Vendor Profile

Enabling DevOps Pipeline Execution with GitHub: Vendor Profile and Bloomberg User Reference Case Study

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IDC OPINION

Software drives business innovation and digital transformation. Code development, management, collaboration, and leverage of open source software (OSS) enable software creation for businesses to be able to respond dynamically to the need for differentiation and worldwide competitive pressures. In addition to complex deployment demands and evolving new technologies that must be interwoven with agile DevOps pipelines, software is frequently created by disparate, fractured teams including contractors, service providers, and partners that are globally dispersed. Collaboration and coordination across these distributed resources are significant barriers to agile execution. To help address these challenges, enterprises and small and medium-sized businesses (SMBs) are increasingly evaluating and adopting platform automation for code repository management and deployment in the cloud and/or on-premises. IDC research indicates that around 38% of organizations had adopted version control/artifact repositories already as of 4Q17 and that an additional 31% are planning to adopt as of 4Q18. The ability to access code management as a service, with visibility into code — including OSS — and transaction analysis to respond to dynamically changing business needs is a core benefit. And the emergence of a variety of software deployment environments demanding fast cycle times drives the need for cross-platform, multimodal deployments — from mobile to wearables and embedded to traditional web, client/server, and mainframe systems of record (SOR) to collaborative systems of engagement. According to IDC, key trends driving growth for repo adoption and collaborative code management include:

- Agile approaches to both development and product evolution, including cross-platform applications and emerging technologies, mean that software release cycles and churn are faster than ever and increasingly complex. Business-critical branding and demand for software necessitate speedy turnaround. Compressed release times from months to days to hours drive the need for code management, repo, and DevOps pipeline automation.
- In the context of worldwide economic and geopolitical volatility, global competition — along with both compliance and innovation needs — has established widespread demand for OSS cloud and/or on-premises code repositories and management to improve stability and consistency. Adoption can enable rapid access to collaboration and support infrastructure to sustain complex software sourcing and distributed development.
- Repos in the cloud require fewer resources and less capital expenditure compared with on-premises and can facilitate fast turnaround times for DevOps. On-premises repos enable the control and management needs required by certain enterprises. (We see opportunities and needs for both cloud and on-premises options.)
- Small and medium-sized businesses and managed service providers along with enterprises are leveraging OSS and other repos to address demand for digital transformation and execution to be more adaptive and to help enable effective scaffolding for agile execution.

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IN THIS VENDOR PROFILE

This IDC Vendor Profile analyzes the repository and code management capabilities of GitHub Inc., including its open source GitHub.com in the cloud and GitHub Enterprise on-premises platforms. With 30 million registered users and nearly 100 million repositories in use, GitHub's ubiquity and popularity led to the company's acquisition by Microsoft, announced 2Q18 and expected to close 4Q18. We see this as a strategic opportunity for the combined companies across synergistic portfolios, assuming Microsoft's ongoing commitment to GitHub as an independent OSS provider with its extensive GitHub community. We expect ongoing announcements that evolve GitHub's products and support community demand. The profile also includes a user reference case study from Bloomberg, a data analytics company that has leveraged GitHub's Enterprise product to successfully coordinate disparate teams and business demands across five continents and multiple business units to address developer and business needs.

