REINVENTING APPLICATION MANAGEMENT

PREPARING FOR INTELLIGENT, CONVERSATIONAL APPLICATION MANAGEMENT

Accenture Labs
the main drivers of differentiation and innovation in a high-velocity, software-driven business world. They’re the gateway to new services and revenue streams, seamless customer experiences and expansion into new markets.¹ There is a strong correlation between the success of a business and the maturity of its application management (AM) function. And now, with both applications and the business environment surging in complexity, more coercive and efficient AM is more essential than ever.

AM has not kept up with buyer demands. The rise in the number of applications and their speed to market means rapid release cycles are essential. There’s also a huge influx of log data, which makes root-cause analysis even more challenging. While automation has been a great help in improving efficiency, and reducing Mean Time To Repair (MTTR), it’s not been able to keep up with the breadth and pace of applications.

The way forward is to introduce ‘intelligence’ to the AM function, so that it can learn and adapt on its own to offer prescriptive solutions to application performance issues in real time. To augment it further, the introduction of virtual assistants to AM adds another layer of automation to the existing machine-learning solution. The simple UX of intelligent AM would ensure that it appears just like another employee on the team.
THE NEED FOR ‘INTELLIGENT’ APPLICATION MANAGEMENT

Many vendors now offer AM automation capabilities. Covering all or part of the AM lifecycle, these tools can help to reduce manual effort and FTEs, minimize Mean Time to Repair (MTTR), and improve time to market and cost efficiency. However, they do not provide complete visibility into the application stack and still require human intervention.

Another challenge is that these automated deployment tools only work with known system performance issues. They won’t work with issues that the system has not yet experienced. On their own, they lack the ‘intelligence’ needed to predict and rectify such issues.

There’s a real need for intelligence in the AM lifecycle (figure 3 shows what we believe this will look like). Reflecting customer demands for hyper-personalization and interoperability, Intelligent Application Management will be a self-learning and self-adapting system, equipped with situational awareness. Insights-driven and prescriptive, it will be able to handle the increasing challenges of security, privacy, customer experience, rapid deployment cycles and interoperability.

Figure 1: Future of AM – Intelligent Application Management

<table>
<thead>
<tr>
<th>PAST</th>
<th>PRESENT</th>
<th>FUTURE</th>
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<tbody>
<tr>
<td>Application Management</td>
<td>Digital Application Management</td>
<td>Intelligent Application Management</td>
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<tr>
<td></td>
<td>Digital AM = f (AM, CX, US, Analytics)</td>
<td>Intelligent AM = f (Intelligence)</td>
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<table>
<thead>
<tr>
<th>CHALLENGES/COMPLEXITY CURVE</th>
<th>PAST</th>
<th>PRESENT</th>
<th>FUTURE</th>
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<tbody>
<tr>
<td>Operates in data silos</td>
<td>Links performance directly to business and customer outcomes</td>
<td>Working with complexities such as changing business models and consumer behavior</td>
<td>Customer experience/user experience</td>
</tr>
<tr>
<td>Don’t understand the impact of performance on business</td>
<td>Offers decision support for precise action</td>
<td>Adapt to consumer demands</td>
<td>Data privacy, security</td>
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<tr>
<td>Fail to align performance resources with business needs</td>
<td>Democratized performance insights across enterprise’ functions</td>
<td>Fails to align business needs with changing ecosystem requirements</td>
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<thead>
<tr>
<th>BUSINESS EVOLUTION CURVE</th>
<th>PAST</th>
<th>PRESENT</th>
<th>FUTURE</th>
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<tbody>
<tr>
<td>Monitors performance and availability of applications</td>
<td>Links performance directly to business and customer outcomes</td>
<td>Insights-driven, prescriptive application management</td>
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<tr>
<td>Designed to detect and resolve issues with application performance</td>
<td>Offers decision support for precise action</td>
<td>Ability to create situational awareness (human intelligence, machine intelligence, open source intelligence)</td>
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<tr>
<td></td>
<td>Democratized performance insights across enterprise’ functions</td>
<td>Self learning and flexible</td>
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<td>Operational excellence</td>
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<tr>
<th>DATA GROWTH</th>
<th>PAST</th>
<th>PRESENT</th>
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Applications have come a long way in the last few decades. From mainframe applications in the 1980s to the cloud-enabled and mobile applications of today, the journey they’ve been on has been marked by increasing complexity in both functionalities and data.

