

Cluster architecture for Java web hosting at CERN

CHEP 2006, Mumbai

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Database and Engineering Services Group

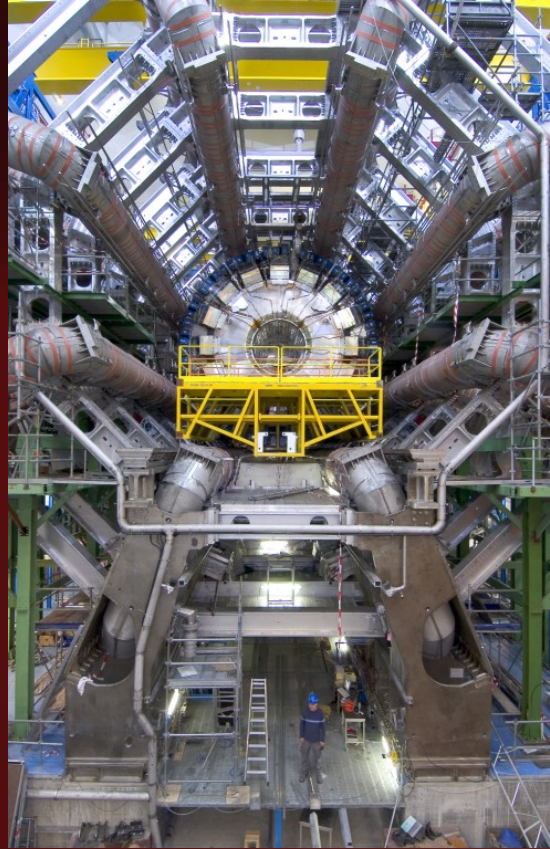


- **Why a central solution for Java web hosting?**
- **The applications**
- **Requirements**
 - **The architecture**
 - **The software**
- **J2EE Public Service**
 - **Java web hosting at CERN**

Why Java web hosting?

