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Oracle Communications Session Border Controller

Oracle Communications Session Border Controller (SBC) makes possible trusted, carrier-grade real-time communications across IP network access borders and IP interconnect borders, including fixed line and mobile (VoLTE) services. SBC runs as a single software application that supports both purpose-built hardware platforms as well as virtualized deployments in both private and public clouds. SBC offers a unique combination of performance, capacity, high availability, and manageability. With the offering, CSPs can manage critical requirements for security, interoperability, reliability and quality, regulatory compliance, and revenue/cost optimization.

Carrier-grade real-time communications services

- Access SBC in next-generation fixed line and mobile services
- SIP trunking and hosted business services for enterprises
- Interconnect SBC for peering, Public Switched Telephone Network (PSTN) termination & origination, and wholesale services
- VoLTE, RCS, and other IMS services access and interconnect

Overview

Oracle Communications Session Border Controller (SBC) helps service providers to deliver trusted, carrier-grade real-time communications services across Internet Protocol (IP) network borders. SBC provides control functions and features, protocol support, scalability, and manageability in all types of IP networks. It supports services and applications ranging from basic Voice over IP (VoIP) to any service enabled by IP Multimedia Subsystem (IMS) including Voice over Long-term Evolution (VoLTE), Rich Communication Services (RCS) such as conferencing, presence, shared whiteboards, and chat. The functions offered by SBC satisfy critical service provider requirements in five major areas: security, interoperability, reliability and quality, regulatory compliance, and revenue/cost optimization. Furthermore, SBC features powerful embedded management options such as Command-line interface (CLI) and REST API. It can also be managed with specialized management solutions such as the SaaS-based Oracle Session Delivery Management Cloud or the on-premises Oracle Communications Session Delivery Manager and monitored with Oracle Communications Operations Monitor.

Key features

- STIR/SHAKEN support
- Comprehensive security framework
- Scales to support up to three million subscribers on a single chassis
- Maximum service reach enabled by normalization and interworking of signaling, media, transport, and security protocols and codec management
- Regulatory compliance supported by lawful intercept, prioritized routing of E911 calls, and session replication
- High QoS and quality of experience (QoE) ensured through high availability and session routing
- Revenue and cost optimization features, including accounting and protection against service theft/fraud
- Available on both purpose-built appliances and virtualized COTS servers

Security

Leveraging a comprehensive security framework for real-time communications, the SBC secures all service provider access and interconnect & peering borders. The tight coupling of the security framework and advanced hardware helps the SBC to protect itself, the service delivery infrastructure, and communications sessions from a wide range of malicious and non-malicious threats. SBC uses the security framework to ensure confidentiality, integrity, and availability of real-time interactive communications services. It preempts attacks, eliminates vulnerabilities, and applies powerful mitigation to counteract events as they

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happen, while ensuring continuity and high quality for subscribers and operators using the services.

Performance, capacity, and scalability

The Oracle Communications Session Border Controller portfolio consists of a wide range of appliances that scale by performance, capacity, and price point. The virtual offering scales through the inclusion of additional compute, storage, and network resources to a single instance. Additional scalability can be achieved by clustering appliances, virtual instances, or a combination of both by front ending the SBC cluster with either Oracle Communications Session Router or Oracle Communications Subscriber-Aware Load Balancer. Additional SBCs can be added seamlessly to existing clusters.

Reliability and quality

SBC plays a critical role in ensuring service availability and user quality of experience. It performs admission control via local policies or external policy servers to ensure that both the network and service infrastructure have the capacity to support high-quality communications. It also monitors and reports actual session quality to determine compliance with performance specifications set forth in service-level agreements (SLAs) between service providers. Intelligent session routing and high-availability configurations minimize outages caused by upstream link failure or equipment problems.

