EMA Top 3 Enterprise Decision Guide 2021

Topic: Observability Platforms
Data-Driven Guidance for Product Evaluation in DevOps, SRE, IT Operations, and Business

Q3 2021 EMA Top 3 Report
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EMA Top 3 Awards

What are the EMA Top 3 Awards?
Enterprise Management Associates (EMA) presents its EMA Top 3 Awards to software products that help enterprises reach their digital transformation goals by optimizing product quality, time to market, cost, and ability to innovate.

Personas and Perspectives
EMA derives its Top 3 product categories from today’s critical pain points experienced by software developers, DevOps professionals, site reliability engineers (SREs), IT operators, data scientists, and business staff belonging to enterprises of any size and industry.

Data-Driven Research
EMA Top 3 Awards are based on the consolidated analysis of a combination of real-life project data, data obtained through daily briefings and end-user interaction, and additional data collected from public sources to optimally understand customer requirements.

You should read this report if...

...you want to learn from the successes and failures of your peers.

...you require hard data on market trends in DevOps, IT operations, and business technology.
The Five-Step Product Selection Process

The purpose of the EMA Top 3 decision guide is to present the reader with products that address the key business requirements and pain points in 2021. The EMA selection process follows five key steps.

1. **Empirical**: EMA identifies the specific key customer pain points for each one of the top challenges in DevOps, SRE, IT operations, and business in 2021.

2. **Strategic**: EMA evaluates how each product addresses the key pain points identified in step 1 and how it aligns with today’s most relevant technology trends.

3. **Innovative**: This criteria rewards products for breaking with legacy constraints in order to provide customers with truly innovative solutions.

4. **Customer-Centric**: EMA Top 3 Awards recognize a product’s radical focus on customer requirements instead of marketing an existing product as something new.

5. **Specific**: EMA Top 3 Award-winning products address quantifiable customer pain points.

Please treat these EMA Top 3 vendor recommendations as a starting point to inform your product selection process and overall digital transformation strategy. While this report can provide valuable data-driven insights, it aims to inform, not replace, your own due diligence process.
Product Selection Criteria

Real-life use cases are the crucial link between PowerPoint and how products work in the wild. This report relentlessly focuses on identifying and clustering use cases based on direct customer observations and on the analysis of quantitative project data. While EMA aggregates and anonymizes all customer-specific data points, the EMA Top 3 evaluation process is based on actual customer problems.

Instead of exclusively relying on EMA survey data and research notes, EMA created a data framework that enables EMA analysts to directly analyze project bottlenecks and enterprise pain points by looking at real-life project artifacts. The example on the right shows an extract of the analysis of 41,558 Kubernetes-related developer problems posted to the Stackoverflow support forum. From this specific evaluation, EMA received a series of technology clusters with a high probability of being involved in production issues of different types and severity levels. By no means does this result reveal that these technology combinations should be avoided in your next project. Instead, it helps EMA define problem areas that require further examination and deserve some additional questioning by enterprises selecting product vendors.

EMA Top 3 Product Awards - Reward for Addressing the Difficult Problems

Each EMA Top 3 Award-winning product has demonstrated its direct focus on addressing today’s key pain points for software developers, DevOps teams, SREs, IT operators, and business professionals.

Example: Learning From Real-Life Challenges

This simplified heatmap shows the most common problem clusters within Kubernetes-based environments. Starting at the top, we can learn that challenges around Helm, the Kubernetes package manager, occur within the context of “ingress control” (1) and “yaml definitions” (2), with “pod management” (3), “the use of minikube” (4), and “Nginx” (5) playing a significant role. This empirical research approach helps focus the EMA Top 3 product awards on actual real-life customer pain points in 2021.
The Cloud-Native Universe: Choice Brings Complexity

This chart shows the full extent of cloud-native choice, in the form of all 936 products from the CNCF landscape, available to product teams to assemble their applications. The fact that teams can select one or more components from each product category brings the flexibility needed to optimize developer productivity while providing DevOps engineers with the required governance and control to ensure cost-efficiency and continuous compliance. The fact that different product teams make different choices and often the same team leverages different components to create their stack for different projects creates a level of entropy that is hard to control with traditional skill-sets, processes, and tools.

Security, Compliance, and Automation

- Security & Compliance
- Observability
- Automation & Configuration

Data, Application, and DevOps

- Data, Application, and DevOps
- Orchestration and Management
- Container Platform

EMA Top 3 Award-winning products help customers leverage their preferred cloud-native products in a well governed, integrated, and automated manner.
CNCF: Metrics

These metrics belong to the CNCF product overview chart from the previous page and aim to provide readers with a high-level overview of the degree of choice and complexity attached to modern distributed and cloud-native applications.

- **Total Venture Funding:** $601,889,361,536
- **Total Individual Contributors:** 104,285
- **Total Number of Annual Code Commits:** 484,198
- **Total GitHub Stars:** 2,571,835
- **Total Number of Products:** 936
- **Total Number of Organizations Involved:** 779
- **Number of Development Languages Used:** 28
Learning From Real-Life Failure

Examine the failures of your peers can offer with valuable lessons for your own decision-making processes, without having to endure the pain of a real-life product failure. The following chart consists of quotes from 52 cloud-native application failures within an enterprise context. These incidents reach all the way from failed code deployments with minimal user impact to major production outages affecting most or all internal and external user groups.

