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Writing Telco 2.0 Applications with JBoss Communications Platform based on Mobicents

Jean Deruelle

JBCP SIP Servlets Lead

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Introduction

Voice Over Internet Protocol? Technologies that provides voice communications over IP networks, instead of the traditional packet-switched networks (fixed or mobile).

Converged VOIP & Web Applications? A few years ago a converged service would translate to an application serving VOIP and traditional packet-switched networks.

We now go beyond this model, and mix traditional internet applications such as the web.



Telco Industry Thumbnail

Industry Dynamics

Telco stocks not performing well. Investors taking wait and see approach to upside for next generation services while Operators aggressively manage costs

Tougher regulation and disruptive technologies (VoIP) lower the barriers to entry for new entrants and increase customer expectations

Operators pursuing aggressive M&A strategies

IP-based convergence forcing operators to invent new business models for survival

Recognition that new business models required for survival

Proprietary Unix is the defacto standard in Telco IT and Networks.

I

Pain Points

Switching costs for customers have never been lower

New entrants are increasing competition for customers

Quality of Service is more important than ever

Investment in next generation network infrastructure

Investment in triple-play services that combine voice video and data

Increased pressure from investment community to perform and manage costs

Need for innovation, faster time to market, and lower cost solutions

Virtual Private Mobile Network

VPN is a solution that integrates all offices and employees in a common network that includes all mobile and desk phones through a connection between a leased line (E1/T1) and an enterprise PABX (Private Automatic Branch Exchange) system, it connects remote and mobile users with the company

The company has the following advantages :

Direct connectivity - the corporate network becomes part of mobile operator's network through direct connection

Private numbering plan - the communication is tailored to company organisation

Corporate Business Group - all offices and employees are part of one common group, that includes all mobile and desk phones

Short dialling - a short number to access each employee

Location based service

Location based Service can be used to analyze real time traffic situation. Can partner with local radio station for continuous announcement of traffic situation on real time base.

Develop Location based Facebook application.

Invite your friends, family to subscribe for location based service

Once they accept the invitation when ever friends, family is in 2kms range from you, your phone beeps

Location based service can be used by transport companies, courier service or even to monitor your children on real time basis!

Quick SMS based service

Quick and Easy to develop and deploy SMS based services like SMS to e-mail or e-mail to SMS

Architecture

SMPP RA can be deployed on JBCP JSLEE Server

SBB written to handle service part

For example

Super Cup started, deploy service

To vote for favourite team

To guess on scoring of each system and announce winner who is accurate

Vote for your Favorite Reality TV Show

IVR Based Service

Quickly create an IVR service and deploy on JBSCP

The service can be integrated with JBoss rules which can be changed by the non IT guy (business analyst) at run-time and system automatically reflects the new IVR

