



IBM IMS

# IMS 11 Open Database Modernizing IMS Database Access

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## IMS SOA Strategy

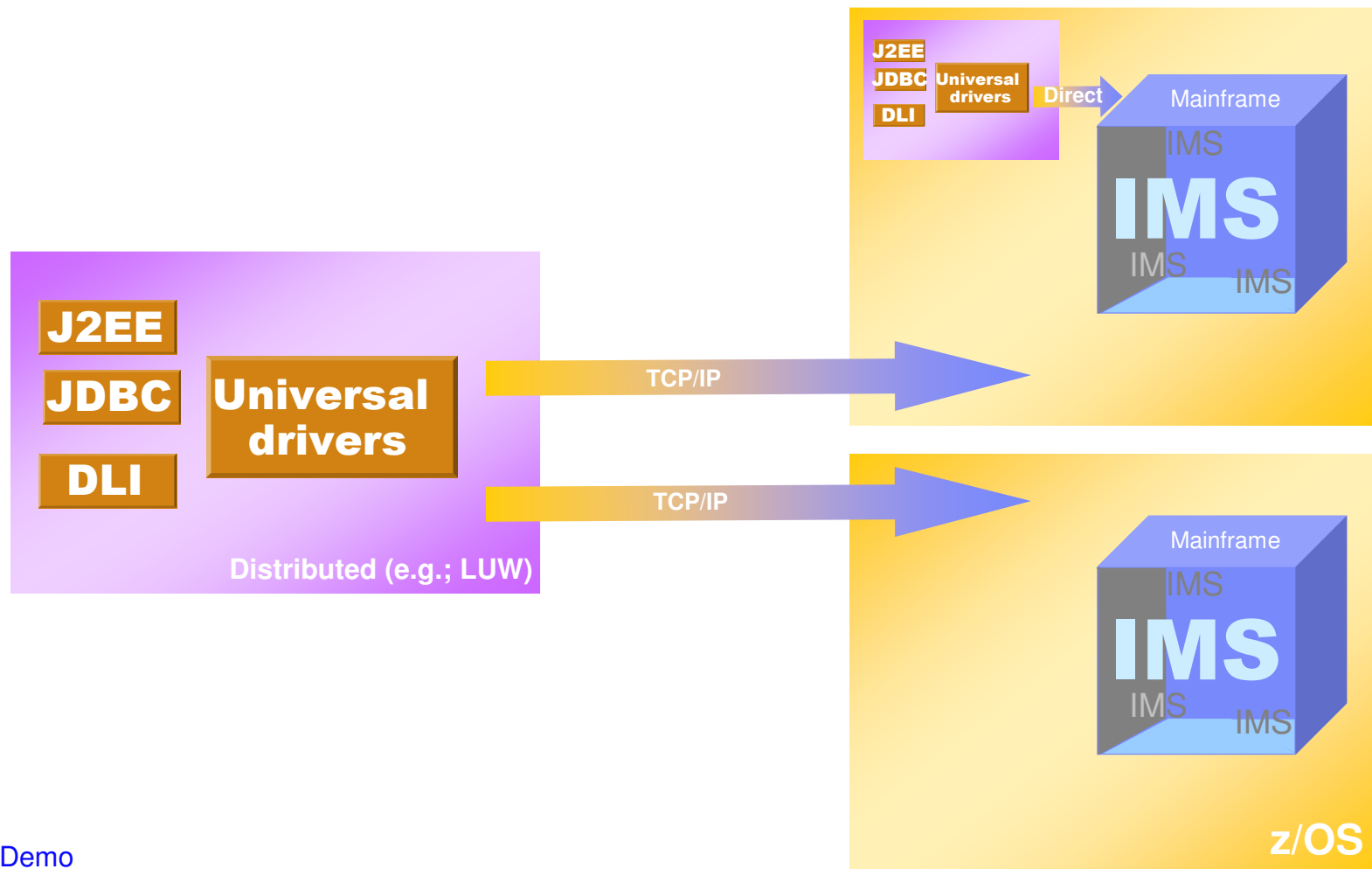


- ✦ **Protect customer investments by making it easy, flexible and cost efficient to reuse and modernize IMS applications and data**
- ✦ **Fully integrate with WebSphere/Rational servers and tooling in a service-oriented architecture (SOA) environment**
- ✦ **Encourage new application development by supporting standards – e.g. XML, SOAP, Java, JDBC, etc.**
- ✦ **Partner with ISVs to facilitate IMS-SOA exploitation**

# IMS Open Database

- Solution Statement
  - Open new avenues to IMS
    - Offer scalable, distributed, and high-speed local access to IMS database resources
- Value
  - Business growth
    - Allow more flexibility in accessing IMS data to meet growth challenges
  - Market positioning
    - Allow IMS databases to be processed as a standards-based data server
- Key differentiators
  - Standards-based approach (Java Connector Architecture, JDBC, SQL, DRDA)
  - Solution packaged with IMS
- Enables new application design frameworks and patterns
  - JCA 1.5 (Java EE)
  - JDBC

# IMS Open Database



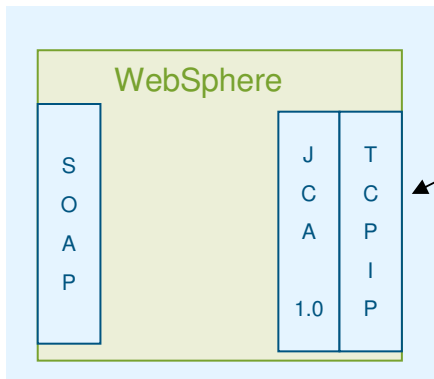
[Demo](#)

