Application Servers
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Session 9 - Main Theme
CORBA 3 Component-Based Computing Environments

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Agenda

- CORBA 3 OMA Services
- CORBA 3 CCM
- CORBA 3 Environments
- Summary
- Readings
- Assignment #7
Summary of Previous Session

- Previous Session Continued
  - OMA Services Detailed
  - BEA WebLogic, IBM WebSphere, JBoss.org JBoss
- Other Open Source J2EE Environments
  - Enhydra.org/Lutris.com Enhydra
  - ExoLab.org OpenEJB
- Other Commercial J2EE Application Servers
- Security in J2EE Application Servers (continued)
- Summary
- Readings
- Assignment #6

Application Servers Architectures

- Application Servers for Enhanced HTML (traditional)
  - a.k.a., Page-Based Application Servers
  - Mostly Used to Support Standalone Web Applications
- New Generation Page-Based Script-Oriented App. Servers
  - First Generation Extensions (e.g., Microsoft IIS with COM+/ASP)
  - Servlet/JSP Environments
  - XSP Environment
  - Can now be used as front-end to enterprise applications
  - Hybrid development environments
- Distributed Object Computing Platforms
  - Provide an infrastructure for distributed communications enabling
  - Still need to merge traditional web-oriented computing with object computing
- Object Management Architectures
  - DOC Platform + APIs to reusable services and facilities
- OMA + Component Models -> J2EE, CCM, DNA
Part I
CORBA 3 OMA Services Detailed

Also See:

and
Transaction Service at Work

CORBA OTS and Messaging Services

- CORBA Transaction Service
  - Available as an OMG specification
  - See slides http://www.cs.wustl.edu/~schmidt/CORBA-docs/
  - Implementations: Orbacus OTS, Encina++, OrbixOTM, etc.
  - Specification used to derive JTS described in part II of this slide set
    (implements Java mapping of the CORBA OTS 1.1)

- CORBA Messaging Service
  - Based on CosEvents and CosNotification Services
  - CORBA 3 adds Filters, Quality of Service, and Structured Events
    - CORBA 3 adds Filters, Quality of Service, and Structured events
    - Structured events promote lightweight notification
  - Implementations: TAO 1.1
  - Contenders: IBM MQSeries, Microsoft Message Queue Server, TIBCO ETX, and PeerLogic Inc. PIPES
CORBA Security Reference Model

Client

ORB(s)

Object Implementation

Request

Client-side and target-side security on invocations, security association, access control, message protection and audit.

CORBA Security Architecture

application mobile objects

implementation - ORB services

implementation security objects

application objects

Authentication and Security Associations

Principal Authentication

Current Credentials

Secure Invocation

Security Context

Vault

Access Policies

Delegation Policy

Domain Manager

Authorization and Access Control

Application Access Decision

Audit Decision

Audit Channel

Accountability

Non-repudiation

Credentials
TAO’s SSLIOP (IIOP over SSL)
Pluggable Protocol

- Protocol must be loaded
dynamic SSLIOP_Factory Service_Object *

  TAO_SSLIOP:_make_TAO_SSLIOP_Protocol_Factory()
  ""
  static Resource_Factory "-
  ORBProtocolFactory SSLIOP_Factory"

- SSLIOP enforces integrity, confidentiality, and secure
invocation for client requests
- X.509 certificate-based request authorization can also be
implemented programmatically via SSLIOP

CORBA Web-Enabling
(Second Generation Client/Server Architectures)

- Need Domain Boundary Controllers (e.g.,
www.xtradyne.com) until HTTP-NG, or CORBA 3
firewall specification get implemented
CORBA Web-Enabling
(Gatekeeper, Wonderwall, etc.)

- Application Servers include IIOP gateway products
- CORBA 3 includes a firewall spec. for IIOP support

Part II
CORBA 3’s
CORBA components Container (CCM) Environment

See Sub-Topic 1 Presentation on “CORBA 3”

Also See John Siegel’s
CORBA 3 Fundamentals and Programming
and
Quick CORBA 3
CCM v.s. EJB

- EJBs are reusable into the CCM platform
- CCM supports component assembly
- CCM is programming language independent and tailored towards legacy application connectivity
- EJBs are not components
- EJB servers provide an object platform and manage containers that support bean deployment with an abstraction to the developer concerning persistence, transaction, and security management

CCM Component Development

- Component Declaration
  - IDL 3 compiler generates stubs and metadata for components
- Component Implementation
  - Component implementations (structure and state) and homes are declared using CIDL (declarative language)
  - Developer provides implementation business logic
- Component Packaging
  - Archive that contains implementations, deployment info, etc.
- Component Assembly
  - Used to deploy a set of components that may need to be linked
- Component Deployment and Installation
  - System generates all connections for component assemblies
- Component Instance Activation
  - Retrieve Home and/or Component reference to invoke business methods
Part III

