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IMS Plays a Role in a System z Cloud

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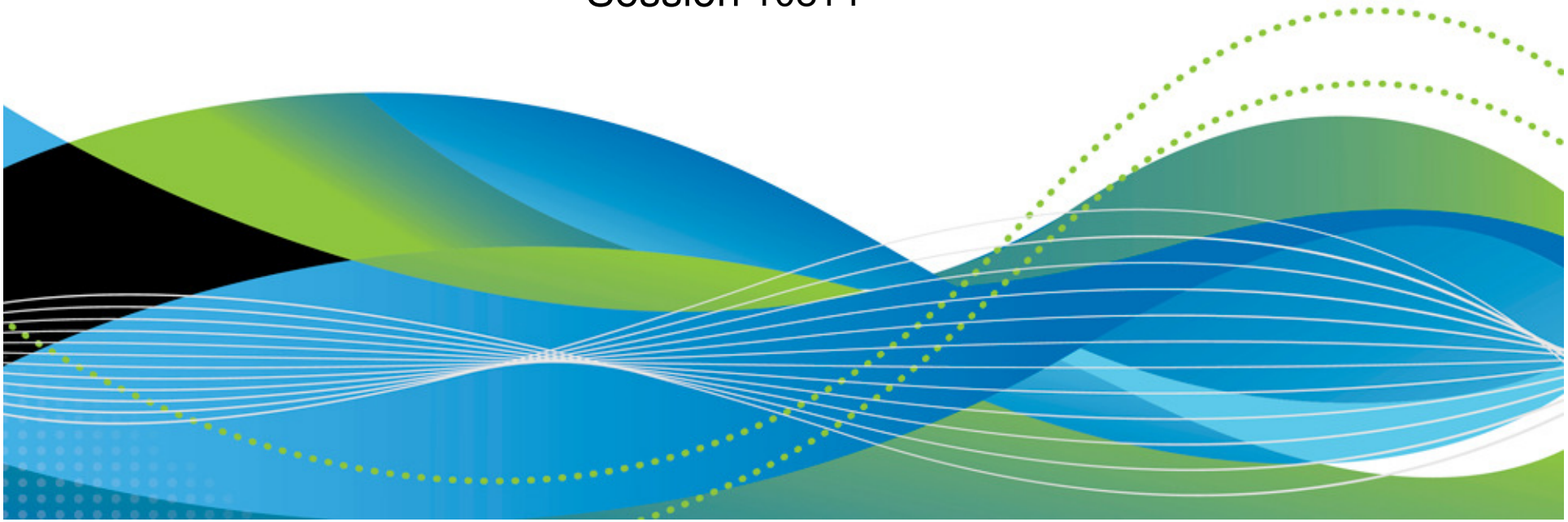


Memory lane

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, …

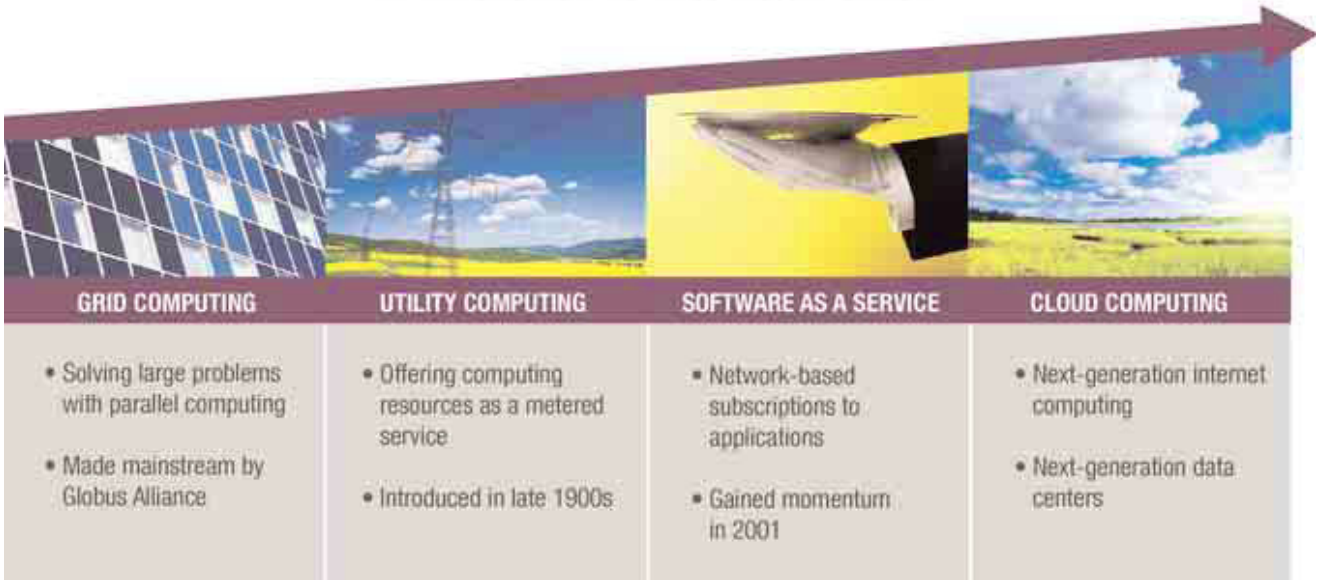
2.Client/Server: 1985 –

- 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

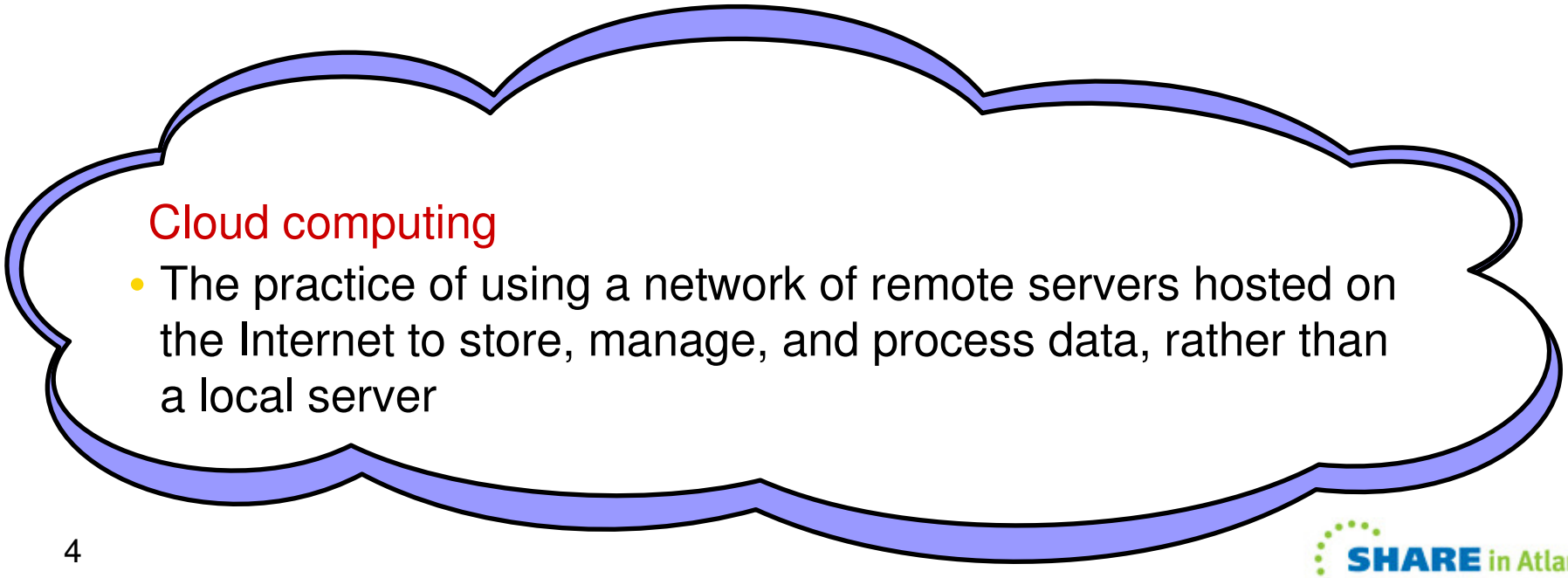
> Can support grids

> Can support non-grid environments, e.g., 3-tiered web architecture with traditional or Web 2.0 applications