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

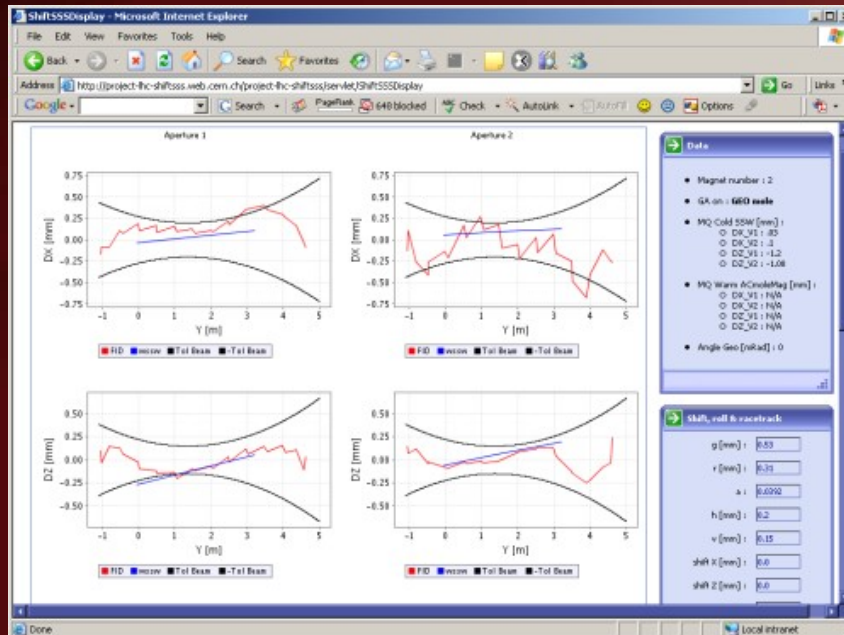
➔ **Users ask for it!**



➔ **30 apps since September 2005**

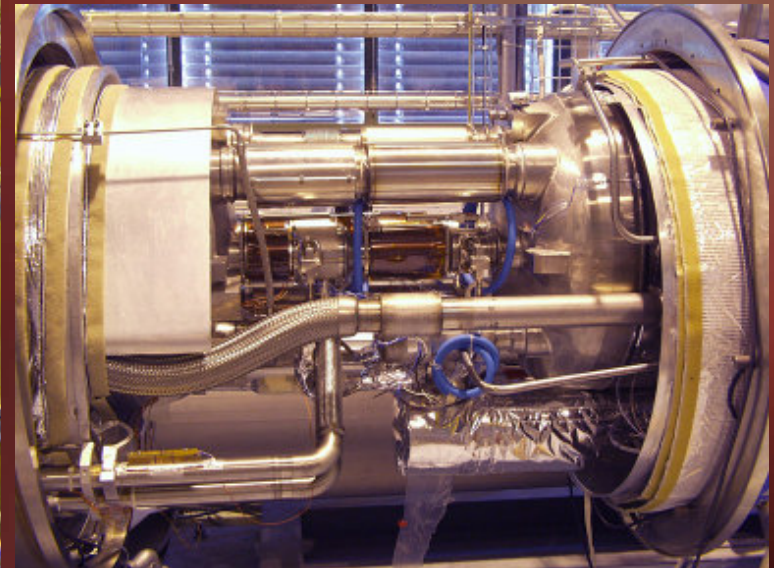
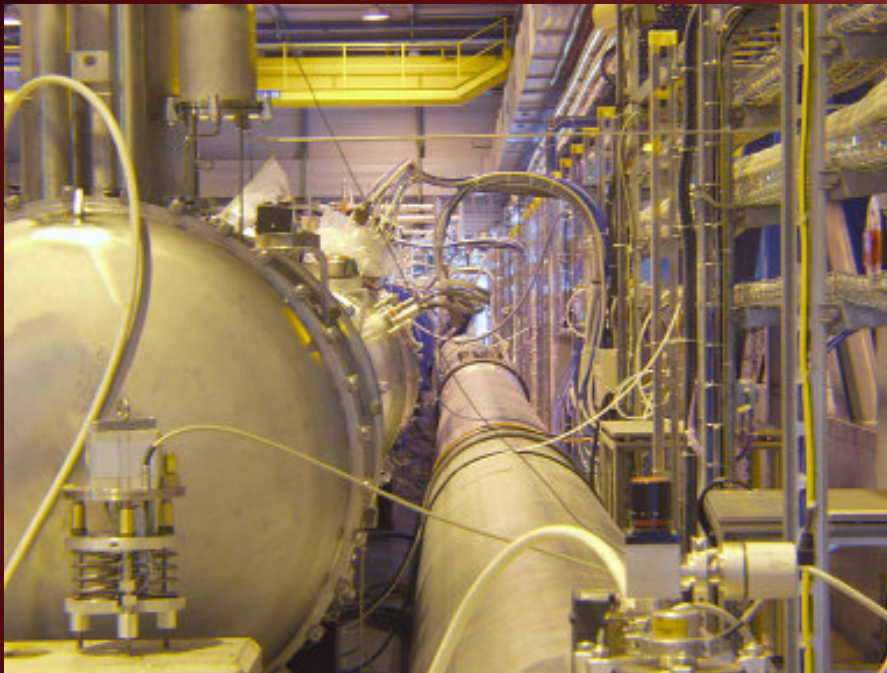
The users: project-lhc-shiftsss