# Open Database Environment

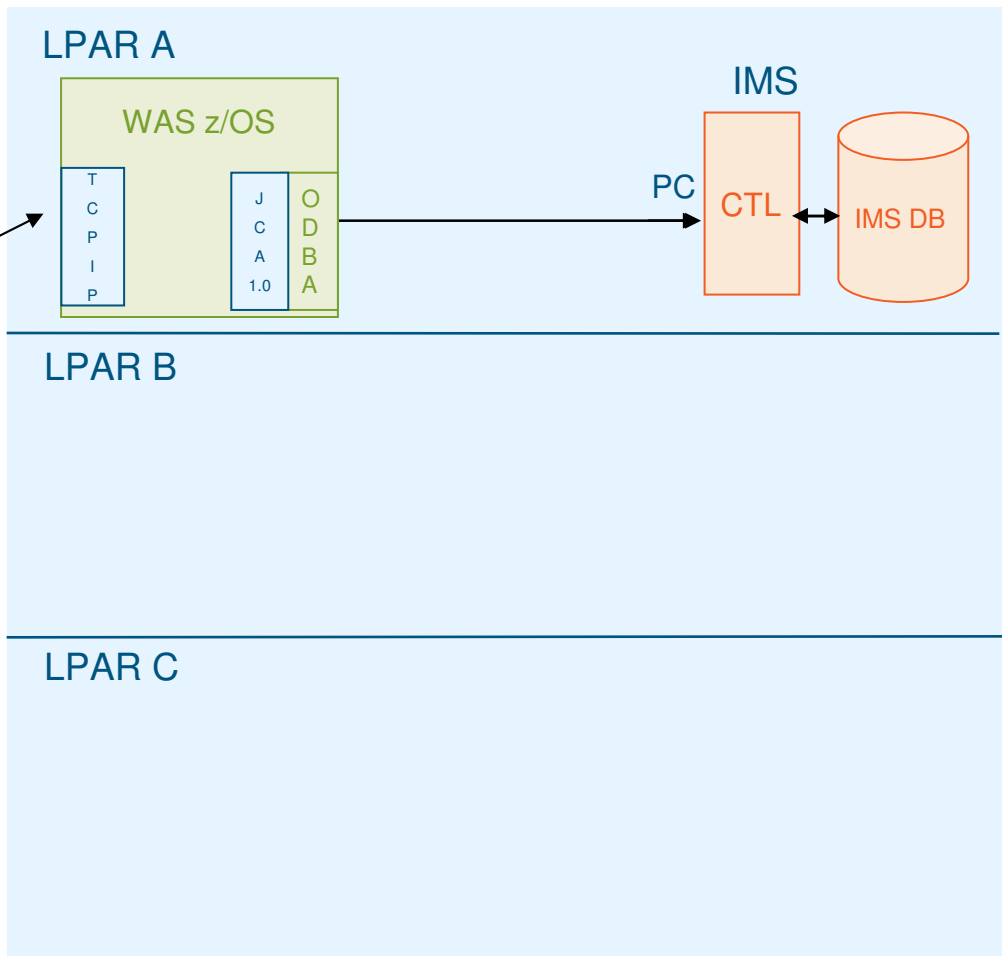
Innovative	Improved Usability	Open Standards
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## Current Solution

Distributed

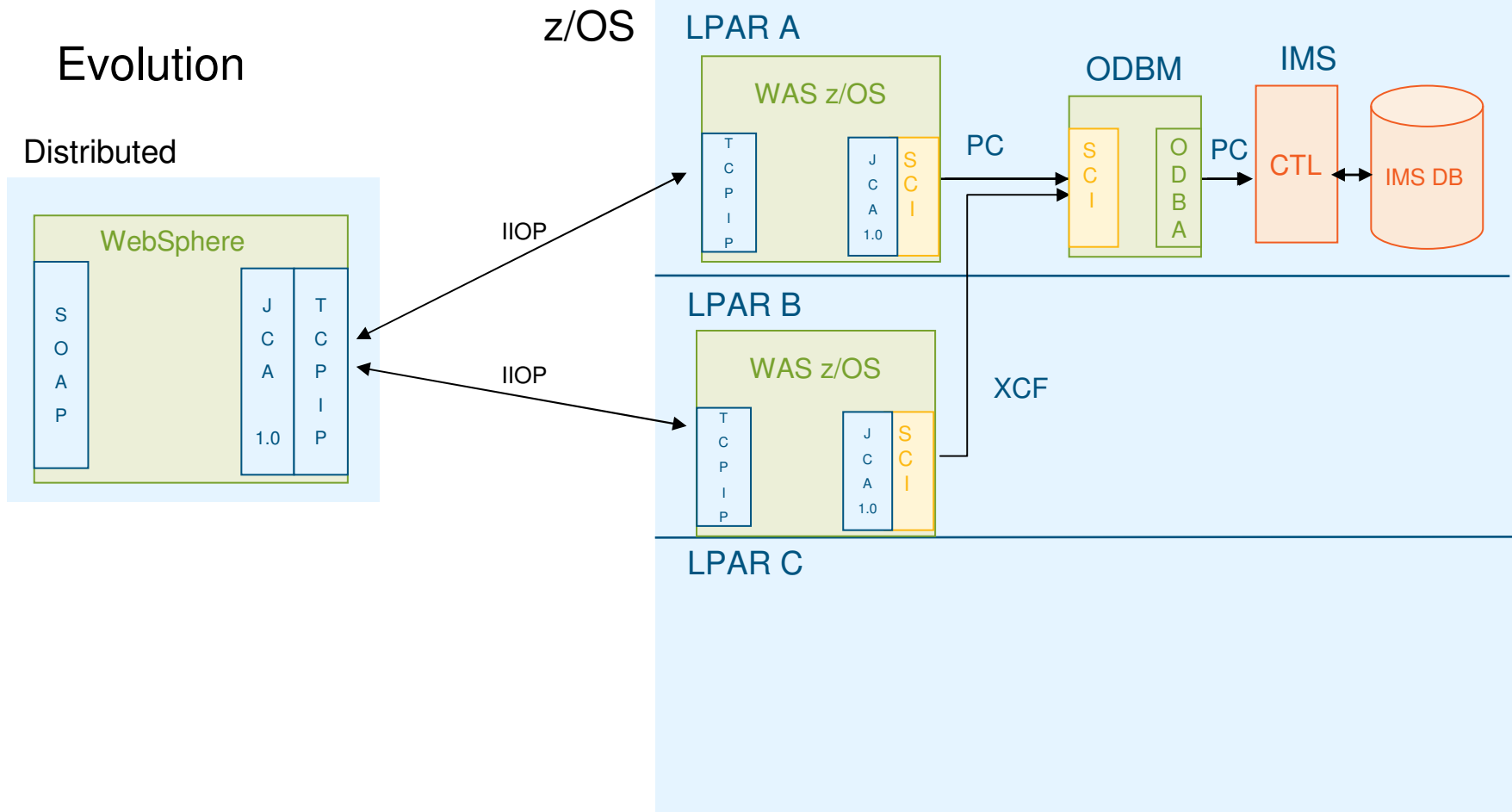


z/OS



# Open Database Environment

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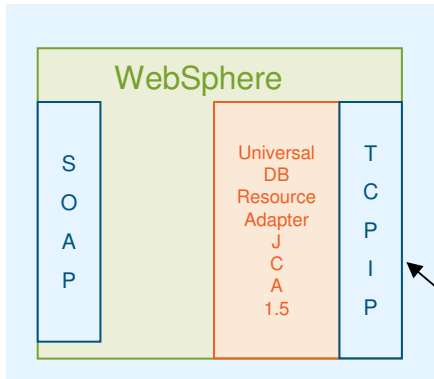


