**FORRESTER®**

# The Forrester Wave™: Continuous Integration Tools, Q3 2017

**Tools And Technology: The Modern Application Delivery Playbook**

by Christopher Condo and Amanda LeClair
September 26, 2017

## Why Read This Report

In our 16-criteria evaluation of continuous integration (CI) tool providers, we identified the 10 most significant ones — Atlassian Bamboo, AWS CodeBuild, CircleCI, CloudBees Jenkins, Codeship, GitLab CI, IBM UrbanCode Build, JetBrains TeamCity, Microsoft VSTS, and Travis CI — and researched, analyzed, and scored them. This report shows how each provider measures up and helps application development and delivery (AD&D) professionals make the right choice.0GitLab, Microsoft, CircleCI, And CloudBees Lead The Pack

Forrester's research uncovered a market in which GitLab, Microsoft, CircleCI, and CloudBees lead the pack. Codeship, AWS, Travis CI, and JetBrains offer competitive options. Atlassian and IBM lag behind.

## Key Takeaways

**AD&D Leaders Empower Their Teams Through Automation**
Adoption of CI tools is growing as more AD&D organizations shift to Agile and DevOps, resulting in smaller, product-centric, autonomous software development teams. AD&D leaders empower their teams with CI tools that automate software delivery tasks and easily integrate with other parts of the tool chain, without unwanted complication and management overhead.

**Pricing Model, Ease Of Use, And Analytical Capability Separate The Vendors**
As AD&D organizations become more distributed, more global, and more reliant on open source components, traditional CI tools no longer suffice. Vendors are taking different approaches to address this evolution. Those with a vision and road map that align best with modern app dev principles will lead the pack.

# The Forrester Wave™: Continuous Integration Tools, Q3 2017

**Tools And Technology: The Modern Application Delivery Playbook**

by Christopher Condo and Amanda LeClair
with Christopher Mines, Amy Homan, and Andrew Reese
September 26, 2017

## Table Of Contents

## Related Research Documents

The Forrester Wave™: Continuous Delivery And Release Automation, Q3 2017

The Quest For Speed-Plus-Quality Drives Agile And DevOps Tool Selection

TechRadar™: Continuous Software Delivery, Q3 2016 (Updated)

**Share reports with colleagues.**
Enhance your membership with Research Share.

---

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The Forrester Wave™: Continuous Integration Tools, Q3 2017
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

# CI Drives Software Delivery Success

CI enables software development teams to work collaboratively, without stepping on each other's toes, by automating builds and source code integration to maintain source code integrity. Modern CI tools do a lot more than that: They also integrate with DevOps tools to create an automated code delivery pipeline commonly referred to as CI/CD (continuous integration/continuous delivery). When fully automated, this can deliver applications from developers' desktops to production servers in minutes, rather than months, by automating and integrating all of the manual processes that comprise the software development life cycle (SDLC). The drive to automation and continuous delivery is happening at a scale and pace that would have been unthinkable only 10 years ago.[1]

This Forrester Wave report focuses on the CI portion of that equation; tools supporting CD are covered in The Forrester Wave™: Continuous Delivery And Release Automation, Q3 2017.[2]

## Development Teams Depend On CI Tools To Maintain Cadence

In our recent survey of more than 2,000 developers, 67% of them indicated that they use CI tools as part of their software development process; however, only 17% use them daily.[3] Dev teams that are not using CI tools are holding themselves back by not taking advantage of the automated, repeatable processes CI tools afford them:

› **Automated code merges.** Modern software development calls for source code integration — early and often, which is what makes it "continuous." This is critical for writing code in a concurrent manner, where developers are often codeveloping shared components and ungoverned code merges can lead to schedule-killing bugs and delays.

› **Automated builds.** Modern software development depends upon an automated build execute each time code is merged into the main branch. Failing early ensures developers can capture and fix issues before they disrupt the flow of the entire team. Modern CI tools orchestrate merges and execute builds in parallel to ensure that builds execute with speed.

› **Automated unit testing.** Developers' adoption of microservices, combined with continuous delivery, places greater demand upon them to write and maintain automated unit tests to ensure functional compliance. Developers need their CI tools to efficiently execute these tests, concurrently when possible, to maintain cadence.