CORBA 3 Environments

See:
- http://ditec.um.es/~dsevilla/ccm/

Implementations (mostly open source):
- GOAL Group OpenCCM - http://corbaweb.lifl.fr/OpenCCM/
- ExoLab.org OpenCCM - http://openccm.exolab.org/
- iCMG K2-CCM (C++) - K2-CCM
- MICO/E (Eiffel ORB) - MicoCCM page
- JavaCCM - http://dog.team.free.fr/details_javaccm.html
- Other companies: Eurescom/GMD/Humboldt U, Computational Physics/Photon Research, Sprint, ONE, Siemens, Sourceforge MI-3 (“Mission Impossible 3”) and CIF projects (http://sourceforge.net/projects/cif/), etc.
Generic CORBA 3 Platform

Application CORBA Components

Development Tools

Component Server

ERP RDBMS ODBMS WEB

Server Control

K2-CCM Architectural Components

Client Process
- A Client (ext. or internal)
  - K2 Client Framework
  - Uses Server/ Application

Queries to Service 50-1000

Load balances 50

Federations

K2daemon
- Trader (Arbitrator) Fault Tolerance Deployment DB
- Admin Config

Federation 2-20

Manager Statistic Collector
- Sends Load Statistics Information

Federation 2-20

Server Process
- User Component
  - K2 Server Framework

Graphical Management and Configuration Tool

Management App

1-10 Visualize/ Change
Part IV

Conclusion

Summary

- CORBA OTS is implemented in several CORBA products and provides the basic standard on which J2EE JTS implementations are based.
- CORBA Messaging Event and Notification services are still being developed to allow for efficient filtering of messages currently unsupported in mainstream solutions.
- Interoperable secure CORBA implementations are complex to implement, and mainstream products only provide partial security solutions.
- CORBA 3’s added-value is in the area of Internet Integration, Quality of Service and CCM support.
- Only a few open source and commercial implementation of CORBA 3 are available today.
Readings

- Readings
  - Building Application Servers: Part II, and III
  - Handouts posted on the course web site
  - Explore CORBA 3/CCM environments
  - Read related white papers/documentation on the CORBA 3/CCM environments

Project Frameworks

- Project Frameworks Setup (ongoing)
  - Apache Web Server (version 1.3.20, www.apache.org)
  - Perl (version 5.x, www.perl.com), PHP
  - Microsoft IIS with COM+ and ASP (), ChiliSoft
  - Apache Tomcat
  - Macromedia JRun
  - Apache Cocoon 2/XSP
  - Visibroker, Orbacus
  - RMI-IIOP
  - WebLogic, WebSphere, JBoss, Enhydra, OpenEJB
  - Inprise AppServer, iPlanet.com iPlanet, Sybase EAServer, Oracle 9i, IONA iPortal, Xoology Concerto, Aligo M-1, Advanced Network Systems WebIx
  - GOAL Group OpenCCM, ExoLab.org OpenCCM, iCMG K2-CCM (C++), MICO/E (Eiffel ORB), JavaCCM, TAO Group, IONA iPortal (no CCM), Borland AppServer (no CCM), Sourceforge MI-3 (“Mission Impossible 3”) and CIF projects
Structured Applications Design Tips

- Reuse: should focus on Domain Models/System Family Architectures
- Applications should separate the various information elements (i.e., content, logic, style, and architecture/handling schemes)
- Various content formats: presentation, message, storage, etc.
- Application architecture supports:
  - Web Enabling (WE), XML Enabling (XE), Data Enabling (DE), Enterprise System Assurance Enabling (ESAE)
- Various application support services to support:
  - Interactions with users via content (content + logic) - WE
  - Encoding of user requests as secure (portable) messages (content generation) - XE/ESAE
  - Processing of user requests via logic (content + logic) - XE
  - Rendering of content via logic using style (content + style + logic) - WE/XE
  - Querying information via logic (content + logic) - XE/DE
  - Interactions with back office via content (content + logic) - XE/ESAE

Assignment

- Explore the textbooks’ references to CORBA 3/CCM Application Server technology
- Homework #6 due date is 11/19/01
- Homework #7a: Investigate CORBA 3 CCM computing platforms’ development environments. Write a short report that documents your findings and recommendations with respect to selection criteria in support of development environments for application server technologies covered in this session
- Homework #7b: See homework #7 specification (due date is 11/26/01)
**Next Session:**
**COM+ Component-Based Computing Environments**

- COM/DCOM Component Model and OLE
- COM+ MTS Services: Transactions and Security
- COM+ Message Queuing