Optimisation of the Short Straight Sections alignment for LHC

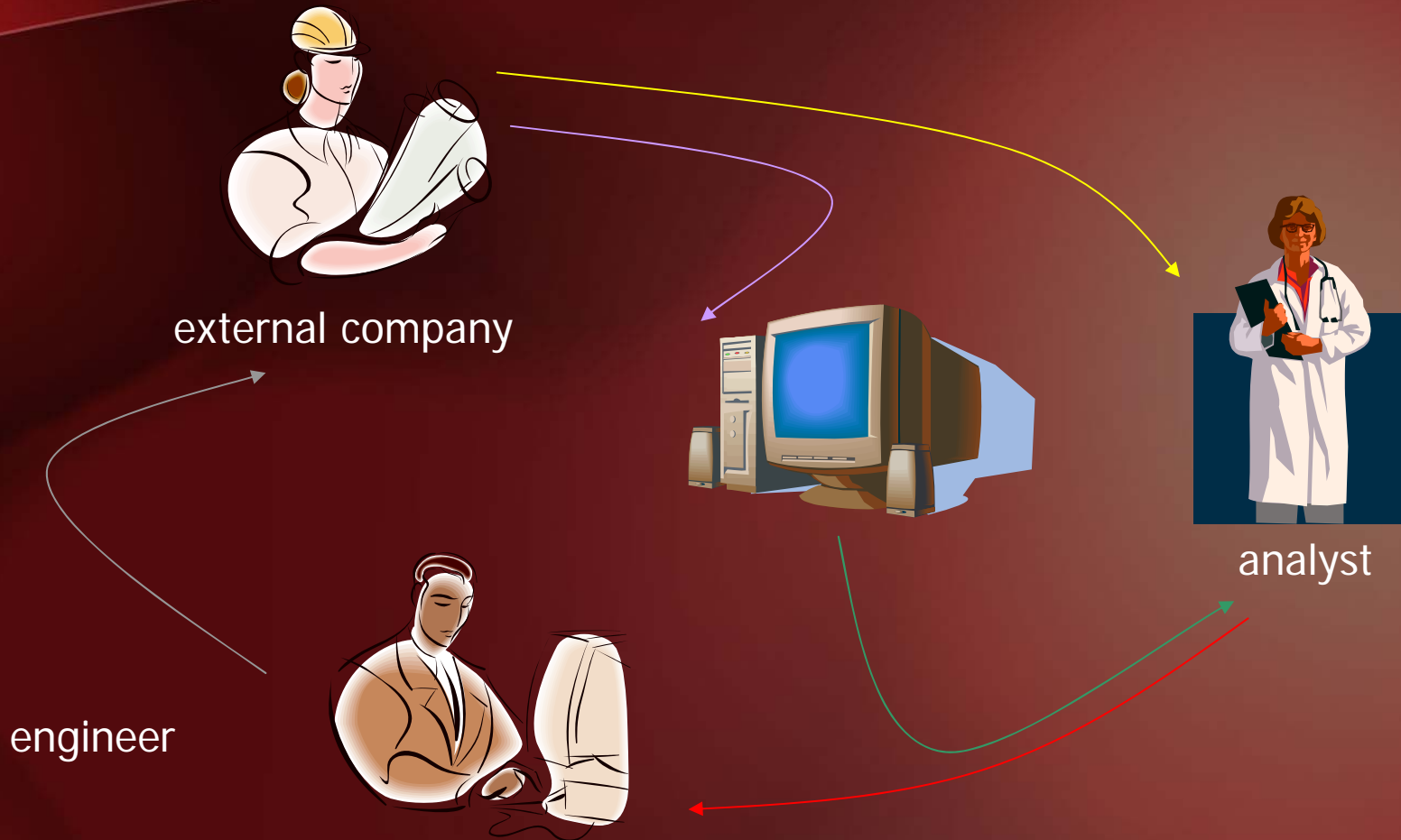


The users: at-mas-pda-geoViewer

**Dipole Geometry
Viewer: online graphs,
magnet measurement
similarity check**



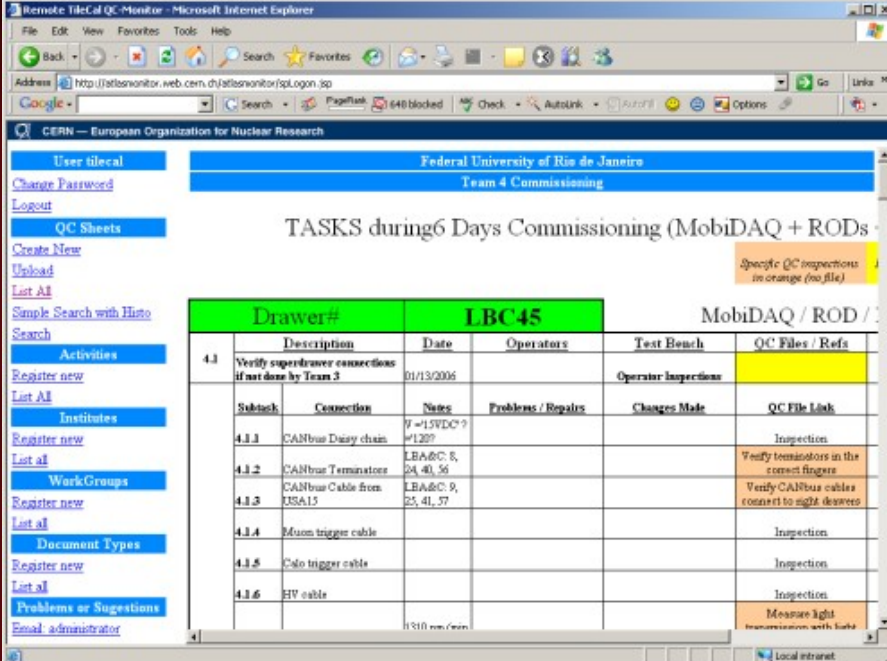
The users: Automatic Holding Point



**To facilitate contact between engineers,
analysts and companies**

The users: atlasmonitor

Management of documents related to the construction of ATLAS detector



Remote FileCal QC-Monitor - Microsoft Internet Explorer

Address: http://atlasmonitor.web.cern.ch/atlasmonitor/splLogin.jsp

CERN — European Organization for Nuclear Research

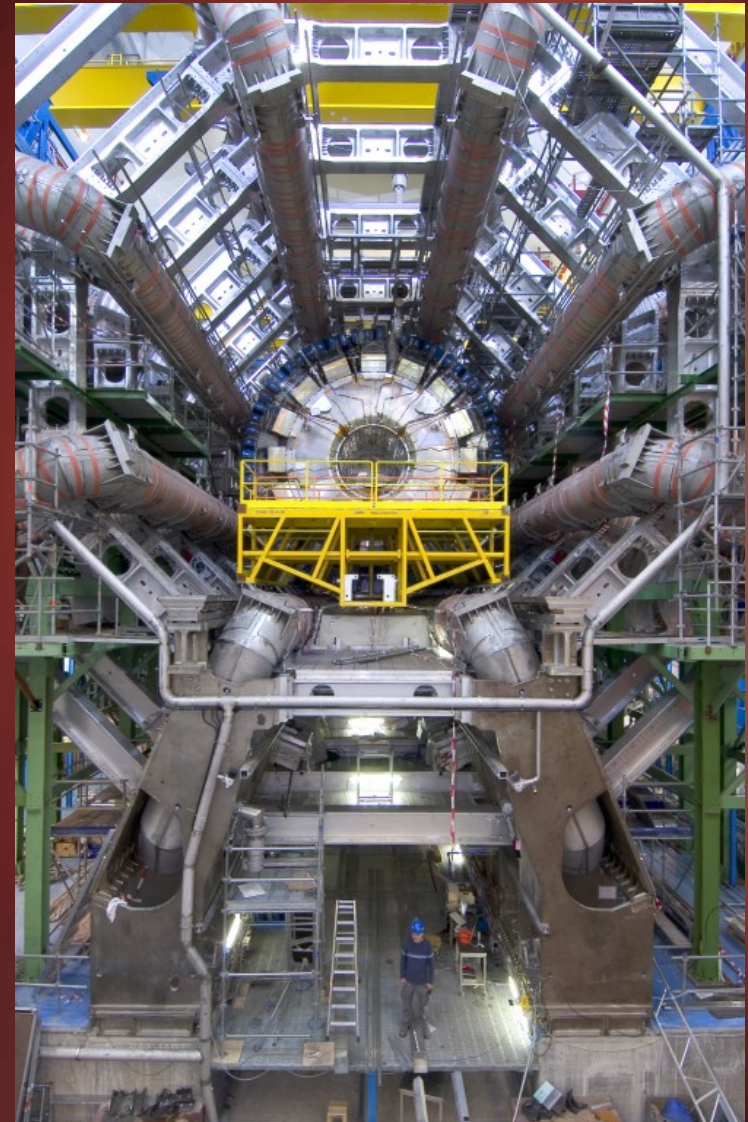
User: tilecal
Federal University of Rio de Janeiro
Team 4 Commissioning

TASKS during 6 Days Commissioning (MobiDAQ + RODs)

Specific QC inspections in orange (no file)

Drawer#	Description	Date	Operators	Test Bench	QC Files / Refs
4.1	Verify superdrawer connections if not done by Team 3	01/13/2006		Operator Inspections	
	Subtask	Connection	Notes	Problems / Repairs	Changes Made
	4.1.1	CANbus Daisy chain	W=15VDC? #120?		QC File Link
	4.1.2	CANbus Terminators	LBA@C 8, 24, 40, 56		Inspection
	4.1.3	CANbus Cable from J3A1.5	LBA@C 9, 25, 41, 57		Verify CANbus cables connect to right drawer
	4.1.4	Muon trigger cable			Inspection
	4.1.5	CMO trigger cable			Inspection
	4.1.6	HV cable			Inspection

Local intranet



Why central platform?



