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Using IMS to Build a Smarter Cloud

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IBM

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Memory lane

1. Centralized Computing: 1960 –

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

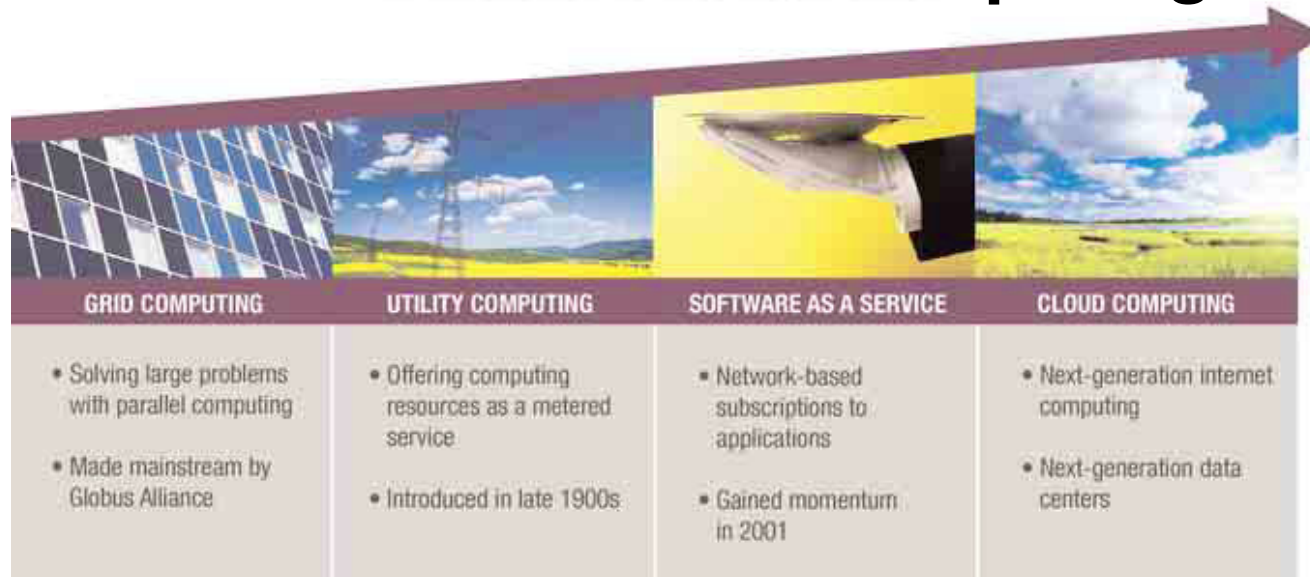
2. Client/Server: 1985 –

- 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, ...

3. Cloud Computing: 2010 –

- ***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

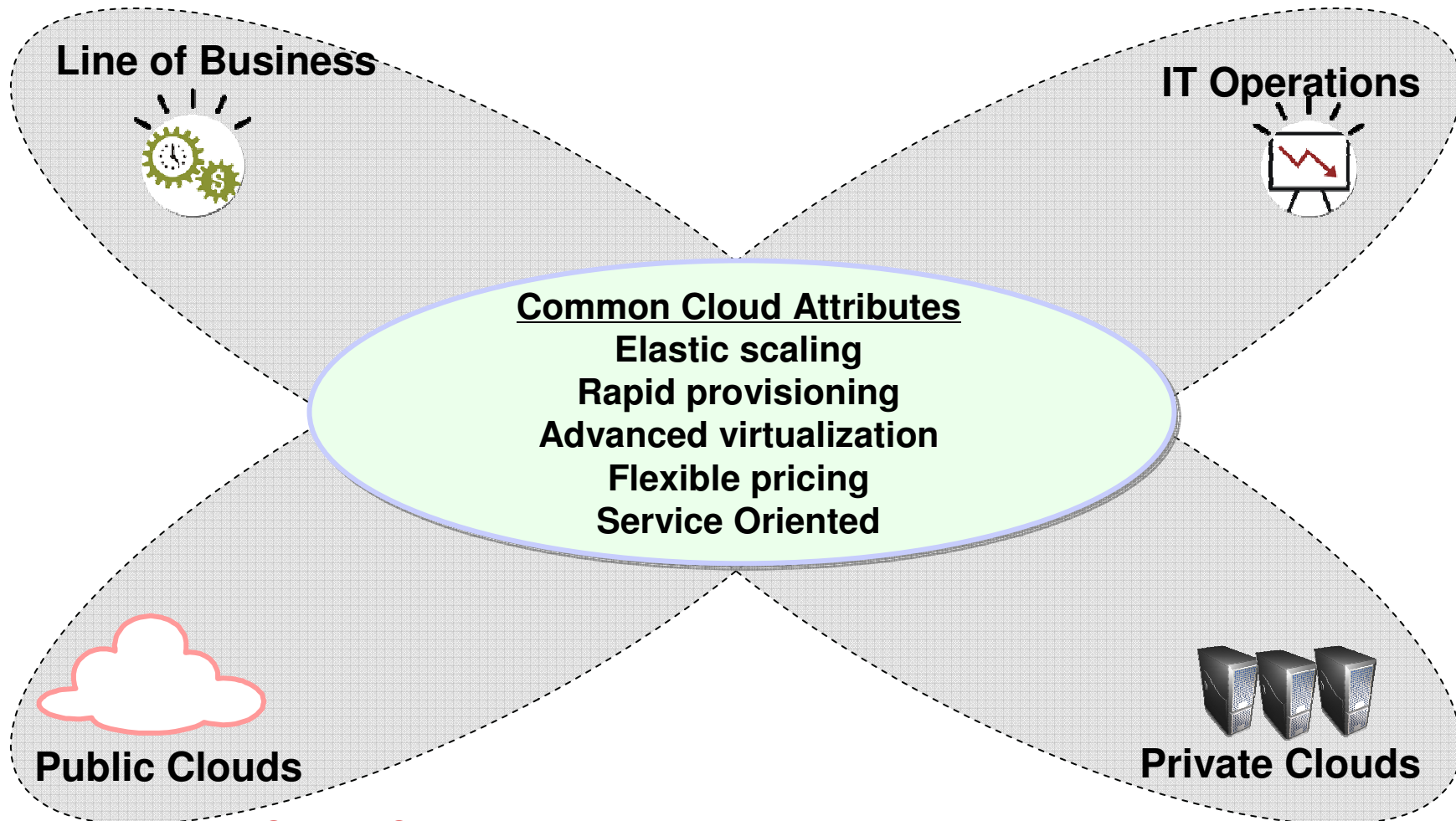
- National Institute of Standards and Technology (NIST) defines a “cloud” as

“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

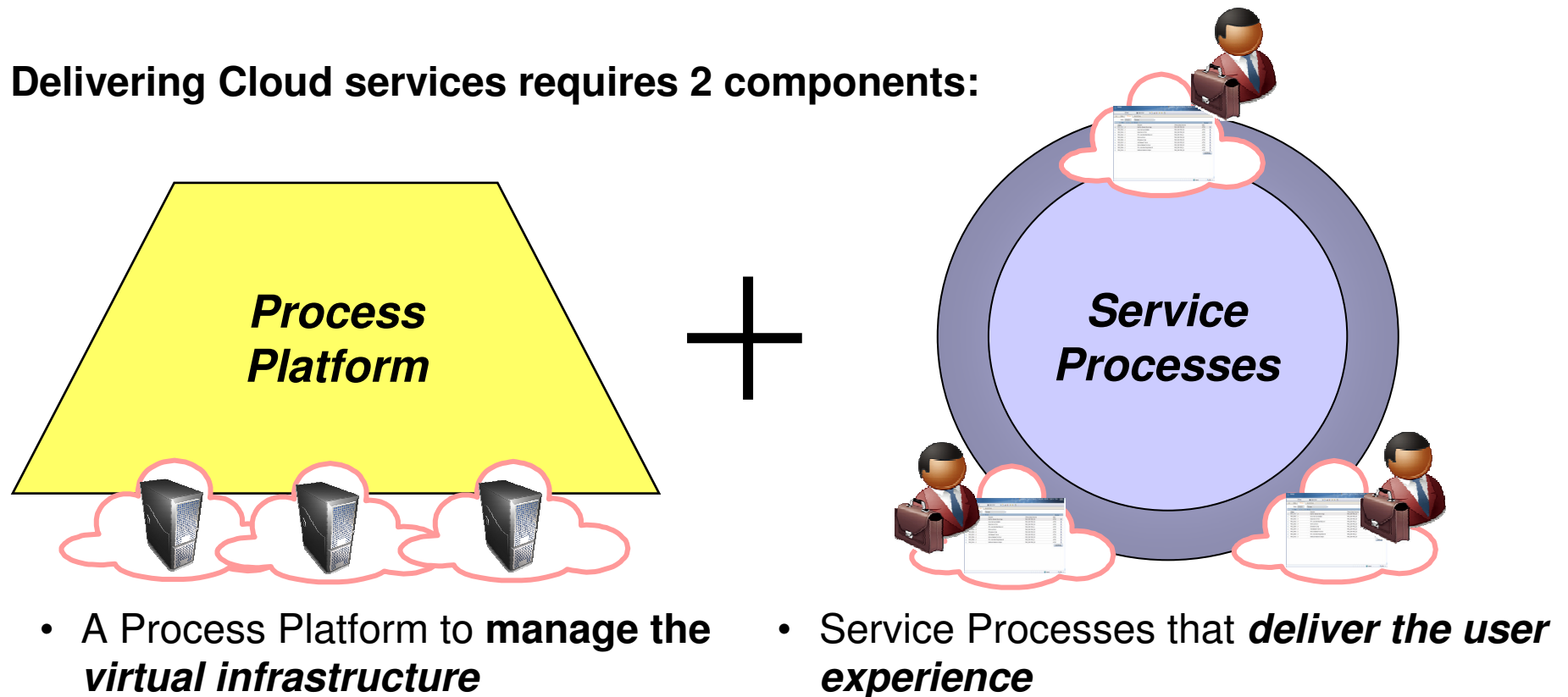
Cloud Computing is a Broad Term



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

Service Management - at the Heart of the Cloud

Delivering Cloud services requires 2 components:



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
 - **I**nfrastructure **as a service** (**IaaS**)
 - Dynamically shared set of virtual computing resources
 - *zEnterprise*
 - **P**latform **as a service** (**PaaS**)
 - Builds on IaaS to provide application middleware
 - *IMS*
 - **S**oftware **as a service** (**SaaS**)
 - Provides higher levels of service delivery
 - *IMS SOA Integration and Enterprise Suites*
 - **B**usiness **p**rocess **as a service** (**BPaaS**)
 - Customer-written applications or business processes

Cloud Deployment Models

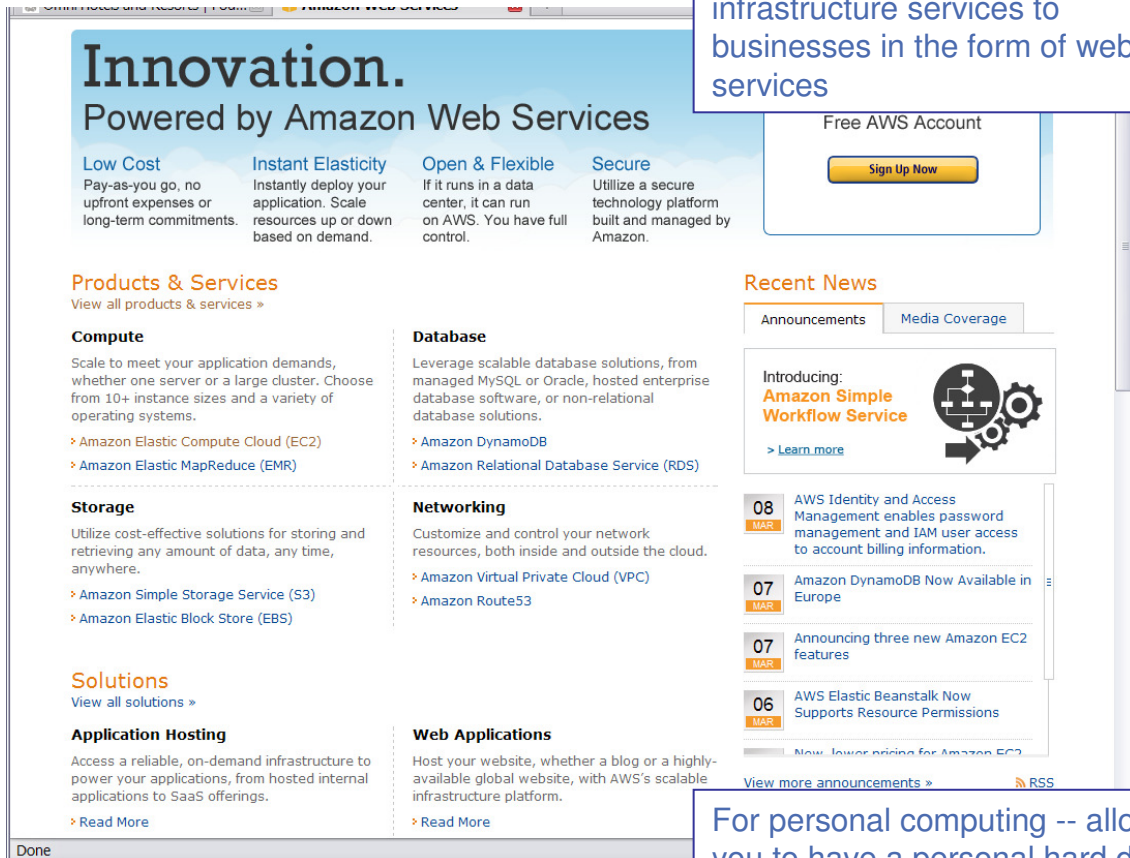


- **Public**
 - Sells services to anyone on the Internet
 - e.g., Amazon Web Services
 - Consumer and Provider exist in separate enterprises
 - owned by an organization selling cloud services
- **Private**
 - Provides a proprietary network or a data center that supplies hosted services to a limited number 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

ices



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.

