

SERVERLESS COMPUTING FOR DEVOPS AND BUSINESS



EMA Top 3 Report and Decision Guide Vendor Focus: Thundra

ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™)
VENDOR RECOMMENDATION REPORT
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IT AND DATA MANAGEMENT
RESEARCH | INDUSTRY ANALYSIS | CONSULTING

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EMA TOP 3 ENTERPRISE DECISION GUIDE FOR SERVERLESS COMPUTING

Serverless technologies enable developers to rapidly create and validate new applications without incurring significant CAPEX and OPEX requirements. This is due to serverless technologies providing developers with API access to all the resources they require to successfully run their code. These resources include basic CPU, memory, and storage APIs, but developers can also access higher-level capabilities, such as database services, machine learning, artificial intelligence, analytics services, or test automation.

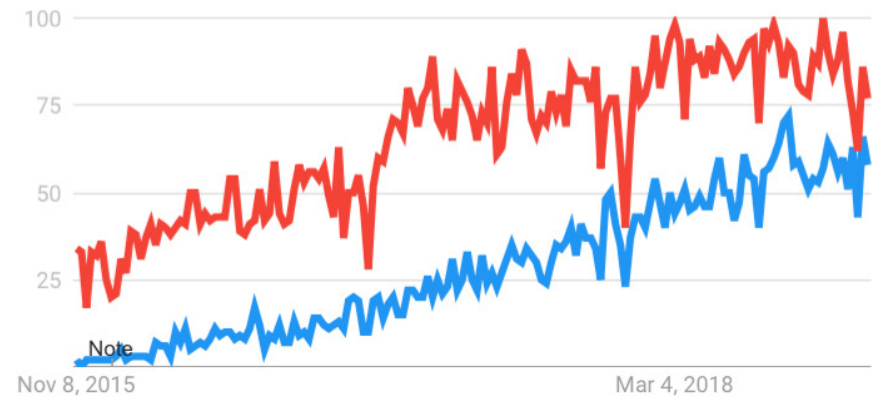
WHAT IS AN EMA TOP 3 PRODUCT?

Enterprise Management Associates (EMA) has awarded its EMA Top 3 trophy to products that help enterprises achieve a state where 90 percent of development and operations resources go toward creating business value. Please note that the EMA Top 3 awards highlight products that address a set of empirically determined customer pain points in a clear and convincing manner. While some of these products “go where nobody has gone before,” others merely show a clear end-to-end solution, concept, and vision that makes them prime candidates to evaluate when looking to better optimize serverless functions.



Interest in Serverless Technologies is Growing Fast

The chart shows the increase in Google searches on “serverless” (blue) and “microservices” (red) buzzwords since November 2015.



Double Development Speed, Gain Differentiation

Enterprise Management Associates (EMA) estimates that creating applications by connecting serverless building blocks through API calls without having to deploy, manage, and support server, storage, middleware, and application services can speed up software development time by 50 percent. As importantly, leveraging API resources instead of building out server infrastructure can have significantly positive business impact by unlocking the (estimated) 80 percent of software projects that never get off the ground due to the unavailability of the required infrastructure. Finally, building serverless apps enables software engineers to transform into product owners who fully focus on understanding today's (and anticipating tomorrow's) customer requirements. Instead of worrying about how to stand up a TensorFlow environment to validate machine learning-driven capabilities, these product engineers can simply leverage a set of managed machine learning APIs.

WHY SERVERLESS TECHNOLOGIES ARE CRITICAL FOR DIGITAL TRANSFORMATION

ENHANCE DEVELOPER PRODUCTIVITY

Serverless technologies aim to liberate software developers from having to spend time on any infrastructure-specific deployment, management, and support activities.



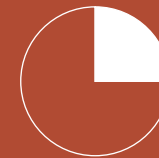
80%

are involved in deploying, managing, or supporting infrastructure



30%

time spent by developers to recreate commodity code



25%

time estimation of developers for how much time goes toward non-development tasks

TURN CORPORATE IT INTO A STRATEGIC ASSET

In 2019, corporate IT is still bogged down in repetitive manual tasks related to keeping the lights on. Serverless technologies help corporate IT step out of the critical path within the release process.



