IMS Plays a Role in a System z Cloud

Kenny Blackman - kblackm@us.ibm.com
Suzie Wendler - wendler@us.ibm.com

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Memory lane

   - Optimized for sharing, industrial strength, systems management, …
   - Managed by central IT organization
   - Back office applications involving transactions, shared data bases, …
   - Mainframes, supercomputers, minicomputers, …

2. Client/Server: 1985 –
   - Optimized for low costs, simplicity, flexibility, …
   - Distributed management across multiple departments and organizations
   - Large numbers of PC-based applications
   - PC-based clients and servers, Unix, Linux, …

   - New consumption and delivery model
   - Optimized for massive scalability, delivery of services, …
   - Centralized model, hybrid service acquisition models
   - Supports huge numbers of mobile devices and sensors
   - Internet technology-based architecture
And the Evolution of Cloud Computing

Grid Computing – leveraged several computers in parallel (clustered servers) to address a single problem or application

Cloud Computing – leverages several resources to deliver a service to the end-user
  > Can support grids
  > Can support non-grid environments, e.g., 3-tiered web architecture with traditional or Web 2.0 applications
Cloud definitions

- National Institute of Standards and Technology (NIST) defines a “cloud” as

  “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources…that can be rapidly provisioned and released with minimal management effort or service provider interaction”

Cloud computing

- The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server
Cloud Computing is a Broad Term

Cloud Computing is more than a computing model; it is a Service Delivery model

Common Cloud Attributes
- Elastic scaling
- Rapid provisioning
- Advanced virtualization
- Flexible pricing
- Service Oriented

Line of Business
- IT Operations

Public Clouds

Private Clouds
Service Management - at the Heart of the Cloud

Delivering Cloud services requires 2 components:

- A Process Platform to **manage the virtual infrastructure**
- Service Processes that **deliver the user experience**

The effectiveness and efficiency of a cloud implementation is predicated on the interaction of these components.
Additionally, Cloud Services

• Provide an environment that differs from traditional hosting due to three distinct characteristics

  • Services can be sold on demand
    • By the minute, hour, etc.,

  • Services are elastic
    • A user can take advantage of as much or little access to services as needed at any given time

  • Services are fully managed by the provider
    • Consumers typically only need a personal computer and Internet access
When Building a Cloud

- Organizations choose a cloud model based on their business model requirements
  - **Infrastructure as a service (IaaS)**
    - Dynamically shared set of virtual computing resources
    - *zEnterprise*
  - **Platform as a service (PaaS)**
    - Builds on IaaS to provide application middleware
    - *IMS*
  - **Software as a service (SaaS)**
    - Provides higher levels of service delivery
    - *IMS SOA Integration and Enterprise Suites*
  - **Business process as a service (BPaaS)**
    - Customer-written applications or business processes
Cloud Deployment Models

• Public
  • Sells services to anyone on the Internet
    • e.g., Amazon Web Services
    • Consumer and Provider exist in separate enterprises
  • owned by an organization selling cloud services

• Private
  • Provides a proprietary network or a data center that supplies hosted services to a limited number of people.
    • Consumer and Provider exist within the same enterprise
  • operated solely for an organization
  • restructures IT around a services delivery model

• Hybrid
  • Combines Private and Public
    • Service provider uses public cloud resources to create a private cloud
IBM System zCloud

• Value of cloud computing is the availability of infrastructure

    … Enterprises are beginning to recognized that the maximum value of cloud-based solutions includes interconnection to their existing business infrastructure

• System z is a natural Cloud Platform
  • zEnterprise 196 and 114
    • central processing complex
  • zEnterprise BladeCenter Extension (zBX)
    • high-performance specialty processors for specific workloads
  • zEnterprise Unified Resource Manager
    • end-to-end platform integration and resource optimization
IMS Private Cloud

- IMS leverages System z’s support for cloud computing
- Extending the cloud to IMS
  - Users tap IMS-based data and business logic as services
    - IMS SOA Integration and Enterprise Suites enable service interface (SaaS)
    - IMS TM controls the transaction workload within the PaaS
    - IMS DB provides database as a service (DBaaS)
Specifically

- IMS provides interfaces that can be deployed in the cloud to access IMS
  - IMS SOA Integration and Enterprise Suite – SaaS (Software as a Service)
    - IMS Enterprise Suite Connect API
    - IMS Enterprise Suite SOAP Gateway
    - IMS Enterprise Suite DLIModel utility
    - IMS Enterprise Suite Explorer for Development
    - IMS TM Resource Adapter
    - IMS MFS Web solutions
    - IMS Web 2.0 solutions for TM and DB
    - IMS solutions for Java development
    - IMS XML DB
    - …

