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Oracle Enterprise Operations Monitor (EOM)

Real-Time Voice over IP Monitoring and
Troubleshooting

Purpose statement

This document provides an overview of features and enhancements included in release 4.3. It is intended solely to help you assess the business benefits of Oracle Enterprise Operations Monitor and to plan your I.T. projects.
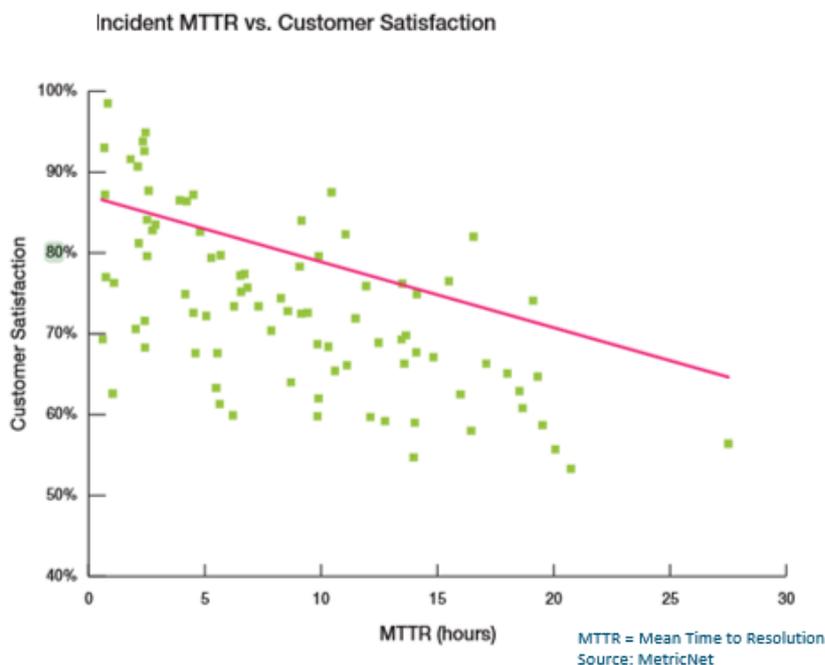
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80% of MTTR is in Diagnosis

Incident MTTR vs. Customer Satisfaction

MTTR = Mean Time to Resolution
Source: MetricNet

Figure 1: Mean time to resolution is the key to customer satisfaction when network operations personnel are fielding complaints from users.

> "Oracle EOM helped us dramatically improve service quality and customer satisfaction across our multivendor IP contact center."
>
> **James Rubio**
> EBS Technology Infrastructure Manager
> *Intuit*

Purpose

This document provides an overview of features and enhancements included in Oracle Enterprise Operations Monitor

Oracle Enterprise Operations Monitor is a real-time, end-to-end, service monitoring, troubleshooting, and analytics solution that provides unprecedented insight into Voice over IP (VoIP) and Unified Communications (UC) networks for enterprise customers. Oracle Enterprise Operations Monitor (EOM) enables enterprises to efficiently and securely deploy IP networks, reduce operational costs, increase user satisfaction, and prevent voice fraud. It also helps enterprises troubleshoot call quality issues in real time with deep drill-down capabilities for both media and signaling—a true differentiator in the market. EOM is a proven solution with more than 100 deployments globally. EOM speeds mean-time-to-resolution (MTTR), reducing network disruption and support costs.

This white paper provides an overview of EOM, including, features, deployment architecture, and optional extensions. It also describes how EOM can help enterprise customers increase the ROI of VoIP and UC deployments and move beyond individual element management to benefit from real-time, network-wide visibility into multivendor IP communications networks.

Overview

Oracle Enterprise Operations Monitor comprises network probes linked to a client dashboard through an unrivalled correlation engine. Together, these elements provide the underlying system that powers EOM. Network probes

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are available in multiple form factors, including software running on commercial off-the-shelf (COTS) hardware and a software component integrated into Oracle Enterprise Session Border Controllers (E-SBCs) and Enterprise Communications Broker (ECB). EOM is capable of monitoring any VoIP network—agnostic to equipment vendors—using deployed E-SBCs.

EOM helps enterprises master a variety of challenges when running IP voice and video networks. It comes with full support for a range of standard protocols, including Session Initiation Protocol, Real-Time Transport Protocol (RTP), Media Gateway Control Protocol, ENUM, Diameter and H.248/MEGACO. It offers seamless integration with third-party management products.