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

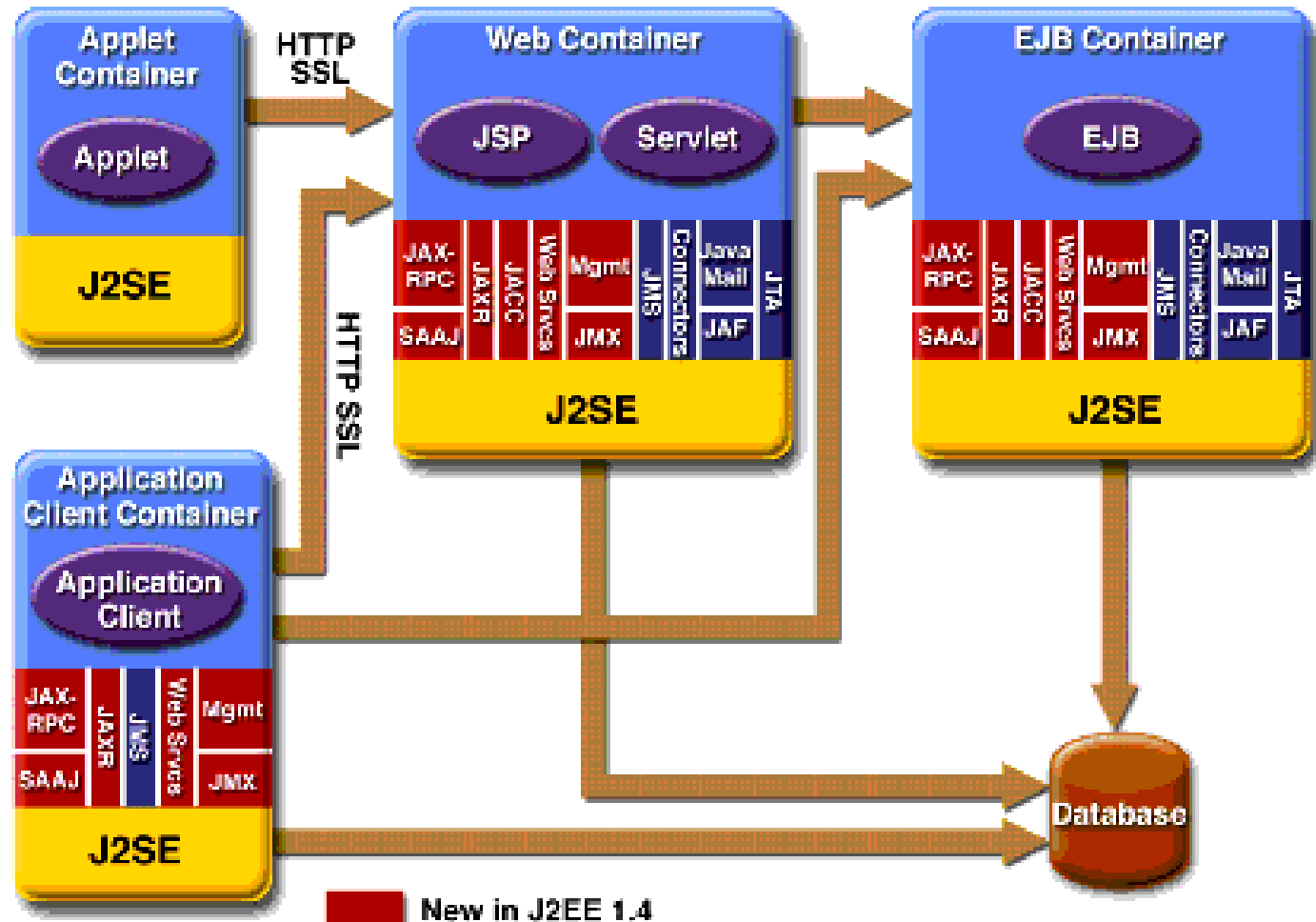
⇒ **To produce synergies**

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

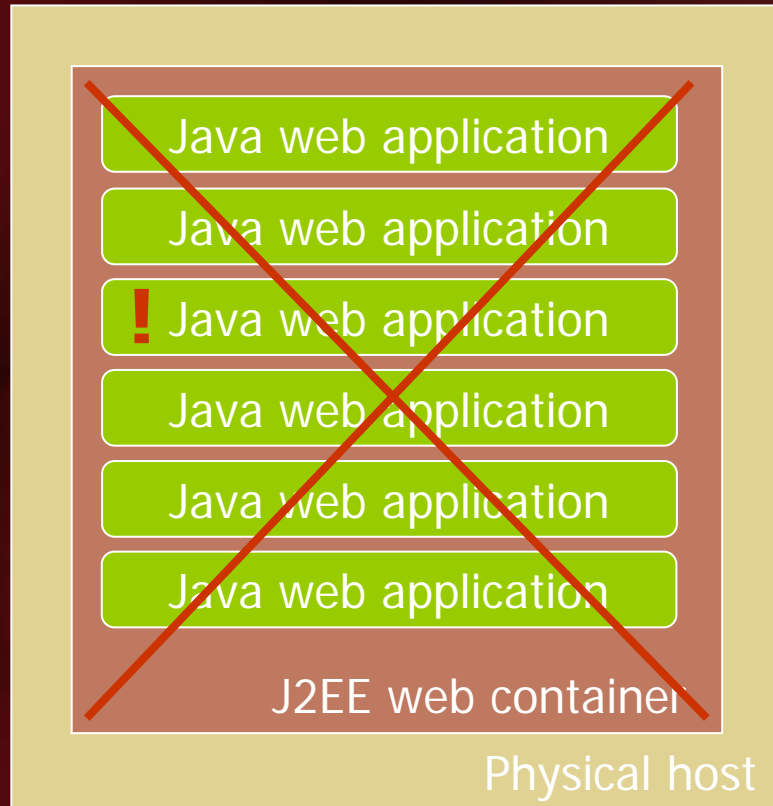


➔ **Architecture**

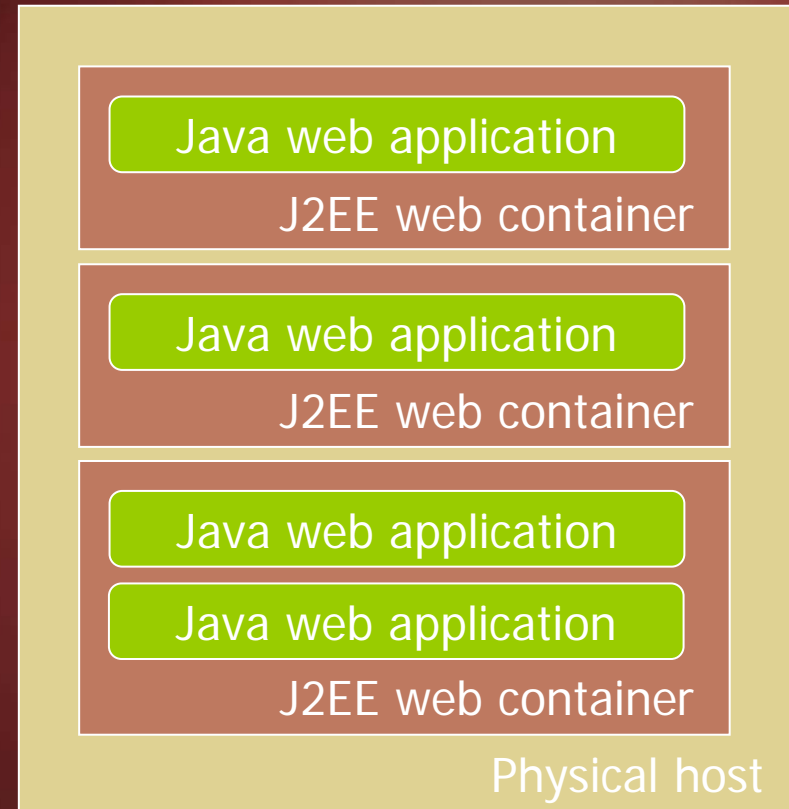
The J2EE world



Shared container