WWW.IBM.COM/IMS
As a standard socket server, IMS Connect is open to a variety of IMS, IBM and other vendor solutions.
IMS TM Resource Adapter
(supports SaaS)

- Provides a way to extend the cloud to IMS
IMS Enterprise Suite Soap Gateway
(supports SaaS)
WebSphere sMash and IMS Connect API for Java

- WebSphere sMash
  - lightweight runtime for creating and running RESTful services
    - Groovy, PHP, and Java through the IMS Connect for Java API
  - sMash application is responsible for
    - Preparing input data for IMS application
    - Interpreting output data from IMS application
    - Configuring connection and interaction configuration property files read in by API during execution
IMS MFS SOA Support

- Providing PaaS (Platform as a Service) access to MFS transactions
  - IBM Integration Designer
  - IBM Process Server
- Benefit
  - Provides MFS transaction support for Business Process Choreography (B2B) and BPaaS (Business Process as a Service)
DataPower Cloud Interface for IMS

- Add: DataPower XML Integration & existing systems connectivity SW
- Add: DataPower XML Security SW
- XS40 XML Security Gateway
- Offloads XML, XSD, XPath and XSLT at wire speeds
- XA35 XML Accelerator

DataPower 3.6.1

- An MQ client
- An IMS Connect client

DataPower Cloud Interface for IMS
Asynchronous callout

ICAL -> Synchronous
Cloud Break
IMS Connect and IMS DB

Client Application

- WebSphere Message Broker
- WebSphere Process Server
- Web 2.0
- WTX
- WebSphere ESB
- WebSphere Application Server
- COGNOS

IMS Universal JDBC or DL/I Driver
IMS Universal JDBC Driver
RYO Java

WebSphere ESB

IMS Universal DB Resource Adapter

z/OS

Operations Manager

IMS CONNECT

SCI

IMS

Database manager

DBM

Database

Exit

IMS CONNECT Extensions
COGNOS – Operational BI and Reporting

Performance Management
- The performance management system from Cognos integrates software, services, best practices, and partners.
- Measuring and monitoring
- Reporting and analysis
- Planning, budgets, and forecasts

IBM Cognos 8 Business Intelligence
- All capabilities. One product. One platform.
- Reporting
- Analysis
- Scorecarding
- Cognos 8 Platform

IBM Cognos 8 Planning
- IBM Cognos 8 Planning is a finance-managed solution that provides real-time visibility into resource requirements and future business results.

IBM Cognos TM1
- IBM Cognos TM1 is an approach to consolidating financial data from enormous volumes of multidimensional data.
- IBM Cognos TM1 Overview
- IBM Cognos TM1 High-Performance Edition

IBM Cognos 8 Controller
- IBM Cognos 8 Controller provides Finance organizations with unmatched capabilities for managing the close, consolidation, and reporting process.

IBM Cognos 8 Workforce Performance
- An analytic application for better workforce and HR metrics.

IMS Universal JDBC or DL/I Driver

IMS Connect

IMS ODBM

IMS DB
IMS DBbaaS
IMS Enterprise Suite V2.1 Explorer for Development

- Supports cross-product integration to simplify IMS application development tasks
  - IBM® Rational® Developer for System z®
  - IBM Optim™ Development Studio
  - IBM Problem Determination Tools Plug-ins for Eclipse
- Visualization and editing of IMS Database and Program Definitions
- Ability to easily access IMS data using SQL statements
  - Leveraging IMS Universal JDBC driver
- **Ability to access the IMS Catalog**
- Connectivity to the z/OS system
  - Browse a Data Set and submit JCL
  - Import and export DBD and PSB source files from a Data Set to the IMS Explorer, and vice-versa

*Requires RDz 8*
IMS – the Cloud
(IMS as a Service - IMSaaS)
IMS – The Cloud

- IMS itself is a “cloud”

- Provides the Infrastructure (IaaS)
  - Dynamically shared set of virtual computing resources
    - zEnterprise platform
    - Ability through Parallel sysplex capabilities to add new instances of IMS control regions with ease and transparency
      - Shared queues and data sharing
      - DRD allows IMS resources to be added dynamically

- Builds on IaaS to provide the IMS platform as a service (PaaS)
  - IMS provides the application middleware environment for high-performing applications
  - DL/I and JDBC interfaces to get to resources
IMS – The Cloud

• IMS itself is a “cloud” …

• Provides service delivery to access software as services (SaaS)
  • IMS Integration and Enterprise Suites
  • Inbound – expose IMS transactions and data as services
  • Outbound – Callout to web services

• Supports business processes as a service (BPaaS)
  • Customer-written applications or business processes
IMS – The Cloud …

