Oracle Communications Service Delivery (OCSD) Product Family

Service Platforms

- **Oracle Communications Services Gatekeeper**
  - Base Platform
  - Enabler Module

- **Oracle Communications Converged Application Server**
  - Standard Edition
  - IP Multimedia Subsystem Edition
OCSD Customer Adoption Leadership
Communications Service Providers
Oracle Communications Service Delivery
The Best of BEA WLCP and Oracle SDP Products

*Presence, XDMS, and Diameter-based Universal Subscriber Profile included
** Generally Available date projected for Q4FY09
Oracle Communications Service Delivery on Linux http://edelivery.oracle.com

Select a Product Pack: Oracle Communications Applications
Platform: Linuxx86

<table>
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<th>Description</th>
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Total: 9
Oracle Communications Converged Application Server

- Converged Web (Java EE, Web Services) – Telecom (IMS, SIP Servlet) Application Server
- Industry’s Most-Widely Deployed SIP-IMS Application Server Platform
- Extremely Fault Tolerant and Highly Available Distributed Deployment Architecture
- Provide Value-Added Enablers for Presence and Group List Management (XDMS)
- Ultra High Performance, Low-Latency, Real Time SIP-IMS Application Processing
- Comprehensive, Converged SIP Servlet, Java EE, Web Services Service Creation Tools

Oracle Communications Converged Application Server

Web-Telecom Apps

Service Creation Tools

Engine/State Tiers

Converged Web-Telco Container (SIP-IMS-Java EE-Diameter)

Real Time JVM

Oracle Communications Converged Application Server

Mobile

Fixed

NGN
## OCCAS 4.0.1 Standard vs. IMS Edition

<table>
<thead>
<tr>
<th>OCCAS 4.0.1 Features</th>
<th>Standard Edition</th>
<th>IMS Edition</th>
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<tbody>
<tr>
<td>Core JSR 289 + Java EE 5 Support</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>High Availability Clustering</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Session Replication</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Geographical Redundancy</td>
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<tr>
<td>Real-time JVM (JRockit Real Time)</td>
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<td>✓</td>
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<tr>
<td>Presence and XDMS (Oracle Communications Presence)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Service Creation Tools (JDeveloper, TopLink, SDK)</td>
<td>✓</td>
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<td>Diameter Base Protocol</td>
<td>✓</td>
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<td>On-line and Off-line Charging (Diameter)</td>
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<td>Profile Application (Diameter)</td>
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<tr>
<td>Universal Subscriber Profile (Oracle Virtual Directory)</td>
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Oracle WebLogic Server® 10.3

- OCCAS 4.0 is based on the Oracle WebLogic Server 10 platform
  - The BEA WLSS 3.0 and 3.1 (and OCCAS 3.1) were based on WLS 9.2
- Dramatically increased developer productivity
  - Java Platform, Enterprise Edition 5 (Java EE 5)
  - Updated Standards
  - BEA enhancements
- New & improved Web Services support
  - Key to writing & deploying services in support of SOA
Oracle Leads Java SIP Servlet API Specification

http://jcp.org/en/jsr/detail?id=289

JSRs: Java Specification Requests

JSR 289: SIP Servlet v1.1

This specification is an enhancement to the SIPS servlet specification. The central focus of this JSR is to enhance the existing SIPS servlet specification with new requirements determined by the industry.

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<td>20 Mar, 2006</td>
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<td>23 Jan, 2006</td>
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JCP version in use: 2.6
Java Specification Participation Agreement version in use: 2.0
Please direct comments on this JSR to: jsr-289-comments@jcp.org

Specification Lead
Yannis Cosmadopoulos Oracle
Mihir Kulkarni Oracle

Expert Group
8x8
Appium Technologies AB
Ericsson AB
Hewlett-Packard
Malvision LTD
Oracle
SBC
Telegdia Technologies, Inc.
AePONA
Avaya, Inc
Fraunhofer-Gesellschaft Institute FIRST
IBM
Netcentrex
Orange France SA
Sun Microsystems, Inc.
Telecom Italia
Apache Software Foundation
Cisco Systems
Fujitsu Limited
Khan, Nasir
Nexcom Systems
Red Hat Middleware LLC
T-Mobile Austria GmbH
Vershoven, Atul
Oracle Leads Java Media Server Control API Specification


JSRs: Java Specification Requests

JSR 309: Media Server Control API

This Specification is a protocol agnostic API for Media Server Control. It provides a portable interface to create media rich applications with IVR, Conferencing, Speech Recognition, and similar features.