› **Automated diagnostics.** Figuring out why a build breaks or takes too long to execute can be critical to keeping the development train running. Developers need CI tools to track system utilization and build stage statistics to point them to exactly where a build broke and help them get back on track.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 26, 2017

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

## Development Teams Need Additional Capabilities To Keep Pace With Innovation

AD&D teams that have already embraced CI and DevOps realize they need to continuously refine and optimize their AD&D processes.[4] To do so, they are looking for help from their CI tool vendors to provide better performance and more capability. Here's what the reference customers we spoke with wanted to see:

› **Increased scale.** CI tools need to execute hundreds or thousands of builds per day depending on the size of an organization. To meet this demand, CI tools now support parallel job execution, dependency management, and autoscaling.

› **Ease of use and administration.** Development leaders want tools that are easy to use and manage to support self-service by their developers across the country and globe. This need for fast learning and simple operation has led to the rise of complete, SaaS-based CI tool chains.

› **Deeper analytics.** Stats are the starting point, but development teams want greater depth of information to help them find current (and future) bottlenecks, identify risky code and flaky unit tests, and present it all in a dashboard that provides tailored, role-based perspectives for each team member.

› **Meaningful alerts and notifications.** Development teams want to know when things go wrong but don't want to be overrun with too many updates. They need useful filters and distribution channels to direct messages to the appropriate audience with the proper priority.

› **Extensibility.** The ability to integrate a CI tool into a sophisticated, CI/CD toolchain is a must-have. Teams want information that can be passed up to Agile tools, across to collaborative tools, and down to automated testing and CD tools.

› **Integration with CD.** Advanced teams know that automating all the CI processes is only taking their SDLC halfway. To go all the way — automating all the steps needed to get code from the developer to the end user — requires integration with CD tools.

## Continuous Integration Evaluation Overview

To assess the state of the CI tools market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of top CI vendors. After examining past research, user need assessments, and vendor and expert interviews, we developed a comprehensive set of evaluation criteria. We evaluated vendors against 16 criteria, which we grouped into three high-level buckets:

› **Current offering.** Our evaluation of the current offering focused on ease of use, pricing and licensing models, build automation, analytics, and DevOps tool chain integrations. Other important components were security features and support for containers.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 26, 2017

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

> › **Strategy.** To assess strategy, we analyzed product strategy, market approach, execution road map, consulting, training, and support.

> › **Market presence.** To assess market presence, we analyzed installed base, product revenue, and corporate profitability.

## Evaluated Vendors And Inclusion Criteria

Forrester included 10 vendors in this assessment: Atlassian, AWS, CircleCI, CloudBees, Codeship, GitLab, IBM, JetBrains, Microsoft, and Travis CI. Each of these vendors has (see Figure 1):

> › **A demonstrable, comprehensive CI product.** Each vendor offers a full-featured CI product that orchestrates the continuous integration process starting from the point at which code is checked into a version management system — kicking off a build and integration process, initiating test environment provisioning, deploying the build into the testing environment, and initiating automated testing. If the CI tool is open source, vendors included offer formal enterprise backing and commercial support for the tool.

> › **At least 25 paying enterprise clients.** Forrester defines an enterprise as a company with at least 1,000 employees.

> › **Significant interest from Forrester's user clients.** Each included vendor receives interest from Forrester's end user clients in the form of inquiries, survey responses, or other input.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

**FIGURE 1** Evaluated Vendors: Product Information And Selection Criteria

| Vendor | Product evaluated | Version number |
|--------|-------------------|----------------|
| Atlassian | Bamboo | Version 6.0.3 |
| AWS | AWS CodeBuild | Version 2016.10.06 |
| CircleCI | CircleCI | Version 1.0 |
| CloudBees | CloudBees Jenkins Enterprise | Version 2.46.3.2 |
| Codeship | Codeship | Codeship Pro |
| GitLab | GitLab CI | Version 9.3 |
| IBM | IBM UrbanCode Build | Version 6.1 |
| JetBrains | TeamCity | Version 2017.1.2 |
| Microsoft | Visual Studio Team Services | Version 2017.2 |
| Travis CI | Travis CI | Travis CI Enterprise |

**Vendor inclusion criteria**

**A demonstrable, comprehensive CI product.** Each vendor offers a fully featured CI product that orchestrates the continuous integration process starting from the point at which code is checked into a version management system — kicking off a build and integration process, initiating test environment provisioning, deploying the build into the testing environment, and initiating automated testing. If the CI tool is open source, vendors included offer formal enterprise backing and commercial support for the tool.