# Open Database Environment

Innovative      Improved Usability      Open Standards

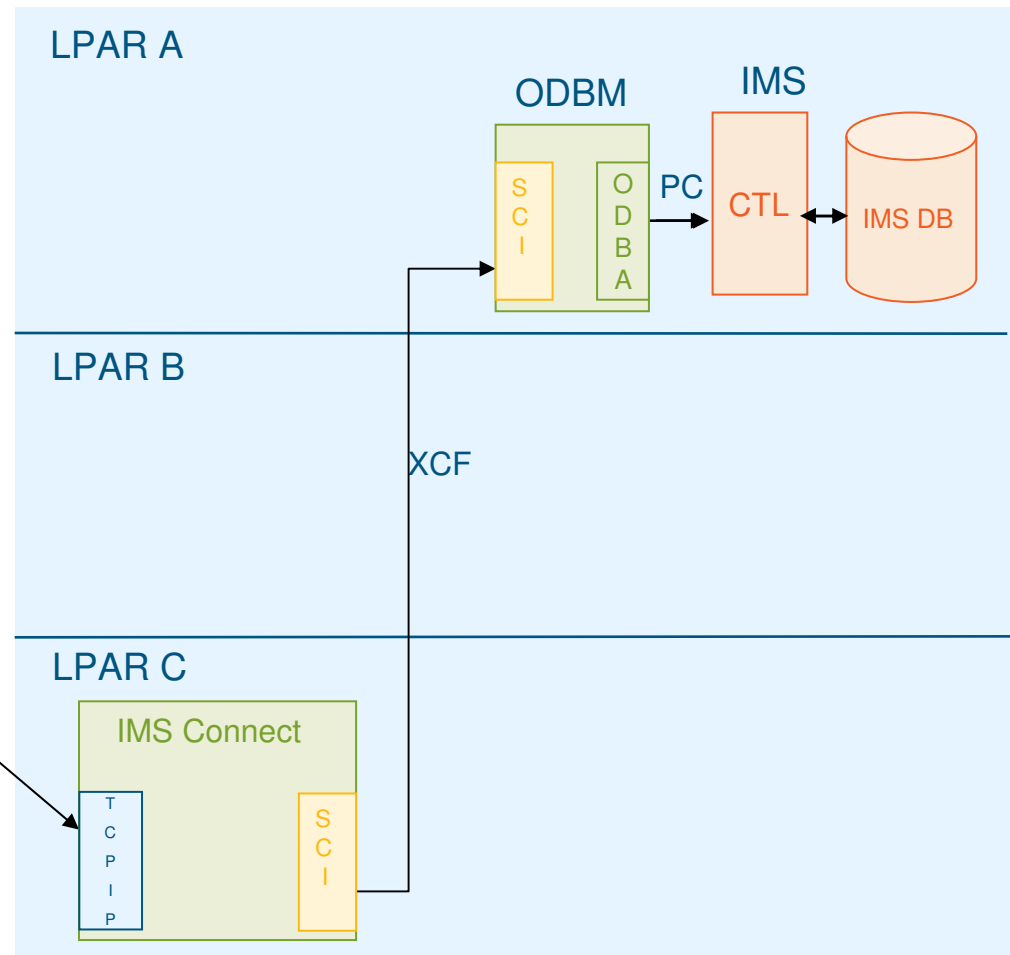
## Evolution

Distributed



TCP/IP

z/OS

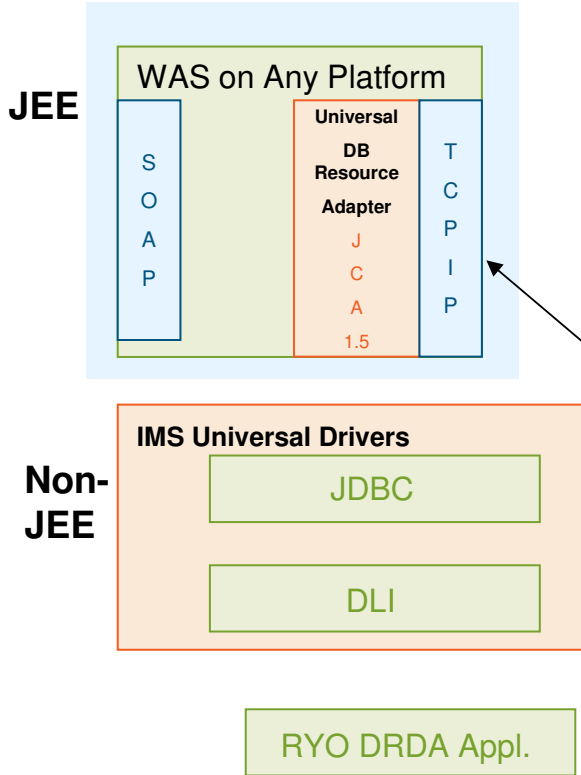


# Open Database Environment

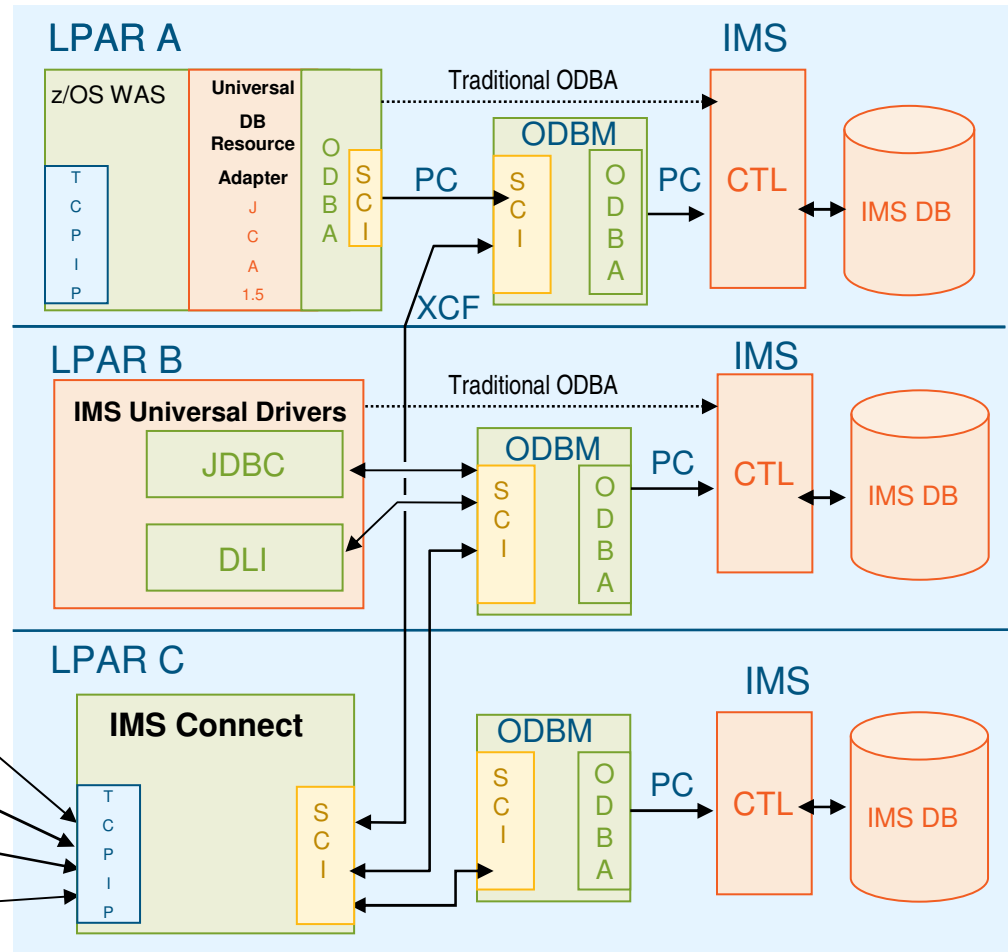
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## IMS 11 Solutions