SITUATION OVERVIEW

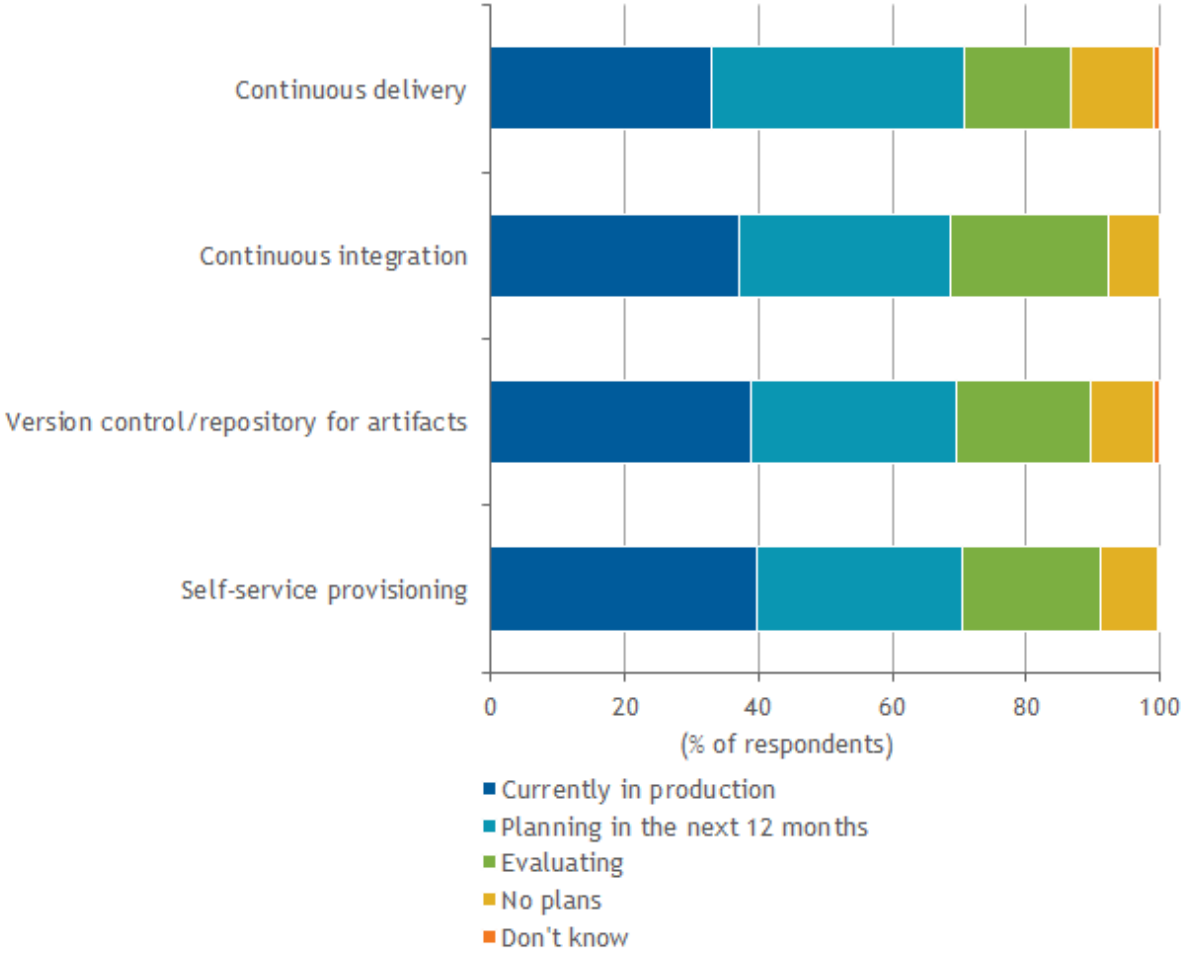
Organizations increasingly require effective, agile change management and version control in conjunction with artifact repositories as part of rapid code execution and responsiveness to changing business demands and establishment of DevOps pipelines. IDC has seen the growth of automated solutions in this market over the past 5–10 years, with accelerating adoption over the past 2–3 years particularly. OSS has played a significant role in driving market growth and demand, both in resulting OSS and proprietary solutions based on Git and with improving policy standards and increased popularity and leverage of OSS components as part of corporate code bases that must be managed. (This impels the need for visibility into OSS quality, security, and license management). Also, implicitly needed is change coordination with continuous testing, quality, and security across artifacts, as part of successful DevOps approaches.

As organizations establish end-to-end DevOps initiatives, they require broad coordination with adaptive software life-cycle pipelines, from inception and design through to deployment, updates, and beyond. Along with repo platform adoption, we increasingly see the evolution of continuous integration (CI). CI requires developers to integrate code into a shared repository several times a day and to verify each check-in via an automated build, letting teams detect issues early in the cycle, and is a core element for improved quality and DevOps. Continuous delivery (CD) — where teams produce software in short cycles to help release software reliably with greater speed and frequency — shows increased commitment and plans, with 33% of respondents already having adopted and 37.6% planning to adopt in the next 12 months (see Figure 1).

FIGURE 1

DevOps Practices Metrics — Deployment Technology Adoption

Q. To what extent has your organization adopted each of the following DevOps practices?



n = 100 weighted DevOps respondents

Source: IDC's *PaaS View for the Developer Survey,* November 2017

These collective factors give visibility into the combined strategy demanded now for code and change management, and its close coordination with other aspects of the DevOps pipeline, including CI, CD, the broader SDLC, and self-service provisioning for DevOps deployment success.

While we observe existing levels of maturity, we advise organizations to consider these aspects of the DevOps agile change management and deployment channel in relation to one another and to also

interweave continuous testing and quality, both for automation choices and as part of agile process transformation.

