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ANSA Phase III

Java, CORBA and Internet technologies

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Abstract

This talk discusses the combination of two powerful technologies to build high-quality distributed systems: Java and CORBA. The emphasis is put on the Java technology and its powerful assets for achieving high-quality distributed systems. We then present Jade and Quartz, two projects within the ANSA programme that realise and exploit the combination of these technologies. We finally sketch our future direction in exploring the new Internet technologies to engineer Open Distributed Systems.

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Distribution:

Supersedes:

Superseded by:

Java, CORBA and the Internet technologies

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Java: The language

- Familiar, Simple, truly Object-Oriented.
- Robust and Secure.
- Architecture Neutral.
- Automatic memory management and multithreaded.
- Dynamic binding and loading.
- Native exceptions support.



Java VM: The “soft” motherboard

- Defines an object machine.
- Portable on different Operating Systems.
- Interprets compiled bytecode from any high-level language (e.g Java).
- Loads bytecode from the file system or other sources (e.g network).
- Verifies the code integrity before execution.



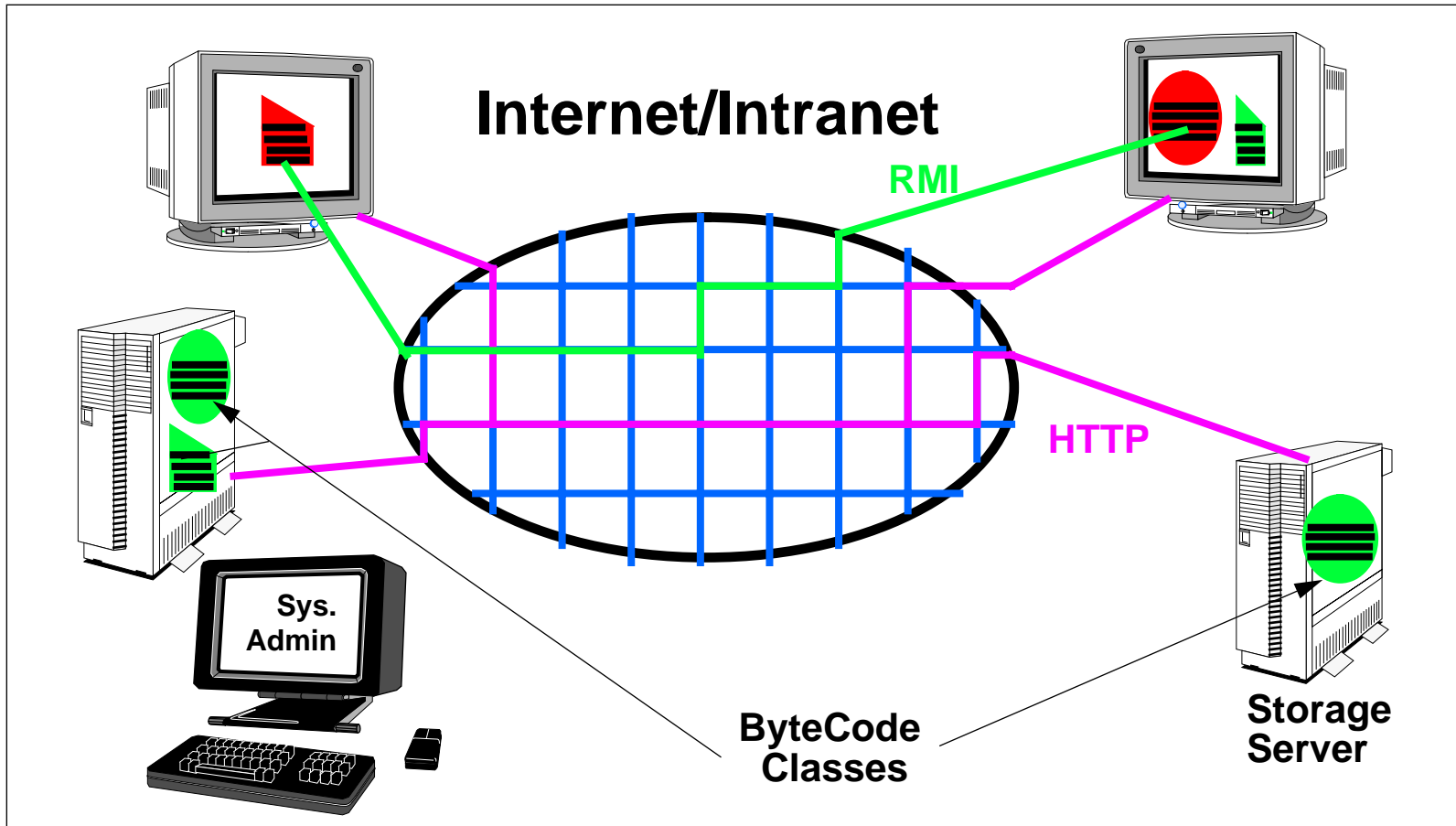
Java ByteCode

- Small instruction set (RISC approach).
- Indirect references to other classes and interfaces.
- Solves the “fragile superclass” problem.
- Supports runtime type checking (opcode **checkcast**).
- Supports multithreading (opcode **monitorenter**).