Private container



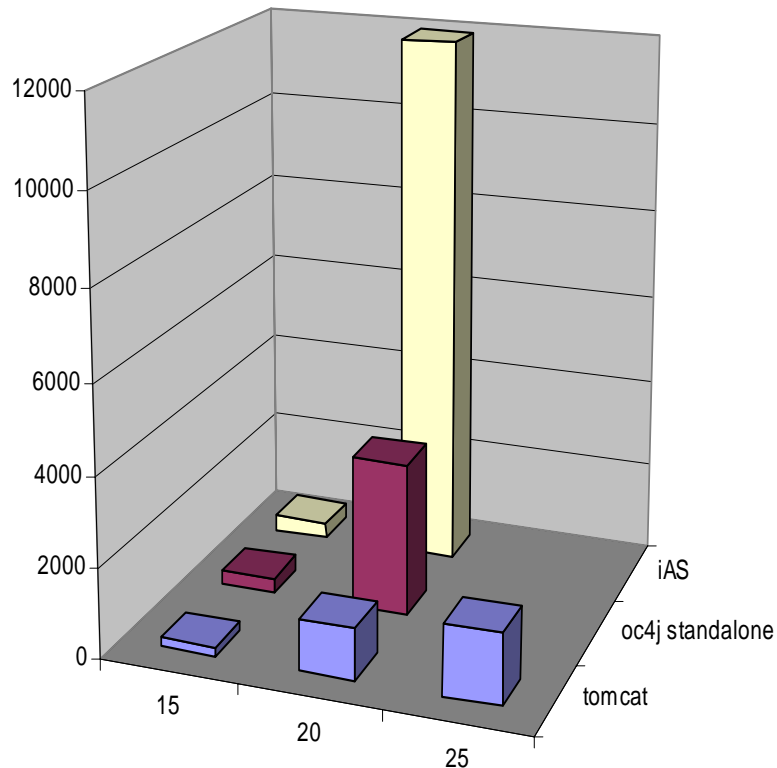
⇒ **Manageability**

⇒ **Security**

Performance

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

AVG response times (the lower the better)



# apps	15	20	25
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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	