VoIP Applications

Business Process Integration

Ring Back Tone

Event Notification by Phone, SMS and IM

Conferencing

IT System Monitoring

Web Integration for Convergence

Customer Relationship Management

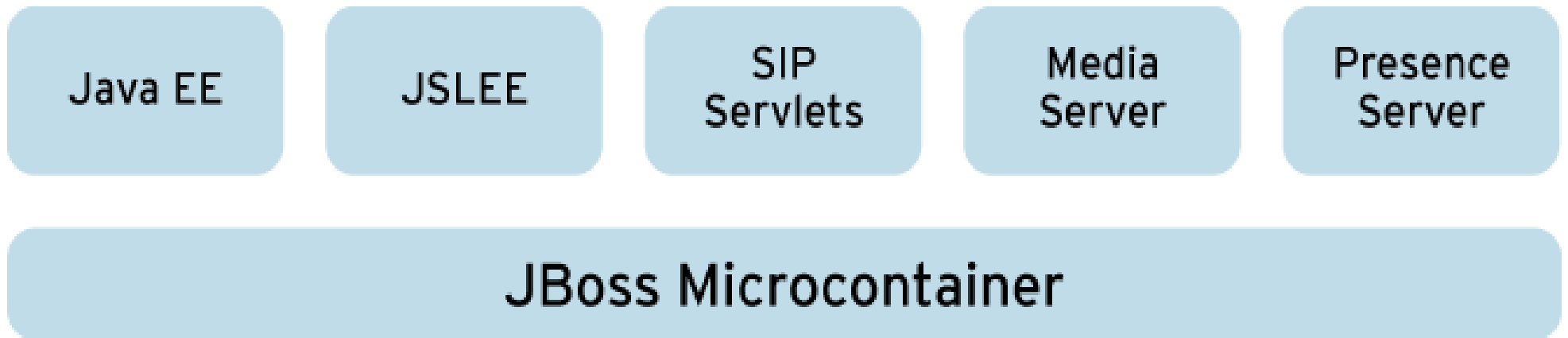
Banking



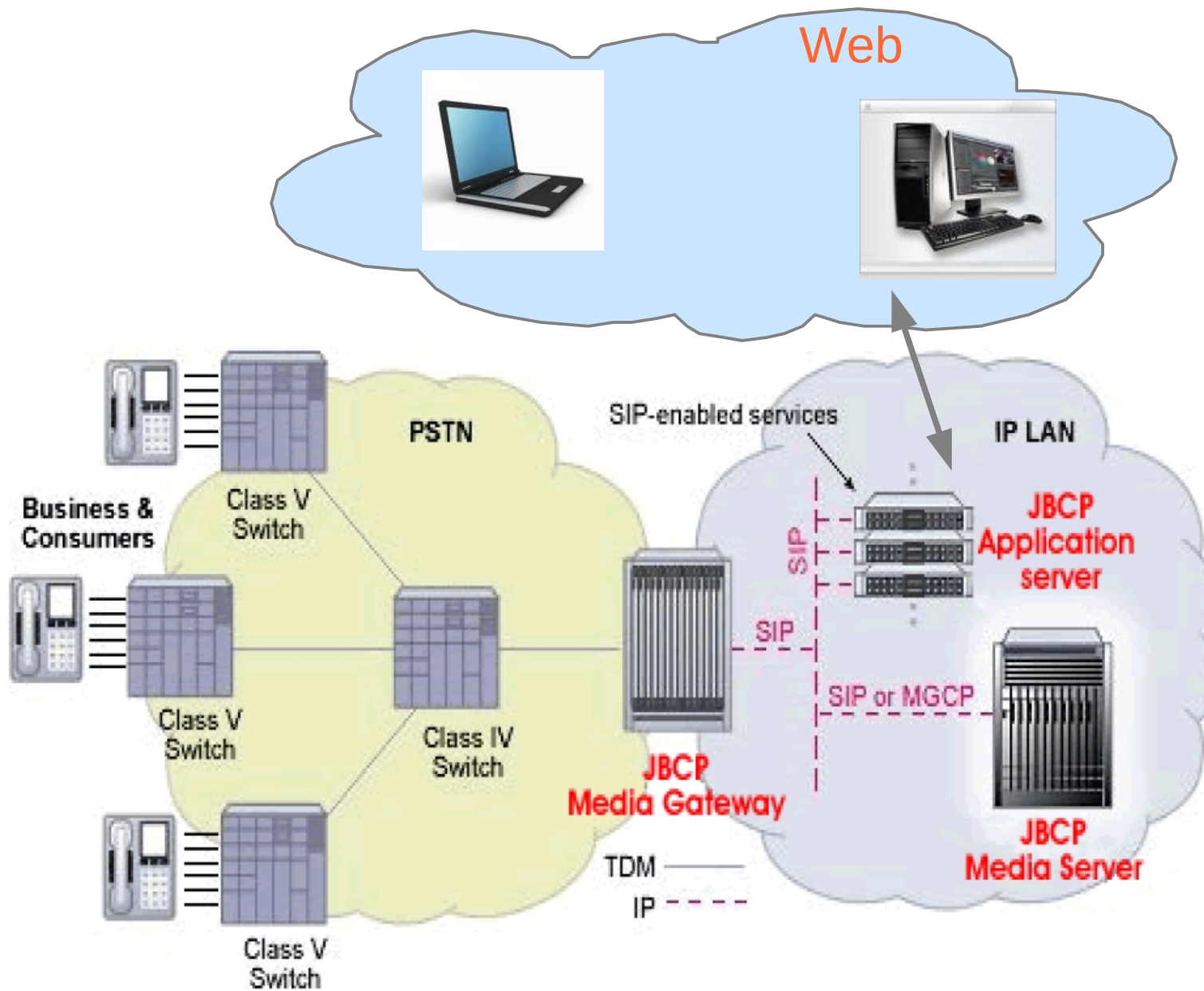
The Sky Is The Limit!

JBoss Communications Platform

JBoss is the only vendor supporting both JSLEE and SIP Servlets.



Deployment Scenario



Market Segments

Big mobile and landline telecoms adopting IP/IMS infrastructure (performance, HA, service exposure)
Call centers (HA, UI convenience, BPM)
Classic web applications (easy development)
Web shopping and customer service
Social, banking, security, etc
Enterprises (integration, customization)
PBX and unified communications
Office application integration

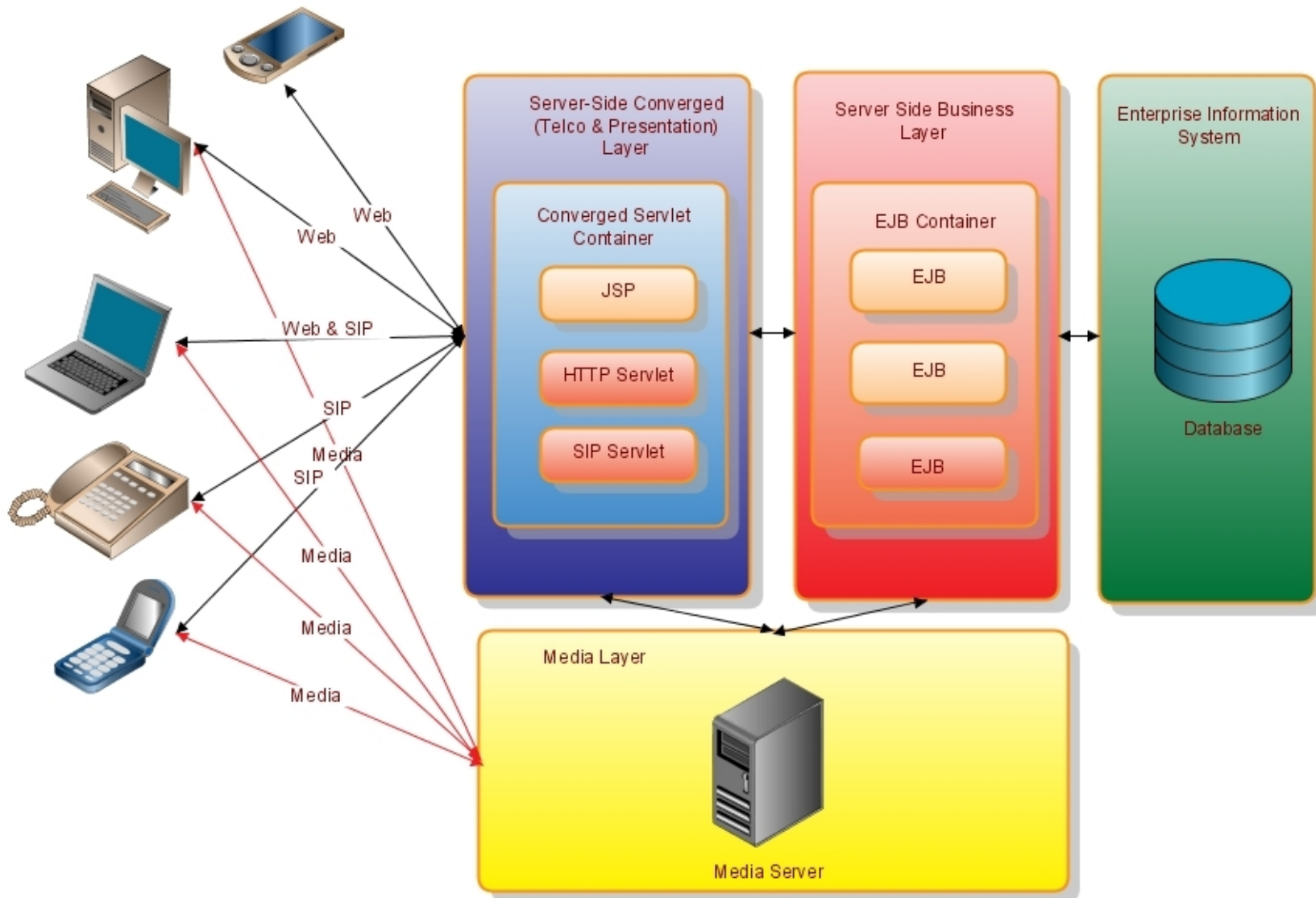
Demo

SIP Servlets

JSR-289



SIP Servlets in Java EE Architecture



Focus of SIP Servlets

Converged HTTP and SIP Applications

(JBCP-specific beyond JSR-289)

