

### EOR2021

Digital transformation in the COVID and post-COVID world



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## 

#### The future—what does it hold?

We couldn't get our hands on a reliable crystal ball, so we asked some of the brightest minds at New Relic—and a few of our equally brilliant friends—to weigh in on the significant business and technology trends, changes, and shifts expected in the year ahead.

Learn what's trending beyond the entrenched languages—JavaScript, Python, Java, and .NET—in the ever-more-complex **developer** landscape.

Find out why data-agnostic **AIOps** technology will continue to grow as organizations strive to further reduce alert noise and enable faster issue resolution.

Get the scoop on what new **DevOps practices** will look like in a post-COVID-19, digital-heavy world; learn how shared data can serve as a bridge across departments; and why tool consolidation can help teams reduce costs and simplify training. You'll also find out why savvy

organizations will use DevOps as a differentiator to drive a competitive business advantage.

You'll see digital transformation continue to accelerate in the year ahead, and with it, **open source** adoption. When it comes to serverless, Lambda functions will continue to grow—no longer limited to cloud native early adopters or niche use cases.

In 2021, it's no surprise that **observability** will fuel post-pandemic digital innovation. But what about observability literacy and boutique observability consulting? You heard it here first.

Read on for the top 21 tech predictions for 2021.

### Developer ecosystem **DIVERSE DEVELOPER LANDSCAPE**

The trend over the last few years has been toward an ever-more-complex dev landscape. The entrenched languages—particularly Java, Python, JavaScript, and .NET—have continued to grow with the overall size of the industry without any noticeable displacement of each other.

Some smaller changes—such as the growth of **TypeScript** and the pivot of the Android ecosystem to Kotlin—

have been evident, but in both cases the proximity and compatibility of the new languages (to JS and Java, respectively) is a major part of their success.

These trends seem set to continue into 2021—steady growth of both TypeScript and Kotlin without any real watershed moment.

The improving maturity of both the WebAssembly ecosystem and the **Rust** programming language should also be watched. In the latter case, it is likely that there will be one or more marquee announcements of a major systems-level project being delivered in Rust, strengthening the case that the language is a viable replacement for C++ across the entire systems programming domain.

Ben Evans, Principal Software Engineer, New Relic



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### **DevOps** POCKETS OF DEVOPS SUCCESS

In 2021, DevOps will be successful and unsuccessful at the same time. As the Puppet State of DevOps report notes, and we have seen, most companies continue to have pockets of DevOps success but struggle to standardize on DevOps throughout the company. This is due to many factors (read my blog on the **Puppet State of DevOps Report** to learn more).

Also, **DevOps** will be successful in spreading the principles of improving communication across organizational boundaries, using measurement to enable that better communication, and increased focus on a better customer experience—but it probably won't be under the "DevOps" banner. And that's OK because DevOps is more about results than taking credit.

*Tori Wieldt, Senior Solution Marketing Manager, New Relic* 

## **B**-TOOL CONSOLIDATION

Organizations large and small are under pressure to modernize to deliver more quickly and reliably in the current times. The most savvy organizations are using DevOps as a differentiator to drive competitive business advantage. However, as systems and practices are modernized, organizations are left with legacy tools that no longer serve their needs. This leads to silos, proliferation of tools, and communication issues that are proving tough barriers to DevOps adoption. A top priority for DevOps teams in 2021 will be to figure out how to effectively **consolidate their tools** with the goal of reduced cost and training. We will see DevOps teams leaning toward consolidating various tools to drive fewer outposts of information, and better end-to-end visibility.

Tori Wieldt, Senior Solution Marketing Manager, New Relic

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### **RELEASE MANAGEMENT & ORCHESTRATION IN CLOUD NATIVE ENVIRONMENTS**





DevOps will increasingly focus on release management and orchestration in cloud native environments. Such environments are particularly dynamic, requiring new approaches like **GitOps** to help organizations scale their DevOps efforts while maintaining quality, security, and compliance.

Jason Bloomberg, IT Industry Analyst and President, Intellyx

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#### **Observability OBSERVABILITY SUPPORTS OMNICHANNEL**



COVID has also accelerated the consumer expectations for seamless omnichannel experiences. Consumers want to mix online and offline purchases freely, including booking experiences, selecting and trying products, purchasing goods, and having them delivered swiftly. This requires frontend and backend processes (comprising in-store, online, stock management, and supply chains) to work seamlessly together. The successful execution of these omnichannel experiences requires an end-to-end view of the business that observability natively supports in real time.

