

Oracle Communications Subscriber-Aware Load Balancer

Oracle Communications Subscriber-Aware Load Balancer enables linear, non-disruptive scaling of capacity up to millions of subscribers from a single Session Initiation Protocol (SIP) Internet Protocol (IP) address. It supports the delivery of any IP Multimedia Subsystem (IMS), Rich Communications Services (RCS), or next-generation network (NGN) service as well as any SIP application—voice, video, presence, messaging, and multimedia—over any mobile or fixed line access network, including the internet.

Overview

Oracle Communications Subscriber-Aware Load Balancer (SLB) is used to front-end clusters of Oracle Communications Session Border Controller (SBC) for SIP signaling. The Oracle SLB is a high-performance subscriber-aware load balancer optimized for clustering SBCs. It provides dynamic, adaptive load balancing of subscribers based on SBC availability and health score, subscriber capacity, system utilization, and user defined policies.

The Oracle SLB features carrier-grade high availability. Deployed as 1:1 active-standby units, Oracle SLB checkpoint configuration and cluster state to ensure no loss of active sessions in the event of single system failures.

An Oracle SBC cluster scales subscriber capacity without requiring architectural forklifts or network disruptions. As all elements of the cluster are SIP subscriber and session-aware, it provides a superior solution in terms of scalability, dynamic adaptive load balancing, redundancy, and management compared to traditional load balancers and SIP redirect servers.

High-capacity, high-throughput access SBC clusters

Oracle Communications Subscriber-Aware Load Balancer enables the creation of Oracle Communications Session Border Controller clusters that can each support up to millions of subscribers from a single IP address for SIP signaling.

Real-time Transport Protocol (RTP) media flows directly from endpoints to the SBCs maximizing cluster throughput and minimizing media latency.

Linear, non-disruptive SBC capacity

Applications

- Session border controller (SBC) clustering
- Any subscriber-based IP Multimedia Subsystem (IMS) or non-IMS service
- Any private or public, fixed or mobile access network

Key features

- Adaptive, session-aware load balancing of SIP sessions
- Dynamic expansion and contraction of subscriber capacity
- Intracluster protocol for state exchange between Oracle Communications Subscriber-Aware Load Balancer and SBC cluster members
- Low-latency control plane
- Geographical distribution of SBC clusters
- Carrier-grade high availability

Dynamic, adaptive stateful load balancing

Oracle Communications Subscriber-Aware Load Balancer distributes subscribers to specific SBCs in the cluster at time of registration based upon SBC availability, health score, capacity, and current load. This information is exchanged between SBCs and Oracle SLB using an intra-cluster protocol. Moreover, if the cluster is composed of different members such as a mix of appliance SBCs with different capacity or a mix of appliance and virtualized SBCs, Oracle SLB uses each individual member's performance characteristics so as to optimize performance of the cluster as a whole without overloading slower members.

SBCs can be easily added or even removed from the cluster without any service disruption, assuming that sufficient capacity exists in the cluster. Subscribers are redistributed across the reconfigured cluster only when they do not have active calls or sessions in progress.

Low latency

Oracle SLB binds subscriber to member Oracle SBC based on loading and subscriber geography. Once binding is established, it utilizes "fast-path" to perform packet forwarding of subsequent signaling messages leading to low latency.

SLB virtualization

Oracle SLB can be run as a Virtual Network Function (VNF). Supported hypervisors for Oracle SLB –Virtual Network Function include:

- Kernel Based Virtual Machine (KVM),
- VMware ESXi.

Oracle Communications Subscriber-Aware Load Balancer software supports deployment in Oracle Cloud Infrastructure (OCI), Amazon Web Services (AWS) and Google Cloud Platform (GCP) public clouds. To reduce the need for cloud expertise, orchestration using Terraform scripts is supported on OCI and AWS.

Management and orchestration (MANO)

Oracle Communications offers VNFs for session management, service delivery platforms including SBCs, load balancing, core network signaling management and policy management. Oracle's strategy is based on providing carrier grade VNFs that can be orchestrated in a flexible manner by a variety of environments, including the major industry orchestration and automation third party offerings.

The Oracle SLB supports REST API to automate instantiation, enable remote configuration and perform monitoring of SLB VNFs.

Catalyst to virtualization

Oracle Communications Subscriber-Aware Load Balancer helps operators' transition to virtualization by enabling an incremental introduction of virtualized SBCs in hybrid clusters alongside purpose build SBCs.

