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Oracle Communications Session Router

An advanced session routing proxy, Oracle Communications Session Router overcomes the challenges inherent in routing large numbers of Session Initiation Protocol (SIP)–based voice, video, instant messaging, and multimedia sessions within and between access and interconnect networks of service providers.

Overview

Oracle Communications Session Router provides SIP routing with scalable routing policies designed to help increase overall network capacity and support cost-effective operations. It plays a central role in Oracle's open session routing architecture and helps service providers build a scalable, next-generation signaling core for SIP-based services.

Oracle Communications Session Router is available as a Physical Network Function (PNF) as well as a software-only application that can be made to run as a Virtualized Network Function (VNF) on top of a hypervisor. On all platforms it leverages Acme Packet Operating Software (Acme Packet OS) to help deliver high levels of SIP routing performance, routing control and deployment flexibility, along with openness and interoperability, high availability (HA), and cost effectiveness.

Services and applications

Oracle's open session routing architecture features Session Routers and Session Border Controllers working in conjunction with an ecosystem of routing database products and services from Oracle partners.

Oracle's open session routing is designed to streamline network operations and support more efficient and intelligent routing compared to legacy distributed architectures, potentially helping to lower capital and operating expenditures.

Oracle Communications Session Router resides in the signaling core and directs traffic to and from other SIP signaling elements in the network, including MSCs, Class 4 and 5 soft-switches, Call Session Control Function (CSCF) servers, and access and interconnect SBCs.

Oracle Communications Session Router provides SIP routing for the following applications:

- Core session routing for Voice over IP (VoIP), Rich Communications Services (RCS), Voice over Long Term Evolution (VoLTE), and Voice over WiFi
- Class 4 routing—interregional and trans-continental network

Carrier-grade communications delivery

Applications

- Core SIP session routing for VoIP, VoLTE, RCS
- Class 4 routing
- SIP interconnect load balancing
- Wholesale and IPX transit services
- Routing services: least cost routing, number portability, calling name presentation (CNAP)

Key features

- High-performance SIP routing
- Extensive and flexible routing policies
- Local and external routing database support
- Programmable interworking and mediation
- Call admission and overload control
- Built in the same framework as the SBC
- Available as a fully orchestrated Virtual Network Function (VNF)
- Carrier-grade high availability
- STIR/SHAKEN support

Key benefits

- Designed to reduce complexity and support cost-effective delivery of SIP multimedia services
- Enables cost-effective network scalability
- Aims to mitigate risk and support network uptime
- Designed to enable rapid interoperability and support faster time to market

- External network selection—Public Switched Telephone Network (PSTN) and IP interconnects
- Routing services—least cost routing (LCR), number portability, and calling name presentation (CNAP)
- Wholesale / IP Exchange (IPX) transit services

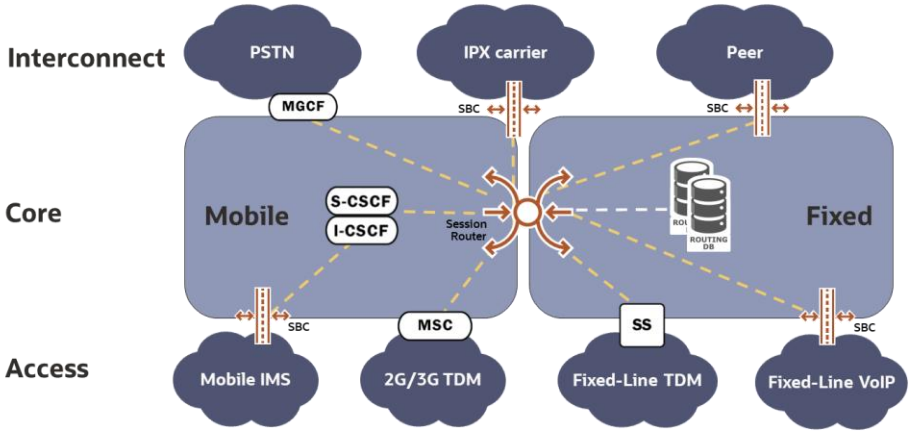

Figure 1. Oracle Communications Session Router support multiple SIP routing applications