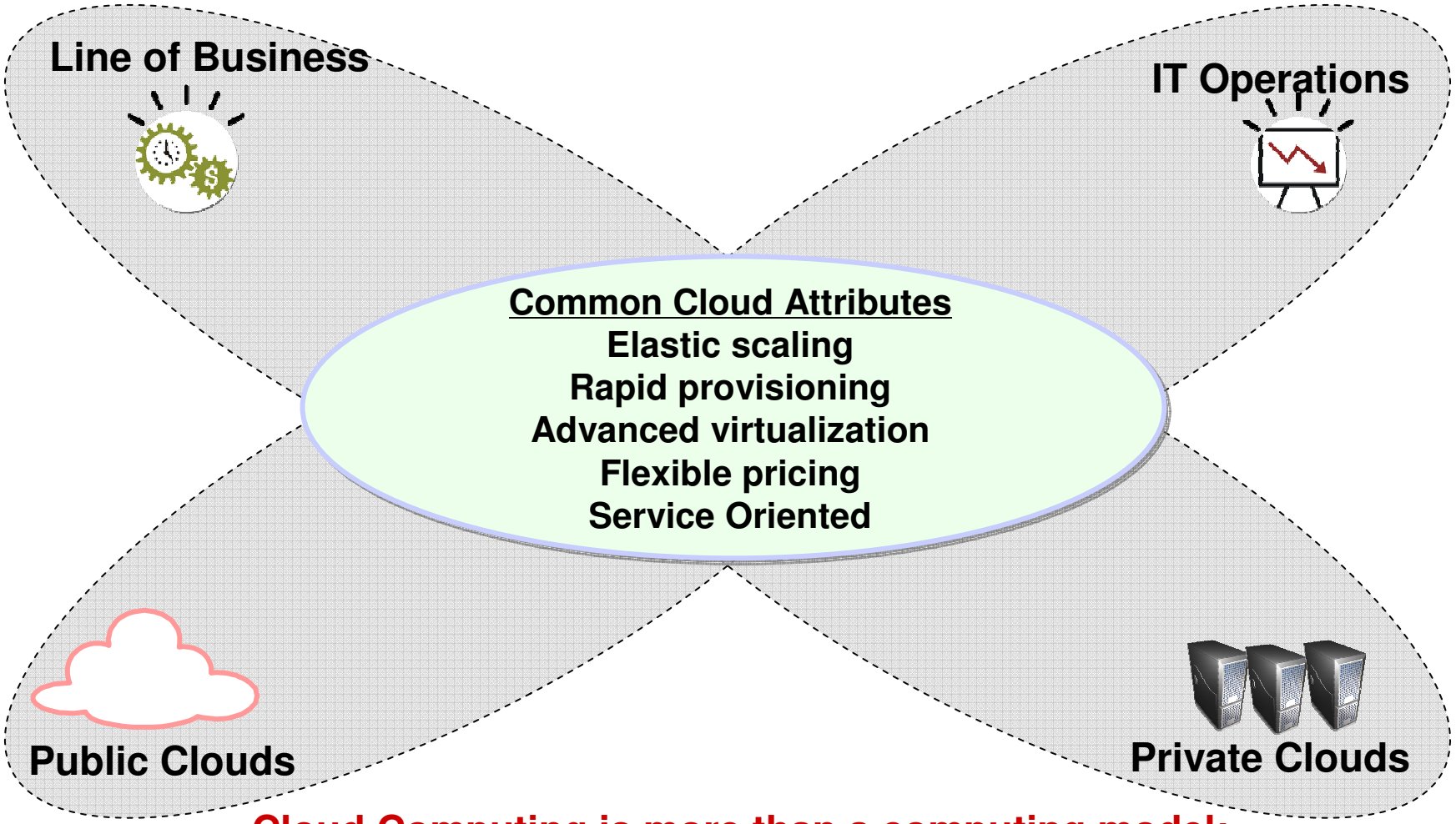
Cloud definitions

- 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”*



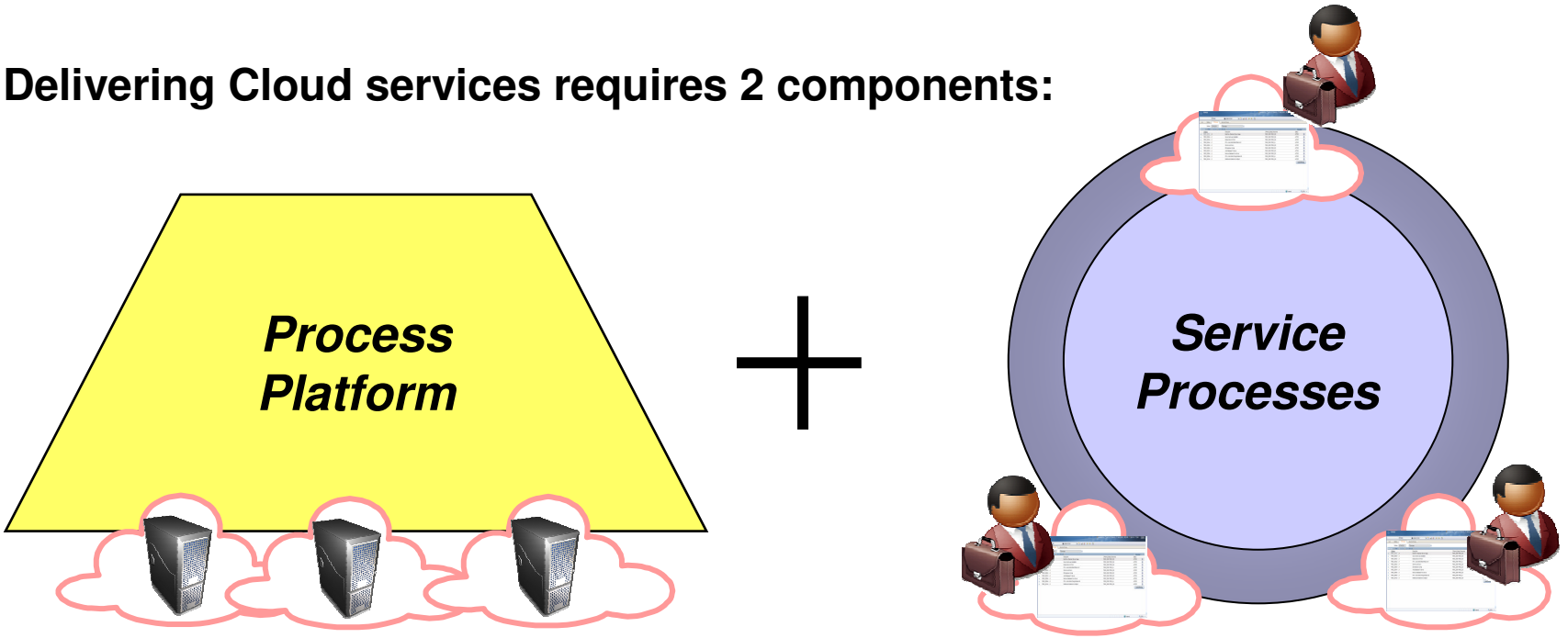
Cloud Computing is a Broad Term



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:



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

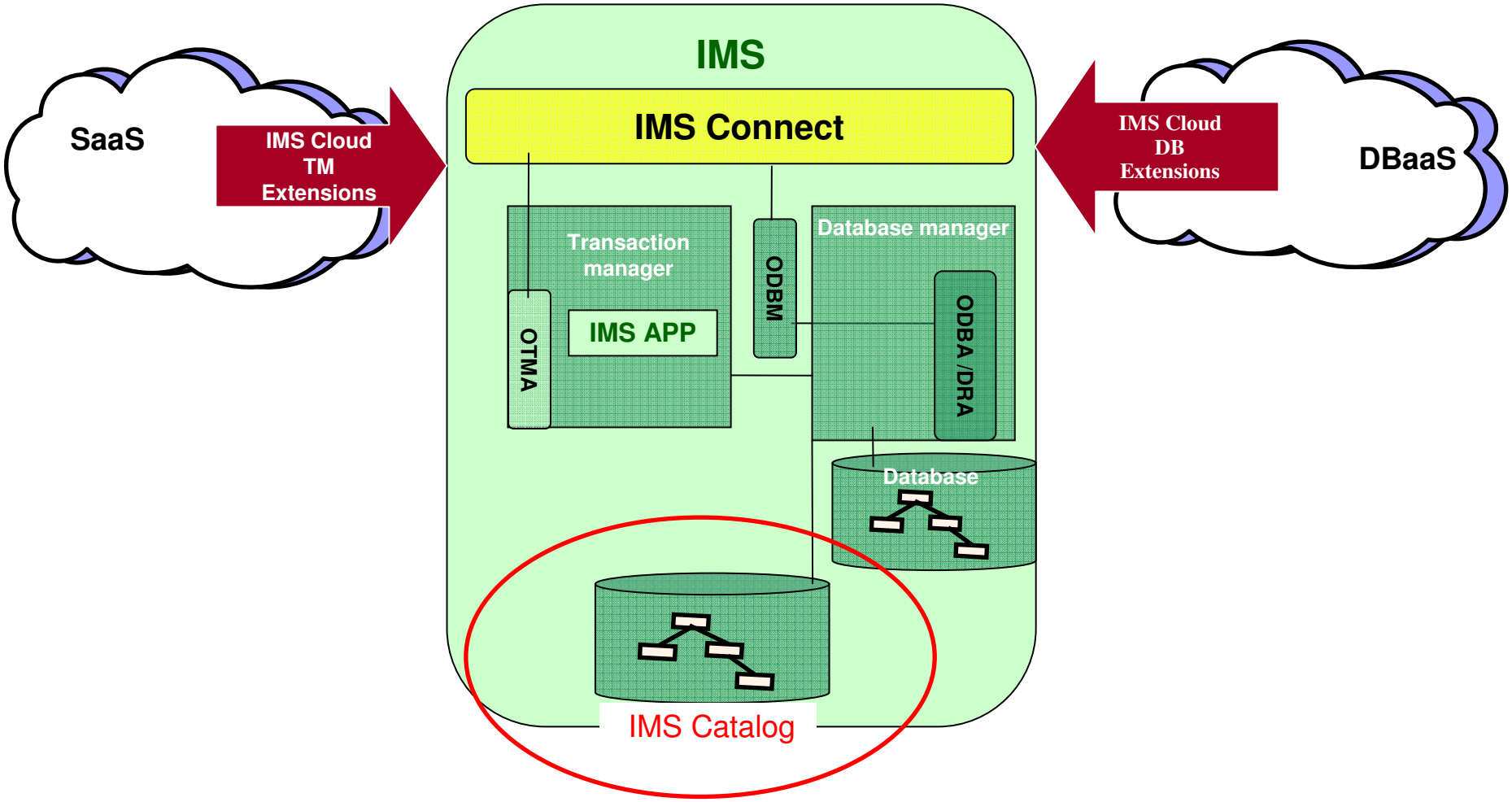
  …. Enterprises are beginning to recognized that the maximum value of cloud-based solutions includes interconnection to their existing business infrastructure

- 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)