As applications became more complex, so AM as a function evolved from ad-hoc resolution of performance-related issues to a continuous process of performance optimization (shown in Figure 2). Today, AM aims to provide prescriptive ways to enhance and optimize the performance goals of applications in production and deployment.2
AM: TODAY’S CHALLENGES

Even with its evolution, AM has not been able to keep up with market developments and buyer demands. Challenges arise from a range of issues, inside organizations and out in the marketplace (see Figure 3):

- Rapid release cycles call for application performance management in near real time; demands for a ‘Zero AM’ strategy.
- Increasing number of applications and volume of log data make root-cause analysis challenging and time-intensive.
- Although open-source tools can solve part of the AM puzzle, in a complex IT environment, it’s difficult to coordinate them.
- With so many start-ups offering strikingly similar AM solutions, it’s hard to evaluate their strengths and capabilities.

On the buyer-side, AM is unable to keep up with growing demands for personalized user experiences, interoperability and self-learning capabilities:

**Personalized real-time user experience.**
Ability to monitor the user experience in real time so that businesses can retain customers that have been attracted to their sites.

**Heterogeneous environments and interoperability.**
Ability to monitor applications across multi-layered infrastructures, within and outside the organization; support for cloud and mobile app environment.

**Ease of implementation and SaaS delivery models.**
Quicker to deploy, easier to manage and agent-less solutions; ‘lightweight’ agents for low server overhead and SaaS delivery models; open source and intelligent; real-time platform monitoring.

**Self-learning analytical capabilities.**
Analytical capabilities that can track, monitor and correlate multiple metrics to predict an outage or potential performance issue before it occurs.³
**INTELLIGENT APPLICATION MANAGEMENT FRAMEWORK**

*Automation* simplifies repeatable AM areas to reduce effort and cost. ‘*Intelligent Application Management*’, on the other hand, provides intuitive application monitoring solutions. These use human-like reasoning to solve and analyze problems, providing end-to-end visibility of the application stack as well as helping enable root-cause analysis and proactive alerts. Intelligent Application Management’s self-learning capabilities analyze and solve issues on their own, augmenting human intervention and reducing cost.

Driven by ‘Intelligence’, AM will meet customer demands for hyper-personalization and interoperability.

*Figure 4: Changing AM model*

1. **OMNI CHANNEL AM**
   - Mobile AM and AM are becoming one; Vendors face a unified monitoring challenge, making use of shared integrated data

2. **AM TODAY**
   - AM dashboards show correlation of financial metrics with performance monitoring—in real time

3. **ANALYTICS IS REDUCING EFFORT**
   - Intelligent discovery, configuration & monitoring reduce manual effort

4. **CUSTOMER EXPERIENCE IS DRIVING AM**
   - Enterprise dashboards showing a continuous real-time view of the CX

1. **MOBILE-FIRST AND CLOUD-FIRST AM**
   - Mobile and Cloud-led applications to drive intelligent AM of the future

2. **AM MONITORS PLATFORM IMPACT**
   - Intelligent AM will monitor performance across platforms and prescribe ways to off tangible benefits

3. **AUGMENTED INTELLIGENCE**
   - Intelligent AM will self-learn and predict failures

4. **PERSONALIZED CUSTOMER EXPERIENCE**
   - Dynamic management of CX and UX for individual users

2. **AM MONITORS BUSINESS IMPACT**
   - AM dashboards show correlation of financial metrics with performance monitoring—in real time

3. **INTELLIGENT AM OF THE FUTURE**
   - Dynamic management of CX and UX for individual users
The Intelligent Application Management architecture leverages existing AM features from leading APM vendors, providing comprehensive visibility and proactive alerts for existing failure cases, along with user and synthetic monitoring. Unlike existing automated root-cause analysis and defect identification systems, as a self-aware, proactive risk identification and resolution platform, it works independent of underlying technology or complexity.

**The system has three core components that allow it to remain independent, irrespective of the data layer below and customer applications above:**

1. **SMART SETUP**
   In the future, AM will be extensible across all data platforms, supporting plug-and-play addition of incoming data from IoT, mobility, server-less and cloud across geographies.

2. **BIG DATA AND AI/ML-DRIVEN PRESCRIPTIVE DECISION-MAKING**
   This layer has two parts. First, an AI layer that integrates geographically-and technologically-separate big data and analytics capabilities. This smart layer will include machine-learning capabilities that gather intelligence from underlying layers and provide customer-focused applications/dashboards ‘on the fly’, as it learns from system triggers and predictive assessments of future failures. Second, AM functions that lie on top of the AI layer. These provide features that utilize machine learning to help enable advanced analytics functions like continuous learning, guided prescriptive resolution and identifying failure-prone modules. Abstraction from the main APM AI layer means modules can be added as ‘plug and play’ solutions when system failure is anticipated.