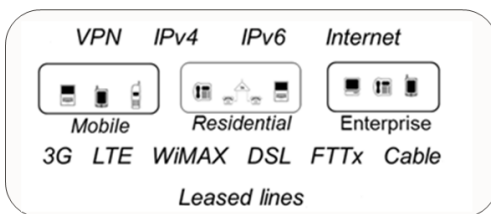
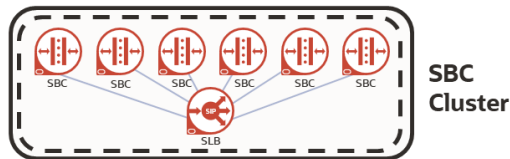
Key benefits

- Maintains cluster wide subscriber awareness and SBC utilization for intelligent SBC selection and rebalancing
- Scales to support up to millions of subscribers with no additional signaling latency
- Delivers greater security than SIP- aware load balancers
- Simplifies endpoint management
- Protects against site disasters and loss of connectivity
- Satisfies all access border control requirements
- Protects SBC investment
- Allows cluster composed of heterogeneous members and protects each against overload

Hybrid clusters can support multiple services, applications, and access networks.

- Any service: Mobile, residential, or enterprise
- Any application: Voice, video, presence, messaging, videoconferencing, content and video share, unified communications, and collaboration
- Any access network: 3G, Long-Term Evolution (LTE), Worldwide Interoperability for Microwave Access (WiMAX), DSL, cable, fiber to the x (FTTx), leased line, internet, IPv4, IPv6, and IPv4/IPv6 interworking.

Any service, any application



Any access network

Figure 1. An Oracle Communications Session Border Controller cluster can be virtualized to physically support multiple services, applications, and access networks

Co-located or geographically distributed deployment models

To enable geographic distribution and preserve IP endpoint address transparency, the Oracle Communications Subscriber-Aware Load Balancer uses IP-in-IP encapsulation Request for Comment 2003 (RFC 2003) to forward traffic to the SBC.

The following deployment models provide geographic redundancy and network resiliency:

- **Co-located SBC cluster:** Oracle SLBs and SBCs are physically co-located in the same data center or aggregation Point of Presence (POP)
- **Distributed SBC cluster:** Oracle SLBs and SBCs are physically distributed and separated from each other. Each Oracle Communications Subscriber-Aware Load Balancer only has access to a specific group of SBCs. This solution provides geographic redundancy

Network session delivery and control infrastructure

Oracle's network session delivery and control infrastructure helps 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 operators, enabling rich multimedia interactions and automating business processes for significant increases in productivity and efficiency. The following Oracle products are part of the network session delivery and control infrastructure.

Related products

- Oracle Communications Session Border Controller
- Oracle Communications Session Router
- Oracle Communications Core Session Manager
- Oracle Enterprise Session Border Controller
- Oracle Session Delivery Management Cloud
- Oracle Communications Session Delivery Manager
- Oracle Communications Operations Monitor

Investment protection

The Oracle Communications Session Border Controller cluster supports existing Oracle SBC investment and can be comprised of a heterogeneous mix of SBC hardware platforms and VNFs. It also supports all Access SBC (A-SBC) configurations such as A-SBC with Proxy Call Session Control Function (P-CSCF) and IMS Access Gateway (IMS-AGW), P-CSCF signaling function only or A-SBC only.

Carrier grade SBC functions and features including NET-SAFE security

The Oracle Communications Session Border Controller cluster solution supports all of Oracle's carrier grade SBC functions and features in the areas of security, service reach maximization, service-level agreement (SLA) assurance, revenue protection, and regulatory compliance.

The Oracle Net-SAFE security framework addresses the unique security challenges of delivering SIP-based interactive IP communications over the Internet. The Net-SAFE framework includes advanced security features, a highly scalable architecture, and comprehensive monitoring and reporting capabilities.

The Oracle Communications Subscriber-Aware Load Balancer (SLB) supports IP Media Subsystem-Authentication and Key Agreement (IMS-AKA) and Transport Layer Security (TLS) including TLS 1.3 encryption.

Centralized management

Oracle SBC and SLB can be configured and managed by Oracle Session Delivery Management Cloud— a cloud native application for management and monitoring of Oracle Communications network functions. From Oracle Communications Session Delivery Manager – a centralized on-premises management system- SBCs can be added to or removed from the cluster, subscribers can be migrated, and software can be upgraded.

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