

IMS...REST it, Share it, Mash it, Just Use It

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Principal Technical Architect
GT Software

Session #9396
August, 2011













The Quote....

“IMS is the original application server”

Steve Nathan-IBM

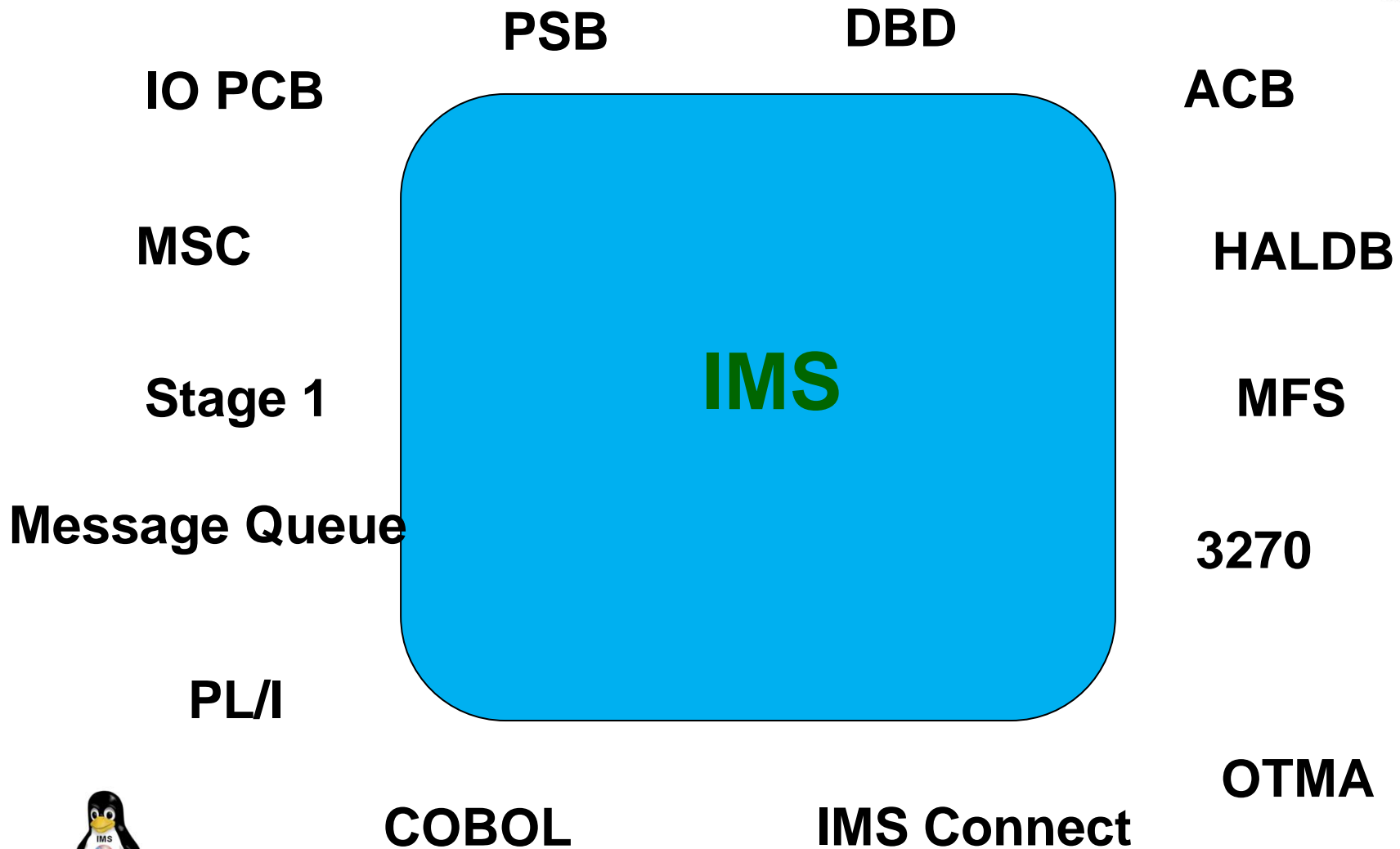


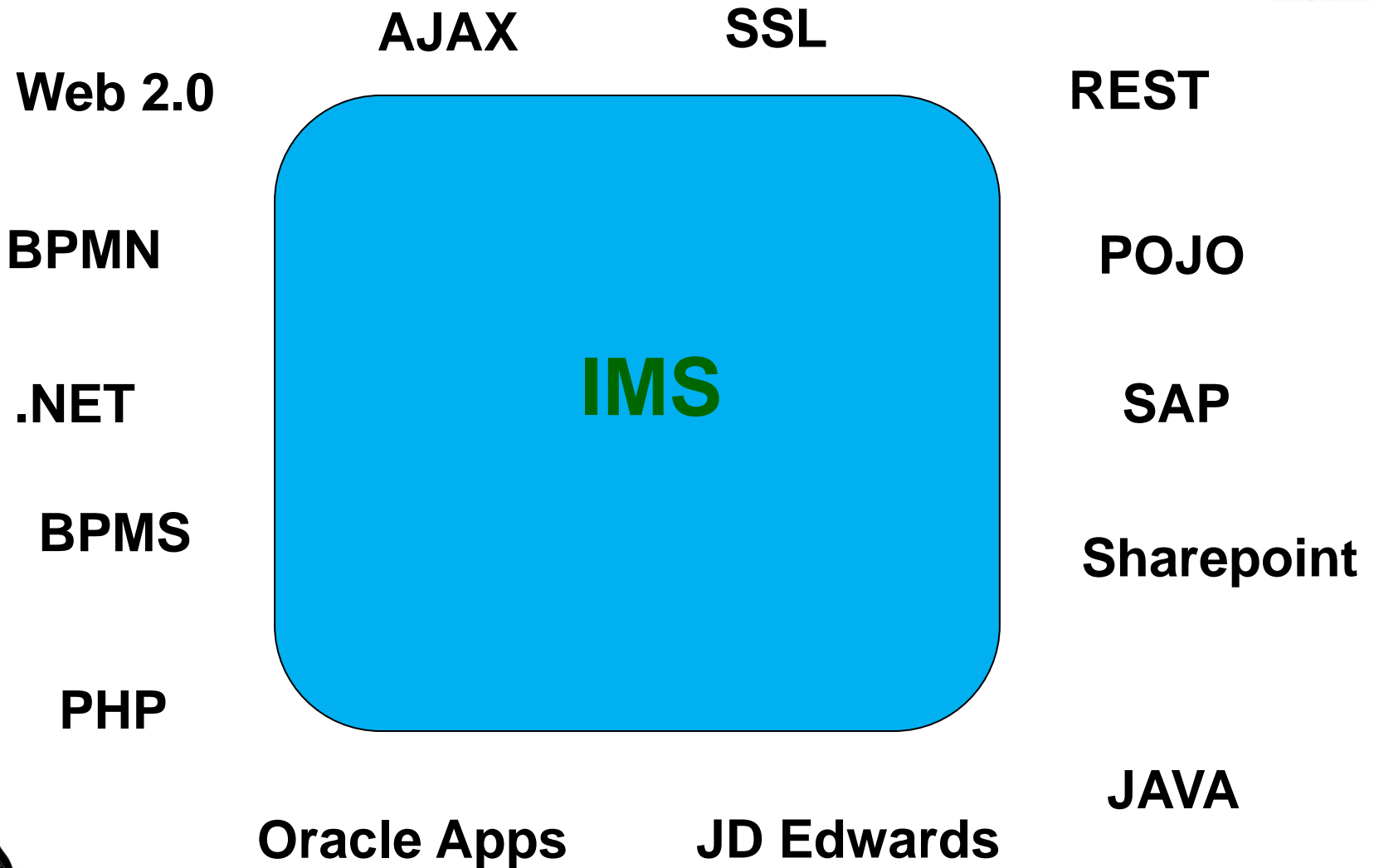
