IBM Z DevOps

Git-based CI/CD pipeline demo for building Z applications

A developer's journey

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DevOps Acceleration Team

Visit:
https://ibm.github.io/mainframe-downloads/DevOps_Acceleration_Program/devops-acceleration-program.html

Agenda

Introduction to IBM Z DevOps

End-to-end CI/CD pipeline demo with an open and modern pipeline based on IDZ/Gitlab/DBB/UCD

Roadmap to CI/CD Practices on the Mainframe

Discussion, Q&A

THE VISION

For agile processes and modern methodologies to be part of our Mainframe customers' Software Development Life Cycle (SDLC)

THE MISSION

To drive DevOps transformation initiatives and adoption of CI/CD pipelines facilitating migrations from legacy library managers to Git

Selecting the right technology is the key to success

Top Technology Investments

- Continuous integration, deployment, and delivery
- Automation and containers
- DevOps

Top 5 Most Important Tools

- Version control system
- Text editors/IDE
- Chat/Collaboration tools
- Bug/Issue tracker
- Continuous integration and delivery

92%

agree that open source tools are critical to software innovation

Open source tool provides a cost effective, sustainable development environment.

58%

think the biggest challenges organization faces when it comes to adopting new practices or tools is replacing ingrained practices

GitLab 2018 Global Developer Report. (n.d.). Retrieved from https://about.gitlab.com/developer-survey/2018/

Enterprise-wide CI/CD standardization

Standardized CI/CD Pipeline

- Open source tools such as Git, Jenkins and Artifactory are becoming the de facto standard for powering Continuous Integration and Continuous Delivery in the enterprise.
- Reduce silos and harmonize development toolchains across the enterprise.
- Building blocks are loosely coupled and highly customizable; No vendor lock-in. IBM provides reference implementation.

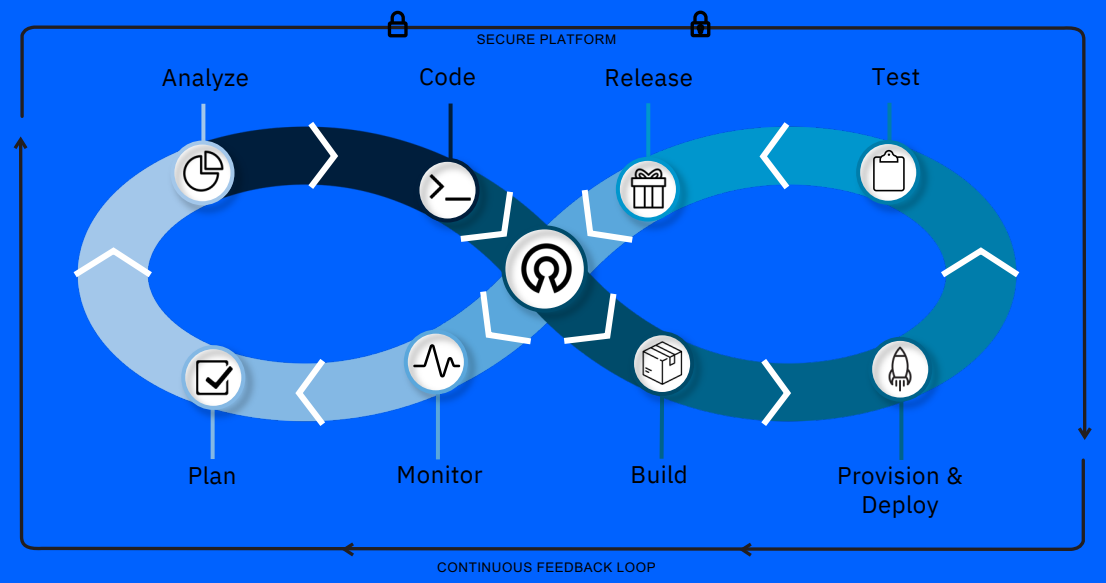
Adoption of agile / DevOps practices

- Leveraging the same development practices across all platforms, across the entire enterprise.
- Take mainframe teams into the 21st century by adopting DevOps practices to improve their agility and customer focus while delivering smaller high quality increments faster.