Revenue and cost optimization

SBC helps service providers control costs and increase revenues with options for integrating many IMS functions—routing sessions optimally to minimize costs, providing accounting and related mechanisms to maximize billable sessions, and protecting against theft of bandwidth and quality of service (QoS). SBC delivers the performance, capacity and throughput needed for any type and size of service provider. Leveraging state-of-the-art hardware with symmetrical multiprocessing across a purpose-built platform family, an Oracle Communications Session Border Controller scales to support up to three million subscribers on a single chassis and it can support massively scalable access networks operating in an SBC cluster controlled by Oracle Communications Subscriber-Aware Load Balancer.

Oracle Session Border Controller rich feature set

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 meet the needs of the growing number of STIR/SHAKEN deployments globally, Oracle has enhanced its field proven SBC 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. SBC also provides support to evaluate,

Key benefits

- Runs as a single software application that supports both Acme Packet platforms as well as virtualized deployments, enabling easier, seamless adoption of virtualization
- Comprehensive signaling, programmability, and control functions and features with Acme Packet Operating Software
- Range of platforms to provide operators a broad array of price/performance points helping them to utilize what matches their needs
- Advanced hardware for offloading of critical functions such as transcoding and security so as not to impact or compromise a user's targeted application of the base platforms
- Symmetrical Multi-processing (SMP) technology helps operators to make an investment today that is designed to meet current and future network performance demands
- Full IMS integration combined with legacy SBC feature sets on a single system allows gradual user migration to IMS and LTE networks
- Clustering for carrier-grade performance, capacity, and availability

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track and troubleshoot operations based on extended STIR/SHAKEN client statistics.

Architectural flexibility

SBC can be configured as an Access SBC (A-SBC), Interconnect SBC (I-SBC), or both roles simultaneously depending on service requirements. The flexibility of Oracle Communications Session Border Controller extends to smaller service providers wishing to consolidate access and interconnect functionality in a single system. SBC also integrates standard IMS functions used at access or interconnect borders, simplifying its integration with that next-generation service delivery architecture.

At service provider access borders (the borders facing enterprise locations, as well as public access networks such as the internet, 3G/4G/5G mobile, or fixed line networks used by residential or cable subscribers), SBC enables new service build-out and consolidation of service infrastructure. It protects the service delivery infrastructure from malicious and equally dangerous non-malicious threats while maximizing service reach, reliability, and user quality of experience. At interconnect borders (the borders between service provider networks), SBC accelerates initial offering or expansion of next-generation IMS or IP services, which helps drive down time-division multiplexing (TDM) costs and expand service provider partnerships. Oracle Communications Session Border Controller delivers key functions for service provider interconnects such as highly scalable and flexible routing as well as hardware-accelerated security and transcoding.