IP Multimedia Subsystem compliance

In Third Generation Partnership Project (3GPP) IP Multimedia Subsystem (IMS) networks, Oracle Communications Session Router fulfills the role of the Breakout Gateway Control Function (BGCF) to select the optimum IP or time-division multiplexing (TDM) interconnect next hop for off-network traffic. In this role, Oracle Communications Session Router is able to offload the CSCF core by receiving session signaled directly from an external network via a Media Gateway Controller Function (MGCF) or an Interconnect Border Control Function (I-BCF), and forward to the appropriate next hop.

High-performance SIP routing and capacity

Oracle Communications Session Router is scalable to 500,000 sessions per system on Acme Packet 6400 platform*. Routing tables may be centralized in external databases, distributed to each Oracle Communications Session Router, or used in combination to create a dynamic, flexible solution. Local route tables can support up to 20 million routes. Larger tables for dynamic, intra-network or global routing data are supported using external high-capacity databases or services from Oracle ecosystem partners.

**Performance based on Oracle Communications Session Router S-Cz10.0p7 software release.*

Virtualization

Oracle Communications Session Router may be run as a Virtual Network Function (VNF). Supported hypervisors include Kernel-Based Virtual Machine (KVM), and VMware ESXi. Session Router supports HEAT templates for improved automation and Virtual Machine (VM) instantiation which can be used in NFV/Cloud deployments with OpenStack as the virtualized infrastructure manager. As a VNF, Oracle Communications Session Router may be deployed as a standalone instance or within an orchestrated Network Function Virtualization (NFV) environment.

Supporting a virtualized function in a public cloud requires meeting special requirements. Public clouds have very specific guidelines such as IP addressing usage, hypervisor selection and I/O mode to provide security and integrity for all its tenets. Oracle Communications Session Router software version supports deployment on Oracle Cloud Infrastructure, Amazon Web Services, Microsoft Azure, and Google Cloud Platform public clouds.

Hardware platforms

Oracle Communications Session Router operates on Acme Packet 4900 and Acme Packet 6400 platforms, leveraging the latest multicore processing and technology advancements, to deliver scalable performance in small to very large networks.

Features and functions

Oracle Communications Session Router provides compelling features that deliver a number of key benefits to service providers' VoIP and IMS networks:

- A more streamlined and scalable network
- Lower total cost of ownership
- Improved network resilience
- Faster time to market
- Vendor flexibility

These features are intended to provide advanced functionality for routing, interoperability, security, and overload control. Oracle Communications Session Router supports high availability (HA) configurations across Oracle hardware and selected third-party server platforms.

Extensive routing control

Oracle Communications Session Router provides comprehensive and flexible control for routing and forwarding SIP messages. It determines the next signaling hop using selection criteria that can be derived from a number of sources.

Routing information can be selected using multiple processing rules and can leverage regular expressions to match, compare, and extract routable information from both standard and non-standard sources.

The source of routing information is SIP message content, including called number, CNAP, ingress realm, egress realm, time, codec, SIP method, cost, trunk group, and proprietary headers.

Oracle Communications Session Router leverages routing policies on its local route table (LRT) in addition to external routing databases. The external databases enable routing decisions for the PSTN and IP networks and include local number portability (LNP), CNAP, Local Exchange Routing Guide (LERG), emergency services (Enhanced 911), LCR, inter-provider private route tables, and public databases.

Oracle Communications Session Router provides multistage routing to support complex routing decisions and enforce business logic. With nested local route policy lookups, the results of the first lookup determine the next lookup, and ultimately the next hop destination. Following route selection, SIP messaging may be further modified to influence behavior in the network.

Network session delivery infrastructure

Oracle's network session delivery infrastructure help enterprises and service providers to manage the many challenges in the delivery of IP voice, video, and data services and applications. Service provider solutions are deployed at network borders and in the IP service core to help fixed-line, mobile, wholesale, and over-the-top service providers optimize revenues and realize long-term cost savings. In the enterprise, session delivery infrastructure solutions seamlessly connect fixed and mobile users, enabling rich multimedia interactions and automating business processes for significant increases in productivity and efficiency.