Self-service provisioning has been a long-standing and relatively well-leveraged aspect for user engagement and empowerment for DevOps infrastructure access and allocation as indicated by current adoption levels. IDC sees significant market growth emerging in the areas of CI and CD, as companies seek to increase the pace and frequency of software deployments, along with improved continuous testing strategies for high-quality software execution.

Company Overview

GitHub was founded in 2008 and is the commercial vendor behind the widely used GitHub public repository, with 30 million registered users and nearly 100 million repositories. As the central repository for the vast majority of open source software projects, public GitHub is ubiquitous and arguably one of the most widely used (if not the single most used) developer software platform technology in the industry.

The GitHub Enterprise product is a commercially supported version of the public GitHub technology, intended to be used in private environments within corporate datacenters and/or in private clouds hosted on-premises or off-premises. GitHub cites around 50% of the Fortune 100 as customers.

Microsoft announced its intent to acquire GitHub in June 2018, and the deal will close 4Q18 (see *Microsoft Significantly Expands Its Developer Collaboration Portfolio with GitHub Acquisition,* IDC #IcUS43961318, June 2018). IDC sees this as a strategic and highly significant acquisition and expects the combined companies to leverage synergies, which has already been occurring even before the deal finalizes based on the companies' existing partnership. (At Microsoft's premier Ignite conference 4Q18, for instance, the company demonstrated the application of Azure Machine Learning and Azure Data Lake Analytics in conjunction with data sets from GitHub.) Microsoft is putting VP Nat Friedman, OSS luminary (and former Xamarin CEO and cofounder), in charge of GitHub as part of its effort to exemplify a strategy that will be "hands off" with regard to GitHub's open source heritage and community. Current GitHub CEO Chris Wanstrath will join Microsoft as a fellow. Successful execution for this acquisition will be dependent on GitHub retaining its open source community independence from Microsoft's business, which both companies continuously emphasize to be their projected approach and strategy.

GitHub Enterprise provides a commercialized version of GitHub for enterprise use and a subscription offering hosted by GitHub that gives customers the option of using GitHub in a nonpublic setting, without having to be responsible for running the product locally. While these offerings are not necessarily unique, this technology has been widely embraced by the larger industry.

Growth of DevOps and agile development means that more organizations are going to move to a repository-based development environment that includes GitHub in some form.

Key Differentiators

There are no major competitors for GitHub Enterprise that offer products based on open source software having the scale of the public GitHub repository. The company has an inside track to become the de facto standard for organizations wanting a private cloud-hosted source code repository. The company cites over $200 million in annual revenue coming from a customer base that includes 30 million registered developers and nearly 100 million repositories (including both commercial- and community-version products). Other delineators for GitHub include its ecosystem and open platform

with 1,000s of third-party integrations and its role as a home for the most popular open source projects. A very significant user base of 30 million registered developers – including 1.7 million registered students – have been using and honing their skills on GitHub, a community that the combined companies seek to retain and grow post acquisition by Microsoft moving into 2019. The magnitude of execution on GitHub is exemplified in GitHub cited figures of 200 million pull requests and 1.5 million commits in 2017. The company is also working to strengthen security of workflows, with around 4 million vulnerabilities detected on 500TBs of code data, at this point.

Challenges

As with most commercial versions of open source software, GitHub faces direct competition from the public GitHub repository. There will likely always be customers that want to house their repositories in a private cloud or in a private repository in public cloud, which means there is a long-term market for GitHub Enterprise. However, how much revenue growth there could be long term in that market segment remains to be seen. GitHub's competitors have sought to sow doubt about Microsoft's long-term intent with regard to its acquisition of the company. That said, both Microsoft and GitHub have staunchly and consistently claimed that GitHub will retain its independence as an OSS provider and community supporter post acquisition. Microsoft's shift in support of OSS culture and technology has been underscored over the past several years since Satya Nadella took over as CEO. That cultural evolution for Microsoft, and the fact that this acquisition will only succeed and be of value long term if GitHub remains autonomous as the purveyor of its platform and supporter of the OSS community, will combine to maintain that strategy, in IDC's opinion.