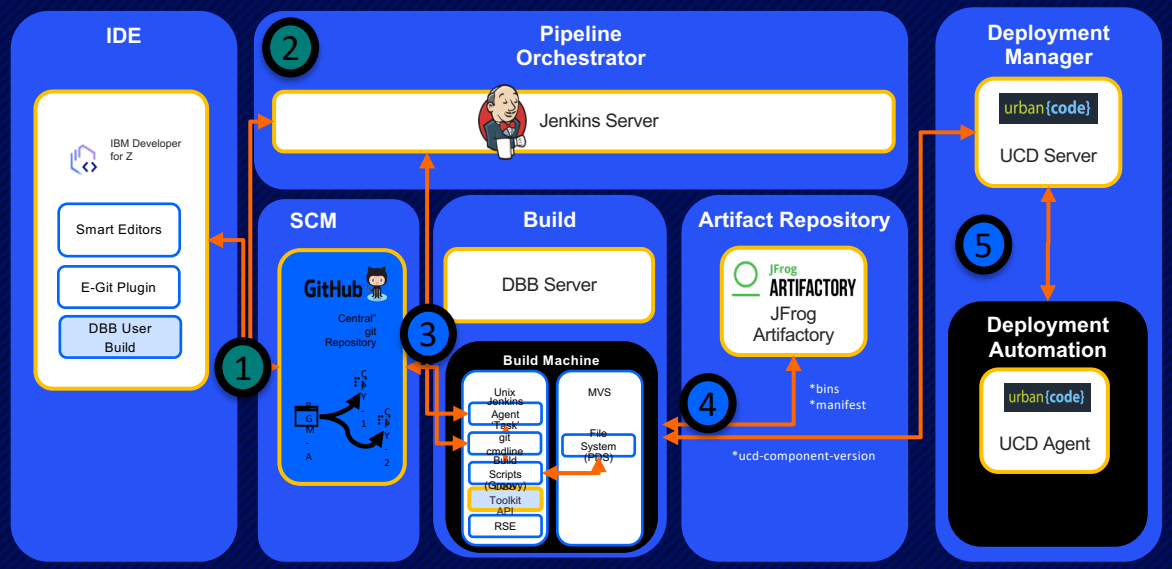
z/OS has been transitioning to remove differences that serve no purpose

- Open Source works on and for IBM Z. Break down silos and address the skill challenges for the next developer generation, by maintaining and modernizing your existing assets.
- Applying provisioning practices like spinning up an execution environment by pushing a single button (IBM z/OS Cloud broker), requires a modern pipeline which can dynamically deploy a baseline of the application to that new environment.

Enterprise DevSecOps Standarization of Practices



High-Level Pipeline Architecture



* named products for Pipeline orchestrator, Git provider, Artifact repository and Deployment manager in this picture are used as a sample. Different solutions possible.

CI/CD Pipeline unification with IBMs Continuous Integration Solution

Open by Design

- IBM Developer for Z offers an Integrated Development Environment that provides core capabilities needed to link z/OS development seamlessly with an established, open and modern DevOps toolchain.
- IBM Wazi for RedHat CodeReady Workspaces delivers the zero-install cloud native development experience
- IBM Dependency Based Build enables to implement mainframe build automation with Git and your preferred CI orchestrator for traditional mainframe artifacts
- Ansible for IBM z/OS integrations and IBM Urbancode Deploy and Velocity enable a common approach for hybrid infrastructure management and application delivery.

