



I D C V E N D O R S P O T L I G H T

Cloud-Based Analytics and Machine Learning Accelerate Hybrid IT Management

April 2018

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Sponsored by Oracle

Businesses around the world are rushing to enable digital transformation initiatives and provide users with consumer-like digital application experiences. Competitive pressures, the impact of disruptive technologies, and constantly increasing user expectations make speed of delivery and quality of service top priorities. A new breed of comprehensive and automated system management solutions is needed to ensure these qualities in complex, high-scale, hybrid IT environments. This IDC Vendor Spotlight examines requirements driving organizational strategies for IT operations analytics (ITOA). The paper considers how Oracle Management Cloud incorporates big data analytics and machine learning technologies with integrated automation to help customers manage IT environments now and in the future.

Introduction

Successful digital business depends on fast, reliable, and secure applications. Threats of service disruptions from performance slowdowns, availability outages, or security incidents are driving IT organizations and service providers to double down on comprehensive system management solutions across infrastructure, applications, and end-user devices.

More agile system management solutions are needed to span increasingly complex IT environments such as conventional on-premises infrastructures and multiple types of clouds including private, public, and hybrid cloud environments. The vast volumes of telemetry generated by these systems such as log, event, and metrics data — often generated in real time — have made it essential for IT system management software and software-as-a-service (SaaS) solutions to streamline and simplify data ingest and analysis at scale.

Implementing approaches that take advantage of big data analytics, multivariate statistics, and machine learning and artificial intelligence technologies is a way of simplifying complexity, speeding runtimes, and optimizing IT management processes. These capabilities help IT organizations manage, navigate, and understand their environments at scale and enable comprehensive monitoring, analysis, and remediation of incidents and exceptions that impact service quality and end-user experience.

Top Strategic Priorities for IT Operations Analytics

Organizations surveyed by IDC identified a broad range of drivers and requirements for ITOA through 2020. Survey participants ranked top-level IT strategic priorities for ITOA that span security, infrastructure, applications, customer experience, and clouds. The respondents placed highest priority on ITOA solutions to improve security and compliance, as shown in Figure 1. Improving security is a use case typically ranked at the top of IT concerns given the widespread industry history of downtime and data theft incidents. Big data analytics and machine learning can be used to identify and monitor security events to detect anomalies and investigate those threats by analyzing security telemetry.

Another important strategic ITOA priority focuses on managing IT infrastructure — especially optimizing utilization of infrastructure (cloud as well as on-premises hardware) and improving capacity planning processes. These are essential requirements for ensuring sufficient resources to support current and expanding workloads, including the ability to consider seasonality and peaks. Capacity planning can rely on forecasting based on the analysis of large volumes of operational data made possible by big data analytics and machine learning to identify trends and provide intelligent forecasting to identify future bottlenecks.

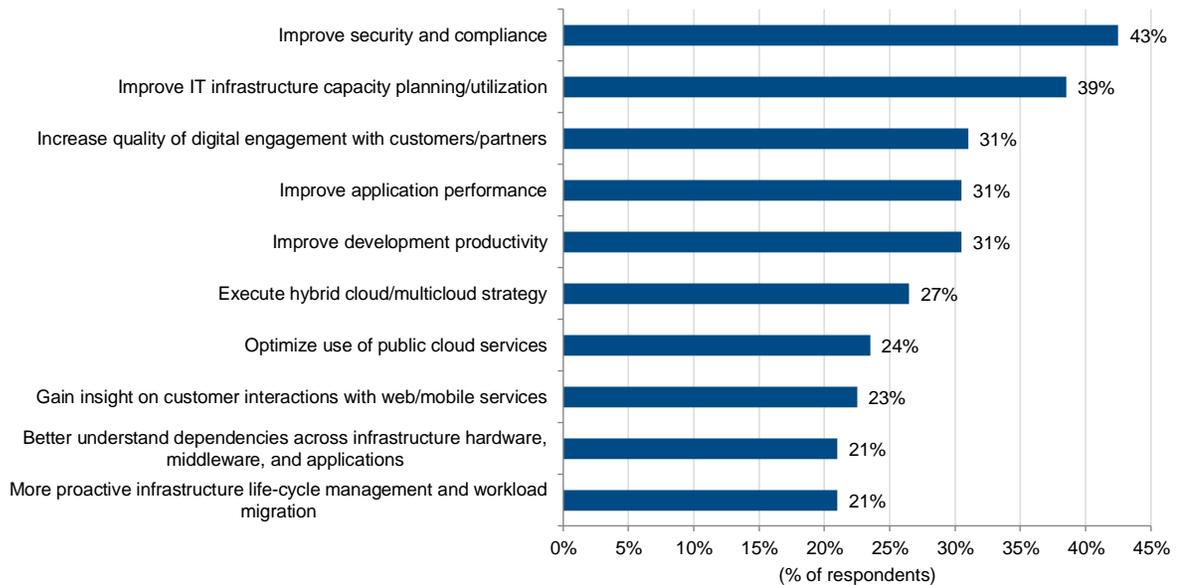
Key focal points for ITOA strategy are improving the quality of digital engagement and gaining insights into customer interactions. As more and more businesses undertake digital transformation initiatives and deploy digital business applications, quality of service and end-user experience become critical key performance indicators (KPIs) for success. Improving application performance can optimize a major component impacting end-user experience.

