



Re-architecting J2EE Application Server with Isolates

Marcin Jarzab

Intern at Sun Labs (Barcelona project)

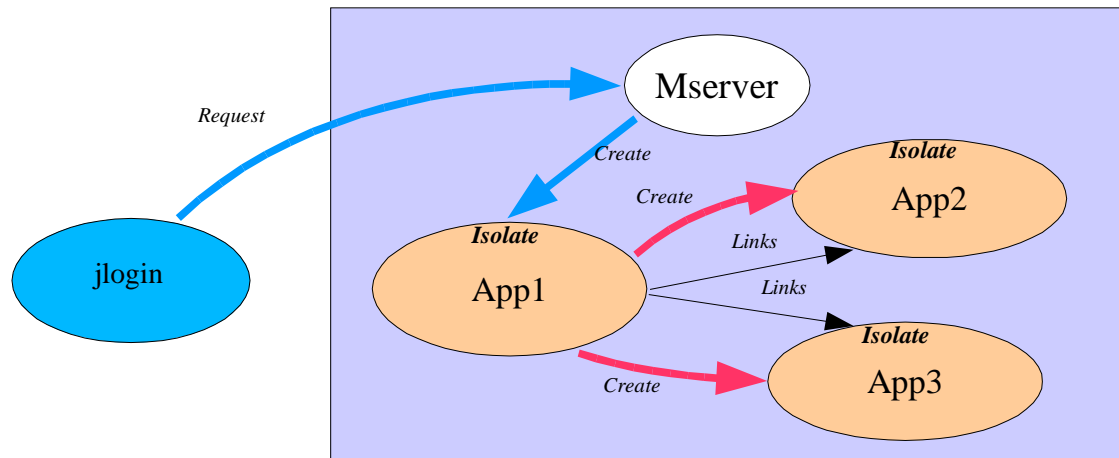
University of Science and Technology
(Krakow, Poland)



Introduction

- Isolate is an independent computational domain introduced by the *JSR 121*
 - *API for creation and lifecycle management*
 - *Fully compatible with existing applications*
 - *Different implementation strategies*
- MVM (Multitasking Virtual Machine) is a modified Java Virtual Machine (JVM) architecture enabling isolated execution of multiple Java applications in a single address space

