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Oracle Communications Operations Monitor

Monitor and Troubleshoot Your IP Communications Network

ORACLE SOLUTION BRIEF | JUNE 2016

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Introduction

The Oracle Communications Operations Monitor (formerly known as Palladion) is a real-time, end-to-end service monitoring, troubleshooting and analytics solution that provides insight into VoIP and Unified Communications networks through a customizable and intuitive graphical user interface.

The solution has been deployed in numerous homogenous networks, proving its scalability in environments ranging from small hosted PBX providers, large enterprises and Tier-3 operators, to large, multi-site distributed Tier-1 service providers across the world.

Features

The Oracle Communications Operations Monitor (OCOM) is a passive and diagnostics service assurance solution that captures call related traffic from NGN environments, correlates the captured packets into end-to-end call message flows, stores these call flows, registrations, RTP streams and control messages into a local database and renders the gathered data to a web interface and makes it available to external applications.

OCOM stands out from the crowd by being able to identify in real-time different call legs of the same call with no need for call detail record (CDR) or database-driven on-demand analysis. This feature is an essential feature for troubleshooting and for providing deep device visibility and accurate statistics. This correlation of incoming and outgoing call legs can be difficult if a network element, such as a session border controller, changes headers in the incoming leg for purposes of topology hiding, decoupling or interoperability. OCOM not only correlates these legs but also gives the network operator the power to adjust the process by customizing this algorithm. This makes OCOM integrate universally with IP telephony vendors' implementations of unified communications and IMS.

OCOM updates and displays call information in real-time, including its status, duration, the codec used, and its audio quality. OCOM also saves completed call data, registrations, and other events, which enables the network operator to investigate historical problems without having to reproduce them.

OCOM allows drilling down into the signaling and media levels by providing a packet-by-packet view of all calls captured. The full IP packet exchange between each network element can be analyzed for better troubleshooting and application-layer issue location. Not only the overall packet loss of one call is provided, but also its frequency so operations staff can better understand the impact of voice and video quality issues.

OCOM is a proactive network monitoring solution that analyses captured traffic and triggers alerts in case of deviations from expectations within the analyzed platform. It comes with a full range of Key Performance Indicators (more than 200 standard ones and a vast range of custom KPIs) for voice network monitoring, addressing service accessibility, retention and integrity, which can be aggregated by service, site and customer. All KPIs can be accessed in real-time through OCOM's web interface (configurable dashboards) and through SNMP and optionally an extensive API based on the REST standard.

OCOM is a framework to which multiple applications can be connected. It comes by default with a web interface that is easy to use even by non-technical staff. This web interface offers several ways to emphasize any faults and trends leading to potential service quality degradation in a VoIP platform. For instance, the status of the voice quality can be easily determined by the color of the charts built, based on the values of MOS, R-Factor, packet loss, burst loss and jitter, where red means "bad" voice quality and green means "good" voice quality.

OCOM's web interface has been designed to help customer support teams find the root cause of an issue and to identify actions to be taken when monitoring and troubleshooting. If a subscriber complains about not being able to call or experiences poor voice quality, the support team can review the call statistics related to the problem by just entering the number of the subscriber without asking the client to reproduce the problem. The entire procedure takes no more than a few seconds and dramatically shortens the duration of customer support calls.

OCOM may be configured to restrict access to its web interface allowing for administrator and user level accesses. The interface may be set to:

- Prevent customer support teams from accessing sensitive configuration sections
- Limit access to a provider to only its own set of users, calls, and registrations information

Extensibility

OCOM's functionality can be extended through add-on modules. These optional modules enhance OCOM's performance and provide a customized solution tailored for service providers' requirements.