- Supports debugging (opcode **breakpoint**).

```
iconst_0 ff f9
iistore
iload_0 00 01
iinc
iload_0
iconst_2
imul
goto ff f9
```



Java's New Software Processes



Using **Java** for Distributed Systems

- Explore the usage of Java for building distributed svstems.
- Advantages :
 - Clear language semantics.
 - Platform independence.
 - Flexible software deployment (fat/thin clients).
 - Easy software management.
- But:
 - **Java** is NOT a distributed language !



Jade: Engineering CORBA Services with Java

- **Goals:**

- Enhance **Java** with a proven distributed technology.
- Allow interoperation between Java and non-Java world (e.g legacy).
- Leverage on existing efforts (e.g **CORBA** services).



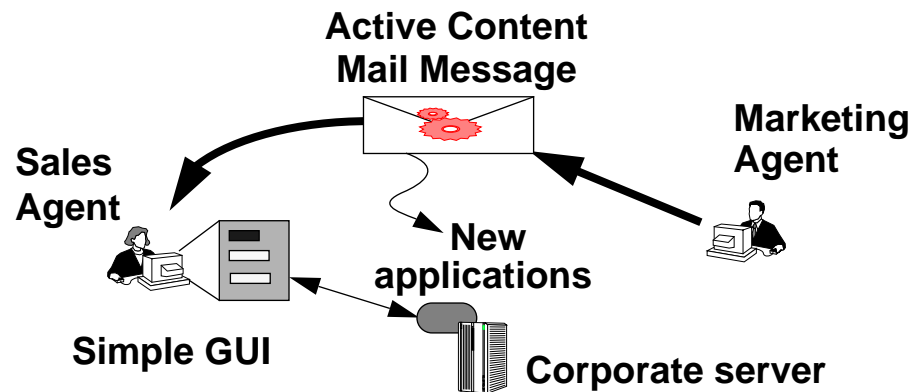
- **Achievements:**

- Built a **Java** RPC protocol based on **CORBA** IIOP.
- Ubiquitous access to **CORBA** services from **Java**-enabled Web browsers.
- Source code, documentation and online demo. available from our web site.



Quartz: Web-based workflow

- Show the powerful combination of WWW technologies with CORBA technology.



- Built a workflow generic manager as a CORBA service accessed by Java applets from Corporate WWW Browsers using Jade.
- Demonstrated two enterprise workflow examples.



Next Steps

- We believe in the potential of **Java**.
- Engineer **ANSA** architectural principles for building high-quality distributed systems in **Java**.
- Exploring issues in:
 - **Java** distribution models (Sun's RMI, object mobility).
 - Security (SSL protocol, **Java** signed code, secure **Java** VMs).
 - Management of the new **Java** software processes.