In 1977

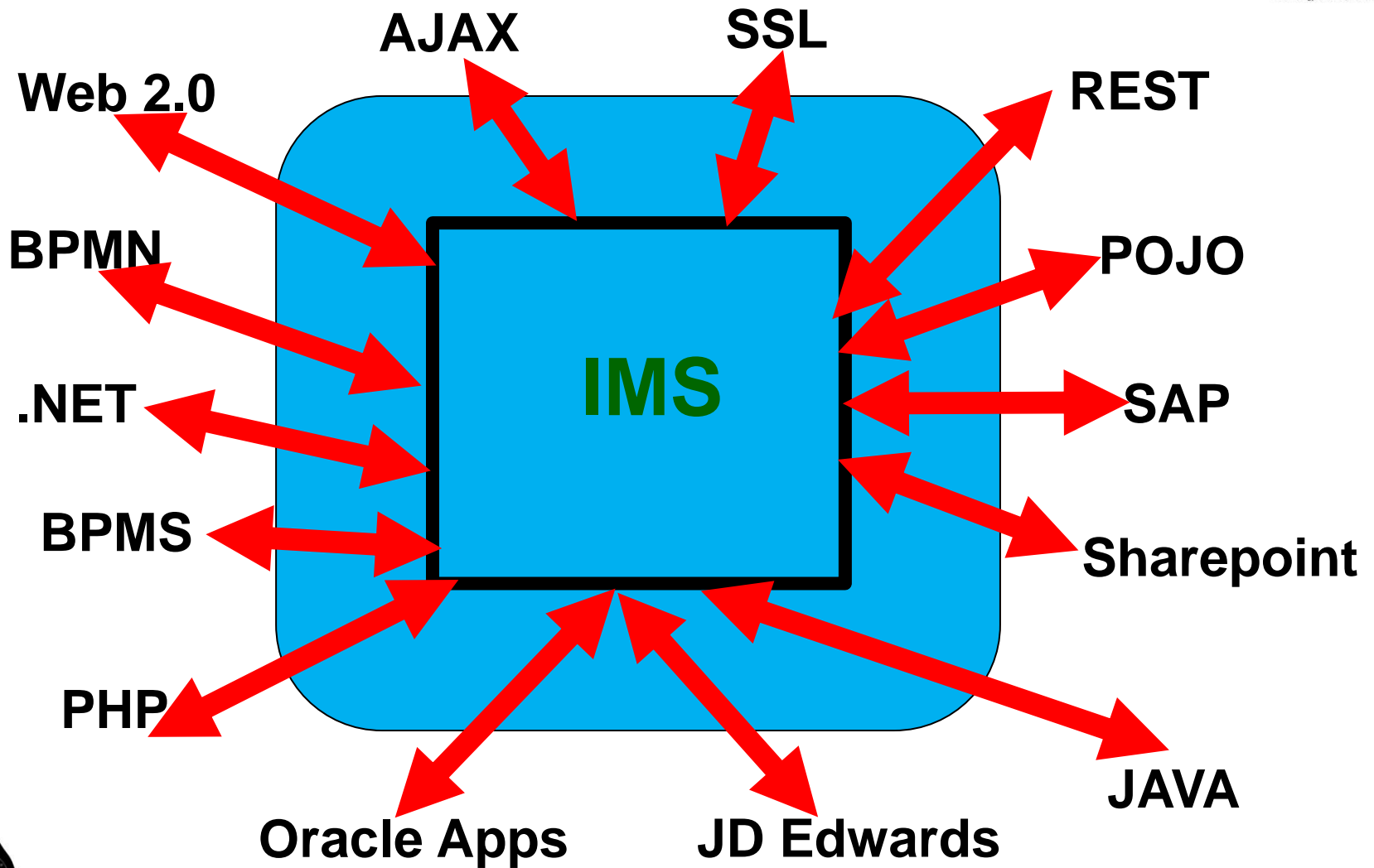
-  No VCR's
-  No Internet
-  No PC's
-  No CD's/DVS's
-  No Cell Phones/PDA's
-  No Flat Screen TV's
-  No 1000 channel Cable TV
-  No Microwaves
-  No WebSphere
-  No Microsoft(windows)
-  No DB2
-  No Linux

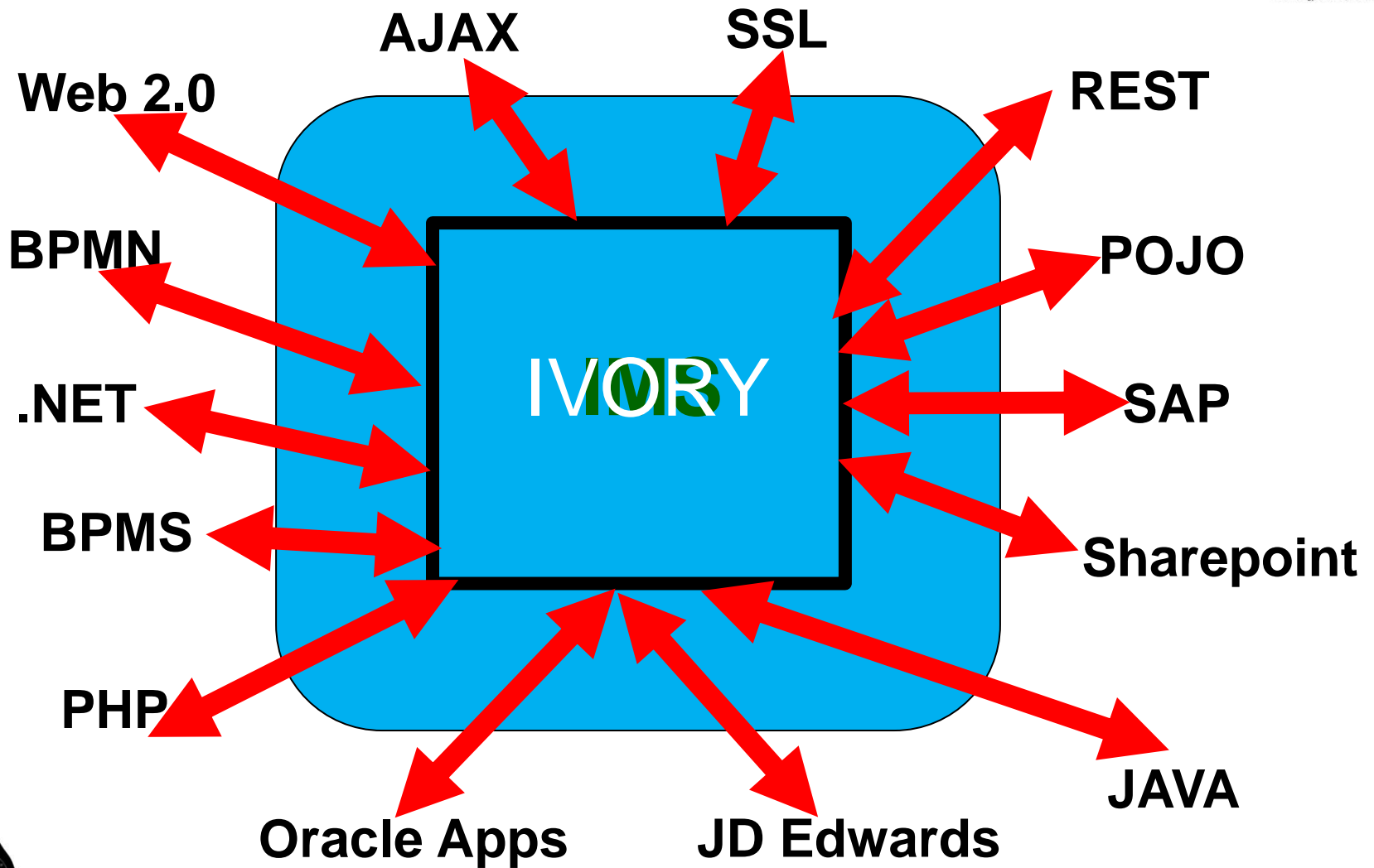
- But there was **IMS**.....