Benefits

- All solutions integrate with your GIT provider to easily identify and make changes quickly and efficiently; leverage real parallel development capabilities which are necessary for DevOps and CI/CD
- Build and debug application changes directly from the development environment
- Pipeline unification with IBMs solution supports your mainframe modernizing projects breaks down silos

References being raised

By implementing DBB and GIT in ZD&T environment, IBM helps a ***large banking group*** *to implement technical and organizational means to increase the autonomy of its AMS centers and improve the quality of the overall process.*

This client shared their story at THINK 2019

A typical User Story

Deb, new z/OS developer

- At school I learned to develop Java with Eclipse, but I could also use my **favorite editor** I downloaded from the web.
- I am used to writing a **unit test** for all my programs - that makes it easier and safer to modify them in the future.
- **Test coverage** for Java is great. It tells me if my tests also hit the changed code. I wish I could use that in COBOL.

Pain points with current tooling

- Slow
- Antiquated tools
- Many tools
- Program understanding
- Deployment steps / complexity

Let me explain to you how I would like to work :

I received a task to fix a defect, so I start by **cloning** the repository of my application into my work environment.

I create a **new branch** for this task, so I can work in isolation, and not worry about being disturbed by the development activities of my team.

In my IDE I use IBM **DBB user build** to compile / link and unit test the program.

Then I **commit and push** my branch to the central Git repository along with my commit.

Let's have a teammate review my change. I create a **pull request** to merge my changes to the common branch of our team.

- The pull request needs to be approved.
- It triggers a build which runs a set of tests and code scans .

After the pull request is approved and merged in, I can delete my personal branch. On the integration branch, a **pipeline build** is performed, so I can move the changes forward or associate them with a release.

The big picture

- A generic CI/CD pipeline setup includes several building blocks each serving a dedicated purpose

Graphical User Interface

IDE

Provides check-out and check-in capabilities to the version control system.

Text User Interface

Pipeline Orchestration

Also known as the CI Orchestrator; providing connectors to version control, build environment, packaging and deployment. This is the place where all the automation happens.

SCM

Storing different versions of your application configuration like **source code**, application specific configuration data, test cases etc.

Build

Platform and language agnostic build environment. In mainframe environments understanding dependencies, compile, link, unit test.

Artifact Repository

Storage for build outputs – an application package containing load modules, DBRMs, DDL, configuration files of subsystems, WAR, EAR files. It decouples scm layouts and runtime environments.

