IBM IMS

The 4 Paths to Digital Transformation in IMS

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IBM Offering Manager – API, Java, DevOps for IMS and Ansible for Z

IBM

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IBM IMS

IBM IMS

From IBM Z Value Drivers to a successful Hybrid Cloud Policy

IBM Z Value Drivers

– Open and connected to public and private cloud environments
– Optimized for Java workloads
– Optimized for Machine Learning, Spark and real time insights / decision
– Unmatched reliability, security, and availability
– Industry first pervasive encryption capabilities
– Transparent and predictable container pricing for new workloads

STAMFORD, Conn., June 22, 2016 View All Press Releases

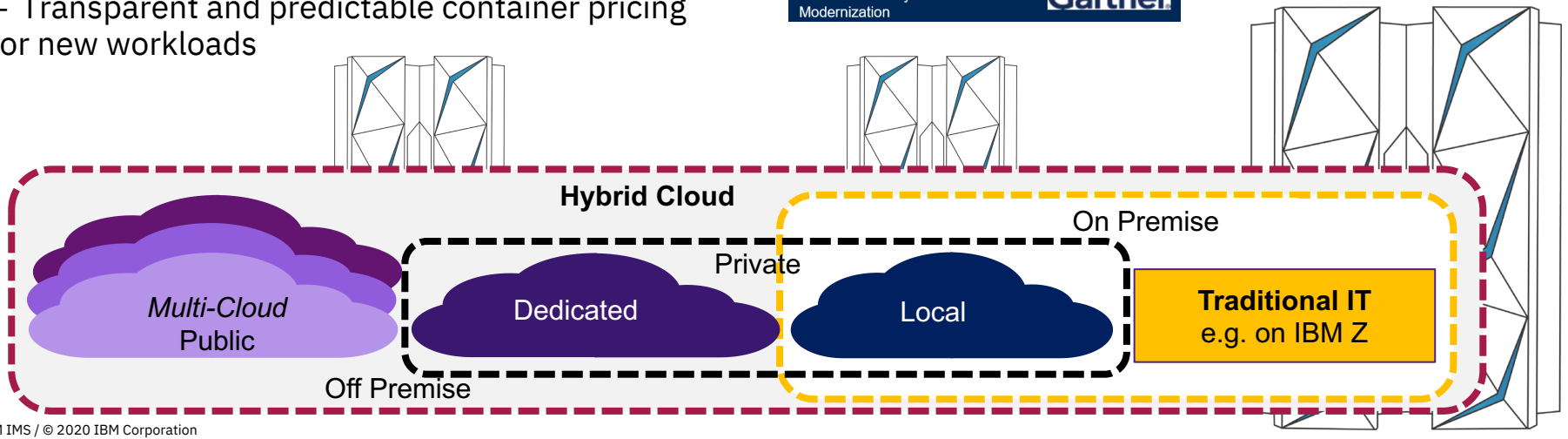
Gartner Says By 2020, a Corporate "No-Cloud" Policy Will Be as Rare as a "No-Internet" Policy Is Today

Hybrid Will Be the Most Common Use of the Cloud

The IBM Mainframe Platform: Ongoing Challenges, New Opportunities

Thomas Klinect
Sr. Director Analyst
Modernization

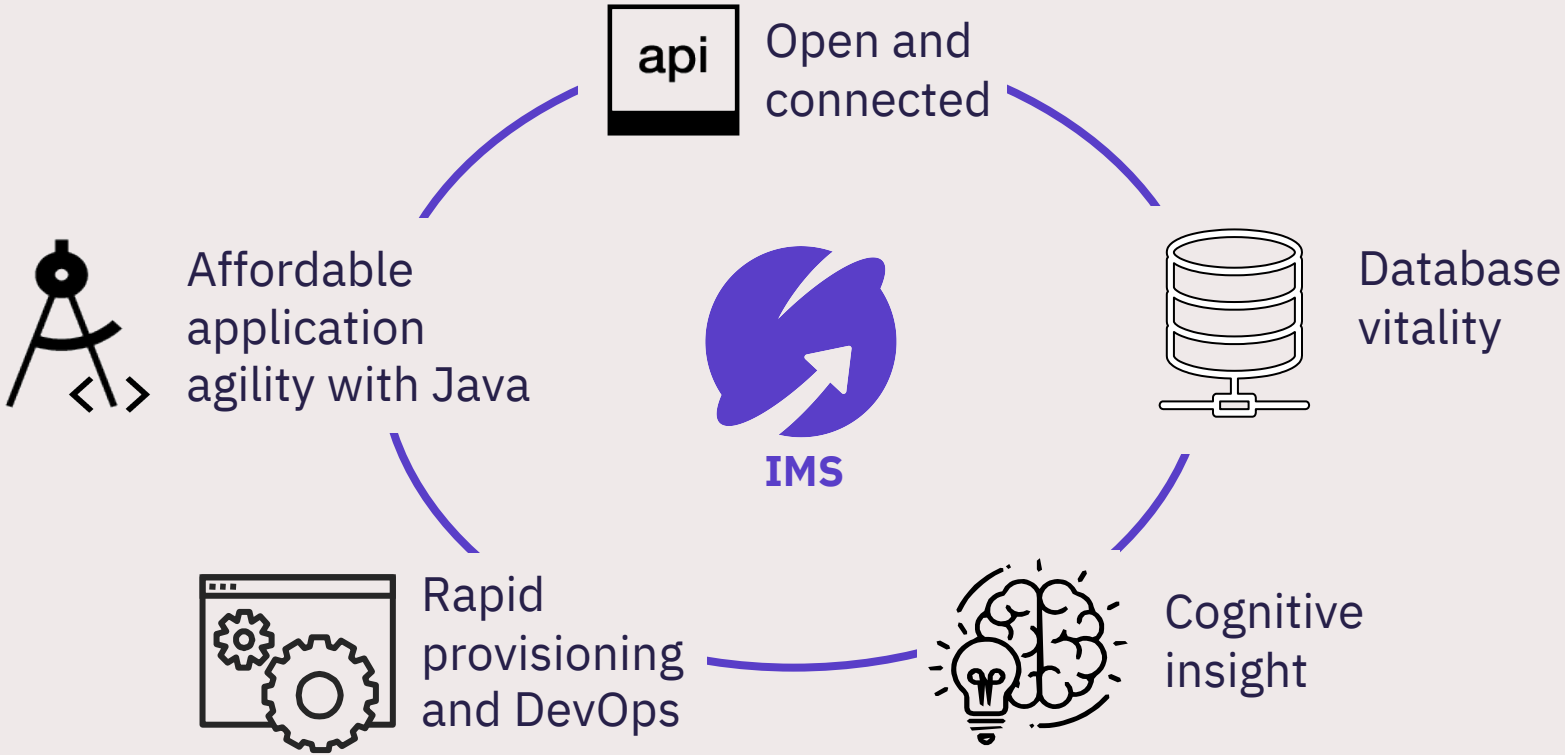
Gartner



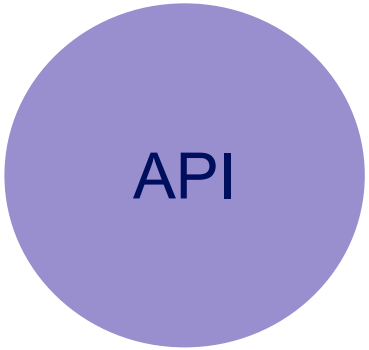
How can we help you to keep IMS modern?

Embrace change

IMS in a Connected Mainframe World



Common IMS Modernization Patterns



IMS assets as API

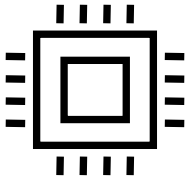
Application Agility with Java in IMS

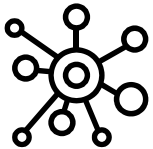
Rapid IMS provisioning and Integrated DevOps

Open IMS data access with JDBC and SQL

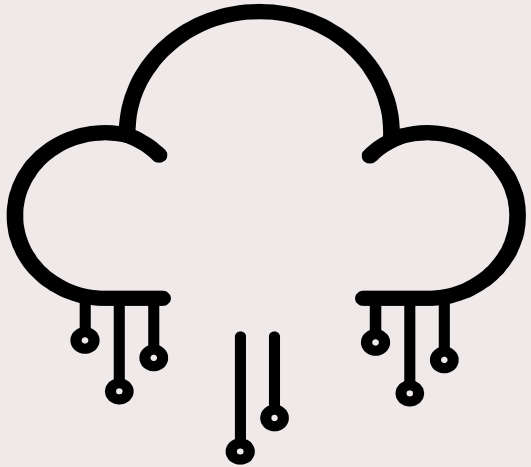
IMS and API

- Open access to IMS data and transactions
- Create RESTful APIs from your IMS transaction assets
- Harness new opportunities with your growing API portfolio
- Maximize opportunity by connecting IMS on-prem assets to the Cloud
- Convert IMS from cost center to revenue center





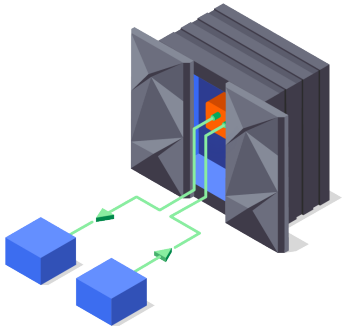
Innovate and extend your IMS investment to the Cloud



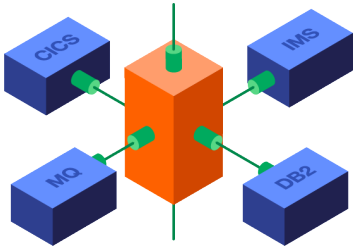
IBM **z/OS Connect Enterprise Edition**

Truly RESTful APIs to and from your mainframe

for building microservices and succeeding in the API economy



APIs to and from the mainframe



Comprehensive subsystem support

Point-and-click API creation

Call external APIs from your mainframe applications, or expose those applications as easily consumable RESTful APIs with OpenAPI descriptions - with simple integration into enterprise API management solutions.