IMS Cloud Parts

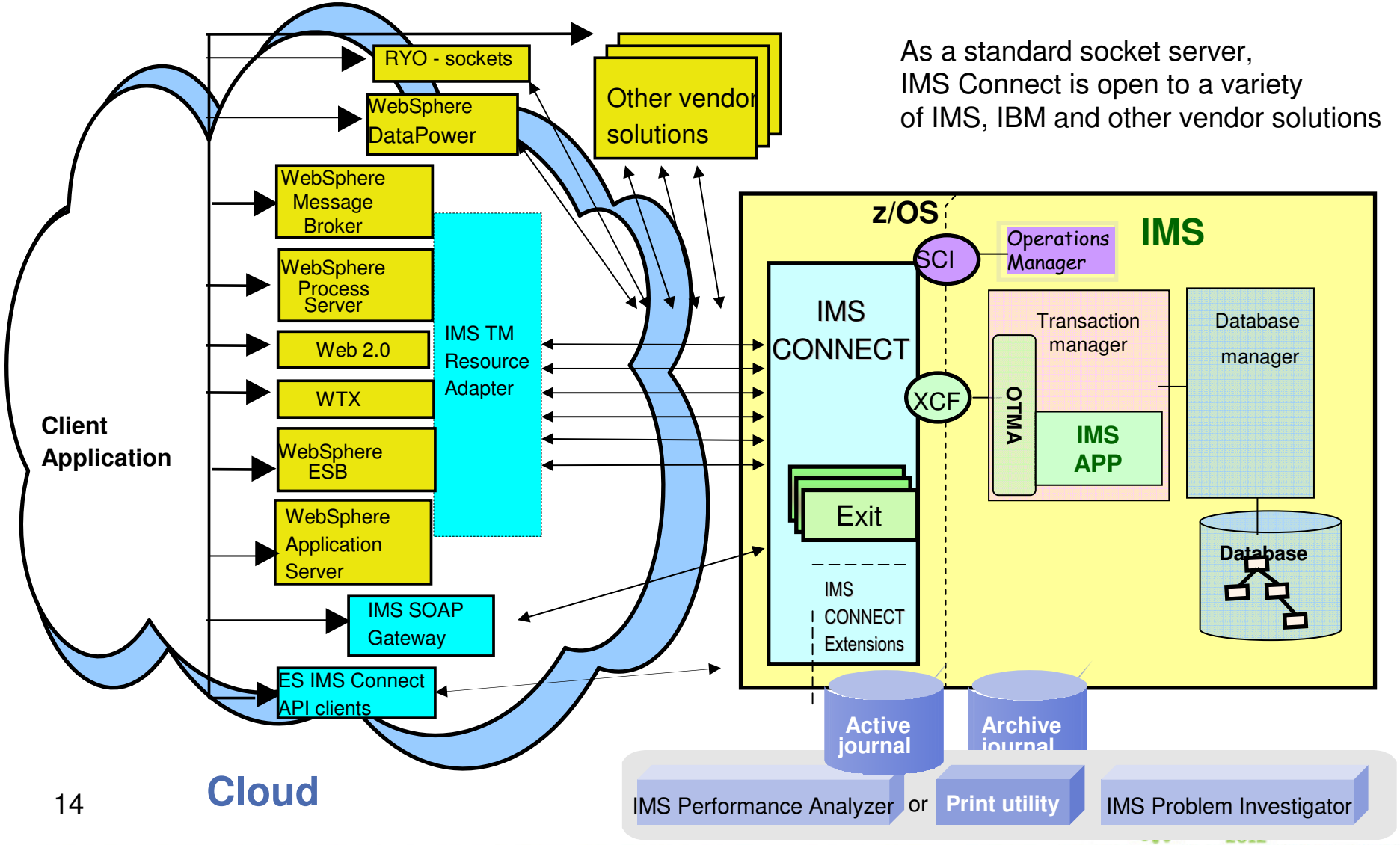


Specifically

- 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
    - …

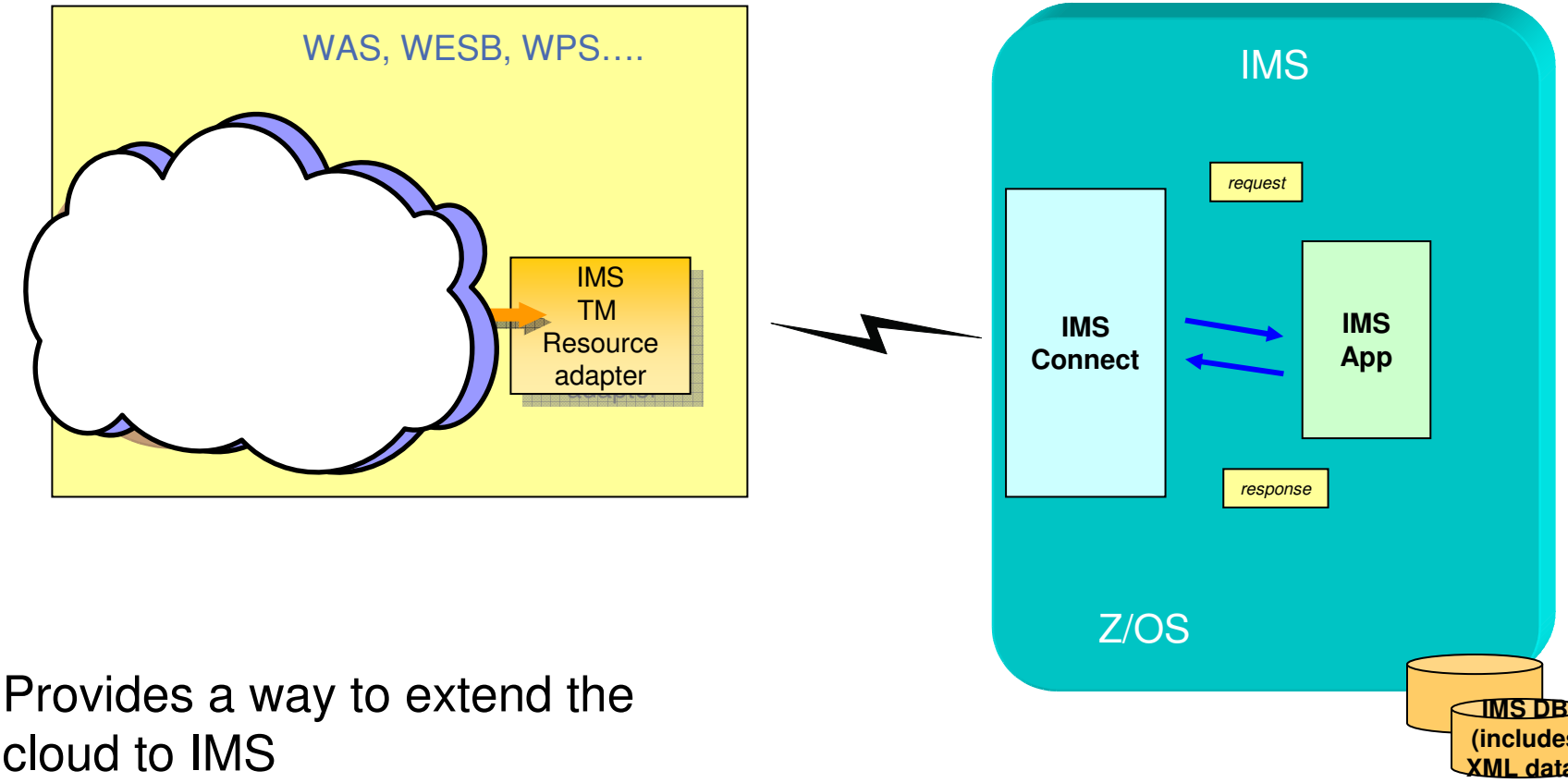
WWW.IBM.COM/IMS

IMS Connect and IMS TM
(Supports SaaS)



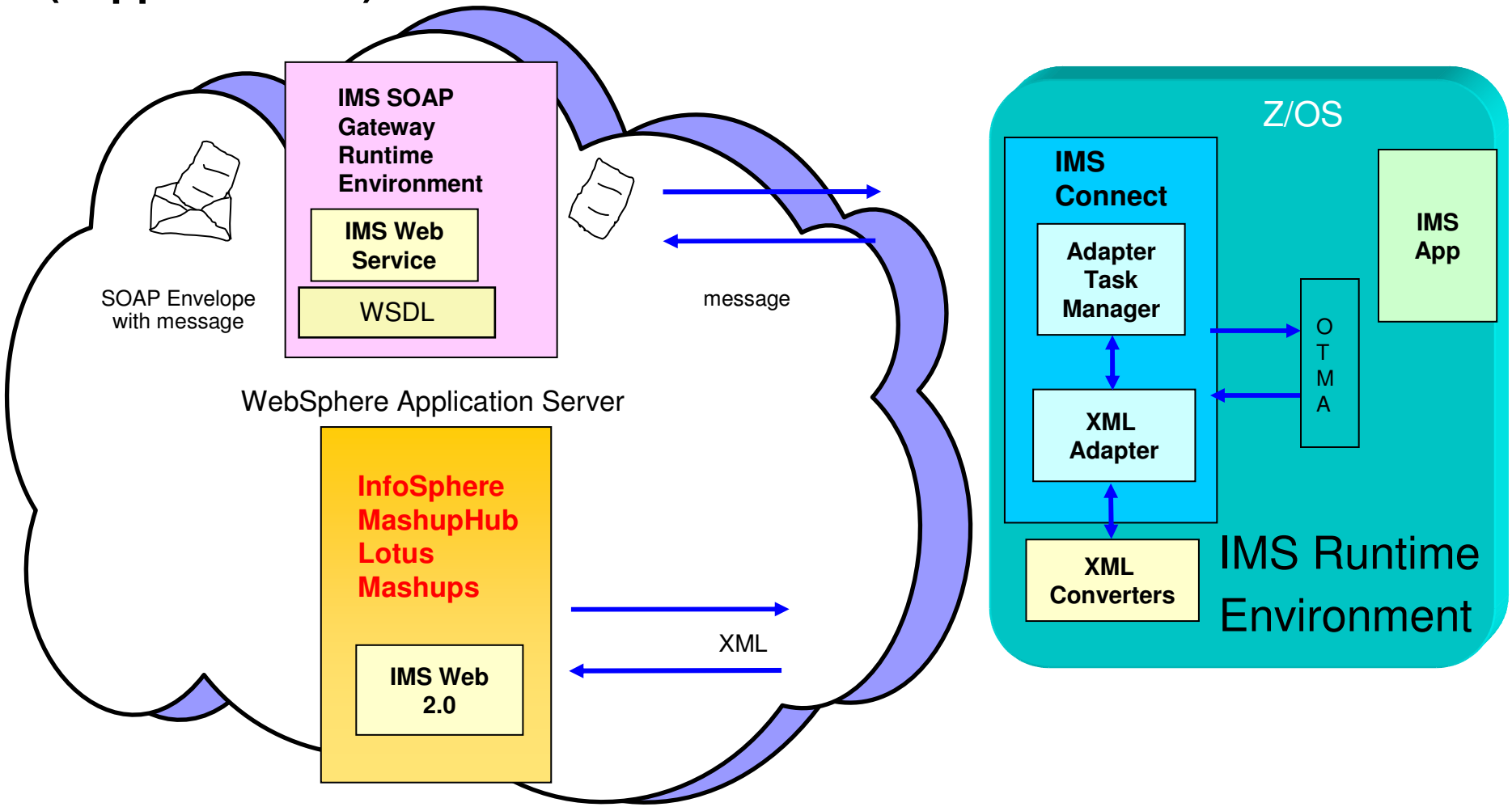
As a standard socket server,
IMS Connect is open to a variety
of IMS, IBM and other vendor solutions

IMS TM Resource Adapter
(supports SaaS)

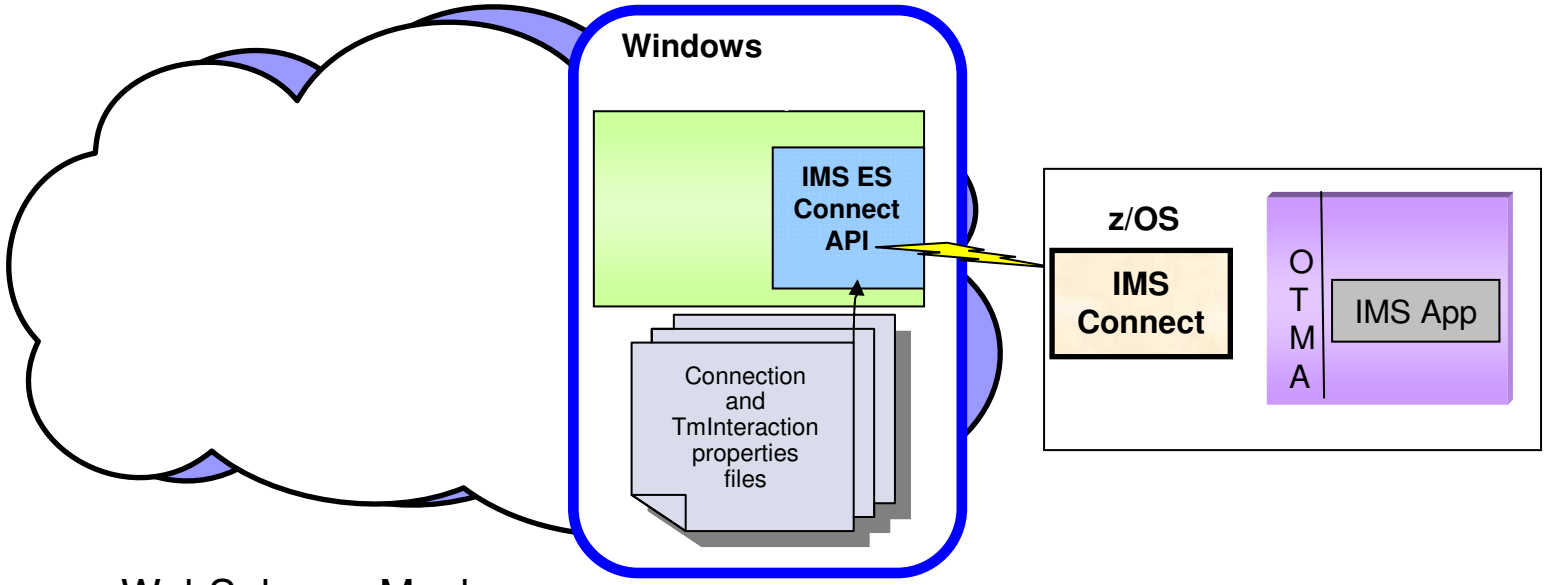


- Provides a way to extend the cloud to IMS

IMS Enterprise Suite Soap Gateway
(supports SaaS)



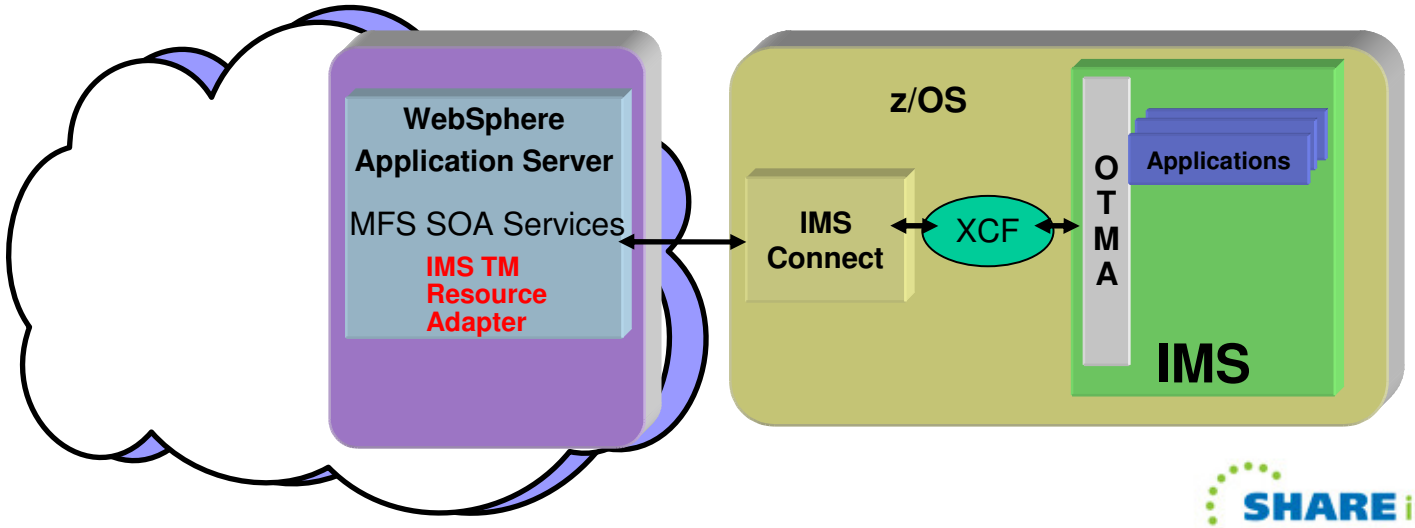
WebSphere sMash and IMS Connect API for Java



