



Highlights

- Assists organizations to bring Db2 for z/OS applications to market more rapidly, at lower cost and with less risk
 - Incorporates DevOps principles into mainframe application delivery with role-based features
 - Supports Db2 for z/OS development that increases agility, automation and repeatable delivery processes without requiring mainframe skills
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IBM Db2 DevOps Experience for z/OS

Delivering DevOps practices for mainframe applications

Today's organizations face numerous challenges as they work to transform their business to adapt to the digital economy. According to a 2016 Forrester analyst report¹, success for a digital business is the ability to unleash its data and business processes of their mainframe-based applications. The future of large enterprises is about removing innovation barriers to win against the competition and better serve customers.

Mainframe applications are essential to today's businesses²:

- 92 of the top 100 banks
- 23 of top US retailers
- All 10 of world's largest insurers
- 23 of world's 25 largest airlines

Mainframe applications need to be modernized to add the flexibility required for new products and services. They need to embody agility and speed, while still adhering to the quality that is important for mainframe data and an organization's customers. This is where DevOps comes into play as a cultural philosophy with practices and tools that increase an organization's ability to deliver applications and services faster than traditional software processes. IBM® Db2® DevOps Experience for z/OS® offers features to modernize mainframe application development.



The mainframe IT/development environment

To modernize the mainframe development environment and take advantage of Db2 DevOps Experience, it is helpful to understand the roles and the tasks users perform to understand the changes needed to transform to a more agile culture. The number of database administrators (DBAs) depends on the number of databases and applications to manage. Typically, the number of application developers far outnumbers that of DBAs. For example, an organization may have over 50 developers to one or two DBAs. The tasks that each application developer and DBA perform are very different and require different skills. Often, the application developer lacks in-depth mainframe skills and relies on the DBA for assistance. Application developers may be responsible for thousands of lines of code in a specialized programming language, developing both new and updating existing applications. They often work in teams and check-in/out versions and changes. For a typical agile development environment, there are many iterations, especially in test environments. Speed is a necessity and plans often change with very short notice. There must be little to no impact on the running environment to avoid any disruption to customers and business.

Database administrators are concerned about the structure and performance of databases. They must maintain control over the current schema definitions as they affect current applications and can impact overall Db2 performance. But DBAs must also assist development with:

- Creating production-like environments used for development and test
- Deploying new versions with repeatable, reliable processes
- Ensuring and validating quality of any submitted changes
- Facilitating faster feedback loops to speed up changes and deployments

Db2 DevOps experience

Db2 DevOps Experience allows organizations to bring applications to market more rapidly, at lower cost and with less risk. The Db2 DevOps Experience can help connect people, processes, and automation in an integrated and collaborative way. One of the benefits of using the Db2 DevOps Experience is to free up resources by reducing day-to-day operating tasks. This includes the time and resources used to respond to provisioning Db2 database environments. This allows Db2 database operations to shift focus to more innovative projects, while improving the quality of the services they deliver. Additionally, an organization can increase customer experience and satisfaction through increased quality of service.

Role-based features

Db2 DevOps Experience is a role-based product that serves various personas within an organization. Depending on your size and culture, all roles may not be defined. However, they have the flexibility and freedom to assign authorizations and functions as needed. A systems programmer or superuser is responsible for the installation and maintenance updates.

The database administrator is responsible for maintaining control and security over the Db2 databases and applications. One of the important functions for the database administrator is the ability to create and link together teams, environments and permissions. Using cognitive capabilities, the application discovery feature identifies schema application components.

Figure 1 shows an example of the search capability for Db2 objects within a specific schema. The results are displayed in a graph with relationship highlights. The database administrator can filter and select items to be grouped as part of an object selection. Often, existing applications lack the necessary documentation to identify the correct schema needed to update an application. The ability to visually discover and select objects, combined with search and filtering capabilities, improves accuracy and efficiency of schema discovery.

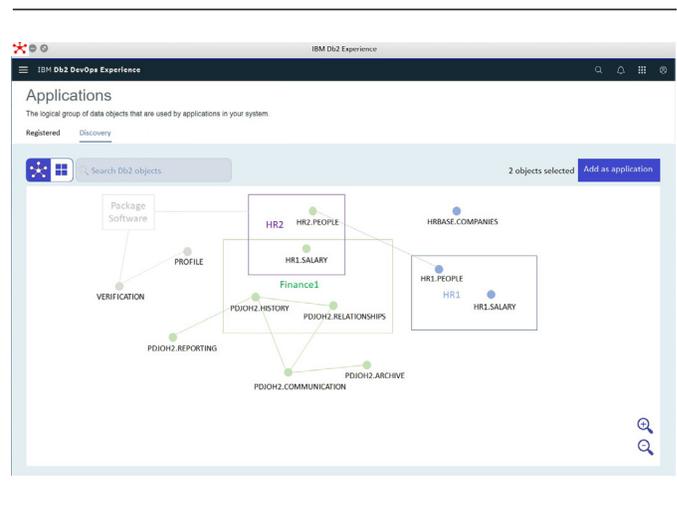


Figure 1: An example of the search capability for Db2 objects within a specific schema.