**At least 25 paying enterprise clients.** Forrester defines an enterprise as a company with at least 1,000 employees.

**Significant interest from Forrester's user clients.** Each vendor included receives interest from Forrester's end user clients in the form of inquiries, survey responses, or other input.

## Vendor Profiles

This evaluation of the CI tools market is intended to be a starting point only. We encourage clients to view detailed product evaluations and adapt criteria weightings to fit their individual needs through the Forrester Wave Excel-based vendor comparison tool (see Figure 2).

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

**FIGURE 2** Forrester Wave™: Continuous Integration Tools, Q3 '17

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017
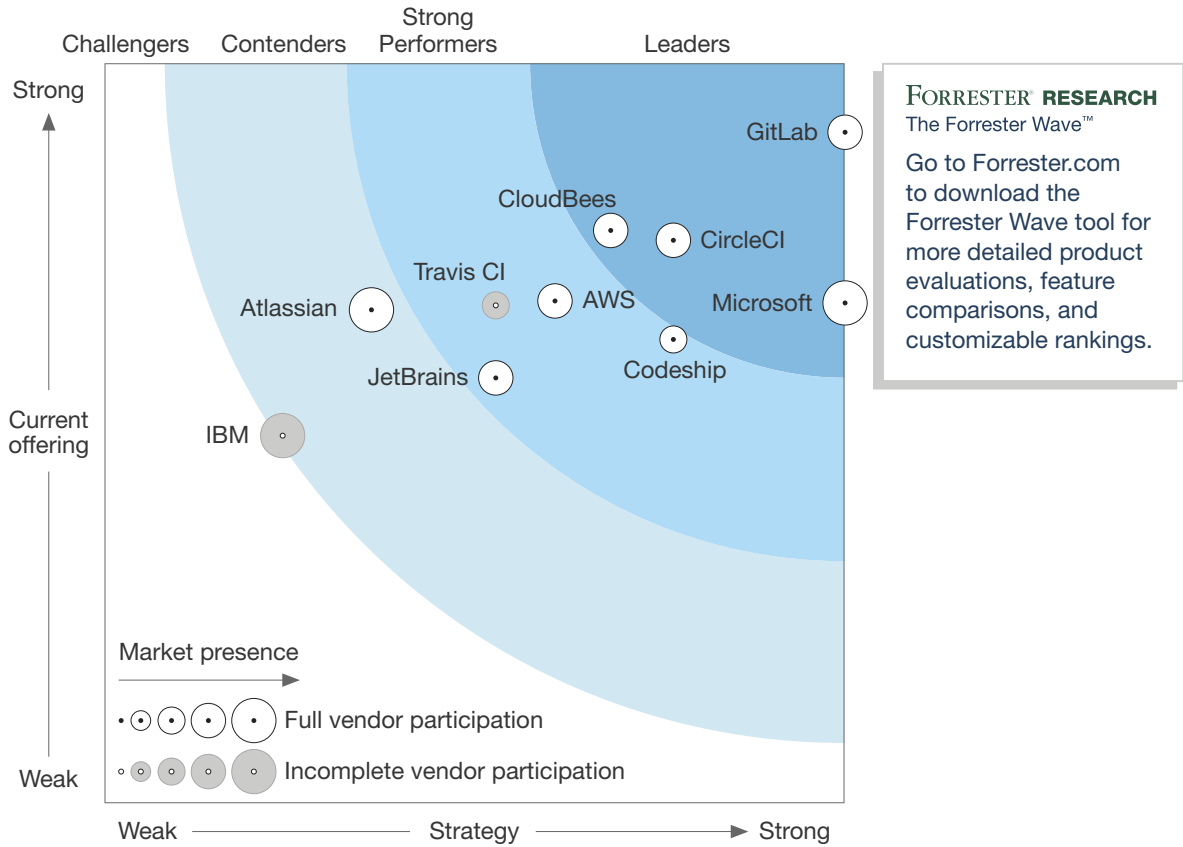
FIGURE 2 Forrester Wave™: Continuous Integration Tools, Q3 '17 (Cont.)