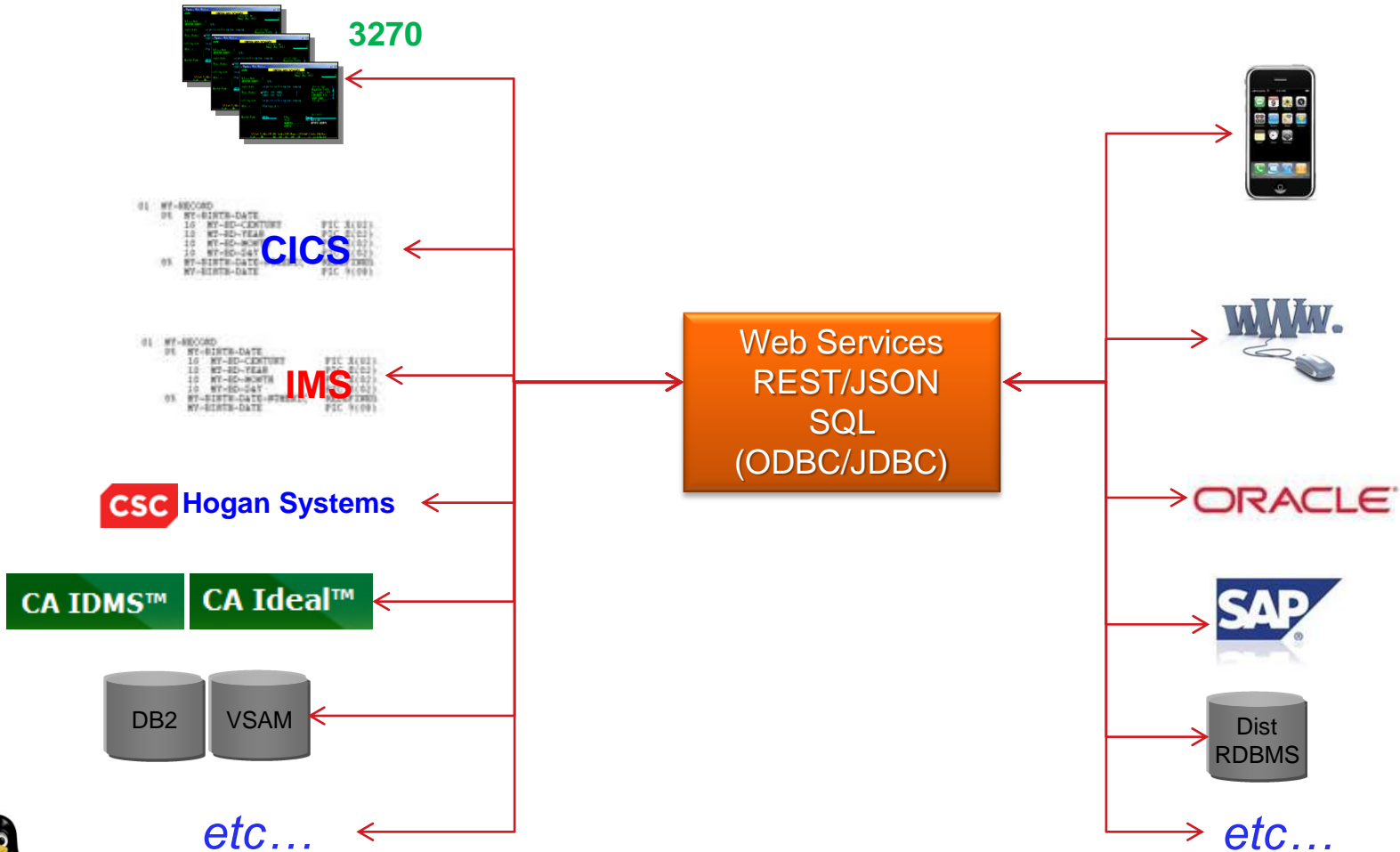




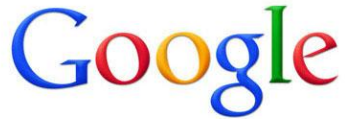




Mainframe Integration Issues and Opportunities



Mainframe Integration with the Cloud.....



at&t



Microsoft®

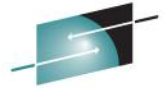


salesforce.com®



So what do you have to change in IMS to use IMS with the new Technologies? The transactions , the programs, the screens????





SHARE
Technology · Connections · Results

Nothing!

