Cluster architecture for Java web hosting at CERN

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Agenda

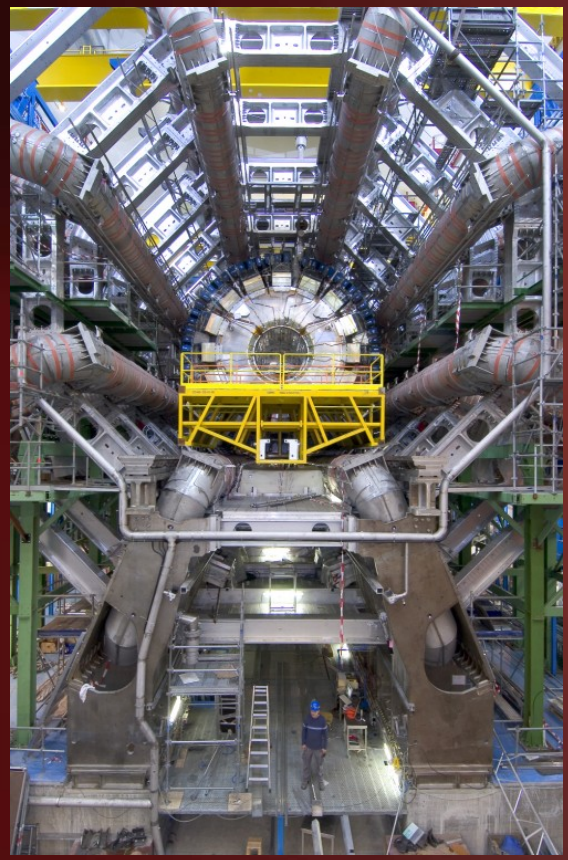
- Why a central solution for Java web hosting?
- The applications
- Requirements
  - → The architecture
  - → The software
- J2EE Public Service
  - Java web hosting at CERN

Why Java web hosting?

- Object-oriented programming
- Code reuse, Java libraries
- Promotes good practices
  - Model-View-Controler model
  - Custom tag libraries
  - Java Server Faces
- It is vendor and platform independent

➲ Users ask for it!

