



COMPARISON EBOOK

A comprehensive guide comparing CI/CD tools

This comprehensive guide evaluates the leading CI/CD tools on the market; comparing GitLab against Atlassian BitBucket and Jira, Azure DevOps and GitHub.



What's inside this guide

A side-by-side feature comparison of all products. Each cloud-based CI/CD tool is evaluated based on the core features vital for teams planning, building, testing and deploying pipelines.

If you are just beginning your CI/CD transformation or your journey is well underway, we can recommend the right tool to support your organisation, helping to ensure you transform your software development pipeline while avoiding risks along the way. Our guide will fill you in on all the essentials to make your choice simpler.

This informative guide was created strictly as a reference point for comparing these tools.

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Features

Overview



GitLab is a web-based open source Git repository which offers functionality to automate the entire DevOps lifecycle. Features include issue tracking, CI/CD pipelines and a wiki. It's positioned as a complete DevOps platform, delivered as a single application.



BITBUCKET

Bitbucket is a web-based repository management solution. Planning, build, integration and deployment can be done in Bitbucket, and its Pipelines tool facilitates all of this with integrated CI/CD. For on-premise deployments that Bitbucket's pipeline functionality is instead achieved through Bamboo, a product that requires yet another license.

JIRA

Jira allows developers to monitor activity, track deployment progress of the software, see repository files and project management.



Azure DevOps is a platform that provides services to support end-to-end support for DevOps practices from application planning to development, delivery, and operations accessible through a unified web-based interface.



GitHub is the largest Git-based version control platform and is most commonly used by open-source communities. It offers great visibility and allows teams to review and manage codes remotely. GitHub is not open-source but contains the largest number of open source projects.

Ideal team size

GitLab is currently used by 30 million developers, and is ideal for medium teams and enterprises who work with CI/CD tools.*

As Bitbucket is more suited to business and enterprise users. Medium to enterprise organisations who use Jira and other tools in the Atlassian stack.

Jira facilitates project management across entire organisations, a top tool for companies of any size.

As Azure DevOps is primarily built around private projects and repositories, it is more suited to business and enterprise users.

GitHub is currently used by 65 million developers, and is great for personal projects and small teams.*

Interfaces

The GitLab interface is intuitive and well-organized. Some interface guides and tutorials are still lacking.

The Bitbucket interface can be confusing, but as the platform becomes more popular, there are a lot more resources. Teams who use Jira often prefer Bitbucket because it provides much better visibility of the overall project.

Jira is a very extensible and customisable platform allowing companies to create interfaces that exactly match their needs for particular projects.

The Azure DevOps interface unifies the different services seamlessly. Though, the interface requires time to get familiar with. The organization of features and options is not always intuitive. The design is pragmatic and would arguably benefit from some polishing. The overall search functionality is relatively basic and less powerful than some of the competing solutions.

GitHub is a well-tested platform with a simple interface. It offers a lot of guides and tutorials, basic functionality can be accessed quickly, the interface is minimalistic and easy-to-understand. The downside is the lack of native integrations with Jira and a lack of advanced CI features.

Licences

GitLab offers two versions - the community edition is open source, and is a self-hosted plan. This is ideal for teams who have their own servers, but it doesn't include some of GitLab's most advanced features. As an alternative, the enterprise edition is proprietary. It's free cloud-hosted plan allows an unlimited numbers of users to work on public and private projects.

Bitbucket is not available as open source. There is a self-hosted version as well as a cloud hosted version. The cloud hosted version offers multiple plans including a free plan called Small Teams for up to 5 team members which offers unlimited private repositories. If a team is larger, there is a charge for each additional team member.

Jira is licensed separately from Bitbucket, so there is an additional cost for wanting to use both products.

Azure DevOps is not offered as open source. There are two cloud-hosted options: Basic Plan and Basic + Test Plans, which are billed by users/month. Azure Pipelines and Azure Artifacts beyond free use are billed as individual services. Azure DevOps Server is the self-hosted option and can be bought as a 3-year server license, or it can be paid through Azure monthly without commitment, but requires paying for the cloud plans in addition to the required Visual Studio subscriptions.