Media – playback, record, conferencing, IVR, TTS and others, JSR 309 support (JSR 309)

Diameter – Base, Sh, Ro, Rf

Tooling - JBCP Developer Studio SIP Servlets Plugin

Integrated with Rich Web UI frameworks for Desktop-like experience
– support for Ajax and Comet-enabled frameworks – Seam,
Richfaces, GWT, Tomcat AIO, Jruby/Rails

Telco Frameworks - Seam Telco Framework, Jruby Torquebox Telco Framework, Echarts For Sip Servlets Framework, JAIN SLEE Interoperability Patterns

Need anything else? It's on a case-by-case basis, but JAIN SLEE is the general solution.

Production Features :

IMS & Diameter Support (Base, Sh, Ro, Rf)

Congestion Control

Concurrency Control

Entreprise Monitoring with JON (Sip Servlets Plugin)

HA Support

SIP Load Balancer bundled with JBCP SIP Servlets

IP Load Balancer support with Red Hat Cluster Suite or any other IP LB

SIP Session & Application Session Clustering nicely integrated with existing HTTP clustering

Fine-grained control replication options

Support for Mid Call Failover with bundled SIP LB or early dialog with IP LB

Support for Converged Failover with apache http + Mod_jk

JAIN SLEE

JSR-22

JSR-240



JAIN-SLEE - Concepts

Specification Defined by the JCP, v1.1 is out

SLEE = Service Logic Execution Environment

High throughput, low latency event processing

Asynchronous Support & Event Orientated

Elaborated event distribution mechanism (with priority)

Mapping of events and method invocation on components

Independent of underlying networks through Resource
Adapters

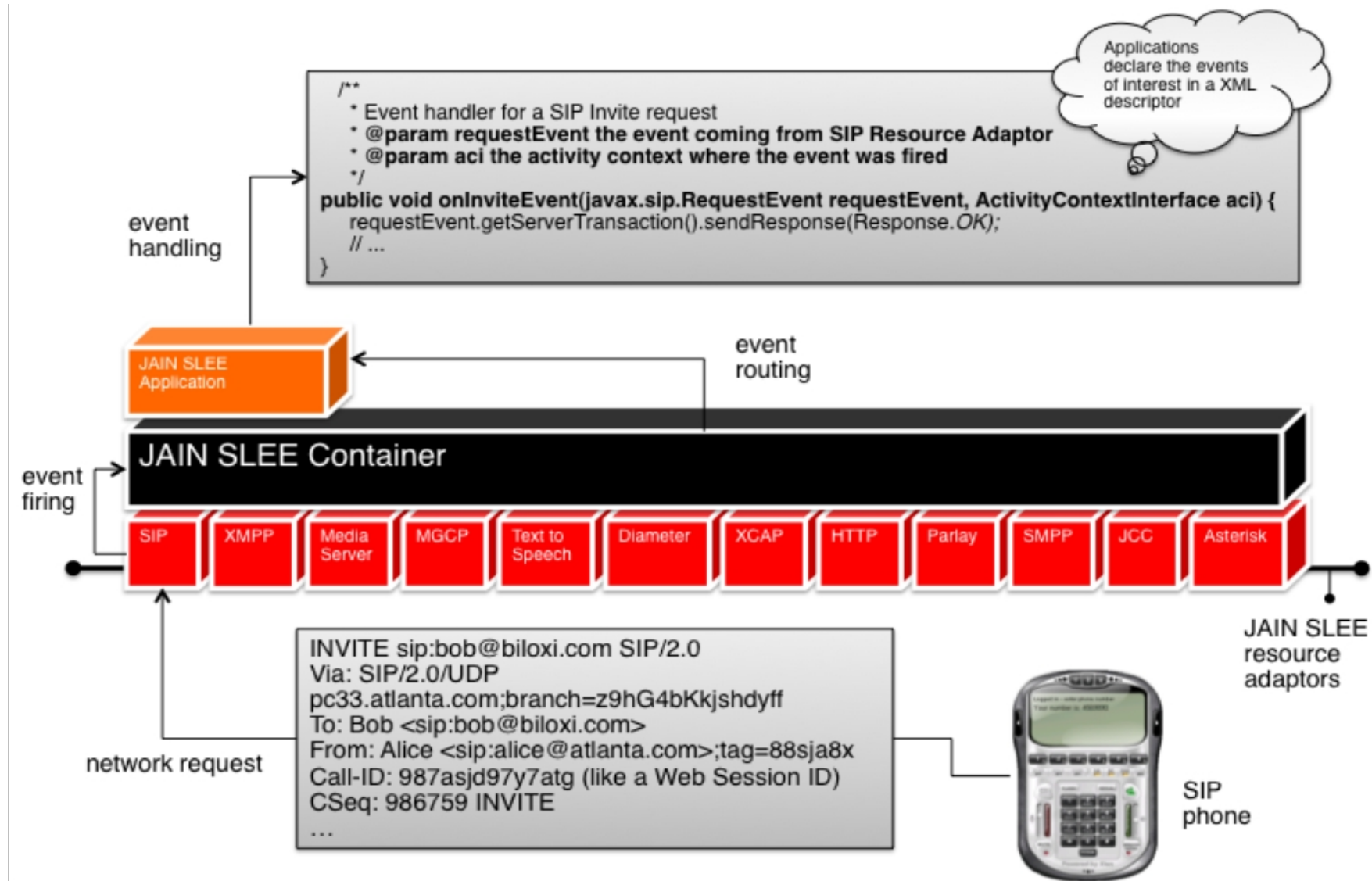
High performing platform for event driven applications

SLEE is complementary to J2EE

SLEE is similar to EJB but are different components

SLEE can be implemented independent of J2EE

JAIN SLEE Example



The JBCP JAIN SLEE Server

Four Core Capabilities

Integrated Java EE + JAIN SLEE environment

Reuses JBoss Container Building Blocks: JBoss JMX MicroKernel, JNDI, JTA, AOP, JBoss Cache, JGroups, Javassist, JBoss Rules, ...