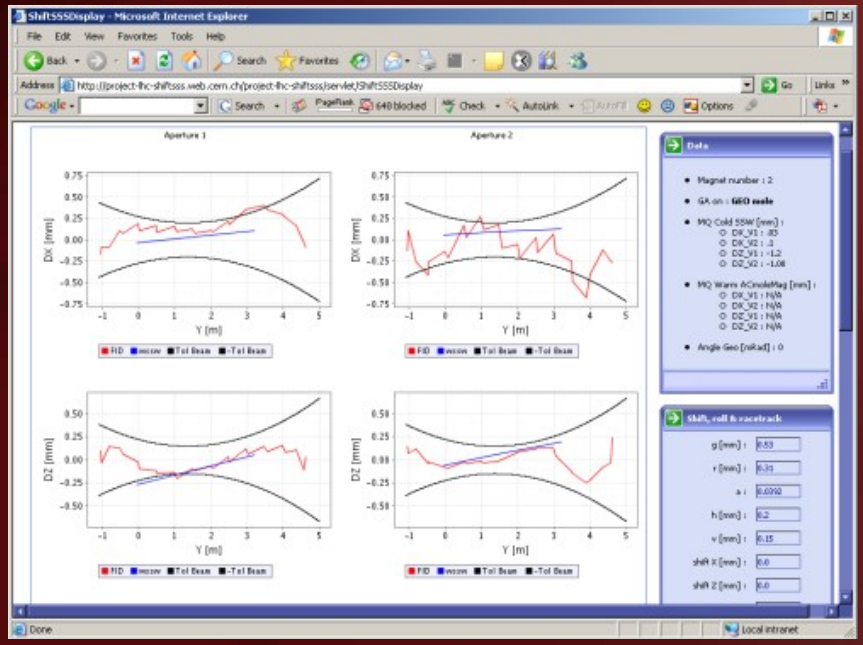
The users



➲ 30 apps since September 2005

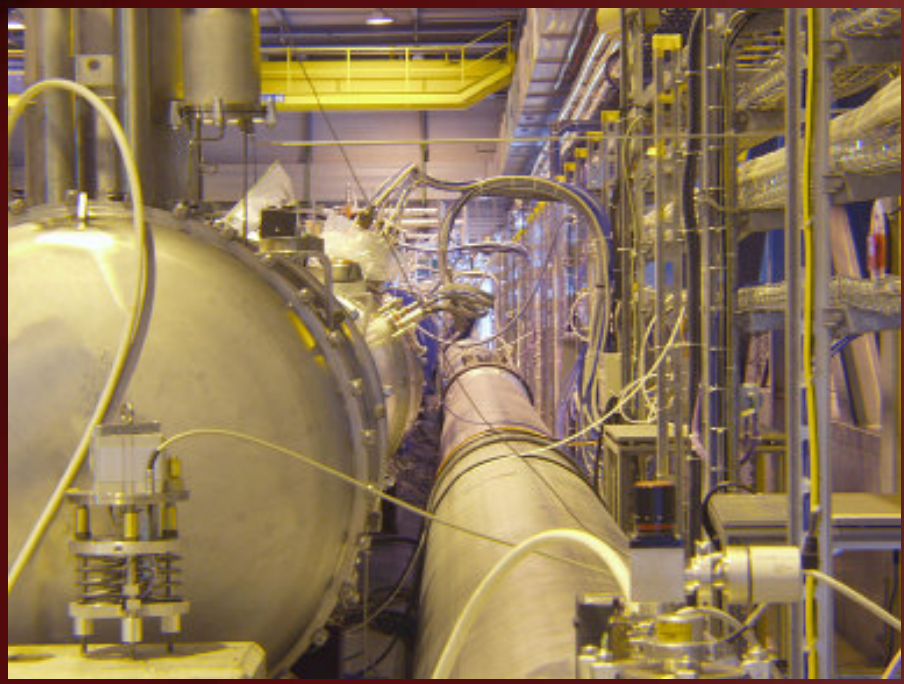
The users: project-lhc-shiftsss

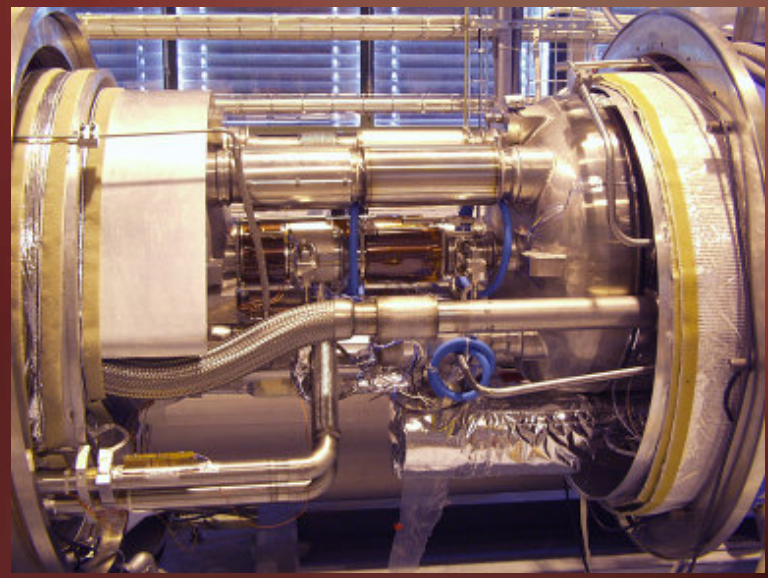
Optimisation of the Short Straight Sections alignment for LHC



The users: at-mas-pda-geoViewer

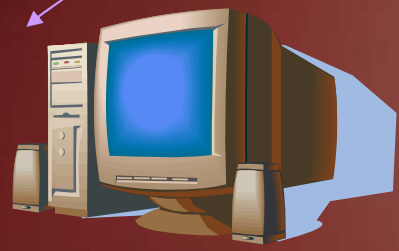
Dipole Geometry Viewer: online graphs, magnet measurement similarity check