Quotes on the Impact of 52 Kubernetes Production Failures

- Aborted application migration
- Lost application logs in production
- Frequent connection failures when talking to services outside the cluster
- Cascading Pod evictions
- Production AirMap platform outage
- Unknown, Pods killed
- Security issue, cryptominer stealing compute power
- Partial production outage
- Development environment outage
- Security, stability of clusters
- Production issues with SaleMove US System
- Multiple production outages
- Production ledger/platform outage
- Data loss
- Unknown cluster outages
- Full production cluster outage, other outages
- High latency, timeouts
- Production outage
- Build errors, production outages
- Production outages
- Build errors
- High latency
- No impact on end users
- Delay of 1-3 seconds for outgoing TCP connections
- QA/dev cluster outage
- Total ingress traffic outage
- 15 minutes cluster outage
- Occasional 502 errors
- Major production outage, 100% traffic loss
- Unknown outages, DNS errors
- Production Universe search and reporting outage
- DNS resolution failures
- Significantly increased latency
- 5XXs thrown from some services
- Stopped Istio rollout, developers’ time spent
- Nonproduction cluster outage
- High error rate on network-heavy services

Source: codeberg.org, hjacobs/Kubernetes-failure-stories, Aug 5, 2021

Failure Impact Across all 52 Cases

Forty-eight percent of this specific set of incidents were full production outages, 18% were less disruptive Kubernetes cluster outages, and the remaining 34% constituted a mix of operational inconsistencies and deployment failures.

Analyzing Failures

Drilling further into the data shows that 45% of the issues are directly related to public cloud technologies (pink) with the remaining 55% shared between security, availability, compute, data, deployment technologies, network, and performance topics.

EMA Top 3 products help enterprises address the underlying challenges of these issues in a cost-efficient manner while optimizing the end-user experience.
Zooming Out: 41,558 Challenges From the Cloud-Native Universe

These challenges are divided into 488 categories and 1,506 subcategories capturing the full spectrum of cloud-native developer challenges.

The tree map is based on 41,558 Kubernetes-related developer posts on the Stackoverflow support forum.
Observability as the #1 DevOps Challenge

Observability, availability, and security are the three primary DevOps challenges today. This is a direct result of the rapidly increasing complexity introduced by the adoption of mostly autonomous product teams, distributed application architecture, and a hybrid multi-cloud operating model. SREs are often scrambling to find the information required to manage operational risk, since organizations typically do not have a unified approach toward collecting, processing, and storing logs, metrics, and traces across the stack in an application-centric manner.

50% Estimated daily time spent by software engineers on overhead tasks.
Harnessing the Value of Technology by Mastering Complexity

The fact that simple changes to the application stack are the number-one root cause for the failure of cloud-native applications demonstrates that organizations in 2021 are still struggling to master complexity in software development, DevOps, and IT operations. EMA Top 3 products enable enterprises to better harness existing and new software technologies in a cost-effective and compliant manner. Policy-driven software development, operations management, scalability, and unified operations of application infrastructure across data centers and public clouds are the key requirements for achieving this goal. The bottom chart quantifies the overall complexity increase in cloud-native technologies between 2017 and 2021 by showing how a 343% increase in the number of individual technologies resulted in a 527% increase in the number of technology combinations that were part of application problems.

The number of distinct cloud-native technologies (orange) increased from 478 to 1,733 (343%) between 2017 and 2021, while the number of cloud-native technology combinations (blue) increased from 826 to 4,349 (527%) within the same timeframe.

Public Cloud Complexity Increase Measured by the Number of Unique Technologies (Orange) and by the Number of Technology Combinations (Blue) Related to AWS, Azure, and GCP

The number of distinct public cloud services (blue) increased from 1,475 to 3,689 (250%) between 2015 and 2021, while the number of combinations of public cloud services (orange) increased from 2,366 to 8,129 (344%) within the same timeframe.

The top chart shows the 250% increase in the number of different public cloud technologies, which corresponds to a 344% increase in the number of overall public cloud technology combinations between June 2015 and June 2021 (source: Stackoverflow).

In complex distributed environments, any configuration change or change to the software code can lead to downtime and performance degradation. Anytime changes of any kind are made to a complex system, such as a microservices application, there is a risk of immediate or delayed negative impact on the application itself or on other applications.

5 Top Causes of Application Downtime and Performance Degradation

- Changes: 37%
- Code Bugs: 31%
- Migrations: 16%
- Security: 11%
- Upgrades: 5%
Five Most Frequently Asked Questions About Observability

Q: What is the difference between monitoring and observability?
A: Observability tracks relationships and dependencies between applications, microservices, and infrastructure in order to enable developers, IT operations, and DevOps to understand and optimize performance, cost, and reliability of production applications.

