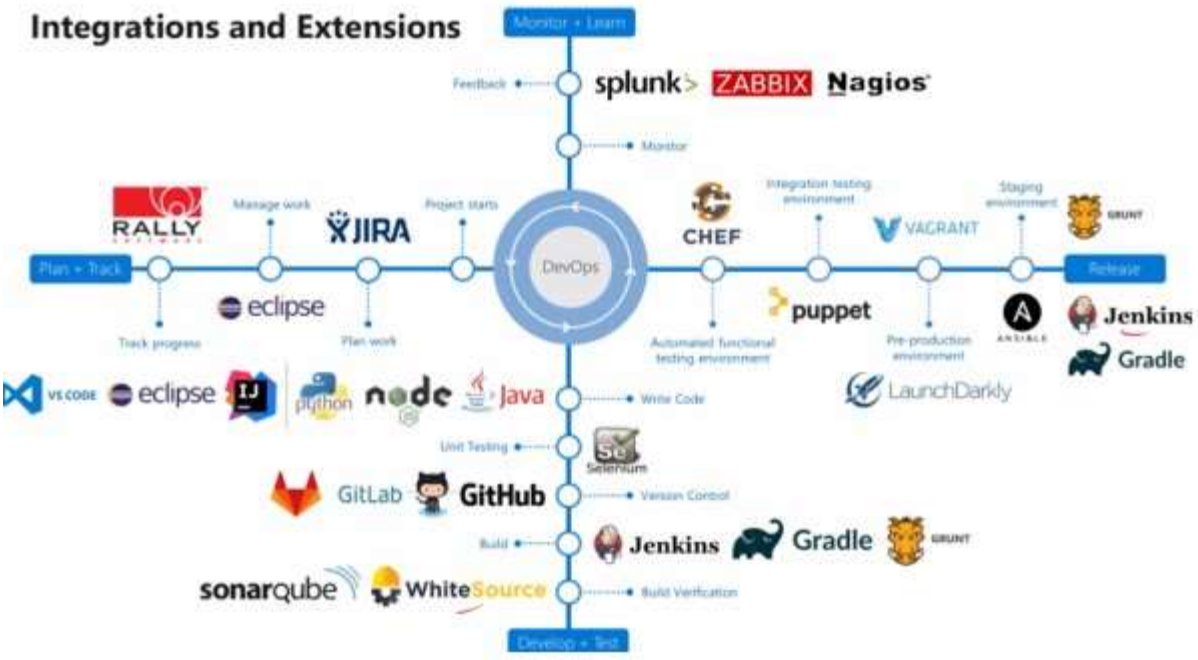
Overview of Azure DevOps

Azure DevOps is a software as a service (SaaS) platform that provides DevOps practises and tools for the end-to-end software life cycle. Azure DevOps is not limited to internal tools but is able to integrate with most other industry leading Dev Ops tools. Below are the various services provided by Azure DevOps:

- Azure Boards – agile planning, work item tracking, dashboard visualisation and reporting
- Azure Pipelines – language and platform agnostic CI/CD with the inclusion of containers and kubernetes
- Azure Repos – Cloud hosted GIT repos and TFVC
- Azure Artifacts – Integrated package management with support for Maven, NPM, Python and NuGet package
- Azure Test Plans – providing an integrated testing solution including manual and exploratory

Migrating or integrating existing work management tools

Azure DevOps can be integrated with a wide variety of existing work management tools:



Azure DevOps licensing strategy

Organisation users who need access to Azure DevOps need to be assigned an access-level license:

- **Stake Holder**
  - Free access level with limited functionality
  - Azure Boards, partial access, no access to Azure Repos
- **Basic**
  - Every organisation gets five free basic licenses
  - Full access to Azure Boards, Azure Repos, Azure Pipelines, no access to Test Plans
- **Basic + Test Plans**
  - Paid only, but free to try for 30 days
  - Full access to Azure Boards, Azure Repos, Azure Pipelines, and Test Plans
- **Visual Studio**
  - There is no additional charge for users with a Visual Studio subscription
  - Access level like Basic + Test Plans

- Visual Studio subscribers are detected automatically when they sign in

Note: Azure DevOps can be configured for single or multi-organisation user billing under Organisation settings > Billing. Setting up as multi-organisation, ensures that users are billed at Azure subscription level and avoids multiple billing for the same user.

Azure DevOps Server:

You can opt for the Azure DevOps Server instead of Azure DevOps services. This means you run it on your own server. You have the option to opt for an Azure DevOps Server license or per user CAL, either directly through Azure (month-on-month billing) or by buying the classic software license. Buying through Azure has the bonus of entitling you to use Cloud Services, so you can move to the cloud at your own pace.