### Distributed



z/OS





## Solution highlights – Universal drivers

- Three Universal drivers
  - Universal DB resource adapter
    - JCA 1.5
      - XA transaction support, Local transaction support
      - Connection pooling
      - Connection sharing
      - Multiple programming models available
        - > JDBC
        - > CCI with SQL interactions
        - > CCI with DLI interactions
  - Universal JDBC driver
  - Universal DLI driver
  
- Distributed access
  - All Universal drivers support type 4 connectivity to IMS databases from TCP/IP enabled platforms and runtimes
    - Windows
    - zLinux
    - z/OS
    - WebSphere Application Server
    - Standalone Java SE
  - Resource Recovery Services (RRS) is NOT required if applications do not require distributed two phase commit

## Solution highlights – local connectivity

- Local connectivity
  - Universal drivers will support type 2 connectivity to IMS databases from z/OS runtimes
    - WebSphere Application Server for z/OS
    - IMS Java dependent regions
    - CICS
    - DB2 z/OS stored procedures
  - All environments zAAP eligible

## Solution highlights - JDBC

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Usability

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Standards

- The two Universal drivers for JDBC - **IMS Universal DB Resource Adapter** and **IMS Universal JDBC Driver** - offer a greatly enhanced **JDBC implementation**
  - JDBC 3.0
  - Local commit/rollback support
  - Standard SQL implementation for the SQL subset supported
    - Keys of parent segments are included in table as foreign keys
      - Allows Standard SQL implementation
  - Updatable result sets
  - Metadata discovery API implementation
    - Uses metadata generated by DLIModel Utility as “catalog data”
    - Enables JDBC tooling to work with IMS DBs just as they do with DB2 DBs



## Java DL/I Access

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Usability

Open  
Standards

- The **IMS Universal DL/I Driver** provides a **DL/I Call interface** for Java applications in a Java SE environment
  - Completely re-architected and rewritten
  - Rich in function
  - Usable in distributed or z/OS environments
- The **IMS Universal DB Resource Adapter** not only supports JDBC, but also fully supports the **JCA 1.5 CCI interaction** specification
  - SQLInteractionSpec class provides SQL call interaction
  - DLInteractionSpec class provides simple DL/I call interaction
    - RETRIEVE, CREATE, UPDATE, DELETE functions

# IMS Open Database

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Open Standards

- Comparison of programming approaches for accessing IMS:

Approach	Scenario
Use the JCA 1.5-compliant IMS distributed DB resource adapter	Accessing IMS data through TCP/IP from a J2EE application that resides on a distributed non-z/OS platform or a z/OS platform that is on a different LPAR from the IMS subsystem.
Use the type-4 JDBC driver or the DL/I for Java API	Accessing IMS data through TCP/IP from a Java application (non-J2EE) that resides on a distributed non-z/OS platform or a z/OS platform that is on a different LPAR from the IMS subsystem.
Use the type-2 JDBC driver or the DL/I for Java API	Accessing IMS data from a local z/OS runtime such as IMS Java Dependent regions, WebSphere Application Server for z/OS, DB2 z/OS Java stored procedures, or CICS Java transactions. All runtimes are on the same LPAR as the IMS subsystem.

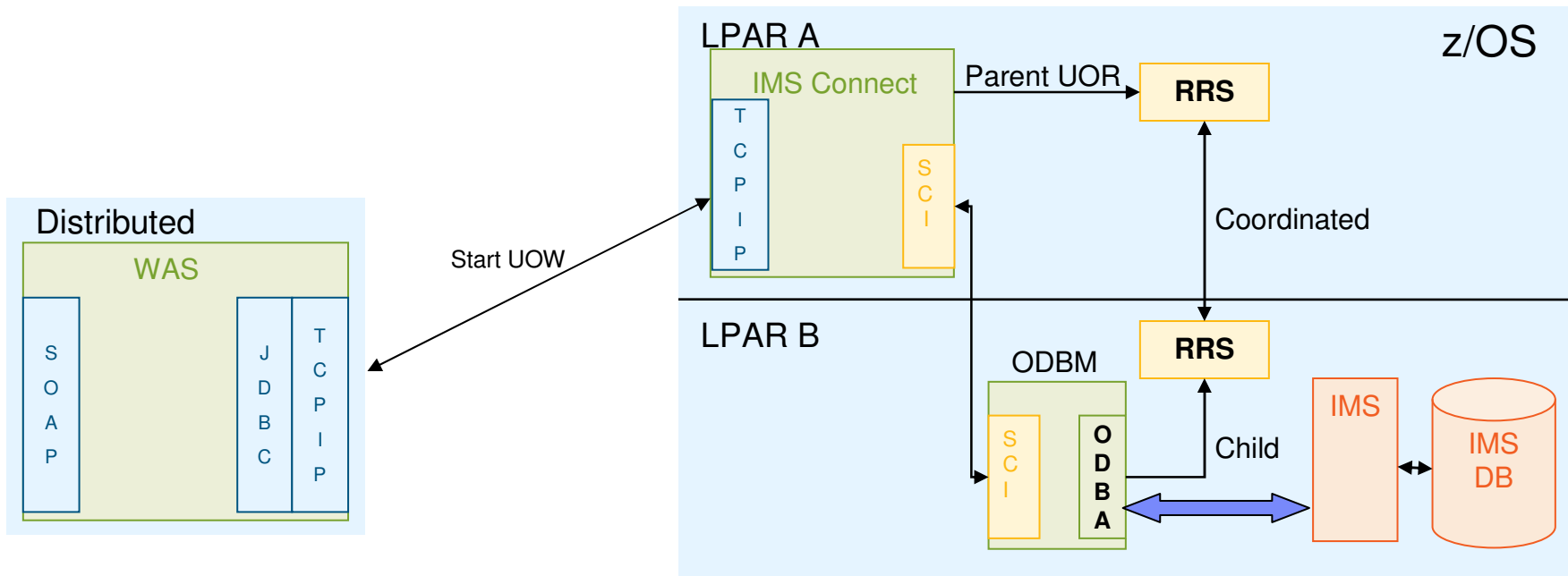
## Solution highlights - virtual foreign keys

- Foreign keys
  - Referential constraint between two tables
    - Used to link information together and have linkage managed by the DBMS
  - Identifies a column (or set of columns) in one referencing table that refers to a column (or set of columns) in another referenced table
  - Columns in referencing table must be the primary key in the referenced table
  - Row in the referencing table cannot contain values that don't exist in the referenced table
  - Cannot insert a row in a referencing table unless the column identified as the foreign key exists in the referenced table
    - Establishes a hierarchy in a relational database
  
- Think IMS...cannot insert a dependent segment unless the parent segment exists
  - Virtually represent foreign keys in each segment which are comprised of keys of each parent segment
    - Fully integrate this into the metadata exposed via JDBC for tooling to consume
    - These fields actually do exist - in the key feedback area

# Solution highlights - XA

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- Distributed Syncpoint (global transaction) requires RRS on z/OS
- Use of RRS with ODBM is optional
  - RRS=Y|N parm for ODBM start-up
    - If RRS=Y (also the default), ODBM will use the ODBA interface (i.e. AERTDLI)
    - If RRS=N, ODBM will use the DRA interface like CICS
      - Global transactions are not supported if RRS=N