Company Strategy

GitHub is committed first and foremost to its open cloud-based platform to further development and coordination with GitHub Enterprise while leveraging its open source heritage and sustaining the GitHub community and marketplace. The company plans to evolve its combined platform to address areas of customer demand, including CI/CD, enhancing support of the DevOps pipeline by connecting its cloud and on-premises product lines to enable users flexibility to explore OSS beyond the firewall. Other areas of evolving focus include security, improving developer experience to address modern development with the flexibility to encompass emerging needs (including those that aren't yet known or visible). Announcements at the company's Universe user conference (4Q18) include: GitHub Actions (limited public beta); security-related products with GitHub Token Scanning for public repositories (public beta) and GitHub Security Advisor API; and for connecting the organization via GitHub Connect, Unified Search and Contributions (in GitHub Enterprise 2.15), and Unified Business Identity (limited public beta).

One of the most significant announcements for expanding the platform is GitHub Actions (which is available on Developer, Team, and Business Cloud plans). GitHub Actions lets users connect and share code containers, applying open source approaches to workflow to flexibly pair tools and integrations in any language on GitHub (or other external systems). The range of opportunities for leveraging GitHub Actions is extremely broad, extending GitHub cloud options significantly.

The security announcements enable vulnerability alerts for Java and.Net (in addition to existing support for JavaScript, Ruby, and Python). Token Scanning helps ensure that tokens and keys are not publicly exposed or committed by scanning public repositories for known token formats and to let providers to contact account owners to issue new tokens. GitHub Security Advisory API lets users leverage aggregated data to have visibility into and help identify security vulnerabilities across millions of projects.

As part of improving collaboration and connections across GitHub's 30 million registered users, 96 million repositories, and 500TB+ of data across the platform, GitHub Connect at launch includes three features: Unified Business Identity, Unified Search, and Unified Contributions. These initial capabilities let developers connect public data and communities whether the companies run GitHub Enterprise or GitHub Business Cloud. In addition, at the conference, GitHub significantly expanded its interactive learning environments with GitHub Learning Lab courses for organizations, to enabling the ability to contextualize GitHub learning environments specific to their businesses.

GitHub's intent is to expand the company's position as a destination platform for developers (i.e., an end-to-end DevOps platform supported by existing and improving workflow capabilities). Both Microsoft and GitHub are unswerving about GitHub's delineated role post acquisition. We expect the combined companies will go down that path, but customer, community, and partner outreach and crisp boundaries between the two companies must be maintained for success once the deal closes. There will also be opportunities, synergies, and benefits potentially for the companies of course and their product portfolios and platforms, but those need to exist within defined borders, given GitHub's position and the ubiquity of GitHub's OSS platform.

We expect GitHub to focus on four key areas over the coming months: its open platform, security, enterprise coordination across GitHub platforms, and improved developer experience. Leverage of machine learning (ML) and artificial intelligence (AI) and evolving data analytics should play a core role across GitHub data moving into 2019-2020 and beyond. We expect additional details to be forthcoming and that these areas will create a foundation moving forward. We already see GitHub moving from the developer and engineering side to help enable business collaboration for some organizations and expect the company to build further on those opportunities and to increase those capabilities for business execution moving forward.

Bloomberg User Reference Case Study

GitHub Enables Collaboration, Faster Development, and Increased Efficiency for Bloomberg

Bloomberg, the global finance, media, and tech company, with around 20,000 employees and approximately 5,500 engineers worldwide needed to improve source code automation and collaboration and began evaluating products. The teams were managing source code primarily in Git and were dealing with code management inefficiencies and deployment challenges that demanded strengthened tooling and a platform for automation to foster cross-team coordination globally.

This initiative began in the 2014 time frame and was led by Bloomberg's Office of the CTO, given its potential benefit and impact. It took Bloomberg about 3-6 months from identifying vendors to making the purchase. GitHub was chosen because it had the best collaboration capabilities and automation available on its platform as the financial data analytics company made its evaluation. Many developers at Bloomberg had worked with open source software already, so it was a model with which they were familiar. GitHub enabled the company to fork a project, request modification, and modify it, with workflow support that was helpful and in line with strategic goals to enable interaction across disparate groups to drive faster deployment.

Initially, a small group of about 50 users piloted GitHub successfully within the company's consumer and subscription web products unit; GitHub was well adopted by teams that saw significantly improved collaboration and increased efficiency. This set the stage for a broader rollout.

At that point, Bloomberg began deploying GitHub Enterprise to the rest of the company, staggered across early adopter groups initially (since it wanted to be sure that the self-hosted platform would be scalable). The company went through 6–12 months of this initial process to bring adoption up to 500 users across its London and New York City offices, with GitHub's support to help scale the product given intensive API usage. Adoption then spiraled upward as others saw the benefits and opportunities for code management and collaboration.