The users: Automatic Holding Point

external company



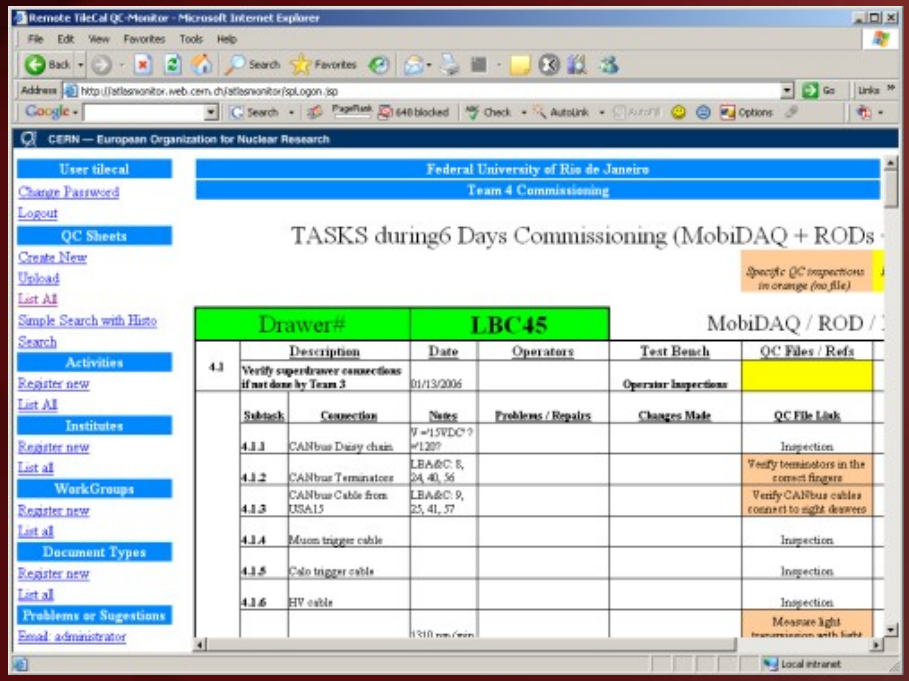
analyst

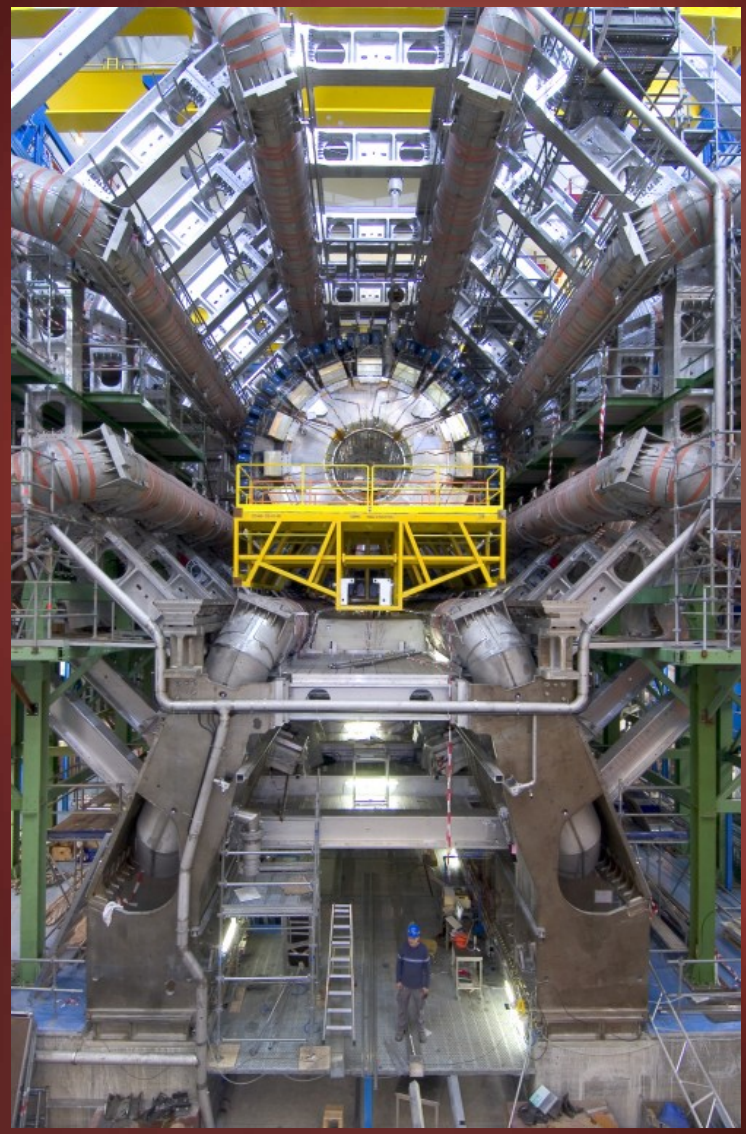
engineer

To faciliate contact between engineers, analysts and companies

The users: atlasmonitor

Management of documents related to the construction of ATLAS detector





Why central platform?