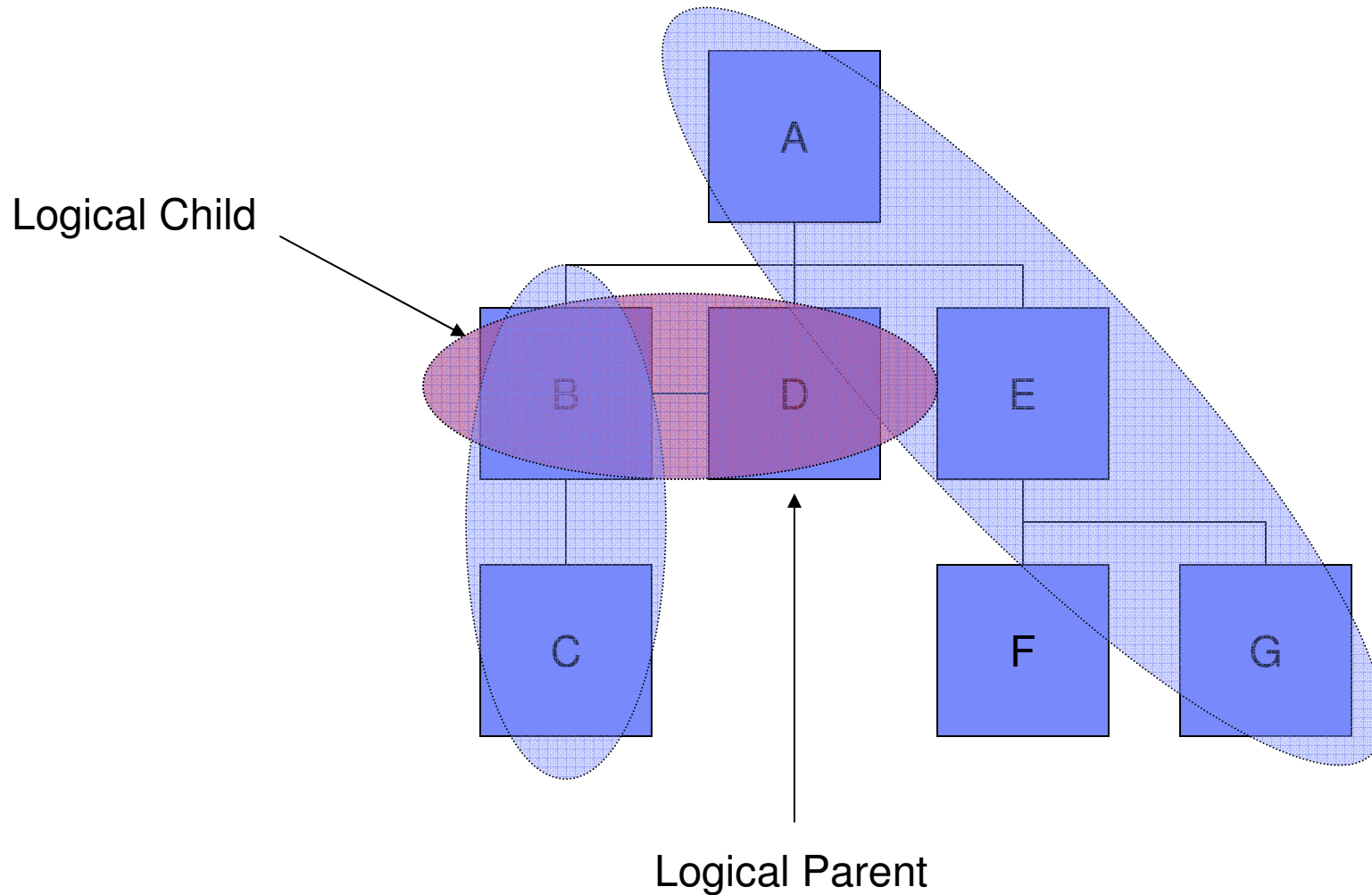


## Solution highlights – SQL query governance

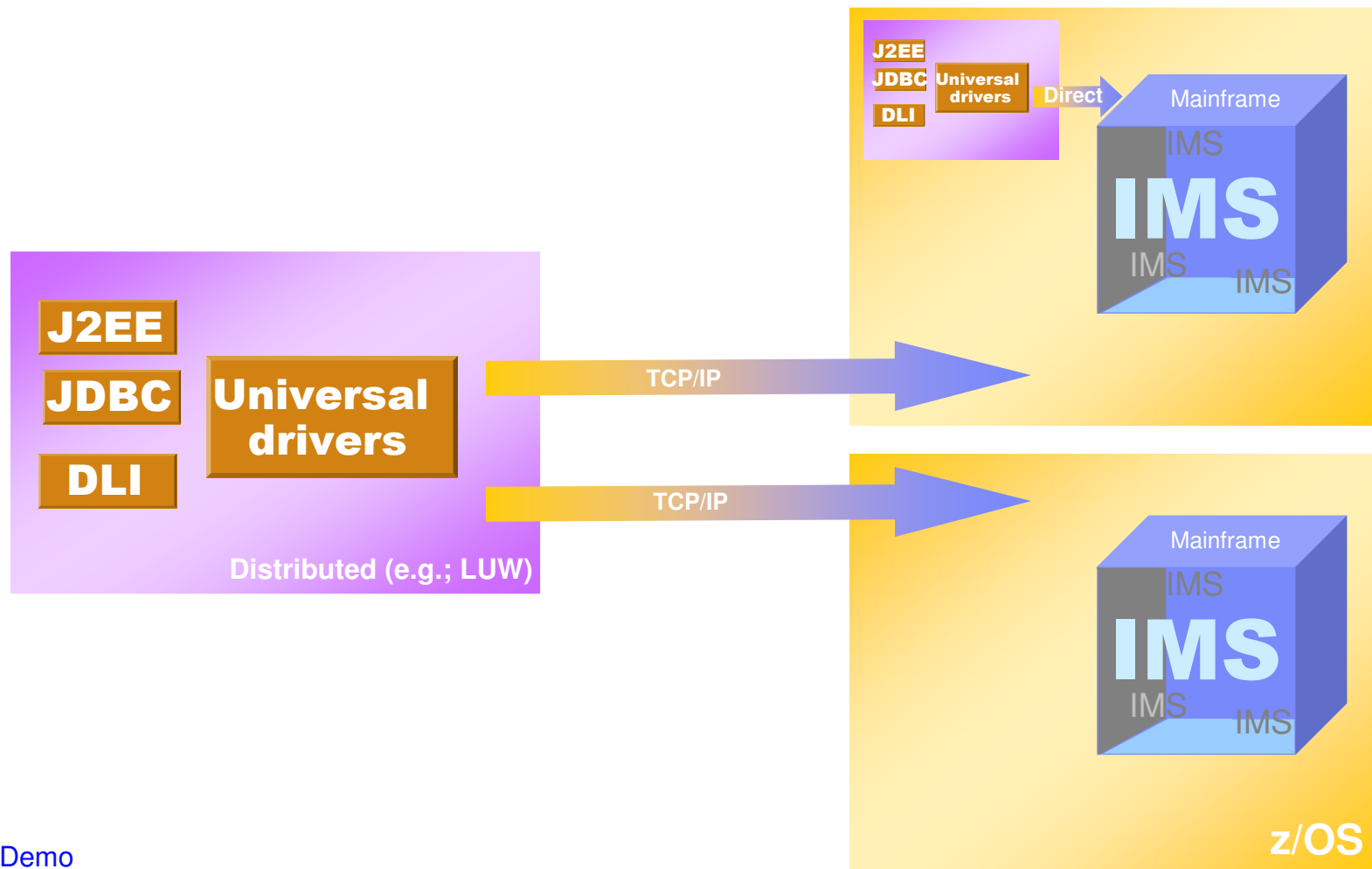
- Value
  - Offer a rules engine such that queries are as efficiently processed by IMS as possible
    - Offer customizable rules
  