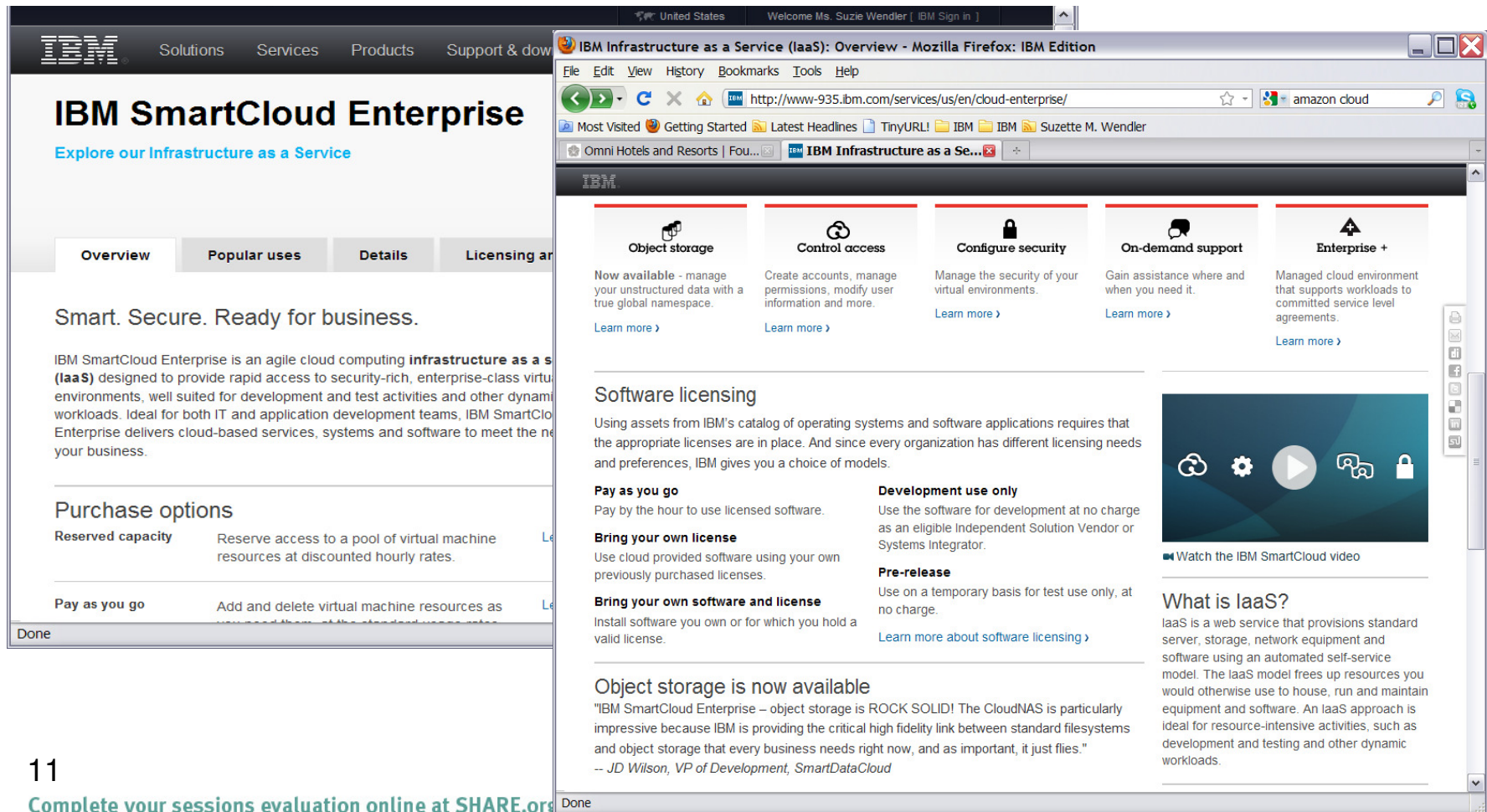
Allows business to run their Websites, blogs, etc

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

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

Cloud Deployment Models...

- Public cloud example – IBM Smart Cloud



The image shows two overlapping web pages. The background page is the IBM SmartCloud Enterprise homepage, featuring the IBM logo, navigation tabs (Solutions, Services, Products, Support & download), and a main heading 'IBM SmartCloud Enterprise' with the subtext 'Explore our Infrastructure as a Service'. Below this, there are tabs for 'Overview', 'Popular uses', 'Details', and 'Licensing and purchase options'. The 'Overview' tab is active, displaying the slogan 'Smart. Secure. Ready for business.' and a paragraph describing IBM SmartCloud Enterprise as an agile cloud computing Infrastructure as a Service (IaaS) designed for rapid access to security-rich, enterprise-class virtual environments. It also lists 'Purchase options' such as 'Reserved capacity' and 'Pay as you go'.

The foreground page is a Mozilla Firefox browser window titled 'IBM Infrastructure as a Service (IaaS): Overview - Mozilla Firefox: IBM Edition'. The address bar shows the URL 'http://www-935.ibm.com/services/us/en/cloud-enterprise/'. The page content includes a navigation bar with 'IBM' and 'IaaS' tabs. Below the navigation bar, there are five main feature cards: 'Object storage', 'Control access', 'Configure security', 'On-demand support', and 'Enterprise +'. Each card has a brief description and a 'Learn more' link. For example, 'Object storage' states 'Now available - manage your unstructured data with a true global namespace.' Below these cards, there is a 'Software licensing' section with sub-sections: 'Pay as you go', 'Bring your own license', 'Bring your own software and license', 'Development use only', and 'Pre-release'. A video player is visible with the text 'Watch the IBM SmartCloud video'. At the bottom, there is a section titled 'Object storage is now available' with a quote from JD Wilson, VP of Development, SmartDataCloud.