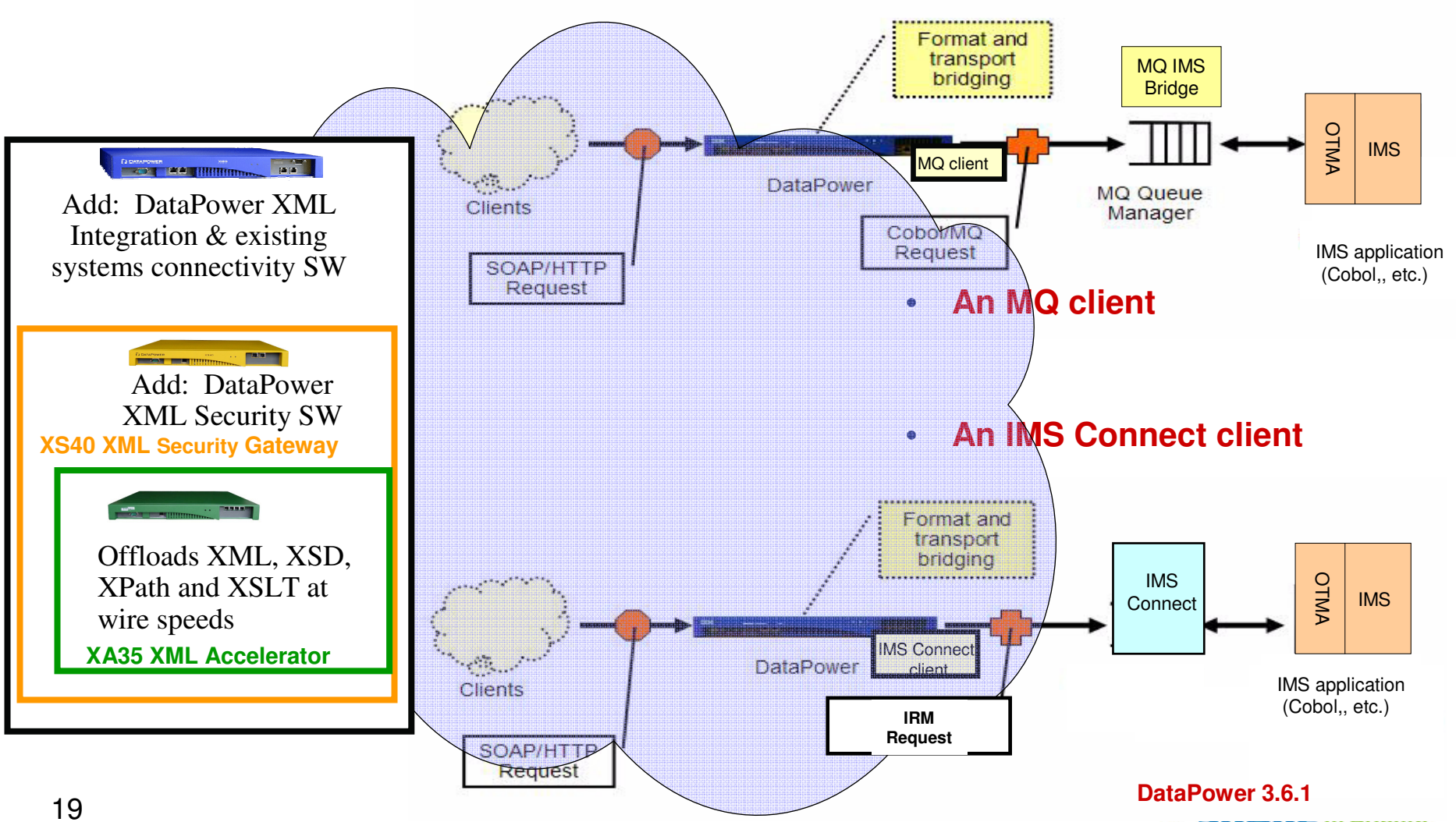
- WebSphere sMash
  - lightweight runtime for creating and running RESTful services
    - Groovy, PHP, and Java through the IMS Connect for Java API
  - sMash application is responsible for
    - Preparing input data for IMS application
    - Interpreting output data from IMS application
    - Configuring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

IMS MFS SOA Support

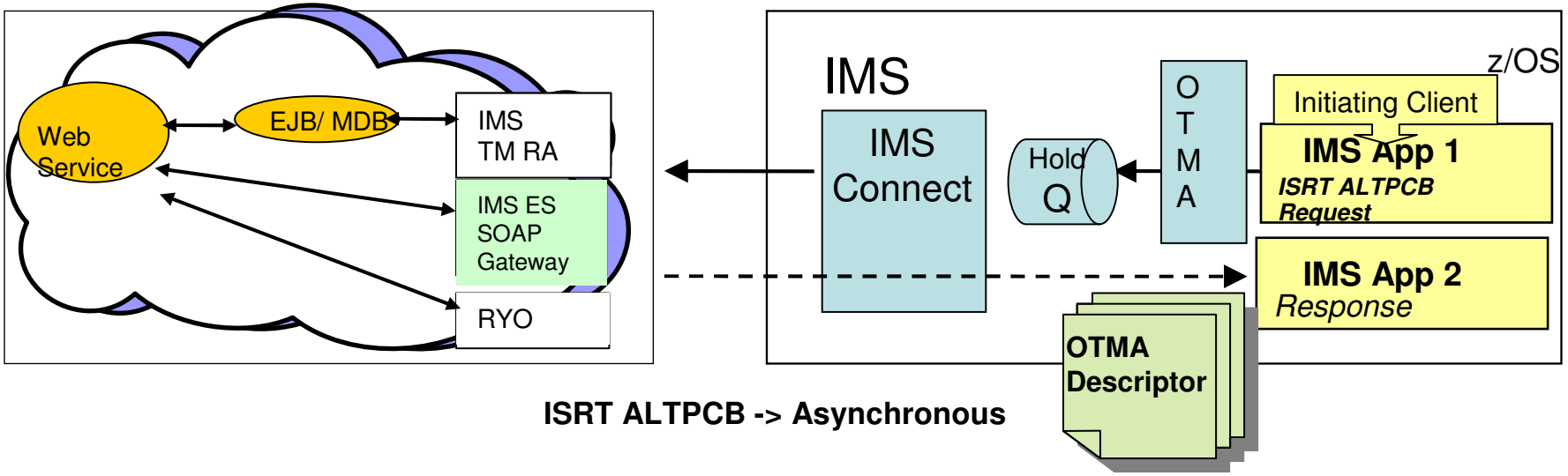
- Providing PaaS (Platform as a Service) access to MFS transactions
  - IBM Integration Designer
  - IBM Process Server
- Benefit
  - Provides MFS transaction support for Business Process Choreography (B2B) and BPaaS (Business Process as a Service)