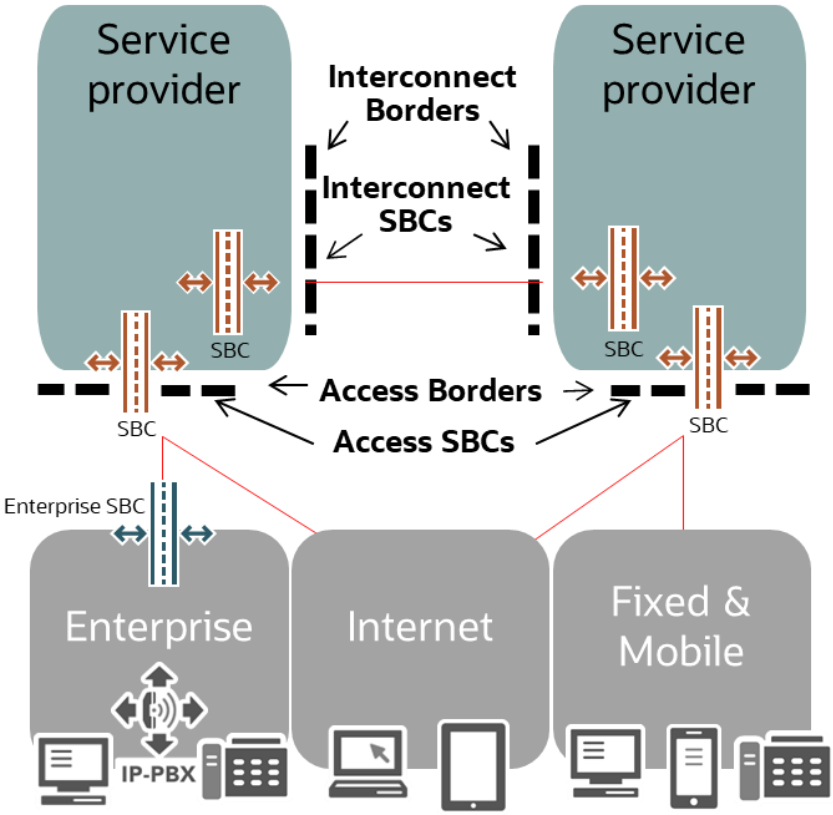

Figure1. Oracle Communications Session Border Controller can be configured as an Access or Interconnect SBC depending on service requirements.

Network session delivery infrastructure

Oracle's network session delivery 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 Subscriber-Aware Load Balancer
- Oracle Enterprise Session Border Controller
- Oracle Session Delivery Management Cloud
- Oracle Communications Session Delivery Manager
- Oracle Communications Operations Monitor
- Acme Packet 3950
- Acme Packet 4900
- Acme Packet 6350

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Acme Packet operating software

Oracle Communications Session Border Controller is based on Acme Packet OS, which delivers comprehensive multiprotocol signaling, programmability, and control functions and features. SBC supports all commonly used IP signaling protocols including SIP, SIP-I, SIP-T, Diameter, Message Session Relay Protocol (MSRP), and Real Time Streaming Protocol (RTSP), helping service providers to extend services to the greatest number of endpoints, as well as services offered via interconnect borders. Extensive signaling protocol Interworking Function (IWF) helps service providers to consolidate signaling traffic within their networks. This reduces the number of required network elements, simplifies management, and reduces capital and operating expenditures. SBC IWF also allows the integration of next-generation SIP with legacy networks and endpoints, maximizing service revenues.

Oracle's implementation of SIP offers unmatched interoperability, maturity, and functionality, with thousands of production deployments throughout the world. To normalize session signaling between SIP implementations that often feature vendor-specific messages and response codes, the SBC features extensive signaling programmability. This empowers inspection or modification of elements within protocol headers or payload, including information found in SIP, Session Description Protocol (SDP), and Diameter headers.

Oracle Communications Session Border Controller implements a full SIP back-to-back user agent (B2BUA) approach that divides each session flowing through the SBC into two discrete segments. In this way, the SBC maintains session state with each endpoint simultaneously, empowering the application of a wide range of control functions over the end-to-end session without modification to either the behavior or configuration of either endpoint.

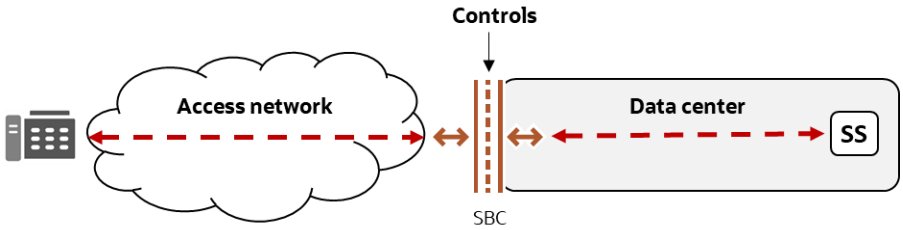

Figure 2: Oracle Communications Session Border Controller functions as a back-to-back user agent to maintain full session state with endpoints and service platforms, perform 7-layer packet inspection, and apply fine-grained controls to session traffic at wire rate

Microsoft Teams, Zoom, Webex, and Google Voice

Service providers can utilize Oracle's session border controllers to establish connectivity with multiple UCaaS/CCaaS solutions and monetize their PSTN services in conjunction with their UCaaS/CCaaS offerings. Service Providers can decide between different deployment models:

- cost efficient multi-tenant deployments like Microsoft Teams Operator Connect, Teams Phone Mobile, Zoom Phone Cloud Peering (including Zoom Provider Exchange), or Webex Go,
- customer dedicated SBC for additional customization of the Enterprise requirements with deployments like Microsoft Teams Direct Routing,

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Zoom Phone BYOC Premise Peering, Cisco Webex Calling Local Gateway, Google Voice SIP Link,

- hybrid deployments combining both cost efficient multi-tenant and customizable customer dedicated deployments depending on enterprise needs.