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Key Features and Functionality

EOM helps network operators improve their productivity and efficiency by providing a high-level overview of what is actually happening in the network in real time with drill-down capability for rapid troubleshooting. Some of the key features include:

- End-to-end call correlation and analytics in real time
- Segmentation of the network path for fast and accurate problem localization
- On-demand troubleshooting down to the individual employee, agent, or customer level
- Media quality analysis, including R-value scores and mean opinion scores (MOSs)
- Unparalleled insight and analysis of signaling messages
- Drill down to view messages per session, including live calls
- Real-time scoring and alerting to VoIP fraud issues
- One stop monitoring suite for all your enterprise Skype for business calls (Audio, video and IM)
- Software embedded in Oracle E-SBCs and ECB eliminates the need to place additional monitoring equipment in the network
- Intuitive and simple graphical user interface (GUI)

EOM is a passive service assurance suite that enables proactive monitoring, rapid troubleshooting, and an array of reporting options. Some of the key functions include:

- Captures traffic from VoIP and UC networks
- Collects raw messages from probes and correlates these messages into end-to -end call message flows
- Calculates 250 out-of-the-box, custom key performance indicators (KPIs)
- Renders gathered data to a web interface and makes it available to external applications via the REST API
- Enables fast root cause analysis with intuitive drill-down capabilities to a per-message view

Proactive Monitoring

EOM analyses the received traffic and triggers alerts when thresholds are exceeded. It detects and generates alerts for network abuse, fraud, spam over internet telephony, and denial of service attacks. EOM can connect multiple applications and allows for integration with existing applications. It offers a web interface that is easy to use for nontechnical staff and that includes multiple fault and trend views to help identify potential service quality degradations in a VoIP network. For example, voice quality status is reflected in the colors used by EOM to display charts, which appear green or red based on the values of MOS, R-factor, packet loss, burst loss, and jitter.

Value Proposition

- Improves service quality in complex multivendor UC and IP contact center networks
- Accelerates problem detection, isolation and resolution
- Eliminates manually intensive and error-prone troubleshooting tasks
- Reduces MTTR and related operations costs

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EOM dashboard displays are designed to streamline proactive monitoring and quickly localize problems. They are constantly updated with real-time data, enabling network personnel to identify the next actions to support remediation. If a user complains about not being able to place a call or about experiencing poor voice quality, the support team can review the relevant call statistics by entering the number of the user. EOM eliminates the need to reproduce problems. The entire procedure takes no more than a few seconds and dramatically shortens the duration of support calls. The web interface offers flexible options for restricting views of EOM data to maintain appropriate authorizations and the security of sensitive information.
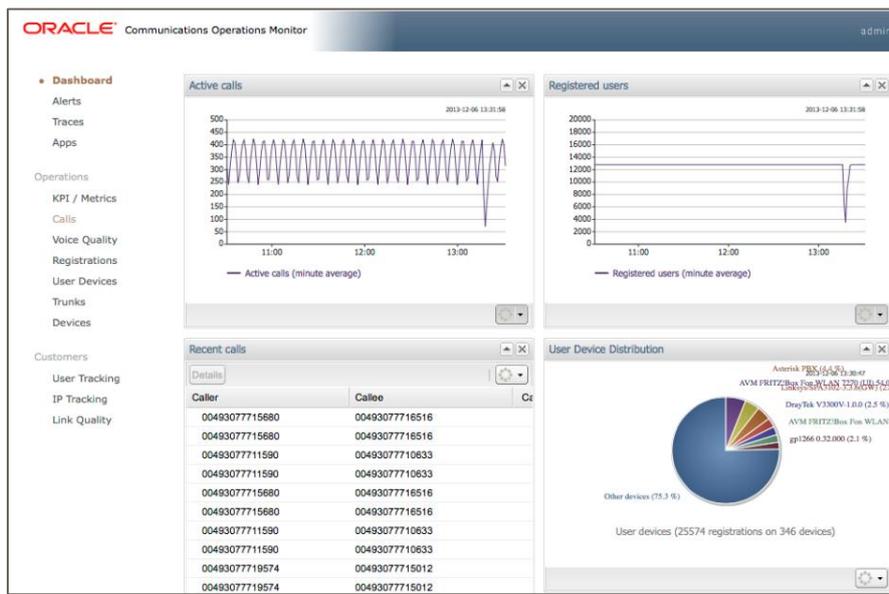

Figure 2: Customizable web-based dashboards enable proactive monitoring of network-wide information

Troubleshooting and Visibility

EOM identifies each leg of a session in real time. This feature is essential for troubleshooting and for providing deep device visibility and accurate statistics. EOM is unique in that the current calls are updated in real time and include the following information:

- Key performance indicators (KPIs)
- Call status
- Call duration
- Codec used
- Call audio quality

The problem with post-call analysis

- Call analysis can only be performed in retrospect, adding complexity to troubleshooting and resolution.

