Using IMS to Build a Smarter Cloud

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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

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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
- Public Clouds
- Private Clouds

IT Operations
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
      - \textit{zEnterprise}
  - Platform as a service (PaaS)
    - Builds on IaaS to provide application middleware
      - \textit{IMS}
  - Software as a service (SaaS)
    - Provides higher levels of service delivery
      - \textit{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 or Heterogeneous
  • Combines Private and Public
    • Bound together by standardized technology that allows for portability
Cloud Deployment Models...

In 2006, Amazon Web Services (AWS) began offering IT infrastructure services to businesses in the form of web services.

For personal computing -- allows you to have a personal hard drive in the cloud.

Lets you provision a private, isolated section of the cloud where you can launch resources in a virtual network that you define. You can define a virtual network topology that closely resembles a traditional network that you might operate in your own datacenter.

Allows business to run their Websites, blogs, etc.

run all types of enterprise applications, from small departmental solutions to mission-critical applications that automate company-wide business processes.
Cloud Deployment Models...

- Public cloud example – IBM Smart 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
IBM SmartCloud Enterprise+ (SCE+) for System z

- The service provides shared, secure and scalable IBM z/OS mainframe capacity
- Offered as secured logical partitions (LPARs) within a continually refreshed, managed environment—in the cloud.

Software stacks:
- CICS
- DB2
- IMS
- WMQ
- WAS

HARDWARE
- Server: Standard, Hot Standby
- Disk: Standard, IBM FlashCopy, Metro Mirror, Global Mirror
- Tape: Standard (Automatic Tape Library), Virtual Tape, Global Virtual Tape

Components of IBM SmartCloud Enterprise+ for System z – z/OS

http://tinyurl.com/d7zj6ym
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 Suites – 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 is available on these clouds:
  - IBM Smart Business Cloud
  - Enterprise Amazon Elastic Compute Cloud

- WebSphere sMash on the cloud:
  - Enables developers to quickly build and execute agile, Web 2.0-based applications that help businesses be more responsive, flexible and cost-effective

- 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

- An MQ client
- An IMS Connect client

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

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Asynchronous callout

ICAL -> Synchronous

Synchronous callout
IMS Connect and IMS DB
(Supports DBaaS)
COGNOS – Operational BI and Reporting

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

IBM Cognos 8 Business Intelligence
- Reporting
- Analytics
- Scorecarding
- Cognos 8 Platform

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

IBM Cognos TM1
IBM Cognos TM1 is an approach to consistent, timely, and accurate manipulation of enormous volumes of multidimensional data.
- IBM Cognos TM1 Overview
- IBM Cognos TM1 Mid-Market 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

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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
Cloud Break
IMS – the Cloud

(IMS as a Service - IMSaaS)
IMS Cloud

SOA / Transaction Access
Java/J2EE Client
Business Intelligence
.NET Client
SAP
Application developer

Web 2.0 Mashup Transaction Access

REST Service
WebSphere
IMS SOAP Gateway
IMS TM Resource Adapter
MFS SOA
MFS Web

WebSphere
IMS JDR Resource Adapter
IMS SOAP Adapter
IMS Universal JDBC Driver
IMS JDBC Driver
IMS Catalog Metadata
DB2 SP CICS
IMS JDR Resource Adapter
IMS Catalog Metadata
IMS REST Service Adapter

HTTP

IMS Connect
TCP/IP
IMS
Transaction manager
Database manager
ODMA
ODBA DRA
IMS APP
IMS Universal DB Resource Adapter
IMS JDBC Driver
IMS Catalog Metadata
IMS REST Service Adapter

HTTP
HTTP
IMS Explorer DL/I Model
IMS Web 2.0
IMS Catalog
WebSphere
IMS Web 2.0
IMS Catalog Metadata
IMS Universal JDBC Driver
IMS JDR Resource Adapter
IMS Universal DB Resource Adapter
IMS Catalog Metadata
IMS REST Service Adapter

SAP
SOA / Database Access
Java/J2EE Applications
CICS Applications
DB2 SP
COGNOS

Web 2.0 Mashup Database Access

SQL XQuery DL/I
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
Dynamically define IMS Resources

IMDb

DATABASES
APPLICATIONS
TRANSACTIONS

CREATE
UPDATE
DELETE
QUERY
IMS TM – IaaS and PaaS

- IMS is a dynamic and configurable platform
- Provides standard interfaces to access resources
- Does not require application program compiles 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 applications do not have to change even when the networks or databases change.
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

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IMS as a Service
- Message Queuing

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

OUTPUT
- REPLY 1
- REPLY 3
- REPLY 2
- REPLY 4

APPC
IMS Connect
TRAN

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IMS as a Service
- Supports multiple runtime environment
- Allows dependent regions to be added as needed for workload

<table>
<thead>
<tr>
<th>Application Programs</th>
<th>SUPPORTED BY IMS TM/DB CTL</th>
<th>STAND ALONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MESSAGE REGION</td>
<td>BATCH MESSAGE Driven PROCESSING (BMP)</td>
<td>DB BATCH REGION (DLI)</td>
</tr>
<tr>
<td>(MPP,IFP,JMP)</td>
<td>BATCH BATCH Non-MESSAGE Driven PROCESSING (BMP,JBP)</td>
<td>TM BATCH REGION (DB2)</td>
</tr>
</tbody>
</table>

- **SCHEDULED BY**
  - IMS
  - USER
  - USER

- **ONLINE DB'S**
  - YES
  - YES
  - SOME
  - NO
  - PROGRAMS
  - YES

- **OS/VS FILES**
  - NO
  - YES
  - ARE INTER-
  - CHANGEABLE
  - NO
  - OPTIONAL

- **MSG Q**
  - YES
  - YES

- **I/O PCB**
  - YES
  - YES

SOME PROGRAMS ARE INTER-CHANGEABLE
IMS Java Development
- (Saas and DBaaS)
The Java Native Interface is used to access IMS procedural code.
Dynamic Metadata management

- Database and Application Program resources are managed by IMS
  - IMS Catalog
  - database definitions
  - Segments, Mappings, Fields and data types
  - program specifications
Summary

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

• IMS provides:
  • The Quality of Service, dynamic nature, transparency… that are the goals of evolving cloud technology

• Are already inherent in the IMS environment