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<td>JSR Review Ballot</td>
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JCP version in use: 2.6
Java Specification Participation Agreement version in use: 2.0
Please direct comments on this JSR to: jsr-309-comments@jcp.org

Specification Lead
Marc Brandt    Hewlett-Packard
Tomas Ericson  Oracle

Expert Group
Avaya, Inc  BEA Systems  Converse
Conversational Computing Corporation  Ericsson AB  Fraunhofer-Gesellschaft Institute FIRST
Fujitsu Limited  Genband, Inc  Hewlett-Packard
Intervoice, Inc  Italtel SPA  Mailvision LTD
Nexcom Systems  NMS Communications  Nortel
Open Cloud Limited  Oracle  Orange France SA
RadiSys Canada Inc  Radvision Ltd.  Red Hat Middleware LLC
Samsung Electronics Corporation  SBC  Streamwide
Sun Microsystems, Inc.  Surf Communication Solutions Ltd  Telecom Italia
Telenity  Varshneya, Atul  Wipro Technologies
OCCAS Composite Deployment View

Service Oriented Architectures/IT Systems
- ESB
- Web Svc.
- Svc. Registry
- BPM Engine

Web Services, RMI, JMS (WSDL/UDDI/SOAP, etc.)

Itf-N (SNMP)

Itf-N (FT) (FTP/SFTP)

Itf-N (LDAP, SOAP or HTTP)

LDAP Security Provider

Relational Database

Legacy Charging Functions

Provisioning System

Network Management

Traditional OSS/BSS

Media Server Control (SIP, HTTP, TCP)

IMS Profile (Sh) (DIAMETER)

Charging (Ro/Rf) (DIAMETER)

(LDAP) (JDBC)

Charging Gateway

HSS

OCCAS

HTTP A/R-Proxy

Plain SIP

HTTP

ISC /SIP

Media/Signalling Server/Gateway

SBC

Terrestrial Broadband

Mobile

GGSN/PDSN

Enterprise

Firewall

TDM G/W

Oracle Restricted and Confidential
OCCAS Proven Interoperability

IMS Infrastructure
- Nokia Siemens Networks
- Ericsson
- ZTE
- NEC
- TEKELC
- Huawei
- Motorola
- Acme Packet
- Nortel

Key ISVs and Terminal Partners
- ITALTEL
- Tellabs
- Cisco Systems
- OKI
- Thomson
- Comverse
- Radvision
- Convergini

Media Servers
- Dialogic
- RadiSys
- HP

SOA and .NET Infrastructure
- SAP
- IBM
- Microsoft
- Tibco

Hardware and Appliances
- HP
- Cisco Systems
- Sun
- F5
- Foundry Networks
- Dialogic
- Intel

Oracle Restricted and Confidential
OCCAS Performance

• Stateful proxy test case (SIPStone* Proxy200)

Summary (Xeon 5160): 95% of all calls set up within 50ms

<table>
<thead>
<tr>
<th>Call Duration</th>
<th>Max call rate</th>
<th>CPU Utilization @ max call rate</th>
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<tbody>
<tr>
<td>80s</td>
<td>1080 cps</td>
<td>42% CPU</td>
</tr>
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</table>

At a call duration of 80s

1080 cps served with 95% of calls setup in less than 50 ms

1080 cps are equal to ...

... 14.040 single SIP messages per second

... 3.888.800 BHCA

System Configuration:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>RedHat EL 4 Update 4 – x86_64</th>
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<tr>
<td>CPU</td>
<td>2 x Xeon 5160</td>
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<tr>
<td>CPU Speed</td>
<td>3.0GHz</td>
</tr>
<tr>
<td>FSB Speed</td>
<td>1.33GHz</td>
</tr>
<tr>
<td>RAM</td>
<td>8GB</td>
</tr>
<tr>
<td>RAM Speed</td>
<td>667 MT/s (333 MHz)</td>
</tr>
<tr>
<td>JVM</td>
<td>JRockit R27.3.0-106IA32</td>
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OCCAS Test Results with JRockit
Deterministic GC

Operating cost reduction of 35% to 50% or more

Deterministic GC allows increased system utilization for real-time traffic processing, resulting in dramatically reduced hardware, hosting and maintenance costs.
For more information

Documentation at

User Forum at
http://forums.oracle.com/forums/forum.jspa?forumID=380&start=0
88+ OCCAS Customers and Growing
Customer: US Fixed Carrier

Business Challenges to Address:
- Needed a comprehensive 2\textsuperscript{nd} line Residential VoIP offering
- Installed 3\textsuperscript{rd} party softswitch deemed insufficient
- Residential VoIP launched after 12 weeks development
- Subsequent projects: Video conferencing, audio conferencing, 4ESS replacement, Media processing complex controller

Project History:
- Large WebLogic customer
- Launched in 2005
- 1m+ subscriber capacity in production 2008