| | Forrester's weighting | Atlassian | AWS | CircleCI | CloudBees | Codeship | GitLab | JetBrains | Microsoft |
|---|---|---|---|---|---|---|---|---|---|
| **Current Offering** | 50% | 3.33 | 3.39 | 3.80 | 3.84 | 3.13 | 4.53 | 2.87 | 3.38 |
| Ease of installation/ configuration | 5% | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 5.00 | 3.00 | 5.00 |
| Configuring builds and build reuse | 10% | 5.00 | 5.00 | 5.00 | 3.00 | 3.00 | 5.00 | 5.00 | 3.00 |
| Pricing/licensing model | 12% | 1.00 | 3.00 | 4.00 | 5.00 | 2.00 | 5.00 | 1.00 | 4.00 |
| Platform support | 4% | 1.00 | 3.00 | 5.00 | 3.00 | 3.00 | 5.00 | 1.00 | 3.00 |
| Security features | 10% | 5.00 | 5.00 | 3.00 | 3.00 | 3.00 | 5.00 | 3.00 | 5.00 |
| Build automation | 15% | 2.40 | 4.40 | 4.40 | 3.00 | 4.40 | 3.00 | 2.40 | 1.60 |
| Notifications and alerts | 5% | 3.00 | 3.00 | 5.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Container build support | 7% | 3.00 | 3.00 | 1.00 | 5.00 | 5.00 | 5.00 | 1.00 | 3.00 |
| Container runtime support | 5% | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 0.00 |
| GUI | 5% | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 5.00 | 3.00 | 3.00 |
| Analytics | 10% | 3.00 | 1.00 | 3.00 | 5.00 | 1.00 | 5.00 | 3.00 | 5.00 |
| DevOps toolchain integrations | 12% | 5.00 | 2.00 | 4.10 | 4.30 | 3.00 | 4.40 | 4.00 | 4.00 |
| | | | | | | | | | |
| **Strategy** | 50% | 1.80 | 3.04 | 3.84 | 3.40 | 3.84 | 5.00 | 2.64 | 5.00 |
| Product strategy | 40% | 2.00 | 3.10 | 3.10 | 4.00 | 2.10 | 5.00 | 2.10 | 5.00 |
| Market approach | 40% | 1.00 | 3.00 | 5.00 | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 |
| Consulting, training, and support | 20% | 3.00 | 3.00 | 3.00 | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 |
| | | | | | | | | | |
| **Market Presence** | 0% | 4.25 | 3.95 | 3.25 | 3.40 | 2.30 | 3.10 | 3.75 | 4.30 |
| Installed base | 50% | 5.00 | 4.40 | 3.00 | 3.80 | 3.60 | 4.20 | 4.00 | 4.60 |
| Company performance | 50% | 3.50 | 3.50 | 3.50 | 3.00 | 1.00 | 2.00 | 3.50 | 4.00 |

All scores are based on a scale of 0 (weak) to 5 (strong).

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The Forrester Wave™: Continuous Integration Tools, Q3 2017
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

### Leaders

› **GitLab delivers ease of use, scalability, integration, and innovation.** GitLab has a broad market reach, with over 80,000 active instances using the open source GitLab Community edition and over 500 enterprises paying for GitLab CI/CD. GitLab supports development teams with a well-documented installation and configuration processes, an easy-to-follow UI, and a flexible per-seat pricing model that supports self-service. GitLab's vision is to serve enterprise-scale, integrated software development teams that want to spend more time writing code and less time maintaining their tool chain. The company actively engages in the DevOps community, hosting regular webcasts and sponsoring developer events. It also stands apart from most other vendors in the space by making its planned enhancements road map available to the community through a public issue tracker.

Despite best-in-class extensibility, reference customers cited limitations in notifications and alerts, calling out difficulty integrating with Slack, among other platforms. GitLab will appeal to organizations that want to operate as integrated teams by offering an innovative, end-to-end solution that works for both small and enterprise-scale teams.

› **Microsoft is developer-focused with free SaaS tools and diagnostic capabilities.** Through Microsoft Team Foundation Server and Visual Studio Team Services (VSTS), Microsoft has a familiar brand in the development tool market. It offers CI functionality within VSTS, which is available in on-premises and cloud/SaaS offerings. Microsoft VSTS has some of the strongest security features across vendors Forrester evaluated, specifically its ease of integration with either enterprise authorization systems or GitHub to import permissions. Reference customers praised VSTS for its analytics capabilities, which include advanced analysis of test results across builds and dashboard widgets for quick summaries. Microsoft demonstrates a clear DevOps vision and a strong go-to-market approach that includes a free version available for small teams.