The database administrator sets up the resource limits and site rules for each application-based team. An impact analysis report informs the administrator on how, when and where resources were utilized such as the number of applications provisioned, the amount of storage used, etc.

The rule generation and enforcement mechanism for schema attributes is controlled by the database administrator with site rules. The enforcement of site rules is reflected in other roles and features of the product. An administrator can specify an expected behavior and know that Db2 DevOps Experience will enforce it without requiring approval by the administrator for every new deployment. For example, the rule-based DDL and HTML editor prevents a developer from coding unauthorized changes, saving time and resources.

The database administrator has the authority to review and approve developer changes to application schema. This mechanism ensures that only approved changes are propagated to sensitive environments, preventing rogue and uncontrolled changes. It also provides the level of authority to users who have more control over environments than development, but slightly less than the database administrator.

Application development features

Db2 DevOps Experience empowers developers accustomed to agile methodologies to work in Db2 environments without having prior mainframe skills. For mainframe developers, creative processes that once seemed impossible, given the infrastructure and lack of available provisioning tools, takes little to no time to implement. As a result, companies can better adapt to changing markets, innovate faster, and meet strategic corporate goals.

An application developer provisioning a database environment may experience a view as shown in Figure 2.

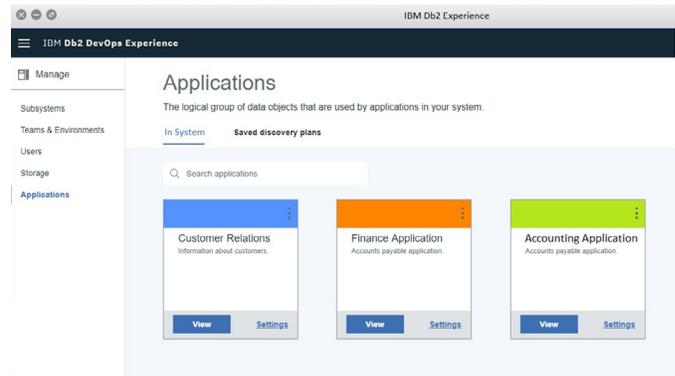


Figure 2: Example of a view an application developer may see when provisioning a database environment.

Available environments for development were predetermined by the administrator according to applications and teams. Developers can select the application that they will be working on, either individually or with a team of other development types of users. They then select that application to be provisioned into a Db2 environment associated with the application for development. The application is placed under version control. This feature provides versioning and source control of object sets with Data Definition Language (DDL) in a management system that includes a history of changes.

A consolidated source control mechanism for database schema enables user to confidently make changes and revert to a prior version if any issues are detected. It also allows a user to test multiple options of changes prior to committing the necessary version. This feature also enables a team of developers to work collaboratively with other developers, merging changes as they are approved. Application environments can also be de-provisioned without administrative assistance.

Db2 DevOps Experience adds a focus on continuous improvement with greater flexibility, automation, and depth across the entire development and deployment life cycle. This allows teams to focus on improving quality of tasks, processes, and decisions that support and enhance customer and user experiences.

Organizations can accelerate delivery and reduce release time, as Db2 DevOps Experience enables developers and Operations (Ops) teams to synchronize processes. Db2 DevOps Experience brings Platform as a Service (PaaS) practices to Db2 on z/OS, empowering faster development, testing, and integration of application changes through automation and standardization. Db2 DevOps Experience also helps in the early detection of errors, leading to quicker fixes and preventing delays because the code is always in a releasable state. It provides necessary Application Programming Interfaces (APIs) to automate the process via a continuous integration or continuous delivery tools such as Urban Code Deploy (UCD), Jenkins, Bamboo and others.

Summary

Db2 DevOps Experience allows Db2 for z/OS development teams to implement DevOps practices by automating and standardizing tasks that would normally require interaction with an operations team. It provides collaboration between roles in an organization. Developers can easily provision a version of an application, make changes, test, and promote those changes for approval. Quality Engineers can easily automate the creation of Db2 test environments to speed and improve testing activities. Administrators can set the site rules for Db2 schema standards, review and approval of changes, and usage rules. These practices speed development time, improve quality, and integrate better into multi-platform development practices. Combined with the mainframe's processing capacity, organizations automating the mainframe application delivery pipeline can reduce risk, cost and complexity while improving responsiveness to changing market and customer needs.

For more information

To learn more about IBM DB2 tools, contact your IBM representative, or visit: ibm.com/analytics/db2/tools-zos



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- 1 Analyst report: "Digital Transformation Needs Mainframe DevOps" 2016 Forrester report by Kurt Bittner and Robert Stroud
- 2 Source: Rosalind Radcliffe, "Mobile to Mainframe DevOps for Dummies", IBM, 2015, pp. 09-10 (ibm.com/marketing/iwm/dre/signup?source=ibm-cloud-weborganic&S_PKG=ov38219)



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