• In other words,
  
  • The Quality of Service, dynamic nature, transparency… that are the goals of evolving cloud technology
  
  • Are already inherent in the IMS environment
IMS TM – IaaS and PaaS

- IMS is a dynamic and configurable platform
- Provides standard interfaces to access resources
- Does not require application program recompiles even if the IMS release is changed
- Does not require application program changes even when the network or db structure changes
From the IMS application perspective, the programs view resources (communication devices and databases) through PCBs that can be easily modified without changing the application.
IMS as a Service
– PCB structure

Device A
Lterm A

Device A
Lterm B

Device C

PROGRAM D

I/O PCB
RECEIVE

ALTERNATE Response PCB
LTERM=Lterm B
Lterm B

ALTERNATE Express PCB
Device C

Modifiable ALTERNATE PCB
PROGRAM D

IMS as a Service
– PCB structure
IMS as a Service
- Message Queuing

INPUT
TRAN
MESSAGE 1
Device A
MESSAGE 2
Device B
MESSAGE 3
Device A
MESSAGE 4
Device C

OUTPUT
REPLY 1
A
REPLY 2
B
REPLY 3
REPLY 4
C

APPC
IMS Connect
IMS as a Service
- Application Call Interface

- An application program can refer to a PCB by a given NAME, not an address (PCBNAME is 8 bytes).
  - For the I/O-PCB, the name is 'IOPCBbbb'
  - For DB-PCB, the name is specified in the PSBGEN:
    - PCBNAME=... parameter on PCB macro
    - LIST=Y|N - Display PCBNAME in PSB listing?

Most DL/I calls can be issued in two ways:

Using a PCB:
   CALL xxxTDLI ( <count>,FUNC,PCB,I/O AREA,... )
   CEETDLI

Using an AIB:
   CALL AIBTDLI ( <count>,FUNC,AIB,I/O AREA,... )
   AERTDLI
   CEETDLI
IMS Java Development
(Saas and DBaaS)

- CICS
  - JCICS
  - Java Virtual Machine
  - IMS
    - DB Resource Adapter
    - Universal JDBC and DL/I Type 2 and Type 4

- DB2
  - Stored Procedures
  - Java Virtual Machine
  - IMS
    - DB Resource Adapter
    - Universal JDBC and DL/I Type 2 and Type 4

- WebSphere
  - EJB
  - Java Virtual Machine
  - IMS
    - DB Resource Adapter and Distributed
    - Universal DB Resource Adapter Type 2 and Type 4

- IMS / TM
  - JMP
  - Java Virtual Machine
  - IMS
    - Java Dependent Region Resource Adapter
    - Universal JDBC and DL/I Type 2 and Type 4

- IMS DB
  - IMS DB Resource Adapter
  - Type 2 and Type 4
  - ODBA
  - DRA
IMS Java SaaS for BPaaS Applications

Assembler Layer Interfaces to IMS

- AERTDLI Interface
- CEETDLI Interface
- AIBTDLI Interface

- JNI Base
- TM API
- DB API
- SQL
- XML-DB
- XQuery
- JCA resource adapter
- IMS Catalog Metadata
IMS as a Service
- Supports multiple runtime Environments

<table>
<thead>
<tr>
<th>IMS TM CONTROL REGION (CTL)</th>
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<tbody>
<tr>
<td>IMS TM CONTROL REGION</td>
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<tr>
<td>FUNCTION(S)</td>
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<td>- DATA BASE</td>
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<td>- TERMINAL</td>
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<thead>
<tr>
<th>APPLICATION PROGRAMS</th>
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<tbody>
<tr>
<td>SUPPORTED BY IMS TM/DB CTL</td>
</tr>
<tr>
<td>STAND ALONE</td>
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<tr>
<td>MESSAGE REGION (MPP,IFP,JMP)</td>
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<tr>
<td>BATCH MESSAGE PROCESSING (BMP)</td>
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<td>BATCH Non-MESSAGE PROCESSING (BMP, JBP)</td>
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<tr>
<td>DB BATCH REGION (DLI)</td>
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<td>TM BATCH REGION (DB2)</td>
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<td>I/O PCB</td>
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SOME PROGRAMS
Are interchangeable
OPTIONAL
IMS Managed Service Flow
Program-to-Program Switch

Device A

MSG-Q

IMSA-PGMA
GU IOPCB
Process Data
ISRT ALTPCB

UOW1

MSG-Q

IMSA/IMSB(MSC)
TRANB/PGM-B

GU IOPCB
Process data
ISRT IOPCB

UOW2
Summary

- Cloud computing is a model of consuming and delivering
  - IT services
  - Business services

- IMS plays an integral role in delivering business solutions