- reliable hardware
- hardware redundancy
- patches, upgrades
- security
- backups
- monitoring
- support deployment

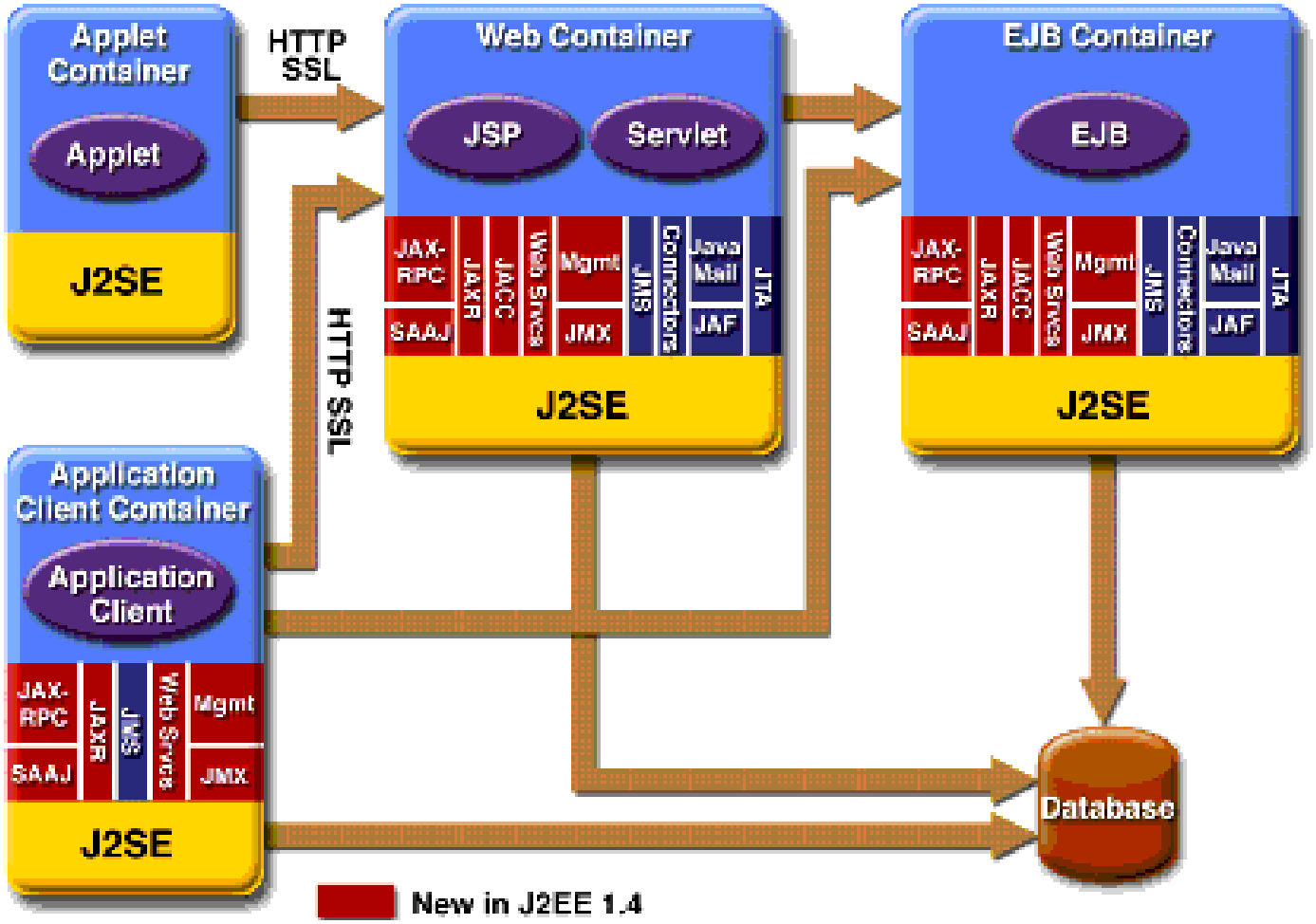
➲ To produce synergies

Requirements

- functionality
- isolation
- manageability
- security
- performance
- scalability
- flexibility