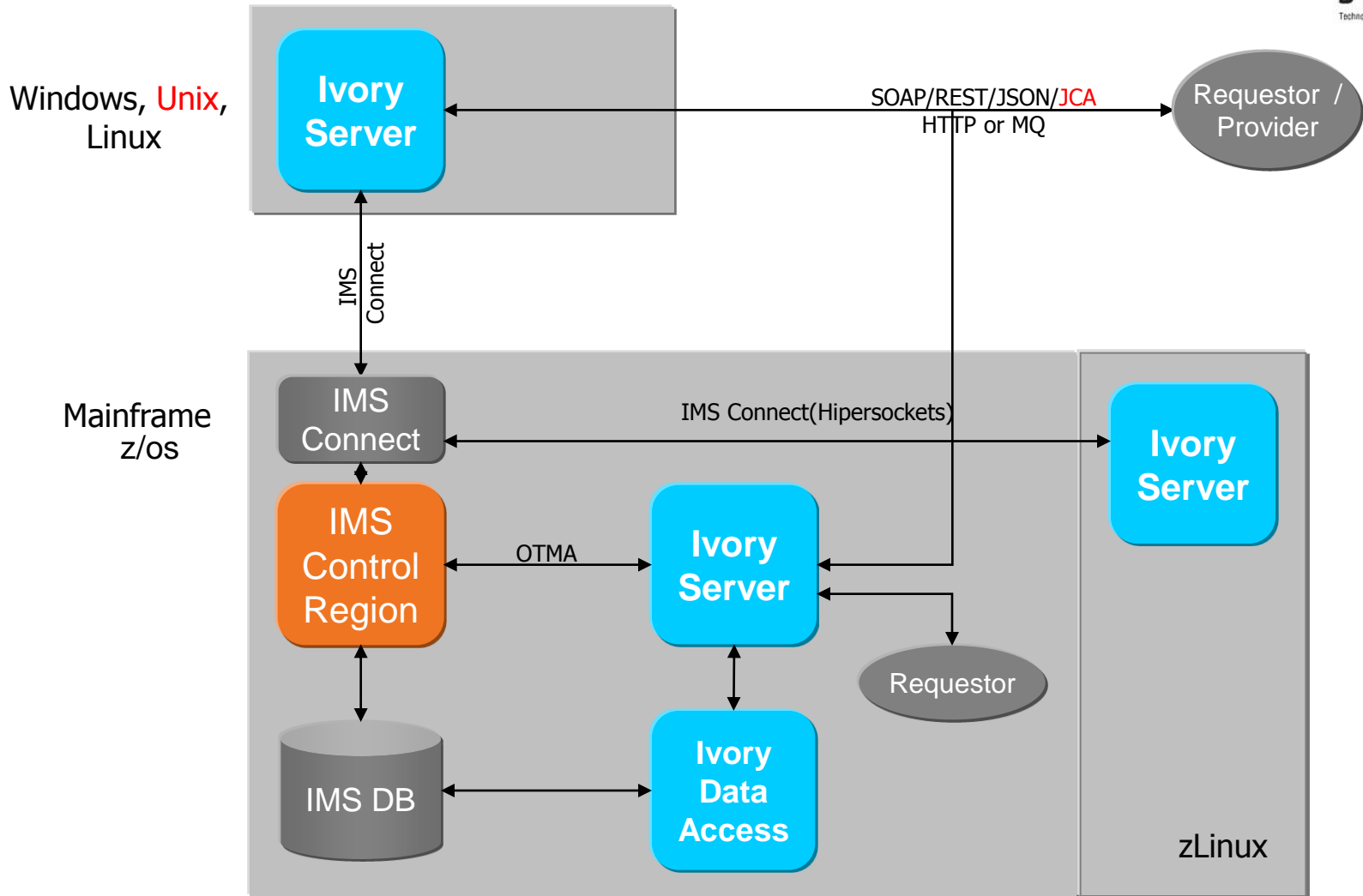


New Development Paradigm

- Integrated drag and drop graphical environment
- One Tool no other pre-reqs.
- Design once, deploy many:
 - Started Task (OTMA)
 - CICS
 - Linux for SystemZ (SUSE or Redhat)
 - Windows (IMS Connect)
 - Linux (IMS Connect)
- Once designed available via:
 - Web Services (WSDL)
 - REST-ful services
 - JSON
 - **JCA**