Network abstraction layer

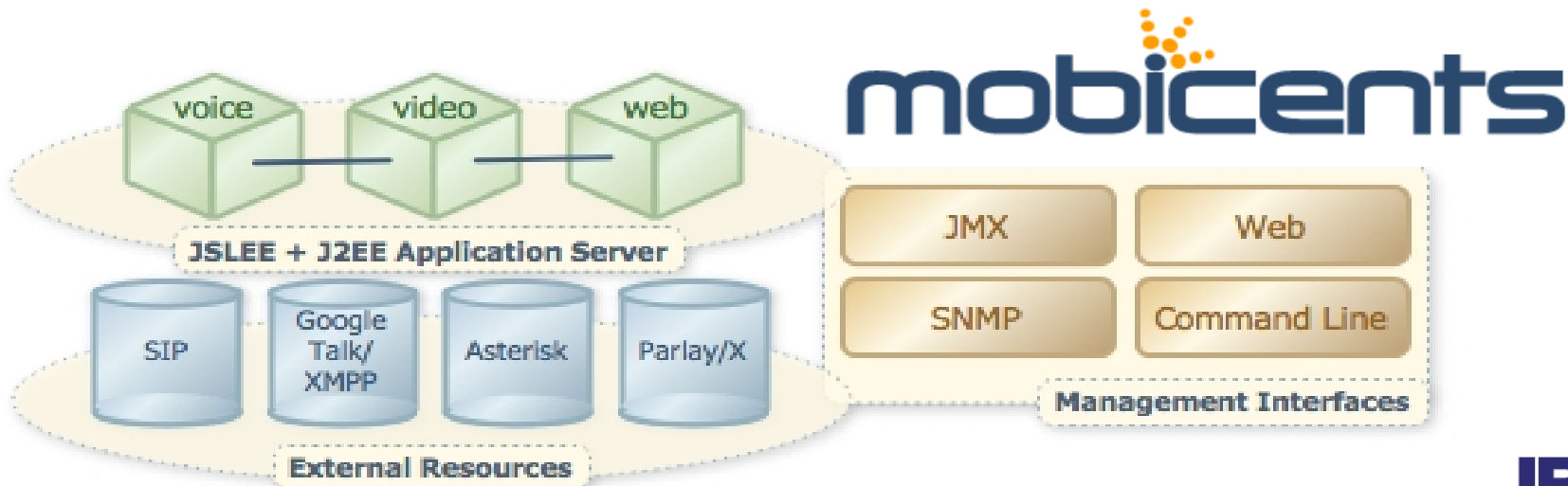
SIP, XMPP/Jingle, XCAP, Asterisk, Parlay, Diameter, Media/MGCP, Persistence, LDAP, HTTP, TTS (Text to speech)

Tooling - JBCP Developer Studio SIP Servlets Plugin

Management interface + 3rd party API

Provides High Performance and High Availability:

250 calls per second on 3Ghz Xeon, 4Gb RAM; 400 calls per second on 4CPU server.