Pre-GitHub, with the earlier Git usage, the many requests to move code and manage transitions were ponderous and challenging; team coordination improved significantly with GitHub because of workflow and collaboration support. While it was possible to find code earlier, code changes had been cumbersome, requiring meetings, work tickets, and critical requests; with GitHub, changes could be found and accepted quickly. With GitHub's strong workflow as a driver, the teams were able to bring in pull requests and became more comfortable pushing them through. As the company made the transition to GitHub, many teams had CI systems for the code merge and wanted feedback on and visibility into the pull requests, which GitHub made available; the company is also able to automate the review process, which is a powerful draw. The GitHub implementation was completed by the organization's own teams for both the initial 50–500 users and the current deployment of 5,000–8,000 users.

Bloomberg now has a range of 5,000–8,000 GitHub users across five continents that include not only developers but also teams outside of Engineering that are using the product across the company. For instance, communications teams are using GitHub to develop content that is published internally and/or externally. Another recent use case is to host an externally published online learning course. The website for the "Foundations of Machine Learning" course was built using GitHub, and data scientists collaborated with engineers to design the site and to revise the content used.

Streamlining Coordination, Pull Requests, and Deployment Workflow

Benefits include the ability for visual designers to make changes to web assets in GitHub without having to make requests and to be able to accept appropriate changes, speeding development. Bloomberg's news arm uses GitHub for certain applications and has been able to successfully streamline the processes and enable collaboration across groups. The feedback from software engineers is that they are happy with the significant collaboration that is now possible and that was previously arduous or impossible. They are now able to discover and configure code, lowering the cost of setting up software automation pipelines. They are also able to take a configuration from a Jenkins plugin as part of the deployment pipeline and it "just works" rather than having to create the API itself. There are web triggers that can be integrated together or changed up.

Updates to GitHub have significantly improved code review and collaboration across larger code bases with clearly delineated owners. GitHub has been responsive when there were issues that needed to be addressed, and experienced support teams have been extremely effective. Bloomberg is a highly engaged user that has pushed the limits of what GitHub could do and challenged them. While GitHub.com has been a focus for GitHub, Bloomberg relies on GitHub Enterprise on-premises. Areas that remain needed for the company are monitoring, alerting, and a load-balancing framework for heavy users (which the company finds for GitHub Enterprise is not as rich or as effective as what is available for GitHub.com). Kubernetes support is something the company would like.

Challenges for the company included initial scaling issues as it hit GitHub API hard with GitHub Enterprise. GitHub Enterprise doesn't come with the range of the load-balancing and scaling options that are available with GitHub.com, which can be stressed brutally as a result of management

capabilities. (Bloomberg loves the API support and has pushed the limits to the max of what can be done with the GitHub platform as a result. But they need stronger management capabilities for the on-premises GitHub Enterprise version.) This is an issue that GitHub is seeking to address for the company, as Bloomberg keeps growing and finding new ways of increasing the capacity that is consumed (and capabilities have improved over the past 12 months). But the company is at a point where the user base has grown significantly, and the use of automation has grown such that it is moving to cluster (in part since its API and other usage is so heavy). Bloomberg is also seeking improved code review capabilities for GitHub Enterprise. New or additional features/services that it would like to see in the solution would primarily be code review, which has improved in the latest version building on top of what GitHub offers, making easier integration with third parties such as Atlassian's JIRA and CloudBees' Jenkins, and improving GitHub Enterprise monitoring and management capabilities (also including anomaly detection and contextualization).

The fundamental uptake and feedback from users at the company are that GitHub is a fantastic third-party tool about which the company is broadly positive. The functionality that has been most important in solving the company's core problems are automation, the GitHub API, workflow (helpful with collaboration and automation), and a web front end that is very well designed (with strong workflow). While adoption transitions can be tough since engineers must change how they work, GitHub incented engineers well, offering clear benefits with better network effects that were observable.

Bringing GitHub into the Application Life Cycle

In terms of coordinating GitHub with other application life-cycle management (ALM) areas, the company uses a range of other tools for testing, static analysis, and prioritization. One area of GitHub coordination required by the teams is on the project side, for which the company is mostly using Atlassian's JIRA. For instance, Bloomberg has integrations it has built for JIRA to GitHub, so that teams can track that through the life cycle. The company has built its own integration for both code pull requests and merge. The company is doing a lot in that area currently, focusing mostly on review automation, to help reduce the human burden of code review and to have static and security analysis run automatically on pull requests. Since Bloomberg has varying maturity levels across the company, it has seen the good impact of having that coordination in place to help reduce manual work and to also reassure teams. This kind of flow is a big deal for the company. GitHub also offers third-party support, which is available off the shelf, though some integrations don't scale brilliantly. Bloomberg is looking for additional integrations to the broader ALM and DevOps pipeline.

