Virtual User Group

NEWSLETTER 4 | JUNE 2023

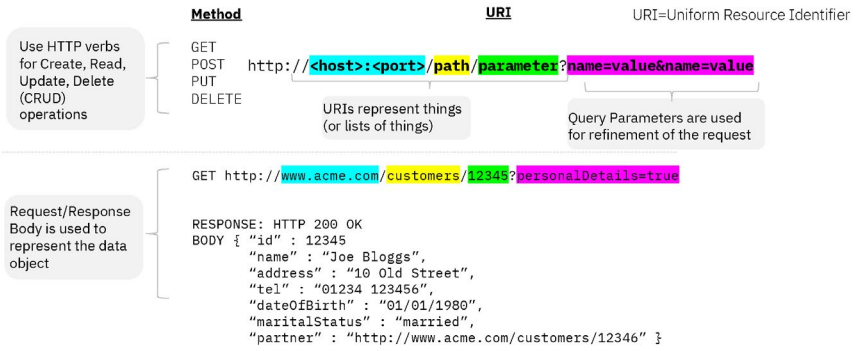
Contents

Virtual Db2 User Group Presentation

DB2 FOR Z/OS AND REST SERVICES

In their recent presentation Keziah Knopp and Victoria Felt, both with IBM Z Washington Systems Center, talk about the drivers behind API usage and explain how tools like z/OS Connect are keeping the mainframe in the game. Tori and Keziah delivered a fantastic and detailed presentation and we encourage you to download the slides and watch the video to gain all of the insights from their session.

Key principles of REST



Mobile Trends and the API Economy

To open the presentation on Db2 for z/OS and REST Services, Keziah Knopp talked about the explosive growth of web and mobile applications in recent years that has transformed the digital landscape. Major mobile-first trends have had significant implications for the enterprise such as the internet of things and the continuous brand experience.

Behind the scenes, the API economy is the enabler of this connected technology. But today, there is more than traditional technical APIs at play In the API economy, business APIs drive particular business objectives like increasing revenue, extending customer reach, and stimulating innovation.

But how does "antiquated" technology like the mainframe exist in this modern, interconnected world? Contrary to misconceptions, Z systems support modern technologies, offering programming options like Python, Node.js, and Swift. Tools such as IBM API Connect and IBM Explorer for z/OS enable developers to create and deploy APIs, leveraging cutting-edge technologies.

Developers' reliance on APIs continues to grow, with surveys indicating an increasing usage of APIs. This trend underscores the vital role of APIs in driving innovation and powering applications across various domains.

RESTful APIs Technical Overview

RESTful APIs, or Representational State Transfer, form an architecture used for sending and receiving information, generally in web and mobile applications. It is a stateless architecture, meaning there is no need to track past or future states. REST utilizes client-server relationships and the HTTP protocol, which is commonly used on the internet.

An API, or Application Programming Interface, is an interface that allows programmers to access specific functions or information in an application. RESTful APIs use HTTP

DB2 FOR Z/OS AND REST SERVICES

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requests such as GET, PUT, POST, and DELETE to interact with data. Db2 native REST only supports the POST method, while z/OS Connect enables the use of all HTTP request methods, making it RESTful.

REST's popularity stems from its foundation on the widely used HTTP protocol, making it easily accessible and interoperable. The standardized format and increasing adoption make it more convenient for developers to integrate RESTful APIs into their applications. REST's stateless nature reduces overhead, and its lightweight design, particularly with JSON data format, facilitates development and readability.

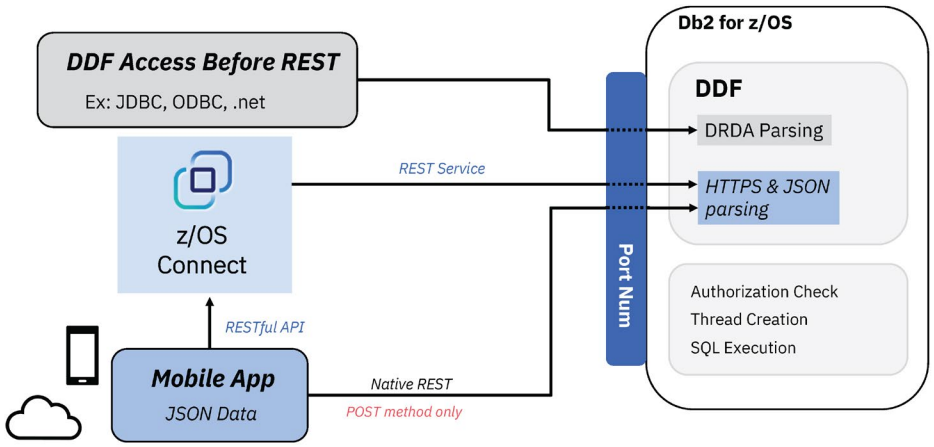
Overall, RESTful APIs offer a standardized and accessible approach for exchanging data between applications, enabling seamless integration and efficient communication.

Db2 for z/OS REST Services

There are four main objectives for using Db2 with REST. First, using REST and JSON to invoke one SQL statement or Stored Procedure. Second, enabling new business value for your enterprise data. Third, modernizing using the power of SQL. Finally, unleashing Db2 data for the API economy.

To achieve these objectives, Db2 REST has a set of properties that enable the direct access of Db2 for Distributed Data Facility (DDF) through REST services. REST services in Db2 can be based on SQL statements or stored procedures and are managed as statically bound packages. Various HTTP methods like CALL, DELETE, INSERT, SELECT, TRUNCATE, UPDATE, and WITH can also be used. Additionally, different data types supported by Db2,

Architecture Diagram



such as BLOB, CLOB, DBCLOB, and XML, can be utilized.