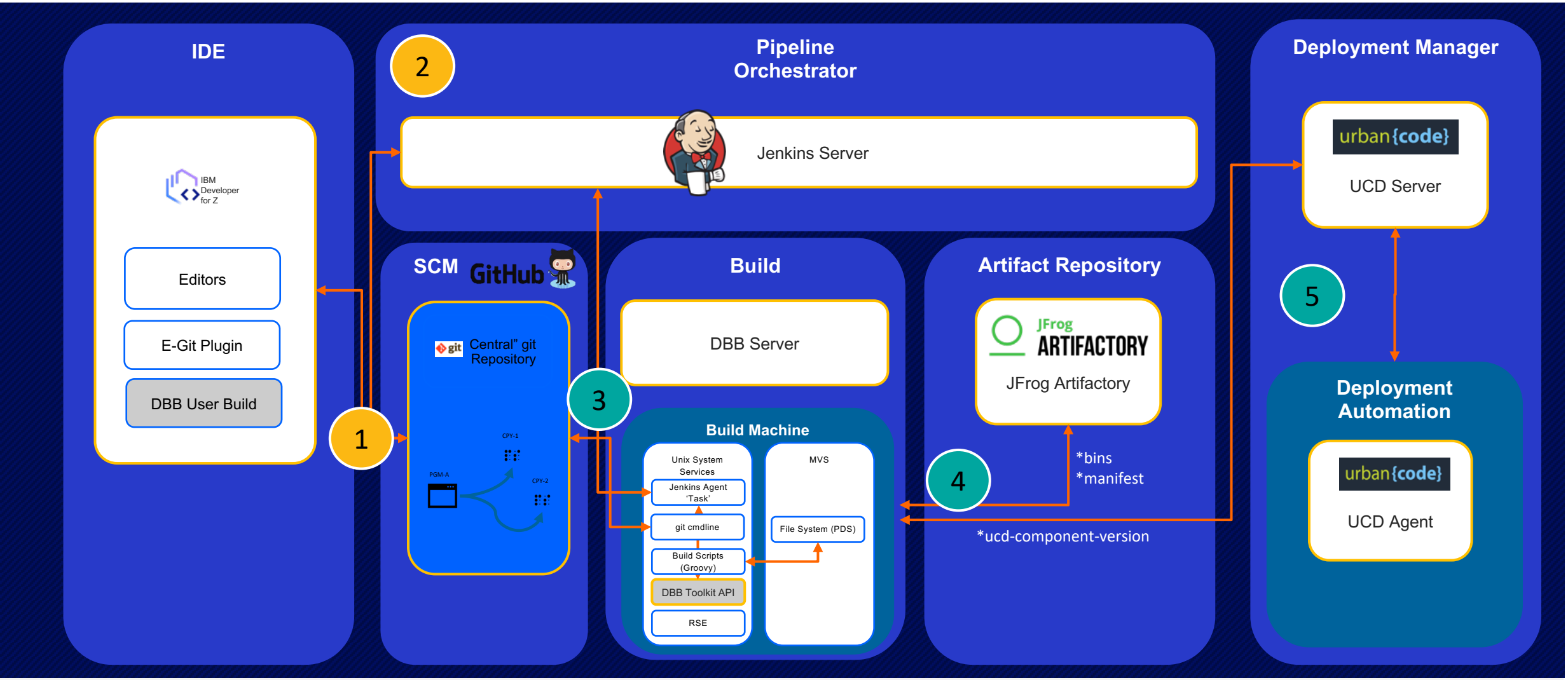
Deployment Manager

Knows about the execution environments and their inventory.

Used to rollout application packages including installation steps like newcopy and bind for traditional mainframe apps.