Learn more: ibm.biz/zosconnectdc

Try for yourself: ibm.biz/ibmztrial

IMS

API

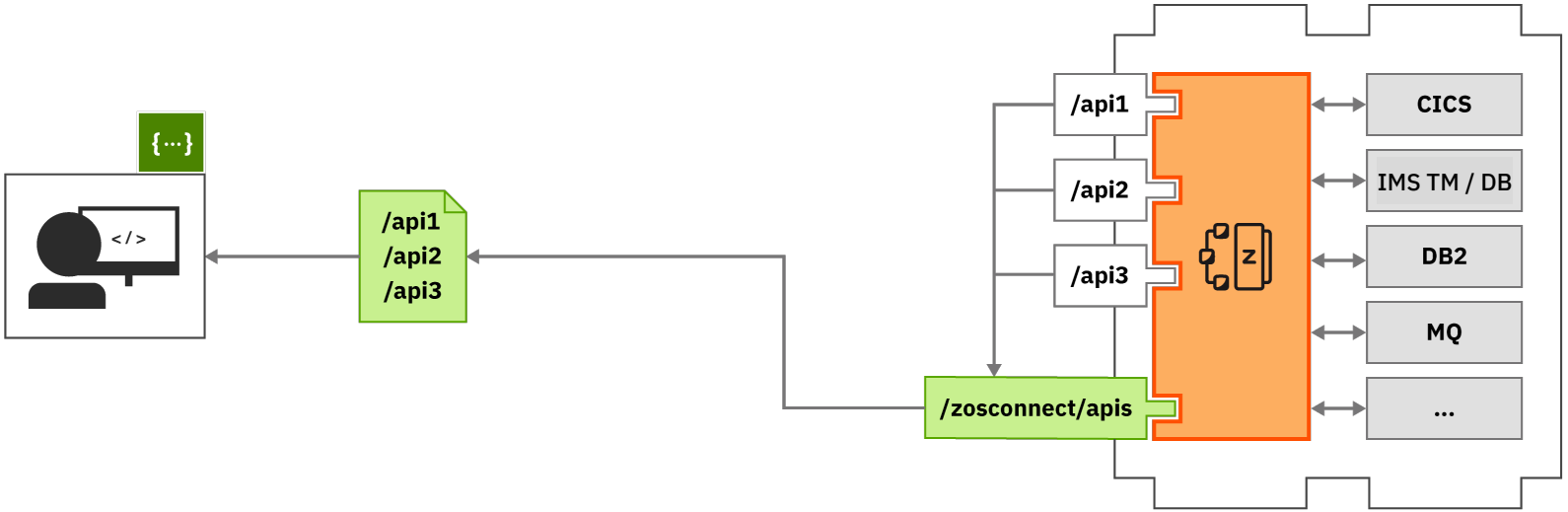
API to
IMS Transaction

API to
IMS Data

IMS Application
to external API

z/OS Connect Enterprise Edition

Expose IMS and z/OS assets as RESTful APIs without writing any code.



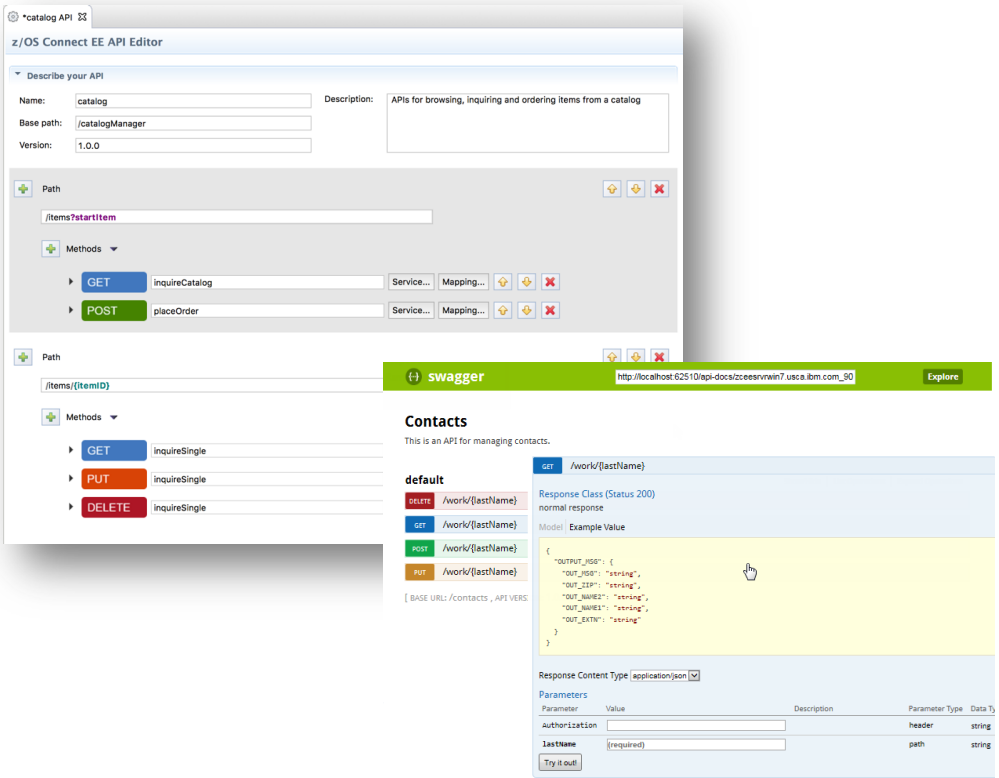
No mainframe skills to use mainframe apps as APIs.

API-enable both **IMS transaction** and **IMS data** directly

API toolkit – Easy creation of API for your z/OS Assets

z/OS Connect EE

API definition



The **API toolkit** is designed to encourage RESTful API design.

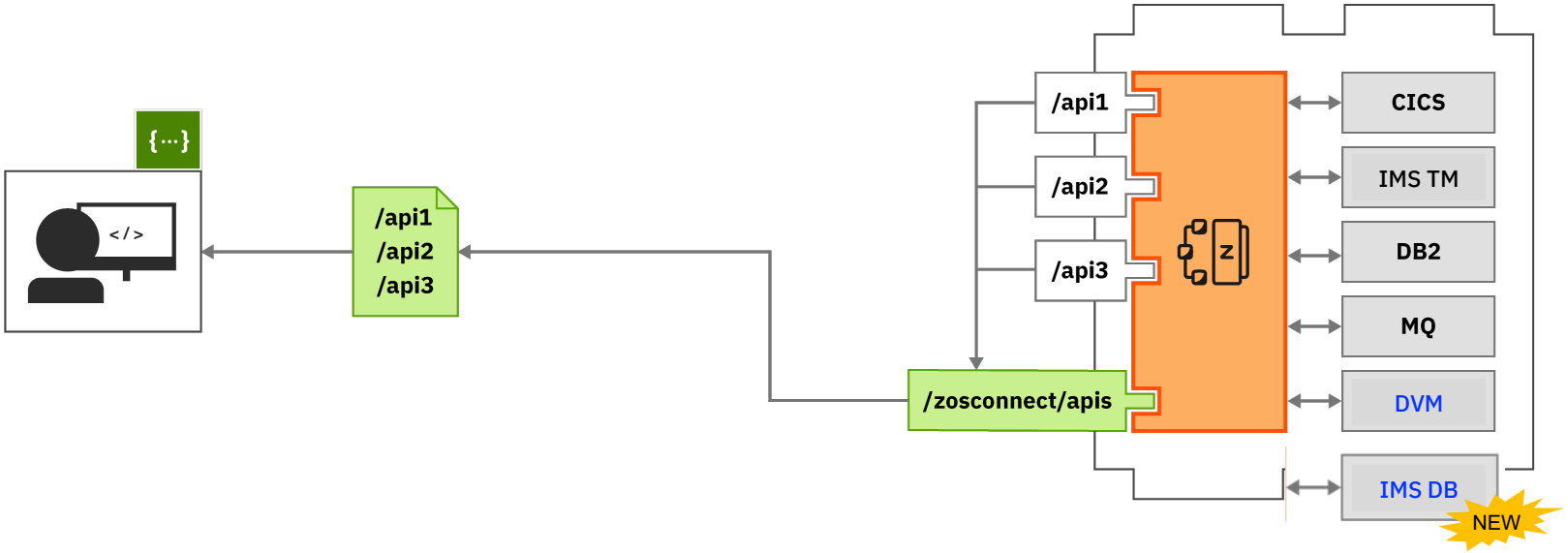
Once you define your API, you can map backend services to each request.

Your services are represented by `.sar` files, which you import into the **API toolkit**.