83%

are aware that they slow down the release process



87%

repetitive manual tasks to prepare for each individual release



55%

estimated share of IT operators' time spent on standard operations tasks

THE CASE FOR SERVERLESS COMPUTING – HIGH STAKES


Serverless computing eliminates infrastructure requirements as the limiting factor for software development projects. Developers can instantly create, validate, scale, and destroy their application stack in its production environment while avoiding infrastructure cost typically generated through resource waste.

“Differentiation in banking comes out of our ability to provide an optimal customer experience by predicting the current and future needs of each individual customer and proactively offering guidance and actionable advice,” says the CIO of a large U.S. financial institution. He continues, “Serverless computing has enabled our development teams to quickly, cheaply, and at minimal operational risk validate new capabilities, such as continuously monitoring end-user sentiment during a banking transaction, so that we can remediate problems before customers even consider leaving for the competition.”



50%

Developers and DevOps teams spend approximately half of their time on tasks that do not generate customer value.



80%

80% of software development projects never get off the ground due to human or infrastructure resource unavailability.

“Since my developers no longer have to worry about supporting test, staging, and production environments, they can now fully concentrate on molding their code to our very specific business requirements. They can now use much of the time they used to spend on thinking about infrastructure to continuously observe how their software is used in production and obsess over how to further improve the end-user experience.”

– Development Team Leader, International Financial Institution

CONTAINERS PLUS SERVERLESS

Containers enable developers to package, build, and ship application code and runtime requirements for rapid deployment to a container cluster. However, EMA research shows that enterprises are struggling to manage these container clusters in a secure and compliant manner. While containers are stateless in theory, practical use has shown that there are still numerous remaining infrastructure dependencies that require significant planning to address.

Serverless computing cuts these ties to the underlying infrastructure by automatically generating and retiring the container infrastructure to run functions. This means that developers simply need to code for a supported runtime, while the serverless platform takes care of the container scheduling behind the scenes. All code will run consistently on these environments, saving developers significant time. Therefore, developers with some experience in serverless programming are often able to spend 90 percent or more of their time on coding new business functionality, instead of defining and debugging dev, test, staging, and production environments for their application.

To fully enjoy these benefits, enterprises need to steer around the pitfalls and limitations of serverless environments. These are addressed by the EMA Top 3 products for serverless technologies.

OPTIMIZING PRODUCTIVITY

Serverless

Full focus on coding and validating business logic with minimum worries about infrastructure restrictions. Serverless infrastructure runs on automated container infrastructure.



Containers

Developers can easily ship their code inside of containers. However, containers still depend on the underlying operating system and container clusters require ongoing management.



Traditional Software Development

60% of IT and development resources were required to “keep the lights on.”



POPULARITY OF SERVERLESS TECHNOLOGIES

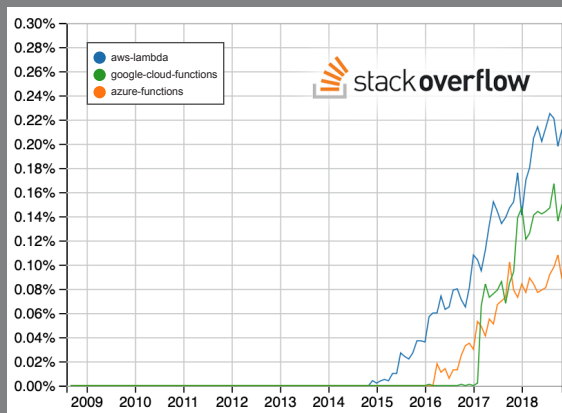
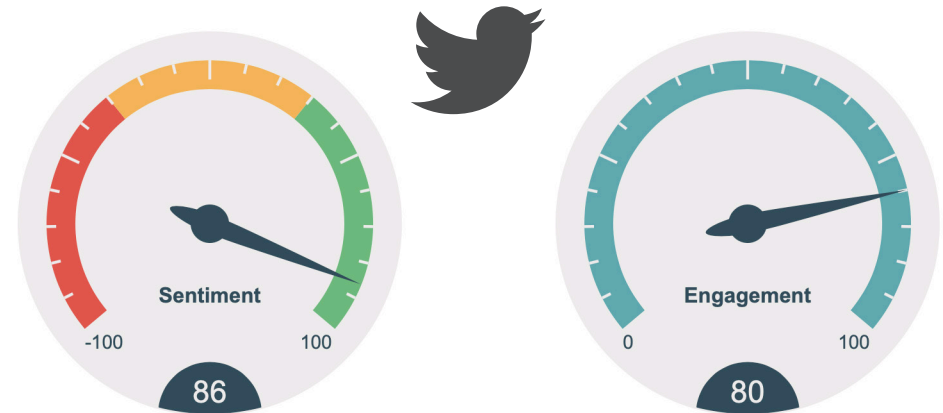
AWS Lambda still holds the first position in the race of the hyperscale public cloud-based serverless platforms, while Google Cloud Functions and Azure Functions are trailing behind. Late in 2017, Google Cloud Functions overtook Azure Functions and managed to defend its lead.