Technology:
- In-house development of core features and integration
- Radisys (Convedia), Acme Packet NetNet-SD, Broadworks, Foundry Networks
- Zero service downtime in nearly 2.5 years of production
Customer: West InterCall

Business Challenges to Address:
- Largest hosted conferencing service provider in the world
- In-house conferencing platform, increasingly expensive to maintain and extend and approaching EOL
- Internal development on OCCAS took 3-4 months versus the 12 to 18 months estimated for alternative approaches

Project History:
- Existing WebLogic Server customer
- Substantial R&D investment approved as a “strategic” investment
- Economic Buyer: VP IT
- Cost savings estimated 70%+

Technology:
- Reservation-less conferencing application
- Development done entirely by InterCall R&D organization
IP Conferencing Platform

PSTN

ECC

Toll Portability

Packet Voice Processor

Session Border Controller

Media Gateway

Load Balancer

Oracle WebLogic Server

Opal (Java Client)

Web UI Server (Moderator, etc)

Web User

Oracle

RTP

SIP

JMS

Other

OCCAS Applications:
IP Conferencing + More

Provisioning and Real-time Conference DB

OCCAS

Media Server

Media Clip Server

OCCAS

Oracle

RadiSys

Sonun

Networks

Netrake

Ditech

Networks
Legacy IN Service Control Points
Vertical Networks with Single Service Design

Legacy Services
- Prepaid
- VPN
- Toll Free
- Calling Cards
- Number Portability

Legacy Transport, Switching & Access Networks
Legacy IN Service Control Points
Vertical Networks with Single Service Design

Legacy Services

- Prepaid
- VPN
- Toll Free
- Calling Cards
- Number Portability

Legacy Transport, Switching & Access Networks
Service Control Point Replacement

Consistent Customer Drivers

1. Legacy SCP Products End-of-Life
2. Lowering Operating Expenses
3. Driving Differentiated Services
Driving Differentiated Services
Simultaneous Network and Service Evolution

**Today’s Reality**
Vertical Networks (single service)

**Services**
- Mobile
- Fixed Telephony
- Fixed Broadband
- WLAN

Transport, Switching & Access Networks

**Tomorrow**
Horizontal Network (multi-services)

**Services**
- Services Environment
- Multiple Network Utilization

**In-House Development**
**Third Party Development**

**SDP**
**IN and NGIN Evolution**
Oracle Standards-Based SCP Replacement

Maximize Commercial Software and Hardware

**Legacy SCP**
- Application Specific Service Logic
- On-Board Database
- Single IN Protocol Transaction Processing
- Proprietary SS7 Hardware
- Proprietary Hardware and OS Platform

**Next Generation SCP**
- Modular Applications on Service Delivery Environment
- Standards-Based Database
- Multi-protocol IN Transaction Processing Support
- Integrated SIGTRAN
- Commercial Off-the-Shelf Hardware and OS Platform
Oracle Solution Components
Next Generation for SCP Replacement

Next Generation SCP

- Modular Applications on Service Delivery Environment
- Standards-Based Database
- Multi-protocol IN Transaction Processing Support
- Integrated SIGTRAN
- Commercial Off-the-Shelf HW and OS Platform

Converged Application Server
Accolade WCS
Linux, Solaris HP, Sun, IBM, Others

Toll Free
Prepaid
Service N
Oracle Recommended Approach
Legacy SCP Evolution towards Replacement

Next Generation SCP
- Modular Applications on Service Delivery Environment
- Standards-Based Database
- Multi-protocol IN Transaction Processing Support
- Integrated SIGTRAN
- Commercial Off-the-Shelf HW and OS Platform

Leverage and Expand Existing Services
- Short time to market, lower cost of service introduction

Replace EOL SCPs
- Deliver Services across Network Domains

Fixed Networks
  (INAP, AIN, TCAP)

Mobile Networks
  (CAP, INAP, WIN)

NGN/IMS Networks
  (SIP, ISC, Diameter)
Oracle Integrated NGIN Architecture for Prepaid Services

- Existing Legacy SCP
- Rating
- Billing
- Oracle BRM
- VPN
- RBT
- HZ
- ... 3rd Party Call Control Servlets
- Prepaid Servlet (IM-OCF)
- Prepaid Mediation Logic
- Unified OA&M
- Profile Management
- WCS Orchestration Engine
- OCCAS SIP Server
- WCS Network Adaptors (IM-SSF, IM-SCF)
- Accolade WCS
- CAP 1-4
- CS1 + variants (SINAP, E/ CS1+)
- MAP
- SIP/ISC
- Core Network
Business Overview:
- Over 5 million wireless subscriber base
- Legacy IN infrastructure currently runs key revenue-generating services including prepaid, VPN, and closed calling groups
- Company objective to reduce Operating Expenses of key revenue-generating services by 50% or more
- Evolution to full SOA (Service Layer) and IP (Network Layer)