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

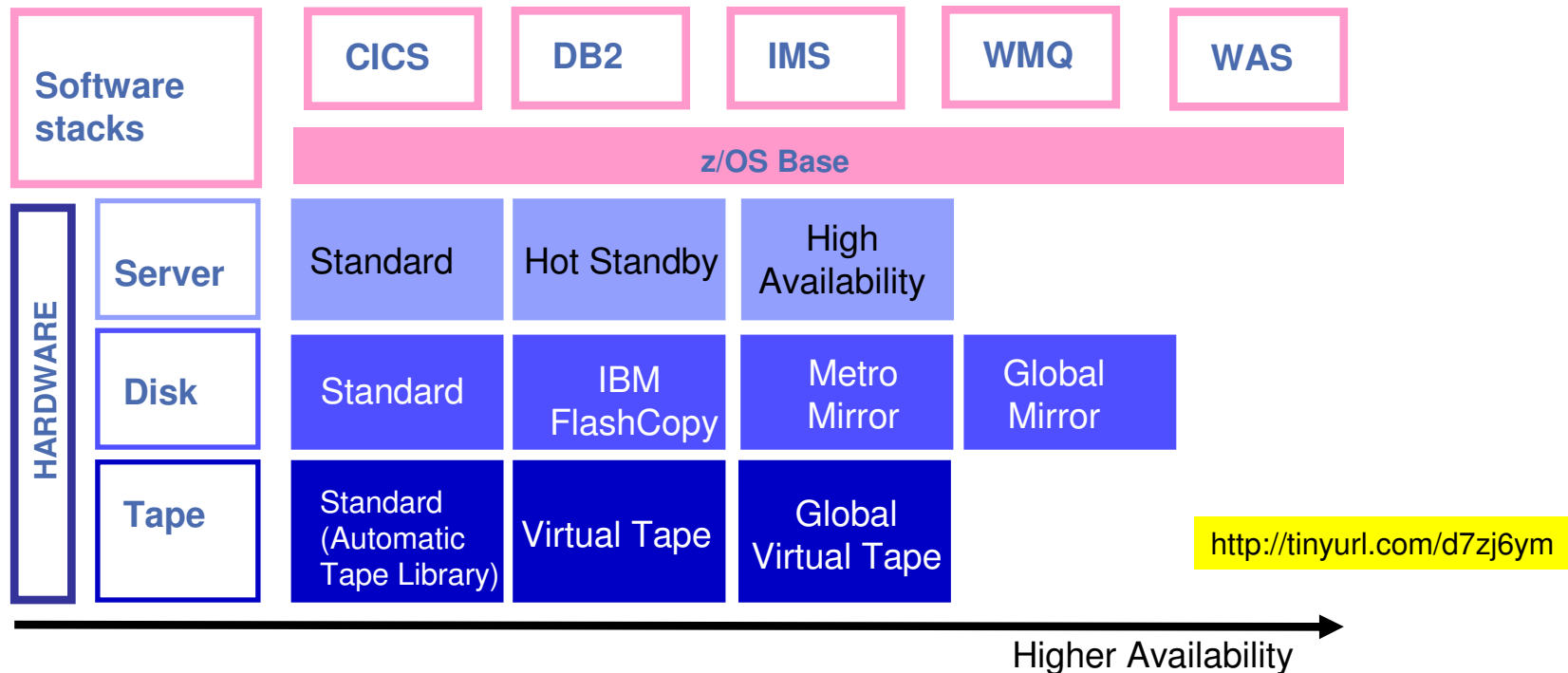
- System z is a natural Cloud Platform

- 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

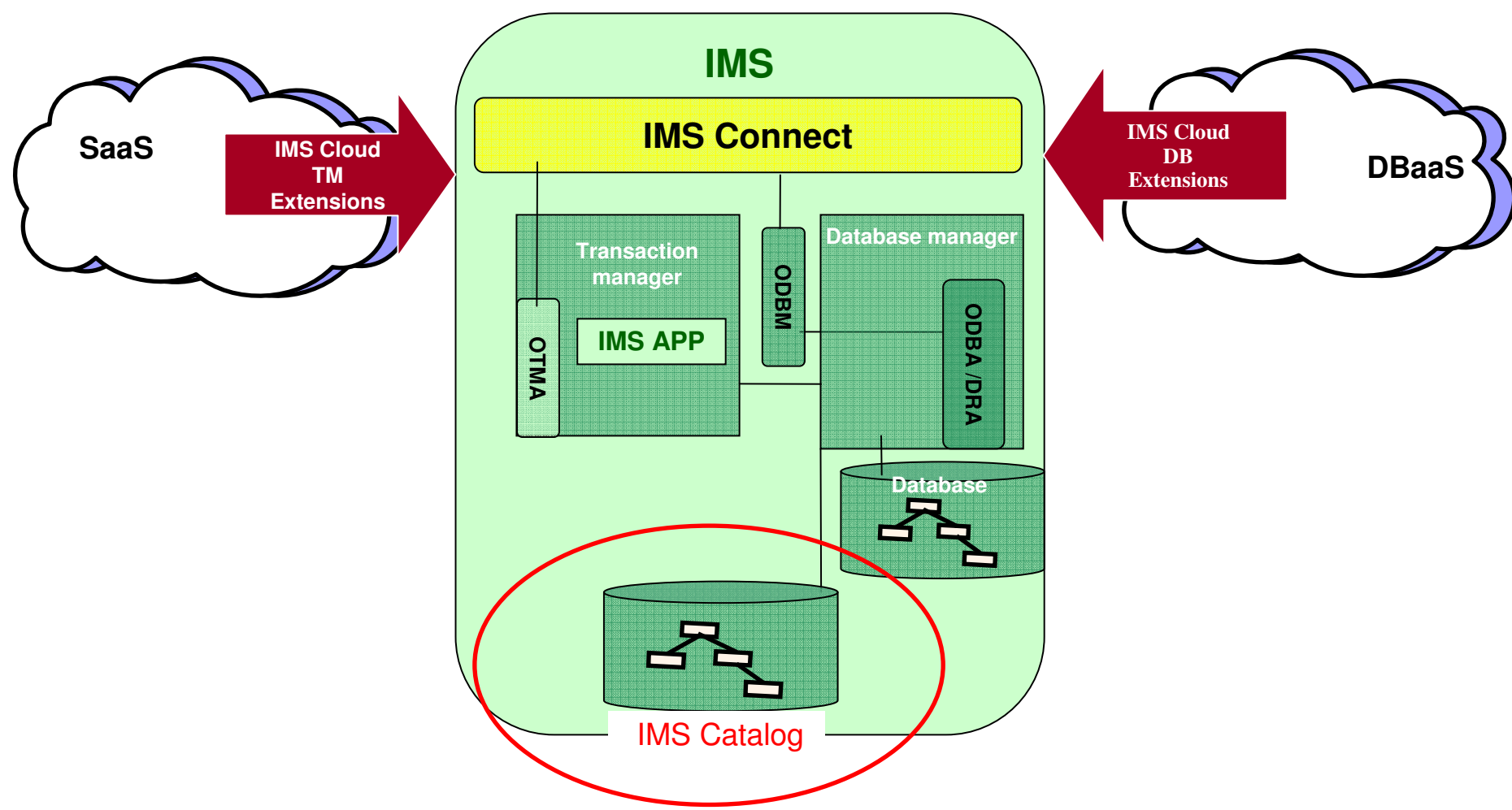
- The service provides shared, secure and scalable IBM z/OS mainframe capacity
 - Offered as secured logical partitions (LPARs) within a continually refreshed, managed environment—in the cloud.



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)

IMS Cloud Parts

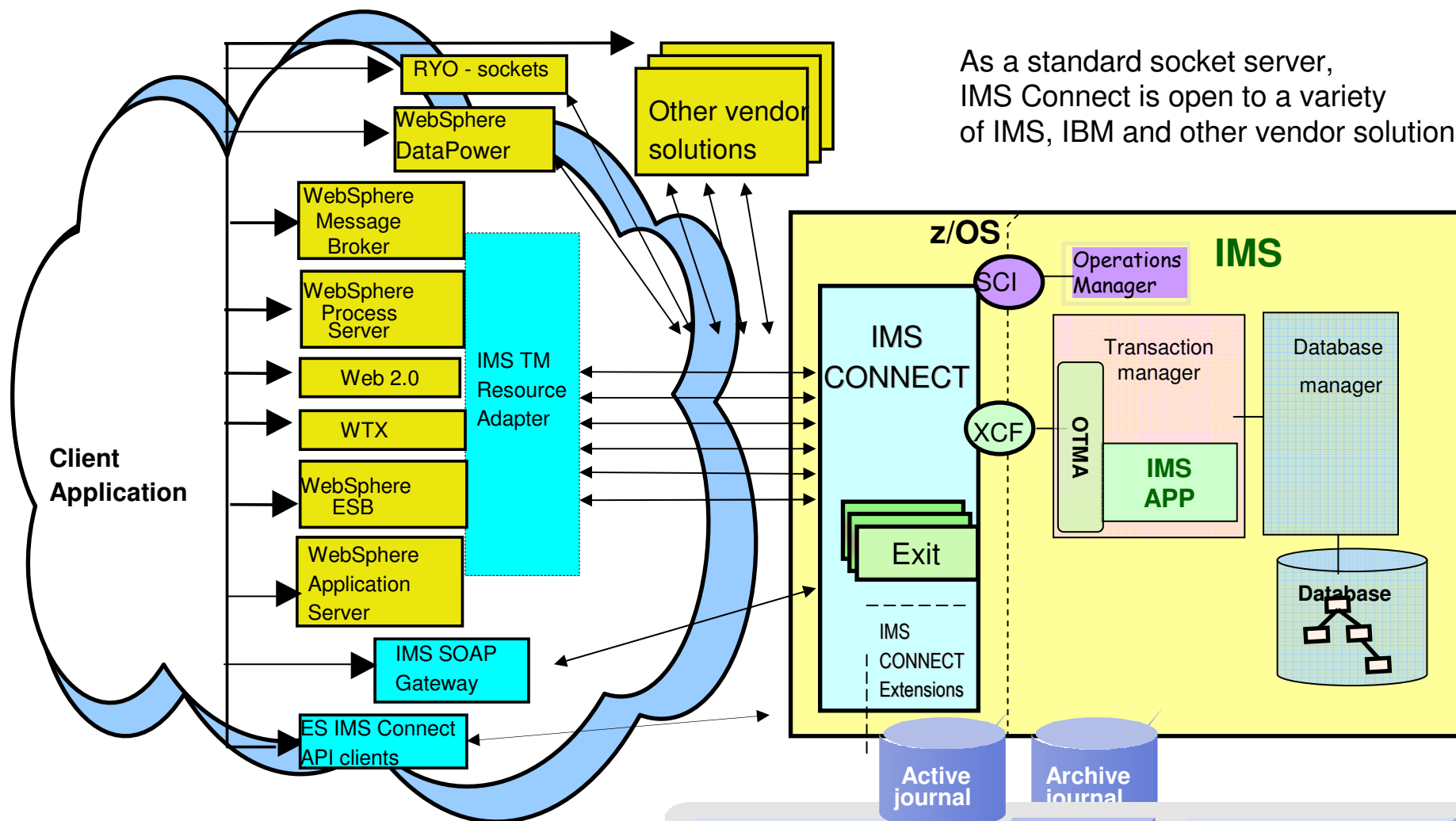


Specifically

- 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

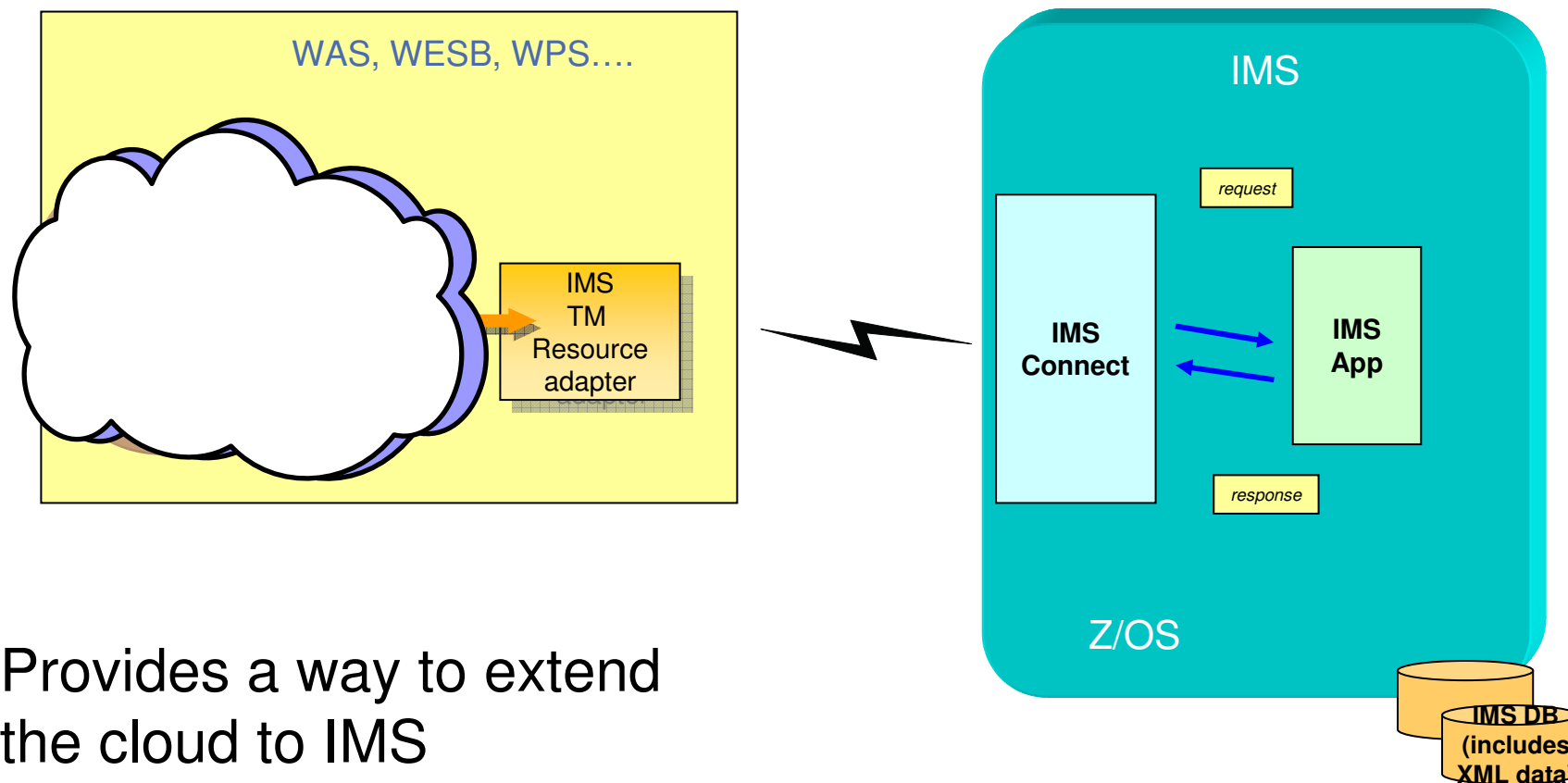
IMS Connect and IMS TM (Supports SaaS)



As a standard socket server, IMS Connect is open to a variety of IMS, IBM and other vendor solutions

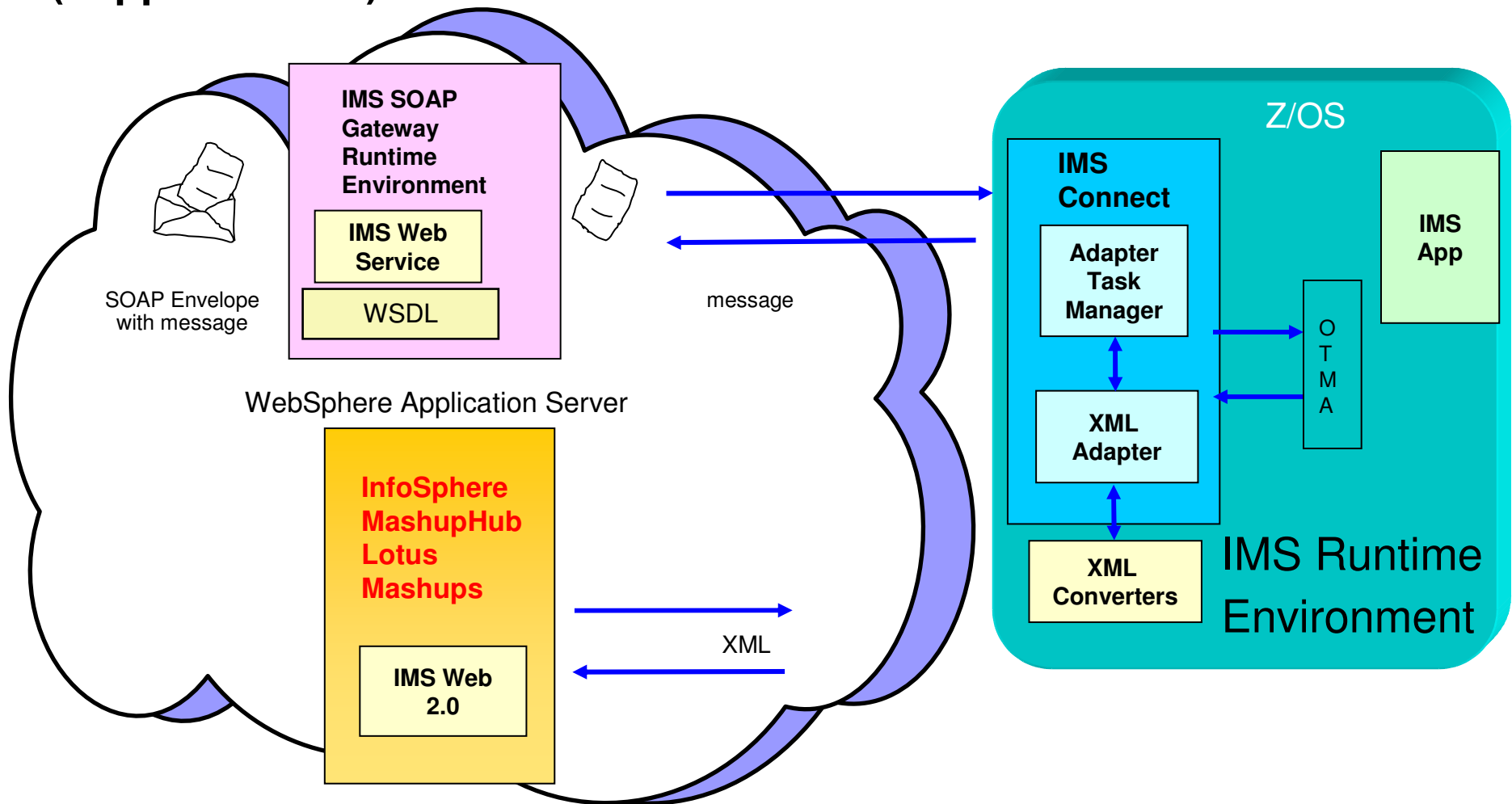
IMS TM Resource Adapter

(supports SaaS)