Your IMS assets are discoverable as Swagger docs served from **z/OS Connect EE**

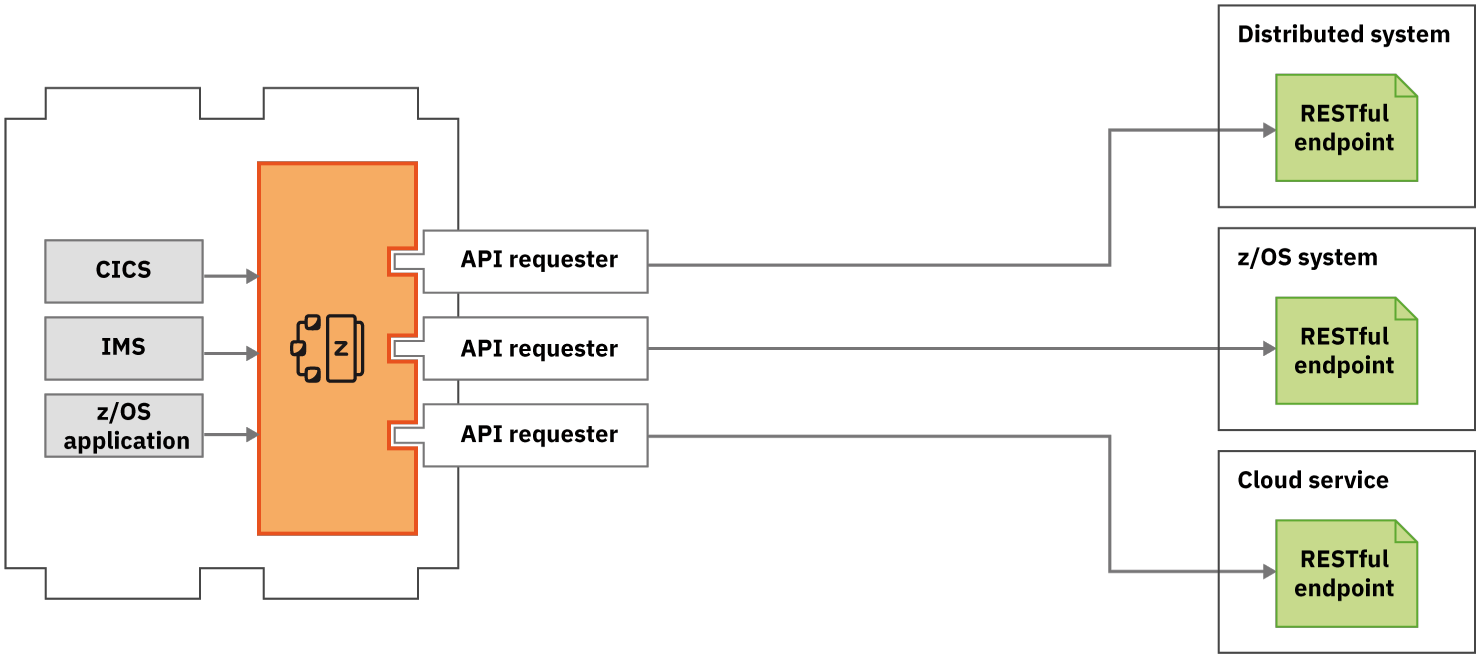
Test your deployed APIs directly with **Swagger UI** inside the editor.

z/OS Connect access to IMS Data



IMS and z/OS assets to call external APIs with API requester

z/OS Connect EE



IMS and API success stories

Australian bank

Modernize Account Open application with API and reduce process time from 3 days to sub-second.
In first 3 months, gained 5500 new accounts, 150M in ledger 3 days longer, 750 hours saved in call center.

Major Insurance company

z/OS Connect EE was used to enable z applications to consume API that allows them to add new real-time quotes capability that requires information from other APIs.

Major Equipment Manufacturer

Using z/OS Connect enabled their existing APIs in the cloud to get the data needed directly from IBM Z, without requiring additional connection options or driving additional transactions.

Canadian bank

Align z assets with company's cloud and API strategy via micro services using z/OS Connect and API with IMS. Reduced cost of integration and increase speed of delivery as no coding needed. Plan to deliver over 100 zAPIs in the next year

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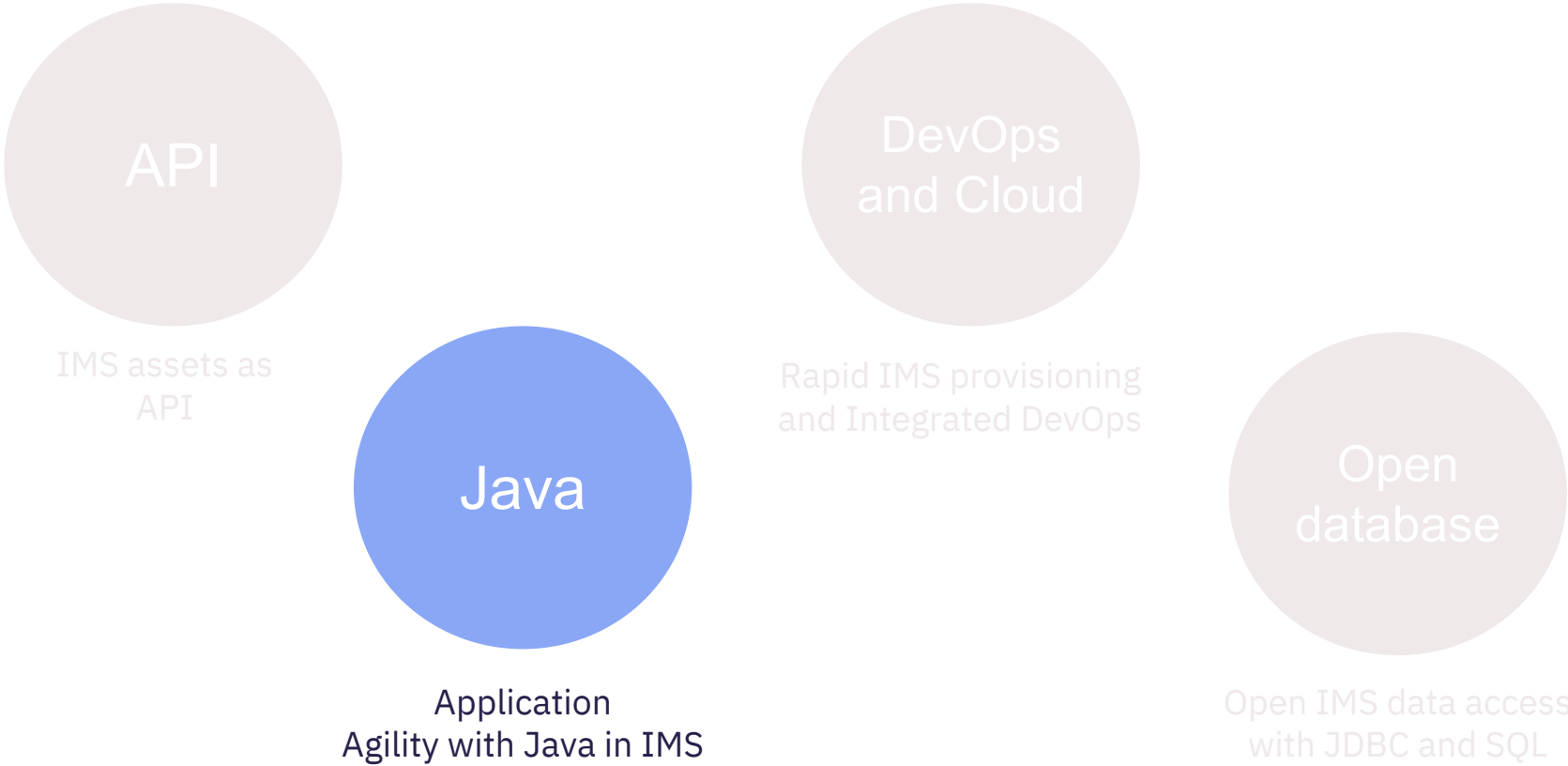
Provide IT services and help their clients to API-enable IMS application and database access with z/OS Connect.

- Build new web-based front-end to a complex and important applications to get rid of the 3270 access
- Quickly deployed services and APIs for mainframe services to avoid double development of the same functionality in both the mainframe and the distributed world

Common IMS Modernization Patterns

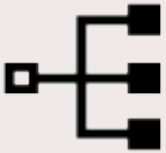


15+ years in IMS, Java and SQL support

IMS and Java: affordable application agility

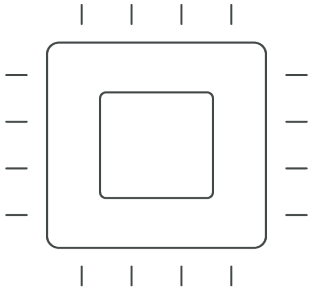
- Modern languages, tooling and frameworks improve application developer productivity and shrink time-to-value
- Leverage 14 million Java developers worldwide to keep trusted IMS applications thriving
- Reduce time, MIPs, and stress with cloud-hosted development and test
- Java in IMS, has been available for over 15 years – is proven production ready solution for your enterprise!

