unit tests of the individual components and it has also revealed few inconsistencies.

Many areas can be enhanced:

- The test suite can be expanded with more complex tests. Our developers should write functional tests in the same natural manner as they already write unit tests.
- More components can be integrated into the Testbed, for now only the low level core components are part of it.
- Only functional testing is covered by the Testbed, however we are considering to include performance and scalability tests.