- Existing query governance
  - Cannot execute SQL queries that filter (search) results based on fields not defined in a DBD
  - Cannot execute SQL queries that join IMS segments that are not in the same hierarchic path
  
- Additional SQL query governance candidates
  - Force key field usage at root levels
    - Customizable
  - Periodic commit processing (internal) during long running update processing
    - Customizable
  - Query explain
    - Given a query, indicate DLI call processing that will take place



# Query governance – join operations



# IMS Open Database



[Demo](#)

## Solution highlights – IMS Connect and ODBM

- IMS Connect
  - TCP/IP endpoint for type 4 connectivity
  - Authentication engine for type 4 connectivity
  - Focal point for two phase commit for type 4 connectivity
  - Proxies one phase commit requests to ODBM
  
- Open Database Manager (ODBM)
  - Processes type 4 database requests
  - Processes type 4 one phase commit requests
  - Authorization engine (via ODBA) for database access
  - Processes type 2 database requests when using ODBM compatibility for ODBA
    - Compatibility mode will allow ODBA to proxy requests to an ODBM address space on the same LPAR

## IMS Open Database – IMS Connect

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Standards

- IMS Connect has the following enhancements in support of IMS Open Database:
  - IMS Connect Configuration member HWSCFGxx
    - New ODACCESS statement
      - DRDA ports, timeout value, IMSplex name etc.
  - Changes to existing commands
    - VIEWHWS, VIEWDS, VIEWPORT
  - New Commands
    - STARTOD, STOPOD, STARTIA, STOPIA, VIEWIA, SETOAUTO
  - New User Exits
    - HWSROUT0 – Routing Exit for ODBM
      - can override the IMS alias and/or select the ODBM target
    - HWSAUTH0 – Security Exit for ODBM
      - can perform the authentication of the userid

## IMS Open Database – IMS Connect

Innovative

Improved  
Usability

Open  
Standards

- **IMS Connect Workload Distribution**
  - Clients can specify an IMS datastore (“alias”) to connect to (e.g.; part of JDBC connection URL)
    - Alias represents the IMS datastore that the client wants to send all requests to
      - Multiple Alias names for an IMS datastore can be defined in the ODBM configuration member
  - If the client sends a message with a blank alias, IMS Connect will route the message to an ODBM using a round robin algorithm
  - If an alias points to multiple ODBMs, IMS Connect will route the message to one of those ODBMs using a round robin algorithm

## IMS Open Database - ODBM

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Usability

Open  
Standards

- Open Database Manager (ODBM) is a new Common Service Layer component
  - Receives database connection requests from IMS Connect
  - Translates incoming database requests from the DDM protocol into DLI calls expected by IMS
  - Translates responses to the client into the DDM protocol
  - Manages connections to ODBA
- ODBM Configuration
  - PROCLIB members
    - ODBM BPE Configuration, ODBM BPE exit list, ODBM Initialization member – CSLDIxxx, ODBM Configuration member – CSLDCxxx
  - CSLODBM procedure
  - ODBM execution parameters
- New type-2 commands
  - QUERY ODBM TYPE(option), UPDATE ODBM START|STOP(TRACE), UPDATE ODBM START|STOP(CONNECTION), UPDATE ODBM TYPE(CONFIG)
- Four new ODBM Exit Routines

IMS Connect and  
ODBM together act as  
the DRDA target  
server

## Leveraging Open Database

## Disclaimer

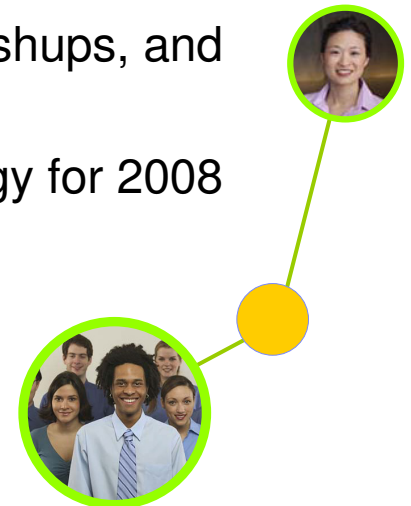
- "The information on the new product is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information on the new product is for informational purposes only and may not be incorporated into any contract. The information on the new product is not a commitment, promise, or legal obligation to deliver any material, code or functionality. The development, release, and timing of any features or functionality described for our products remains at our sole discretion"



# What is Web 2.0?

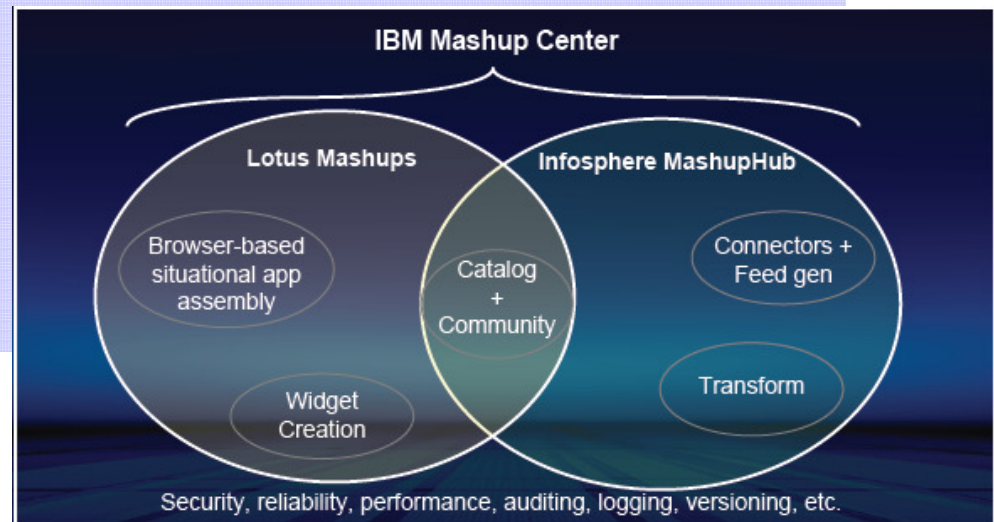
## Achieve Growth, Efficiency, and Collaboration with Web 2.0