IT organizations expect to use ITOA solutions in support of cloud strategies. This includes executing on a hybrid cloud/multicloud strategy and optimizing the use of public clouds. Cloud management is an essential requirement for ensuring a successful cloud strategy, including managing workload transitions to the cloud.

FIGURE 1

Top Goals of an ITOA Strategy

Q. *What are the most important drivers and requirements shaping your organization's overall IT operations analytics (ITOA) strategy from today through 2020?*



n = 200

Note: Multiple responses were allowed.

Source: IDC's *IT Operations Analytics Survey*, August 2016

Cloud-Based Management Solutions Growing

IT organizations are increasingly adopting cloud-based management solutions. Over 50% of the surveyed users planning net-new ITOA solutions want to move from on-premises to cloud service-delivered solutions. Public cloud-delivered system management revenue grew 46% in 2016. Strong growth of public cloud-based solutions is forecast to continue through 2020 with revenue expected to grow to more than double 2016 levels.

One reason for increasing adoption of cloud-based management solutions is dissatisfaction with current management approaches. Current approaches are often fragmented and IT silo based, leading to redundant and overlapping toolsets that make it difficult to detect and analyze the impact of anomalous events on service quality and end-user experience. Current solutions also carry a substantial ongoing human-effort burden to manage the toolset.

Many survey respondents indicated they want a shared back-end data and analytics platform to avoid fragmented solutions. Another limitation that can impact current solutions is lack of ability to scale sufficiently as log, metric, and event volumes grow exponentially. Other considerations for dissatisfaction with current solutions include excessive costs for initial infrastructure, setup, and ongoing operations, making the solutions too expensive for some IT organizations.

Advantages of SaaS Delivery

SaaS-based management solutions can provide significant benefits to IT organizations. Key advantages include rapid time to deploy and implement SaaS solutions compared with conventional on-premises approaches. Ongoing development and maintenance of SaaS-based management — including enhancements and updates — become the responsibility of the SaaS provider, freeing IT staff from the necessity of managing the management platform itself.

Public cloud-based solutions can support high scalability with the ability to dynamically acquire compute and storage resources from resource pools often far larger than those available in conventional on-premises approaches. SaaS-based management platforms can support integrated data and analytics, helping break down IT silos and avoid the problems associated with fragmented toolsets. Integrated SaaS-based management solutions can provide high degrees of automation and orchestration for detecting and remediating events and anomalies, improving service quality, and increasing IT and business agility.

Considering Oracle Management Cloud

Oracle Management Cloud is a suite of IT management solutions from Oracle delivered as subscription-based cloud services running in Oracle Cloud. Oracle Management Cloud provides integrated monitoring, management, and analytics for on-premises, Oracle Cloud, and third-party cloud services. The solution supports heterogeneous infrastructures and all layers of the Oracle stack, notably deep integrations with Oracle Enterprise Manager, Oracle Exadata, Oracle applications (such as e-Business Suite, PeopleSoft, and Siebel), and Oracle Autonomous PaaS and IaaS.

