CCM: The CORBA Component Model

- Portable Object Adapter (POA) revisited
- CORBA Objects
- CORBA Component Model (CORBA 3.0)

Szymerski: Component Software 2e, Chapter 13.3

Portable Object Adapter (POA) revisited

\[ \text{CORBA object} = \text{Object ID} + \text{servant instance} + \text{mapping} \]

Client

Server

Object references

POA = "MyPOA"

POA policies...

"Fred"

"Anna"

Servant

Servant

Active Object Map

maps object IDs to servants

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 (multithr.) SINGLE_THREAD_MODEL</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>LifeSpanPolicy</td>
<td>TRANSIENT, PERSISTENT</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>IdAssignmentPolicy</td>
<td>SYSTEM_ID, USER_ID</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>IdUniquenessPolicy</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_IMPLPLICIT_ACTIVATION IMPLICIT_ACTIVATION</td>
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</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
  - the lifetime of the 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 instantiated
  - State stored in a database

Types of CORBA Objects (1)

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

Client

Server

1. Create servant

2. Activate servant

POA = "SessionPOA"

TRANSIENT, ...

Fred
Types of CORBA Objects (2)
- **Entity objects**
  - Usually long-lived, persistent

Client

<table>
<thead>
<tr>
<th>1. Create DB record</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Create servant</td>
</tr>
<tr>
<td>3. Activate servant</td>
</tr>
<tr>
<td>4. Create IOR</td>
</tr>
</tbody>
</table>

POA: "EntityPOA" PERSISTENT...

Fred

DB state

Server

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 (2.0) look-and-feel**
  - Basic components: Fully EJB compatible

**CORBA Component Model Architecture**

**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