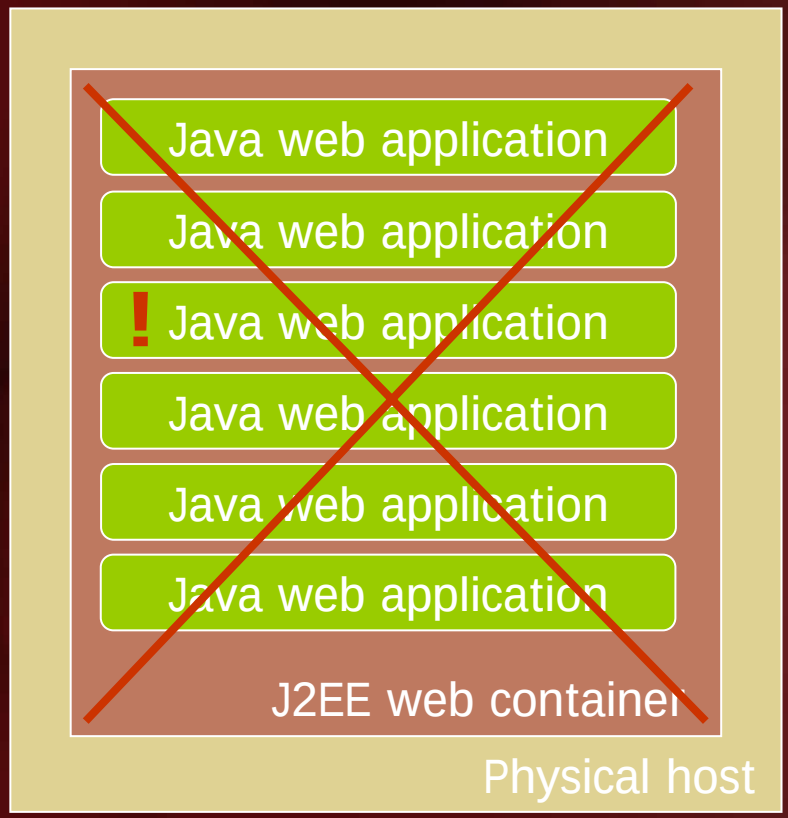
➲ Architecture

The J2EE world

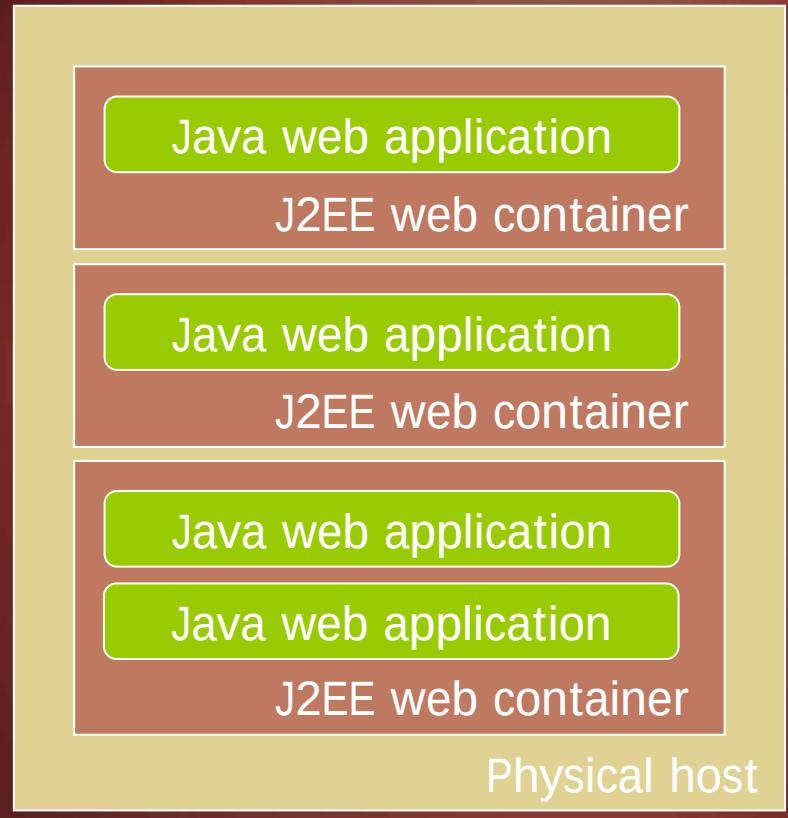


Isolation

Shared container



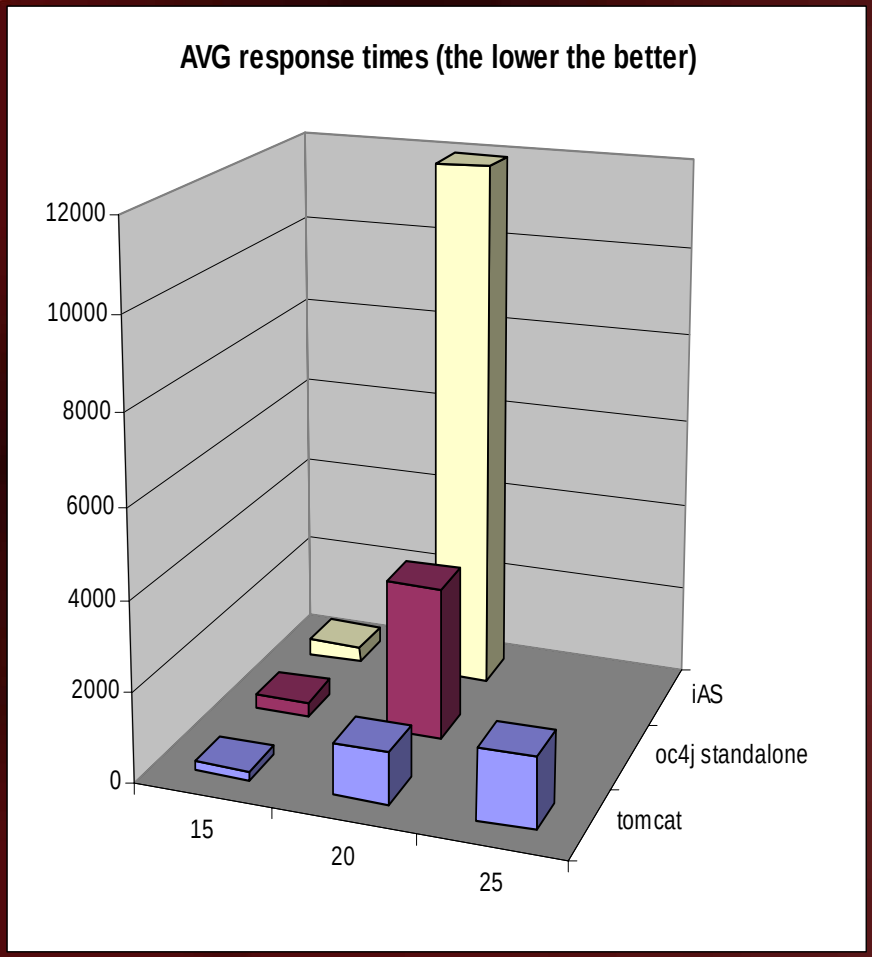
Private container