Oracle Management Cloud delivers highly automated platform capabilities. It complements management capabilities for Oracle's recently introduced self-healing autonomous database, including automated managed workflows for moving databases from on-premises to cloud. Oracle Management Cloud extends automation and proactive management for multitier environments including monitoring, alerting, and notification across infrastructure tiers. Automation and proactive management enable Oracle Management Cloud to identify anomalies and to detect and remediate incidents and security threats. Orchestration capabilities are supported for automated actions and remediation.

Oracle Management Cloud Services Offerings

Oracle Management Cloud services are licensed in several editions containing a broad range of functional modules as follows:

- **Infrastructure Monitoring and Application Performance Monitoring (APM)** support metric and configuration-based management of application stacks, including the Oracle stack and heterogeneous environments. The services provide visibility from the end user all the way down through and to infrastructure. Big data analytics and machine learning are built in and require no operator input or setup.
- **Orchestration** supports task automation using scripts, REST, or third-party automation frameworks. It provides intelligent and automated remediation, integrated with all functional modules.
- **IT Analytics** provides insight into performance, availability, and capacity of applications and infrastructure as well as forecasting over long periods of time.
- **Log Analytics** monitors, aggregates, indexes, and analyzes log data from infrastructure and applications. The application also supports rapid anomaly detection and troubleshooting and can be used standalone or combined with infrastructure and application performance monitoring to provide a single, comprehensive data set to enable proactive problem detection and resolution.
- **Configuration and Compliance** enables the IT and Business Compliance function to assess, score, and remediate configuration and compliance violations using industry-standard benchmarks and customer-specific rule sets. The software also provides machine learning–based configuration drift management.
- **Security Monitoring and Analytics** enables rapid detection, investigation, and remediation of the broadest range of security threats across on-premises and cloud IT assets.

Oracle Management Cloud Platform

Oracle Management Cloud services leverage an integrated platform built on big data, a unified data store, and machine learning processes. Key functions supported by the platform include the following:

- **Ingest.** Oracle Management Cloud ingests "all the operational and security data" — logs, metrics, configurations — using big data analytics for high-throughput processing. This allows customers to unify data from traditionally siloed management and security functional disciplines (e.g., APM tools, log tools, user and entity behavior analytics tools) across on-premises and hybrid cloud IT environments. Data is normalized to a common format — saved in a unified data lake. Oracle Management Cloud's "entity model" ensures that raw data and derived data (e.g., baselines, topologies, dependencies) are analyzed within the context of hybrid cloud topology and identity.
- **Analyze.** Oracle Management Cloud uses purpose-built Machine Learning foundationally against all data that is ingested. Machine Learning has been optimized to answer operational and security questions out of the box, with no need for data scientist involvement. Every piece of data is analyzed by Oracle Management Cloud Machine Learning. All data in the data lake is available to the Oracle Management Cloud analytics engine as a unified set of telemetry.
- **Automate.** Oracle Orchestration cloud service allows customers to perform automated actions and take advantage of existing edge automation tools.

Machine Learning Capabilities

Oracle Management Cloud supports a comprehensive set of machine learning capabilities to streamline, simplify, and automate platform operations. The platform supports the following categories of machine learning capabilities:

- **Anomaly detection.** Machine learning performs automatic baselining to enable detection of outliers and exceptions versus normal ranges.
- **Clustering.** This capability includes pattern recognition and management, as well as event reduction, and configuration clustering; especially appropriate for voluminous log and configuration data.
- **Correlation.** This capability determines how data streams relate to each other. For example, it compares server utilization versus application response time and can understand normal relationships and flag if behavior deviates from expected patterns (i.e., correlation is broken).
- **Dependency mapping.** This capability discovers, maps, and understands service and application dependencies.
- **Forecasting.** This capability forecasts future outages and performance or security issues by extrapolating trends using a variety of forecasting methods to see if something will break. Based on that information, organizations can take actions to prevent likely service interruptions before they can occur.

Machine Learning Examples

The following are examples of how machine learning capabilities in Oracle Management Cloud can help optimize system management processes:

- **Configuration clustering** rationalizes duplicates from different sources and performs real-time discovery to inspect and reinspect configurations to detect and eliminate drift from golden images. Software links directly to automation for actions.
- **Topology mapping** discovers infrastructure and application service trees across infrastructure tiers.
- **Capacity forecasting** enables "what if" capacity planning with Oracle IT Analytics cloud service.
- **Early warning** flags potential future issues by observing multisymptom behavior in real time.