Many enterprises are looking for serverless solutions that can run on-premises and in the cloud. OpenWhisk, OpenShift, and Knative are three fast-growing technologies that can stretch serverless environments across data centers and clouds.

Serverless platforms are catching up to container platforms in popularity. This is reflected by data from Stackoverflow that shows a similar number of weekly forum activity for both serverless and containers.

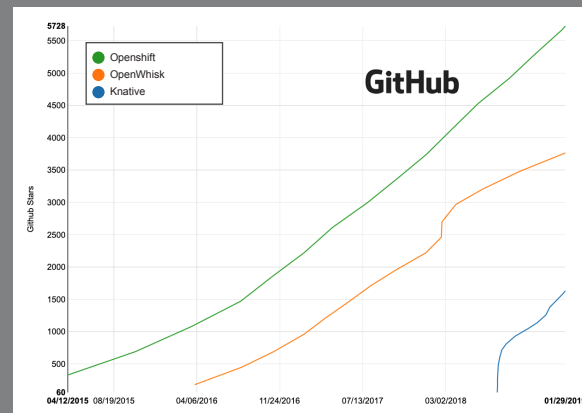
A Twitter sentiment and engagement analysis confirms the high popularity and positive attitude toward serverless technologies. This segment is showing rapid growth and, so far, very little disillusionment.

STRONG MOMENTUM FOR SERVERLESS



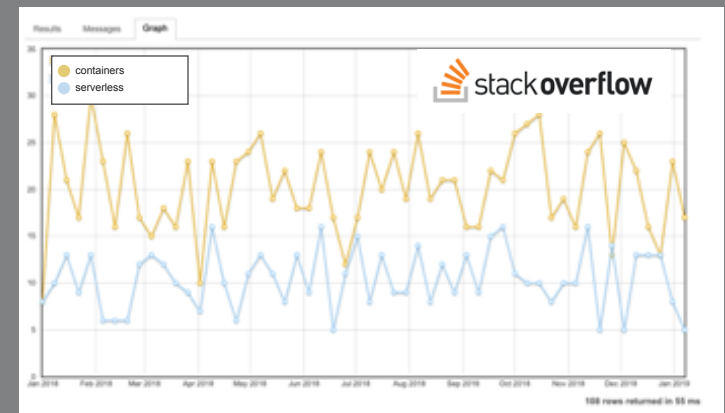
Popularity of Public Serverless Platform Sources (Stackoverflow API)

AWS widened its lead in 2018 compared to Google Cloud Functions. Google Cloud Functions overtook Azure Functions in 2017.



OpenWhisk, OpenShift, and Knative are Growing Fast

OpenWhisk, OpenShift, and Knative are fast-growing platforms for hybrid serverless deployments in the enterprise.



Serverless is Catching up to Containers

The volume of questions tagged as "serverless" is catching up with the question volume for "containers" on StackOverflow.

SERVERLESS COMPUTING: THE KEY TO CUSTOMER OBSESSION

In a serverless development model, no infrastructure stands between product owners and the end user or customer. Even better, developers can observe how users interact with their software. This enables product owners to constantly obsess about end-user productivity and satisfaction.