Innovate and extend your core applications with speed and confidence



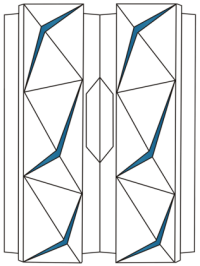
Java and IBM Z: Perfect Partners

zIIP



Cost efficiency ensured through offload to specialty engines

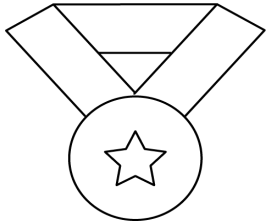
Co-location



Improved performance through eliminating network latency

*vs a distributed architecture

Extend Agility



Easy to find Java skills

Proven versatile and performing language

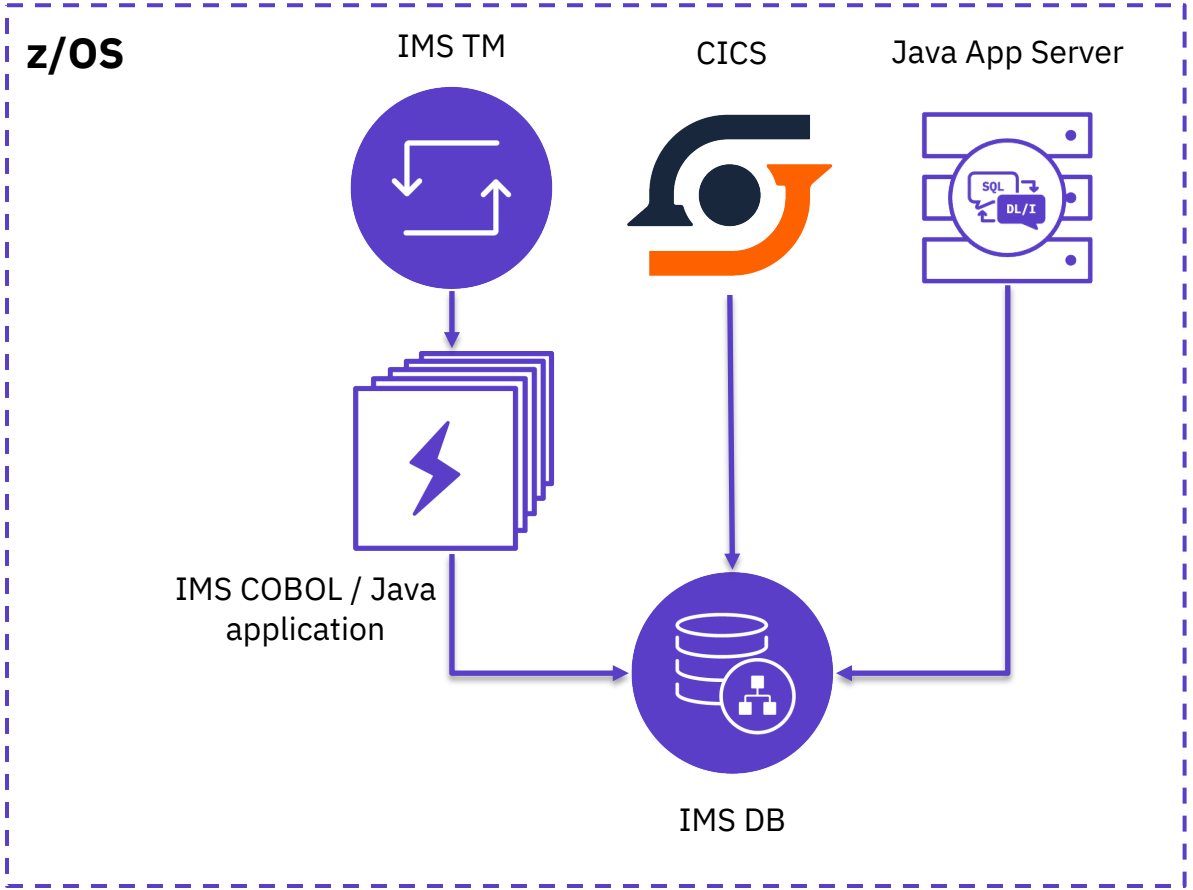
DevOps ready

Java on z with IMS

Java running in **IMS dependent regions**

CICS Java application accessing IMS data

Java EE server on z access IMS



How do you use Java on Z with IMS?

Extend existing IMS applications with Java

Leverages Java in their existing COBOL applications

Convert heavy CPU consumption routines to Java

Transitions development from COBOL to Java

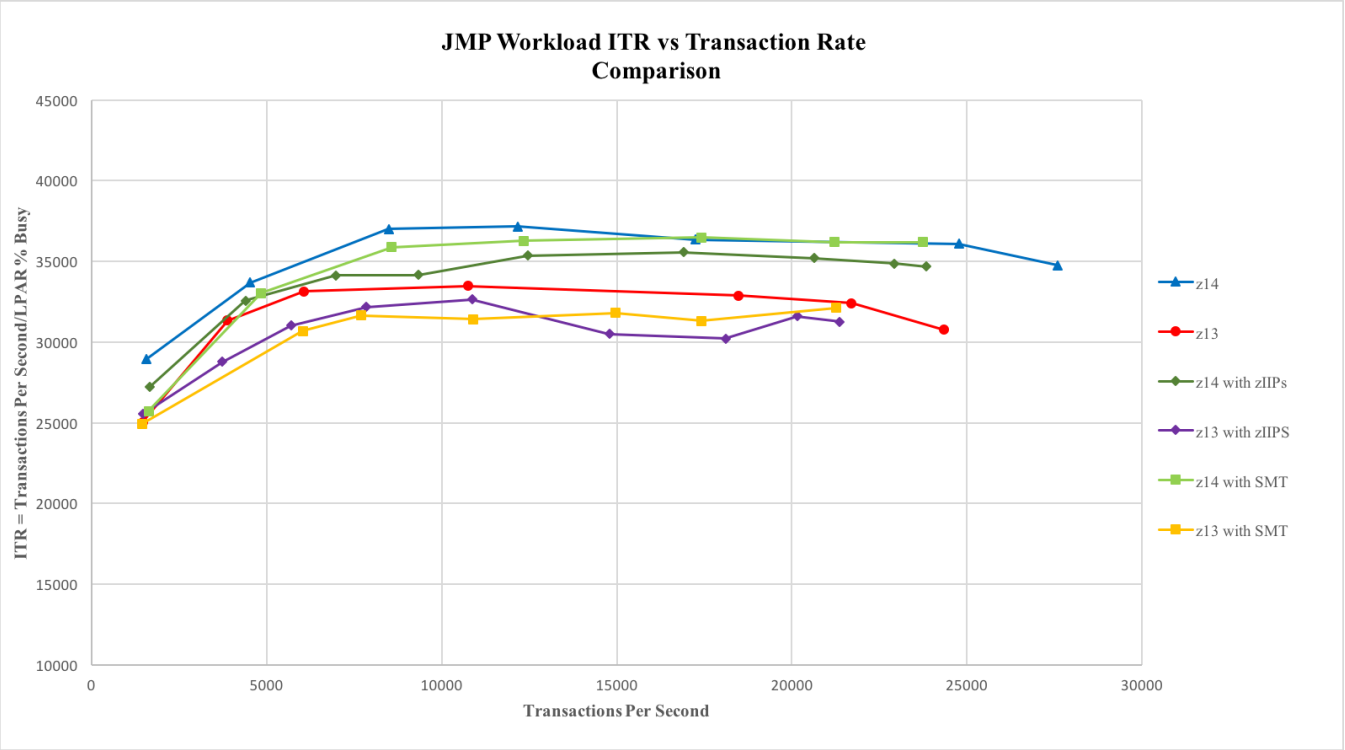
Write new or Convert IMS applications in Java

Places most of the business logic in Java allowing for better offload

Allows for easier maintenance

IMS Java Transaction Processing Workload

Over 25000 tps with IMS 14 and z14



z14 and IMS Performance white paper
https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=54013754USEN&

IMS and Java success stories

FIDUCIA GAD
ZUKUNFTSERFAHREN

"Combining IMS, Java and COBOL technologies is an effective strategic way of modernizing existing mainframe applications with minimal disruption, operational risk and costs."
- Carsten Pfläging, CIO Fiducia & GAD

Major International Bank based in North America

Convert business-critical IMS applications to pure Java improve application maintenance and cost-savings using Java in IMS

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Modernize IMS application with Java and SQL that needs to access a complex IMS database (1.2 billion segment HALDB with a data structure dependency). Cut down development time and easier to maintain.

- Able to replace/remove distributed partial copy of the database, vendor software packages (saving hardware, software license and management cost)
- Reduce batch processing and data replication to distributed
- Remove legacy assembler code that is maintained by vendors

A Java on the Mainframe Success Story

Fiducia & GAD IT - Bringing high-speed, low-cost, low-risk development to core banking systems

Business Challenge

To enable member banks to launch new applications and services faster and at lower cost, Fiducia & GAD IT AG needed to make it easier and more transparent to call existing services from new software.

Transformation

Fiducia & GAD IT AG introduced Java alongside COBOL in IBM IMS on IBM Z, accelerating the creation of new services and extending the life and value of its applications.

"Combining IMS, Java and COBOL technologies is an effective strategic way of modernizing existing mainframe applications with minimal disruption, operational risk and costs."
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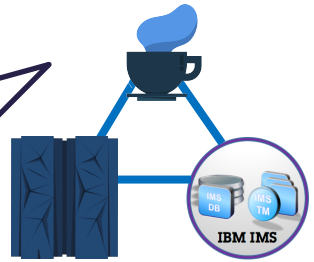