Ivory Runtime Architecture

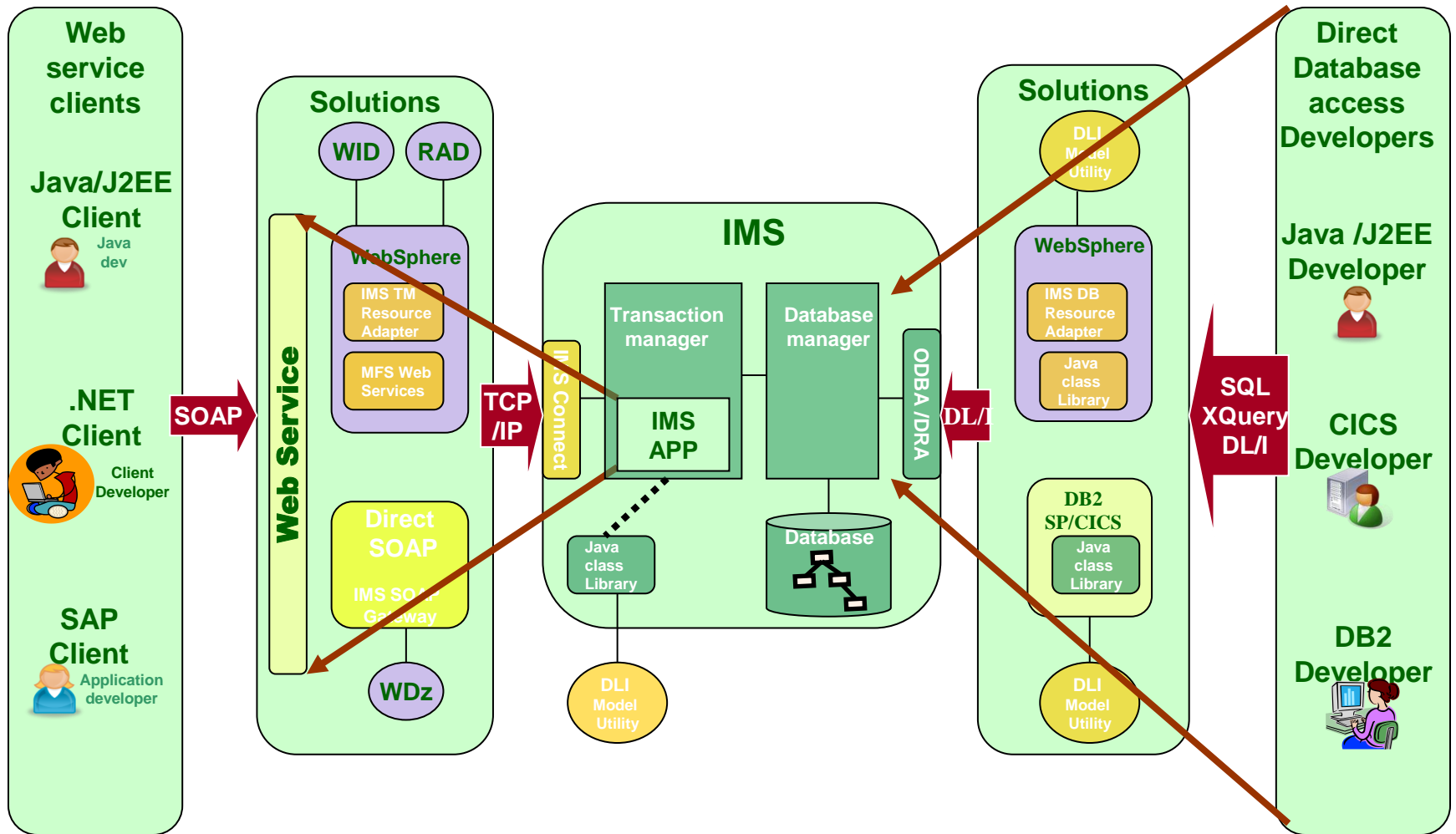


Hard Questions

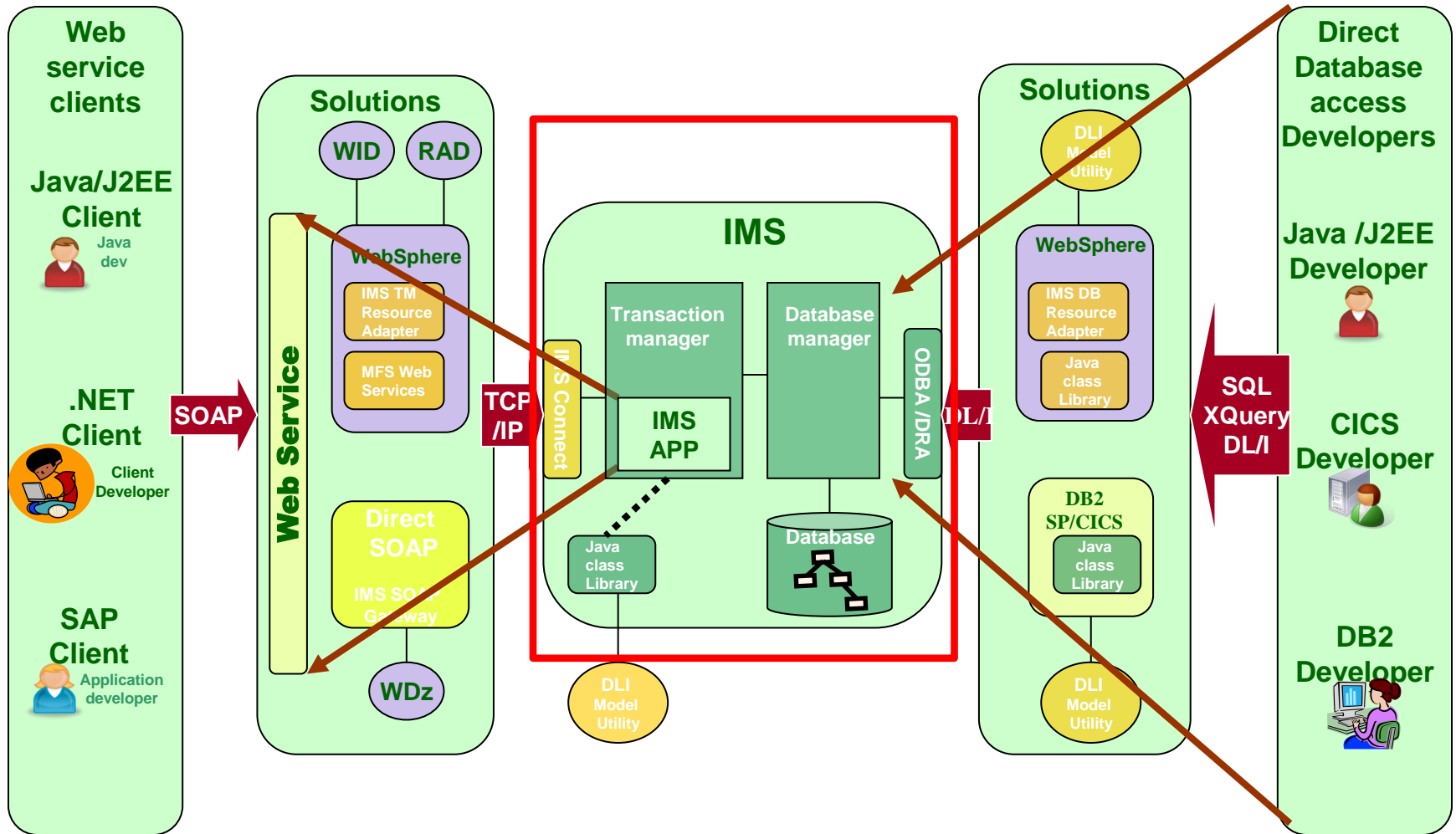
- Can I get IMS data for use in the new software?
- Can I get IMS transactions easily incorporated into the new software?
- What about the others(CICS,IDMS/DC,IDEAL,NATURAL,etc.?)
- Do you have the need for 1 IMS tran per service with no other mainframe artifacts?
- Are you are at the current latest edition/version of IMS?
- Do you only want to run the services strictly on the mainframe?
- Do you only have simple IMS transactions, no conversational IMS transactions?
- Do I need IMS calling out to other distributed systems?