Sample Pipeline Overview

1 Edit & check-in → 2 Pipeline → 3 Build → 4 Packaging → 5 Deploy & Test



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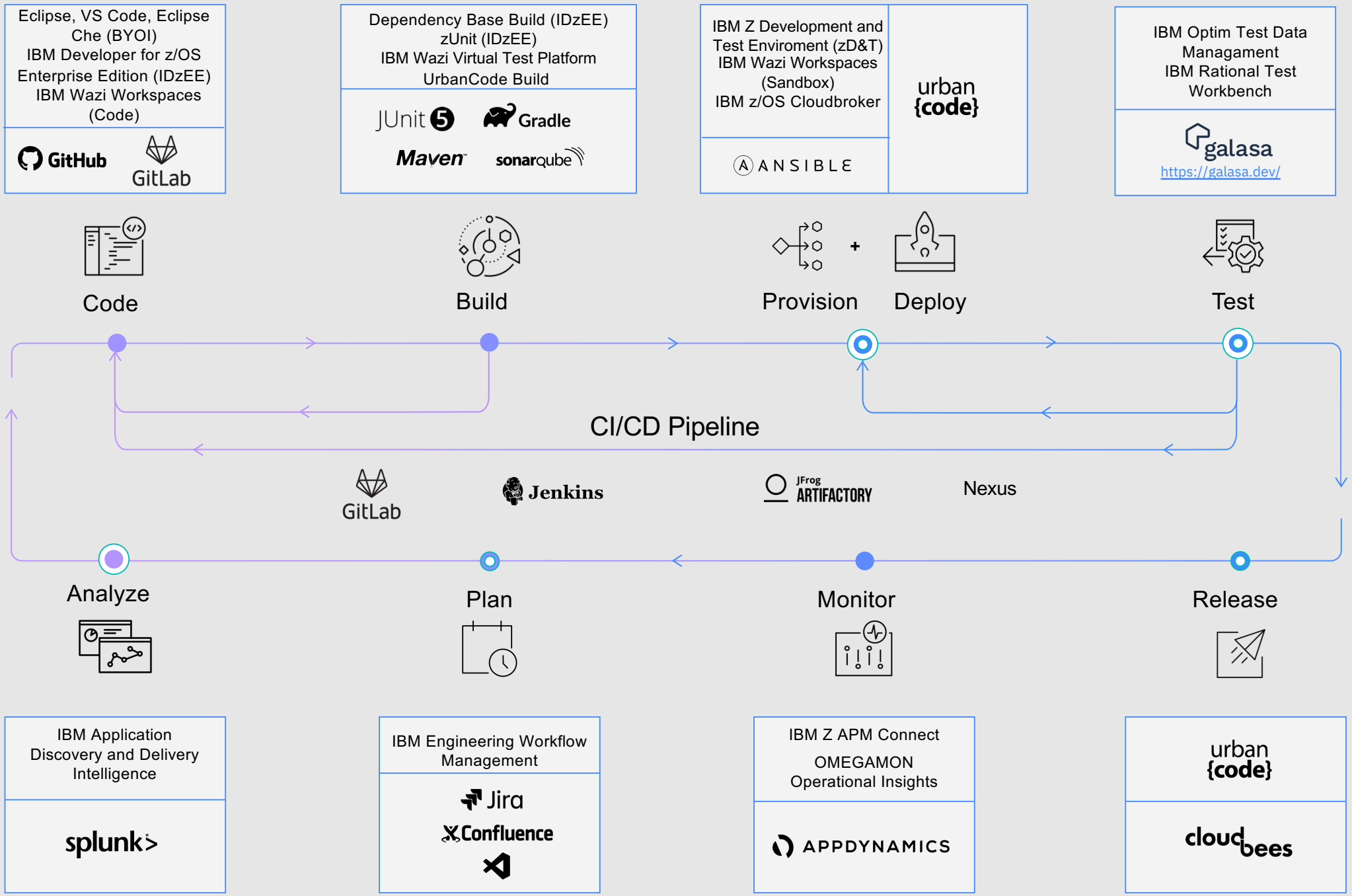
End to end DevOps The IBM way *Open and Flexible*