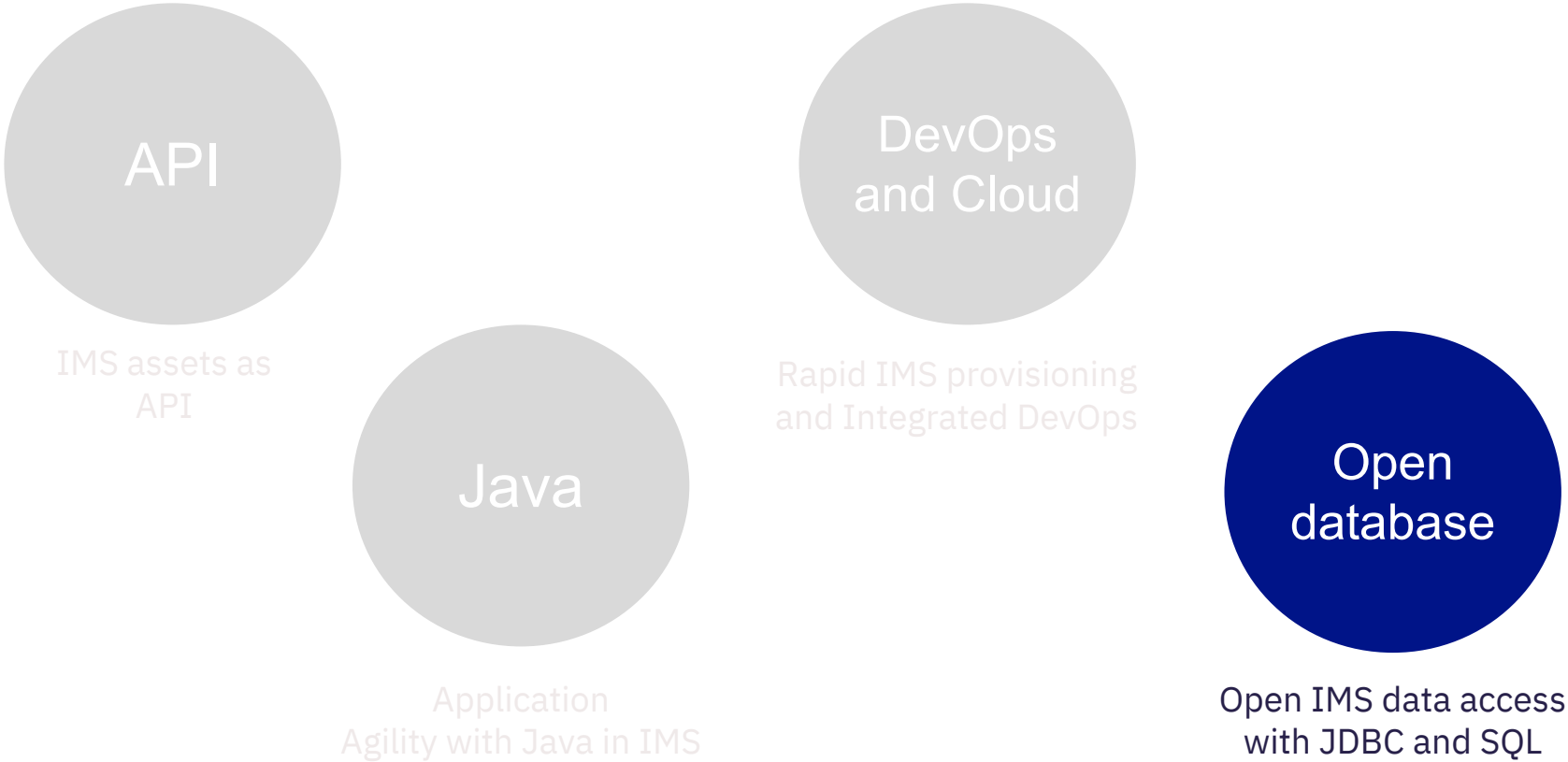
FIDUCIA GAD
ZUKUNFTSERFAHREN

Results:

- ✓ Ensures the best delivery by making code open, agile, and portable.
- ✓ Accelerates application delivery
- ✓ Cuts costs with modern frameworks and APIs
- ✓ Enriches existing apps fast and at low risk, using more easily accessible skills

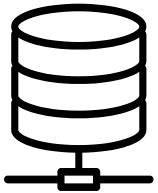
See whitepaper - https://developer.ibm.com/zsystems/documentation/java/ims/
Case study - http://ecc.ibm.com/case-study/us-en/ECCF-ZSC03341USEN

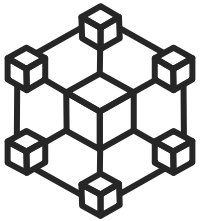
Common IMS Modernization Patterns



IMS and Open database

- IMS is open and connected via Open Database solution
- Enable data modeling and data insight with Catalog
- Focus on DBA to broaden the available skill base for managing IMS
- Increased currency of insights from reduced latency and elimination of ETL





Innovate and extend your IMS database and your most trusted data

Top 3 reasons for modernizing IMS with ***Open Database***

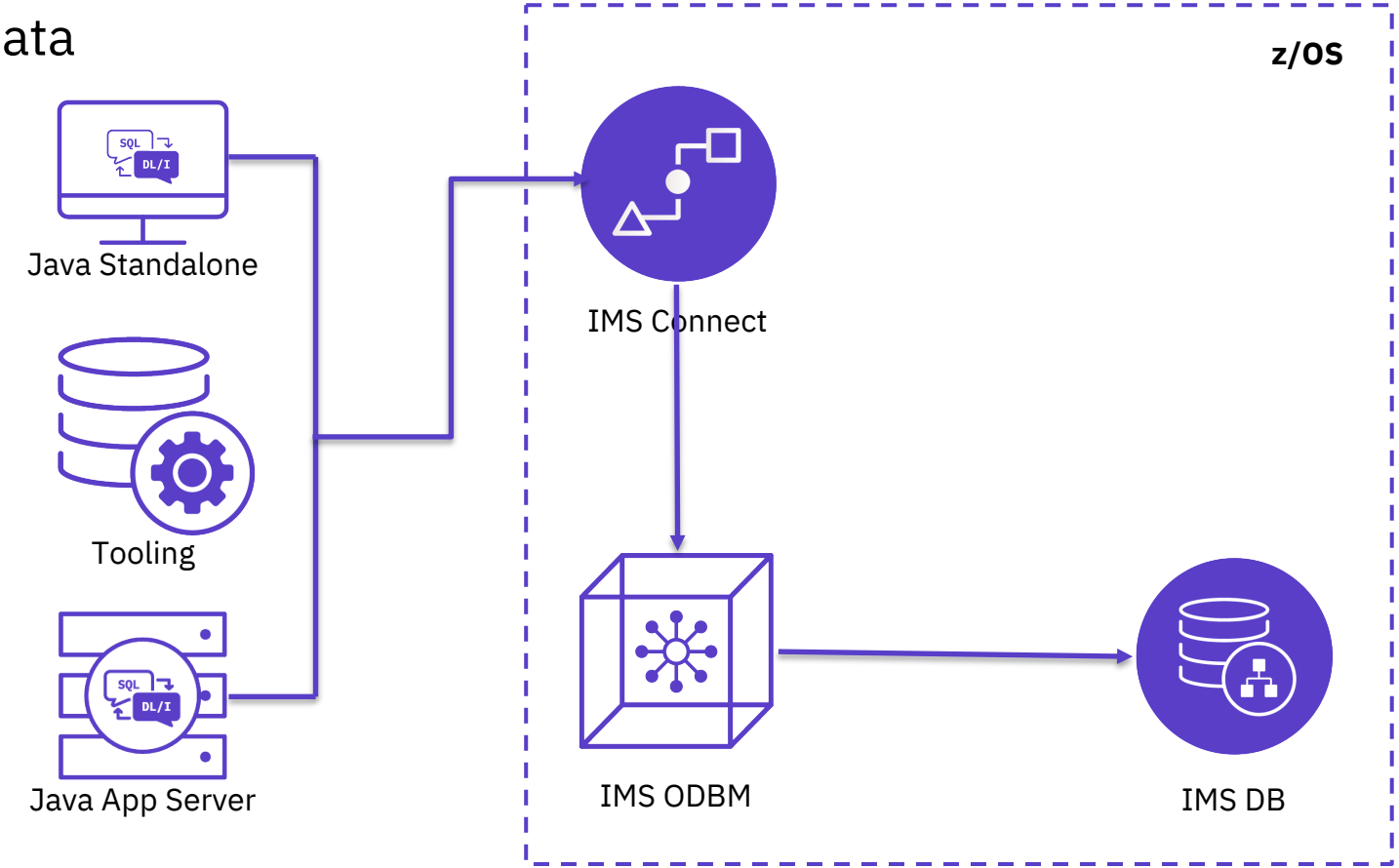
Make your **IMS data more accessible**

Instant data access with reduced latency and elimination of ETL

IMS data as a key data source for **Analytics** platforms

Distributed Java access to IMS data

Direct database access from Java clients running in IMS or distributed platforms using **SQL** (JDBC) or **DL/I** calls



IMS and SQL

IMS support **SQL** for both data access and data manipulation

- SELECT – Retrieve data
- INSERT – inserts data
- UPDATE – updates data
- DELETE – deletes data

As of IMS 14, IMS also supports **DDL** for data definition and data administration

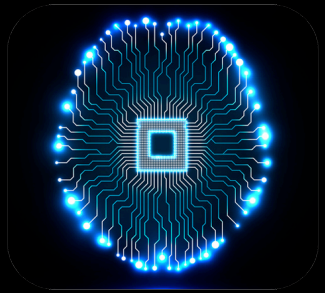
- CREATE DATABASE, TABLE
- ALTER DATABASE
- etc…

https://www.ibm.com/support/knowledgecenter/en/SSEPH2_14.1.0/com.ibm.ims14.doc.dag/ims_imspldbdes_ddl.htm

IMS Data Fuels Your Cognitive Journey

IMS JDBC drivers + common JDBC tooling =
IMS as a key data source for Analytics platforms

IBM Machine Learning for z/OS



z/OS Platform for Apache Spark

Spark

Rocket

IBM Db2

Analytics Accelerator

IMS and Open database success stories

TRAVELERS

“If your company has a need to access your legacy IMS data, then Open Database will literally open the door for easy, fast access to your data. The biggest benefit to IMS Open Database is the ease of access into IMS data using today’s standard SQL.”
- Rob De Sesa, Mainframe Infrastructure Support

Major International Bank based in North America

With the IMS Open Database solution, the call center services is modernized by providing direct access to client data in IMS using standard SQL. This significantly simplified their data access pattern, increased agility, reduced cost, and currently is driving million transactions per month and growing.