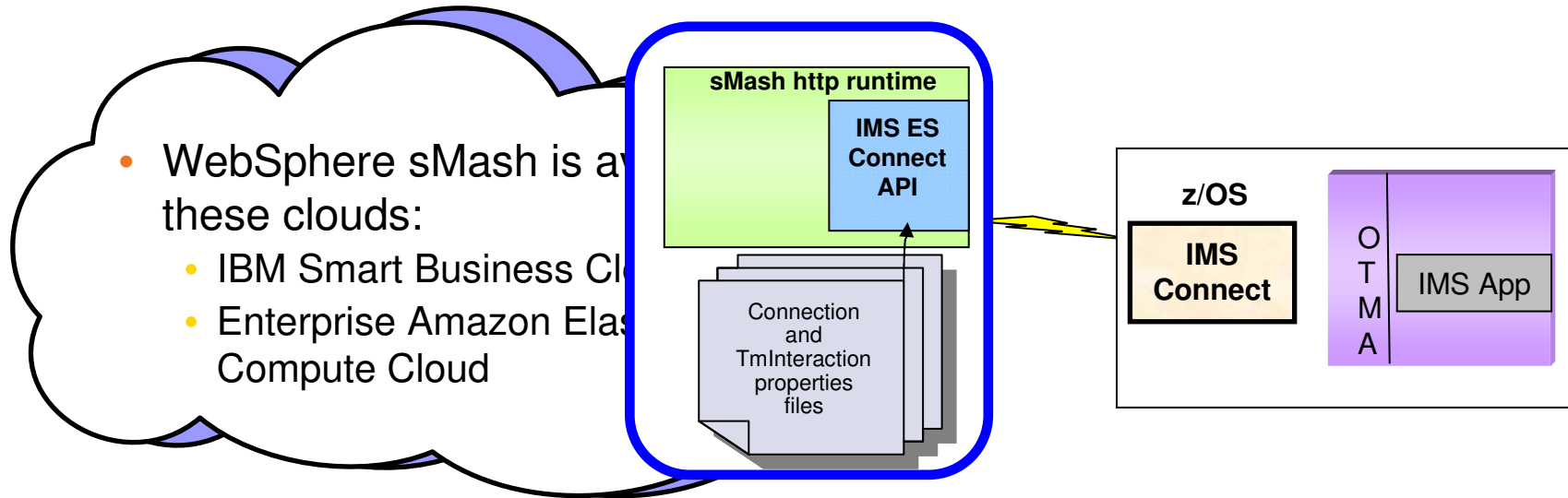


- Provides a way to extend the cloud to IMS

IMS Enterprise Suite Soap Gateway (supports SaaS)



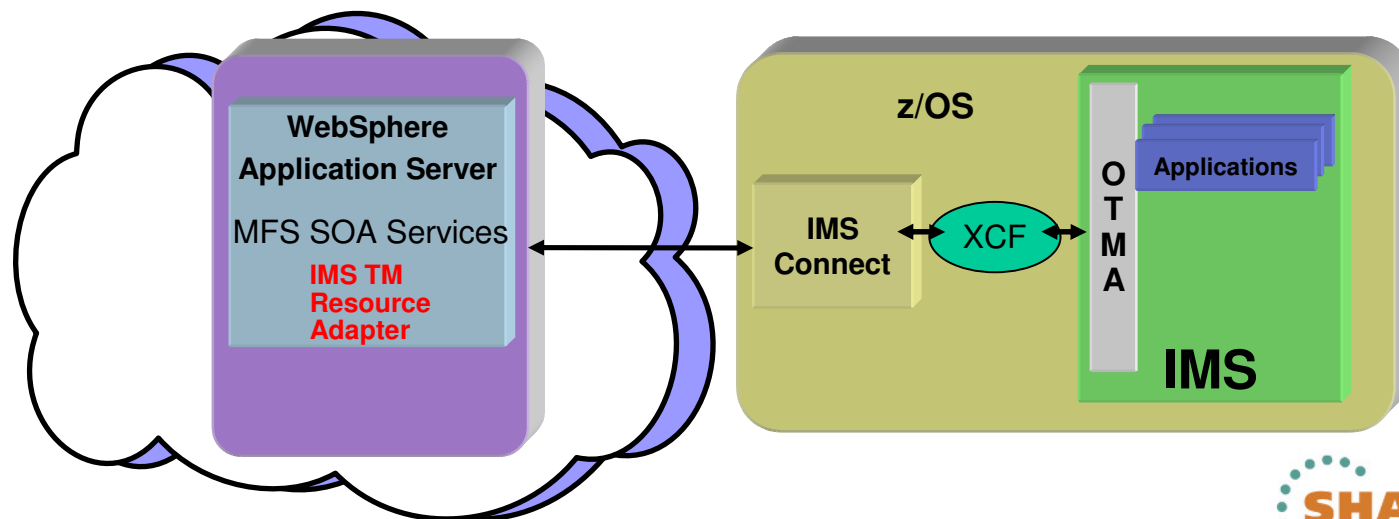
WebSphere sMash and IMS Connect API for Java



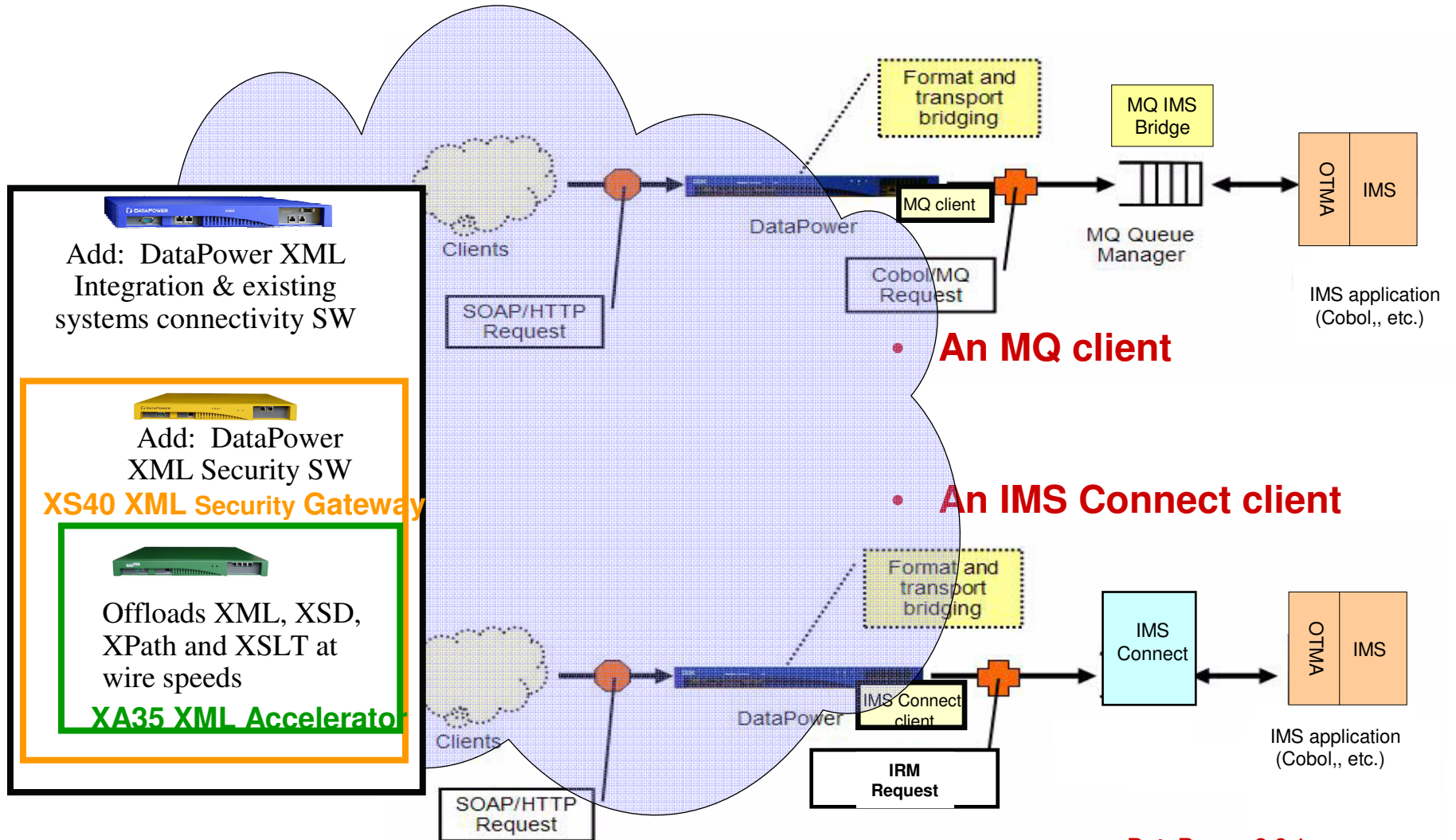
- WebSphere sMash is available on these clouds:
 - IBM Smart Business Cloud
 - Enterprise Amazon Elastic Compute Cloud
- WebSphere sMash on the cloud
 - Enables developers to quickly build and execute agile, Web 2.0-based applications that help businesses be more responsive, flexible and cost-effective
- 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