Related products

- Oracle Communications Session Border Controller
- Oracle Communications Subscriber-Aware Load Balancer
- Oracle Enterprise Session Border Controller
- Oracle Session Delivery Management Cloud
- Oracle Communications Operations Monitor

Session Router hardware platforms

- Acme Packet 4900
- Acme Packet 6400

Oracle Communications Session Router also monitors SIP elements and E.164 Number Mapping (ENUM) database servers for availability and reroutes traffic upon failure to provide service continuity.

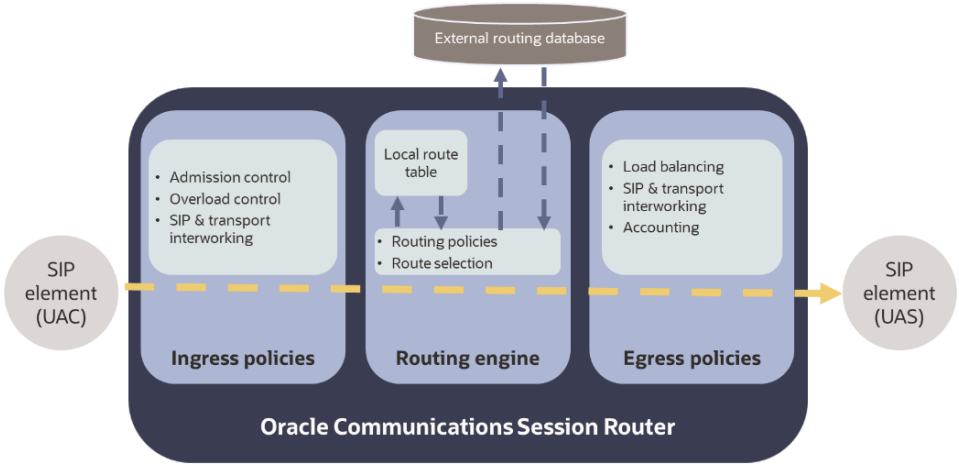

Figure 2. The Oracle Communications Session Router system architecture leverages routing policies on its local route table in addition to external routing databases

Load balancing

Routing can be further supported by load balancing features, which are designed to help optimize network performance. The result can be a unique element from a group of session agents or a recursive set of targets from the selected group. The next signaling hop can be selected based on a variety of load-balancing techniques, including:

- Hunt
- Least busy
- Lowest sustained rate
- Proportional
- Round robin

Interworking and mediation

Oracle Communications Session Router provides interworking capabilities to provide rapid interoperability between vendors and various SIP elements. The normalization and mediation functionality accelerates time to market, as vendors and core equipment are added and changed over time. This interworking capability also helps service providers to choose best-of-breed elements and to integrate acquisitions or new vendors into the network more rapidly.

All SIP message headers can be modified, added, or removed based on specified criteria as messages flow through Oracle Communications Session Router. This dynamic manipulation provides a powerful interoperability tool that is not dependent on feature enhancements or software updates.

The interworking and mediation functions include:

- SIP, SIP with Encapsulated ISDN User Part (SIP-I), and SIP for Telephones (SIP-T) protocol mediation and normalization
- Response code translations
- User Datagram Protocol (UDP), Transmission Control Protocol (TCP), and Stream Control Transmission Protocol (SCTP) transport layer interworking

Call admission and overload control

Dynamic signaling rate limiting is designed to help protect Oracle Communications Session Router and other network elements from excessive signaling rates, including those due to DoS attacks or non-malicious overloads. Incoming messages that exceed configured maximums based on a variety of constraint criteria are rejected. Oracle Communications Session Router overload control features help maintain core network and overall service availability.

Accounting

Oracle Communications Session Router provides accounting via call detail records (CDRs) or Remote Authentication Dial-In User Service (RADIUS) for session-based billing and settlement, in addition to traffic planning and performance management.