100% Focus on Developer Productivity

Modern developers still spend a significant amount of time defining how to deploy, configure, and manage their application code on virtual machines or containers. Remember that even in a fully containerized world, the application runtime is tied to the Linux operating system (kernel) in addition to hundreds of container platform configuration parameters. As a result, developers need to maintain 200-300 lines of infrastructure code per application. In a serverless environment, coders simply consume the functions they need through a RESTful API, without having to worry about the deployment and operation of the underlying software, container, virtualization, and hardware stacks.

100% Customer Focus

Performance, cost, and reliability metrics are a mandatory part of each release. Once the new code is in production, developers focus on observing how end users interact with these features and how these new interactions affect performance, cost, and reliability. Monitoring-driven development ties developers closely to their end users and enables them to proactively explore features and capabilities to make customers more productive.

100% Focus on Business Differentiation

Development teams can free up the approximately 30 percent of time spent by an average developer on creating code that brings no differentiation. Code functions for user sign on, authentication and authorization, user interface creation, or data storage already exist and can be reused within a serverless development paradigm. This is also the case for more advanced capabilities, such as content indexing and machine learning-driven automatic content categorization. Serverless platforms are “construction kits” that enable developers to consume basic, intermediate, and even advanced capabilities in the form of APIs that they can then chain together through one or more serverless functions. In short, the product owner can quickly, easily, and cheaply chain together service APIs into sophisticated applications, without needing a team of specialists for each individual discipline. This is best explained by example.

EXAMPLE

Personalized Real-Time Content Curation System

The chart shows the core serverless architecture of a real-life serverless application created by a midsize nonprofit organization to provide each one of their staff members with individualized content from different sources. This application was created in response to staff spending almost half of their daily worktime on searching for relevant content required to successfully complete their tasks.

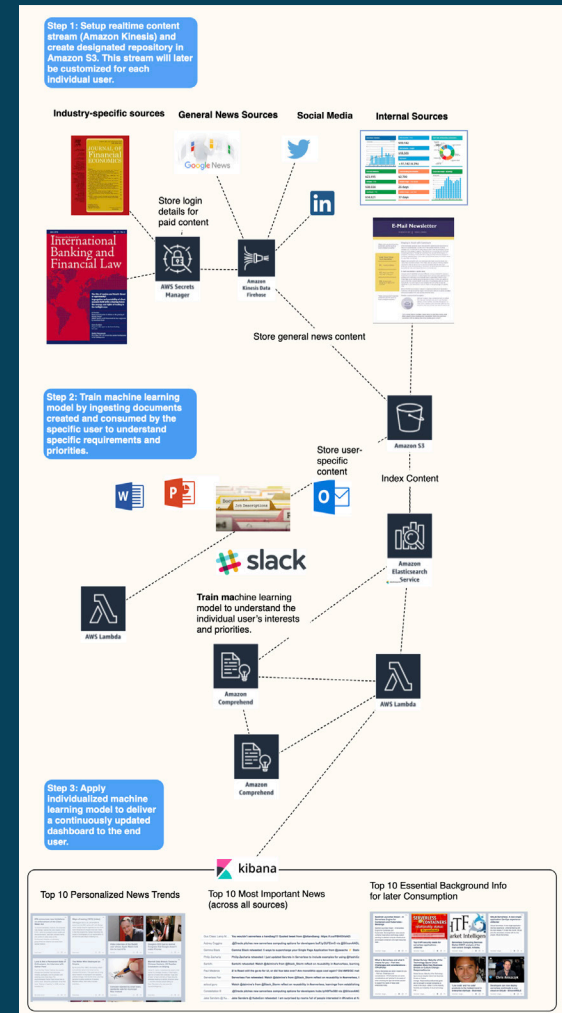
One Developer, Four Weeks

The initial release of this personalized content curation system was created by a single developer, using a set of AWS serverless APIs to solve the following three challenges to build a minimum viable product (MVP).

Challenge 1: Create and index a comprehensive content stream consisting of all the sources that staff members reviewed manually.

Challenge 2: Train a machine learning model to understand each user's individual priorities based on the content he or she has created and consumed.

Challenge 3: Leverage the machine learning model to filter and prioritize individualized content for each staff member to consume.