- Enabling employees to be **more productive, more knowledgeable, faster**
- Situational applications
  - Leveraging enterprise data without necessarily having the full technical knowledge
- The web becomes a platform for delivery
- From a technology perspective, Web 2.0 uses AJAX, mashups, and feeds predominantly
- Mashups rated by Gartner as Top 10 Strategic Technology for 2008
  - Projected dominant model in 2010
  - <http://www.gartner.com/it/page.jsp?id=530109>
- Collaboration: Social networking (Facebook, LinkedIn)
- Simplification: Mashups, RIAs, Web services



## IBM Mashup Center *Lotus Mashups + InfoSphere MashupHub*

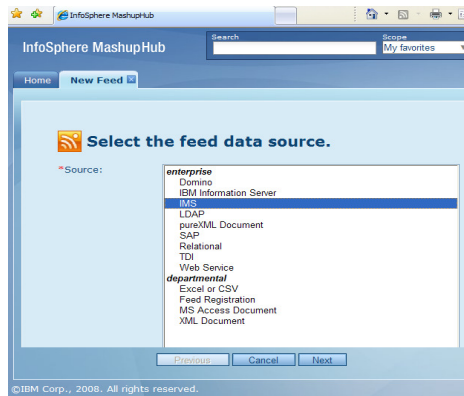
- **Unleash business users** from the limitations of fixed application landscapes
- **Unlock information buried in information silos:** enterprise, departmental, Web, and personal data
- **Utilize visual tools** for transforming and re-mixing Web 2.0-style feeds
- **Quickly uncover new business insights**  
*by easily assembling information from multiple sources in a browser – when it is needed*
- **Fuel Innovation** while applying the appropriate levels of IT control



<http://www.ibm.com/software/info/mashup-center/>

# IBM InfoSphere MashupHub

*A visual tool for creating, storing, transforming, and remixing feeds to be utilized in mashup, and a central catalog for users to tag, rate, and share mashable assets.*



## Transform and Mix:

- Importing Feeds
- Filtering Feeds
- Annotate Feeds
- Merge Feed
- Publish Feeds

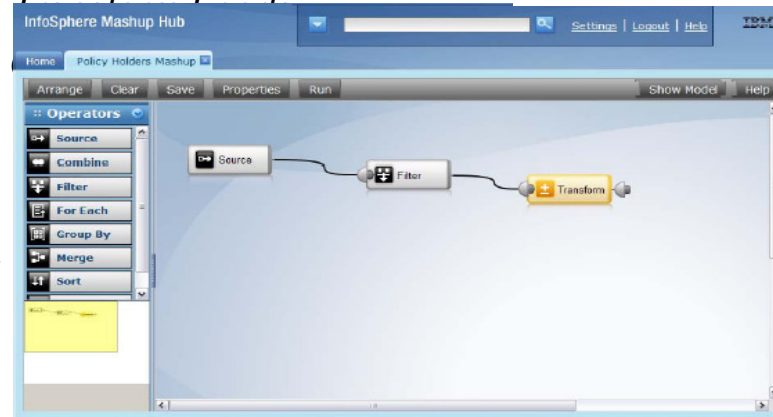
## Catalog

Sharing & discovery of mashable assets.



## Create Feed from:

- Domino
- IBM Information Server
- IMS Transaction
- LDAP
- pureXML Document
- SAP
- Relational
- TDI
- Web Service
- Excel or CSV
- Feed Registration
- MS Access Document
- XML Document



## IBM Lotus Mashups

Quickly Assemble and Share New Mashups

***Browser-based tool supports quickly and easily on-the-glass assembly of situational applications by non-technical users.***

- Easily Mix and Mash content without coding!
- Rapidly creation to address an immediate need of an individual or community
- Just-in-time solution
- Intuitive, on-the-glass wiring of widgets & feeds
- Increase agility by fostering reuse and rapid remix of content into new, compelling Web applications
- Support innovation and new business opportunities



- Share –public or by user/group.
- Automatic wiring
- Embed
- Save new assemblies as widgets
- Edit Source

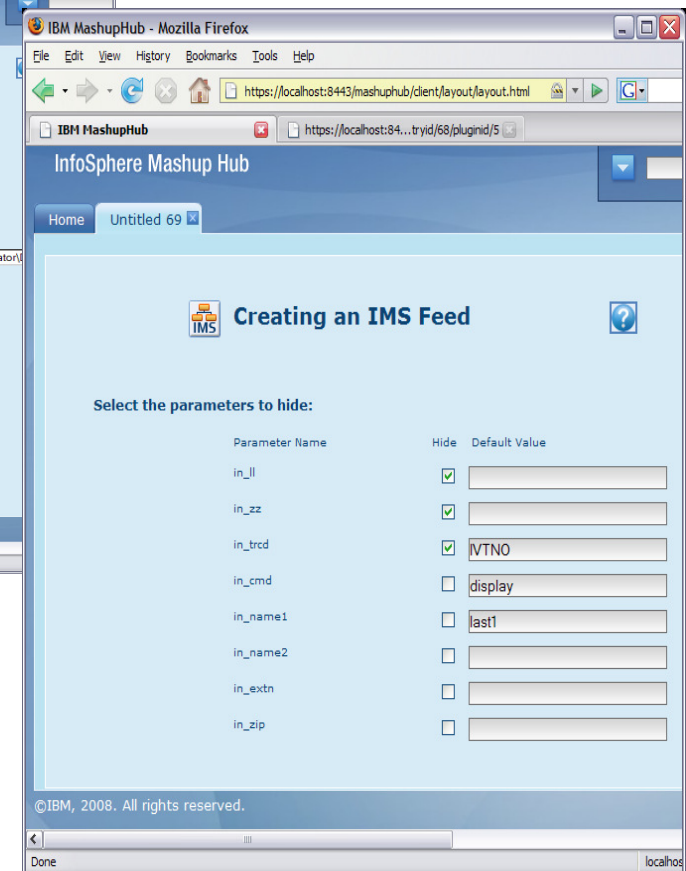
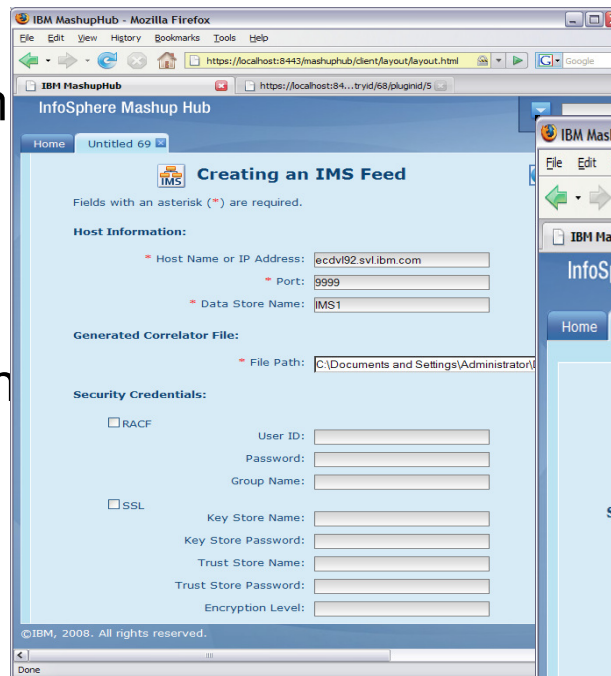
Reference: [ftp://ftp.software.ibm.com/software/lotus/lotusweb/portal/why\\_mashups\\_matter.pdf](ftp://ftp.software.ibm.com/software/lotus/lotusweb/portal/why_mashups_matter.pdf)

