IMS Strategy & Direction

—

Central Canada Db2 User Group Kick-off

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Central Canada Db2 Users Group - IMS Track

- IMS Strategy & Direction – *Betty Patterson Bucci, Chief IMS Architect, IBM*
- Nuts and Bolts of IMS Lock Management – *Kevin Stewart, IMS Support/Client Advocate, IBM*
- IMS Tools Update – *Tracy Dean, IMS Tools Offering Manager, IBM*
- IMS and the Relational Database
  - *Robert Recknagel, Senior Architect, Finanz Informatik Technologie Service*
  - *Deepak Kohli, IMS Offering Manager - Database Management, IBM*
- DevOps and IMS - *Haley Fung, IMS Offering Manager - API, Java and DevOps, IBM*
- DevOps and IMS: Creating, Updating, and Testing IMS Artifacts with Your IMS Application Changes
  - *Tracy Dean, IMS Tools Offering Manager, IBM*
  - *Ron Bisceglia, Distinguished Engineer, Rocket Software*

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Agenda

- Digital Transformation
- Ansible
- Recent Enhancements
  - z/OS Data Set Encryption
  - z/OS Data Privacy for Diagnostics
  - z/OS Workload Interaction Correlator
- Looking toward the future
  - Database Manager
  - Transaction Manager
  - Application Enablement
- Education

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How to evolve with IMS?

embrace change

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How can you accelerate your organization's **Digital Transformation** to meet the opportunities and disruptions facing your market?

Option 1

Keep the status quo (falling behind)

Option 2

Rearchitect your entire infrastructure (high risk, low reward, opportunity costs)

Option 3

Leverage your assets on IBM Z to accelerate your digital transformation

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A single cloud experience:
Hybrid cloud for the enterprise with IBM Z

Delivering cloud native applications with speed and agility		Manage your enterprise hybrid cloud with your choice of consumption model	
Modernize existing applications	**Build new application services**	**Private**	**Public**
Modernize and transform infrastructure, applications and data by exposing and connecting to existing Z assets across the enterprise	Open ecosystem on IBM Z and LinuxONE for access and use by administrators, developers and architects with no special skills required	Integrate Z into hybrid cloud environments and manage everything from behind the firewall	Tailor your environment with a choice of Z-backed services delivered via IBM Cloud

Optimize and manage technology transformation securely with velocity

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IBM Z and Red Hat Ansible are partnering to deliver a complete automation experience for IBM Z leveraging an open, market-leading IT automation solution.

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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
- Developers or system programmers 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 (for example, configuration, provisioning, application deployment) for z/OS and the broader IBM Z community

Over 5500+ downloads on Ansible Galaxy

Ansible IBM z/OS core collection sample use cases

- A security administrator can use Ansible to automate SAF configuration on z/OS by issuing RACF, ACF2, or Top Secret commands via the TSO Command module.
- A Z systems programmer can automate and orchestrate job submission and data manipulation.
- An application developer can execute an Ansible playbook to compile and deploy their newly developed application to z/OS to test with the middleware stack running on the system.
- A network administrator can use Ansible to pull reports on network usage information and make changes to the network if specific results are returned.
- A middleware systems programmer can automate the provisioning of subsystems to accelerate processes and provide test environments for application developers more efficiently
- New hires can automate on z/OS quickly and easily by utilizing Ansible's simple and flexible YAML syntax to simplify automation across architectures in their environment

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IBM z/OS IMS collection

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

Ansible Module	Description	Availability
ims_command	Issue Type 1 and Type 2 IMS Commands and retrieves the result and output	Galaxy v1.0.0-beta1
ims_dbd_gen	Generates IMS Database Descriptor (DBD) resources to define a database	Galaxy v1.0.0-beta1
ims_psb_gen	Generates IMS Program Specification Block (PSB) resources for the IMS application programs and resources to be used.	Galaxy v1.0.0-beta1
ims_acb_gen	Merges and expands IMS DBDs and PSBs into an IMS internal format called IMS Application Control Blocks (ACBs) to be used during IMS runtime for program execution	Galaxy v1.0.0-beta2
ims_catalog_populate	Load/update IMS DBD, PSB, and ACB instances into the catalog data sets	Galaxy v1.1.0-beta.1
ims_dbrc	Submit DBRC commands to query and maintain recovery data sets	Galaxy v1.1.0-beta.1
Future candidates		
IMS application regions	Manage application regions and resources	

NEW

NEW

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Ansible supports your enterprise-wide automation transformation

Normalize skills and improve infrastructure automation agility

Orchestrate end-to-end automation integration including Z

Enable self-service provisioning of IBM Z middleware

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Pervasive Encryption: z/OS Data Set Encryption

Protection of data at-rest and in-flight

Disk
at-rest data is protected by layers of encryption controlled by Identity and key management

Legend:

*** - encrypted data

abc - unencrypted data

Value Proposition:
Reduced cost of encryption along with simple policy controls allows clients to enable extensive encryption to protect data in mission critical databases including Db2, IMS, and VSAM

z/OS Data Set Encryption:

- z/OS DFSMS encrypts/decrypts records via CPACF when written to or read from disk.
- Centralized changes to Media Manager enable multiple data set types (BSAM/QSAM/VSAM/zFS/hsm/dss)
- Ability to decrypt data tied to existing access control mechansim

In-memory system or application data buffers will not be encrypted

IMS data sets that supported z/OS data set encryption at launch: VSAM, GSAM, Fast Path DEDB

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How z/OS Data Set Encryption works

- With z/OS data set encryption, you can identify new data sets or groups of data sets to be encrypted
- Identification is done through SAF controls or RACF and SMS policies
- Specify key labels within Cryptographic Key Data Sets (CKDS) to identify encryption keys
- Authorization to view the data set contents is based on access to the key label that is associated with the data set
- Data is encrypted and decrypted by Data Facility Storage Management Subsystem (DFSMS)
- Encrypted data sets must be in SMS-managed extended or compressed format

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OSAM Overview

- Overflow Sequential Access Method
- Used for databases, local message queue data sets, restart data sets
- Access method unique to IMS
- Popular because of its speed and reliability
- OSAM uses physical sequential access data sets in a non-extended format
- Not compatible with z/OS Data Set Encryption

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Bringing OSAM to z/OS Data Set Encryption

- IMS supports VSAM linear data sets as optional data set format for OSAM databases
- OSAM supports a key label, encryption key, encryption, and decryption
- OSAM I/O has been enabled to use Media Manager and VSAM linear data sets
- OSAM uses Media Manager to access VSAM linear data sets instead of direct channel programs
- With VSAM linear data sets, you can exploit technologies that are available through Media Manager, such as High Performance FICON for z Systems (zHPF)

Prerequisites:

- z/OS 2.3 and later, or z/OS 2.2 with APAR OA50569 and dependent APARs installed
- IMS version 15.2 PTF – APAR PH16682/PTF UI67505

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IMS and Data Privacy for Diagnostics

- Allows clients to “sanitize” diagnostic information sent to IBM and other vendors
- Shield sensitive data sent to third parties
- Diagnostic data (dumps, logs, other data sets) sent to IBM can contain sensitive client information such as messages, database data, user IDs, and passwords
- Data privacy regulations (HIPPA, GDPR)
- Risk of data theft, damage to clients, reputation, financial penalties
- IMS clients can reduce the amount of customer-sensitive data sent to IBM and other vendors for diagnostics

Prerequisites:

- z/OS 2.3 and later - PTFs OA57570 and OA57633
- IMS version 15 or later - APAR PH14059

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How it works

- The IMS team used sensitive data-tagging APIs to classify areas in memory that contain data our clients would consider to be sensitive.
- The z/OS Data Privacy for Diagnostics algorithms were trained on this data so that they can distinguish between areas in a diagnostic dump that we need to give to support and which areas needed to be redacted with a dump.
- With z/OS Data Privacy for Diagnostics, a new “redacted” dump is created and sent to IBM and other vendors. Original dump remains with our clients.
- Critical that clients keep original copies of dumps in case diagnostics sent to vendors is missing information necessary to diagnose the problem.
- The tagging process does not impact the time it takes to create a diagnostic dump.

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IBM z/OS Workload Interaction Correlator

Generate **Standardized, Synchronized, Smarter Data** every 5 seconds - **high value data with low generation cost**

Time-sequenced short interval summary data enables analytics to establish interval activity baselines for the purpose of **anomaly detection**

Enable entire z/OS and middleware **stack analysis** through a ***common*** **analytics engine**

Organize workload into cubes by software stack dimensions (core type, job size, job priority)

Prerequisites:

- z/OS 2.3 and later – PTF OA57165
- IMS version 15 - APAR PH15062

IMS Support for z/OS Workload Interaction Correlator

- Number of transactions processed
- CPU time
- Elapsed transaction time for MPP and JMP regions
- Written to SMF type 98 subtype 1025 records
- IMS is one of the first middleware exploiters of this technology!

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IBM z/OS Workload Interaction Navigator

Runs as an application in the IBM Z Distribution for Zowe.

Zowe

A single interface to analyze Workload Interaction Correlator data. Correlates and recognizes multi-domain anomalous activity with cross-sectional views with exceptional job detail per cube.

Dynamically recognizes anomalies in a single time interval. Anomalous activities are **temporally correlated and contextually prioritized** to present only the most impactful issues.