DataPower Cloud Interface for IMS

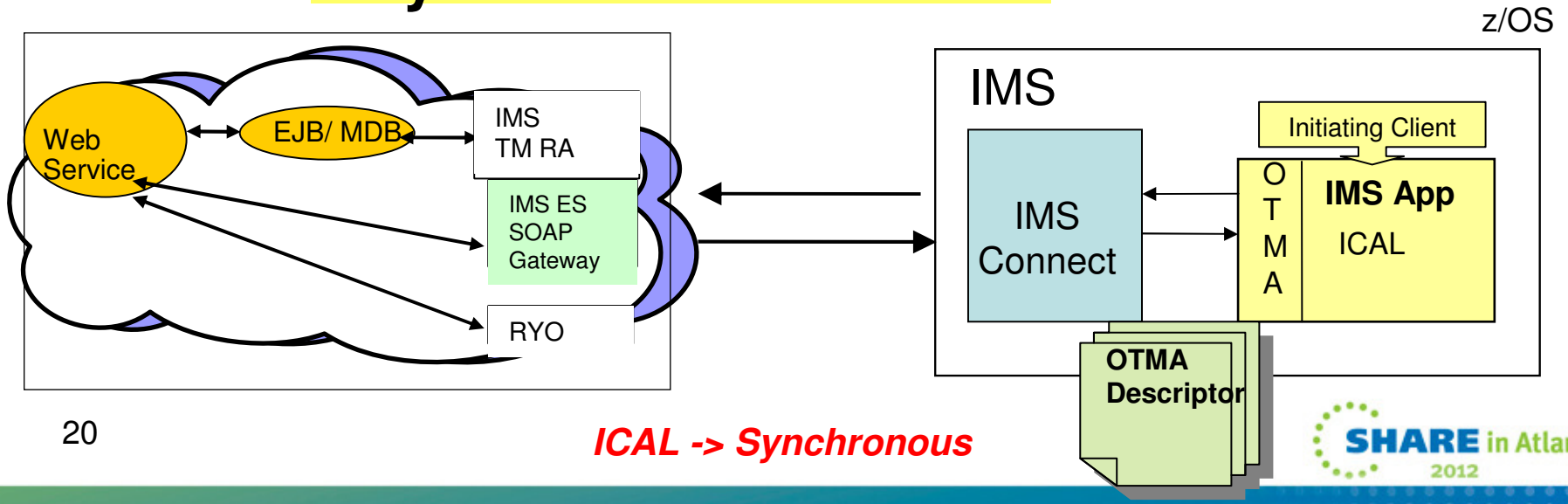


Asynchronous callout



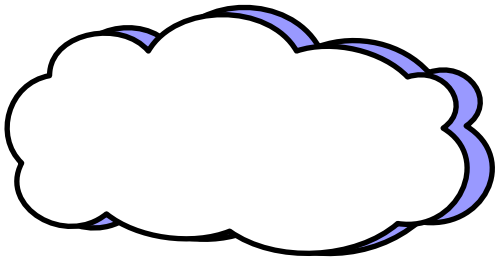
ISRT ALTPCB -> Asynchronous

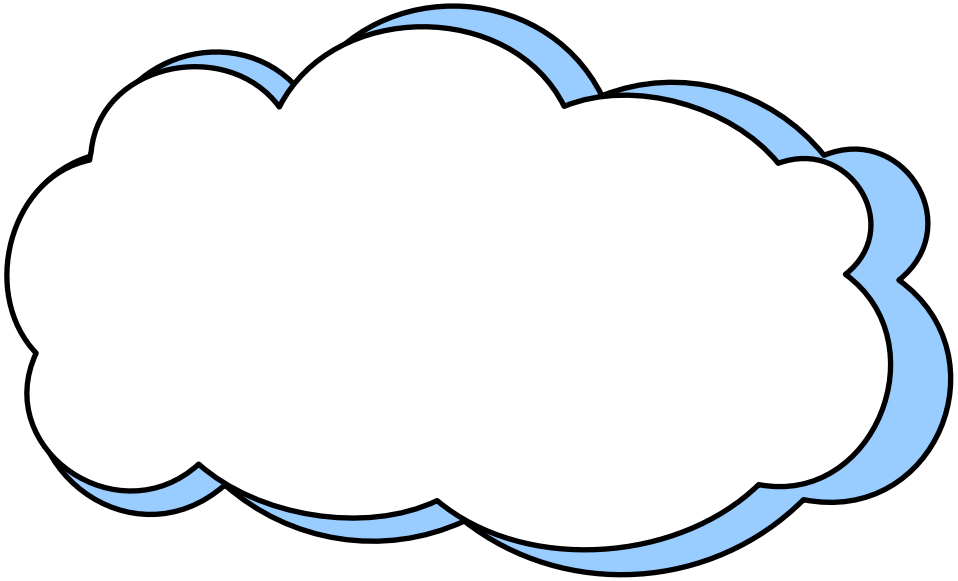
Synchronous callout



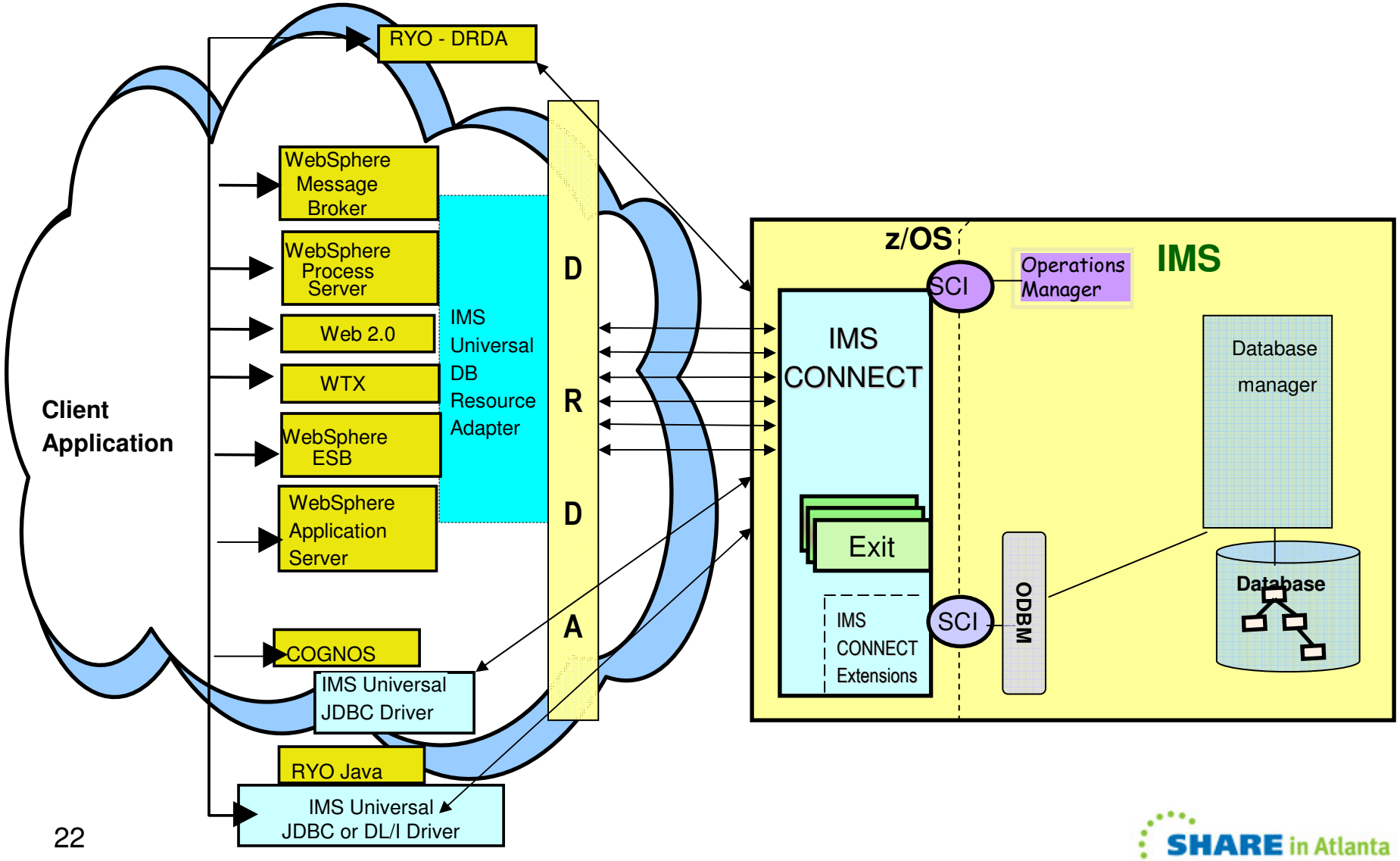
ICAL -> Synchronous

Cloud Break

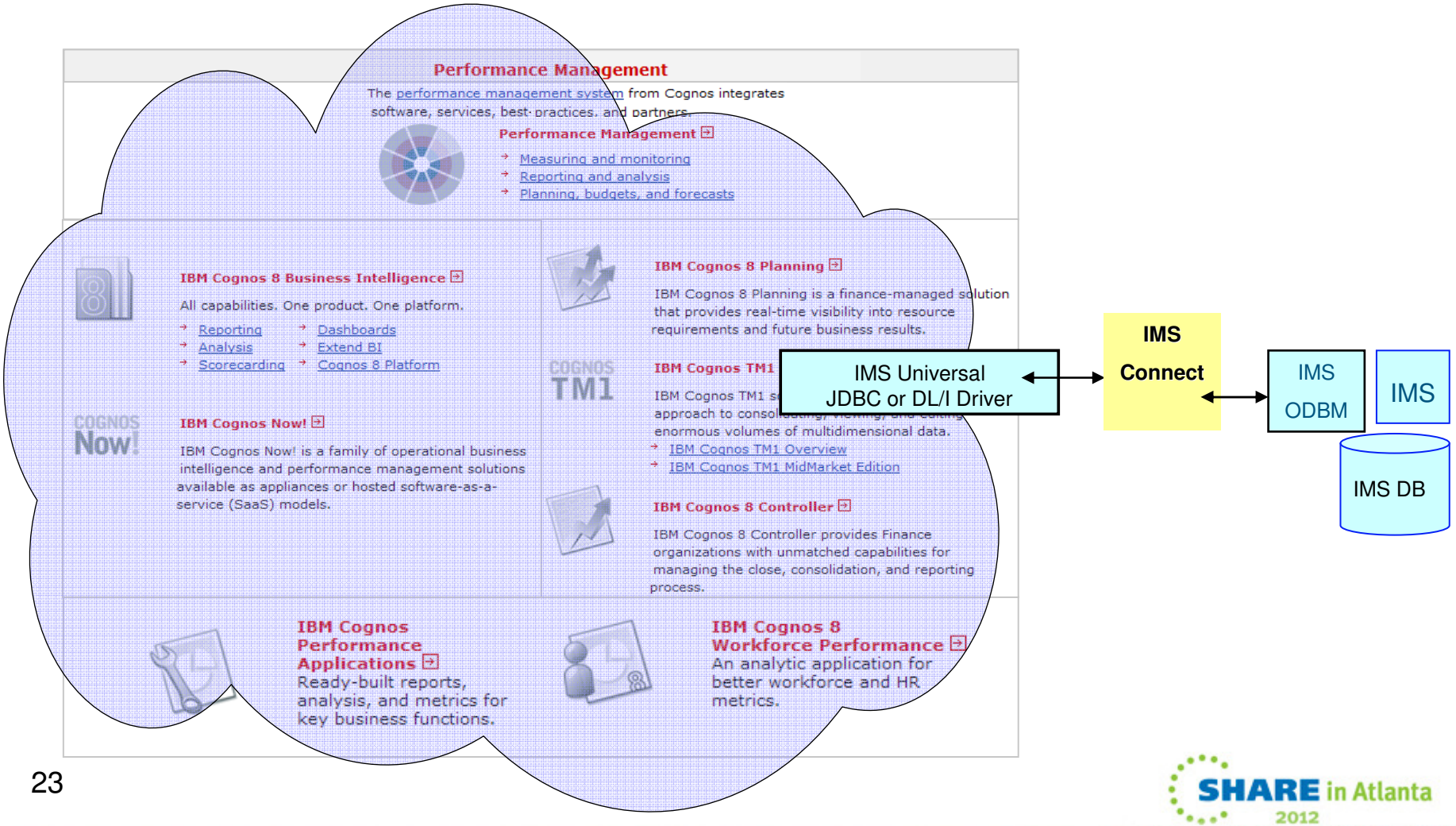




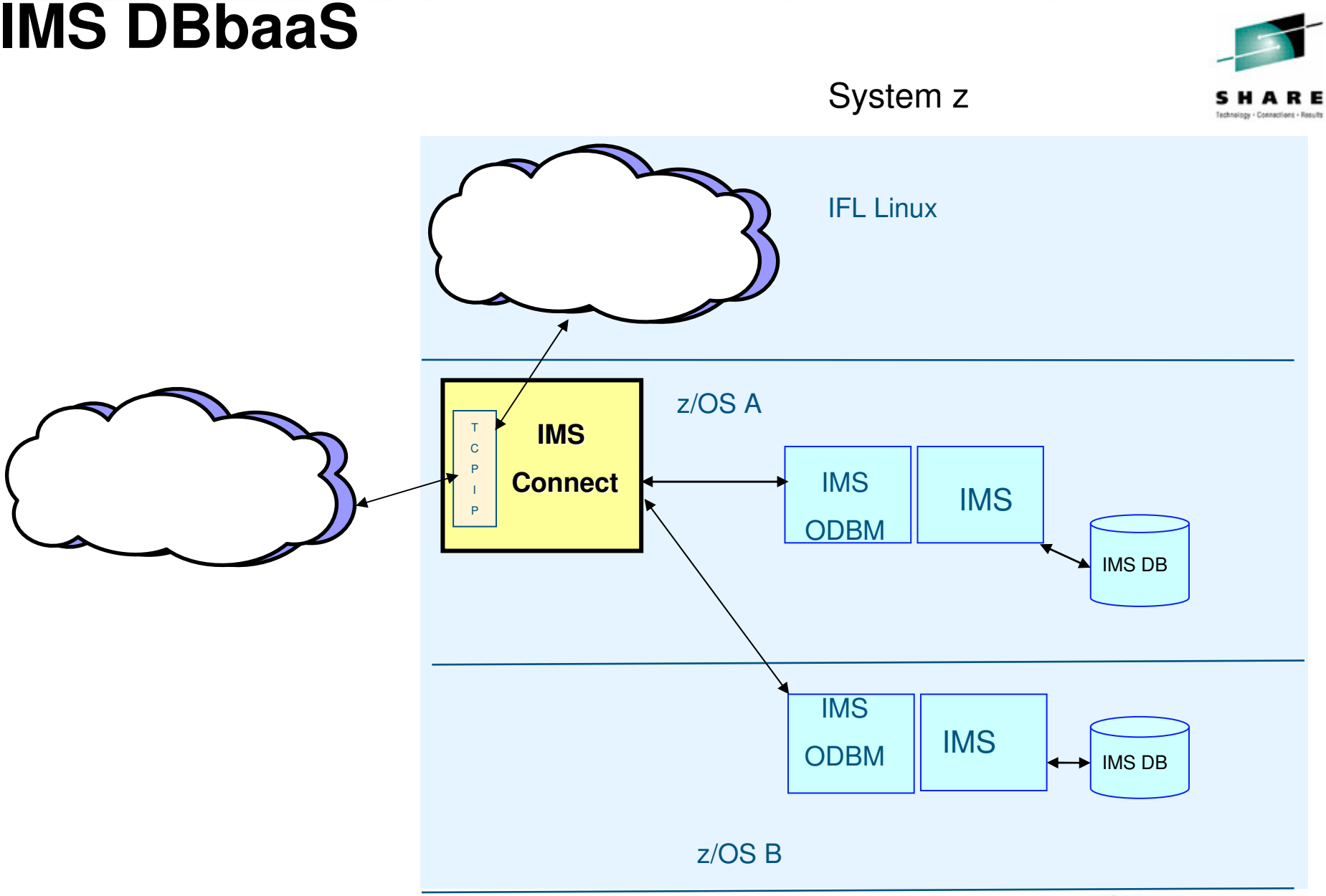
IMS Connect and IMS DB



COGNOS – Operational BI and Reporting



IMS DBbaaS


System z
IFL Linux
z/OS A
T
C
P
I
P
IMS
Connect
IMS
ODBM
IMS
IMS DB
IMS
ODBM
IMS
IMS DB
z/OS B