- Time lapses cause the enterprise to be on the reactive.

- With Oracle Enterprise Operations Monitor, calls are monitored and analyzed as they are in-progress, which allows the enterprise to be more proactive and see problems as they occur.
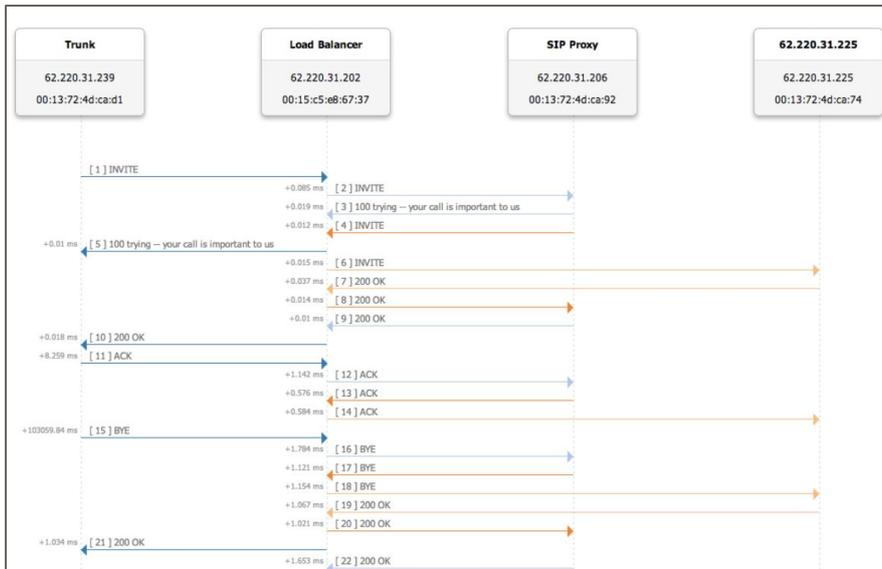
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Figure 3 EOM enables network operations staff to analyze voice calls on a network-wide basis to measure call characteristics, isolate problem areas, and consistently improve voice quality characteristics

EOM can save a history of calls, registrations, and other events, which enables network operators to investigate historical problems without having to reproduce them.

Integration and Reporting

EOM offers a collection of tools and services that simplify integration and interoperability with a range of network management system, business intelligence, and customer relationship management applications. A scripting API enables local access to all the data gathered by EOM using Python, and a REST API enables external applications to access EOM data.

For example, an external application can gather custom data such as the list of users registered from a phone with special firmware, successful call rate, or number of users with more than two contacts. The resulting information can be used to build valuable statistics.

EOM also supports Simple Network Management Protocol (SNMP) for generating alerts to third-party applications. This integration flexibility makes EOM future-proof for growing networks.

Deployment Architecture

EOM software is installed on the following physical platforms:

Probes

EOM probes collect and analyze data feeds from the network. Probes are deployed across the infrastructure to produce a network-wide view of performance and analyze trends. Probes serve two primary functions:

- Collect packet captures of signaling messages (SIP, ISDN User Part, and so on) and forward them to the EOM Mediation Engine for correlation and analysis

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- Collect and analyze local RTP media streams and send the results to the Mediation Engine for correlation with relevant signaling information

EOM probes are available in two form factors:

- Software that can be loaded on COTS Linux servers. (EOM probe software is offered at no additional cost; servers must be procured independently.)

- Probes that are embedded into Oracle Enterprise Session Border Controllers and Oracle Enterprise Communications Broker. This form factor enables network operators to optimize their IP communications networks while reducing network cost and complexity. The embedded probes leverage Oracle encryption technologies to gain visibility of network traffic.

Mediation Engine

The EOM Mediation Engine receives compressed signaling and RTP metadata from the probes and performs further processing, call correlation, and database functions. The Mediation Engine and probes can be connected through secure channels for secure data transactions. The Mediation Engine performs massive processing and correlation of a wide range of messages to produce a network-wide view of all calls in real time.

The EOM Communications Operations Monitor renders the correlation, KPIs, and metrics, and an intuitive GUI simplifies analysis and troubleshooting operations.