Q: What is telemetry versus observability?
A: Telemetry data can consist of logs, traces, and metrics emitted from applications. Observability ingests, consolidates, normalizes, and analyzes this telemetry data in order to continuously optimize an application.

Q: Who is responsible for establishing observability?
A: Operators and developers need to collaboratively implement observability into the application stack. This means overcoming the still prevalent practice of both personas using different platforms for gaining application visibility.

Q: What is observability engineering?
A: Observability engineering aims at building software systems that are easy to understand, debug, optimize, operate, and enhance.

Q: How do we achieve full-stack observability?
A: Full-stack observability provides real-time visibility for development and operations personas to understand the impact of any component that is part of the application stack on application performance. Achieving full-stack observability requires the consolidation, normalization, and analysis of all logs, traces, and metrics across the application stack, including their contextual dependencies.
Market Analysis: Observability

EMA Quick Take

The term “observability” was coined in the early 1960s by Rudolf Emil Kalman, a Hungarian-born mathematician seeking to explain how automated control systems work, only by observing their output. In 2021, “observability” has become one of the key pain points and requirements in cloud-native computing due to the struggles experienced by organizations when attempting to control and optimize the performance, reliability, and cost of their distributed applications.

Observability platforms enable developers, operators, DevOps engineers, SREs, and security personas to directly connect the dots between end-user experience, application performance, and the underlying code, data, and infrastructure in data centers and the public cloud. The ability to seamlessly drill down from a big picture view of the overall application and infrastructure topology into the details of how individual infrastructure components and code functions impact the end-user experience constitutes the core capability of observability platforms. The rapid adoption of a cloud-native distributed application architecture and the resulting complexity of semi-autonomous teams developing and managing individual microservices across the corporate data center and different clouds have accelerated the growth of the market for observability platforms.

Business Problems Solved

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<th>Developer, DevOps, and SRE productivity</th>
<th>Cost-performance optimization</th>
<th>Rapid recovery</th>
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<td>High reliability</td>
<td>Unified management for cloud-native and monolithic apps</td>
<td>Minimize release and operations cost</td>
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EMA Research Facts

1. Observability is the number-one DevOps challenge in 2021
2. 100% YoY Increase in observability-related developer challenges
3. 50% Estimated daily time spent by SREs on finding decision-relevant data

Quote From the Trenches

“Our SREs are often spending 50% of their time on fact-finding missions. Addressing this inefficiency is one of our key goals for 2021 and beyond.”

VP Cloud Engineering, Automotive Parts Manufacturer
Productivity Impact

DevOps and SRE

- Continuous access to all required context data
- Security and compliance across the DevOps pipeline

Software Developers

- Rapid debugging of distributed apps
- Continuous compliance and security

IT Operations

- Automatic dependency and topology tracking
- Full stack app management across data center and cloud

Market Size

- Incumbents: 106
- Funding: $78B
- VC Funding: $1B
- Revenue: $10B
- Employees: 125,000
- Open Jobs: 4,432
- GitHub Stars: 443,890
- GitHub Contr.: 12,241

Market Growth

- Competition

- Outlook

Very High: "small" = slow, "fast" = intense

Heating up: none = small, average = slow, heating up = fast, intense = hot
Market Segment:

Automatic End-to-End Observability

Changes to the application stack, code, and release pipeline are the three key reasons for performance degradation and downtime in cloud-native apps and traditional enterprise applications alike. EMA Top 3 award-winning applications in the “automatic end-to-end observability” segment capture these changes in near-real time, at full resolution, and without requiring manual instrumentation, in order to provide:

1. Business-driven production insights
2. Targeted alerts with problem context
3. Automatic root cause analysis
4. Monitoring across application environments

These components lead to better alignment between IT and business through the ability of tuning optimization and resolution actions to optimize specific sets of business KPIs.

Why IBM Observability by Instana Received the EMA Top 3 Award

Instana received the EMA Top 3 Award for the platform’s ability to automatically discover and monitor cloud-native and traditional application stacks within the context of their orchestration platform (typically Kubernetes), and the underlying data center or cloud infrastructure. Instana’s reinforcement learning models continuously learn to watch out for issues similar to the ones that were detected within a comparable context in the past. Instana automatically discovers new applications simply by developers adding standard configuration code to their Git repository that enables the platform to automatically place, configure, and manage the required agents in order to ensure comprehensive observability.

Business Impact

- Enhance developer and SRE productivity
- Decrease MTTR
- Lower operational risk by continuously optimizing the application stack
- Proactive issues resolution and application optimization
- Complete observability for traditional and cloud-native apps across data center and cloud
- Empowering developers and operations staff to handle complex cloud-native applications independently of where they currently run

We are set in our ways of guessing what the business needs and how we prioritize developer and operator tasks to get there. Sometimes we are right and sometimes we are wrong, since in the end, we are just taking our best guess.

Development Lead, Global Financial Institution
About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals, and IT vendors at www.enterprisemanagement.com. You can also follow EMA on Twitter or LinkedIn.

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