Interoperability

SIP interworking capabilities of Oracle Communications Session Border Controller are designed to maximize service reach by ensuring interoperability with and between subscriber endpoints, soft-switches, IMS Call Session Control Function (CSCF) elements, application servers, media and recording servers, media gateways, and SBCs in peering and enterprise networks. SBC enables sessions traverse network address translation (NAT) and firewalls, IPv4 or IPv6 networks, public and private networks using overlapping IP addresses, and virtual private networks (VPNs). SBC mediates between different signaling, transport, and encryption protocols; converts incompatible codecs; and translates signaling-layer telephone numbers, addresses, and response codes.

IMS/next generation network integration

Oracle Communications Session Border Controller offers IMS functionality at access and interconnect borders to control the SIP, Real-time Transport Protocol (RTP), and Message Session Relay Protocol (MSRP) traffic flows that comprise IMS sessions. At IMS access borders, the SBC implements signaling and media related IMS functions such as Proxy Call Session Control Function (P-CSCF), Emergency Access Transfer Function (EATF), Access Gateway (AGW), Access Transfer Control Function (ATCF), and Access Transfer Gateway (ATGW). IMS I-SBC functions include Interconnect Border Control Function (I-BCF), IWF, and Interconnect Border Gateway Function (I-BGF)/Translation Gateway (TrGW).

Highly scalable platforms and SBC clustering

Oracle Communications Session Border Controller operates on a wide range of platforms that leverage the rich functionality of Acme Packet OS. SBC platforms feature high availability, carrier-grade manageability, and redundancy for uncompromised quality, interoperability, and security.

When deployed in conjunction with Oracle Communications Subscriber-Aware Load Balancer, SBC can also function as a member of an SBC cluster. SBC clusters provide dynamic, adaptive load balancing of subscriber traffic across the cluster, allowing services to scale to support millions of subscribers without architectural forklifts or network disruptions. SBC clusters also deliver enhanced redundancy and manageability not achievable with traditional load balancers or SIP redirect servers.

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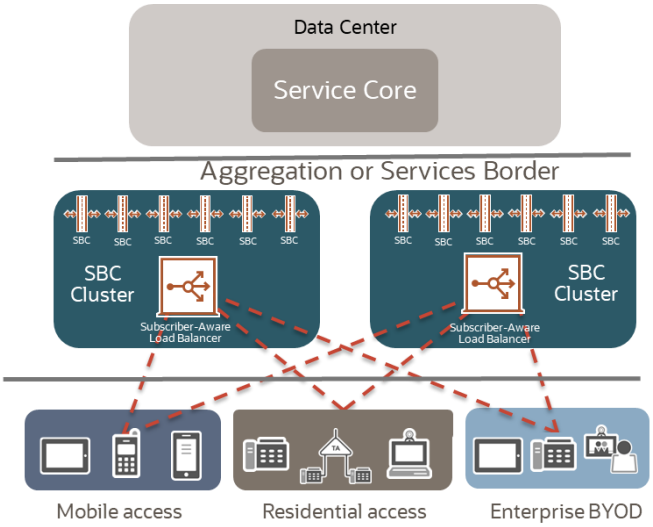

Figure 3. Oracle Communications Subscriber-Aware Load Balancer enables formation of SBC clusters for enhanced scalability.

SBC virtualization

Oracle Communications Session Border Controller may be run as a Virtual Network Function (VNF). Supported hypervisors for SBC VNF include Kernel-Based Virtual Machine (KVM), and VMware ESXi. SBC supports HEAT templates for improved automation and Virtual Machine (VM) instantiation which can be used in Network Function Virtualization (NFV) and Cloud deployments with OpenStack.