Media Server JSR-309

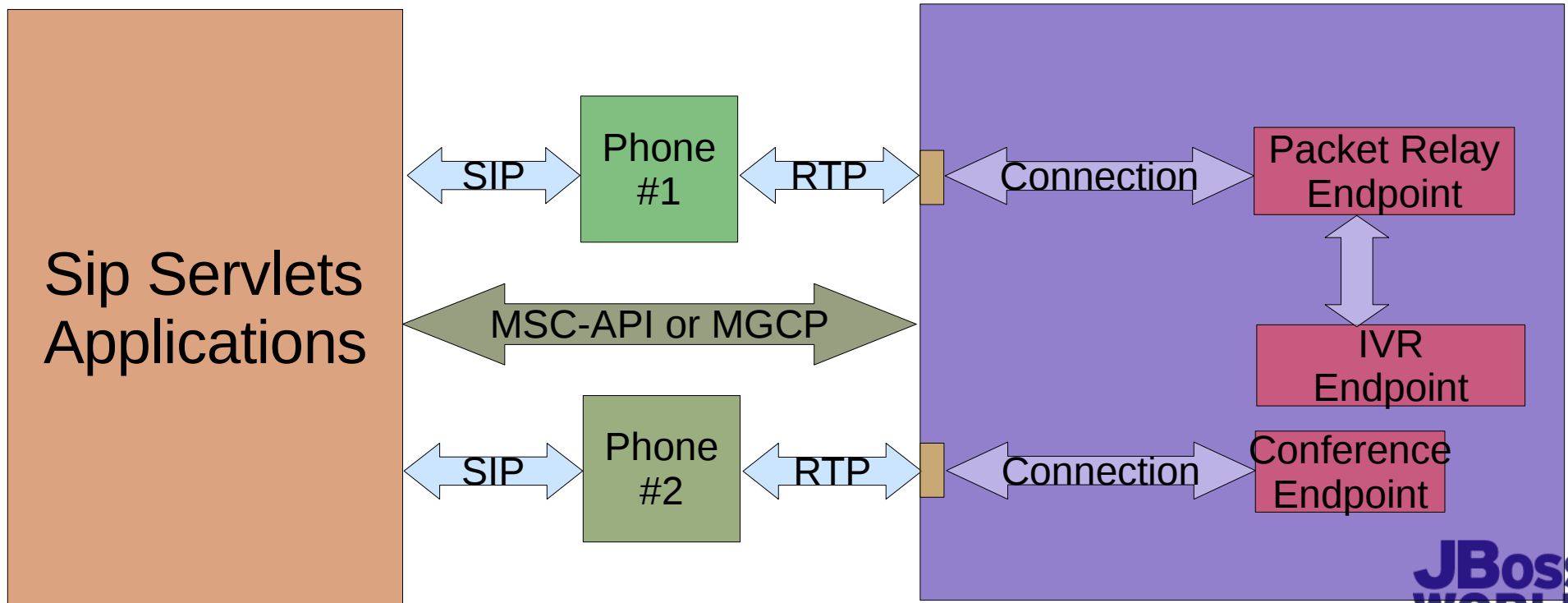


What is JBCP Media Server

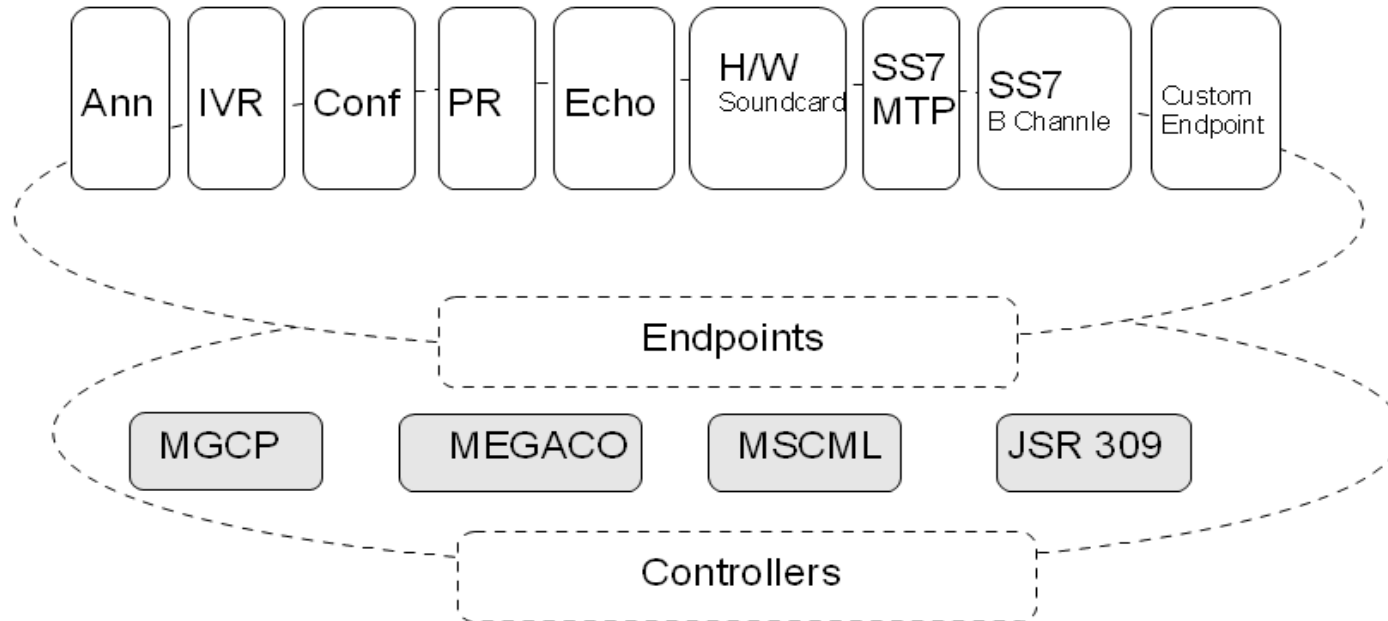
Handles Media processing to **Deliver competitive, complete, best-of-breed, high quality media gateway.**

Application logic executed on Jain SLEE (JSR-240) or Sip Servlets (JSR-289).

Remote Control through industry standard telco protocols and Java Media Control API (JSR-309).



JBCP Media Server - Features



Ann(ouncement) Endpoint: Allows playback for announcements in *wav* files.

Interactive Voice Response: Allows playback for announcements and tones, *listen* for DTMF events or voice messages. Allows recording.

Conference Bridge: provide access to a specific conference where calls are mixed.

Packet Relay: specific form of conference bridge with only two sockets

SS7 endpoints for interface with legacy networks (in MMS 2)

Echo for testing

Pure Java Implementation

Control the Media Server – MGCP, MSC API, JSR-309 API (any will work)

JBCP Media Server - Features

Media control

MGCP (RFC 3435), Java Media Control API(JSR-309)

Media bearing:

RTP formats: G711, G729, GSM, SPEEX, PCM 16bit 8-44kHz (Mono/Stereo)

Audio codecs:

G711,G729,GSM, SPEEX.

Processing:

Phone signal detection/generation(DTMF, BUSY, etc) for inband and outofband mode

Media files *.wav (G711, GSM, PCM), *.spx(SPEEX), *.gsm

Java Speech API compatible TTS

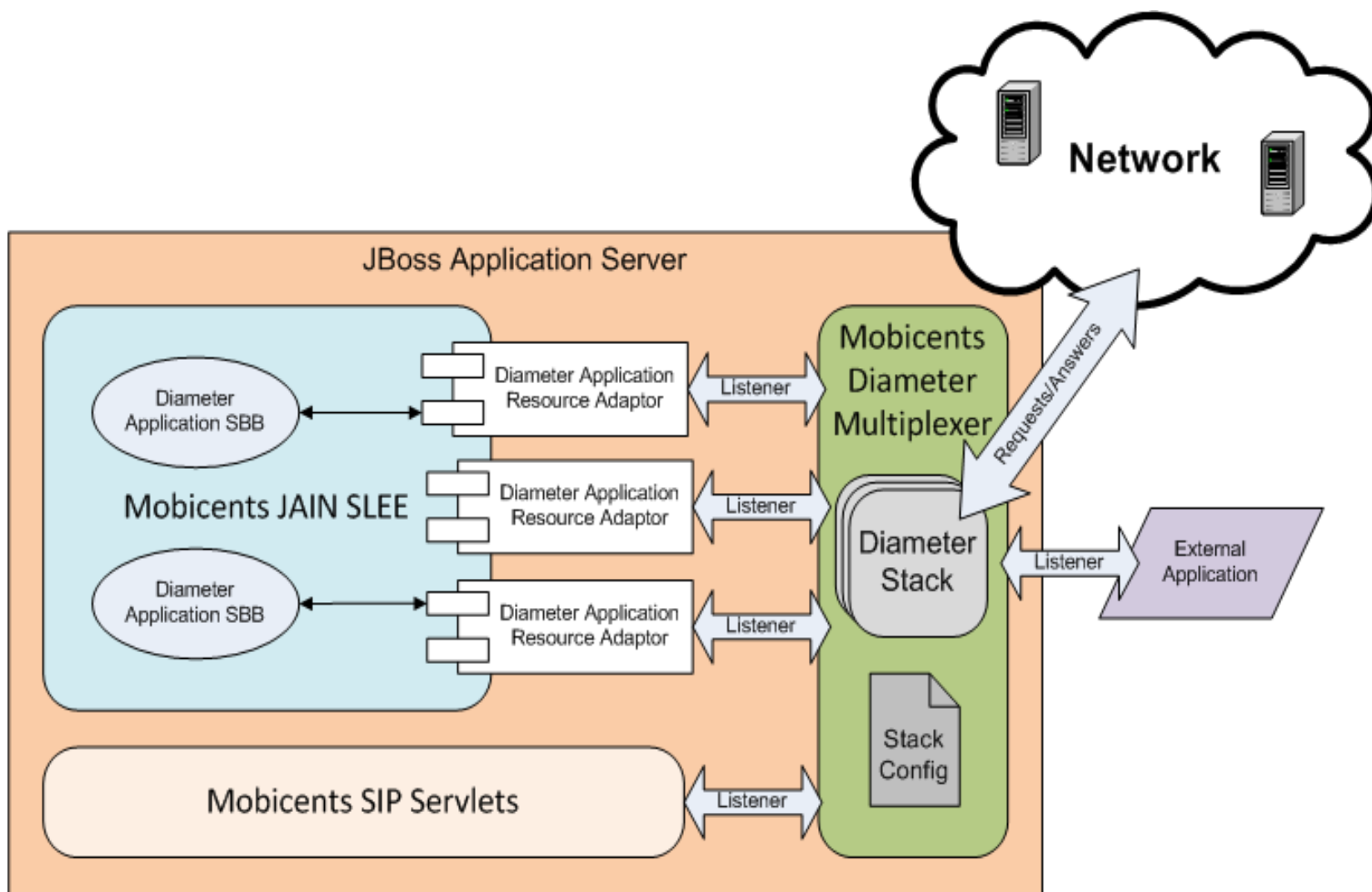
Performance

400 concurrent RTP connections (G711) @ 2Hz CPU

Diameter

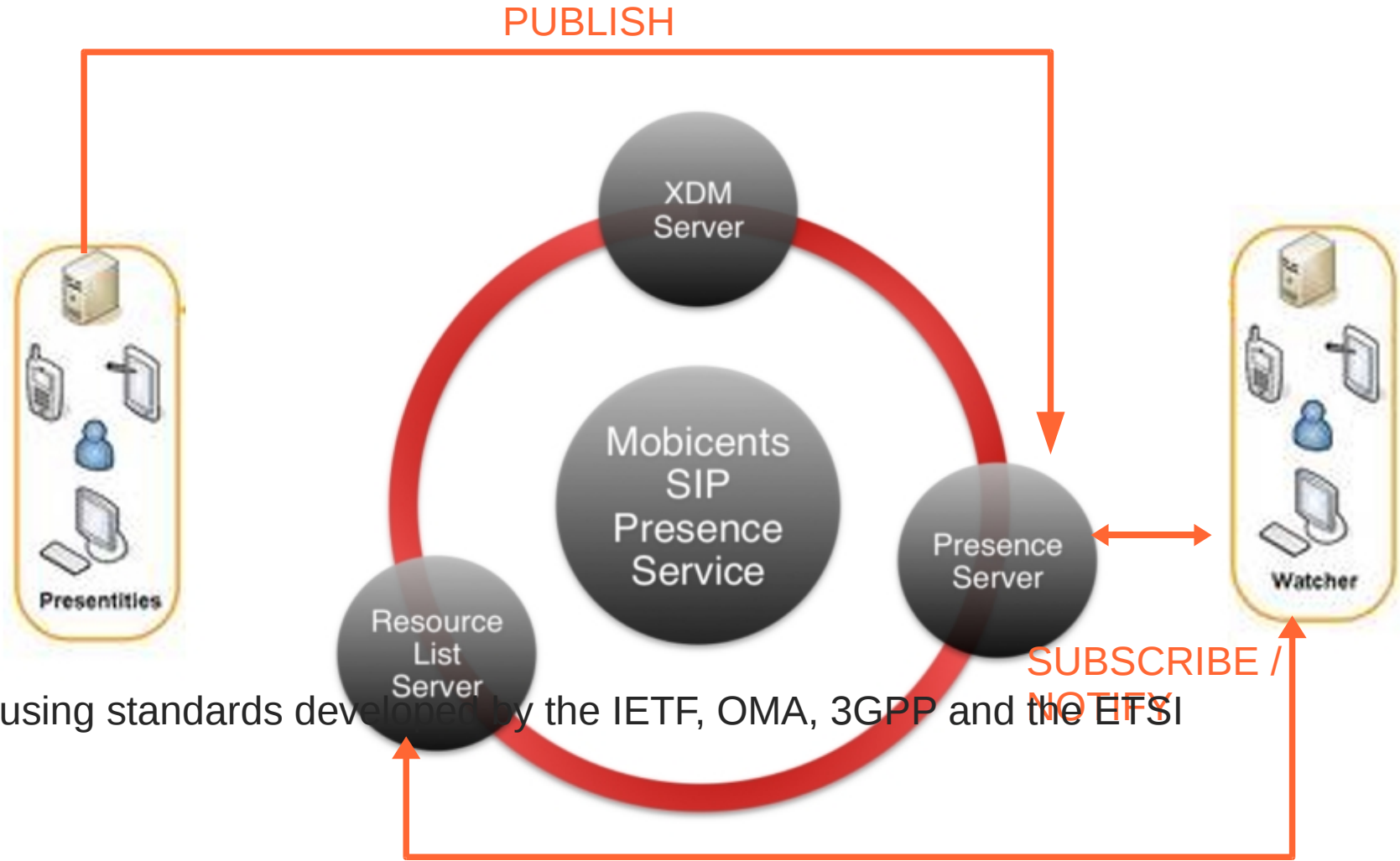


JBCP Diameter Architecture



SIP Presence Service

SIP Presence Service

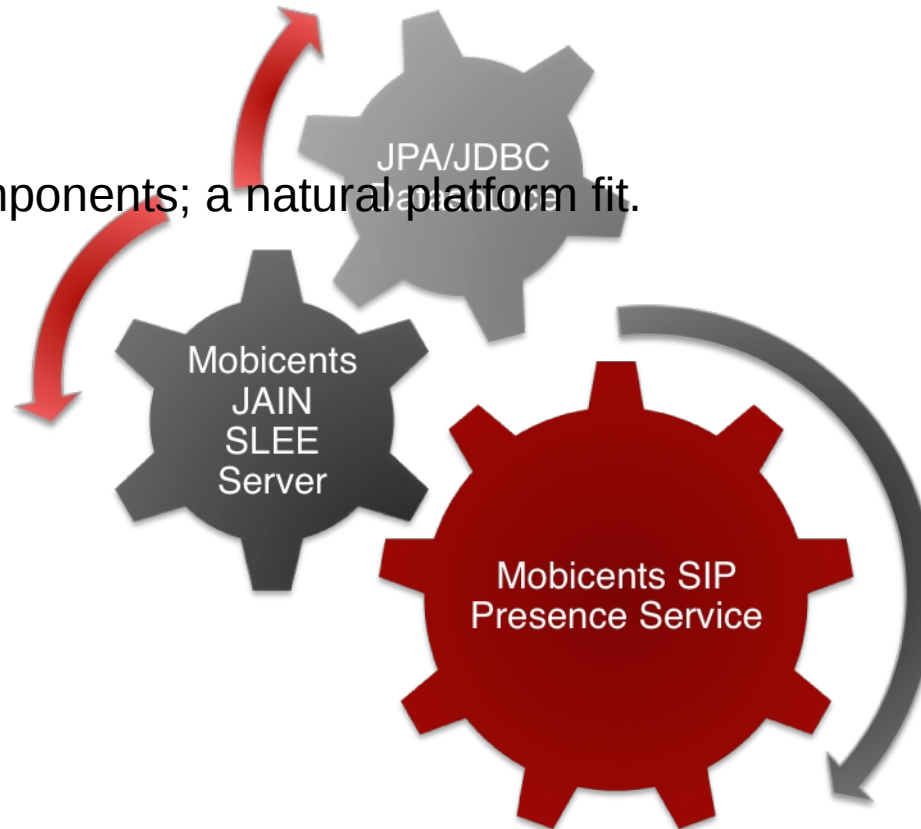


networks using standards developed by the IETF, OMA, 3GPP and the ETSI