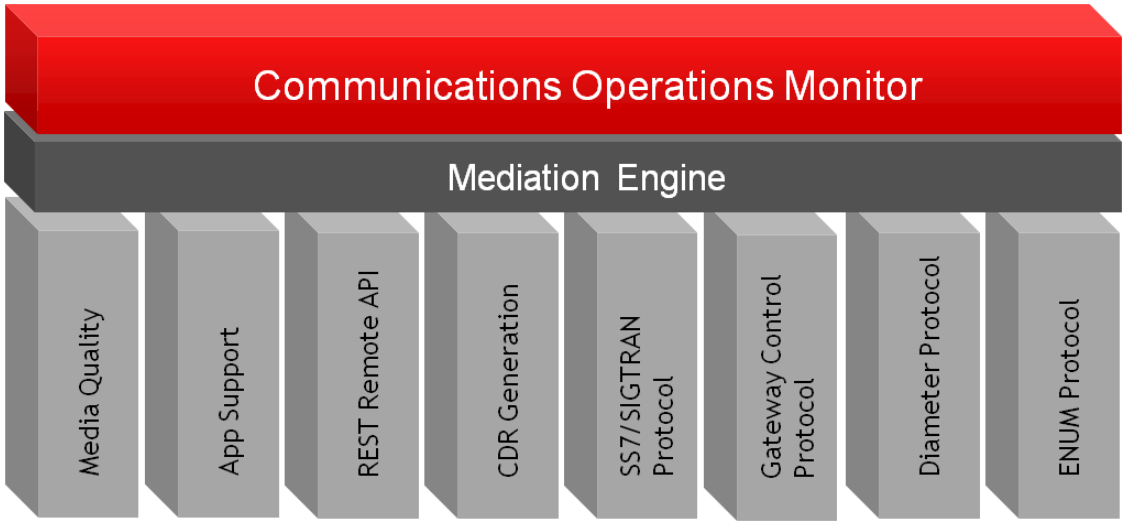

Figure 1: OCOM Optional Extensions

RTP traffic (multiple directions, multiple legs) is measured and analyzed by OCOM's network probes which implement the ITU G.107 standard without decoding any of the streams or rerouting traffic. The probes also support a range of protocols including RTCP, RTCP-XR, X-RTP-STAT, RTP-RXSTAT, P-RTP-STAT, etc. OCOM's Media Quality extension enables the retrieval and processing of media quality information from the probes. This extension provides KPIs to measure the packet loss rate, burst packet loss rate, jitter, latency, R-Factor, and MOS-score as well as further quality information such as codecs negotiated, codecs used, length of media streams, source and destination addresses and ports, etc.

OCOM offers an array of tools and services that simplify integration and interoperability with different network management system (NMS), business intelligence (BI) and customer relationship management (CRM) applications. All the data gathered by OCOM can be accessed from an external application through a scripting API (using Python) or a REST API.

An external application can, for instance, use these provided API to gather custom data, for example, a list of users registered, the successful call rate or the number of users with more than two contacts, etc., and can display the aggregate information in its own user interface.

The scripting feature in OCOM can be used to extend its built-in functions. For example, if a new service needs to be monitored in a different manner using new KPIs, this feature can not only generate those KPIs but also extend the web GUI to display these new values. This flexibility allows new features in OCOM without software upgrades and enhances its applicability.

Through the use of CDR Generation Extension, OCOM can generate call detail records (CDRs) as well as media detail records (MDRs) for calls, based on its end-to-end call correlation engine. These CDR and MDR data provided as CSV files includes all internal information and can be accessed remotely using an FTP or SFTP interface.

The set of signaling protocols supported by OCOM can be extended through two add-on extensions. SS7/SIGTRAN Protocols extension fully integrates ISUP, M2UA, M2PA, M3UA and MTP3 protocols with the built-in signaling protocols. It also facilitates in detailed views of multi-protocol calls in their ladder diagrams. A history buffer enables individual protocol elements to be found.

Gateway Control Protocols extension fully supports H.248/MEGACO, MGCP, as well as all relevant transport protocols (SCTP, UDP, and TCP). It provides a sophisticated correlation with other signaling protocols allowing for real end-to-end troubleshooting and monitoring features.

OCOM also provides Diameter protocol support (UAR/UAA, SAR/SAA, LIR/LIA, MAR/MAA message types), and its full correlation with call signaling protocols. The Diameter Protocol extension supports the IMS Cx interface toward the Home Subscriber Server (HSS). This add-on also extends OCOM capabilities into the AAA domain (according to the IETF RFC 3588).

ENUM protocol extension enables support for processing of ENUM messages as defined by RFC 3761. It allows for troubleshooting and monitoring routing logic while providing a real-time correlation with call data.