3. **CUSTOMER-FOCUSED SOLUTIONS**
   The AI layer means users can rapidly develop custom reports / dashboards, as well as interacting with the system in real time, viewing end-to-end system health, and identifying areas that may be concerns in future.

4. **COMPREHENSIVE MONITORING**
   End-to-end application management solutions will go beyond application performance monitoring focused solely on specific components or modules. By tracing the flow of transactions through the entire application delivery chain, an intelligent system will eliminate blind spots while providing full visibility into every service and tier. This helps enable detection and root-cause analysis of performance problems in real time, as well as prescriptive resolution, preventing service outages and responding to user complaints without human intervention.
Customer demands for Intelligent Application Management software

Customer Application/Services

Fuels use cases proactive to user demand/ custom implementations

AI/ML/ Intelligent processor OR assistant that understands underlying data and client business automatically

Intelligent Integration
Proactive Security & Event Management
Predict Failure of Application / Proactive Alerts
Identify Failure Prone Modules

Reliability Analysis of Critical Path
Behavioral Analytics/ Anomaly Detection
Continuous Learning
Guided Prescriptive Resolution

Vendor / Service Provider ML capability that can gather intelligence from underlying capability

Analytics / Big data processing capability / Automation

DATA from Deployment, AM services etc.

Provides scalability, plug and play for all application types

Cloud & Micro-Services
IoT
Serverless
Mobile

CUSTOMER FOCUSED SOLUTIONS
END-TO-END MONITORING
BIG DATA AND AI/ML DRIVEN PRESCRIPTIVE DECISION MAKING
SMART SETUP

CUSTOMER FOCUSED SOLUTIONS
END-TO-END MONITORING
BIG DATA AND AI/ML DRIVEN PRESCRIPTIVE DECISION MAKING
SMART SETUP
The Intelligent Application Management architecture leverages big data and AI to predict application failure and offer prescriptive resolutions for potential performance issues. It achieves all this while keeping the UX simple enough to appear just like another employee on the team. A virtual assistant adds a secondary layer of user interaction with the AM system. Users can check system information and generate reports, helping enable detection of errors before they even occur. IT users can access the same deep insights via a simple voice conversation, without having to negotiate complex dashboards. It also can enable non-technical teams to monitor and understand network health and performance issues using familiar communication tools.

Figure 6: Conversational AM of the future

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<tr>
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<tbody>
<tr>
<td>Human operator based error identification and report generation.</td>
<td>AI Based Detection and Reporting modules triggered on failure or operator triggered event</td>
<td>Conversational intelligent AM virtual assistant providing system information proactively</td>
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</table>

Application Management UX Evolution has laid foundations for a True Intelligent AM solution of the future.

Solutions from all leading APM vendors like support core enterprise application performance management functions such as unified application and infrastructure monitoring, end-user experience monitoring, and synthetic monitoring using its inbuilt Machine learning capabilities. This allows users to identify the root cause of any service degradations so they can quickly find the solution and get the problem resolved. But end users face another key issue with most leading platforms.

“"We were using New Relic, but we never got the full picture of our production environment. So we were limited in what we could do. Their dashboard is also almost non-existent. It would require us to build our own which we did not want to.”

Mark Kaplan, IT Director at bar exam test prep provider BARBRI

Adding virtual assistants like ‘Dynatrace davis’ adds another layer of automation to the existing ML and Reporting solution. IT operations can have a simple voice conversation and access the same deep insights, without having to dive into dashboards. Additionally, it gives non-technical teams the ability to monitor and understand network health and performance issues via familiar communication tools.
There’s a strong correlation between the success of a business and the maturity of its AM function. Businesses today are more dependent on applications than ever, which is why it’s imperative for them to have an application management function that’s intelligent enough to learn on its own and work with unknowns.

Removing the need for complex IT dashboards, conversational agents provide essential ease of access and depth of analysis to IT and business users. Intelligent Application Management won’t just identify, trace and provide remedial actions to known performance issues. It will also simplify the entire process, with virtual agents making it simple to use and conversational. AI provides much-needed flexibility and agility so the AM process can work well in a fast-changing business environment. Adding virtual agents to the picture ensures that the system appears just like another employee on the team, providing users with a seamless experience.
**END NOTES**

1. See ‘The Future of Applications’
3. Accenture Research Analysis
4. Accenture Research Analysis
5. Dynatrace.com, BARBRI Dynatrace case study.

**ACKNOWLEDGEMENTS**

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