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

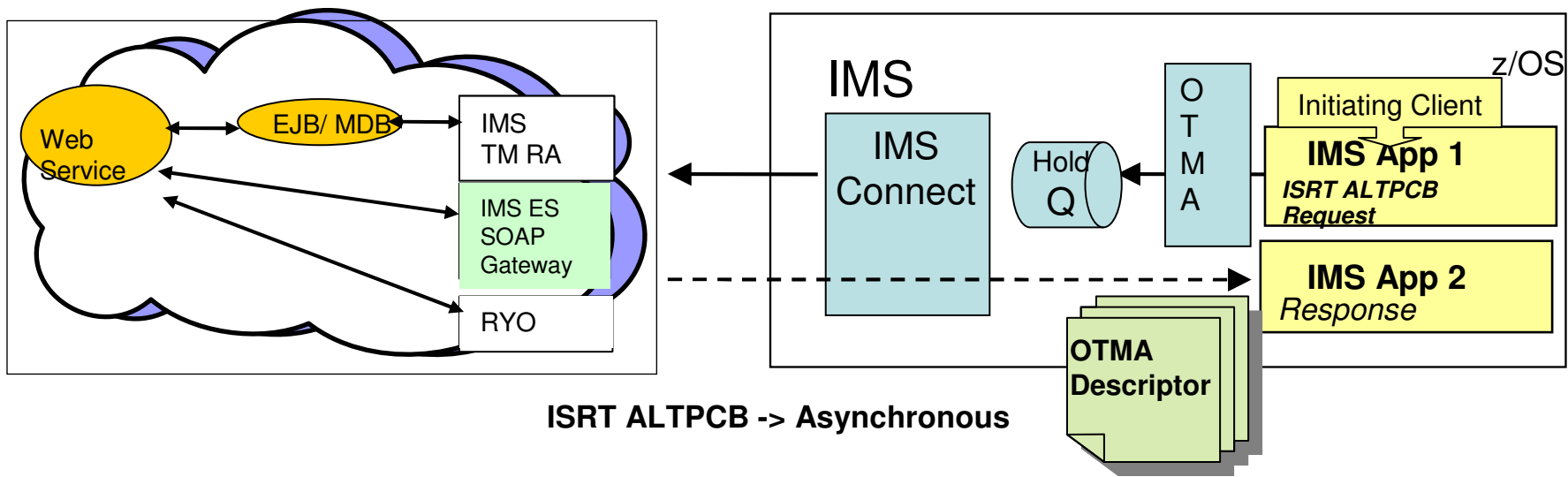
XA35 XML Accelerator

• An MQ client

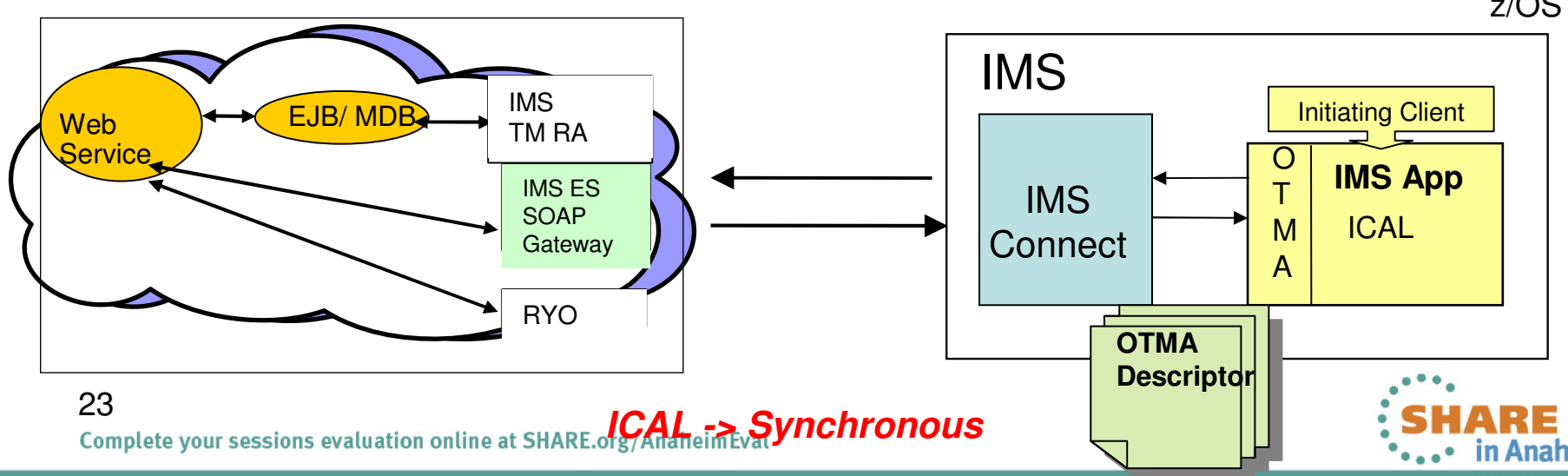
• An IMS Connect client

DataPower 3.6.1

Asynchronous callout

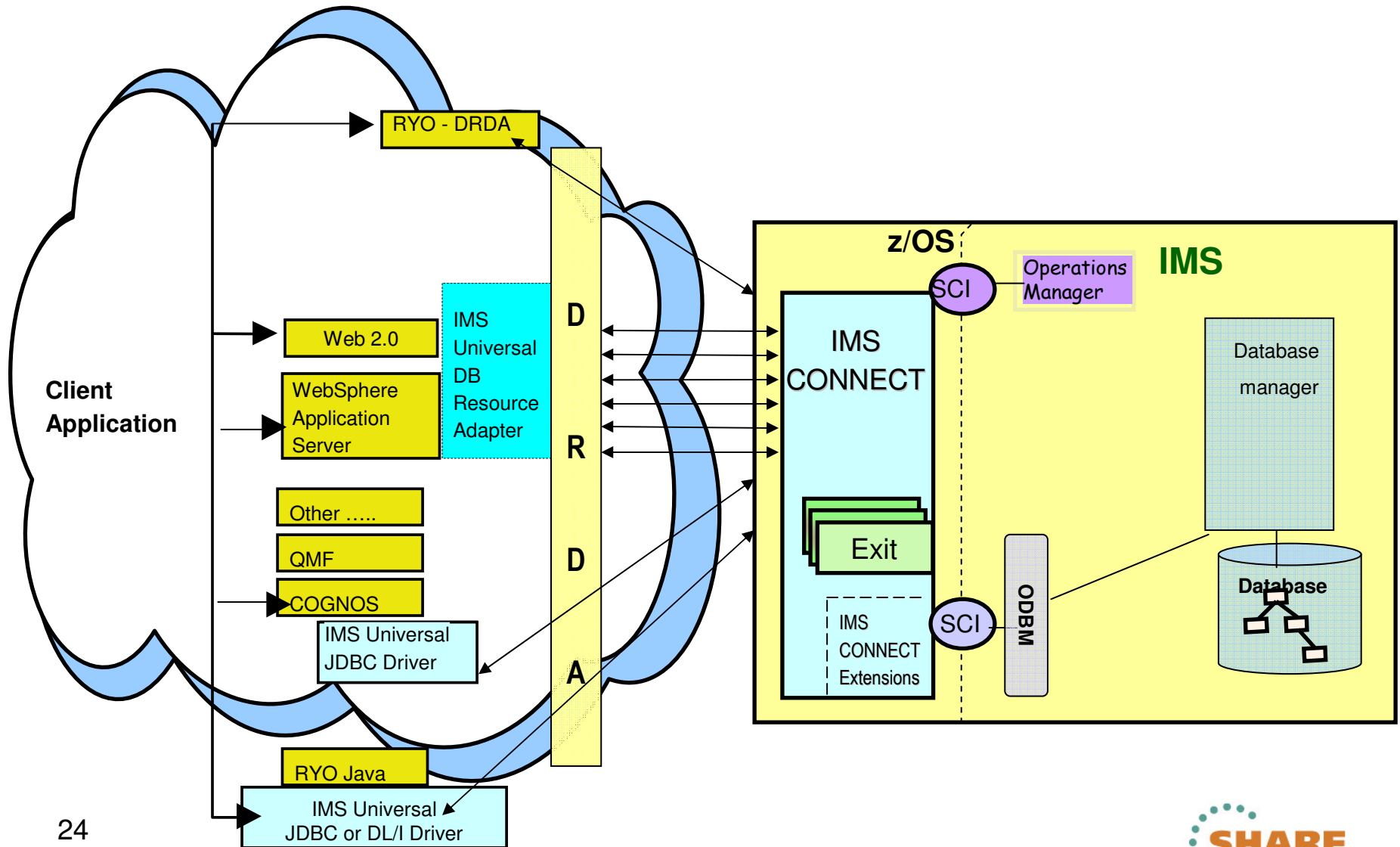


Synchronous callout

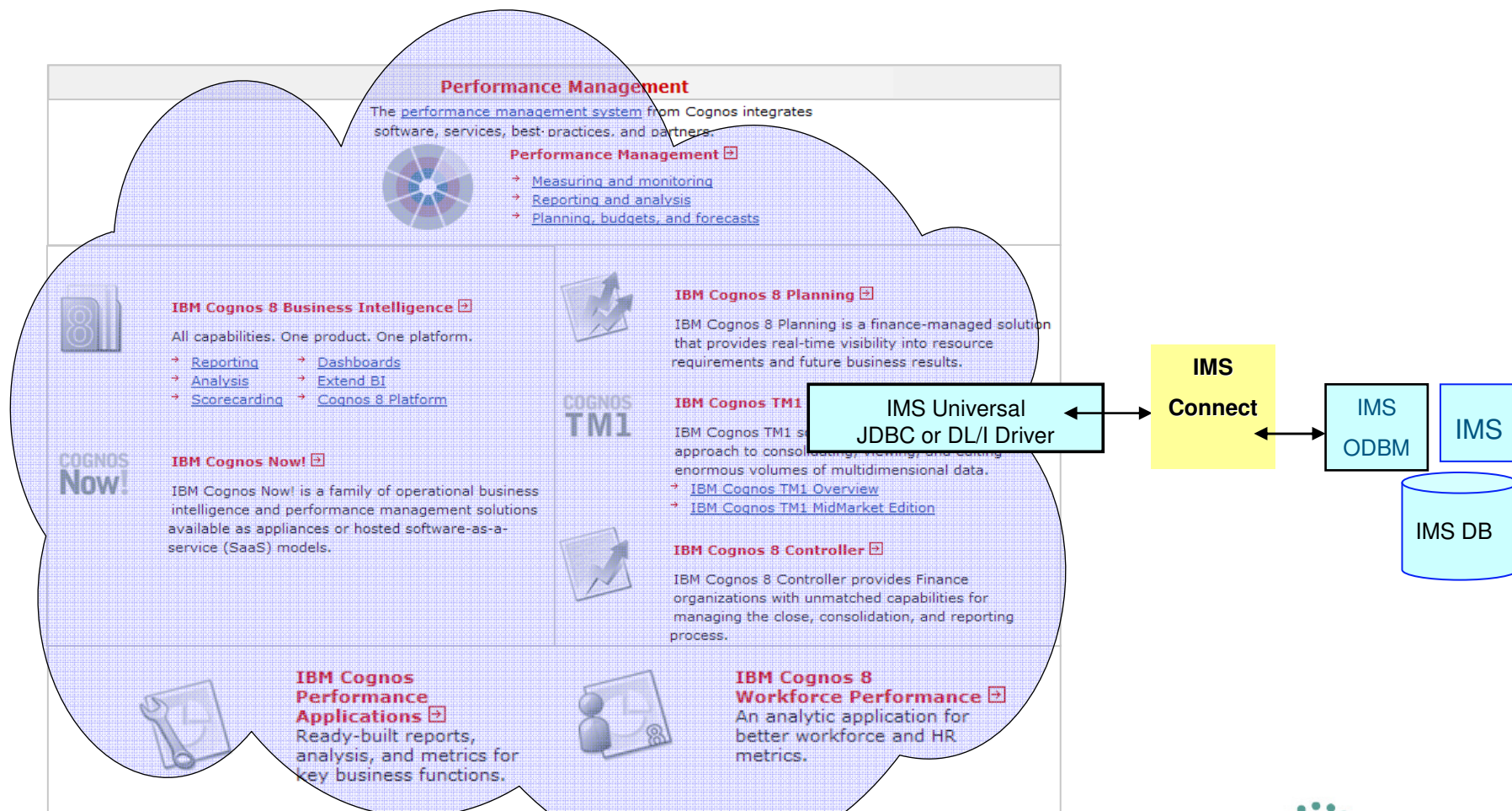


IMS Connect and IMS DB

(Supports DBaaS)