OCOM offers advanced monitoring and troubleshooting features for LTE environments. It provides statistics that mobile service providers need about Diameter usage in roaming scenarios or even within their own EPC networks.

OCSM tracks mobile calls traversing S6 (S6a and S6d) and S13 (S13 and S13') interfaces, allowing mobile service providers to track user endpoints authentication requests going through the Mobile Management Entity (MME), the Equipment Identity Register (EIR), the Home Subscriber Server (HSS), the Serving GPRS Support Node (SGSN) and Diameter proxies. The mobile service provider is then able to balance resources among these different network nodes so as to prevent network congestion.

OCSM identifies and correlates transactions in real-time, builds ladder diagrams, provides KPIs and Transaction Detail Records for all traffic around the above-mentioned interfaces, which means for all traffic between MME/HSS/SGSN and between MME/EIR/SGSN.

Figure 2: Samples of Dashboards from OCOM GUI

System Architecture

As described, OCOM works by capturing the traffic from the operator's network, correlating all messages in real-time, and storing the resulting information in indexed formats so that they can be available for the different reports offered by its graphical web interface.

Its multi-layered architecture ensures its scalability, the reliability, and the cost-effectiveness of the solution. OCOM architecture consists of three layers as shown in Figure 3.

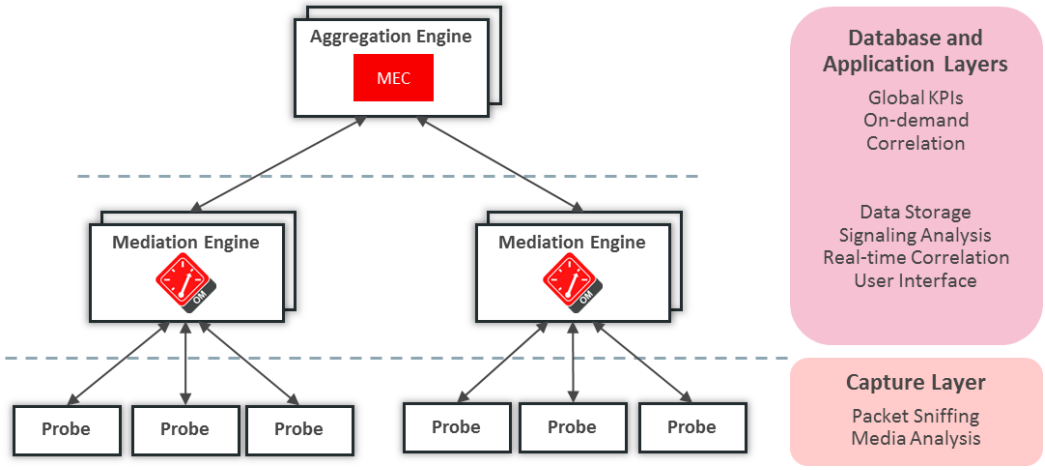

Figure 3: OCOM System Architecture

Probes: Probes are network elements that are responsible for capturing the traffic from the network and performing media quality analysis. These probes analyze RTP streams locally and send results of this analysis (MOS, R-Factor, packet loss, burst loss, etc.) as well as the meta-data for each of the signaling messages captured (PCAPs) to Mediation Engines.

Mediation Engine: These are software function that host the OCOM application and are responsible for analyzing captured packets received from probes, correlating, and storing them in real-time. Mediation Engines use two layers of databases. Data for active calls is stored in a very high performance in-memory database while data for historical calls is stored in separate long-term storage. Mediation Engine is also responsible for measuring, managing, and storing KPIs, and providing the user front end as a web interface.

Aggregation Engine: Aggregation Engine hosts the Mediation Engine Connector (MEC). MEC is responsible for aggregating global KPIs for on-demand correlation of calls monitored by different instances of OCOM across multiple geographical sites and for providing global search and drill-down features.

All components of OCOM architecture are software-based and can be deployed on standard hardware (Intel 64-bit x86 compatible). They are provided as self-contained installable software packages—the operating system (Debian Linux 64 bit) is part of the software installation image.

For small setups, it is possible to run probe and Mediation Engine software on the same physical hardware. However, the Aggregation Engine always requires its own hardware.

Oracle Communications Session Border Controller (OCSBC), Oracle Communications Session Router (OCSR), and Oracle Communications Unified Session Manager (OCUSM) can also be used for probes which may avoid the need for standalone probes.