Azure Repos – Source Control and Code Repository

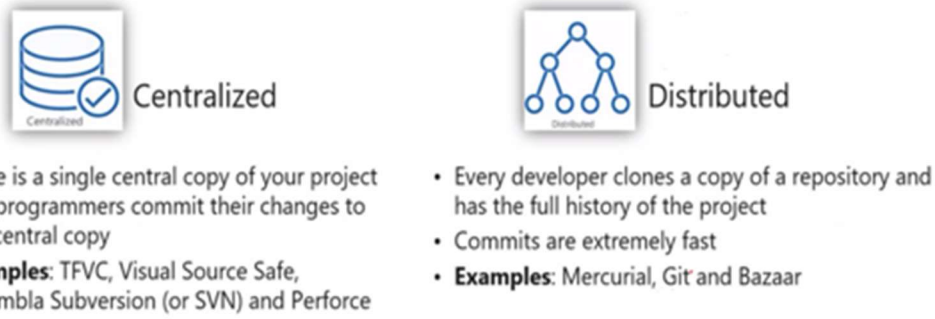
Azure Repos is a set of version control tools that you can use to manage your code. Azure Repos provides two types of version control:

- Git: Distributed Version Control
- Team Foundation Version Control (TFVC): Centralised Version Control

Note: Git is the default version control provider for new projects. You should use Git for version control in your projects and begin to move

your existing TFVC projects to Git. TFVC is considered to be feature complete. Azure DevOps will maintain compatibility with TFVC, but Git will receive all future investment.

Types of Source Control Systems - Centralized vs Distributed



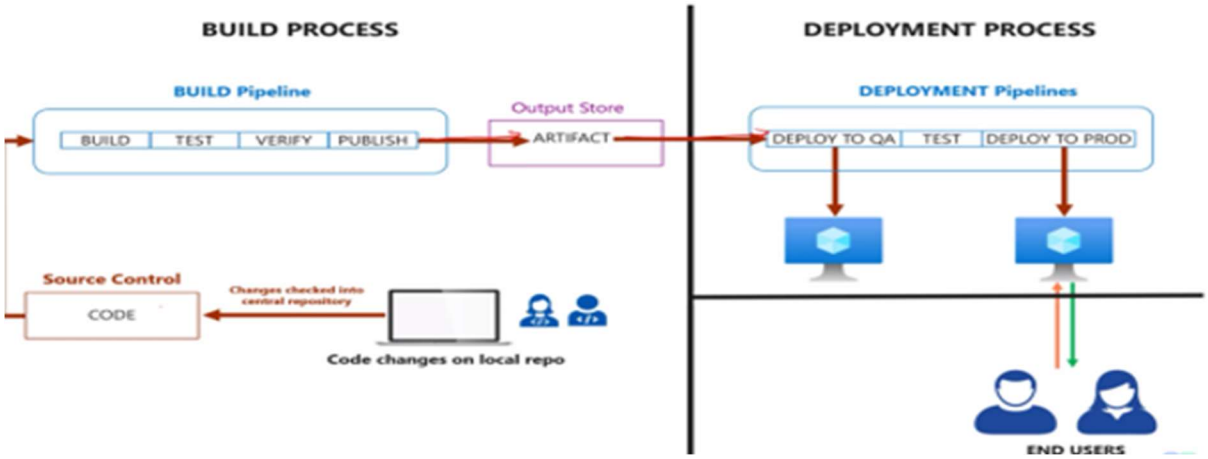
Azure Pipelines – Continuous Integration and Continuous Delivery

Continuous Integration:

- Automatically ensure you don’t ship broken code
- Run tests continually
- Increase code coverage
- Build faster by splitting test and build runs

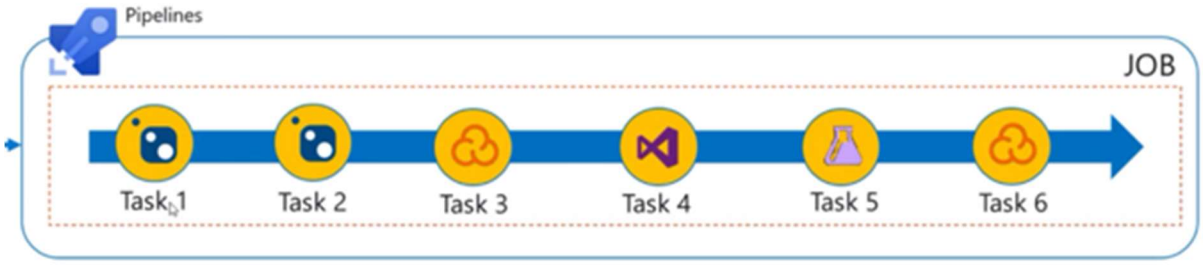
Continuous Delivery:

- Automatically deploy code to production
- Ensure deployment targets have latest code
- Use tested code from CI Process



Azure Pipeline

- Build Azure Pipeline with two options
  - YAML Pipeline (yaml file)
  - Classic Pipeline with interface editor
- Azure Pipeline is a workflow of automated tasks
- Azure Pipeline is a collection of jobs. A job is a collection of tasks
- Azure Pipeline is made up of steps called tasks, so we map scripts to tasks



Jobs within Pipeline will need an Agent (Server) for Compute resources to Run

Hosted agents

There are two types of agents: Microsoft-hosted agents and self-hosted agents

Microsoft agents

- Maintenance and upgrades are taken care of for you
- Fresh VM each time you run a pipeline
- Windows Server with Visual Studio, Ubuntu, MAC
- Not all build software is available in a Microsoft-hosted agent. For the ones which don't exist, in Azure Pipeline you'll need to have the software installed first and run jobs.

Self-hosted agents

- As the customer, you are provisioned and managed – download Azure Pipelines agent and install
- It gives you more control to install any dependent software needed beforehand. Azure Pipelines can just run code while not reducing run time by not running the additional tasks of installing build software.

Agentless jobs:

Does not require target compute to run

Supported tasks:

- Delay task
- Invoke Azure function task
- Invoke REST API task
- Manual validation task
- Publish to Azure Service Bus task
- Query Azure Monitor Alerts task
- Query Work Items task

Azure Boards

Azure Boards is an interactive and customisable tool to plan and manage projects. It supports agile, scrum and Kanban processes as well as dashboards and reporting.

Why use Azure Boards:

- Pre-defined work item types provided to track features, user stories, bugs and tasks
- Highly interactive and visual tools
- Easy customisation
- Built-in discussions and communication
- Generous cloud storage
- Notifications on changes
- Built-in dashboards and analytics to monitor status
- M365 office integration
- Third-party extensions

For all the above, you can start using Azure Boards for FREE with up to five users and unlimited stakeholders

Azure Artifacts

Azure Artifacts enable developers and teams to share code packages from different feeds and public registries. Azure Artifacts support multiple package types:

- NuGet
- Npm
- Python
- Maven
- Universal Packages

Note: Azure Artifacts storage is charged on consumption basis and is free up to 2GB

Azure Test Plans

Azure Test Plans are a browser-based test management solution providing all the capabilities required for planned manual testing, user acceptance testing, exploratory testing and gathering feedback from stakeholders.

You can:

- Create test plans and test suites
- Manage test plan run settings and configurations
- Run tests on any platform (Windows, Linux, Mac) with Test Runner
- Create charts with various pivots like priority and configuration to track test progress
- Browse test results
- Export test plans and test suites for review

Azure DevOps security and compliance

Security is everyone's responsibility and a continuous process which should include:

- Infrastructure
- Architecture design with a high priority for security
- Continuous security checks
- Continuous monitoring for outside threats

Azure DevOps repos and pipeline security:

What needs to be scanned?

- App code
- Infra code
- Container images
- Config code

What to assess?

- Hardcoded secrets
- App package vulnerabilities
- Code quality issues
- Embedded malware

What languages and platforms are supported?

- App code – C#, Java, Node, Python

- Infrastructure as Code – ARM, Terraform, Cloud Formation, Dockerfile, Kuberntes
- Container images – Linux or Windows, Files or apps

Below are a few third-party tools integrated with Azure DevOps to assist in overall application and infrastructure security compliance:

Application Code Analysis

- SonarCloud
- SonarQube
- WhiteSource Bolt
- Checkmarx
- Kiuwan
- Veracode
- Snyk Security Scan
- ShiftLeft Inc

Infrastructure Code Analysis

- Secure DevOps Kit
- ARM Template Tesk Kit
- Checkov/Bridgecrew

Container Security Tools

- Trivvy**
- Clair
- Twistlock (Prisma Cloud)
- Aqua Sec

Conclusion

Azure DevOps has paved the way for faster and more agile software development processes by unifying teams, processes, and technologies to create an ever-evolving software development lifecycle (SDLC).

Feature-rich and flexible, with its supported languages, platforms and cloud vendors, Azure DevOps is a great option for a wide range of organisations.