SIP Presence Service: **Implementation**

JDBC Datasource, abstracting what is the underlying database engine complexity or performance, p

vers are handled by JAIN SLEE Components; a natural platform fit.



QUESTIONS?

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[REDHAT.COM/JBOSSWORLD-SURVEY](https://redhat.com/jboss-world-survey)**

Backup Slides

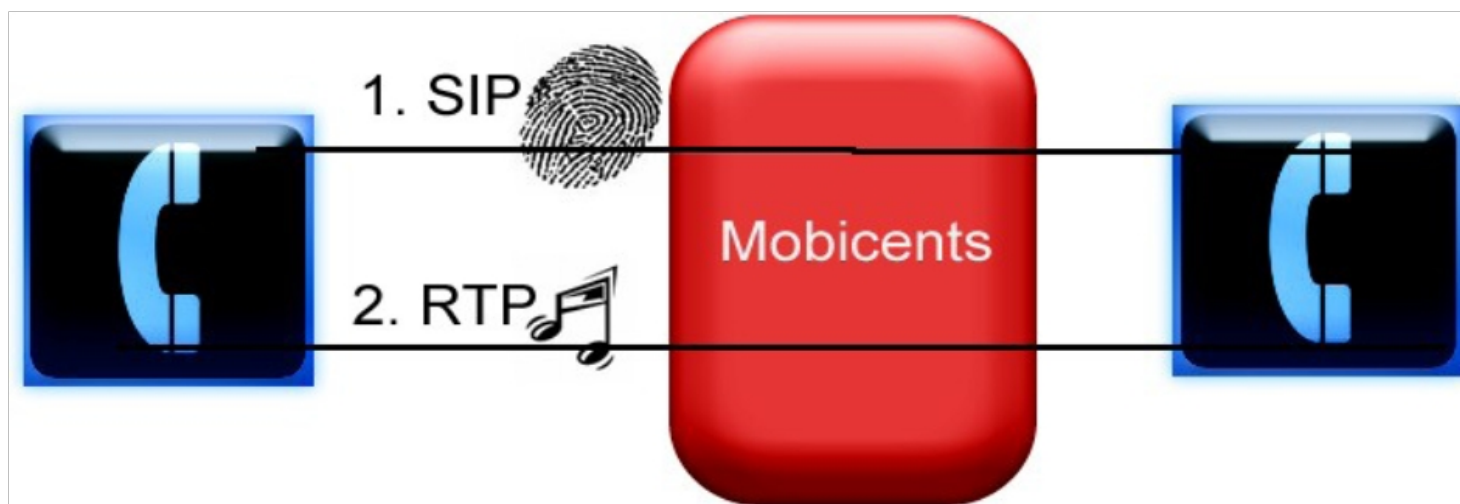
VoIP Calls

SIP

Negotiates RTP parameters

Authentication

RTP – carries audio stream in small packets



SIP

Requests (Methods)