A typical OCOM set up is illustrated in Figure 4.

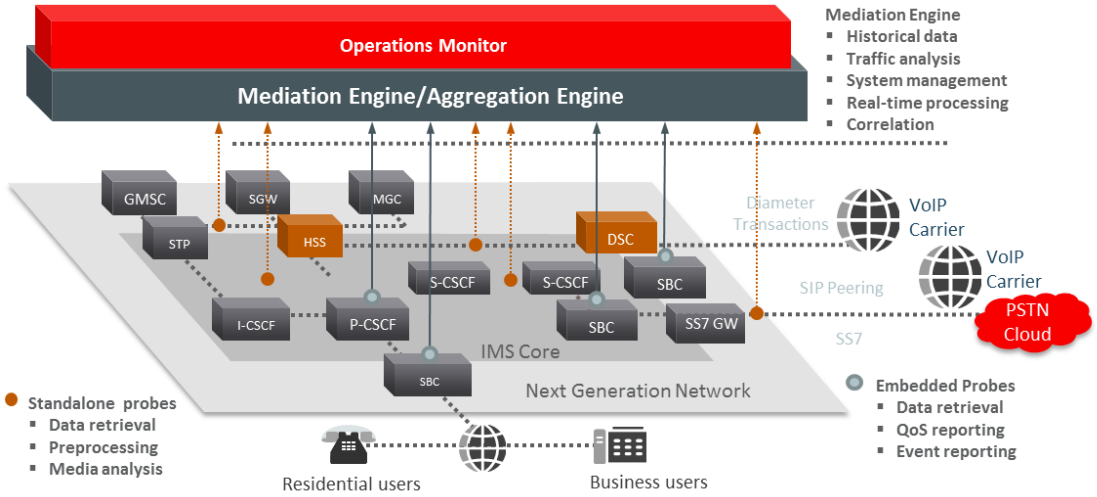

Figure 4: An Example of OCOM Deployment

Scalability

OCOM's Mediation Engine Connector (MEC) provides end-to-end visibility and call correlation across Mediation Engines installed in multiple network sites. The application enables calls that go through different geographical sites to be viewed as a single call and then offers a "single pane of glass" for providing a global and aggregated map of all data collected by multiple Mediation Engines.

Thanks to its distributed architecture, OCOM's environment brings a high degree of scalability. Several scaling options are available when implementing the OCSM framework within a growing service provider network.

Scaling option 1 (Figure 5): Probes from multiple geographical sites can send the traffic to a single and centralized Mediation Engine.

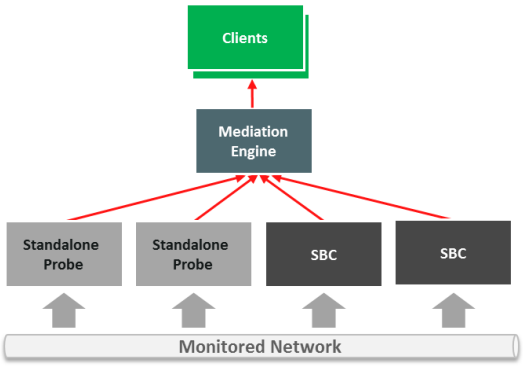

Figure 5: Single OCOM System with 1 ME and Probes

Scaling option 2 (Figure 6): Several dedicated Mediation Engines can be installed within the same network site (which means as many separate monitoring structures).