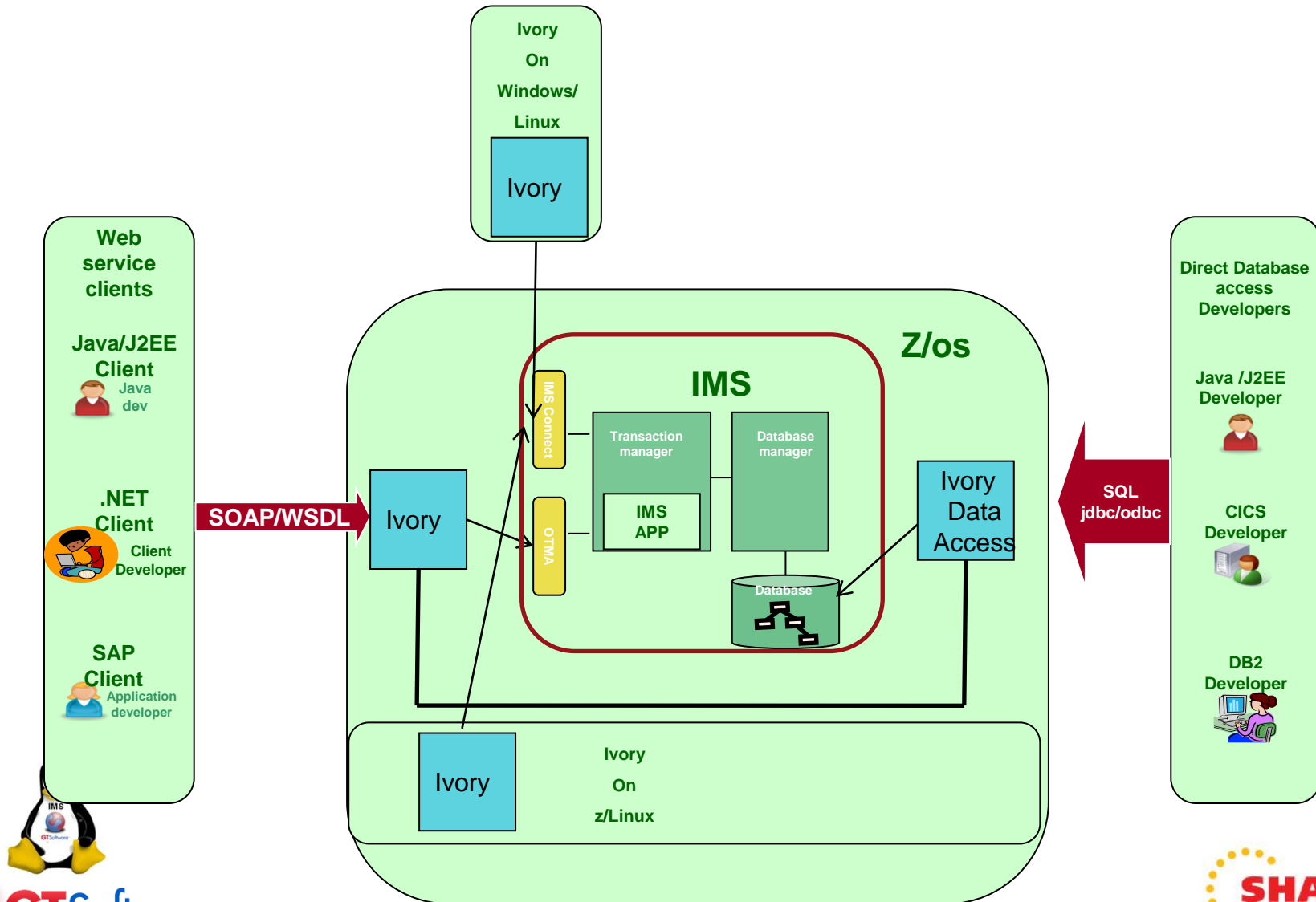
IMS Standard Architecture Slide



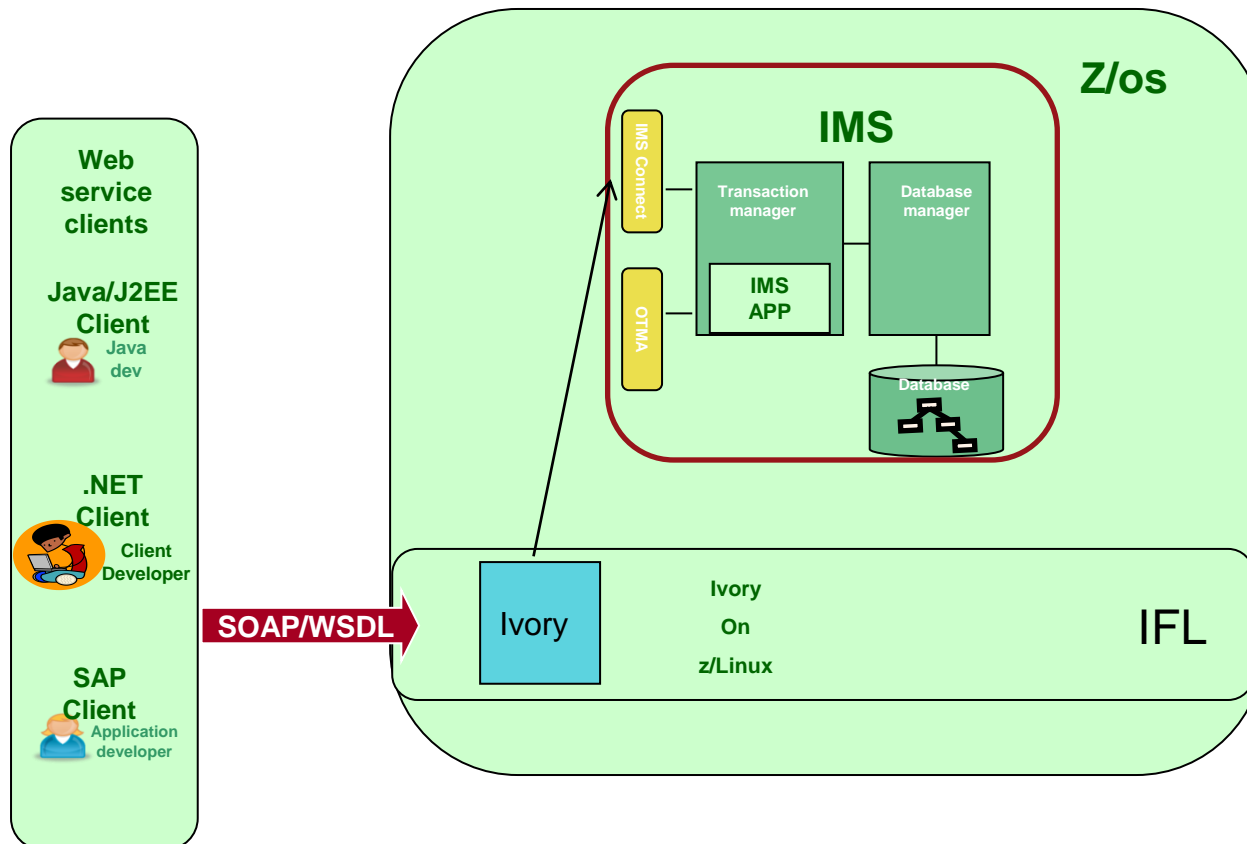
IMS Standard Architecture Slide



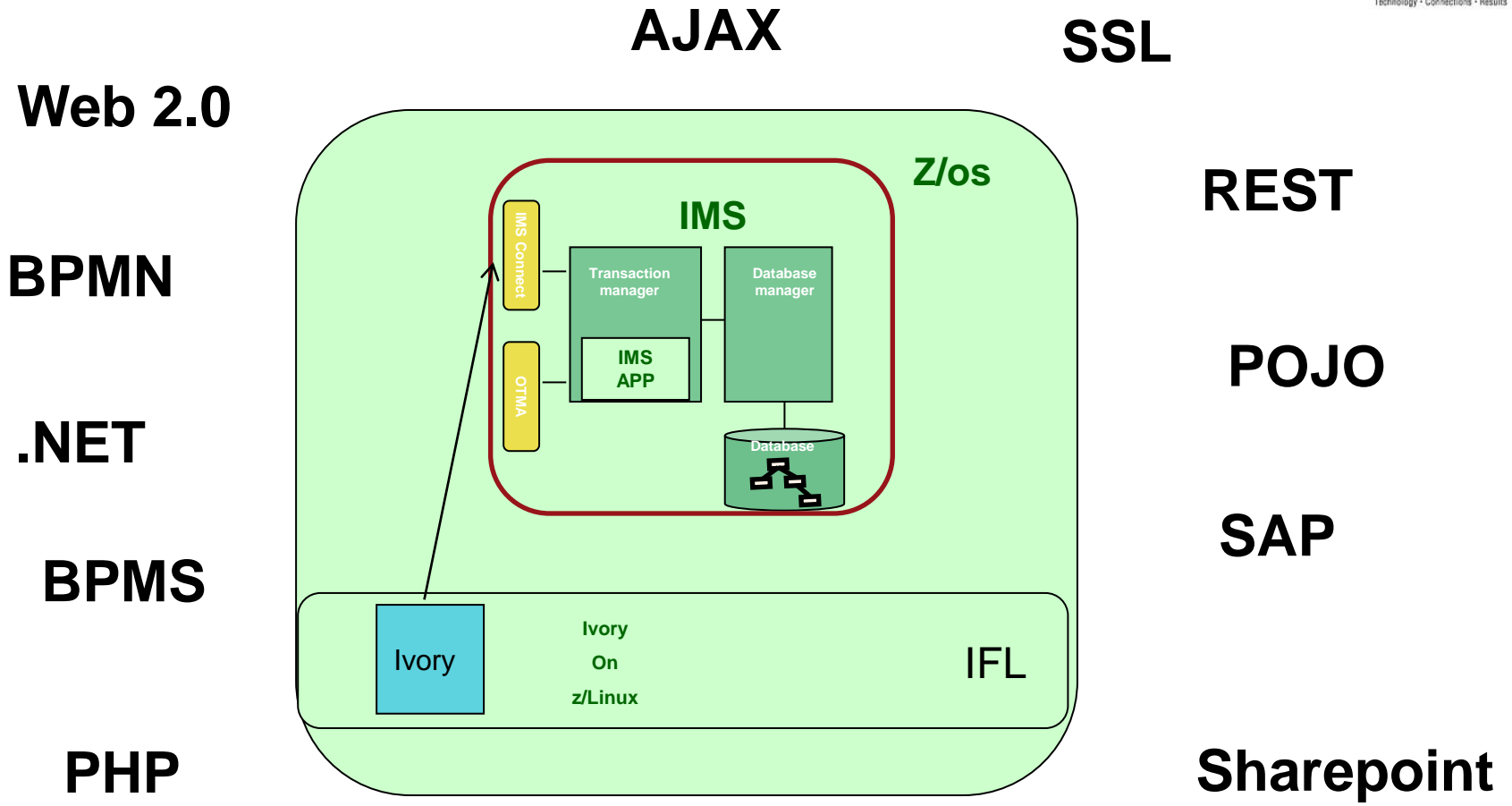
IMS Architecture with Ivory



IMS Architecture with Ivory(zLinux)



IMS Architecture with Ivory(zLinux)



Easy !

I need to have IMS data in a new spreadsheet.....

- IDA demo



Easy !

I need to have IMS transactions in a new software.....