INVITE – make a call

CANCEL – cancel a call

BYE – end a call

SUBSCRIBE – to subscribe SIP events, such as buddy status update

REGISTER – submit your contact info to the server

MESSAGE – send a text (or other) message

OPTIONS – query capabilities

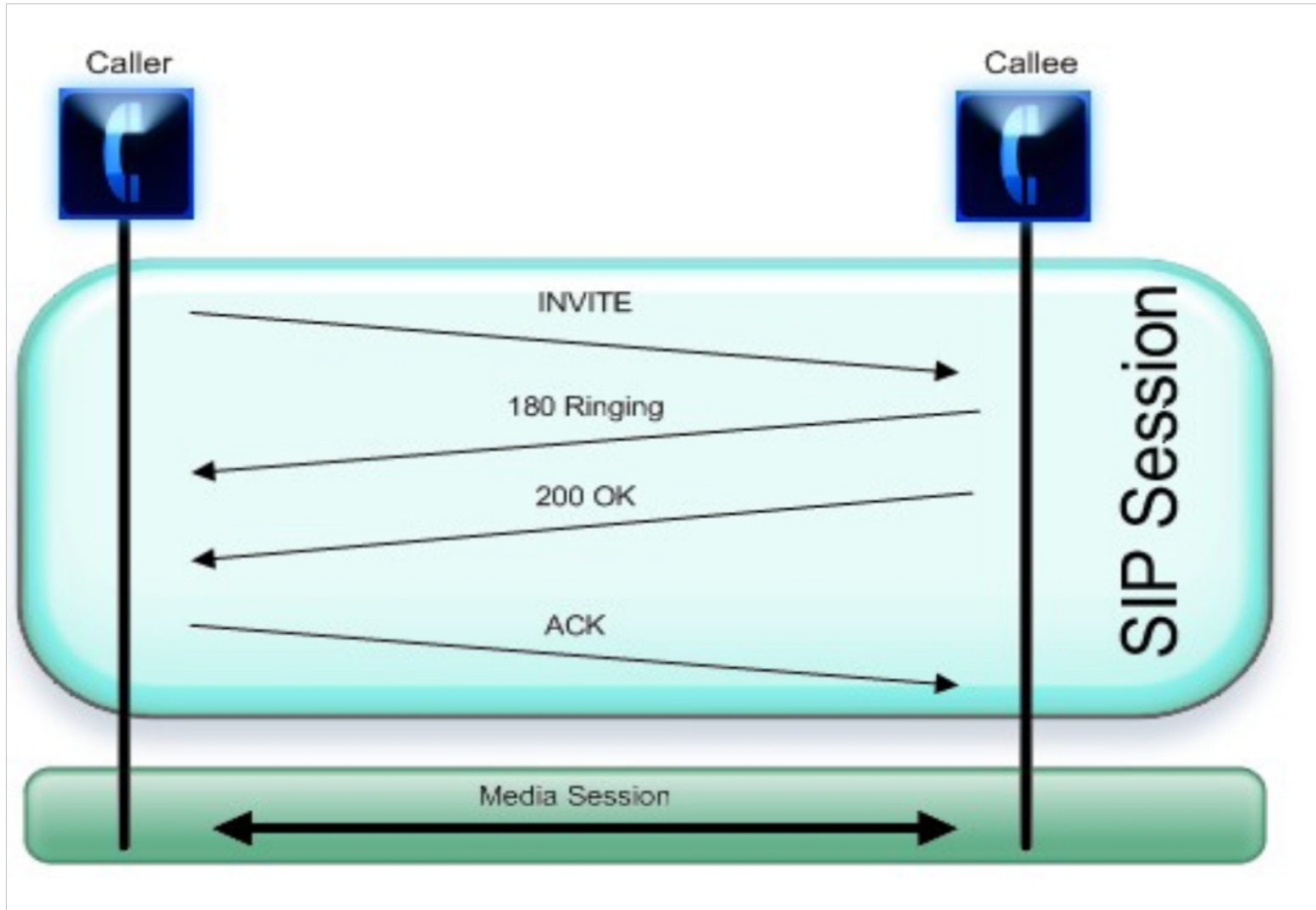
SIP

Plaintext protocol like HTTP.

Sample request:

```
INVITE sip:bob@biloxi.com SIP/2.0
Via: SIP/2.0/UDP pc33.atlanta.com;branch=z9hG4bKkjsdyff
To: Bob <sip:bob@biloxi.com>
From: Alice <sip:alice@atlanta.com>;tag=88sja8x
Call-ID: 987asjd97y7atg (like a Web Session ID)
CSeq: 986759 INVITE
```

Call flow



Roadmap : <http://www.mobicents.org/roadmap.html>

SIP Presence Client interfaces + XCAP support.

Support for more protocols/architectures : XMPP, Parlay X, REST, SOA, ...

Integrating with more JBoss projects: JBoss Drools, JBoss jBPM, JBoss RESTEasy, WebBeans, ...

Improved PBX on top of Mobicents SIP Servlets

Support for ICE and TURN, bundling STUN Server

Improved Eclipse plugin.

Diameter Ro/Rf support examples

Unified API to easily develop SIP applications working on top of both JSLEE and SIP servlets

IMS : implement xCSCF on top of JBCP SIP Servlets.

Porting SIP Presence Server on top of JBCP SIP Servlets ?

Mocking framework

HA support for co-locating the LB with the node

HA API for applications to notify the LB of grouping strategies.

Roadmap :

JBoss 5 based

IMS: implement xCSCF on top of JBCP JSLEE.

JSLEE 1.1 compliant

High Availability + Fault Tolerance with JBoss Cache 3.x

JBoss ON plugin

Roadmap : <http://www.mobicients.org/mms-roadmap.html>

JBoss 5 Based (already done, BETA1 released)

Video Support (pre-encoded streams)

JSR 309 (public draft implemented, waiting for TCK)

SS7 Support - ISUP : Signaling and Voice, INAP, MAP, CAMEL (HDLC/MTP layers are done)

MEGACO (partially done)

MSML/MSCML

JBoss ON plugin/Management console

Text to Speech (available, but not integrated)

Speech Recognition

Roadmap : <http://groups.google.com/group/mobicents-public/web/mobicents-diameter-roadmap>

Cx/Dx

JBoss ON Plugin

HSS Implementation

HA Failover Support

Roadmap

Independent Server Deploy

Multi Domain Support

Subscription Filters/partial notification, publication

Authentication/Authorization

JBoss ON plugin