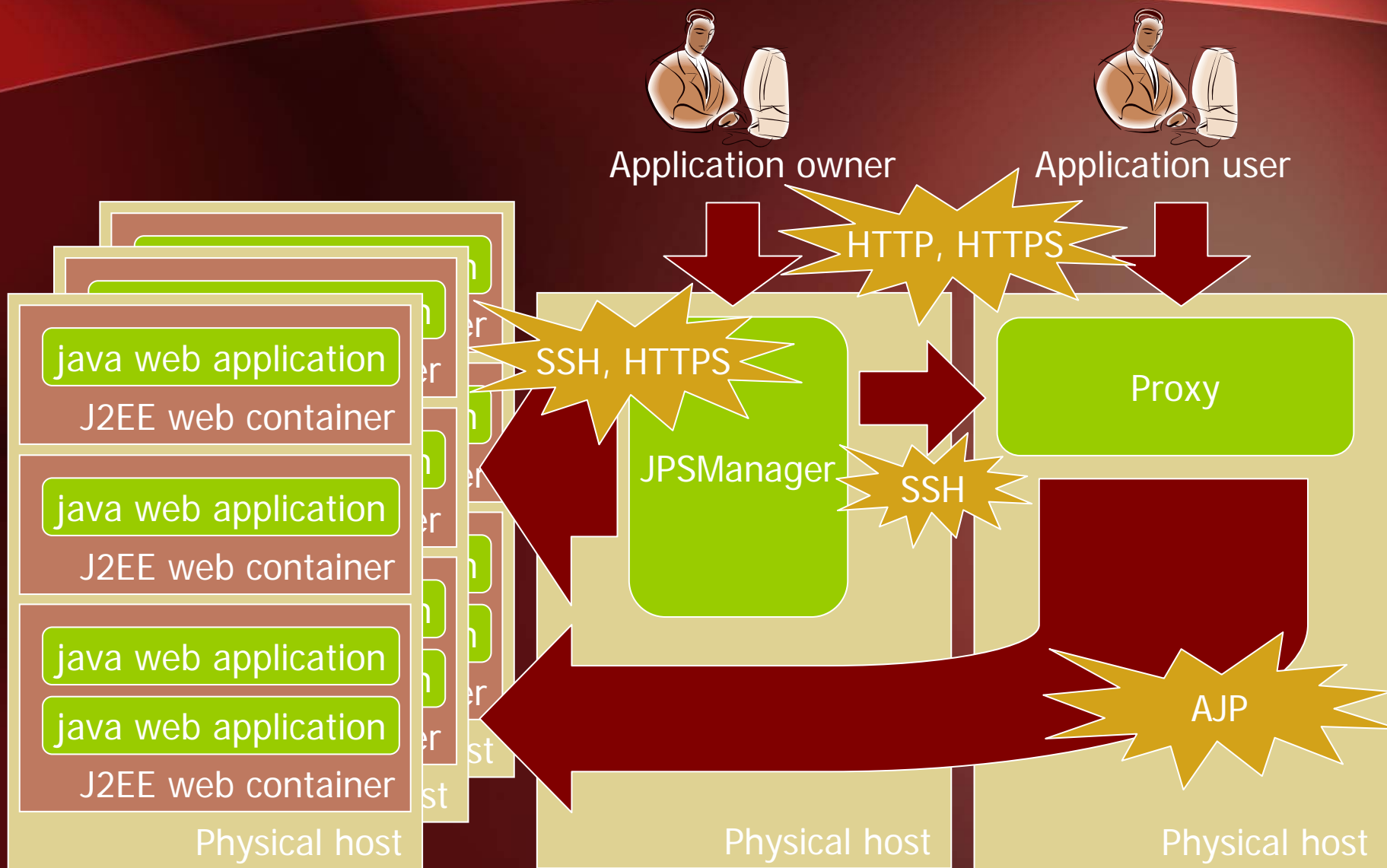
IO WAIT

tomcat	0,33%	6,80%	12,96%
oc4j stand.	0,46%	35,90%	
iAS	66,31%	81,56%	

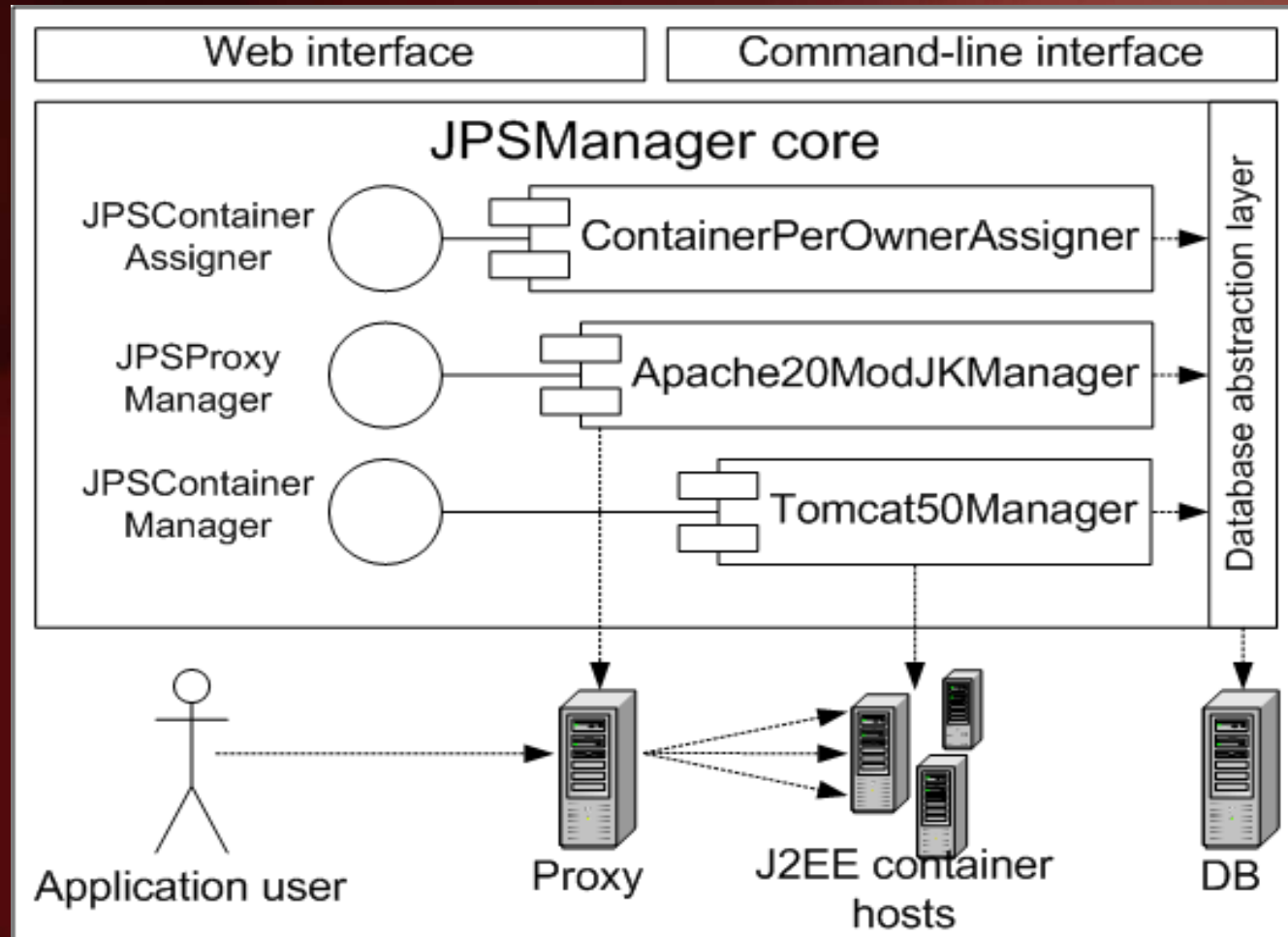
OC4J Standalone has been tested with JMS down.

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

The architecture – linux cluster

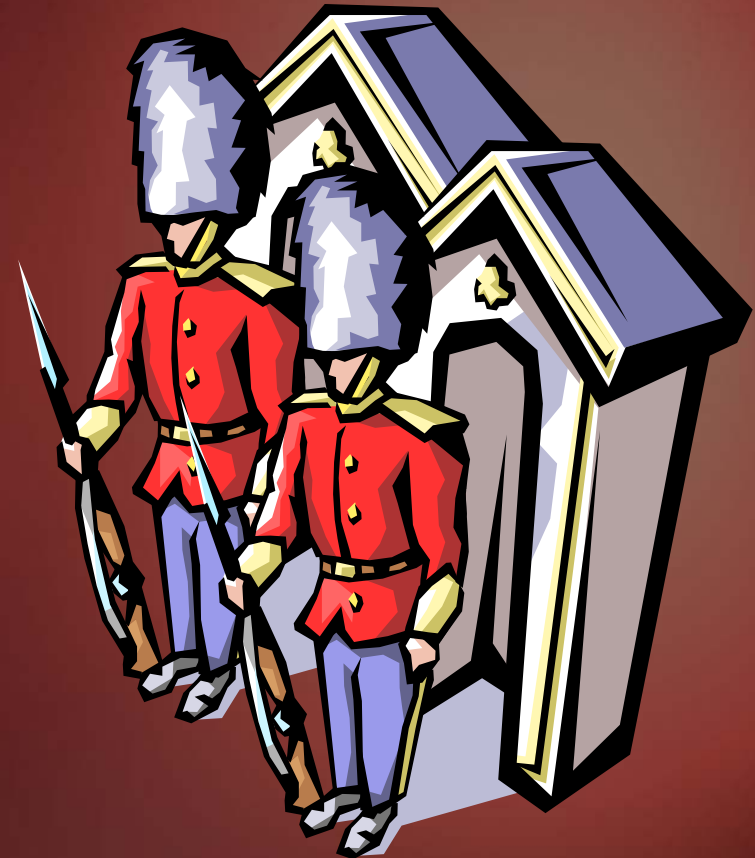


The software - JPSManager



⇒ **Open, flexible architecture**

- **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.**



Implement:

- **certificate authentication**

Evaluate:

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

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



Questions?



⇒ <http://www.cern.ch/j2ee-public-service/>