- ISA demo



Rest and WSDL(Web Services)

```
<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:s0="urn:ims2TNS">
  <soap:Body>
    <s0:getInfo>
      <s0:inCommand>display</s0:inCommand>
      <s0:inLastName>smith</s0:inLastName>
    </s0:getInfo>
  </soap:Body>
</soap:Envelope>
```

Input

http://gtzdev.gtsoftware.com:20180/soap/ims2?RESTRequest=getinfo
&inCommand=**display**&inLastName= **smith**

```
<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:ns1="urn:ims2TNS">
  <soap:Body>
    <getInfoResponse xmlns="urn:ims2TNS">
      <outDataType>
        <outLastName>SMITH</outLastName>
        <outFirstName>MARY</outFirstName>
        <outExtension>265</outExtension>
        <outZipCode>30022</outZipCode>
      </outDataType>
    </getInfoResponse>
  </soap:Body>
</soap:Envelope>
```

```
<?xml version="1.0" encoding="utf-8" ?>
<getInfoResponse>
  <outDataType>
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    <outFirstName>MARY</outFirstName>
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```

WSDL

REST



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  <soap:Body>
    <getInfoResponse xmlns="urn:ims2TNS">
      <outDataType>
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        <outFirstName>MARY</outFirstName>
        <outExtension>265</outExtension>
        <outZipCode>30022</outZipCode>
      </outDataType>
    </getInfoResponse>
  </soap:Body>
</soap:Envelope>
```

Output

```
<?xml version="1.0" encoding="utf-8" ?>
<getInfoResponse>
  <outDataType>
    <outLastName>SMITH</outLastName>
    <outFirstName>MARY</outFirstName>
    <outExtension>265</outExtension>
    <outZipCode>30022</outZipCode>
  </outDataType>
</getInfoResponse>
```

WSDL

REST



IBM Mashup Center - Windows Internet Explorer

https://localhost:9443/mashuphub/client/layout/layout.html

File Edit View Favorites Tools Help

NETGEAR ProSafe™ - Welc... Google Suggested Sites

Internet Explorer cannot dis... Integrated Solutions Console IBM Mashup Center

IBM Mashup Center drivers | Settings | Logout | Help

Home: Catalog REST Service 39

REST Service 39

https://drivers3.gtsoftware.com:9443/mashuphub/client/plugin/generate/entryid/39/plu...
RESTRequest=get&ims1=ims1&inCommand=display&inLastName=rivers¶meter0=&soa...

Details

| | | | |
|------------------------|---|----------------------------------|--|
| Permalink: | http://drivers3.gtsoftware.com:9080/mashuphub/public/permalink?entryid=39 | | |
| Source: | REST Service | Creator: | drivers |
| Version: | 1.0 | Average Rating: | ★★★★★ by 0 user(s) |
| Documentation: | None | My Rating: | ★★★★★ Specify rating component 0 stars |
| Times Accessed: | 2 | Categories: | None |
| Last Updated: | 2/1/11 4:10 PM | Related Entries: | None |
| MIME Type: | application/atom+xml | Active Content Filtering: | Disabled |
| Saved: | Yes | Tags: | |
| My Permissions: | View , Edit | My Tags: | <input type="text"/> <input type="button" value="Submit"/> |
| Depends On: | None | Provides For: | None |

Comments

There are no comments.

Add a Comment

Required fields marked with *

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Local intranet 100%

Actions

- Invoke REST Service
- View REST Service description
- Add to Remote Catalog
- Add Favorite
- Usage Statistics
- Edit Details
- Edit REST Service
- Delete

Rest String

IBM Mashup Hub(InfoSphere MashupHub) , and Ivory REST Service(IMS) has been added to the hub as a listed REST service

IBM Mashup Center - Windows Internet Explorer

https://localhost:9443/mashuphub/client/layout/layout.html

File Edit View Favorites Tools Help

NETGEAR ProSafe™ - Welc... Google Suggested Sites

Internet Explorer cannot dis... Integrated Solutions Console IBM Mashup Center

IBM Mashup Center drivers | Settings | Logout | Help

Home: Catalog REST Service 39 Parameters

REST Service Invoker

* soap:

* ims1:

* RESTRequest:

* inCommand:

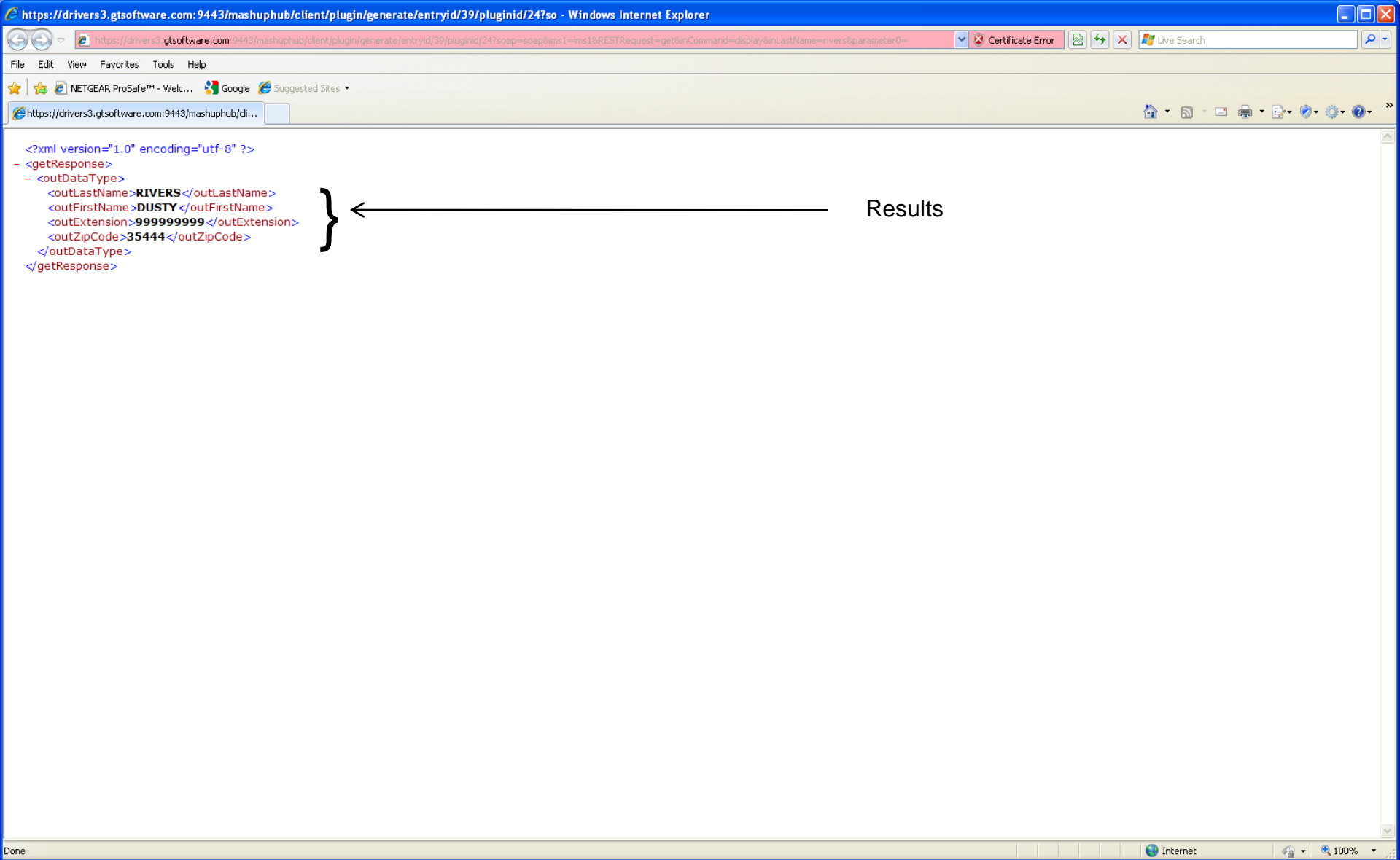
* inLastName:

parameter0:

