

EJB

Prashant Lamba,
Niket Parekh, and
William Pugh

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Some notes

- Sun's j2ee ri fails in bad and mysterious ways under Java 1.5
- The j2ee 1.3.1 implementation is certified under Java 1.3
- Generally works under 1.4

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What are EJB?

- Some RMI
- Some software component technology/terminology
- Ability to intercept calls and add system-level functionality
- Functionality that can be added
 - transactions, security, activation/passivation
 - ...

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Kinds of beans

- Entity beans
 - represents thing in persistent store
- Message-driven beans
 - listeners
 - we won't be talking much about these today
- Session beans
 - stateless
 - stateful

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Bean clients

- Clients can only get references to session and entity beans
- Can create messages that are processed by message driven beans

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Session/Entity confusion

- Clients see same interfaces for both session and entities beans
- Some methods only make sense on entity beans, some only on session beans
- Some methods have different semantics on entity beans

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Entity beans

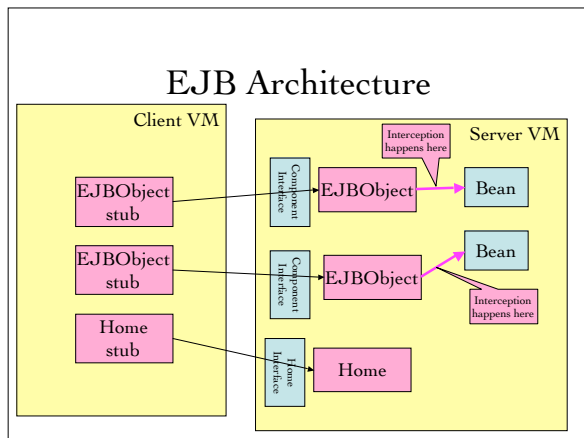
- An entity bean is backed by an entry in a persistent store
 - removing an entity bean deletes the entry from the persistent store
- You can search for entity beans
 - by primary key, or there is even a query language

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Stateful Session Beans

- Maintains state over a series of calls from a client
- Not shared between clients
- Can be (almost) silently dropped after timeout
 - not for storing important data
- Cannot search for session bean

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- ### Assumptions
- Initially, we'll assume that all calls to EJB's are from remote machines
 - at least, via RMI
 - assumption relaxed in EJB 2.0, we'll talk about it later
 - Clients never get to talk directly to a bean
 - would allow circumvention of security and transaction checks
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- ### Home sweet home
- Home interface allows beans to be created, located and removed
 - Factory design pattern
 - I would have preferred factory to home as a naming convention
 - But we are stuck with home
 - User specifies interface only, no code
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- ### Component interface
- Called remote interface in a lot of the literature
 - made more sense when all client references were remote
 - User specifies interface only, no code
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Responsibilities

- You provide
 - Component interface
 - Home interface
 - Bean implementation class
- Container generates
 - Home implementation and stubs
 - EJBObject implementation and stubs

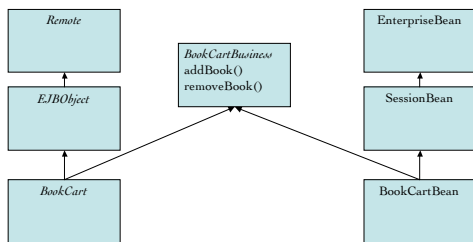
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Bean doesn't implement component interface

- Typically, the bean doesn't implement the component interface
- A bean is not an instance of a something that can be invoked by a client
- How do you know that a bean can handle all the methods supported by the interface?
 - tools

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If this worries/bothers you



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Narrowing

- Normally, in Java/RMI, you can just downcast a reference returned from a lookup
 - e.g., RemotePortal p
= (RemotePortal) Naming.lookup(pAddress);
- Not in EJB

```
Context ic = new InitialContext();
Object o = ic.lookup("Advisor");
AdviceHome home = (AdviceHome)
    PortableRemoteObject.narrow(o,
        AdviceHome.class);
```

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Deal with it

- This is ugly, but necessary
- Deal with it
- RMI may be implemented with IIOP/CORBA
 - in which case, downcast may actually have to do something
- If nothing needed, it is cheap

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EJBObject interface

EJBHome	getEJBHome()
Handle	getHandle()
Object	getPrimaryKey()
boolean	isIdentical(EJBObject obj)
void	remove()

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EJBHome interface

EJBMetaData	getEJBMetaData()
HomeHandle	getHomeHandle()
void	remove(Handle handle)
void	remove(Object primaryKey)

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Handles

- Handles are persistent references to EJBObjects
- Can be serialized, passed between machines
 - stored in Servlet sessions

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isIdentical

- Used to determine whether two EJBObject stubs refer to the same bean
- Stateless session beans
 - true if they come from the same home
- Stateful session beans
 - false for any two distinct stubs
- Entity beans
 - true if entities have same primary key and same home

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Session/Entity Bean Creation

- Home interface must have create(...) methods
- EJB must have matching ejbCreate(...) interfaces
- Stateless session beans should have only no-argument create methods

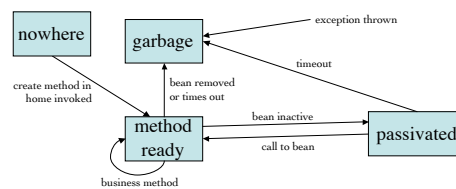
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Removal

- Removing an entity bean deletes the corresponding info from persistent store
- Removing a session bean says that you are done with it

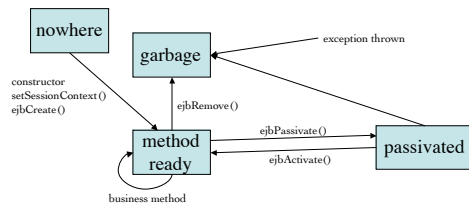
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Stateful Session Bean Lifecycle



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Lifecycle notications



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Stateless Session Beans

- No state that lasts longer than a single call from a client
 - Only one call at a time on a stateless session bean (?)
 - Can have instance variables / state that persist for the duration of one call (?)
 - Can keep resources, debugging info, caches
- Different invocations from a client can be routed to different beans

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Local interfaces

- EJB2.0 adds local interfaces for components and homes
 - extend EJBLocalHome and EJBLocalObject
- Local objects don't have handles
- Call by reference rather than deep copy
- Methods don't throw remote exception

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Mix and Match

- No need for one bean to support both Local and Remote interfaces?
 - rather different
- Client of bean must know what it is getting

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