Db2 for z/OS REST can be accessed through a simplified architecture diagram, replacing previous methods like JDBC, ODBC, or .net. It allows mobile app developers to invoke Db2 REST services without needing deep knowledge of SQL, while Db2 app developers or database administrators (DBAs) can create and manage these services without requiring expertise in JSON.

The lifecycle of a Db2 REST service involves discovering existing services, creating new services, displaying the services, executing or invoking them, and deleting them if necessary. Authorization is required for these actions, and various methods, including REST clients, browser-based interfaces, and standard Db2 interactions, can be used to manage Db2 REST services.

Versioning Db2 REST Services

DB2 REST Services allow for the development and deployment of new versions of REST Services while existing versions are still being used. With versioning, creating a new version of a REST service is made easy and doesn't disrupt the existing versions.

Versioning of DB2 REST Services is built on existing package versioning support, so the necessary infrastructure is already in place. The same authorizations, such as DBA or mobile app authorizations, that were used previously can be utilized for creating new versions. Each version can be identified by a version ID, which by default is V1 but can be named anything you prefer. Additionally, a default version can be set for all calls to the REST service.

Enabling versioning has no impact on preexisting version-less REST services. They remain unchanged, with an empty string value in the version ID field. However, after versioning is enabled, all services will be versioned. Versioning simplifies the modification and development of REST services, making it faster and easier, ultimately improving time-to-market.

Db2 REST & z/OS Connect

Native REST Services are a great way to expose Db2 data but the method only supports the POST method and has limited security protocol support. However, with z/OS Connect, mobile

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NEWSLETTER 4 | JUNE 2023

NEXT VIRTUAL MEETING - JULY 18, 2023, 10:30 AM CDT

Db2 12+ and 13 for z/OS Database Design and Application Performance: Features and Usage

With every new release of Db2 we look to see what features will allow us to improve the capabilities and performance of our existing applications as well as the availability of our data. We also have to plan to utilize new features in our development efforts. This presentation takes a look at the features in Db2 12 (+FLs and APARs) and 13, that will improve our performance and provide us with maximum data availability as well as advanced application development. We will be focusing on features (including those in the most current function level) that can be utilized by DBAs and application programmers.

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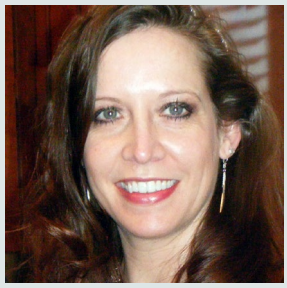

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DB2 FOR Z/OS AND REST SERVICES

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and cloud programmers can use additional methods like GET, PUT, and DELETE along with POST. This allows for more flexibility in accessing and manipulating data.

The architecture overview shows that z/OS Connect acts as an intermediary between the client applications and the DB2 database. It allows mobile and cloud apps to use various methods to access data from DB2, providing a consistent and uniform configuration for accessing mainframe data.

From a developer's perspective, using z/OS Connect simplifies the creation of APIs compared to native REST Services. It allows developers to use different methods like GET and provides a clearer and more straightforward way to create APIs and specify what they want to do.

To connect to DB2 with z/OS Connect, a Db2 native REST service needs to be created using the POST method. Once created, it can be imported into z/OS Connect using the API toolkit. The toolkit helps developers build APIs and creates API documents, such as Swagger documents, to describe the API's inputs, outputs, and supported methods.

Z/OS Connect consists of two main components: the Runtime Server and the Eclipse-based Tooling Platform. The Runtime Server processes API requests, performs security checks, and connects to back-end systems. The Tooling Platform provides a graphical tool for defining APIs, mapping JSON data, and generating API documents.

Z/OS Connect serves as a single point of entry to z/OS resources and acts as an API gateway to different back-end subsystems. It provides a unified configuration and security administration, simplifying the access to mainframe data for external applications. The sophisticated tooling and mapping capabilities of z/OS Connect make it developer-friendly and allow developers to work with mainframe data without extensive knowledge of z/OS.

Overall, DB2 REST Services with z/OS Connect provide a powerful and flexible way to expose and access data from the DB2 database using RESTful APIs, making it easier for developers to work with mainframe data and integrate it into modern applications.

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NEWSLETTER 4 | JUNE 2023

NEWS AND ANNOUCEMENTS

- Sponsorship opportunity - We are looking for additional co-sponsors for the Virtual Db2 user group. The user group has been in existence since 2022 and is gaining respect among users of Db2. The user group gives its sponsors an opportunity to show that they are working with, and helping to build, the Db2 user community.
  Contact **trevor@itech-ed.com** for more information.
- After you register for our next event on July 18, save the date for our September 19th session with Broadcom's Steen Rasmussen.

ARTICLES AND BLOGS

- **Mainframe Cost Savings Part 2: 4HRA, zIIP Overflow, XCF, and Db2 Memory**—Todd Havekost—11 May 2023
  —IntelliMagic Blog
- **IBM doubles down on generative AI and hybrid cloud**—May 2023
  —SiliconAngle.com

Click HERE to complete our Poll!
We want to know how we can make the Virtual Db2 User Group better.

ABOUT THE VIRTUAL DB2 USER GROUP

The Virtual Db2 User Group is an independently-operated vendor-neutral site run by and for the mainframe Db2 user community. This is a mainframe Db2 information website, not in any way related to, sponsored, or approved by IBM, which is the legitimate owner of the trademark, and any use of the mark in the URL or the body of the site is for information, education, and opinion expression purposes. The Virtual Db2 user group was established as a way for individuals using IBM's Db2 for z/OS database to exchange information, learn new techniques, and advance their skills with the product. Anyone with an interest in Db2 for z/OS is welcome to join the Virtual Db2 user group and share in the knowledge exchange.

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