JMX in
Java & Management
Environments
(DSOM 2001)

Christophe Ebro
JMX Foundation Spec Lead
Java Technology For Service Providers

JMX in Java & Management
Environments

? <u>Status</u>
? JMX and Java environments
?JMX and Management environments
? Evolution
? Q & A

? 60% market share for app server mgt
? 14 Major J2EE App Server vendors in JSR 77 expecting JMX to become a J2EE Standard Service
? Huge amount of JMX downloads
? JMX books:
  – One chapter in a Prentice Hall book (beg 2002)
  – One O'Reilly book (mid-2002)
? In major conferences (NOMS, IEEE, OMG)

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- Standard optional package for generic management, widely adopted
- Possible following step could be to have JMX delivered along with the VM itself as standard way of doing management:
    - For user management
    - To monitor and manage the VM itself
- Your opinion?

The Management/Monitoring of the VM must be transparent: no need to have additional stuff for management, or to know anything about it

➢A possible solution could be the use of Dynamic MBeans representing the VM Java objects to be managed/monitored

➢Your ideas/feedback/requirements?

? Already used by all major app server vendors for app server management

? App server vendors involved in JSR77 have requested that JMX become a J2EE Standard Service

➢Possible solution could be to include JMX API into J2EE 1.4 (with added security control)

➢Your ideas/feedback/requirements?

Possible solutions to define a Management Interface concept, similar to the Remote one, but dedicated to Management:
➢This interface would be referenced in the Deployment Descriptor
➢It would automatically register itself into the JMX MBean Server

Proposal: 3 types of EJBs:
? Pure Business EJBs
  – Created by a Business client via Home
  – Accessed by Business client using Remote
  – No management

Business Client · Home · Remote · EJB
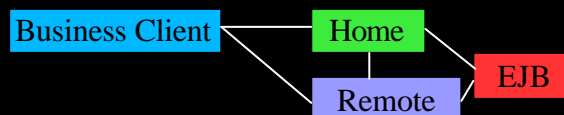
? **Manageable Business EJBs**
- Created by a Business client via Home

- Accessed by Business client using Remote

- Manageable using operations described in their Management Interface (MBean), through the Container Management infrastructure (MBS)

Management Client
JMX MBean Server

Management

Business Client — Home

EJB
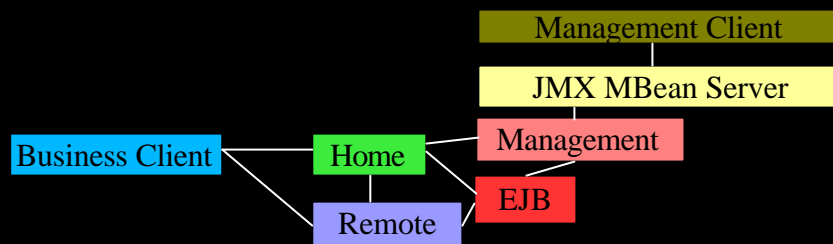
Remote

? **Management EJBs (logs, monitors, etc.)**
- Created by a Management client via Home

- Accessed by Management client using Remote

- Manageable using operations described in their Management Interface (MBean), through the Container Management infrastructure (MBS)

Management Client
JMX MBean Server

Management

Home

EJB

Remote
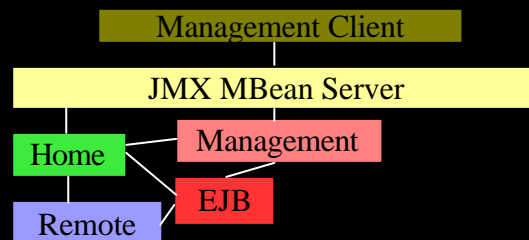
? Using JMX for J2EE Application Deployment?