MVM architecture

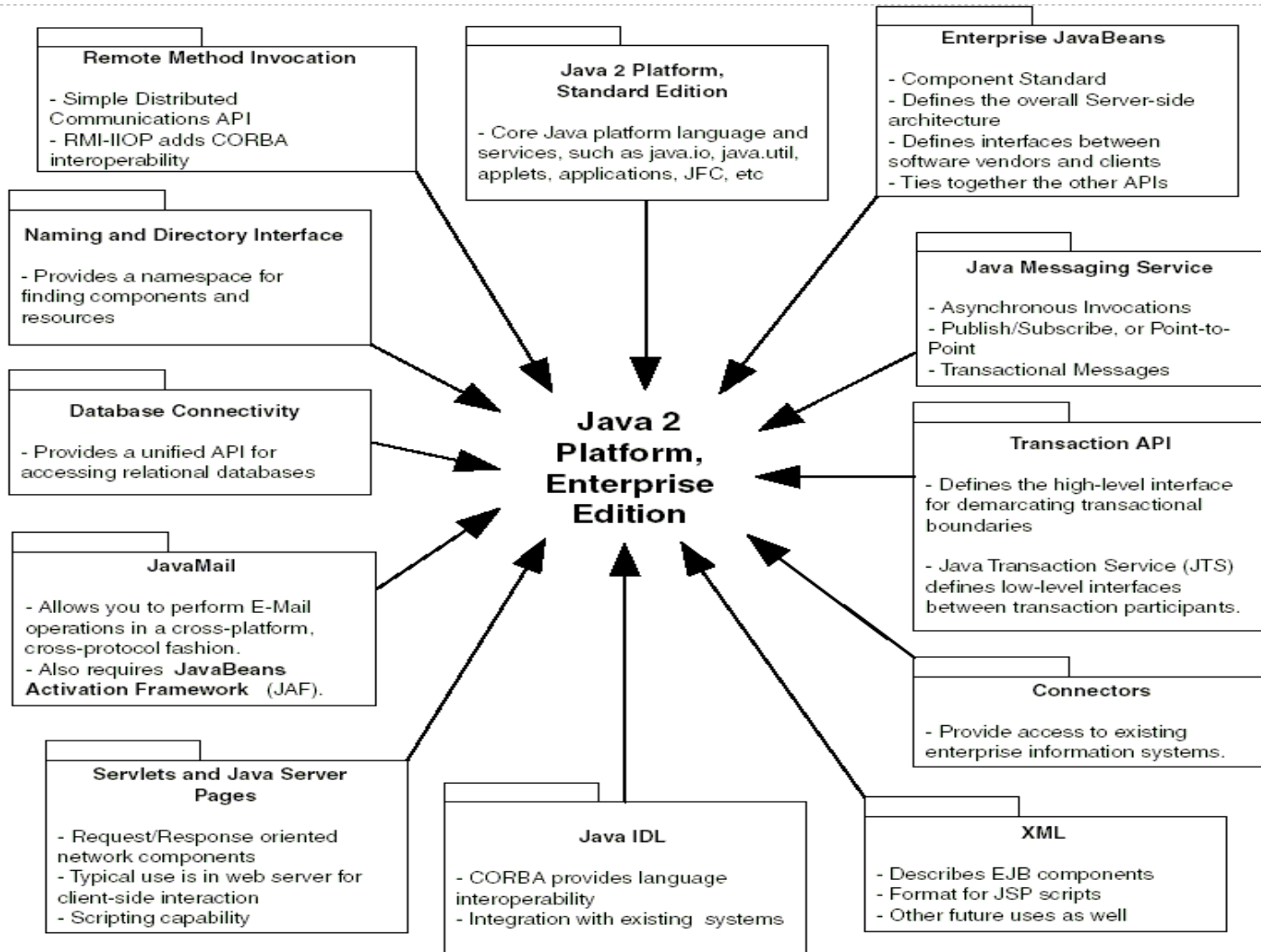


- *Mserver*: first isolate application that listens on a socket for connections from *Jlogin* process and creates new isolate for application
- *Jlogin*: connects to *Mserver* to run isolate for application
- *Isolates*: independent computational environments run in MVM
- *Links*: for efficient communication between *Isolates*