Carrier-grade high availability

Across multiple hardware and server platform options, Oracle Communications Session Router supports an HA configuration with active and standby units. The SIP message state and peer state are check-pointed between the active and standby units to enable uninterrupted service in the event of a unit failure.

STIR/SHAKEN

The STIR/SHAKEN framework, an industry-standard caller ID authentication technology, is a set of technical standards and protocols that allow for the authentication and verification of caller ID information for calls carried over Internet Protocol (IP) networks.

To address the needs of the growing number of STIR/SHAKEN deployments globally, Oracle has enhanced its Session Router based STIR/SHAKEN REST client. Improvements include support for new PASSporT types, configuration optimizations, country specific operational requirements, and provide a means for STIR/SHAKEN header customization. Session Router also provides support to evaluate, track and troubleshoot operations based on extended STIR/SHAKEN client statistics.

Management

Oracle Session Delivery Management Cloud—a cloud native application for the management and monitoring of Oracle Communications network functions—provides configuration management for Oracle Communications Session Router. It also supports automation for local route table (LRT) management and distribution using a flexible work order framework, and automatic rollbacks in the event of failure. Oracle Communications Session Delivery Manager—a centralized on-premises management system—it can be used as well to configure Oracle Communications Session Router. Additionally, Oracle Communications Session Delivery Manager provides Northbound interface integration for LRT management.

Oracle Communications Session Router can also be managed by command-line interface (CLI) and Telnet. Secure File Transfer Protocol can be used to update local route tables with XML. RADIUS is used for accounting and Simple Network Management Protocol (SNMP) and Syslog for monitoring. REST API can be used for both configuration and statistics monitoring.

Oracle Communications Session Router is also supported by Oracle Communications Operations Monitor, a real-time monitoring and troubleshooting software that provides network intelligence for service provider networks.

Flexible operational modes

Oracle Communications Session Router supports four modes, providing multiple levels of session statefulness that balance interoperability, security, and accounting features with performance, as outlined in table 1.

Table 1. Modes of session statefulness supported by Oracle Communications Session Router

Mode	Performance	Signaling State	Topology Hiding	Overload Control	Load Balancing	SIP Interworking	Accounting
Stateless	Highest	Initial invite only	No	No	No	No	No
Transaction Stateful	Higher	Through initial setup	No	CPS only	Hunt, lowest sustained rate	Yes	No
Session Stateful	High	Through session termination	No	CPS and sessions	Hunt, round robin, and proportional, least busy, lowest sustained rate	Yes	Yes
Dialog Stateful	High	Through session termination	Yes	CPS and sessions	Hunt, round robin, and proportional, least busy, lowest sustained rate	Yes	Yes

Table2. Technical Specifications

FEATURE	DETAILS
RFC 3261	SIP proxy, ScIP relay
SIP interface support	Mi, Mj, Mk, Mx
3GPP compliance	BGCF
SIP protocols	SIP, SIP-I, SIP-T, and interworking
Transport and security protocols	UDP, TCP, SCTP, and interworking Transport Layer Security (TLS), including TLS 1.3
IP protocols	IPv4, IPv6
Resolution and translation protocols/rules	ENUM, DNS Number matching and translation rules
Supported platforms	Acme Packet 4900*, Acme Packet 6400** and Oracle Server X9-2***
Management	Oracle Session Delivery Management Cloud, Oracle Communications Session Delivery Manager, CLI, Telnet, SFTP, XML, REST, RADIUS, SNMP, and Syslog REST API support for configuration REST API support for monitoring and performance KPIs Support for orchestration on Oracle Cloud Infrastructure and Amazon Web Services using Terraform scripts

** S-Cz9.3.0p2 and newer*
*** S-Cz10.0p7 and newer*
**** S-Cz9.2.0 and newer*

Table 3. Oracle Communications Session Router -VNF Specifications

FEATURE	DETAILS
Hypervisors	Kernel-based Virtual Machine (KVM), VMware ESXi
Minimum Required Configuration	4 vCPU Cores, 8 GB RAM, 20 GB HDD, 8 vNICs

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