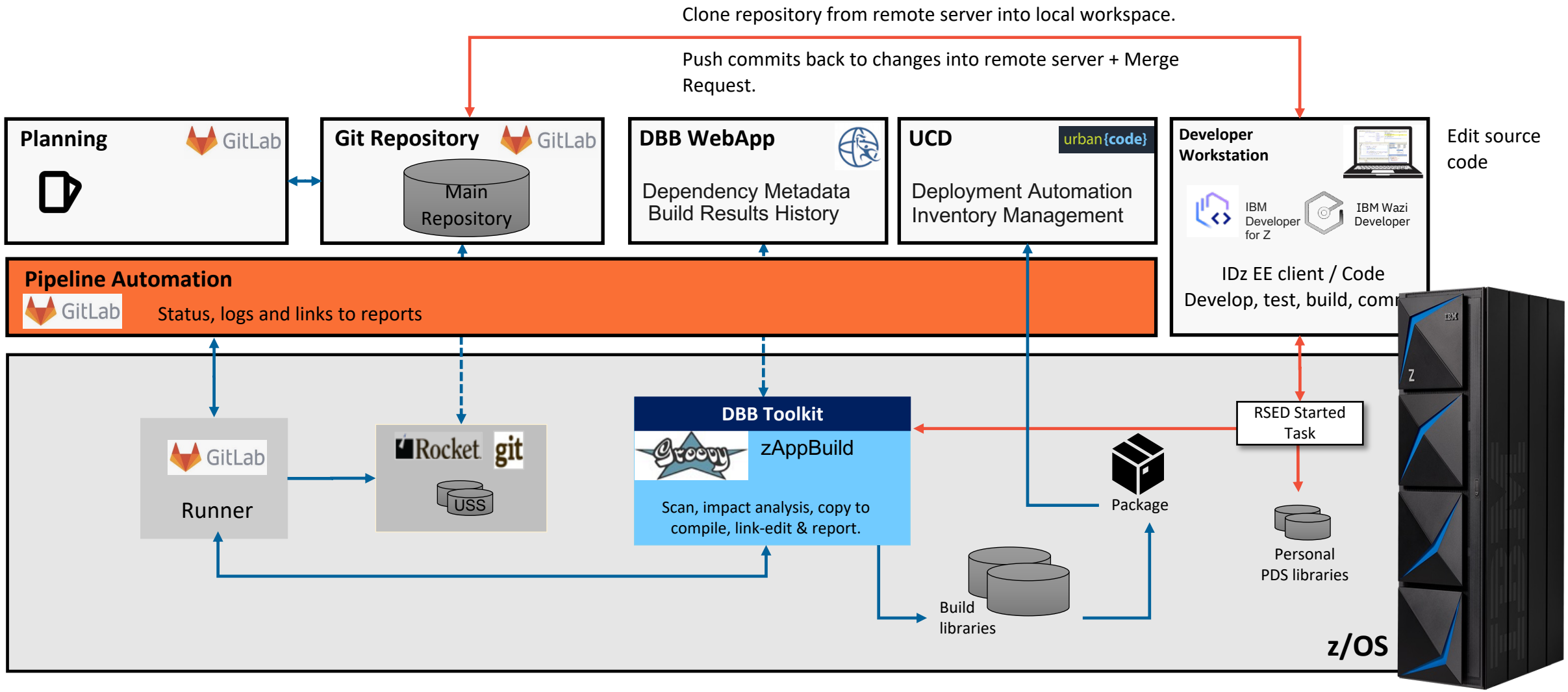
LEGEND

- Analyze
- Feedback, approvals

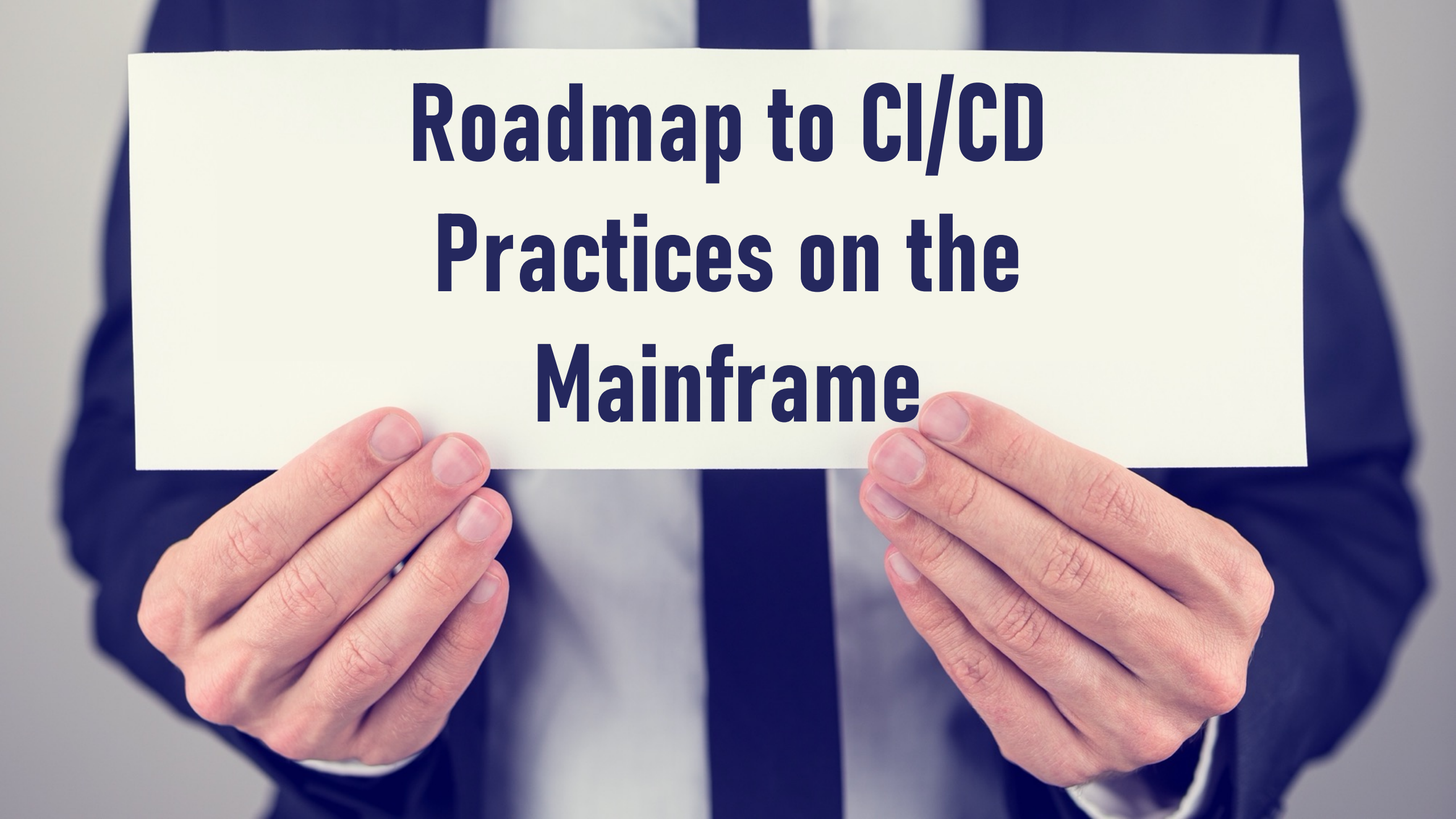
Note: Starting from the upper left, products and significant capabilities appear once, the first time they are used in the pipeline. Products and capabilities are used at multiple points.


DEMO TIME!

Pipeline Architecture



Developer activities
Pipeline orchestration


Roadmap to CI/CD
Practices on the
Mainframe

The journey to a CI/CD pipeline

Design and Validate the high-level future design

- Develop your high-level to-be future state
- Understand the technical composition of the pipeline
- Build a pilot to prove feasibility
- Establish the Champions to drive the project
- Achieve Senior Management Support

Deep-dive analysis to build business case and migration strategy

- Analysis of the existing build management system
- Analysis of the existing repository layouts
- Develop a migration strategy which fits the customers' needs

Architect and implement the future state and new way of working

- Refinement of future state – define workflows and integrations
- Low-level design
- Architect and implement the e2e future state
- Communication of the journey - sandbox system

Rollout the new way of working

- Onboard and train the development and operation teams
- Execute the migration plan and migrate applications to the new pipeline

Realize the benefits

- Work in a standardized pipeline
- Return any ISV license(s)
- Enable new capabilities in the pipeline

Learn more

Our remote instructor-led and self-paced training provides you with the perfect start to begin your DevOps journey

IDz instructor led virtual remote training
https://ibm.github.io/mainframe-downloads/Training/idzrdz-remote-training.html

CI/CD Learning Collection
https://www.ibm.com/training/collection/zdevopstransformationcicdpipelineswithdbbgit

IDz Basics - self paced
https://ibm.github.io/mainframe-downloads/DevOps_Acceleration_Program/idz-self-paced-learning.html

DBB Fundamentals - self paced
https://ibm.github.io/mainframe-downloads/Training/dbb-self-paced-learning.html

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QUESTIONS?