- Manageability
- Security

Performance

Private containers, tests run on a machine with 512 MB RAM

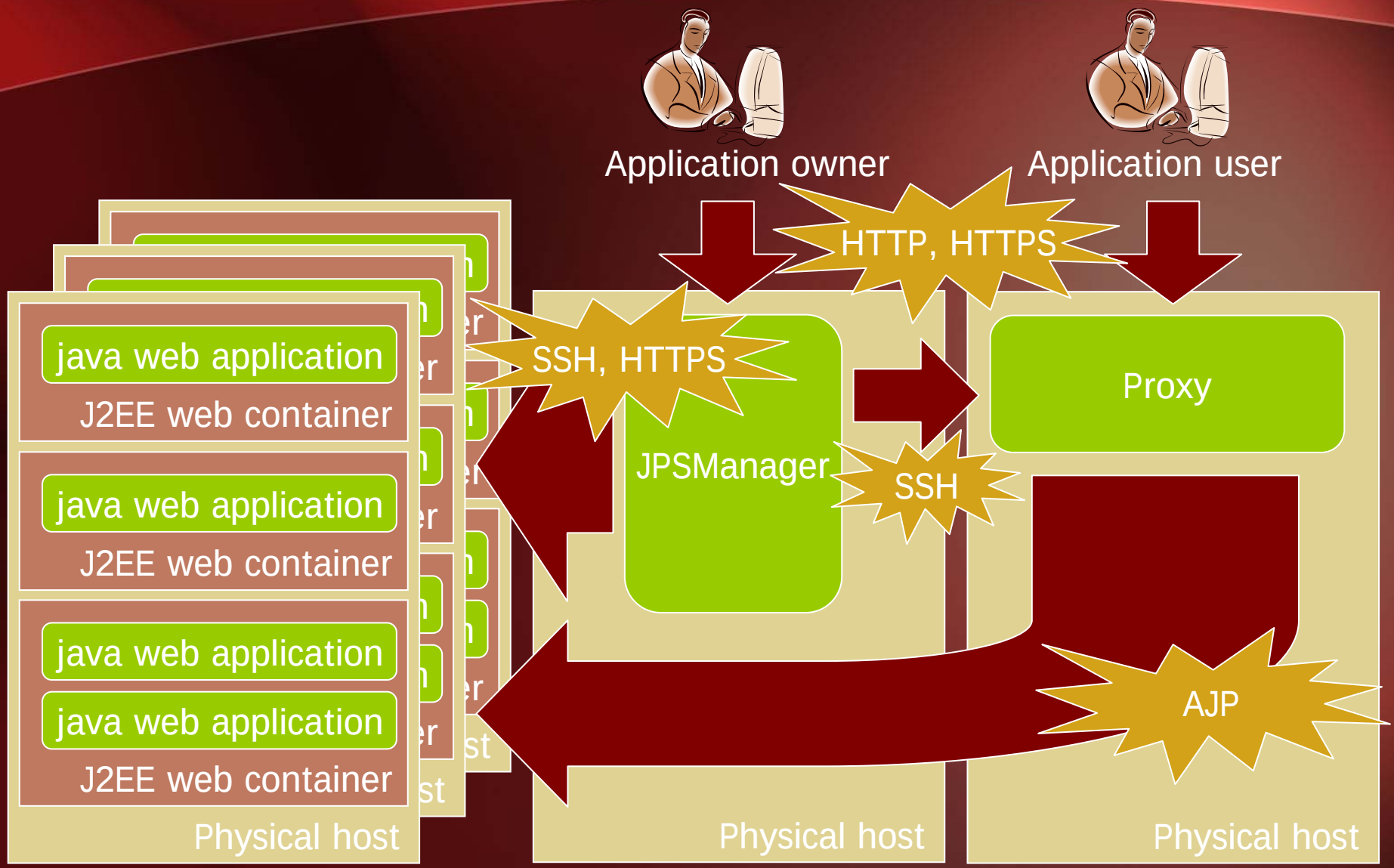


# apps	15	20	25
AVG response times			
tomcat	196	1143	1563
oc4j stand.	355	3432	
iAS	364	11979	
AVG swap used			
tomcat	54389	149072	233738
oc4j stand.	112824	252619	
iAS	201852	493872	
IO WAIT			
tomcat	0,33%	6,80%	12,96%
oc4j stand.	0,46%	35.90%	
iAS	66,31%	81,56%	