? J2EE Connectors exposing the generic JMX Client API?
Allow J2EE developers to interface EISs in middle-tier apps by:
– Using a single interface

– Abstracting the underlying protocol
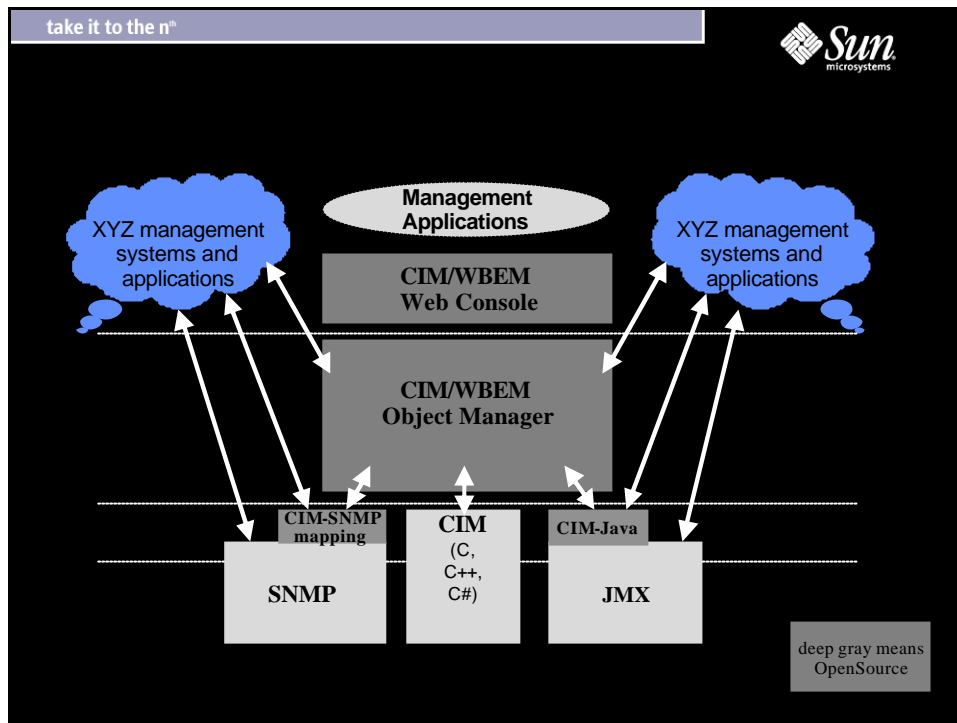
➤ Your ideas/feedback/requirements?

J2ME: opportunities

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Consumer Devices	Enterprise desktops, servers, printers, LANs	Java Applications	Internet Infrastructure	Telecom Infrastructure
Existing No management RMON Proprietary	**Existing** SNMP Proprietary	**Existing** JMX	**Existing** SNMP	**Existing** TMN TL1 Proprietary
Emerging Java & Web -based	**Emerging** CIM/WBEM			**Emerging** J2EE-based

?

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Management Applications

XYZ management systems and applications

XYZ management systems and applications

CIM/WBEM Web Console

CIM/WBEM Object Manager

CIM-SNMP mapping

CIM (C, C++, C#)

CIM-Java

SNMP

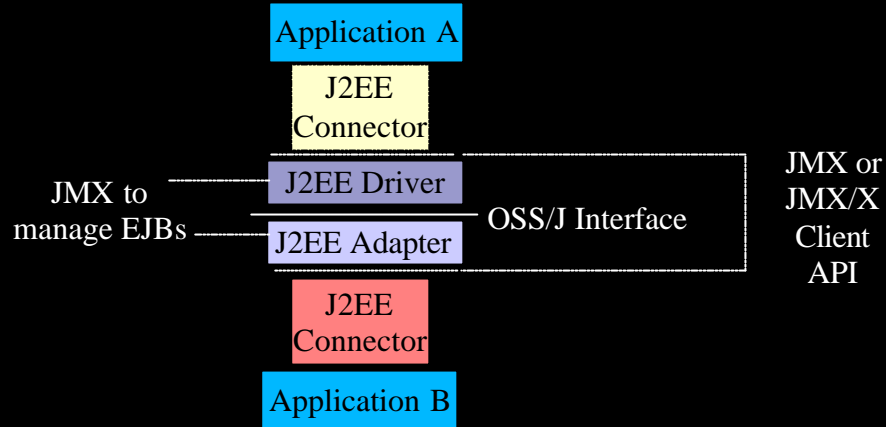**JMX**

deep gray means OpenSource

? JSR 146:

- CIM <-> JMX mapping

- JMX WBEM provider

?Possible to model using CIM and manage using any protocol

?Possible to manage existing JMX agents using CIM/WBEM by:

- Modeling in CIM extending CIM schemas

- Generating "mediation" Mbeans in agents

(JMX->CIM mapping not reusing CIM schemas!)