IMS Enterprise Suite V2.1 Explorer for Development

- Supports cross-product integration to simplify IMS application development tasks

- 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

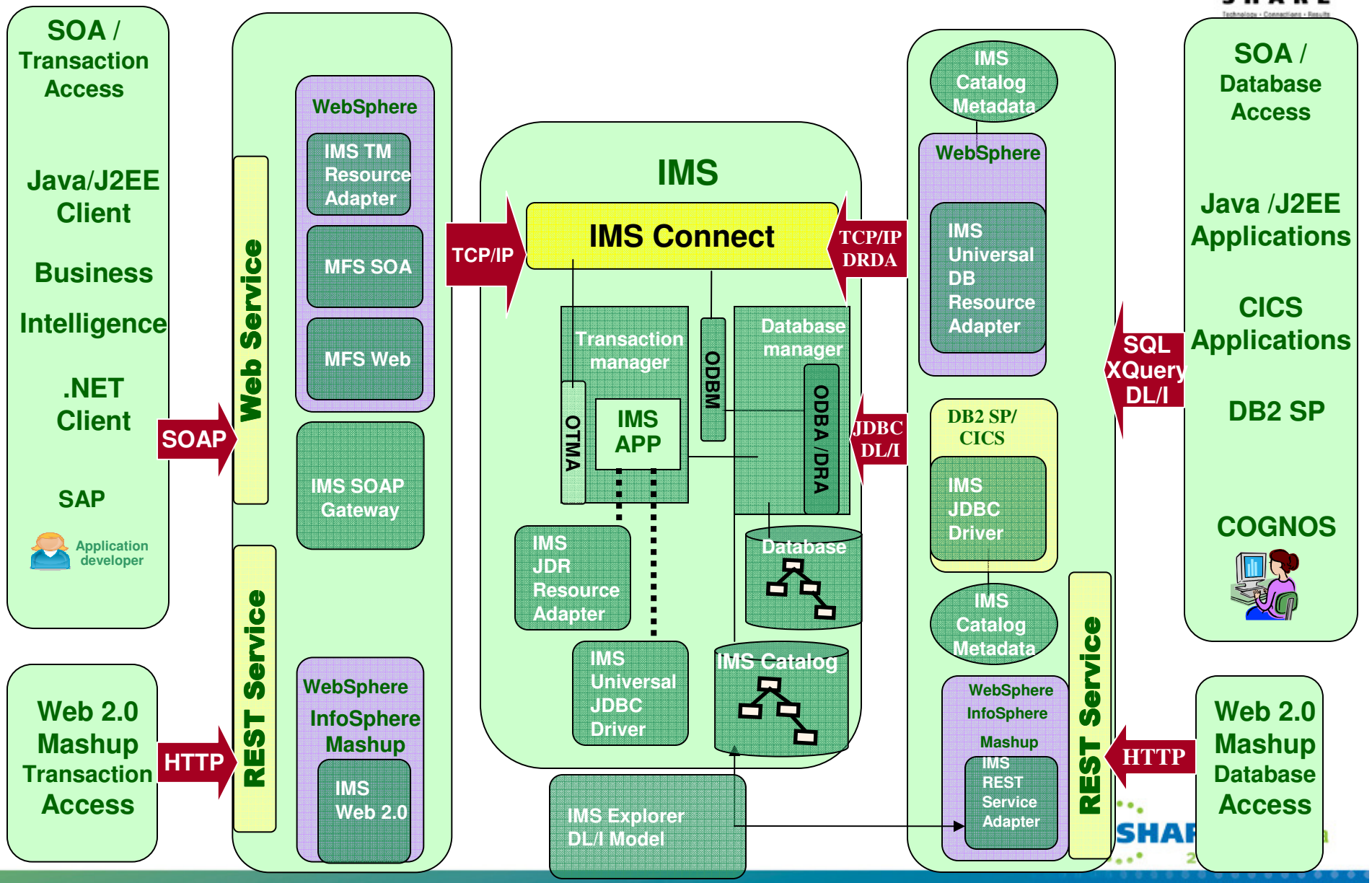
IMS – The Cloud

- 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 …

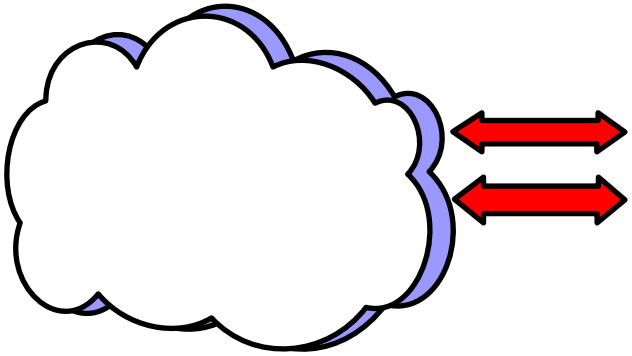
- In other words,
  - The Quality of Service, dynamic nature, transparency… that are the goals of evolving cloud technology
    - Are already inherent in the IMS environment

IMS Cloud

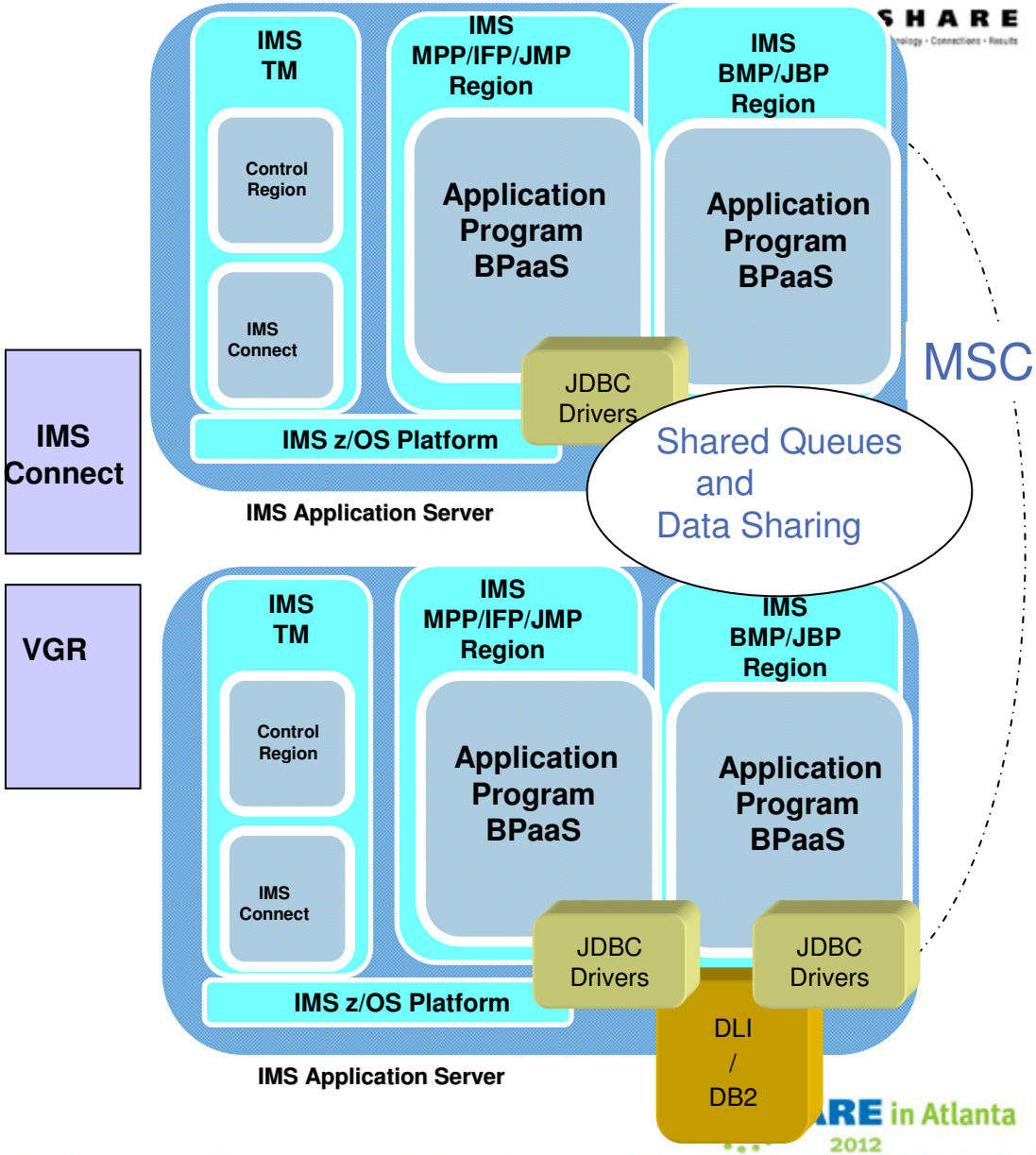

SOA / Transaction Access
Java/J2EE Client
Business Intelligence
.NET Client
SAP
Application developer
Web 2.0 Mashup Transaction Access
SOAP
HTTP
Web Service
REST Service
WebSphere
IMS TM Resource Adapter
MFS SOA
MFS Web
IMS SOAP Gateway
WebSphere InfoSphere Mashup
IMS Web 2.0
TCP/IP
IMS
IMS Connect
Transaction manager
OTMA
IMS APP
ODBM
Database manager
ODBA /DRA
IMS JDR Resource Adapter
IMS Universal JDBC Driver
Database
IMS Catalog
IMS Explorer DL/I Model
TCP/IP DRDA
JDBC DL/I
IMS Catalog Metadata
WebSphere
IMS Universal DB Resource Adapter
DB2 SP/ CICS
IMS JDBC Driver
IMS Catalog Metadata
WebSphere InfoSphere Mashup
IMS REST Service Adapter
SQL XQuery DL/I
REST Service
HTTP
SOA / Database Access
Java /J2EE Applications
CICS Applications
DB2 SP
COGNOS
Web 2.0 Mashup Database Access