Greg Ouillon, EMEA Field Chief Technology Officer, New Relic

#### **6 THE RISE OF CLOUD-AGNOSTIC DEVELOPMENT FRAMEWORKS—THE PENDULUM IS SWINGING BACK**

The rise of cloud-agnostic development frameworks is really about how technology is evolving with a pendulum swing. We've seen the cloud create a few Infrastructure-as-a-Service components, then create middleware components, and it's starting to mushroom. It's starting to get so complicated that cloud providers have started to create groups of services to bring some level of coherence and readability. Cloud providers want customers to go all-in on their solutions, but we are seeing a number of customers demanding the portability of their apps. This is why customers are using the likes of **Pivotal**, **Anthos**, and **Rancher**, and I think we're going to see an expansion of these cloud-agnostic development frameworks that will allow businesses to develop code and deploy it on any cloud as they wish. To a large extent, at a lower level Kubernetes is a cloud-agnostic framework. It allows you to bring your containers and run them anywhere you want. And where the effort to port your code does exist, it's much less than if you deployed using a cloud PaaS. There will always be a battle between portability and integrated verticalization, and it's not the observability platforms' role to arbitrate that. Observability platforms need to provide customers with the freedom of portability. They need to support every cloud and have the capabilities to manage them effectively. The beauty of an **observability platform** is that it creates an invariant across teams, processes, and digital services, fostering transversal stability even as your digital architectures evolve at a faster pace.

*Greg Ouillon, EMEA Field Chief Technology Officer, New Relic* 

# **DEVSECOPS AND THE RISE OF APPLICATION DETECTION AND RESPONSE (ADR)**

DevSecOps is now embedding security and secure development lifecycle considerations in agile processes and DevOps practices. There are some key differences. This shiftleft in security enables automated security testing of developed code very early in the cycle, with static detection of vulnerabilities at source code level (or static application security testing—SAST). The code build then goes to a sandbox where it will be tested for dynamic attacks and vulnerabilities once more (dynamic application security testing, or DAST). This development cycle empowers developers to build secure applications. I see a strong role for observability here in two ways: observability helps developers detect vulnerabilities in their DAST and staging phases, but also, and most important, by detecting anomalies and changes in application behavior and performance in production. The goal here is early detection, preferably in your staging environment.

A lot of businesses are becoming interested in using observability as one of the tools to manage security vulnerabilities. In the field of cybersecurity there has been a lot of investment in network security, network detection, and response, and employee and endpoint detection and response. But with the move toward containerization and continuous deployment (where production code can be shipped hundreds of times per day), cybersecurity cannot be across all the changes that are going out the door. There is a big question around whether observability will also become application detection and response (ADR). Instead of just

detecting issues like a drop in throughput or an increase in latency, for example, will observability, with machine learning assistance, start to help you detect attacks and vulnerabilities?

Greg Ouillon, EMEA Field Chief Technology Officer, New Relic

# **BOBSERVABILITY FUELS POST-PANDEMIC**



In 2020, more enterprises leaned on observability as the pandemic forced all businesses to be digital businesses. The ability to view the entire software stack is now a must-have within complex IT and development environments and during continued cloud migration. In 2021, the use of traditional application performance management will continue to decline—and observability will rise to the occasion and fuel post-pandemic digital innovation. But there is more work to be done to adapt observability to tomorrow's business and IT needs. Modern enterprises will increasingly look for **observability platforms** that have three fundamental traits—those that are open, connected, and programmable.

Bill Staples, Chief Product Officer, New Relic

#### **OBSERVABILITY LITERACY & CONSULTING** The value of "observability literacy" for practi-Cold starts tioners in the DevOps, business operations, and analyst community will become a highly valued skillset. Observability will start to become a core curriculum in higher education and academic

organizations.

programs due to the rarity of these skills today. People who embrace education and certification around observability will find themselves in a position of great opportunity for career development both within and outside of their

We'll see a shift in the traditional consulting firms in establishing observability practices to bridge gaps that exist today for many organizations. Boutique consulting firms with strong domain expertise around observability will leverage the industry's leading tools to help organizations achieve business-relevant observability. With this evolution, 2021 promises to be an exciting year underpinned by the huge number of organizations embracing digital transformation as they emerge from the period of COVID.

Ben Goodman, SVP Asia, New Relic

### **IUCLOUD NATIVE OBSERVABILITY** SUBSUMES TRADITIONAL APM



Traditional approaches to APM will continue its decline in importance and mindshare as cloud native observability subsumes traditional APM. In particular, agentless approaches that leverage **OpenTelemetry** will increasingly supplant agented APM. Agents will still have a role, but they will be relegated to legacy environments that aren't properly observable.

Jason Bloomberg, IT Industry Analyst and President, Intellyx



### **HUMAN-CENTRIC SOLUTIONS WILL BECOME A FOCUS OF OBSERVABILITY**

As our industry has developed, the focus has been primarily on the complexity of interdependent computer systems, layers of the stack, and the ever-expanding innovations that shift that landscape. In 2021, the observability solutions that begin to take root will focus on the constant layer beneath the systems: the network of interrelated teams that build and support those systems to deliver remarkable experiences to other human beings. Helping humans see, connect, collaborate, and generously **serve other humans** will mark success in our sector. That looks like use cases over features and a focus on saving people time.

Joel Worrall, Senior Director, Open Source, New Relic

### **<b>THE SOLUTION THAT** MAKES OBSERVABILITY SIMPLE, CONSISTENT, AND OPEN WILL TAKE THE CLEAR LEAD

Engineers (both ops and dev pros) face the ongoing challenge of responding to new technology. The introduction of complex observation tools to equally complex systems has unhelpfully narrowed our industry's field of vision on dedicated ops professionals. Great solutions will be the ones that make complex problems simpler—simpler to deploy, manage, understand, and share.