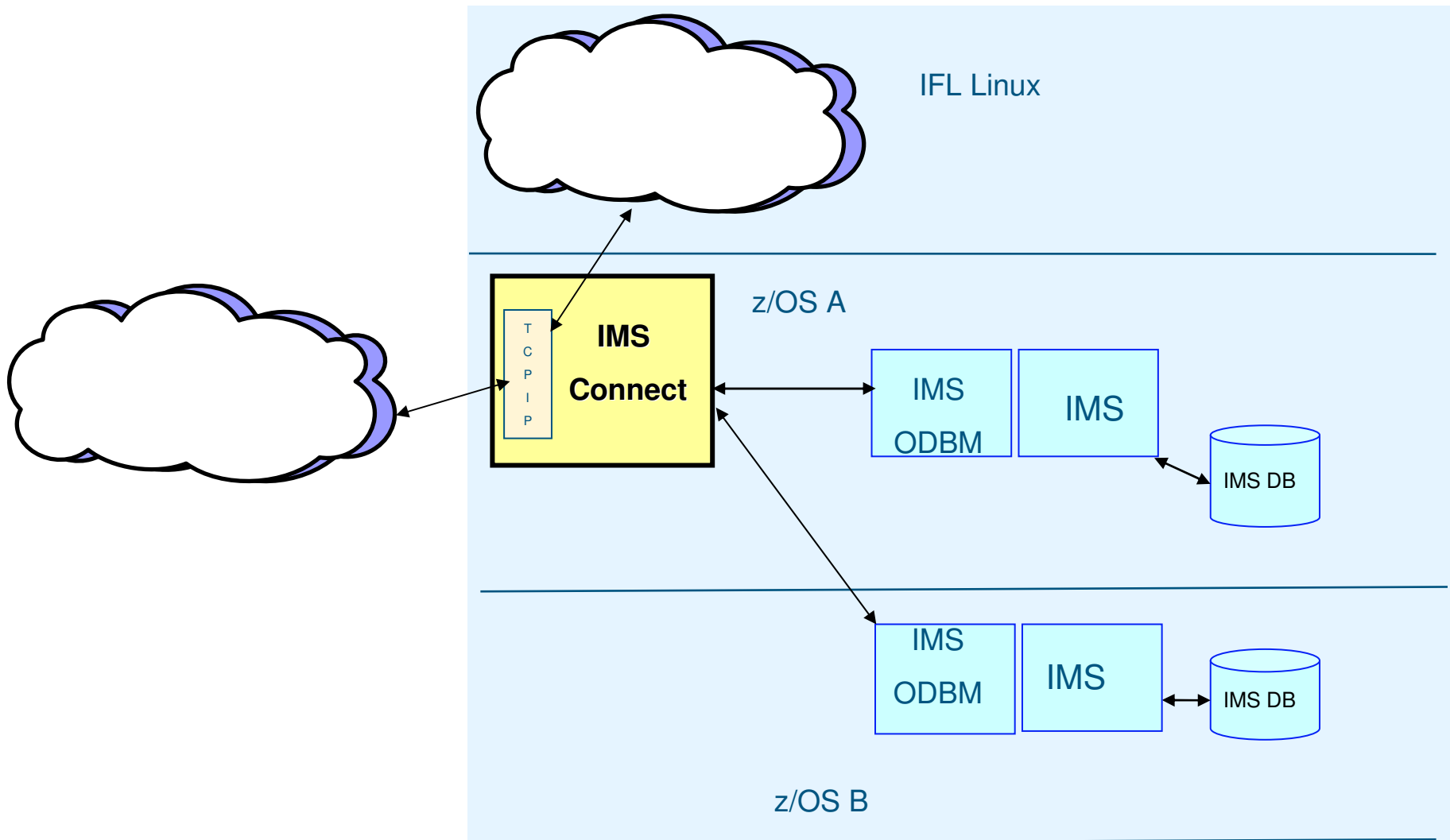


COGNOS – Operational BI and Reporting



IMS DBaaS

System z



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

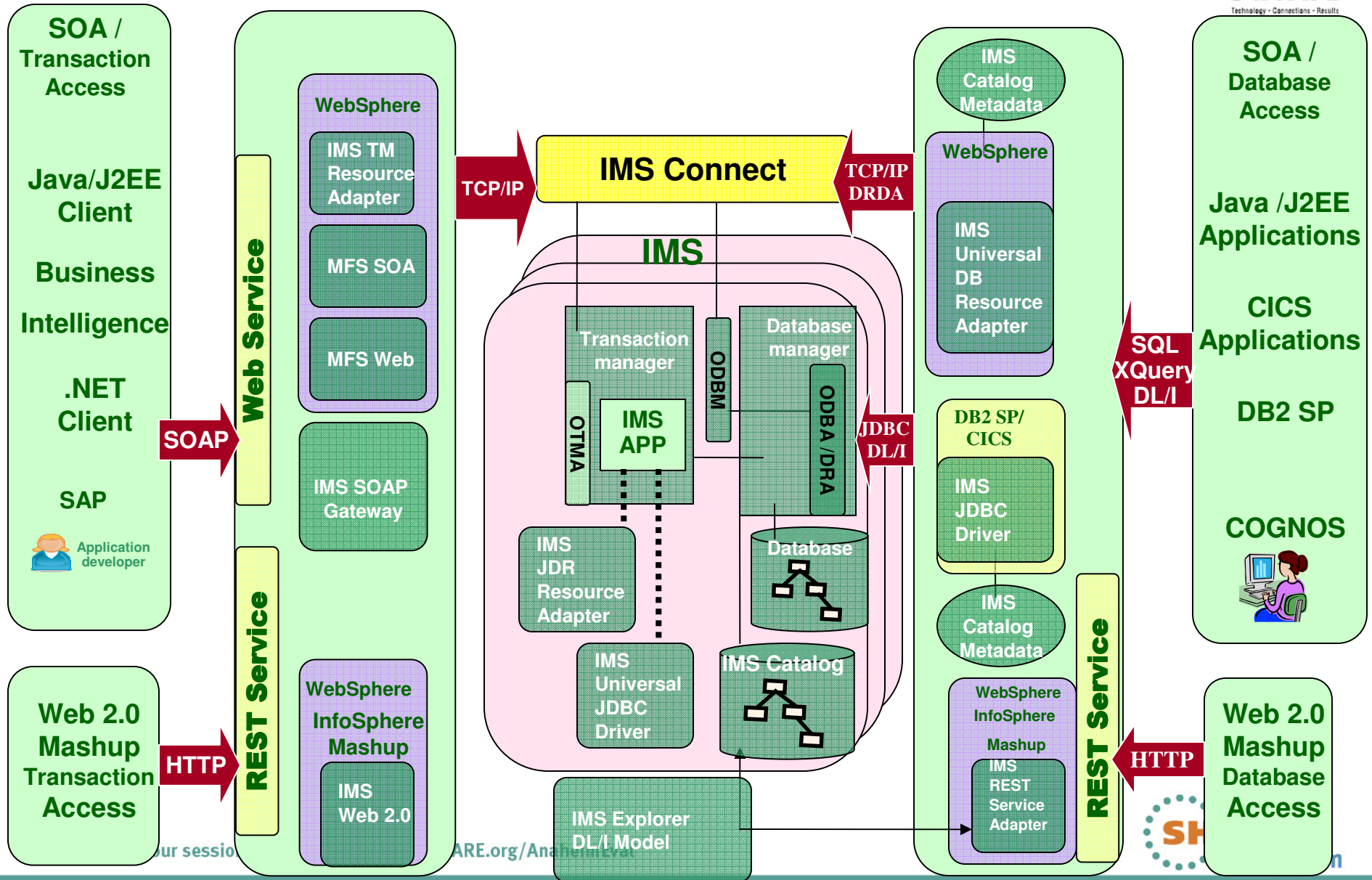
Cloud Break



IMS – the Cloud

(IMS as a Service - IMSaaS)

IMS Cloud



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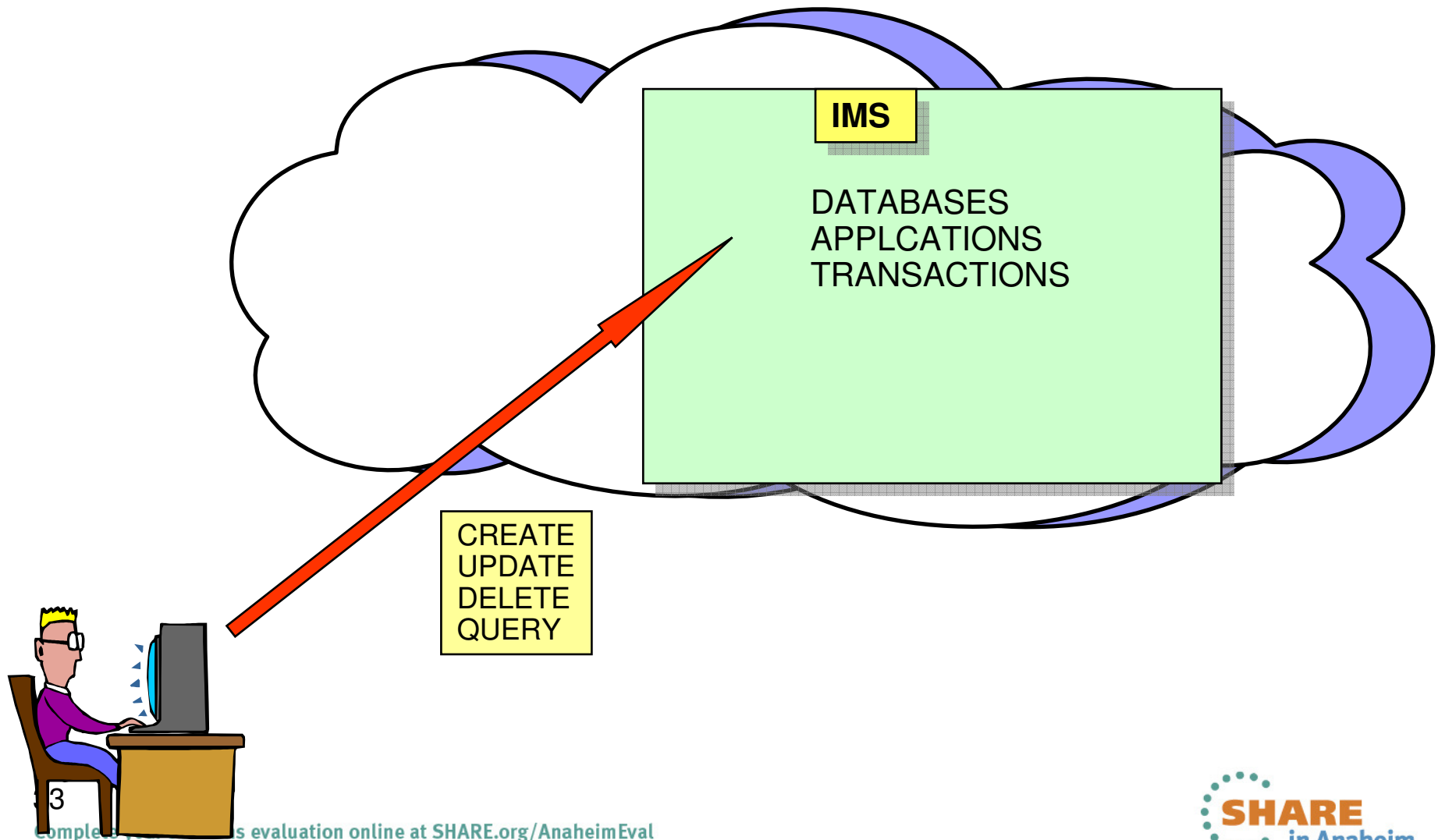
IMS – The Cloud

- 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

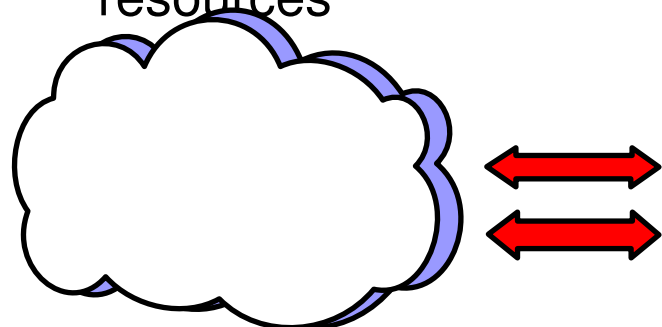
- IMS itself is a “cloud” ...
 - Provides service delivery to access software as services (**SaaS**)
 - IMS Integration and Enterprise Suites
 - Inbound – expose IMS transactions and data as services
 - Outbound – Callout to web services
 - Supports business processes as a service (**BPaaS**)
 - Customer-written applications or business processes