GitHub pricing is free for unlimited public and private repositories. As well as the free plan they offer Team and Enterprise plans. GitHub Enterprise is suitable for large organisations and offers cloud-based and on-premise deployment options. A self-hosted version is available with the Enterprise plan.

Integrations



GitLab offers around 20 integrations, including with Jira, which is available for both data center and cloud users. As it's open source, customisation can be done easily, and they have a REST API. The integration with Jira allow for process automation, for example closing Jira issues when a commit has taken place or a merge request is resolved.



BITBUCKET

Bitbucket has rich integration with Jira and other Atlassian tools. The Jira integration allows for creating and updating issues and viewing deployment information. As tickets are updated, the integration delivers time savings. The platform also has multiple plugins via Marketplace and a REST API so that you can build your own integrations.

JIRA

Jira has an extensive set of first and third-party integrations with SCM tools and several other full-stack monitoring and planning tools.



The Azure Marketplace provides more than 1k extensions with support for third-party platforms and services, including Atlassian tools. Azure DevOps has basic Gitlab and Bitbucket integration. REST APIs are provided to support building extensions to Azure DevOps and integrations to other external systems.



GitHub has integrations with several hundred third-party tools which are available in Works with GitHub, or Github Marketplace. You can also create your own custom integrations with a REST API. GitHub has integrations with Jira and Trello, as well as Slack for team chat and Codefresh for continuous integration.

Flexibility

GitLab only supports Git repositories.

Bitbucket supports Git repositories.

Jira supports integrations via the Atlassian Open DevOps platform.

The platform supports hosting Git repositories, Team Foundation Version Control (TFVC) and integrates Github repositories.

GitHub doesn't have the most versatile functionality, it offers the fastest performance.

Artifact Management

GitLab has a built-in container registry and Kubernetes integration making it easy to get started with containerization and cloud native development. It supports it natively and encourages best practices.

Bitbucket doesn't have much functionality to get you started with containerized code. However, Bitbucket does offer a built-in artifact management download portal for pipelines to place their build artifacts in after building.

N/A

Azure DevOps integrates well with containers, offering features like integration and access to Azure Container Registry and Azure Kubernetes Service. Azure Artifacts offers integrated package management for Maven, npm, NuGet, and Python. Both public and private sources are supported.

GitHub offers both a built-in container registry for images and a built-in artifact management download portal for both pipelines to place their build artifacts in after building and for manually compiled artifacts.

Opinions

GitLab's single application approach and streamlined offering in the shape of a complete packaged platform can sometimes limit user choice, however there are 30+ APIs for integrations with other apps and platforms like Jira offering flexibility.

Bitbucket is a powerhouse tool with very few opinions on how to work, rivalling the flexibility of tools, such as Jenkins, but with a cloud spin. BitBucket offers organisations a wide capability of build options and flexibility.

Jira offers the most complete planning and tracking, with user-friendly customisable built-in templates.

Azure DevOps is a rather un-opinionated platform. It's all about flexibility and allows you to adopt each of the services independently and integrate them with your existing tool chain.

GitHub offers many similar features to GitLab and Bitbucket, however in many cases, you need to use an app or third-party integration with GitHub. GitHub has 400+ apps in its marketplace (free and paid) so users can build their platform with different apps.

Task Tracking

GitLab has issue tracking out of the box, where users can create tickets, comment on issues and close them, all within GitLab.

Bitbucket comes with an integrated issue / tickets management system.

Jira is designed to be used by the entire business. There are integrations between GitLab and Jira to ensure some links exist, but it's not as feature-rich as solely using Jira for everything.

Azure DevOps includes boards for task management with pre-defined, customizable workflows to support both Scrum and Kanban. You can drive git development from board items, which can include creating branches and pull requests. In repositories you can automatically link and transition work items with git commit messages and complete work items with pull requests.

GitHub offers fairly basic task-tracking functionality, being able to link issues to pull requests and the ability to use basic Kanban boards for higher-level planning.