Joel Worrall, Senior Director, Open Source, New Relic

### AlOps **ELEGANT RISK ASSESSMENT**

As the **AIOps** space continues to mature, we see an opportunity for vendors to refine their risk assessment capabilities to enable customers to fix issues with near-certainty and without breaking anything else in the system. In 2021, engineers will need more elegant dependency mapping to accurately assess risk as a part of the remediation process or build-deploy cycle. That way, they'll be confident software changes in one part of an environment won't break the system elsewhere.

We will continue to see a lot more interoperability among technology in the AlOps space to become more data agnostic. The end goal will be to normalize that data from multiple sources, identify relationships across them, and start to group and correlate alerts and incident data resulting from the same core issue to reduce alert noise further and enable faster resolution.

Michael Olson, Director, Product Marketing, New Relic



### **TIGHTER COUPLING** BETWEENAOPS **& AUTOMATION** TECHNOLOGIES

There was a lot of talk about automatic remediation, this idea of AlOps providing self-healing capabilities in 2020. Most AlOps offerings out there today aren't doing that yet. So far, the focus has primarily been on detecting anomalies to predict and prevent issues before they happen, correlating events and alerts to reduce noise, and enriching incidents and alerts with metadata as well as context to be able to diagnose and get to the root cause faster. In the longer term, we will see AlOps technology expand its scope



to include automatic remediation. It will do so by providing automation runbooks and scripts tailored to specific problems or by tighter coupling with automation technology that's already out there in the market so teams can close the gap between issue detection and remediation.

Michael Olson, Director, Product Marketing, New Relic

#### Serverless **BACKLASH AGAINST MICROSERVICES**



It's easy to see the appeal of microservices architecture. It makes maintaining code easier. It's easy to understand, in that the code is restricted to just one business function. Plus, it can make IT faster and more flexible. However, it does pose some potential risks, such as complicated implementation, increased overhead, and the challenge of finding specific developer talent. These issues have been lurking around for some time now, but in the new year we will see technology teams taking a hard look at the promised benefits of microservices. Organizations will realize that the monolith never died, and microservices were never a solu-

tion for every problem. Both have their place—sometimes within the same development organization. Organizational approach to architecture will be predicated on good business analysis—specifically validating that investments in technology will have a measurable and meaningful financial return.

Nočnica Fee, Developer Advocate, New Relic

### SERVERLESS ADOPTION SHIFT FROM COST TO CONVENIENCE

Cloud adoption and **serverless** have been the differentiators. This business model and the value differentiation will continue to move into 2021. The convenience of serverless will start to break free from the clutches of its cost thinking.

Sheen Brisals, Senior Engineering Manager, The LEGO Group





### **THE FUTURE OF SERVERLESS**





As we see serverless getting more storage options with **Amazon Elastic File System (EFS)**, serverless functions are looking more and more like lightweight containers. I think we'll see more Docker experts trying out serverless and vice versa, and the result will be that these will be seen as tools on the same spectrum of microservice options.

Farrah Campbell, Alliances and Ecosystems Director, Stackery



# CANBDA FUNCTIONS WILL CONTINUE TO GROW

In 2021, the adoption of **AWS Lambda** will continue to grow, making it the most widely adopted serverless platform. In fact, Lambda will no longer be limited to cloud native early adopters or niche use cases. On the contrary, with AWS' market share combined with the additions of new language support, Lambda serverless functions will be in widespread use across a variety of companies with an infrastructure footprint in AWS.

Nočnica Fee, Developer Advocate, New Relic

### **Open source REMOTE WORK AND OPEN** SOURCE DEVELOPMENT PRACTICES

In 2020, the entire world has had to learn to work remotely in distributed teams, but distributed teams were already the norm for the **open source community**. As corporations see remote work as a longer-term plan, they will adopt open source development practices to improve the efficiency of distributed teams.

Melissa Klein, Open Source Program Manager, New Relic

# **INCREASED OPEN SOURCE ADOPTION**

Enterprises will continue to embrace open source in 2021. The ability of everyone on the DevOps team to view and understand the state of application development is a key DevOps principle. With increased adoption of open source technologies, teams will be able to drill down to the code level of all of the tools they run. In 2021, multi-language environments proliferate, and it will become the norm to use open source language automation. Organizations that don't embrace these new DevOps practices will risk becoming irrelevant in a post-COVID-19, digital-heavy world.

*Tori Wieldt, Senior Solution Marketing Manager, New Relic* 

### **OPEN SOURCE WILL** MAKE HEADWAY ON **OPEN STANDARDS** FOR INSTRUMENTING POINT SOLUTIONS

Throughout 2020, the major focus of open standards has been around language-specific solutions in projects like **OpenTelemetry**. In 2021, vendors will start to make inroads on open solutions for monitoring the supporting infrastructure to applications. That work will give way to open standards further down the line.

Joel Worrall, Senior Director, Open Source, New Relic

Read **A Three-Phased Approach to Observability** to learn more about how to improve the customer experience by moving from reactive to data-driven behaviors.