Cause and victim relationships can be visualized across disparate activities – **reducing root cause identification time.**

Directly comparing the activities across two intervals enables the ability to identify differences, providing **validation that workload/software changes have the desired effect.**

IBM z/OS Workload Interaction Correlator

Smart, low cost, time-sequenced summary data enables **automated** detection of anomalous behavior from multi-domain activities

Improve workload **availability** by providing a method to validate changes to the environment to have the desired effect

IBM z/OS Workload Interaction Navigator

Enable subject matter experts to quickly determine the cause and victim relationship across the IBM Z software stack by gaining visibility into the interdependencies and interactions across workloads

Looking Ahead with IMS

- IMS is compatible with same automation technologies used in Hybrid Cloud
- IMS supports cross-platform development and management tools integration across enterprise and across the cloud
- IMS offers Cost predictability
- IMS reliability and security is rock solid
- IBM continues to deliver IMS capabilities and enhancements for the cloud and beyond

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Database Request for Enhancements

Managed ACBs

A DBA can generate PSB/DBD or ACB resources from the catalog for all resources, including those related to GSAM.

An application can reduce storage requirements by using an API to retrieve DBD information from the catalog without including non-runtime metadata.

A DBA or application can retrieve change data capture information for DEDBs from the catalog DB.

Database Management

An IMS professional will be able to prevent updates to the replicated databases at the stand-by site, except by permitted applications.

An IMS professional can dynamically enable or disable greater the 2048 Areas

An IMS DBA can specify ByPass extent checking for DEDBs that are shared among multiple IMS systems resulting in lower device busy time.

DDL

A security auditor can collect required audit information from SMF records related to changes made to IMS metadata using DDL from any supported method of input using standard tooling.

A sys prog or DBA can modify IMS program views by using DDL ALTER statements.

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Transaction Manager Request for Enhancements

An application developer can easily create mobile applications without needing to know about IMS DL/I calls and IMS regions.

Performance

System programmers can pick the frequency that IMS transactions are passed to Db2 allowing for environment flexibility and greatly improving performance.

Resilience

System programmers will receive return codes for failed transactions thus enabling them to quickly diagnose the root cause of transaction failures.

System programmers can view statistics related to IMS Transaction Manager performance to better manage their IMS system.

Scalability

System programmers will see improved storage allocation thus improving the resilience of the IMS Transaction Manager during periods of system slow-down.

System programmers can view message age with increased granularity to better manage their IMS environment and prevent outages.

Application Enablement Request for Enhancements

System administrators can implement an exit to control whether to stop an IFP tran or any program after abend.

Susan, an IMS app developer can extend existing 31-bit COBOL applications that run in IMS (MPP, BMP, IFP regions) to call 64-bit Java code to expand memory and process more data without a full rewrite.

Steve, a system programmer, can provide a default package name to dynamically influence which Java class to be loaded in IMS to save time in creating and managing the Java classname mapping.

Steve, a system administrator, can retrieve TM RA version in the IMS Connect extension log for problem determination.

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z/OS Native Containers

- Bringing a cloud-native experience to z/OS
  - Simplified deployment
  - Uniformity in management
  - Compatible with cross-platform, open-source tools
  - Open Container Initiative (OCI) compliant

- <u>IBM statement of direction for bringing containers and Kubernetes orchestration to z/OS</u>
  - IBM United States Software Announcement 220-033, June 23, 2020:
    - IBM intends to deliver a container runtime for IBM z/OS® in support of Open Containers Initiative compliant images comprising z/OS software.
  - IBM intends to deliver Kubernetes orchestration for containers on z/OS.
  - Technology would incorporate the client's core mission-critical applications and workloads across their **z/OS middleware** into a container-based cloud-native strategy.

Are you interested in z/OS Containers for IMS? If so, please contact Betty Bucci – bjp@us.ibm.com

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Along the IMS Client Journey

- Discover
  - IMS Gold
- Learn
  - IMS Central Community
  - Media Center
- Try
  - Red Hat Ansible Certified Content for IBM Z
  - Github
  - zTrial
- Co-create
  - IMS Gold
  - Makerspace

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IMS strategic education priorities

- The IMS team is providing educational content for our clients.
- The goal:
  - An IMS user can find and leverage engaging education offerings (videos, webinars, courses, etc.), on demand, following clear learning paths for specific roles and subject areas.

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Recently released educational content

IMS (general) videos

- Intro to Application Development video, Part 1 and Part 2
- Java app demos (how-to's)
- Migrating to IMS V15
- Intro to IMS catalog

IMS database videos

- DBRC
- Physical organization of databases

Digital courses and badges (on IBM Training)

- IMS Fundamentals
- DBCTL
- IMS Diagnostics

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What’s coming

IMS (general) videos

- Intro to IMSplex
- Managing IMS with commands
- Automation with Ansible

Digital courses and badges

- Shared queues
- Database performance and tuning
- Building Java Applications for IMS

Learning path outlines

Goal is to link a series of courses, videos, and other content in a prescribed order for these roles:

- Database administrator
- System programmer
- IMS app developer

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Possible learning path for IMS database administrators

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Questions?

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