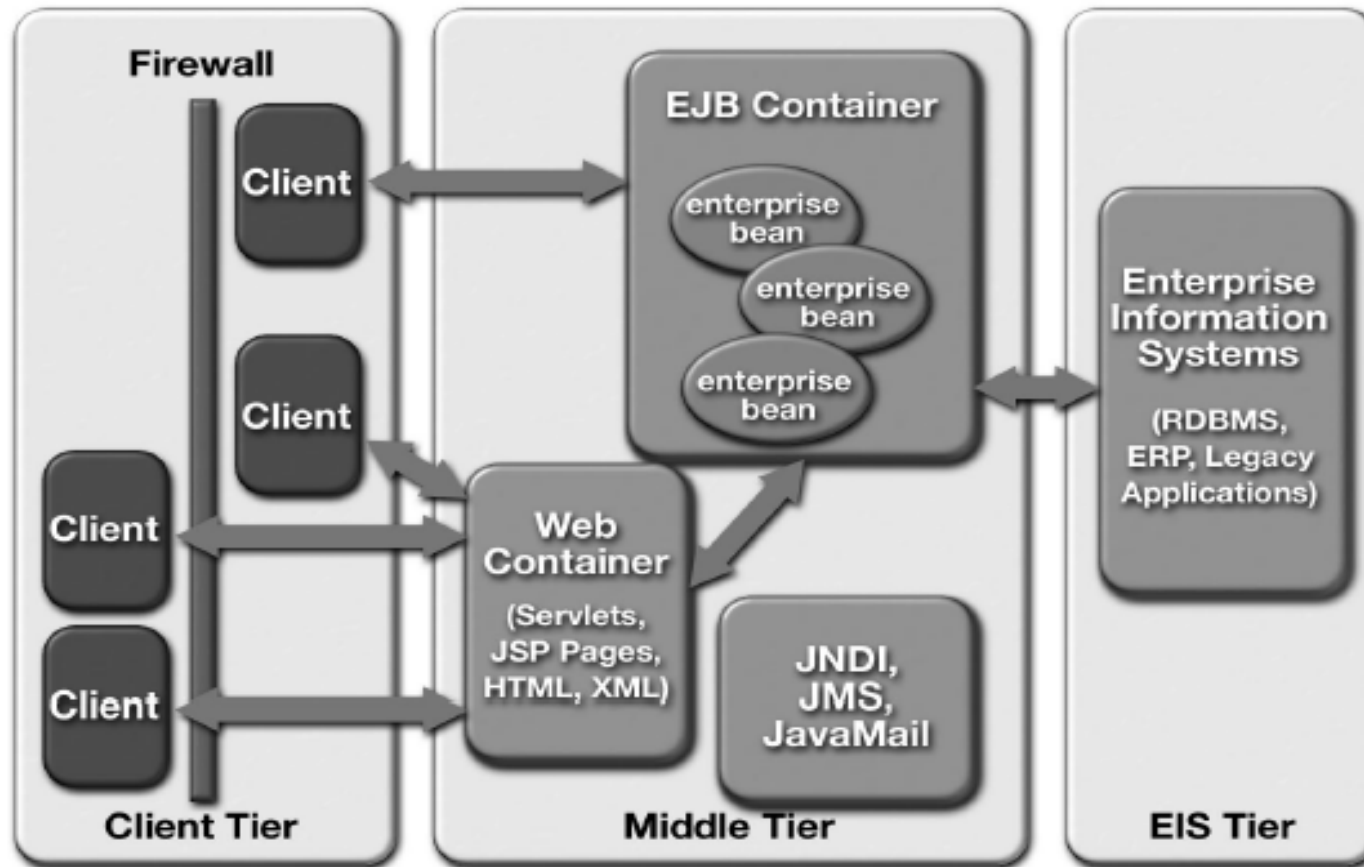
Motivation, Goals

- Integrate Isolate architecture into the J2EE platform
 - Scalability
 - Clean termination of applications
 - Resource Management
- Study how new APIs (Isolates, Resource Management) can be introduced into the application server architecture
 - Programming model
 - Performance
 - New features