Solution Imperatives:
- Replace end-of-life Ericsson Network Resource Gateway deployed products, legacy IN infrastructure, with Next Generation IN solution Maximum
- Maximize re-use of existing services

Technology Implemented:
- Oracle Communications Converged Application Server
- Oracle Product Partner: Convergin Accolade WCS
- Oracle Regional System Integrator Partner: Services Development and Deployment

Customer Case Study
Wireless Communications Network Operator
Customer Case Study
Wireless Communications Network Operator

Convergin Accolade WCS IM-SSF/SCIM (Built on OCCAS)

OCCAS Clusters: Prepaid, VPN, Private Group Calling, More

OCCAS Clusters:

Mobile devices

SIP
SIGTRAN
GSM/3G Wireless
Diameter

HP
Oracle
Oracle
Oracle
Oracle
Oracle

Convergin
OCCAS
Load Balancer
radware
OCCAS
Load Balancer
Sun
Dialogic

ERICSSON

MSC
Oracle Communications Services

Gatekeeper

- Expose Network & SDP Capabilities as Web Services to 3rd Party Partners
- Control SDP Access and Usage by 3rd Party Partners & Applications
- Provide Value-Added Enablers: Profile, Messaging, Call Control, Location, Presence
- Extend and Customize with Service Creation Environment Suite
- Integrated Support for Java EE 5, Web Services, SIP and IMS

3rd party applications

Service Creation & Extension
Service Exposure
Policy & Partner Mgmt
Network Access Layer
Oracle Communications Services Gatekeeper

Mobile
Fixed
NGN
Service Providers Connectivity

Oracle Communications Service Gatekeeper (OCSG)
<table>
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<th>Service Enabler</th>
<th>Protocol Adaptor</th>
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<tbody>
<tr>
<td>Short Messaging</td>
<td>SMPP 3.4</td>
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<tr>
<td>Multimedia Messaging</td>
<td>MM7 Rel5</td>
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<td>Terminal Location</td>
<td>MLP 3.0</td>
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<tr>
<td>3rd Party Call</td>
<td>INAP CS1, SIP, Parlay 3.3</td>
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<tr>
<td>Call Notification</td>
<td>SIP, Parlay 3.3</td>
</tr>
<tr>
<td>Audio Call</td>
<td>Parlay 3.3</td>
</tr>
<tr>
<td>Presence</td>
<td>SIP</td>
</tr>
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<td>Subscriber Profile</td>
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For more information

Documentation at

http://edocs.bea.com/wlcp/wlmg40/index.html
OCSG Customers

Services Gatekeeper

[Image of various company logos]
Business Challenges to Address:
- Service availability of SDP
- Uncontrolled network access traffic degraded overall service quality
- Integrate multiple IVR systems into existing SDP

Key Concerns
- Time to market for new services
- Simplified policy enforcement across all services
- Management of SDP and flexibility for new application drivers

Evolution
- Horizontal service exposure layer
- Support for key messaging capabilities
- Leveraging web clients
Vodafone IVR Services exposed by OCSG

- Content Filter
- Bundle Information
- Electronic Recharge
- Free Text Messaging
- Authenticate Subscriber (DoB/Postal Code)
- Send Letter
- Last invoice
- Next invoice
- PUK
- Retail Roaming
- Roaming Topup
- Status Payment
- Terminal Configuration (OTA)
- Number Registration
- Lost Call Settings
Business Challenges to Address:
- Provide a central connection and control point for valued services partners
- Central management for network policy
- Simplify how partners can connect to Singtel network
- Ease the deployment of new application using web services

Key Concerns
- Support for new applications yet preserving existing revenue generating application
- Migrating silo’ed applications to common point of service exposure

Evolution
- Mobile Advertising Strategy
- SOA and BPM adoption
- Migrate legacy SMS/MMS application to new infrastructure
O2 UK
Mobile data/content service delivery platform

Customer Challenges

- Multiple entry points for 3rd parties into O2’s network, each with its own protocol, security, conventions, etc.
- Need i-mode (2G data services) roll-out by end of 2005
- Need SDP for best possible mobile data/content downloading experience, with consistency and richness
- Need more efficient content partner integration

Oracle Solution – Service Access Gateway (SAG)

- Oracle Communications Services Gatekeeper, SAG becomes single point of entry into O2 network for all 3rd party content partners
- Partner Relationship Management (PRM) portal provides self-service access to 3rd party partners
- Reduce content partner on-boarding time to 30 days