Common IMS Modernization Patterns

IMS assets as API

Rapid IMS provisioning and Integrated DevOps

Application Agility with Java in IMS

Open IMS data access with JDBC and SQL

Cloud Native Experience

A cloud native developer experience for z/OS

Hybrid multi-cloud

Integrate z/OS into a hybrid multi-cloud architecture powered by market leading development and management solutions

Self provisioning

Empower development squads to self provision z/OS runtimes and databases that support their apps and data

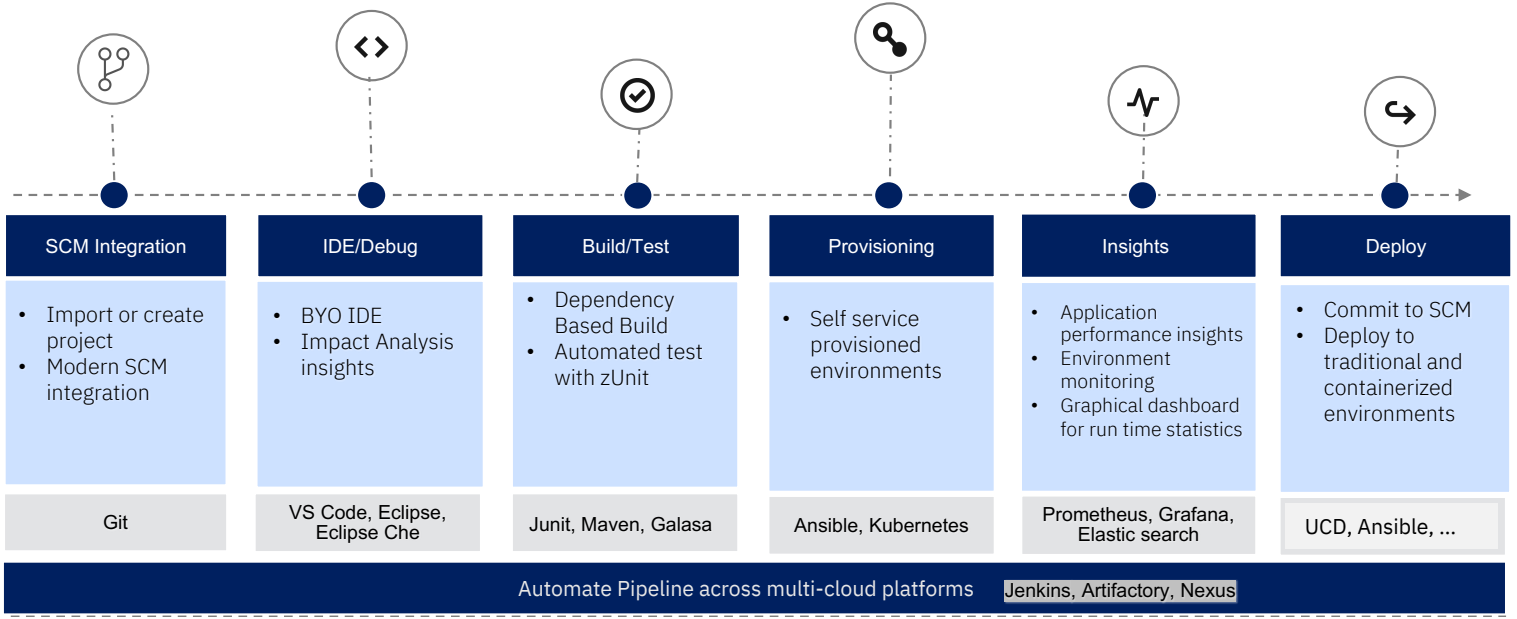
Enterprise DevOps

Deliver solutions with confidence through a fully integrated enterprise CI/CD pipeline embracing open source tools

Shift-left operations

Act on intelligent, operational feedback available from development to production based on variations in system behavior

IBM Z Open Developer Experience



IBM Wazi for Red Hat CodeReady Workspaces

Develop. Innovate. Transform

Develop hybrid applications spanning IBM Z and multi cloud platforms using a standard DevOps toolchain

Reduce the need for specialized skills and improve productivity with cloud native tools

Reduce cost with an enterprise wide standard toolchain

Increase speed and agility with a containerized development & test environment

Flexibly rebalance entitlement over time: from what you need today, to what you need tomorrow

End to end cloud native developer experience

Portable across **any** cloud or platform and optimized to run on **Red Hat® OpenShift**

Bring your own Integrated Development Environment (IDE)

Microsoft® Visual Studio™ Code

Eclipse®

Eclipse Che®
Red Hat® CodeReady Workspaces

IBM Wazi for Red Hat CodeReady Workspaces

IDE and Sandbox

Red Hat OpenShift Container Platform

Project: all projects

OperatorHub

Discover Operators from the Kubernetes community and Red Hat partners, curated by Red Hat. Operators can be installed on your clusters to provide optional add-ons and shared services to your developers. Once installed, the capabilities provided by the Operator appear in the Developer Catalog, providing a self-service experience.

All Items

AI/Machine Learning
Application Runtime
Big Data
Cloud Provider
Database
Developer Tools
Integration & Delivery
Logging & Tracing
Monitoring
Networking
OpenShift Optional

All Items

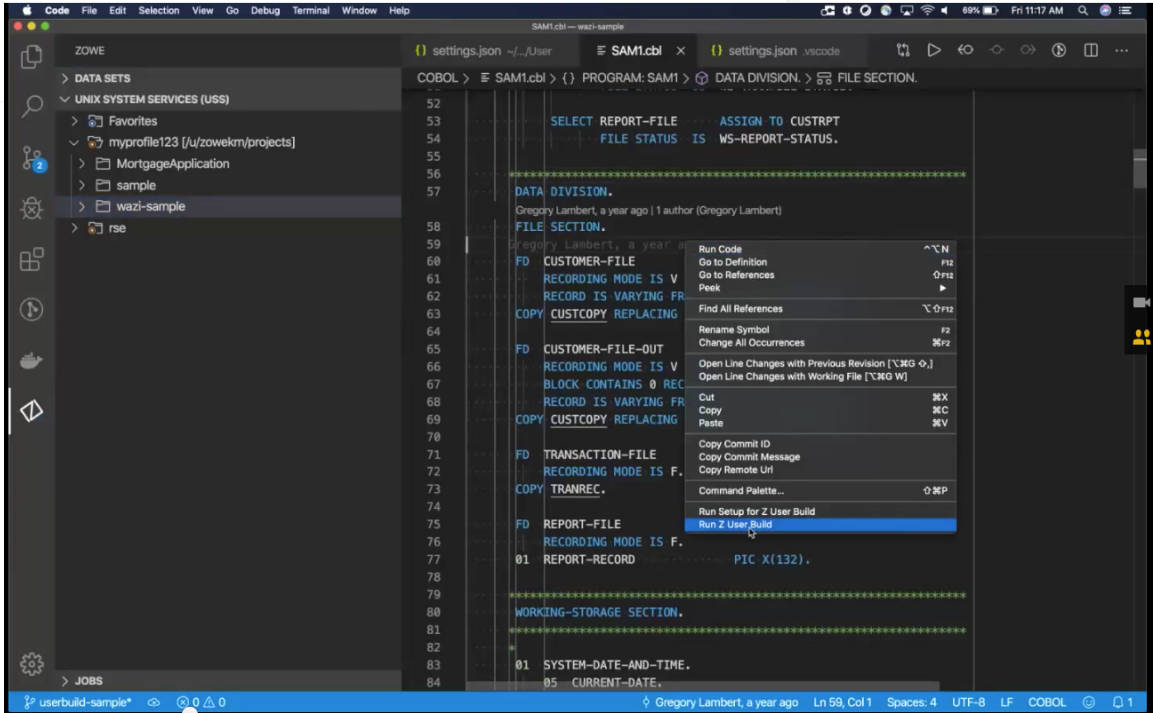
wazi

Custom

IBM Wazi for Red Hat CodeReady Workspaces Sandbox

provided by IBM

Deploy virtual z/OS® sand



Red Hat Ansible Certified Content for IBM Z

Red Hat
Ansible Automation
Platform

Red Hat Ansible Automation Platform is the enterprise framework for Ansible that enables a common approach to hybrid applications and infrastructure management

Flexibility

- Bring disparate IT into a coherent whole using a market leading open solution backed with enterprise support
- Interact directly with z/OS resources or integrate with existing platform tools

Consistency

- Integrate z/OS into an enterprise automation strategy in a consistent way
- Centralize management of your IT infrastructure

Simplicity

- The certified collections codify much of the z/OS specific knowledge and complexity
- Developer or system programmer can focus on their tasks and be more productive

Red Hat Ansible Certified Content for IBM Z

- Set of collections that accelerate the use of Ansible with IBM Z
- Initial collection focuses on the basic building blocks of interacting with the z/OS system
- Collections will be added regularly covering additional use cases (ex. configuration, provisioning, application deployment) for z/OS and the broader IBM Z community

***Available on Ansible Automation Hub and Galaxy!**

Ansible managing to z/OS use cases

Provisioning

- Some interested in provision middleware instances – these are typically activities that happen infrequently or have existing automation in place
- Provisioning new software (zCEE, DVM, etc) to make set up easier, faster, and repeatable

Configuration Management

- Parameter/configuration member management - make source control the single point of change & truth for z/OS configuration
- Leverage Ansible to consistently make changes to the system and create discipline

Security Automation

- Probe the mainframe to collect information (audit details, configuration details, health checks, etc)

Application Deployment

- Deploying all components of a version of an application on one to n sites in a controlled and reliable way
- Ability to deploy on n-distinct OPEN and Z sites in a secure way from development to production