SOFTWARE CATEGORIES FOR SERVERLESS SOLUTIONS



Development, Deployment, and Observability

OBSERVABILITY, COST, AND DEBUGGING: Transaction monitoring, cost control, and advanced root-cause analytics

AWS LAMBDA DEPLOYMENT AND OPERATIONS: Observability, validation, alerting, and debugging for Lambda functions

CONSISTENT AND COMPLIANT MANAGEMENT: Simplify application deployment by automating and managing platform-specific parameters, variables, and dependencies

INTEGRATED DEVELOPMENT ENVIRONMENT (IDE): Development IDEs integrating test, build, and deploy for serverless functions



Serverless APIs

SERVICE MESH: Enabling developers to source features and capabilities from preexisting internal or external service APIs to prevent redevelopment of existing code

SERVERLESS PLATFORMS: Commercially supported serverless platforms for operating serverless functions within a hybrid- and multi-cloud context

OPEN-SOURCE FRAMEWORKS: Adding the capabilities to Kubernetes required to automatically run, scale, and terminate individual code functions inside containers



Serverless Operations

HYBRID APPLICATION OPERATIONS MANAGEMENT AND MONITORING: Universal monitoring of traditional infrastructure, hypervisors, containers, platform services, and serverless functions from one dashboard.

DEVSECOPS: CONTINUOUS SECURITY AND COMPLIANCE: Extending compliance and security policies across traditional applications and microservices-based apps consisting of serverless functions.



Serverless Context

SCALE OUT INFRASTRUCTURE: Systems that instantly deploy, scale, update, and failover without the need for any manual configuration.

OBJECT STORAGE: Unified storage layer providing serverless functions with a central namespace and RESTful API for storing stateful information.



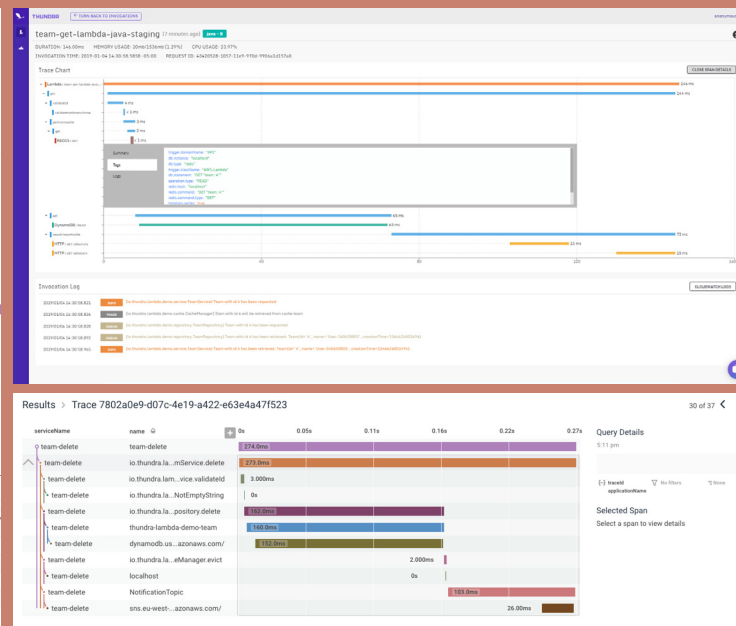
EMA QUICK TAKE

Thundra provides instant application-centric end-to-end insights into cost, performance, reliability, and impact on external services of serverless functions down to the database query and code statement levels.

www.thundra.io

PRODUCT HIGHLIGHTS

- **Automated trace chart:** Thundra automatically creates trace charts for each Lambda function that show granular performance metrics for AWS services (DynamoDB, SQS, SNS, Kinesis, Lambda, S3), HTTP-requests, and databases (MySQL, PostgreSQL, Redis).
- **Automated dependency analytics:** Upon service invocation, Thundra provides end-to-end tracing including full insights into integration points with external systems, such as credit card authorization or identity management.
- **Unified logs:** Thundra aggregates all logs belonging to any particular operation within the entire function flow.
- **Rapid setup through Lambda Layers:** Thundra can be added to Lambda functions simply through the addition of a Lambda Layer (announced at Re:invent 2018).



KEY PAIN POINTS ADDRESSED:



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 or blog.enterprisemanagement.com.

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