IMS TM – IaaS and PaaS

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

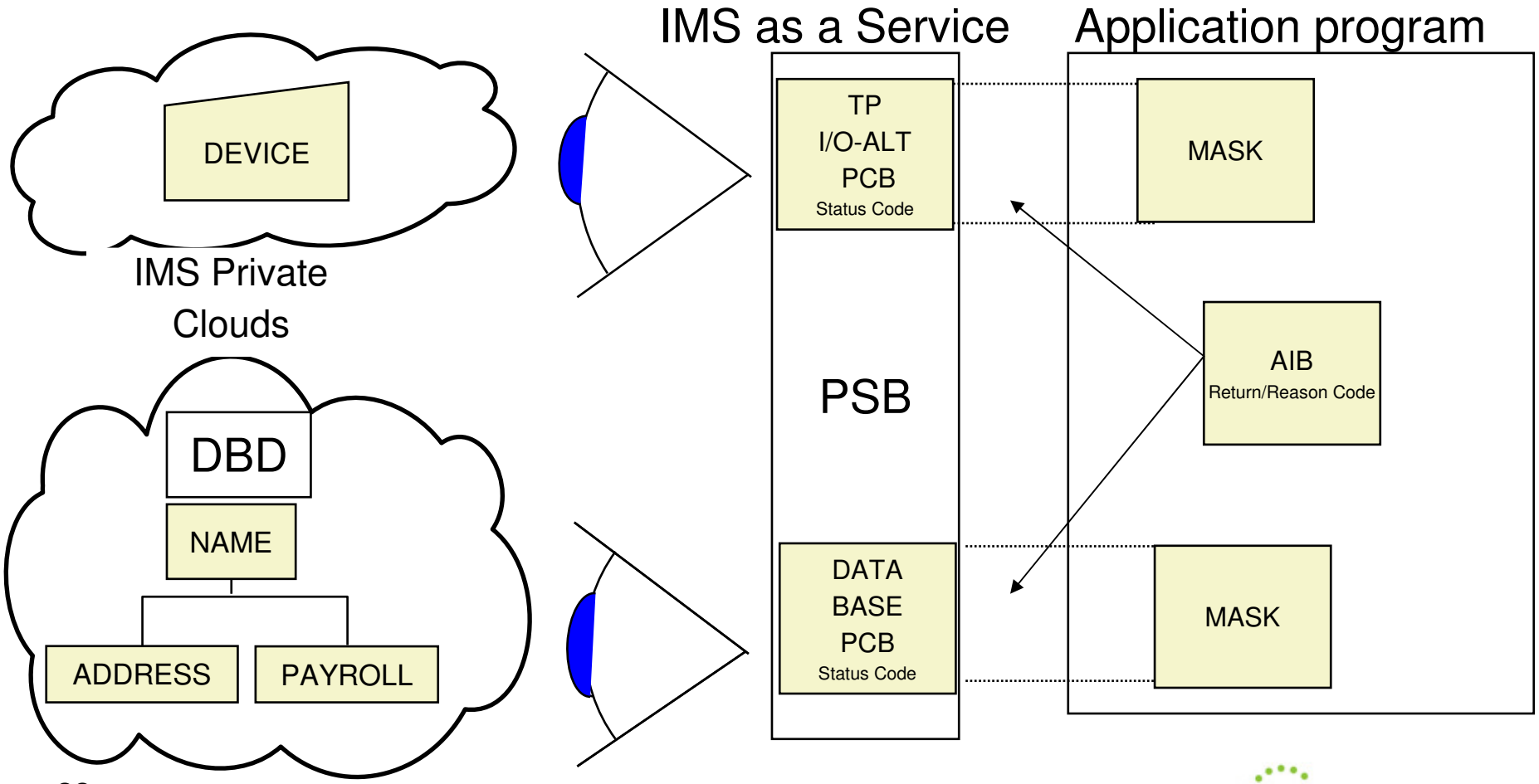


- Does not require application program recompiles even if the IMS release is changed
- Does not require application program changes even when the network or db structure changes

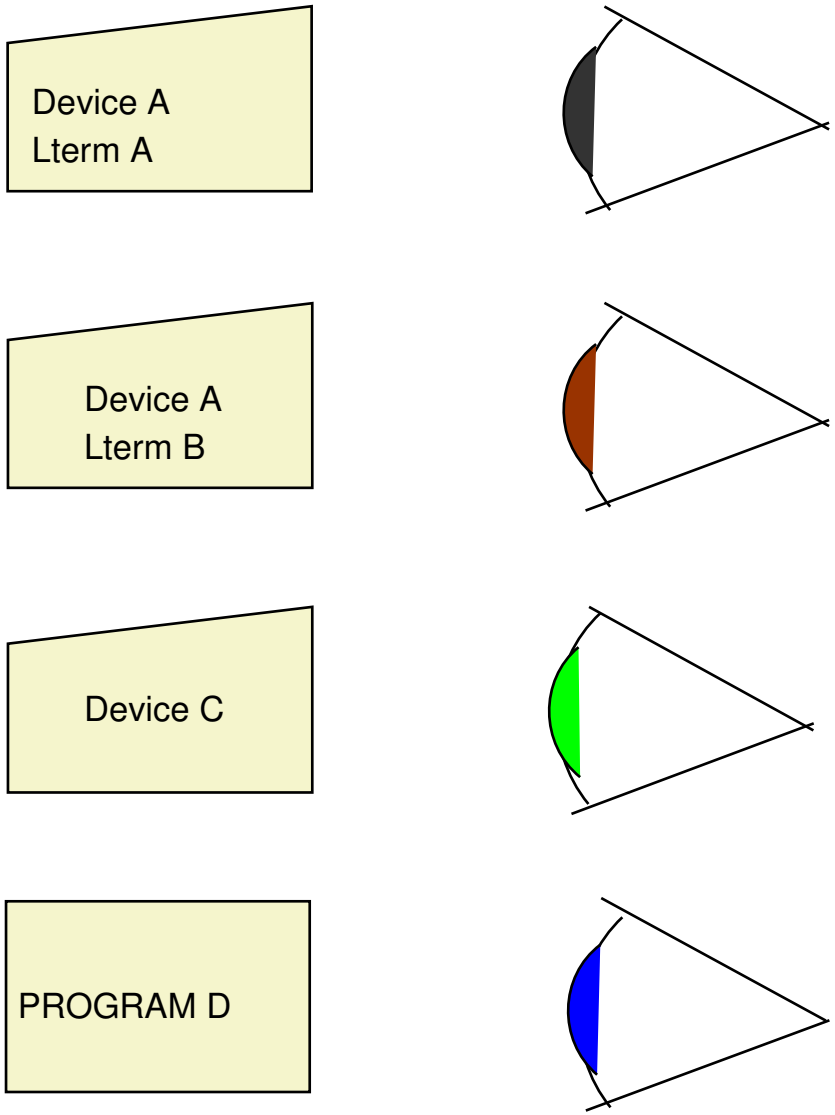


IMS Cloud Layer

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

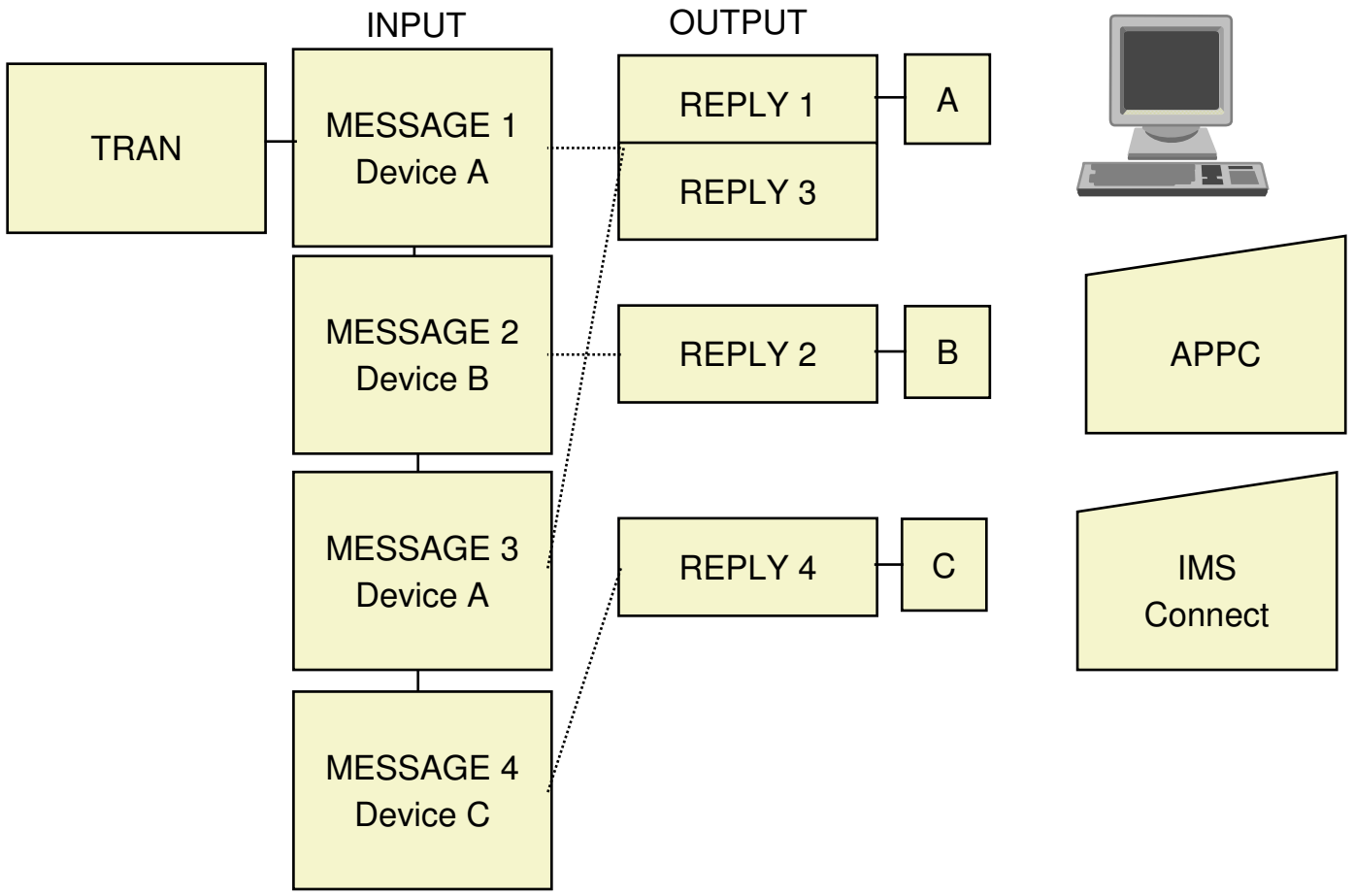


IMS as a Service
– PCB structure



IMS as a Service

- Message Queuing



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

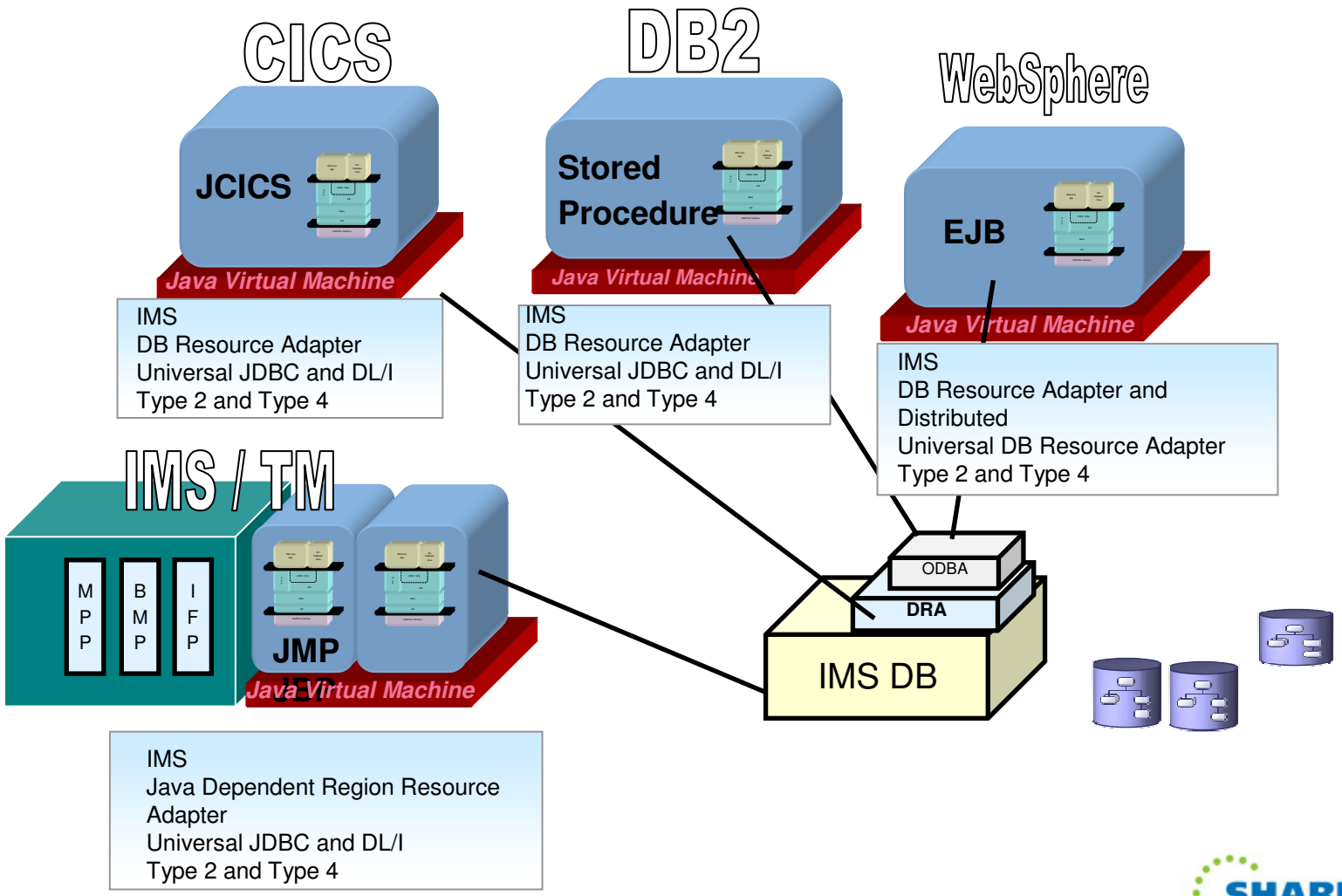
Using an AIB :

CALL AIBTDLI (<count>,FUNC,AIB,I/O AREA,...)

