CCM: The CORBA Component Model

- Portable Object Adapter (POA) revisited
- CORBA Objects
- CORBA Component Model

Szyperski: Component Software 2e, Chapter 13.3

Portable Object Adapter (POA) revisited

Client

Server

POA = "MyPOA"

Object references

Servant

Servant

Active Object Map

Image adapted from: F. Bolton, Pure CORBA, Sams Publishing, 2002

Configuring a POA

<table>
<thead>
<tr>
<th>POA policy type</th>
<th>Allowed values</th>
<th>RootPOA policy</th>
<th>Child POA default pol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ThreadPolicy</td>
<td>ORB_CTRL_MODEL (multi-thr.), SINGLE_THREAD_MODEL</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>LifeSpanPolicy</td>
<td>TRANSIENT, PERSISTENT</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>IdAssignmentPol.</td>
<td>SYSTEM_ID, USER_ID</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>IDUniquenessPol.</td>
<td>UNIQUE_ID, MULTIPLE_ID</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>RequestProcessingPolicy</td>
<td>USE_ACTIVE_OBJECT_MAP_ONLY, USE_DEFAULT_SERVANT, USE_SERVANT_MANAGER</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>ServantRetentionPolicy</td>
<td>RETAIN, NON_RETAIN</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>ImplicitActivationPolicy</td>
<td>NO_IMPLICIT_ACTIVATION, IMPLICIT_ACTIVATION</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

Configuring a POA, continued

- Remark: Not all theoretically possible combinations make sense / are permitted.
- RootPOA: The default POA when the server comes up
- Customized child POA’s can be created with different policies

Life span of CORBA Objects

Controlled by POA life span policy

- Transient objects
  - Lifetime bounded by
  - Lifetime of server process that created it
  - and of its POA
  - Usually, short-lived

- Persistent objects
  - Lifetime unbounded
  - Its creating server can be stopped and restarted multiple times
  - Dormant when its POA is destroyed
  - Reactivated when its server is restarted and POA is reinstated
  - State stored in a database

Types of CORBA Objects (1)

- Session objects
  - Usually short-lived, non-persistent

Image adapted from: F. Bolton, Pure CORBA, Sams Publishing, 2002
Types of CORBA Objects (2)

- **Entity objects**
  - usually long-lived, persistent

POA - “EntityPOA”

1. Create DB record
2. Create servant
3. Activate servant
4. Create IOR


Types of CORBA Objects (3)

- **Factory Object**
  - Create, find and destroy other objects
  - Perform steps 1, 2, 3, 4 as above for session / entity objects
  - Can itself be a session or entity object

CORBA Component Model (CCM)

- Abstraction of CORBA object with its environment
- **Container**
  - Abstraction of POA functionality
  - Life cycle management
  - Provision of CORBA Services for enterprise applications
  - Security, transaction, event service
  - Simplified interfaces covering most commonly used features
- Support for ready-made components
  - Configuration and assembly
- Separate component logic and CORBA functionality
  - e.g., hide house-keeping code (POA object creation, life cycle management for CORBA objects etc.)
- EJB look-and-feel
  - Basic components: Fully EJB compatible

CORBA Component Model Architecture

- **Home**
  - Factory object to create, find, remove component instances
- **Component**
  - Basic building block for server application
  - Configuration interfaces with setters and getters
- **Container**
  - Environment that supports components
  - Callback interfaces for container to notify component about events etc.

CORBA Component Categories

- **Session components** (cf. EJB stateful session beans)
  - transient state, transient identity
- **Service components** (cf. EJB stateless session beans)
  - no state, no identity
- **Entity components** (cf. EJB entity beans)
  - persistent state
  - persistent identity, automatically visible to clients
- **Process components**
  - persistent state
  - persistent identity, not automatically visible to clients