Continuous Delivery

- Improve CI/CD pipelines

Orchestration

- System recovery and failover: replacing home grown orchestration – Ansible is a likely target – cross-LPAR dependencies and non-z/OS environment coordination

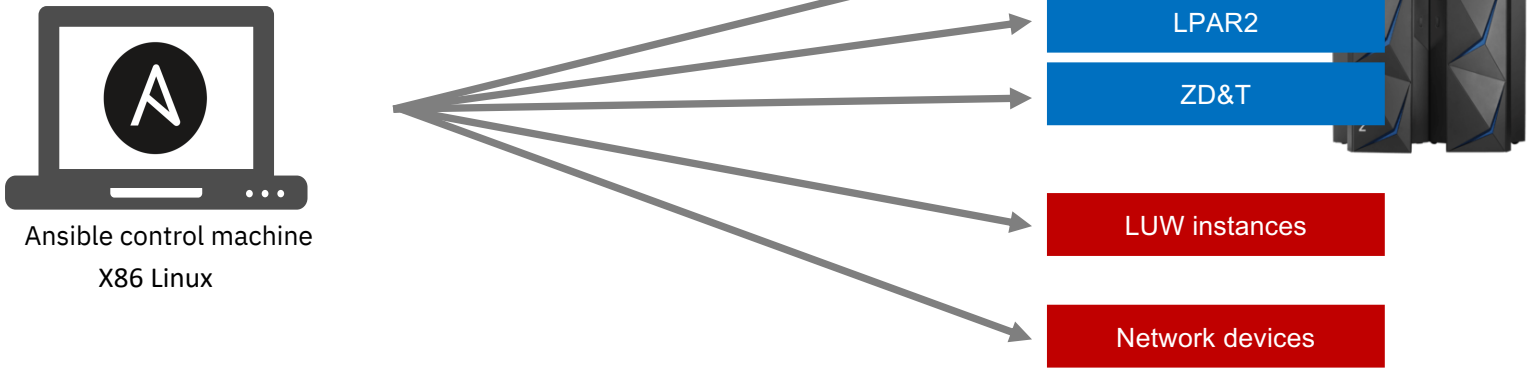
Ansible with z/OS

Ansible Control Nodes

- The orchestrator
- Connects and executes to 1:n managed nodes
- Playbook execution happens here via Ansible Engine (CLI) / Ansible Tower
- Connects via SSH or REST/SOAP APIs
- Supported on x86 Linux

Ansible Managed Nodes

- Targets for automation of any kind
- Can be any target, such as Linux, Unix, Windows, z/OS, Power, network devices, etc



IBM z/OS core collection

Ibm.ibm_zos_core collection (https://galaxy.ansible.com/ibm/ibm_zos_core)

Ansible Module	Description	Availability
zos_data_set	Allocate and delete data sets	Galaxy and Hub v1.0.0
zos_job_submit	Submit a z/OS job with various options to: • wait for completion • return output	Galaxy and Hub v1.0.0
zos_job_query	Query the status of a z/OS job that was previously submitted	Galaxy and Hub v1.0.0
zos_job_output	Get output for a z/OS job	Galaxy and Hub v1.0.0
zos_fetch	Fetch z/OS data sets: • from managed node to the control node	Galaxy v1.1.0-beta1
zos_tso_command	Executes a TSO command and returns command output	Galaxy v1.1.0-beta1
zos_encode	Convert text encoding from ASCII to EBCDIC and EBCDIC to ASCII	Galaxy v1.1.0-beta1
zos_operator	Issue z/OS operator (console) commands	Galaxy v1.1.0-beta1
zos_operator_action_query	Return outstanding operator reply-to messages	Galaxy v1.1.0-beta1

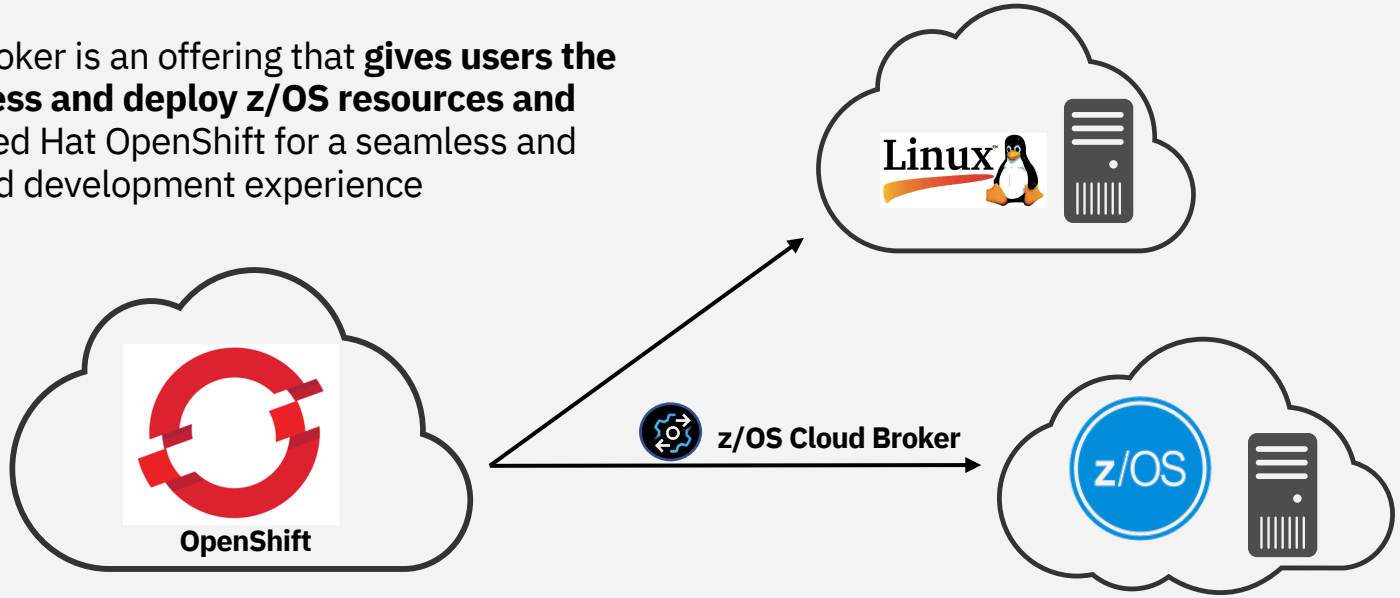
IBM z/OS IMS collection

Ibm.ibm_zos_ims collection (https://galaxy.ansible.com/ibm/ibm_zos_ims)

Ansible Module	Description	Availability
ims_dbd_gen	Generates IMS Database Descriptor (DBD) resource(s) to define a database	Galaxy v1.1.0-beta1
ims_psb_gen	Generates IMS Program Specification Block (PSB) resource(s) for the IMS application programs and resources to be used.	Galaxy v1.1.0-beta1
ims_acb_gen	Merges and expands IMS DBD(s) and PSB(s) into an IMS internal format called IMS Application Control Blocks (ACBs) to be used during IMS runtime for program execution	Galaxy v1.1.0-beta2
ims_command	Issue Type 1 and Type 2 IMS Commands and retrieves the result and output	Galaxy v1.1.0-beta1

z/OS Cloud Broker brings z/OS runtimes to the OpenShift catalog

z/OS Cloud Broker is an offering that **gives users the ability to access and deploy z/OS resources and services** on Red Hat OpenShift for a seamless and universal cloud development experience



> *The broker will allow us to level the cloud playing field by simplifying deployments, bringing value to the business by saving time and resources.*
>
> - Large international bank

z/OS Cloud Broker – Available Services

Enable holistic cloud consumption of z/OS middleware

- Make z/OS middleware available in the OpenShift catalog
- Self-service/agility for developers

z/OS Connect EE	Db2	CICS	IMS	MQ	WLP
Services to provision / deprovision z/OS Connect Servers Start/Stop z/OS Connect Servers	Services to provision / deprovision Db2 subsystems, schemas, and databases + *snapshot / restore*	Services to provision / deprovision CICS regions	Services to provision / deprovision IMS TM/DB systems	Services to provision / deprovision MQ Queue Manager subsystem	WLP server provisioning (with option to connect to Db2 data source with type 2 or type 4 connectivity) Liberty

Zowe and IMS

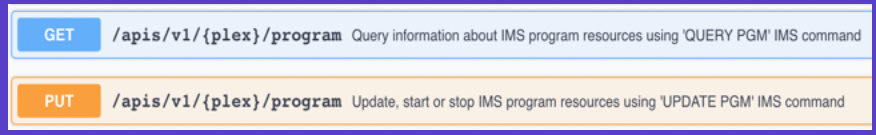
Provide Scriptable CLI and RESTful APIs to manage IMS system and resources

Sample Use cases:

- Create, update and deploy IMS applications using with modern scripting and tooling
- Use API or CLI commands to start/stop/query region, transaction and program resources
- Build integrated DevOps pipelines for IMS application delivery with open source or any widely adopted DevOps tools

https://github.com/zowe/ims-operations-api
https://github.com/zowe/zowe-cli-ims-plugin

REST API for IMS Commands



Zowe CLI for IMS

```
$ zowe ims start region MYREGION

 DESCRIPTION
 -----------
   Command to specify the region that is to be started.

 USAGE
 -----
   zowe ims start region <name> [options]
```

How to get Started?