- Aggregates data across MEs
- On-demand correlation
- Global KPIs

Mediation Engine Connector

- Real time correlation
- Traffic analysis
- Database storage

Mediation Engine(s)

Database / App Layer

- Collect and forward signaling to ME
- Collect and analyze media; forward metadata to ME

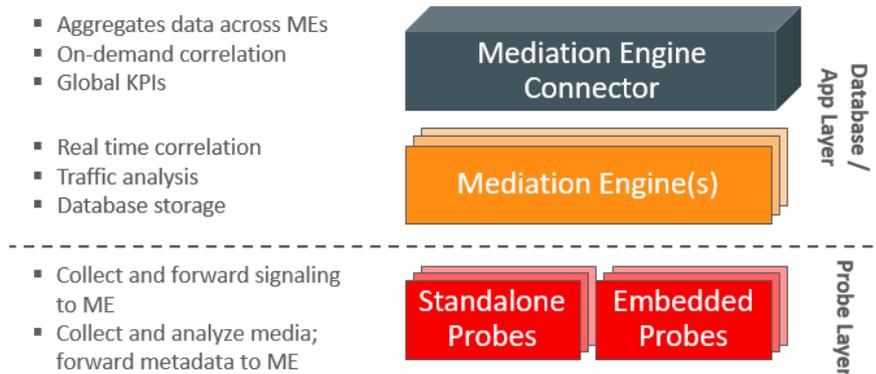**Standalone Probes**   **Embedded Probes**

Probe Layer

Figure 4: EOM offers full, end-to-end correlation of all calls in real time and high-level visibility of the network for management and troubleshooting

Mediation Engine Connector

Mediation Engines are installed in each geographical location of a multi-site enterprise network and serve as monitoring nodes. The Mediation Engine Connector extension provides an overview of the data collected by Mediation Engines, offering a global dashboard and implementing global KPIs.

Mediation Engine Connector simplifies the management of multiple Mediation Engines and maximizes the benefits of EOM across multiple locations. The global search and drill-down tools of Mediation Engine Connector enable enterprises to scale the troubleshooting features of EOM across multiple sites. Operations personnel can rapidly gain an understanding

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of the overall status of the global network while obtaining the ability to drill down to troubleshoot issues.

Oracle Enterprise Operations Monitor

Oracle Enterprise Operations Monitor includes a range of features for proactive network monitoring. It captures all signaling messages and offers full, end-to-end correlation of all calls in real time. Various configuration options can further divide and filter information to provide exactly the right network view and a view of the complete user base, enabling enterprises to increase service quality, reduce operations costs, and increase efficiency. EOM is an easy-to-use tool that enables root cause analysis of problems related to a user, a user group, a trunk, a network device, or an IP address. This enables helpdesk and support teams to efficiently resolve reported incidents.

EOM also analyzes and displays media quality statistics forwarded by the probes, including:

- KPIs to measure media stream quality—packet loss rate, burst packet loss rate, jitter, latency (if provided by endpoint), R-factor (audio), and MOS Conversational Quality Estimate (audio)

- Codecs negotiated, codecs used, length of media streams, source and destination addresses, and ports

- Individual RTP streams (multiple directions / multiple legs) providing full visibility of the overall and local media quality

EOM uses multiple information sources to perform quality analysis, including

- RTP analysis; no decoding required

- The International Telecommunication Union Standard G.107 computational model

- Full protocol support for RTP Control Protocol (RTCP), RTCP Extended Report, X-RTP-Stat, RTP-RxStat, and P-RTP-Stat

EOM Optional Extensions

EOM can be enhanced by purchasing extensions with additional functionality. The add-ons provide a customized solution for specific user requirements.

App Support Extension

The App Support extension for EOM adds support for customer-specific applications and seamlessly integrates into web applications. It enables enterprises to develop custom functionality that is unique to their needs or not available in EOM. The App Support extension:

- Operates independently from release schedules and product lifecycles

- Runs in a secure sandbox environment

- Is future-proof and independent from development roadmaps

- Provides applications full access to all internal real-time and historic data structures

- Enables applications to modify and extend the EOM web-based GUI

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REST Remote API Extension

The REST Remote API extension for EOM provides an open interface so third-party applications can access its real-time and historical data. The internal data—including raw and aggregated data such as traces, calls, registrations, KPIs, and user experience information—can then be exposed to third-party systems. Some of the key features include:

- Remote execution of applications and download of recorded media streams
- Easy-to-use interface based on modern RESTful paradigm
- Access to all network and user information
- Ability to use EOM information in mashups
- Easy integration with umbrella systems, data warehouses, network management systems, and more
- Self-explanatory interface with link-based structure that is directly accessible with a web browser or command-line tools such as cURL and Wget
- State-of-the-art Representational State Transfer for remote data access through implementations in all modern programming languages

CDR Generation Extension

The CDR Generation extension generates call detail records (CDRs) for successful and failed calls based on EOM's end-to-end call correlation.