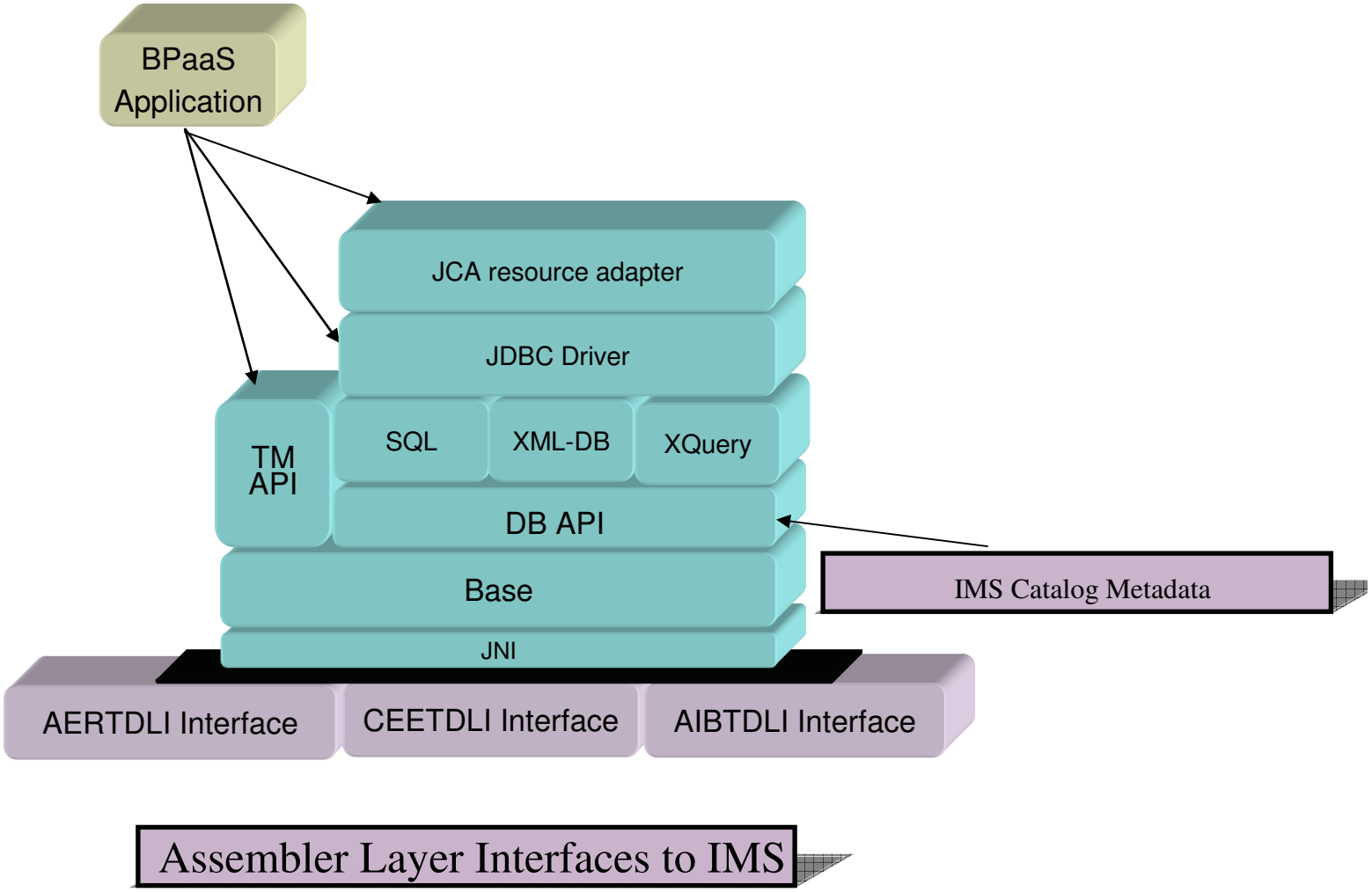
AERTDLI

CEETDLI

IMS Java Development
(Saas and DBaaS)

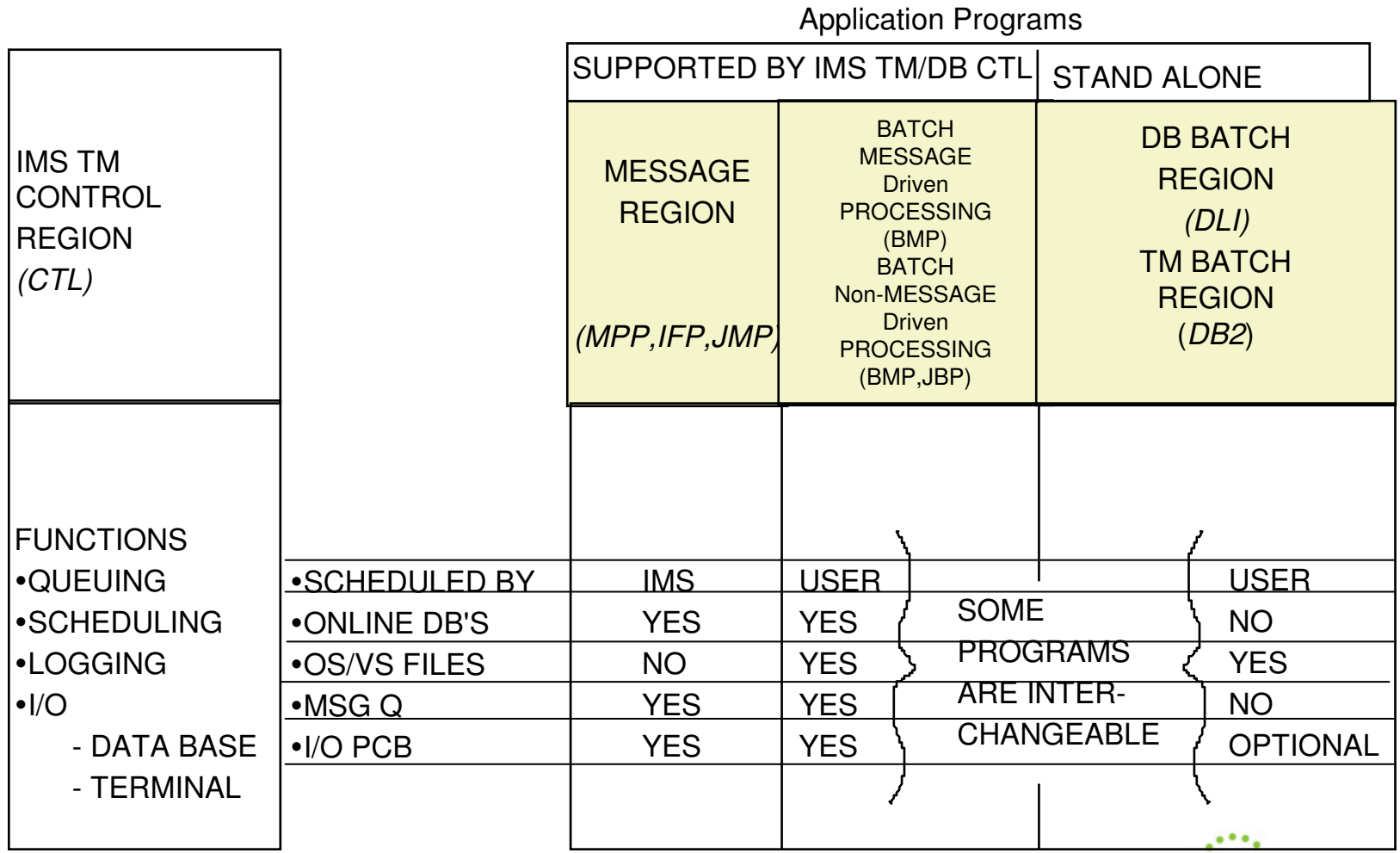


IMS Java SaaS for BPaaS Applications

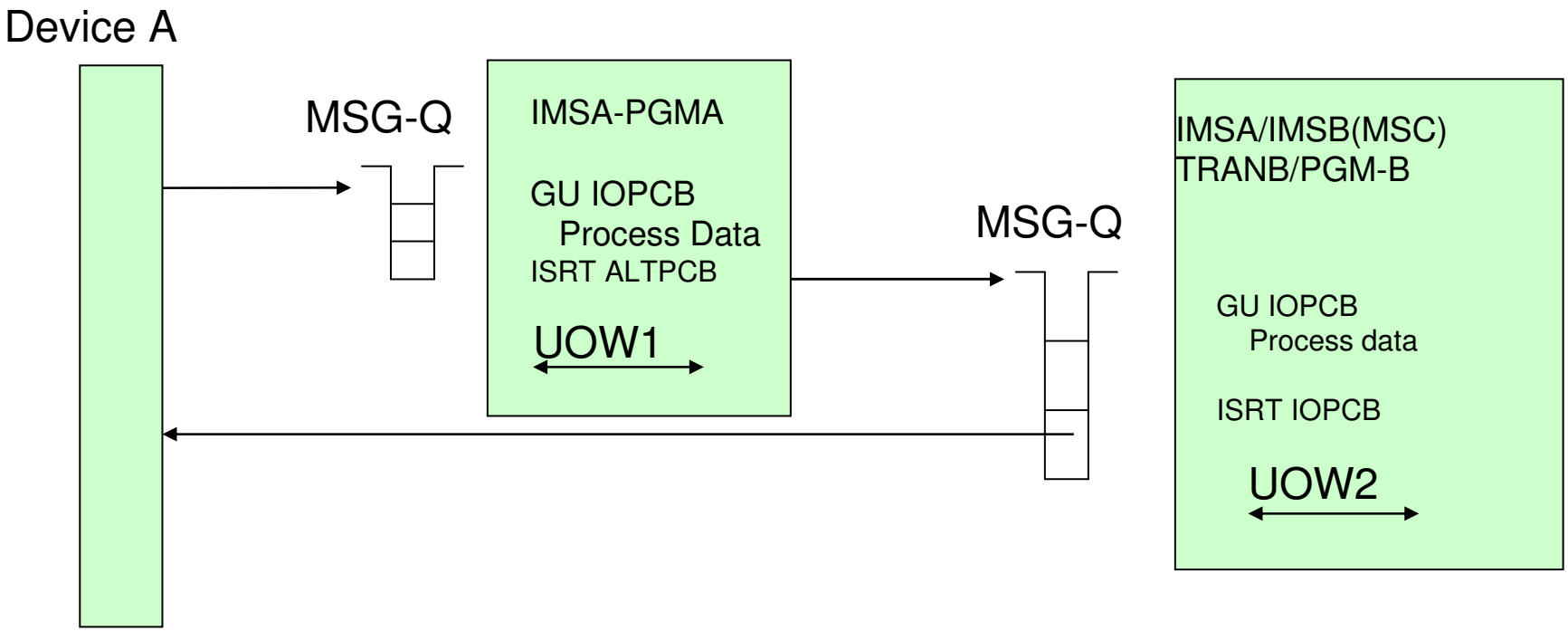


IMS as a Service

- **Supports multiple runtime Environments**



IMS Managed Service Flow Program-to-Program Switch



Summary

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

- IMS plays an integral role in delivering business solutions