Co-create with IMS

IMS Makerspace

IMS Makerspace

Education + Co-create

- Meet the experts and learn how simple it is to modernize IMS assets
- Define your digital transformation strategy with IMS
- Partner with IMS and jump-start with customizable hands-on workshop and POC
- Potential guided deployment for production

Transform IMS for the Digital World

API

Open IMS transaction and database access as API

Java

Extend existing or develop new IMS applications with Java

DevOps

Integrate IMS assets into enterprise DevOps pipeline

Open Database

Open access to IMS DB with JDBC and SQL

Administrate IMS database with catalog and DDL

Sample IMS Makerspace Schedule

Day 1

Education

For example:

- *Java in IMS – Overivew, Use cases, Development, Setup and Deployment*

Design Thinking

- Persona Feedback
- Collect Pain Points
- Prioritize Needs
- As-is/To-be

Day 2 – 3 (Optional)

Prototype

For example:

- *Develop a sample Java application. Deploy and run as a JMP in IMS*
- *Rewrite your existing (simple) IMS transaction to use Java and SQL and run in IMS*

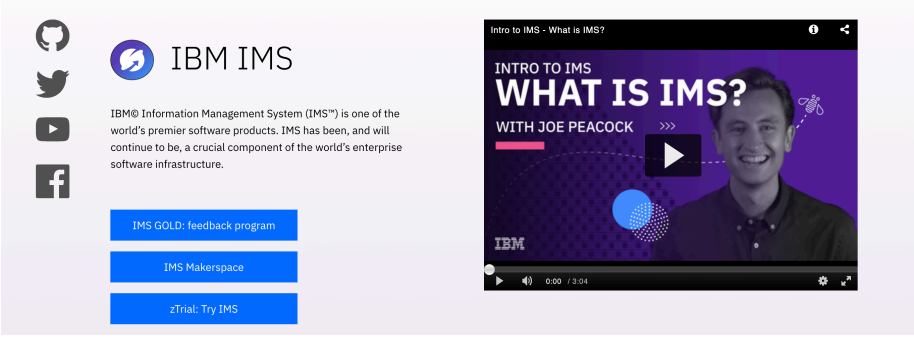
Day 4 – 20 (Optional)

Deployment

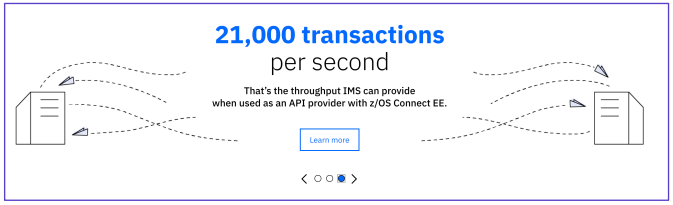
- Complex Use Cases
- DevOps
- Security
- Production

New IMS Community (One Stop Shop) site

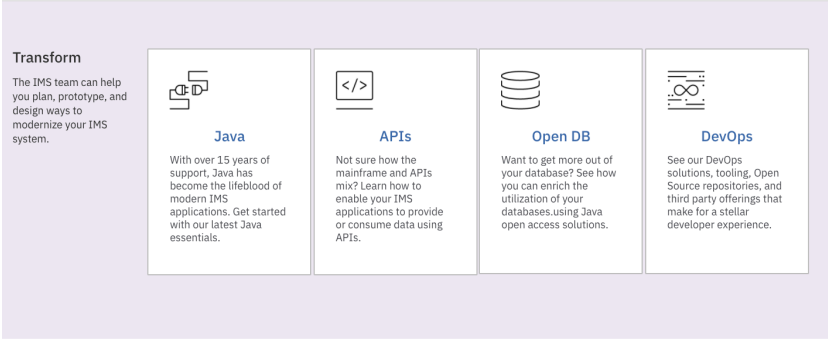
https://developer.ibm.com/zsystems/ims



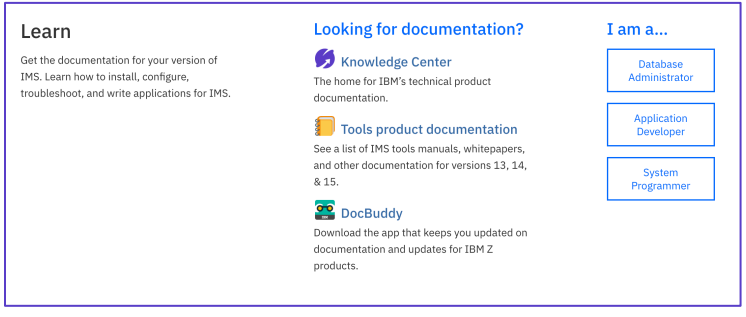
Integrated videos and social media links!



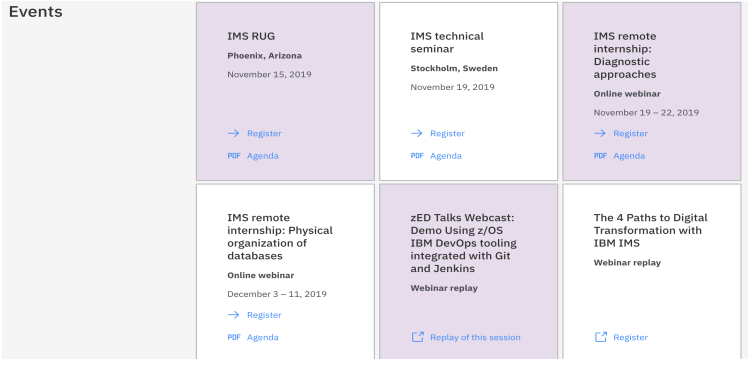
Carousel of value statements



Resources for Transformation



New Learn section filtered by role



Integrated Events section

IMS GitHub

Sample Java application code, API tutorials and DevOps deployment samples for IMS

IBM IMS on GitHub

Welcome to IMS on GitHub. Here you will find sample code and tutorials for your IMS application development and deployment needs.

Application samples

ims-java-jmp

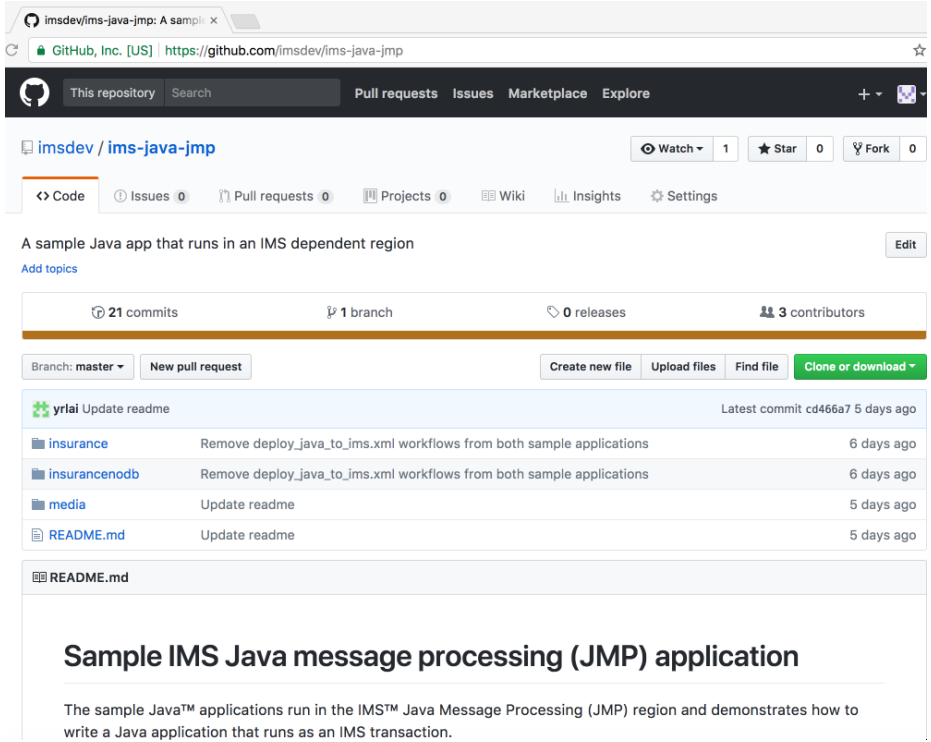
A sample Java app that runs in an IMS dependent region

ims-java-cobol

A sample Java app that inter-operates with COBOL in an IMS dependent region
(Coming soon)

ims-java-jee-tm

A Java EE app that accesses an IMS transaction



https://imsdev.github.io/

IBM Z Trial Program

Experience the value of the latest IBM Z capabilities today at no charge, and with no install required.

Why Z Trial?

Free, on-demand environment

No setup, no install

Hands-on tutorials

z/OS Connect Enterprise Edition

Create efficient and scalable RESTful APIs for mobile and cloud applications securely from your business critical applications residing on the mainframe.

Register now

What's in the trial?

Your trial environment includes hands-on tutorials that explain how to:

- Expose a CICS COBOL program as a RESTful API.
- Expose an IMS application as a RESTful API.
- Call a REST API from a COBOL Application.

Information Management System (IMS)

The most secure, highest performing and lowest cost hierarchical database management software for online transaction processing (OLTP).

Register now

What's in the trial?

Your trial environment includes hands-on tutorials that explain how to:

- Use IMS Enterprise Suite Explorer for Development to import and visualize IMS database and program definitions in IMS catalog.
- You will also create and execute SQL queries to access and manipulate IMS database.

https://www.ibm.com/it-infrastructure/z/resources/trial

Session Summary

Modernize your IMS assets to leverage abundant **Java and API skills** in the marketplace

Make your IMS assets more **Open and accessible** with little or **no mainframe skill**

It is **possible** to have **well performing**, **cost-efficient** and **modern** IMS application and data

Start small and let us help and **co-create** with you

- Modernize access to existing transactions and data with API
- Converting simple batch jobs
- Use Java and language interoperability to start converting IMS applications

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Notices and disclaimers continued

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