## IMS Web 2.0 support

- Solution Statement
  - Offer capability to expose IMS transaction assets as RESTful services for use in Web 2.0 mashups and Rich Internet Applications
- Value
  - Business growth
    - Allow more flexibility in accessing IMS to meet growth challenges
  - Standards-based approach
    - Transaction feed creation leverages XML
- Key differentiators
  - Transaction feed creation panels customized specifically for IMS

## Web 2.0 support for IMS Transactions (Mashup Center)

- IMS Transaction Editor
  - 1. Specify Connection Properties
    - Optional Security Settings
  - 2. Specify Transaction Parameter Properties
    - Default Values



## IBM Mashup Center

- IBM Mashup Center currently
  - Supports feed generation from several databases that offer JDBC implementations
    - DB2, IDS, Derby, Oracle, etc
  - Supports SQL query generation as part of feed creation
    - GUI panels to facilitate
- IMS V11
  - Universal drivers offer a rich JDBC implementation
- Statement of direction
  - Support creation of RESTful services and feed generation using IMS databases as the feed source
    - Leverage Universal drivers for JDBC connectivity to IMS

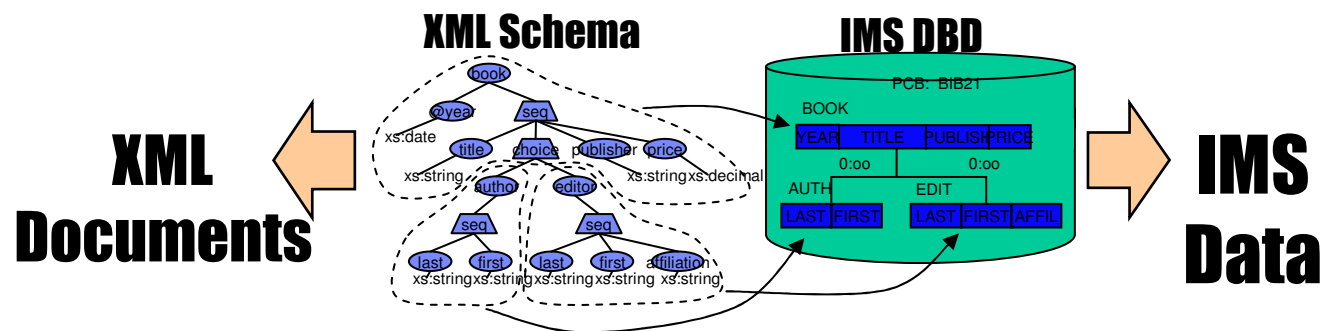
## Future Considerations

- Universal drivers
  - XML-DB/XQuery support
- IMS simplification agenda
- Explore integration opportunities with other IBM offerings



## IMS and XML data

- XML Database (IMS V9)
  - Introduces a way to view/map *native* IMS hierarchical data to XML documents
  - Aligns IMS Database (DBD) with XML Schema
  - Allows the retrieval and storage of IMS Records as XML documents with ***no change*** to existing IMS databases
  
- XQuery (IMS V10)
  - Further aligns IMS with industry direction
    - XML, SOA, Web Services, etc.
  - More natural fit for hierarchical data query
  - Enables customers to leverage emerging standard skill set
  - Enhanced product and tooling integration
  - Immediately usable with ***no change*** to existing IMS databases



# IMS Simplification Agenda

## Current landscape

- re-THINK IMS campaign is gaining traction
  - Growing trend in customer base to modernize IMS applications
    - Enabling existing IMS transactions to be shared across the enterprise
    - Injecting Java workload into existing frameworks using Java technology built by IMS
  - New IMS workload growing
    - Java is more than ever a viable solution for new IMS transactions
    - IMS database assets now more accessible than ever
      - Open Database and the Universal driver framework already showing signs of making a tremendous impact
    - Standards, standards, standards
  - IMS is again a strategic DB of choice
- As good as the new technologies and IMS solutions are...
  - There are stumbling blocks that need to be addressed
    - We feel it is imperative that we remove them in order to continue the momentum

## Issues

- Perception
  - IMS is 40+ years old...and therefore it and its surrounding technology are no longer state of the art
- Lack of knowledge regarding new IMS technology and solutions
  - Key decision makers are simply not aware of it
    - Reality is that IMS has not done a great job marketing itself the past decade
- Net result is that new application workload is targeted less for IMS than it should be
  - There are a lot of choices
  - Need to make sure IMS is in the list
  - Great new technology isn't enough...need more

## Application development sticking points

- Resource creation
  - IMS wasn't built to be dynamic
    - Create new (and modify existing) databases
    - Create new transactions
- Application development support
  - The technology is there now...but
    - Opportunity to provide more assistance building new applications targeting IMS
- Application deployment and testing
  - Opportunity to provide more assistance deploying these applications and testing them

## Application development needs

- Provide a collection of eclipse-based components to ease IMS application and resource development and deployment tasks
- IMS specific value-adds to IBM's strategic development environments
  - Provide code assistance to simplify development of IMS application
  - Provide graphical editors to simplify development of IMS resource definition
  - Leverage metadata repository
  - Provide interface for extensibility with IBM and vendor tools

## Application development strategy

- Integration, not separation
  - Eclipse shell-sharing goes a long way towards integration with any Eclipse-based solution
  - Similar approaches to similar logical functions so that the cross-over of learning is minimized
  - Panel integration where appropriate
  
- There will always be some aspects of similar tools that will be unique due to the differences in the underlying data technologies

# IMS Simplification Strategy

- Simplify application development
  - Accelerate the development time for new IMS applications with an integrated development environment that supports a choice of programming languages, including COBOL, PL/I and Java
  
- Simplify IMS resource definition and management tasks
  - Provide a graphical toolkit to visualize IMS resource design, creation, and update
  - Automate deployment of changes without the requirements for a multi-step batch executive process
  - Resources include
    - Database
    - Application
    - Transaction
  
- Simplify IMS management
  - Focus on reducing skills required to configure, manage, operate, and monitor IMS resources, including IMS regions



Thank  
You

The text 'Thank You' is rendered in a large, 3D, blue font. Each letter is a hollow shell with a white outline and a blue gradient. Inside the letters, there are cutouts of various business professionals in office attire. The 'T' shows a man in profile. The 'h' shows a man in a suit. The 'a' shows a woman in a blazer. The 'n' shows a man in a white shirt. The 'k' shows a woman in profile. The 'Y' shows a man with glasses. The 'o' shows a man in a suit. The 'u' shows a man in a light blue shirt. The background is a light blue gradient.