As a VNF, SBC may be deployed as a standalone instance or within an orchestrated virtual environment, and offers the same level of functionality, security, interoperability, and reliability as it does on purpose-built platforms. Instances of virtualized SBCs may be clustered with their counterparts on purpose-built platforms, creating what are known as "hybrid clusters", providing a way for their gradual introduction and for even greater deployment flexibility and network agility.

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. SBC software supports deployment on Oracle Cloud Infrastructure, Amazon Web Services, and Google Cloud Platform public clouds in highly available (HA) mode. It can also be deployed on Microsoft Azure public cloud in Standalone mode.

Management and orchestration

Oracle Communications offers VNFs for session delivery platforms including SBCs, load balancers and session routers. 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.

SBC supports REST API to enable zero-touch instantiation, remote configuration and monitoring of SBC VNFs and facilitates multivendor interoperability and predictable behavior based well defined standards and specifications.

"At Evolve IP, we are committed to evolving our network, positioning ourselves to support the anticipated traffic growth and value added services our customers will require in the future. It is clear to us that moving to the cloud will be critical in meeting these goals. We see Oracle as an expert in cloud, virtualization, IT, and telecommunications and have found that its Oracle Communications SBC offers unique strengths in all of these areas."

Michiel van Dis
Managing Director
Evolve IP Europe

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SBC key functions and features

FUNCTIONAL AREA	SBC FUNCTIONS/FEATURES
General	• Supported on Oracle's purpose-built hardware and virtualized server platforms • A-SBC or I-SBC functionality • Software only offering for virtualized platforms • HA: signaling, media, configuration checkpointing
Signaling protocols	• Session Initiation Protocol (SIP): user interface or back-to-back user agent (B2BUA) • Message Session Relay Protocol (MSRP) • DNS: application layer gateway (ALG)
IMS/NGN support	• Proxy Call Session Control Function (PCSCF) • Serving Policy Decision Function (SPDF) • Access/Core Border Gateway Function (A/C-BGF) • Access Transfer Control Function (ATCF) • Access Transfer Gateway (ATGW) • Interconnect Border Control Function (I-BCF) • Interworking Function (IWF) • Interconnect Border Gateway Function (IBGF) • Emergency Access Transfer Function (EATF) • Signaling interfaces: Gm, Mw, Ic, Iw • Diameter interfaces: Rf, Rq, e2, Gq, Rx • COPS interfaces: Rq, e2
Security	• SBC denial of service (DoS) self-protection • Static or dynamic access controls (permit/deny) • Self-protection against signaling overloads and distributed denial of service (DDoS) attacks • Protection of IMS core from registration overloads and attacks • Media and signaling validation to prevent service theft and fraud • Internet Protocol Security (IPsec), Transport Layer Security (TLS) including TLS 1.3, Datagram Transport Layer Security (DTLS), IP Media Subsystem-Authentication and Key Agreement (IMS-AKA), and Secure Real-time Transport Protocol (SRTP) encryption for privacy and confidentiality • DTLS-SRTP in server mode
Interoperability	• SIP signaling protocol interworking and mediation • SIP/SIP-I/SIP-T interworking • SIP IPv6-IPv4 interworking • NAT traversal and IP address mediation • Signaling and dial plan normalization • Dual Tone Multi-Frequency (DTMF) extraction • Transcoding/transrating with flexible, dynamic codec management • Microsoft Teams • Zoom Phone • Cisco Webex Calling • Google Voice
SLA assurance	• Check-pointing of signaling, media, and configuration for nonstop availability • Define and enforce QoS marking/mapping • Traffic and session prioritization • QoS monitoring, accounting, and reporting • Admission controls to maximize service infrastructure availability • Policy enforcement to ensure bandwidth availability • Session reroute around upstream outages
Service enablement	• Flexible routing • Number matching and translation rules • SIP load balancing • Standards-based AAA (ENUM, DNS, Diameter, RADIUS) • Protocol interworking to simplify core network traffic • Dynamic bandwidth monitoring and control • Industry-standard Session Recording Protocol (SIPREC) • Lawful intercept • 3GPP Enhanced Firewall Traversal Function (EFTF), formerly TSCF • Accounting with Diameter, RADIUS, and comma-separated value (CSV) file formats • Native REST API for custom configuration and KPI monitoring • Support for orchestration on Oracle Cloud Infrastructure and Amazon Web Services using Terraform scripts