Microsoft VSTS has a few functional weaknesses. Its pricing by concurrent builds created scalability issues for reference customers, who reported having to use their own build server or having to manually intervene to scale up or down as demand changed. Microsoft's core user base will appreciate its continued focus on this class of tools, the diagnostics, and its recent adoption of Git and other open source approaches. The free online version and integration with Azure will broaden this product's appeal to open source developers who might have shied away from Microsoft tools in the past.

› **CircleCI's emphasis on simplicity at enterprise scale is a strong combination.** CircleCI launched in 2011. Its free version is used by 17,000 organizations; an additional 4,000 are paid customers. CircleCI's setup wizard, with out-of-the-gate YAML examples and next-step guides, is one of the most developer-friendly tools for configuring projects. Reference customers were impressed with the simplicity and flexibility of setting up build notifications and alerts. In addition, CircleCI provides build diagnostic capability via secure shell (SSH), which several customers greatly appreciated. CircleCI's 2.0, released in July 2017, adds workflows, greater scale, and first-class Docker support, which gives organizations building microservices-based apps the capability they need.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

CircleCI lags behind other vendors in total number of DevOps toolchain integrations, but CircleCI does support a number of collaboration and Agile planning tools via webhooks. Organizations striving to be lean and stay lean will appreciate the simplified, nearly zero-maintenance approach CircleCI provides. Existing customers will appreciate the new features of CircleCI 2.0 that appear to completely address all the top asks that customers are looking for.

› **CloudBees Jenkins has a clear vision for greater scale and simpler maintenance.** CloudBees Jenkins Enterprise is based on the Jenkins open source platform, to which CloudBees contributes 80% of the code. Jenkins has approximately 2 million users, a broad underpinning to CloudBees' visibility in the CI market. Functionally, CloudBees Jenkins shines in container support through plugins with Docker, which many reference customers say is an increasingly important selection criterion for a CI tool. CloudBees includes a full analytics platform, and customers can access more advanced analytics and dashboards through the open source community. CloudBees has a DevOps vision that aligns well with its users' needs, and it is actively engaged in the developer community — most notably through its Jenkins World conference.

Because of CloudBees' server/agent model, users face challenges managing scale due to overhead needed to maintain all the moving parts. Reference customers found their licensing model, also based on servers and agents, limiting. To address these issues, CloudBees introduced a private SaaS version of CloudBees Jenkins in February of 2017, and CloudBees is transitioning to a per-user model. Almost every developer is familiar with Jenkins, both the good and the bad, and to its credit, CloudBees is working to address those challenges head on. CloudBees' new offering rewards existing customers that have stayed loyal to the Jenkins platform and will make it easier to win over new users that want enterprise capability and support from a product that has a thriving open source community.

## Strong Performers

› **Codeship sees the future, and it's Docker.** Codeship offers two products, Codeship Basic and Codeship Pro, both of which include a free tier and are free for open source. Codeship Pro is one of only a few CI tools that offer pipeline-as-code, enabling developers to version and reuse pipelines far more easily than traditional, GUI-based configuration systems. It also supports Docker natively and supports building Docker images as an output of the CI process. Both Codeship Basic and Codeship Pro have built-in continuous delivery functionality. From a strategy perspective, Codeship's vision and planned enhancement road map are rather basic when compared to leading vendors in this category; however, it is actively engaged in the developer community through a weekly newsletter and presence at several developer conferences each year.

While Codeship Basic allows developers to be up and running within minutes, reference customers noted that Codeship Pro requires a more in-depth installation process, which required extra time for custom syncs. In addition, customers said Codeship needed to improve extensibility,

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

as they had to write custom code to configure it within their environment. Codeship appeals to organizations that are heavily invested in Docker and looking for a complete SaaS offering, even as the product is still maturing.