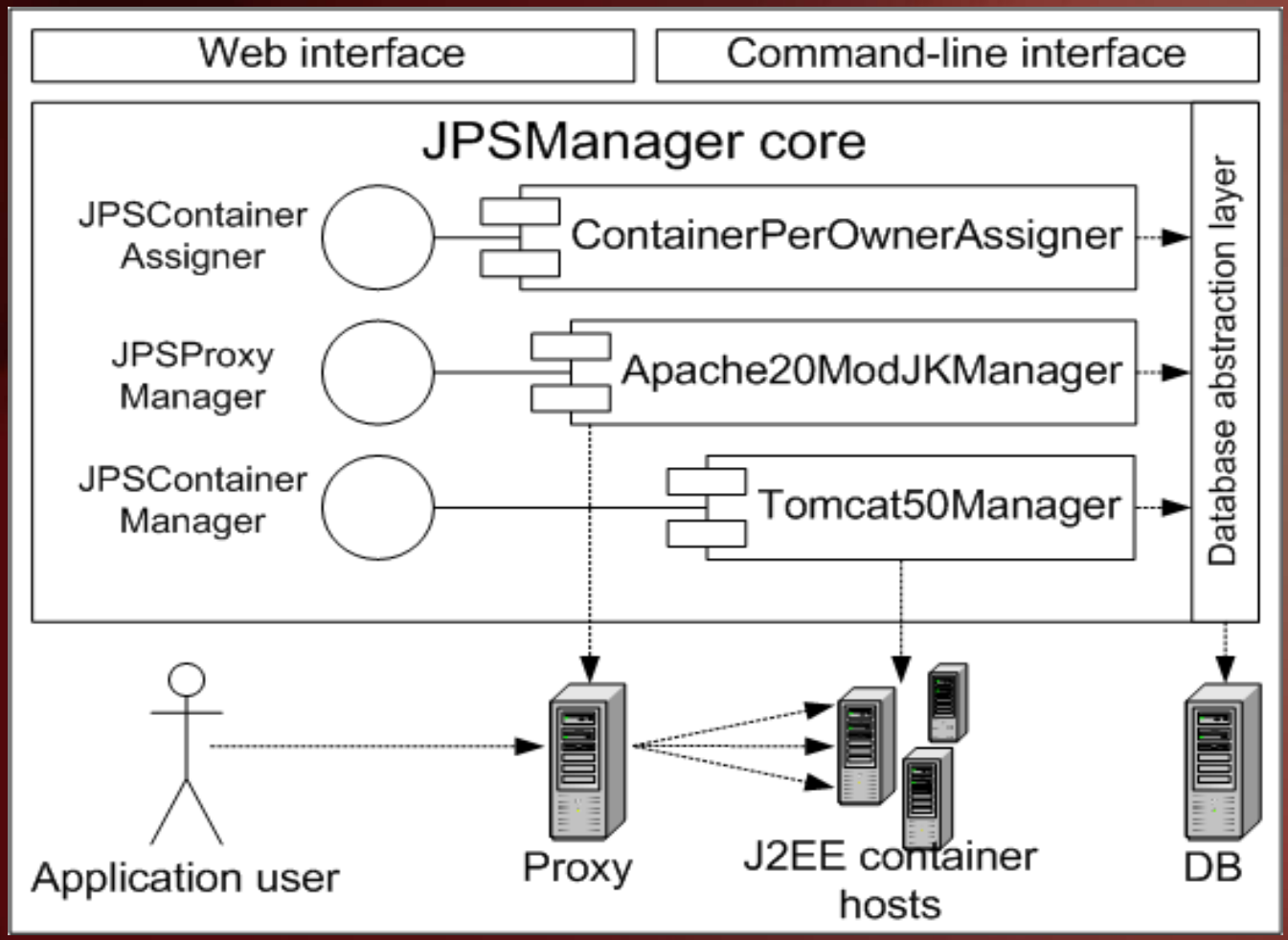
OC4J Standalone has been tested with JMS down.

- **On 5 servers with 4GB of RAM each, we can host ~200 apps**

The architecture – linux cluster



The software - JPSManager



➲ Open, flexible architecture

Security

- File system access rights
- Java security manager

➲ Two levels of control

J2EE Public Service

- server-side infrastructure for deployment of java (servlet/jsp) web applications provided at CERN by IT-DES
- integrated with:
  - CERN's web services
  - CERN's database services
  - NICE authentication
- we use:
  - JPSManager
  - Apache Tomcat 5.5
  - Apache httpd 2.0

- SLA: aimed for medium-sized, non-critical applications;
  full support within CERN working hours.

Evolution

Implement:

- certificate authentication

Evaluate:

- other containers: JBoss, Oracle OC4J
- high availability solutions:
  - hardware load balancer
  - clustering of J2EE containers

Summary

- functionality
- isolation
- manageability
- security
- performance
- scalability
- flexibility

Questions?

- http://www.cern.ch/j2ee-public-service/