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Oracle – Supported SBC platforms – Sample capacity and performance comparison*

Feature	Virtualized SBC**	AP3950	AP4900	AP6350
Form factor	Virtualized	1U System	1U System	3U System
System Architecture	Data Centre /COTS	Purpose Built	Purpose Built	Purpose Built
Max. Media Sessions	60,000	10,000	40,000	160,000
Max. SRTP Call Legs	30,000	10,000	16,000	120,000
Max. SIPREC Sessions	19,000	7,500	12,000	40,000
Max. Transcoded Sessions (G711 <-> G729)	3,500	6,500	6,500	60,000
Max. Calls Per Second	2,000	150	700	1,700

* Performance and capacity numbers vary by deployment type, transport protocols used, feature interaction and usage of transcoding resources. Performance and capacity based on S-Cz9.3 software release.

** VM configuration dependent

Monitoring and management

Oracle Communications Session Border Controller embedded element management delivers full administrative access to the command line interface (CLI), Simple Network Management Protocol (SNMP) management information bases (MIBs), statistics, system logs, packet trace information, and system software and configuration files via distinct management interfaces. Third-party management systems and operation support systems (OSS)/ business support systems (BSS) applications can also leverage Secure File Transfer Protocol (SFTP) and SNMP to access system accounting and performance data, MIBs, and historical data records (HDRs). REST API support is also available for configuration and statistics monitoring.

Built on Oracle's next-generation cloud infrastructure, Oracle Session Delivery Management Cloud helps customers minimize operational costs in a more agile, reliable, and secure way. The feature-rich SaaS solution includes fault, configuration, accounting, performance, and security (FCAPS) management, and provides an insightful and unified view across the Oracle Communications session delivery products portfolio. Through integration with monitoring solutions such as Oracle Communications Operations Monitor, Oracle Session Delivery Management Cloud provides users with the ability to view call data using a ladder diagram, as well as additional monitoring KPIs which can be displayed in customized dashboards. Oracle Communications Session Delivery Manager is the on-premises solution for FCAPS management across multiple Oracle's session delivery products. Oracle Communications Session Delivery Manager also features application add-ons for reporting, SIP trunk provisioning, and SIP session routing.

Oracle Communications Operations Monitor is browser-based real-time network intelligence software that optimizes next-generation IP communications networks, enables rapid troubleshooting of customer experience issues down to the individual session level, proactively identifies and isolates communications network faults and events, and detects fraudulent network activity. Oracle Communications Operations Monitor delivers end-to-end network visibility to

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better align network resources with end user application requirements and improves the performance of end user services.

SBC features an internal probe that captures and forwards session traffic at wire rate, helping Oracle Communications Operations Monitor to instantly display fine-grained real-time communications performance metrics. Since it is integrated with the SBC, the internal probe overcomes limitations of standalone external probes by capturing and analyzing encrypted sessions without compromising subscriber privacy or confidentiality. The embedded probe also analyzes voice quality metrics and reports it to Oracle Communications Operations Monitor.

Summary

Oracle Communications Session Border Controller is a valuable solution for fixed line, mobile and over-the-top service providers. SBC is based on a product strategy that is aligned to support the continued growth of IMS based mobile and fixed broadband services. Via state-of-the art hardware platforms, virtualized offerings, industry-leading 3GPP, GSMA, and IETF compliance, and groundbreaking software enhancements, SBC brings value-added solutions through integration with other key Oracle technologies and helps operators remain innovative and profitable.

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