› **AWS CodeBuild delivers the power of AWS to the developer's doorstep.** The AWS CodeBuild offering is barely a year old, but based on its feature set and customer feedback, it is already a force to be reckoned with. AWS CodeBuild users are willing to live with some growing pains in exchange for pay-as-you-go pricing, automatic scaling, and no maintenance overhead. And AWS CodeBuild supports developers where they live, GitHub, and complements its CI tool's capabilities with an AWS development toolchain that includes AWS CodePipeline and AWS CodeDeploy. AWS's platform approach extends beyond the product capabilities of AWS CodeBuild, which is the narrower focus of our evaluation. The AWS vision reflects the newness of this product; it covers a lot of ground but doesn't have the crystal-clear focus we saw from the leading vendors. But that vision does include supporting small, connected teams without limitations on scale; so, it is definitely on the right track.

Turning that vision into reality is still a work in progress. Reference customers explained that tool chain integrations were difficult and that they didn't like that build logs are disjointed from the AWS CodeBuild UI, forcing them to view build output via AWS CloudBuild. In general, customers desired a more cohesive user experience. But considering the newness of this product, these problems are not unexpected. Organizations that want a complete SaaS solution that integrates fully with AWS and its pay-per-minute pricing model will love this product — if they don't mind being early adopters that help shape its direction.

› **Travis CI has flexible platform support, but lacks Agile integrations.** Travis CI is a well-known player in the CI space; nearly all of the reference customers we spoke with, regardless of which tool they use, mentioned it as a tool they evaluated. Travis CI has a flexible, per-user pricing model and offers free support for open source projects. The installation and configuration process is simple with ample documentation for self service, and the tool can run on a variety of platforms. It supports container builds and runtime within the tool and also offers additional support through online educational materials. Travis CI uses GitHub permissions, which don't provide the level of granular control that many potential customers were looking for. Beta features indicate that TravisCI's road map is focused on improving performance, which aligns with the priorities that reference customers identified.

TravisCI has much narrower Agile tool integrations than the leaders in the CI space. Its list of third-party integrations seems short compared to other vendors, but given that Travis is focused on CI, the integrations it does have appear to align with needs of users in this space. Travis CI is worth a look from organizations that need a solution in both SaaS and on-premises CI solutions. TravisCI was a nonparticipating vendor in this evaluation.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The Forrester Wave™: Continuous Integration Tools, Q3 2017
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

› **JetBrains TeamCity offers integration with CD tools, but lags on containers.** JetBrains TeamCity is one of the biggest players in the CI tools market, with over 5,000 total paying customers. TeamCity easily integrates into a DevOps tool chain, primarily due to its serving as both a CI and CD tool. It has strong integration capabilities with Agile tools primarily through plugins, and offers extensive documentation for further extensibility. TeamCity users get a strong community, training, and support through quick turnaround times from customer support (less than 24 hours), a community issue tracker, and thorough documentation. From a strategy perspective, TeamCity's planned enhancements are well-aligned to what we heard from its customers, focusing on improving scalability and adding container support, as well as cloud-hosted agents.

In addition to lagging in container build support, customers found TeamCity's pricing by agents and servers too restrictive for self-service and automated scaling. TeamCity is only available on-premises, which dissuaded customers who wanted a SaaS-based CI tool. Given its JetBrains pedigree, TeamCity appeals to organizations that want an on-premises solution, backed by a company with enterprise experience.

### Contenders

› **Atlassian's key strength is its ecosystem, but it lags in innovation.** Atlassian Bamboo sits within the portfolio of Atlassian's well-known developer tools and runs on-premises only. Bamboo offers strong security features for encryption, permissions, and authentication, making it a good fit for development teams that need robust access controls. Customers reported that ease of integration was a top criterion for selecting Bamboo, which has over 200 plugins available in the Atlassian marketplace. Customers also like the ease of installation and setup. Atlassian's road map will focus on minimizing the management overhead of dealing with agents and servers, was an important issue for all of our reference customers.

Atlassian Bamboo is priced by servers and agents. As with other vendors that have similar pricing models, this creates management challenges for customers. The product road map has a strong focus on enterprise customers that includes performance enhancements, support for complex workflows, and containerization, but it lacks the innovation breadth of the strategy leaders in this evaluation. Despite that, Bamboo is a solid tool that will appeal to teams looking for a Jenkins alternative and a complete, out-of-the-box integrated experience within the Atlassian tool suite.