Core technical

		 BITBUCKETJIRA			
Planning & Design	Iterations and sprint planning are available on GitLab's paid plans.	No planning built in, Jira (or other) integration. Does support code reviews (through pull requests) and comments with threading.	Jira is a full-scale project management suite for complex plans and systems.	Iterations and sprint planning are available on all of Azure DevOps' plans.	GitHub offers the ability to plan issues into milestones. However, it does not offer anything in the way of sprints or larger agile management capability.
Build	Features include preview code changes, issue tracker and code review.	With Bitbucket, code can be hosted on public and private repositories.	N/A	Features include code review, code search, branch policies and required sign offs and passed tests.	Features include preview code changes, issue tracker and code review.
Test & Code Scanning	GitLab has an automated testing tool that scans code for potential security risks. Load performance testing and browser performance testing are available on GitLab's paid plans.	None built in, but can integrate with any number of tools through command line or API.	N/A	The optional cloud plan "Azure Test Plans" offers test suite and test cases management for manual and automated tests that is integrated with Azure Boards. Automated tests can be integrated into Azure Pipelines. Supported tests include coded UI tests, Selenium tests and tests using MSTest or .net core framework.	The GitHub marketplace offers several third-party actions for code testing and scanning.
Release & Deploy	GitLab provides inbuilt CI/CD features for its users across all of its plans, and is favoured by users for its support with CI pipeline and Docker. GitLab's CI tools allow you to build, stage and deploy code automatically from within the platform. Kubernetes is in-built as part of the deployment platform and allows you to deploy, stage, test and scale automatically.	Bitbucket Pipelines allows developers to track the progress of a product through the entire development lifecycle.	N/A	Azure DevOps provides built-in support for un-opinionated CI/CD implementation. Deployment to the three main cloud providers Azure/AWS/GCP is supported and there's solid support for container deployments as individual hosts or to Kubernetes. Azure Pipelines allows to build, stage and deploy code automatically from within the platform.	GitHub does not provide CI/CD features so users have to rely on third party apps and platforms such as Jenkins or Circle CI.
Security / Vulnerability Scanning	In the Gold and Ultimate plans, GitLab provides security scans and allows for dynamic security testing. GitLab's built-in tooling ensures code is secure, passes obvious QA tests, and has a few integrations to make it easy to test.	Available through third-party paid integrations, such as Snyk.	N/A	Security / vulnerability scanning is not supported by the platform natively. However, Azure Marketplace extensions can be purchased and integrated with Azure Pipelines.	GitHub offers several out-of-the-box security scanning solutions.
Importing and exporting	GitLab comes with a import feature that allows users to easily migrate repositories from other platforms.	Existing repositories that have been hosted on another platforms such as Git and Google Code can be imported.	N/A	Azure DevOps supports importing existing Git repos from GitHub, Bitbucket, GitLab, or other locations.	GitHub offers the ability to import SVN, Mercurial, TFVC, and Git repositories natively.

Documentation

Analytics

Authentication / Authorization



Wikis are enabled by default in GitLab.

GitLab has an in-built analytics tool to track projects.

GitLab allows permissions to access repositories based on their role in the organisation, which can be set from the user interface.



BITBUCKET

Bitbucket has documentation, wiki, and integration with Confluence for collaborative documentation. Wikis are set-up when a code repository is created, and can be edited and version controlled.

Bitbucket does not have any in-built analytics tools.

Bitbucket supports multiple authentication methods including OpenID, Google, Facebook and Twitter.

JIRA

Jira relies heavily on Confluence for any documentation capabilities.

Jira has some analytical capabilities. Basic reporting can be extended via plug-ins.

Jira has similar methods to BitBucket. Jira also offers fine-grain user permissions and privileges.



Wikis can be created for Azure DevOps projects, and are stored as Git repositories that maintain version history.

Analytics is a built-in reporting platform for Azure DevOps. It can be used to gain quantitative insights about Azure DevOps projects.

Azure DevOps relies on Azure Active Directory, Microsoft Account and Active Directory to provide multiple account types, concepts and features for flexible and secure identity and access administration.



GitHub has a wiki for making and sharing documentation.

GitHub doesn't have any in-built dashboards.

GitHub offers read and write permissions to repositories. Due to open source, organisations should take care of their access control to ensure security.

AWS does have some native services for source control (CodeCommit), automated builds (CodeBuild) and pipelines (CodePipeline); however, they are very feature-light compared to the tools on this list.

This, however, might be the best choice for small, straightforward projects where you don't necessarily need to invest in larger, more complex tools. You do, though, get what you pay for!