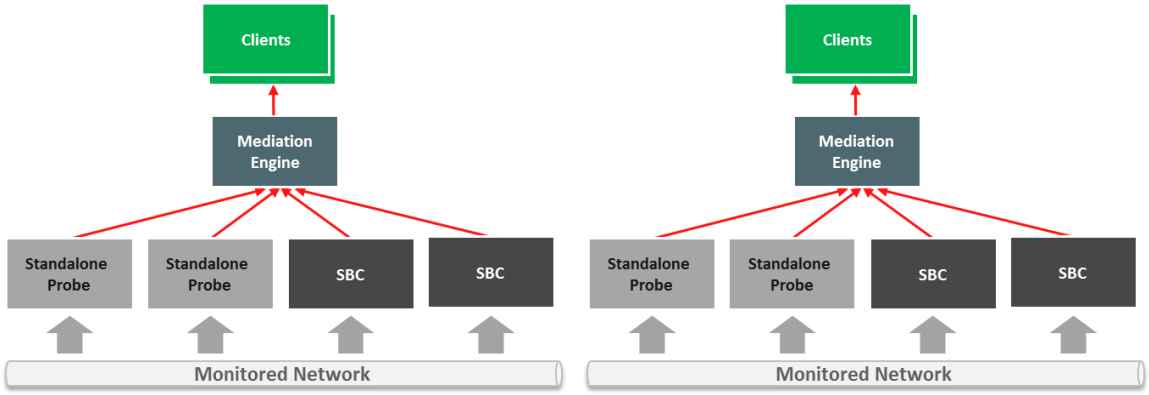

Figure 6: Two Separate OCOM Systems with 2 MEs and Probes

Scaling option 3 (Figure 7): One Aggregation Engine (running the Mediation Engine Connector) can be set up for the whole network and connected to several Mediation Engines (one per geographical site for instance).

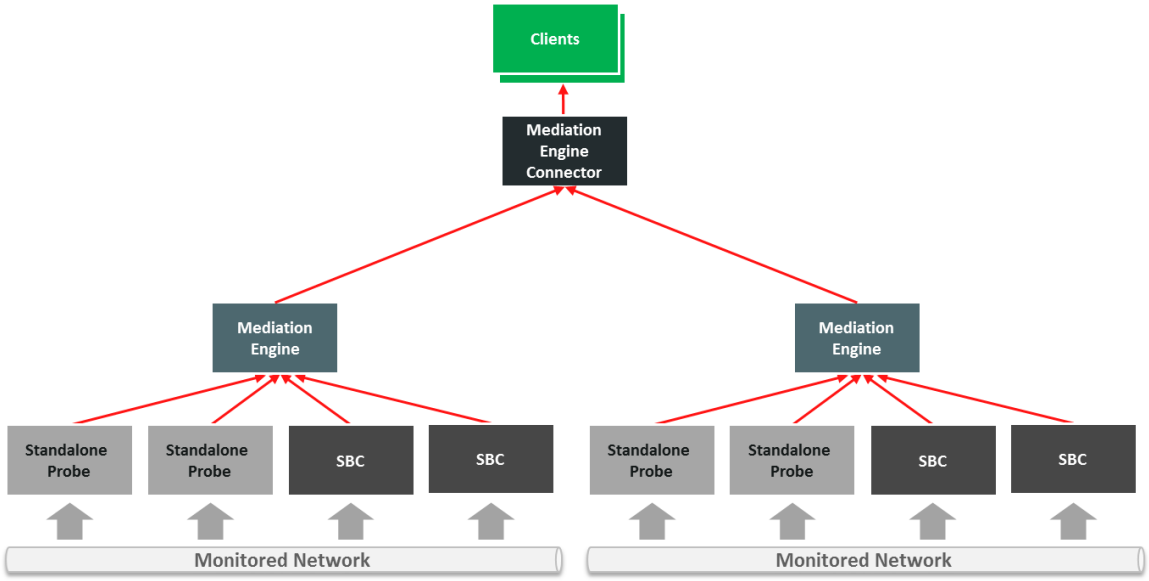

Figure 7: One OCOM System with 1 MEC, 2MEs, and Probes

OCOM's scalable architecture is therefore not subject to performance or network bandwidth limitations and allows for mapping of organizational structures to monitoring infrastructure. OCOM's implementation also depends on traffic assumptions and/or specific requirements from the service provider.

Conclusion

Oracle Communications Operations Monitor provides an unprecedented level of network visibility in a variety of networks and devices. This depth of visibility includes signaling messages – as they traverse through individual devices – and media quality, in real time. Using OCOM, service providers and enterprises can increase user experience by resolving problems quickly, ensure SLA compliance, and quickly identify traffic patterns that help network planning.

References

Oracle Communications Operations Monitor on Oracle.com:
http://www.oracle.com/us/products/applications/communications/operations-monitor/index.html

OCOM user and administration documentation: http://docs.oracle.com/cd/E74345_01/index.htm

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June 2016