› **IBM's offering relies on centralized management, leaving self-starters hanging.** IBM UrbanCode Build provides a traditional approach to CI. It features robust capabilities for large enterprise development teams but is based on an organization model where developers are supported by a central IT team, which is often not the case anymore. It features reusable project templates, global reporting, and is highly extensible and customizable. In addition, UrbanCode Build offers integrations to newer, must-have technologies such as Docker and tools such as Jira.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

September 26, 2017

Many AD&D organizations are transforming from large siloed teams (within centralized IT) into two-pizza, Agile teams with self-service or hosted environments that don't have central IT team to support their needs or can't afford one. IBM's answer for this new breed of dev team is IBM Bluemix Continuous Delivery, a completely SaaS offering that requires no onsite installation. Despite these ongoing shifts in dev organizations, users that need to balance a top-down approach with the bottom-up desires of DevOps teams may find that UrbanCode Build combines enterprise scale with key capabilities that developers need. IBM was a nonparticipating vendor in this evaluation.

## Engage With An Analyst

Gain greater confidence in your decisions by working with Forrester thought leaders to apply our research to your specific business and technology initiatives.

### Analyst Inquiry

To help you put research into practice, connect with an analyst to discuss your questions in a 30-minute phone session — or opt for a response via email.

Learn more.

### Analyst Advisory

Translate research into action by working with an analyst on a specific engagement in the form of custom strategy sessions, workshops, or speeches.

Learn more.

### Webinar

Join our online sessions on the latest research affecting your business. Each call includes analyst Q&A and slides and is available on-demand.

Learn more.

**Forrester's research apps for iOS and Android.**
Stay ahead of your competition no matter where you are.

## Supplemental Material

### Online Resource

The online version of Figure 2 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings. Click the link at Forrester.com at the beginning of this report to download.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 26, 2017

**The Forrester Wave™: Continuous Integration Tools, Q3 2017**
Tools And Technology: The Modern Application Delivery Playbook

## Data Sources Used In This Forrester Wave

Forrester used a combination of three data sources to assess the strengths and weaknesses of each solution. We evaluated the vendors participating in this Forrester Wave, in part, using materials that they provided to us by August 31, 2017 or prior.

> › **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.

> › **Product demos.** We asked vendors to conduct demonstrations of their products' functionality. We used findings from these product demos to validate details of each vendor's product capabilities.

> › **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with at least three of each vendor's current customers.

## The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria for evaluation in this market. From that initial pool of vendors, we narrow our final list. We choose these vendors based on: 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation.

After examining past research, user need assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave evaluation — and then score the vendors based on a clearly defined scale. We intend these default weightings to serve only as a starting point and encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve. For more information on the methodology that every Forrester Wave follows, please visit The Forrester Wave™ Methodology Guide on our website.

## Integrity Policy

We conduct all our research, including Forrester Wave evaluations, in accordance with the Integrity Policy posted on our website.

## Endnotes

[1] See the Forrester report "Master DevOps For Faster Delivery Of Software Innovation."

[2] See the Forrester report "The Forrester Wave™: Continuous Delivery And Release Automation, Q3 2017."

[3] Source: Forrester Data Global Business Technographics® Developer Survey, 2017.

[4] See the Forrester report "Master DevOps For Faster Delivery Of Software Innovation."

We work with business and technology leaders to develop customer-obsessed strategies that drive growth.

PRODUCTS AND SERVICES

› Core research and tools
› Data and analytics
› Peer collaboration
› Analyst engagement
› Consulting
› Events

Forrester's research and insights are tailored to your role and critical business initiatives.

ROLES WE SERVE

| **Marketing & Strategy Professionals** | **Technology Management Professionals** | **Technology Industry Professionals** |
|---|---|---|
| CMO | CIO | Analyst Relations |
| B2B Marketing | › Application Development & Delivery | |
| B2C Marketing | Enterprise Architecture | |
| Customer Experience | Infrastructure & Operations | |
| Customer Insights | Security & Risk | |
| eBusiness & Channel Strategy | Sourcing & Vendor Management | |

CLIENT SUPPORT

For information on hard-copy or electronic reprints, please contact Client Support at +1 866-367-7378, +1 617-613-5730, or clientsupport@forrester.com. We offer quantity discounts and special pricing for academic and nonprofit institutions.