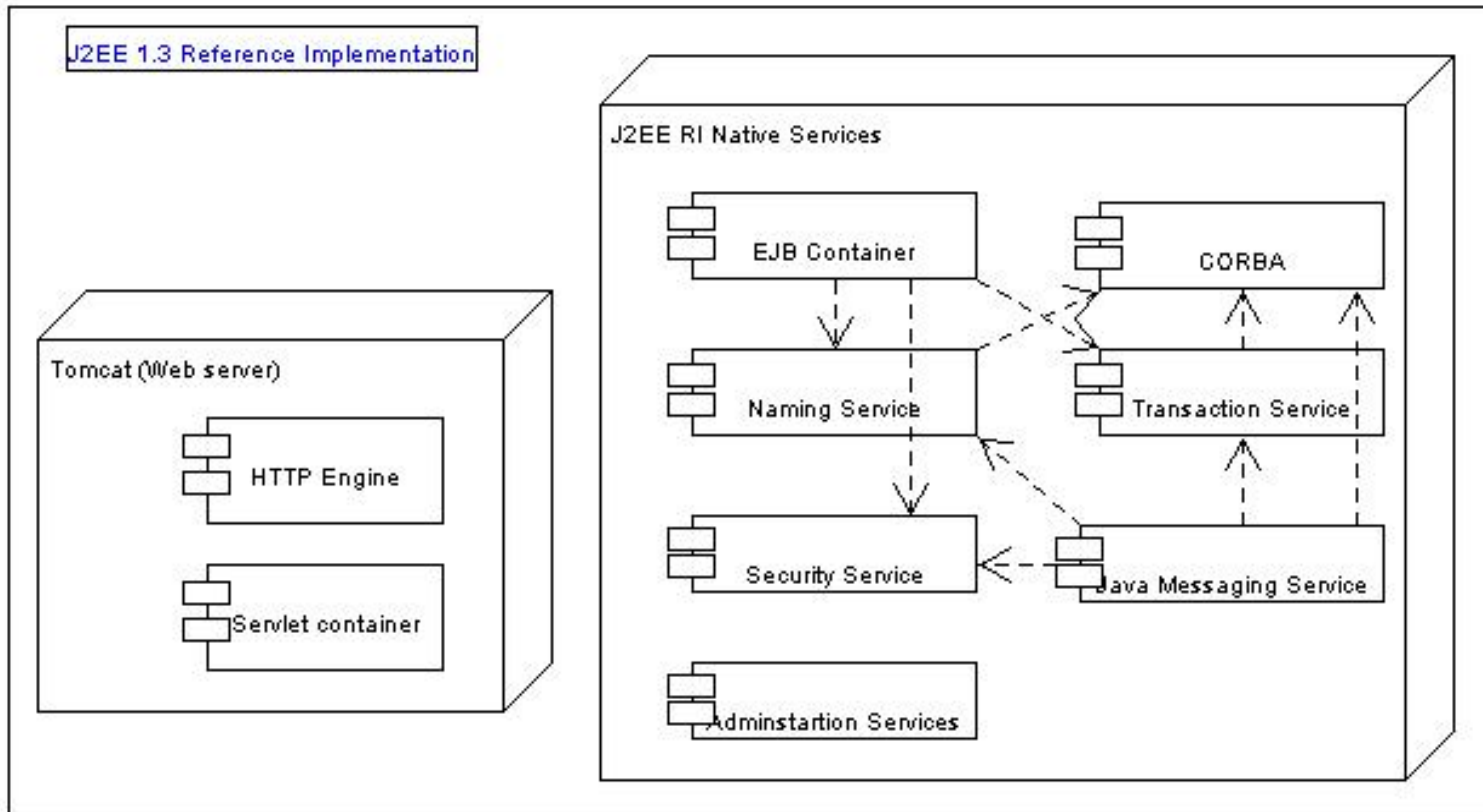
J2EE Platform



J2EE Application Model



J2EE Reference Implementation



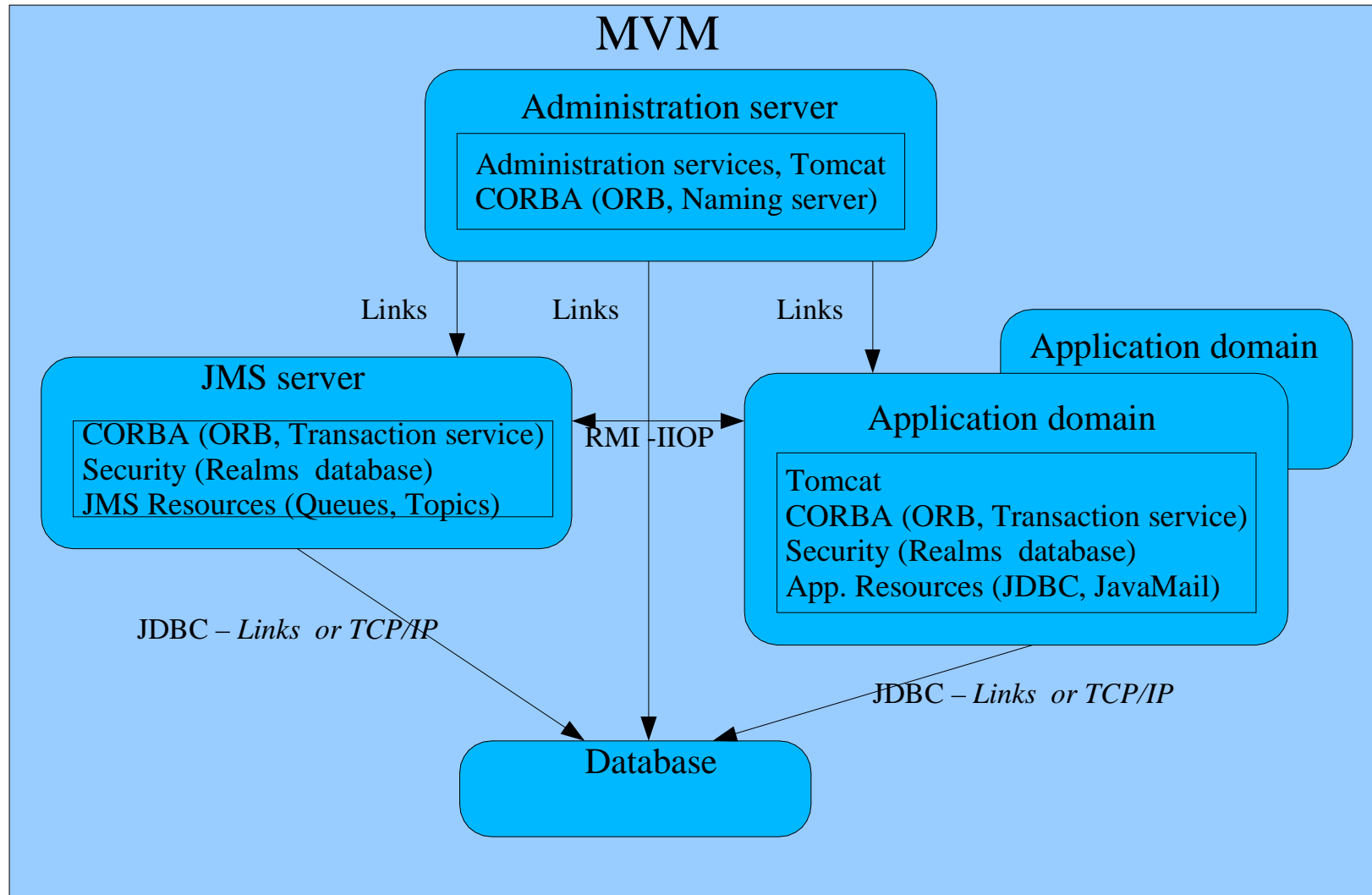
Possible approaches to introducing Isolates into J2EE

- Multiple J2EE servers in MVM
- One J2EE server with each component (Servlet and EJB) in a separate isolate
- One J2EE server with each application in a separate isolate
 - Application domain

Application domain

- Separate configuration environment disjoint from other domains
- Contains J2EE application resources (JDBC, JavaMail, Connectors)
- Unit of management for resource consumption

J2EE environment with Isolates



Conclusions

- Deeper understanding of all software layers
 - J2EE specification
 - Request flow in EJB and Web servers, deployment logic
- Built J2EE application server prototype based on *MVM* and *Isolates* proved its usability in J2EE environments
- Good platform for further experiments