Dynamically define IMS Resources

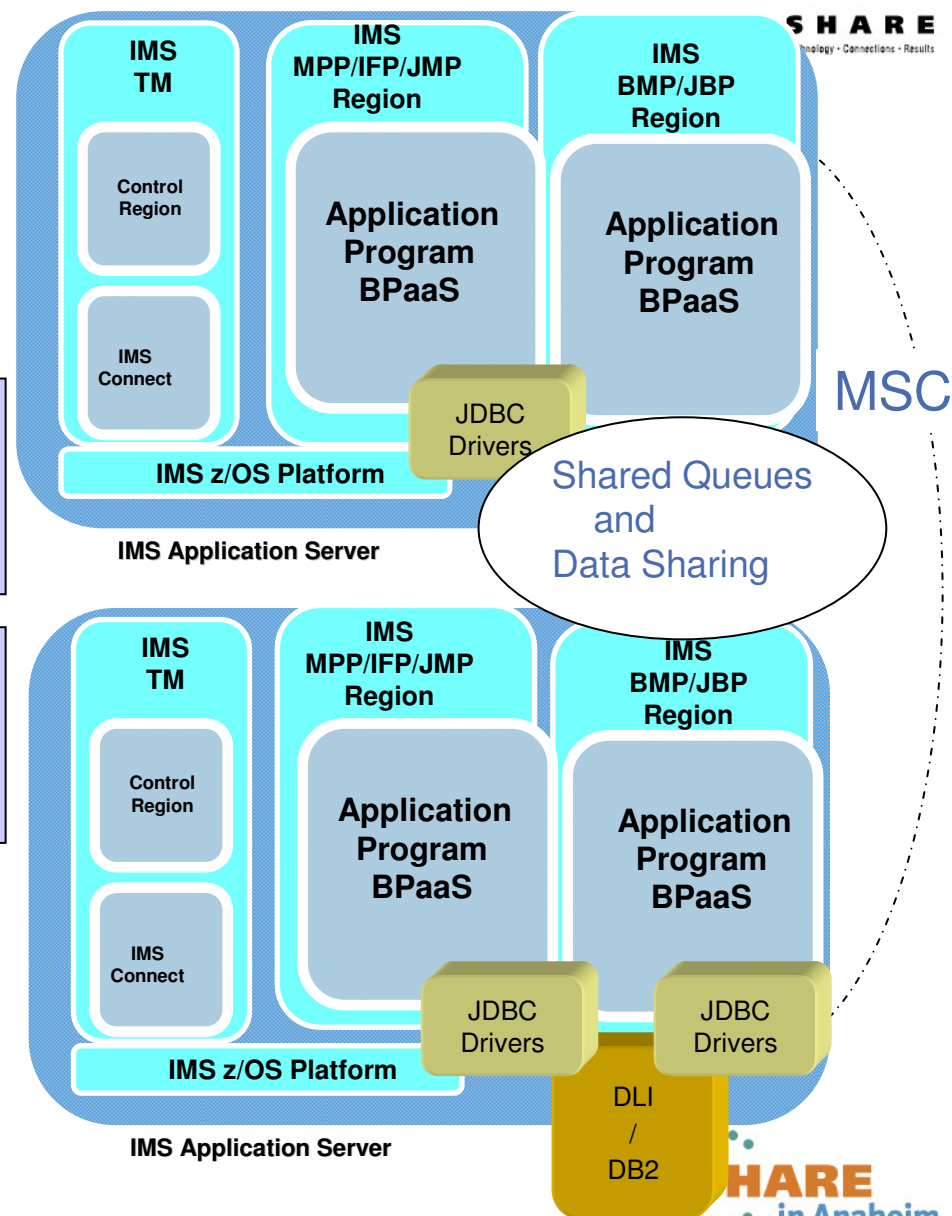


IMS TM – IaaS and PaaS

- IMS is a dynamic and configurable platform
- Provides standard interfaces to access resources

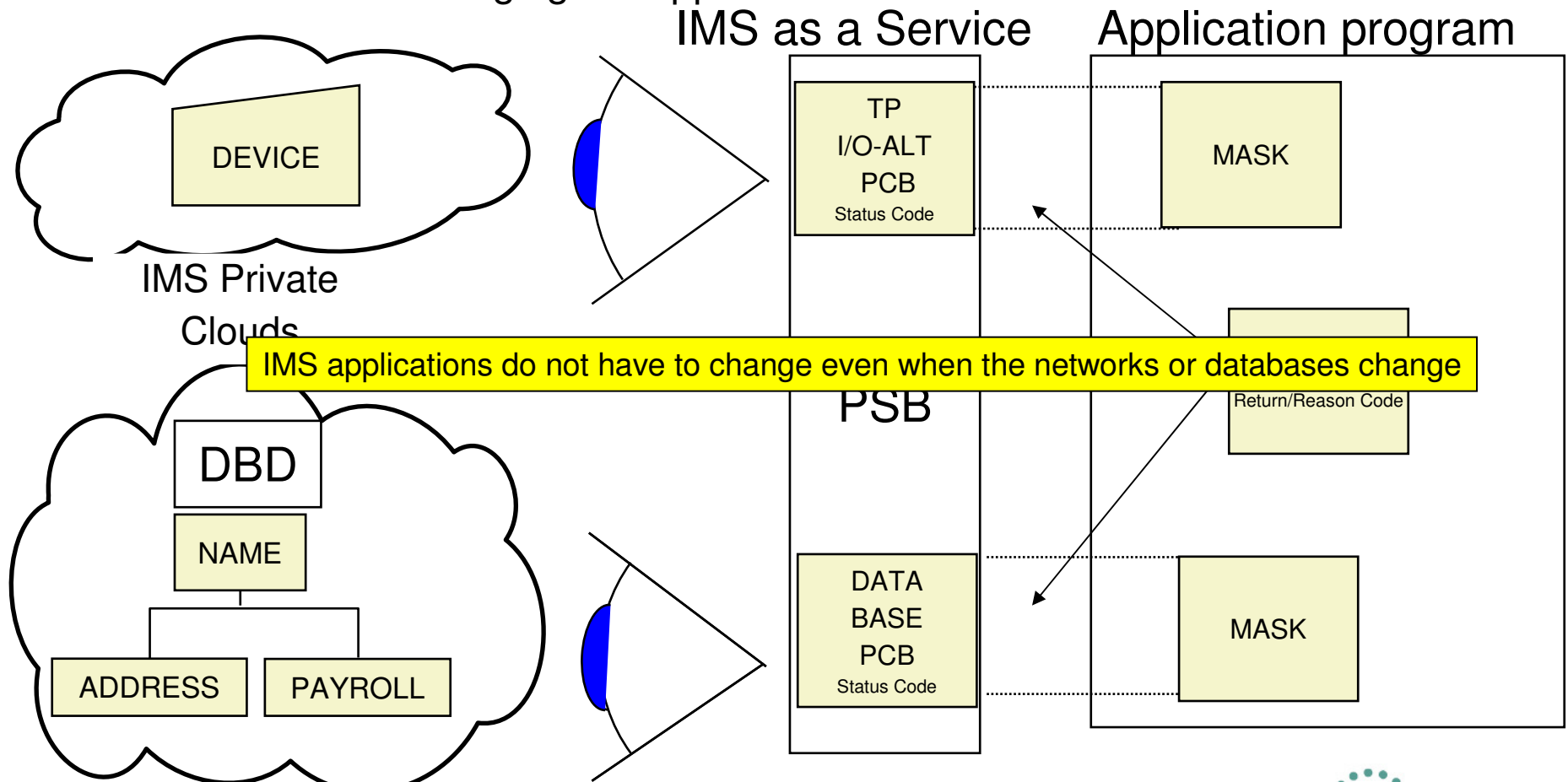


- Does not require application program recompiles even if the IMS release is changed
- Does not require application program changes even when the network or db structure changes



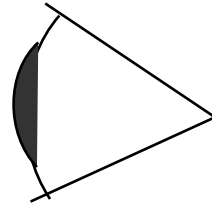
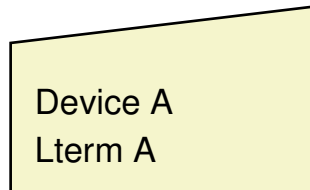
IMS Cloud Layer

From the IMS application perspective, the programs view resources (communication devices and databases) through PCBs that can be easily modified without changing the application

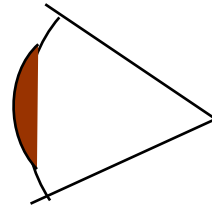
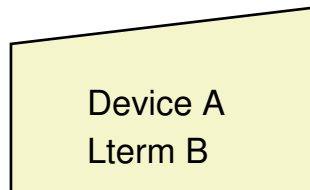
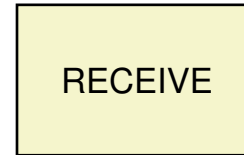


IMS as a Service

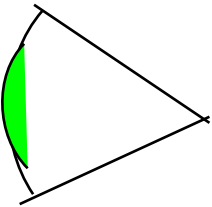
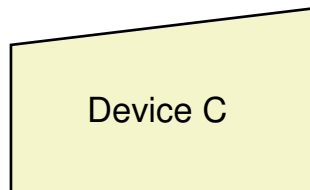
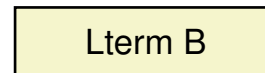
– PCB structure



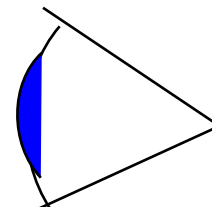
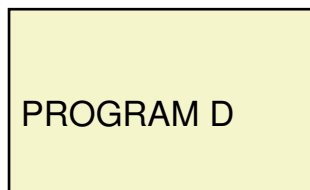
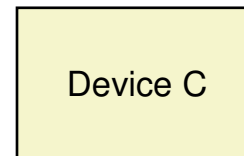
I/O PCB