Oracle Management Cloud Benefits

As businesses undertake digital transformation initiatives and deploy digital business applications, Oracle Management Cloud can bring the following significant benefits to IT organizations for delivering and improving quality of service and providing responsive end-user experience:

- **Faster processes.** The Oracle Management Cloud platform provides an integrated approach to data capture and storage across multiple log and metrics sources. Monitoring, machine learning, and comprehensive data analytics can discover normal behavior, detect anomalies, and support remediation. These capabilities can have a positive effect on the speed of management processes — faster troubleshooting, faster response to incidents, and better reaction times.
- **Improved accuracy.** Oracle Management Cloud Machine Learning and Analytics can improve the accuracy of problem determination and event management by actions such as discovering normal behavior to reduce false positives.

- **Prevention through forecasting.** Forecasting analytics in Oracle Management Cloud extrapolate operational trends to determine if a future anomaly or outage is likely, in time to take remedial actions.
- **Management tool rationalization.** Comprehensive capabilities in the Oracle Management Cloud integrated platform and data store reduce the need for point products or overlapping or redundant toolsets.

Challenges

As a SaaS-based platform, Oracle Management Cloud can be subject to user concerns about security, information privacy, or localization of data managed in the cloud. Oracle has addressed these challenges by demonstrating the security model and enterprise-grade infrastructure of the Oracle Cloud managed by Oracle where Oracle Management Cloud is hosted to help meet these challenges. According to Oracle: "Security is a top priority for Oracle Cloud solutions. Oracle's vision is to create the most secure and trusted public cloud infrastructure and platform services for enterprises and government organizations. Oracle's mission is to build secure public cloud infrastructure and platform services where there is greater trust — where Oracle customers have effective and manageable security to run their workloads with more confidence and build scalable and trusted secure cloud solutions."

Oracle may also face challenges around organizational acceptance of integrated management solutions versus point tools. Oracle will need to demonstrate the value of the integrated data and analytics platform to help optimize IT operations and service management. Focus on use case-specific dashboards can help.

Customer Experience

A large financial services and retail lending company operates over 900 point-of-sale stores across the United States, Canada, and Latin America. The company's collateral-based loan business is driven by proprietary application software that supports loan writing, underwriting, and loan servicing, providing a key differentiator in the industry. The company's ERP functions are provided through PeopleSoft.

Recently, the company's IT leadership decided to adopt a cloud-first strategy, moving all of the company's application platforms out to the cloud so that resources could be redirected toward value-add activities. Oracle Cloud Platform was chosen as the best fit for the company.

The company believes application uptime and performance are key to running the business more profitably. Currently the company is using two Oracle Management Cloud services: Oracle APM and Oracle Log Analytics.

Oracle APM enables the company to have a real-time view of the business. It provides the company with the ability to see customer experience at the application level, such as how long it is taking to make a payment on a loan during peak periods. APM dashboards are used by IT support and increasingly by business managers as part of daily operations. During the process of migrating applications to the cloud, APM was used to detect performance bottlenecks, help pinpoint causes, and show performance improvements as problems were fixed.

Oracle Log Analytics is used by the company to analyze logs from application servers to get integrated views, conduct security checks, and support root cause analysis. This enables the organization to troubleshoot issues faster and more easily.

Overall, according to the company, the use of Oracle Management Cloud has resulted in significant benefits such as dashboards that provide real-time views of the core application, including details at various layers of its software stack; enhanced troubleshooting; a view of scalability issues or needs; and better management of overall customer experience at the stores. The company cites Oracle Management Cloud's integrated functions and data as key benefits in contrast to individual "best of breed" approaches.

Conclusion

The rapidly growing pace of company and IT initiatives to develop, adopt, and support digital business transformation requires robust management capabilities to deliver the service levels and end-user experience needed to be successful. Monitoring, troubleshooting, and remediation take on added importance with digital business growth.

The increasing complexity and scale of public cloud and hybrid environments call for management solutions that can integrate across management functions and can operate on large pools of shared data to detect patterns and anomalies and pinpoint root causes across the full infrastructure and applications stack. When considering management options, IT decision makers should carefully consider the benefits of integrated management solutions versus "best of breed" alternatives.

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