Application A

J2EE Connector

J2EE Driver

JMX to manage EJBs

J2EE Adapter

OSS/J Interface

JMX or JMX/X Client API

J2EE Connector

Application B

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take it to the nth

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- Bug fixing (ModelMBean, etc.)
- Complete OpenMBean implementation
- Minor extensions (to be identified)

- JMX 1.0 has security problem in MBeanServerFactory class
- Static methods allow anyone to get a handle on MBean servers
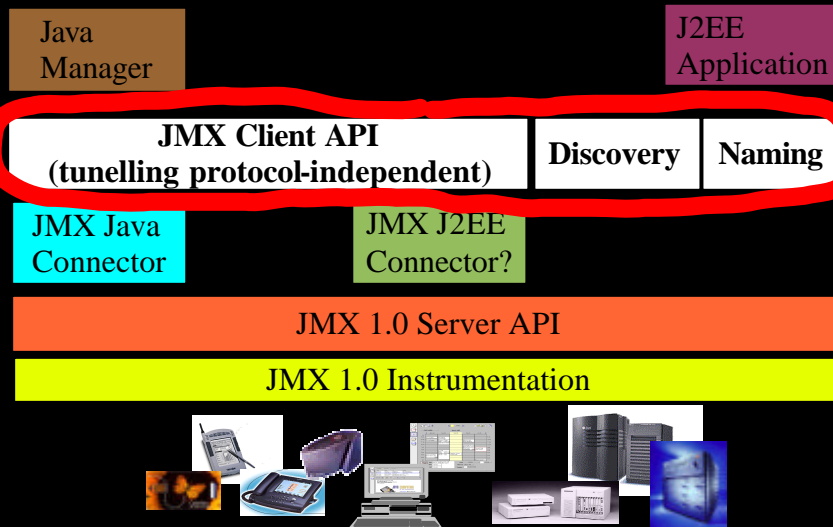- Should add permission checking

- Insert any object implementing MBeanServer between connector and real MBean server
- Object can check permissions before forwarding operation

Java Connector		Java Connector
MBean server		Context checker
		MBean server
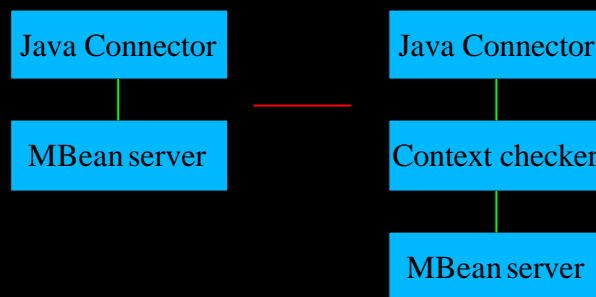
Need to define a Client interface for tunneling to the JMX MBean Server, in order to standardise the way a Java Manager (local or remote) can connect to a JMX Agent:

- Expose a single interface to client
- Hide the underlying tunneling protocol
- Provide Discovery and Naming

- Use the RemoteMBeanServer client API contribution as a basis
- Provide a Discovery mechanism based on a generic independent mechanism or JINI/JXTA
- Define Naming Conventions, for a manager to be able to access several managed applications simultaneously

Java Manager		J2EE Application
JMX Client API **(tunelling protocol-independent)**	**Discovery**	**Naming**
JMX Java Connector	JMX J2EE Connector?	
JMX 1.0 Server API		
JMX 1.0 Instrumentation		

JSR Scope

Launch of a component market place, the JMXperience, for anybody to provide components around JMX to the community.
The component provider is free to choose format (source or binary) and licencing conditions (free or for a fee).

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