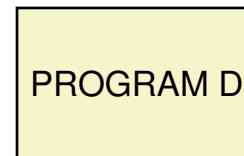
ALTERNATE Response PCB
LTERM=Lterm B



ALTERNATE Express PCB

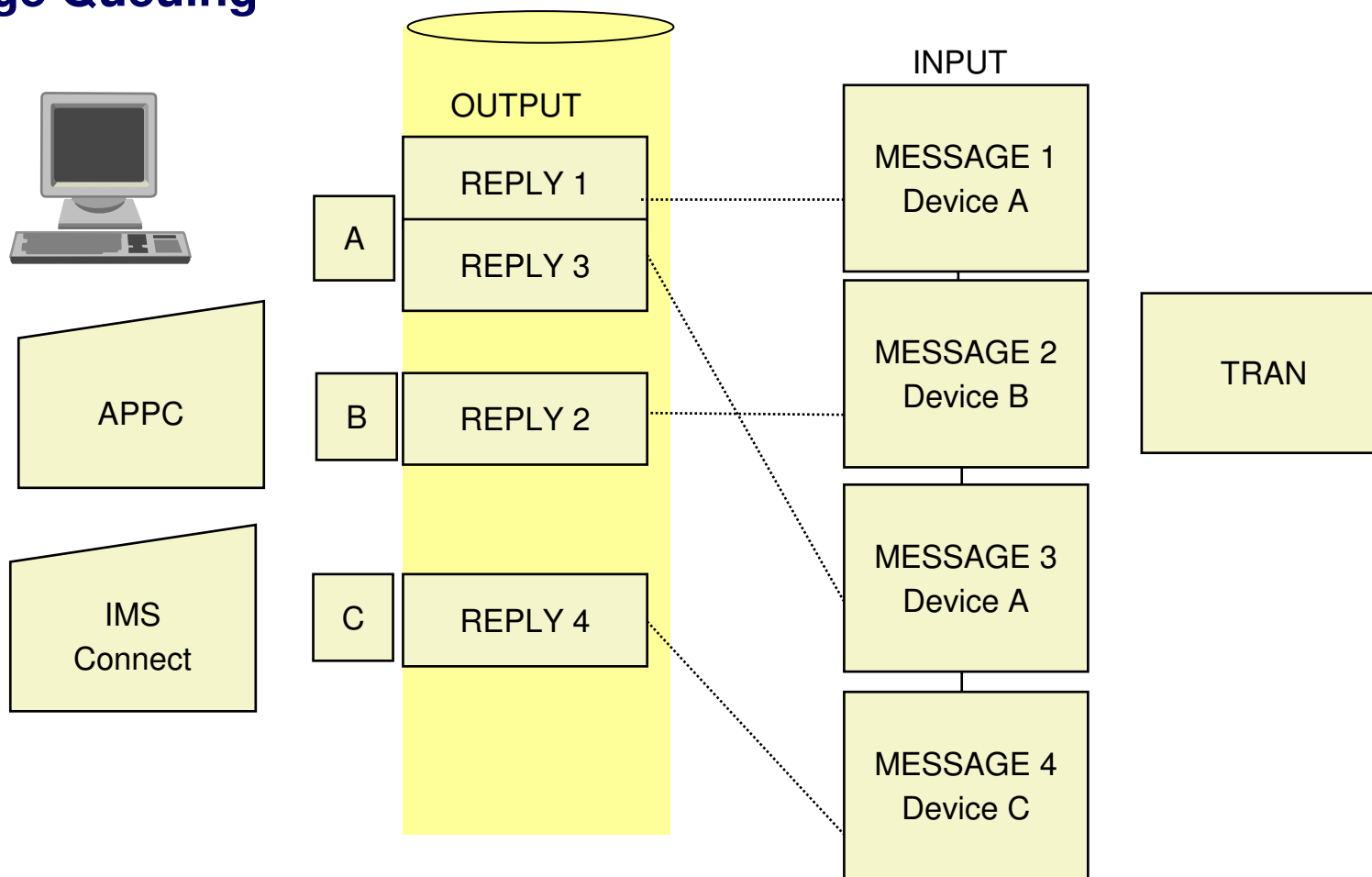


Modifiable ALTERNATE PCB



IMS as a Service

- Message Queuing



IMS as a Service

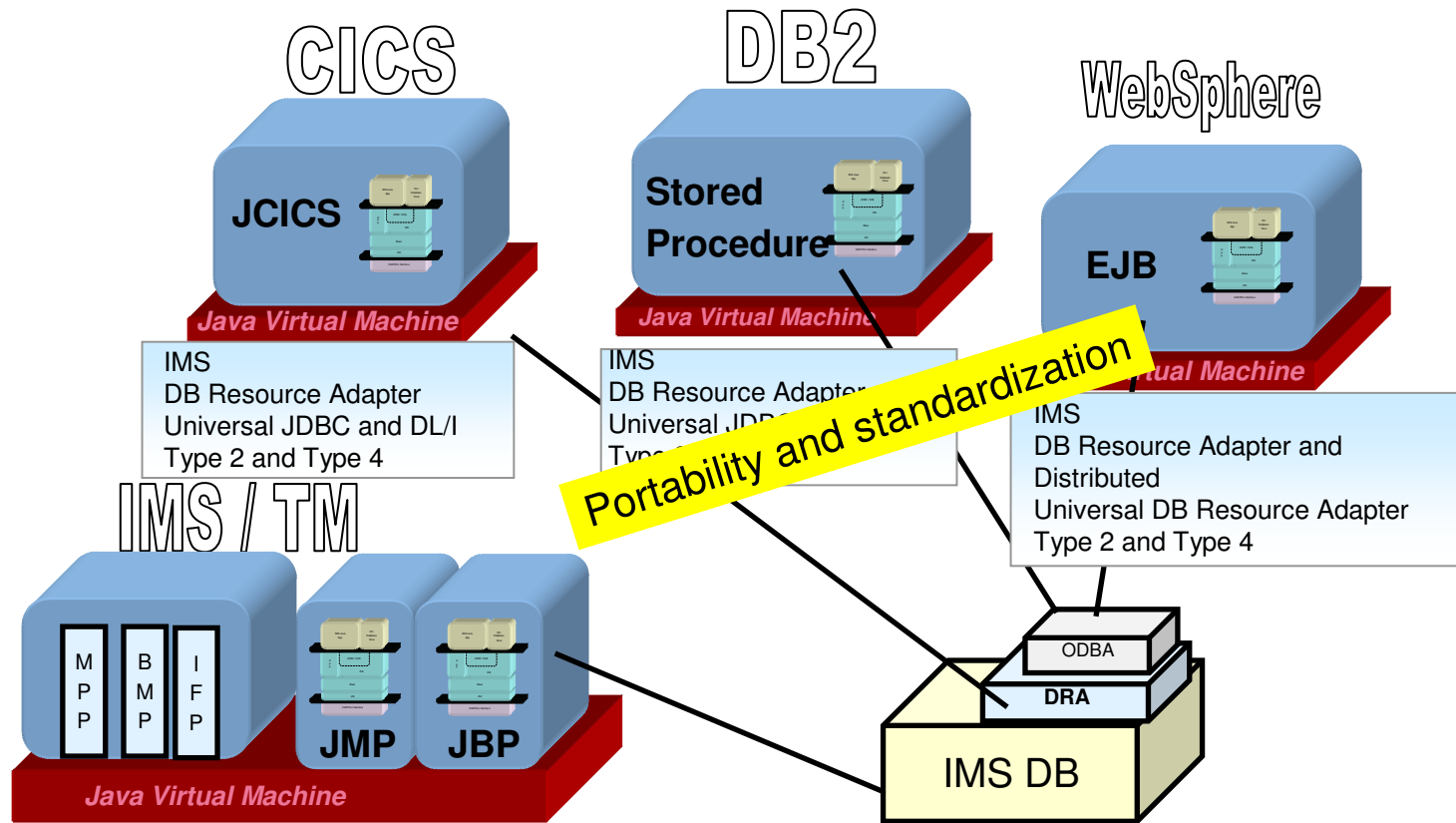


- Supports multiple runtime environment
- Allows dependent regions to be added as needed for workload

		Application Programs			
		SUPPORTED BY IMS TM/DB CTL		STAND ALONE	
IMS TM CONTROL REGION (CTL)		MESSAGE REGION <i>(MPP, IFP, JMP)</i>	BATCH MESSAGE Driven PROCESSING (BMP) BATCH Non-MESSAGE Driven PROCESSING (BMP, JBP)		DB BATCH REGION (DLI) TM BATCH REGION (DB2)
	FUNCTIONS				
<ul style="list-style-type: none"> • QUEUING • SCHEDULING • LOGGING • I/O <ul style="list-style-type: none"> - DATA BASE - TERMINAL 	• SCHEDULED BY	IMS	USER	SOME PROGRAMS ARE INTER-CHANGEABLE	USER
	• ONLINE DB'S	YES	YES		NO
	• OS/VS FILES	NO	YES		YES
	• MSG Q	YES	YES		NO
	• I/O PCB	YES	YES		OPTIONAL

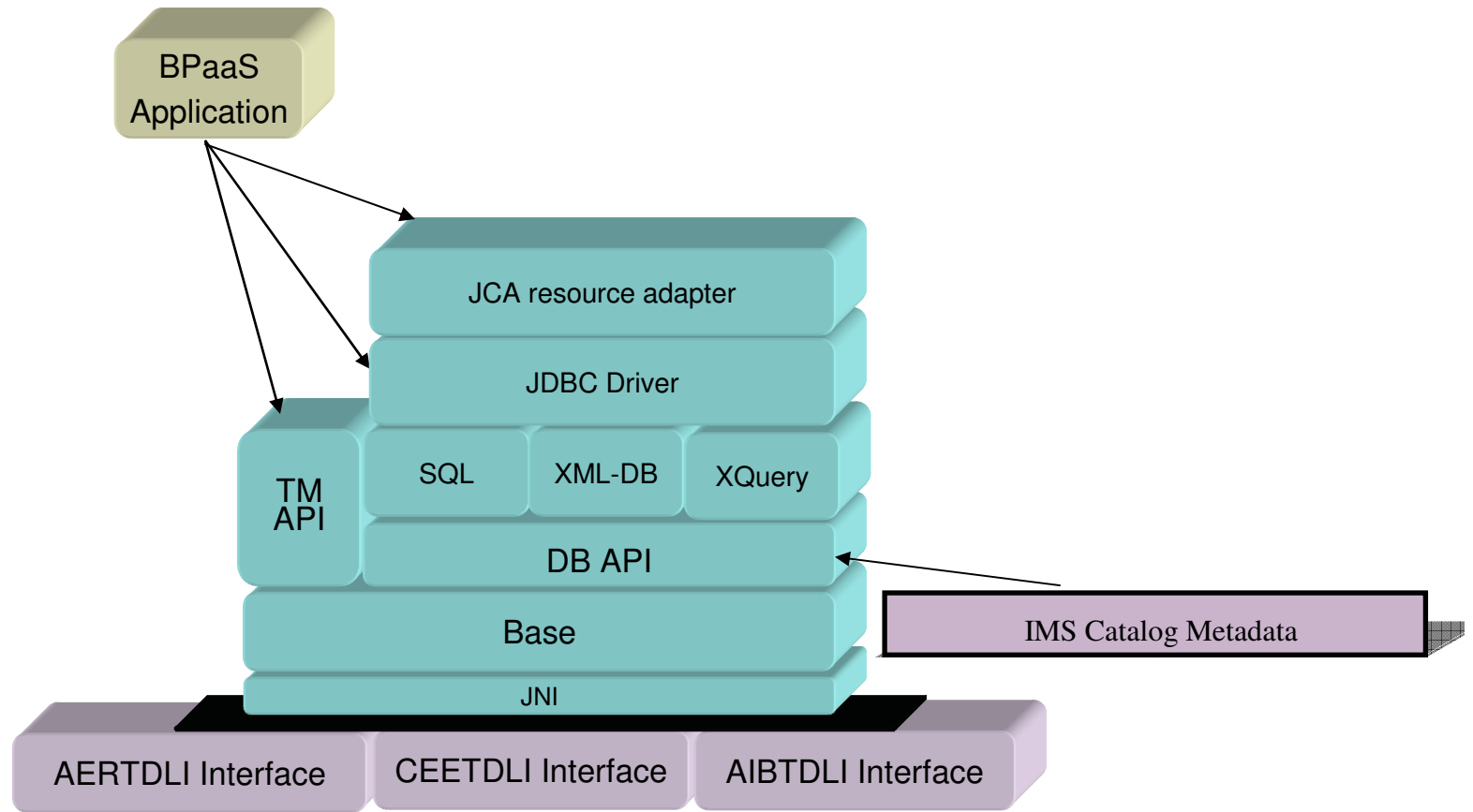
IMS Java Development

- (Saas and DBaaS)



IMS
 Java Dependent Region Resource Adapter
 Universal JDBC and DL/I
 Type 2 and Type 4

IMS Java: SaaS for BPaaS Applications

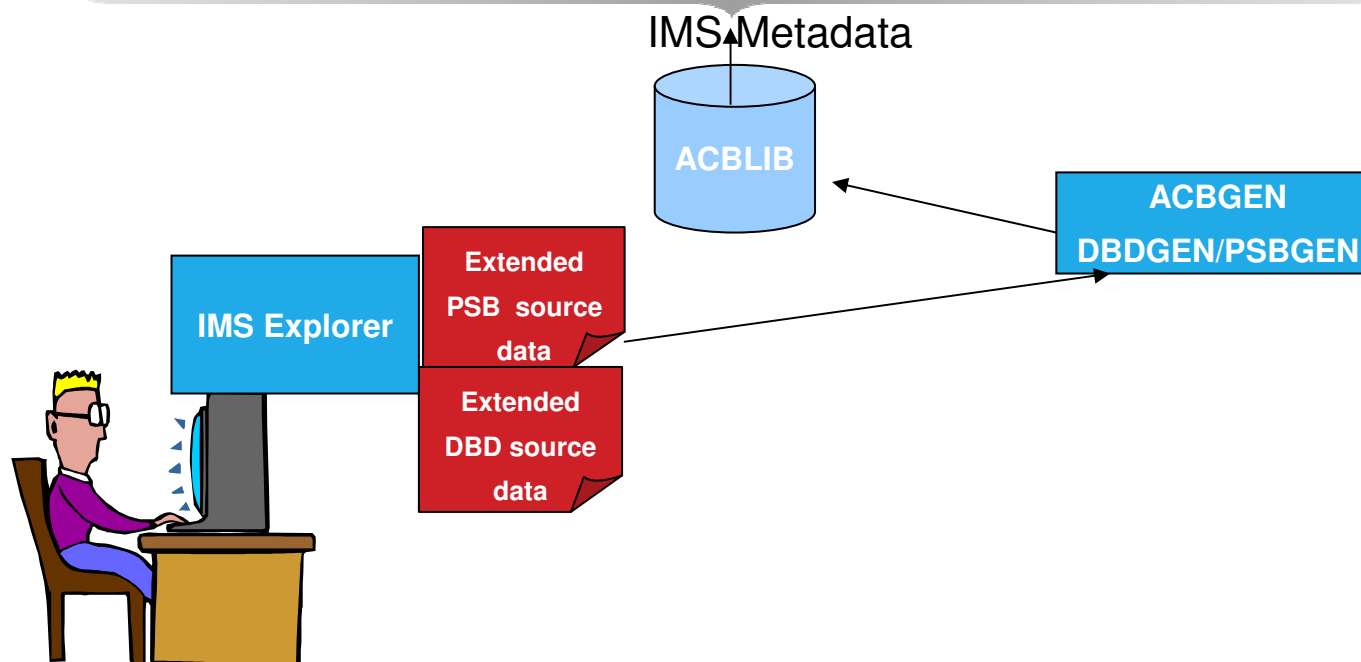


The Java Native Interface is used to access IMS procedural code

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