Successes Include Faster Turnaround and Evolving Opportunities with GitHub

Quantifiable successes include turnaround time improvements and streamlined processes that improved premerge integration checks and led to better code quality. Pull request workflow enabled developers to run the automation request on the pull request prior to code mergers, and backlogs are moving through much more quickly. People are more comfortable making changes; they weren't doing pull request workflow before GitHub. As an example, prior to bringing in GitHub, visual design tweaks to mobile applications would go into a request queue that would take a few weeks to complete rather than a quick pull request; after bringing in GitHub, visual design tweaks were able to be completed in less than an hour, making a significant difference in elapsed time. It is also much easier to leverage work that someone else has done, making it obvious that you had forked it, which you wouldn't have known before, for instance.

Deployment times are also faster, but since the company has changed metrics, it's harder to measure against a different baseline. Improvements include significantly shortening the length of time that code

spends in pull request before it's merged; before GitHub, code would just sit in branches for days or sometimes weeks; the company has increased deploys per day and is getting better at collecting the data for visibility into those benefits.

As mentioned previously, Bloomberg's teams are beginning to leverage GitHub for nondevelopment areas of the company, and it is seeking to extend that further. Also, it is streamlining the workflow, such as setting up more automated checks on pull requests rather than checking in postmerge. Until now, teams have had to configure picks on the repo; the company is trying to automate many of those actions so the teams don't have to do it manually. GitHub has helped fill interconnections "under the hood" for the company.

Lessons Learned and Future Trajectory with GitHub Across the Organization

In terms of organizational and process structure for GitHub, Bloomberg has folded it into the Developer Experience (DevX) group, which is responsible for scaling up tools for the company's software engineers. The biggest learning curve for this organization was that it's hard to predict how its people would interact with the product; its assumptions about API usage were way off and underestimated by far the level of engineer engagement – the company has fantastically talented developers who are good at finding new ways to do things, and it's hard to predict what they would do. So advice to its peers would include flexible expectations about the range of usage models, adaptability, and close coordination with strong vendor support to respond well to potential scaling opportunities.

In conjunction with GitHub support, Bloomberg's teams have been able to evolve its adoption to global usage with efficiencies of scale, collaboration improvements, faster pull request merges, deployments, and workflow. The company has been able to expand GitHub adoption beyond Bloomberg Engineering to include other business areas and is looking to extend that further moving into 2019.

FUTURE OUTLOOK

We expect repository and code management and OSS to remain a lynchpin for organizations' DevOps and digital transformation strategies. Increasingly, the DevOps pipeline and ALM strategies will interweave with repos to enable software execution across multimodal platform environments and emerging technologies. Artificial intelligence and machine learning will play key roles in enabling data analytics that make information available and actionable pragmatically that has typically been locked up and moribund, allowing for agile approaches and adaptability for DevOps execution in new and emerging environments that has eluded organizations typically.

ESSENTIAL GUIDANCE

Advice for Users

Evaluate emerging technology platform solutions for code management and leverage strategies that encompass OSS on the cloud to take advantage of those benefits (and on-premises as needed for business reasons), as well as improving coordination with DevOps pipelines, ALM, and modern development with microservices and evolving support for ML with data analytics to target complex, multimodal deployment environments and predictive execution. As the GitHub/Microsoft acquisition closes, be cognizant of emerging capabilities and progression of the standalone GitHub portfolio as part of the GitHub community, as well as synergies across the product portfolios and ongoing company delineation and execution.

Organizations must also focus on organizational and process strategies to accompany automation decisions; shifts to digital transformation and effective DevOps strategies necessitate human cultural change and adaptability and require significant investments.

LEARN MORE

Related Research

- *Market Analysis Perspective: Worldwide Agile ALM Quality and Portfolio Strategies, 2018* (IDC #US43390618, September 2018)
- *Microsoft Significantly Expands its Developer Collaboration Portfolio with GitHub Acquisition* (IDC #IcUS43961318, June 2018)
- *Worldwide Software Configuration, Change, and Process Management Market Share, 2017: Double-digit Growth Driven by DevOps, Agile Innovation, and Multimodal Deployment* (IDC #US42653118, June 2018)
- *Worldwide Software Configuration, Change, and Process Management Forecast, 2018-2022* (IDC #US42653218, June 2018)

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