The CDR Generation extension:

- Includes all internal information
- Generates preliminary CDRs as well as CDRs for failed calls
- Provides CDR data as comma-separated value files that can be accessed remotely using an interface for FTP- or Secure File Transfer Protocol–based GUIs

Gateway Control Protocol Extension

The Gateway Control Protocol extension extends the set of supported signaling protocols by the relevant gateway control protocols H.248, MGCP and MEGACO. Some of the key features include:

- Full correlation of control protocols with other signaling protocols
- End-to-end troubleshooting and monitoring capabilities
- Sophisticated correlation algorithm
- Support for all relevant transport protocols (Stream Control Transmission Protocol [SCTP], UDP, and TCP)

Enterprise Telephony Fraud Monitor

Oracle Enterprise Telephony Fraud Monitor is a self-learning, scalable solution that detects phone fraud and prevents it before damage is done.

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To identify fraudulent calls, Oracle Enterprise Telephony Fraud Monitor builds an end-to-end correlated, network-wide session model is built, then analysed. The model is used to determine user behavior and compare it with the individual learned behavioral patterns. The session model is built from the probes deployed in your network to collect real-time information about all users, customers, trunks, and IP addresses. Based on this passive monitoring system, the solution is undetectable by potential attackers and imposes no performance burden on the network.
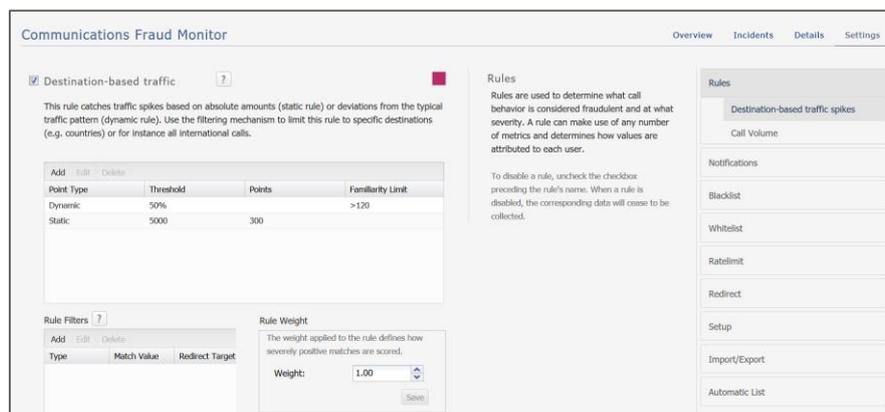
Figure 5 Fraud Monitor uses configurable rules to find call patterns that are considered fraudulent, classify the severity and trigger a fraud alert

Fraud incidents can be identified based on customizable rules for various traffic profiles and scenarios like call volume, traffic spike across source and destination. Once a fraud alert is triggered on the basis of these rules, the network user alerted within a matter of seconds. Enterprises can leverage these alerts to take necessary action like disable users, trunks, and subscribers on their Session Border Controllers (SBCs), application servers, core network elements, or provisioning servers. Other responses to fraud cases include redirecting users to systems like IVRs or rate limiting the amount of inbound traffic.

Implementation Service

Oracle Professional Services offers a robust deployment service that streamlines implementation of EOM. It combines several established Oracle Professional Services offerings into a single service solution tailored for EOM deployments. Oracle Professional Services network engineers will design, optimize, and produce all documentation for EOM configurations necessary to ensure the successful integration of EOM solutions. Engaging experienced Oracle Professional Services engineers not only brings industry experience and best practices to the design and implementation of EOM, but it also ensures that deployment complexity and risk is reduced while desired operational and business objectives are met effectively and on schedule.

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Conclusion

Oracle solutions enable the hyper-connected enterprise with a layered architecture that seamlessly connects users to each other, enables rich multimedia customer interactions, and automates business processes, for significant increases in productivity, efficiency, and ROI. Oracle network visibility solutions work in real-time, in end-to-end, and across multivendor networks to drastically reduce the mean-time-to-identification (MTTI) and mean-time-to-resolution (MTTR) of potential issues.

Enterprise network operators are looking for ways to optimize their IP communications networks, not only to reduce cost and complexity, but also to better deploy new value-added applications and services. Using Oracle Enterprise Operations Monitor in enterprise networks enables IT staff to get the most out of their IP communications networks with unique, real-time monitoring capabilities.

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