Invoke

Input Values

IBM Mashup Hub(InfoSphere MashupHub) , REST Service Invoker



Results



| Name | Type |
|---|---------------------------|
| Lists | |
| Announcements | Lists |
| Calendar | Lists |
| Links | Lists |
| Tasks | Lists |
| Team Discussion | Lists |
| Document Libraries | |
| Customized Reports | Document Libraries |
| Document Library | Document Libraries |
| dustyIDA | Document Libraries |
| Form Templates | Document Libraries |
| Shared Documents | Document Libraries |
| Site Assets | Document Libraries |
| Site Pages | Document Libraries |
| Style Library | Document Libraries |
| testIDAfrom INP2010 | Document Libraries |
| SOAP Services | |
| acctlkup From Ivory Server(dusty) | SOAP Services |
| AcctMain on gtzdev.gtsoftware.com:20080 | SOAP Services |
| IVORY CICS ACCT | SOAP Services |
| RSS, REST, Server Scripts | |
| dase on gtzdev.gtsoftware.com:20990 | RSS, REST, Server Scripts |
| XML Files | |
| dustyform.xml | XML Files |

SharePoint 2010 Designer

Microsoft Excel

Table Name: Table_Query_fro

Table Tools: Design

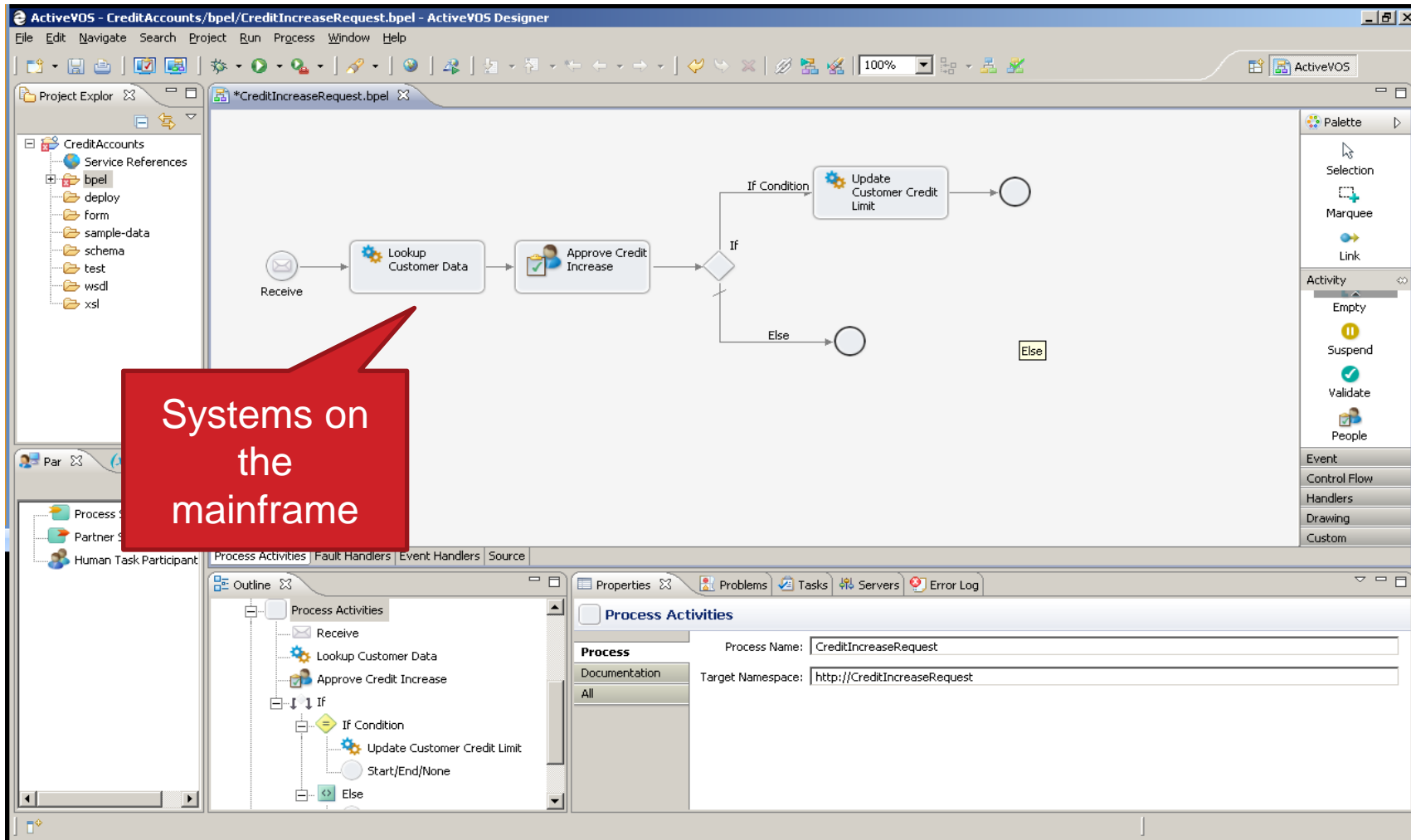
Table Style Options: Header Row, Total Row, Banded Rows, First Column, Last Column, Banded Columns

Table Styles: [Various style thumbnails]

| NUMBER | ITEM | PRICE | SUPPLIER | CATALOG | UNIT | STATUS |
|--------|---------------------------|--------|----------|---------|-----------------------|--------|
| 1 | 1 Spare Ribs | 30 | 8 | 2 | 10 Cartons x 20 Boxes | 2 |
| 2 | 2 American Cheese | 12 | 1 | 1 | 24 - 12 oz-Box | 17 |
| 3 | 3 Seedless Cherries | 20 | 1 | 2 | 12 - 550 ml-Box | 13 |
| 4 | 4 Canned Cherries | 10 | 5 | 2 | 48 - 6 oz-Bottles C | 53 |
| 5 | 5 Canned Peaches | 18.5 | 11 | 2 | 36 Cartons | 2 |
| 6 | 6 Concord Grape Spread | 52 | 3 | 2 | 12 - 8 oz-Bottles | 120 |
| 7 | 7 Organic Pears | 30 | 3 | 7 | 12 - 1 lb-Packages | 15 |
| 8 | 8 Hot Sauce | 41 | 3 | 2 | 12 - 12 oz-Bottles | 6 |
| 9 | 9 Mashed potato | 97 | 4 | 6 | 18 - 500 g-Packages | 29 |
| 10 | 10 Salt Bread Orig | 31 | 4 | 8 | 12 - 200 ml-Bottles | 31 |
| 11 | 11 Hamburger | 21 | 5 | 4 | 1 kg Paket | 22 |
| 12 | 12 Pizza Crust | 38 | 5 | 4 | 10 - 500 g-Packages | 86 |
| 13 | 13 Hershey Bar | 14 | 2 | 4 | Case OF 24 | 45 |
| 14 | 14 Soy Beans | 26.25 | 6 | 7 | 40 - 100 g-Packages | 35 |
| 15 | 15 Garden Salads | 15.5 | 6 | 2 | 24 - 250 ml-Box | 39 |
| 16 | 16 Pork | 17.45 | 7 | 3 | 32 - 500 g Cartons | 29 |
| 17 | 17 Pork Chops | 50 | 8 | 6 | 20 - 1 kg-Dozen | 0 |
| 18 | 18 Corn Bread | 62.5 | 7 | 8 | 16 kg Pakets | 42 |
| 19 | 19 Buttermilk Biscuits | 9.2 | 8 | 3 | 10 Cartons x 12 Stack | 25 |
| 20 | 20 Sir Rodney's Marmalade | 81 | 8 | 3 | 30 Cartons | 40 |
| 21 | 21 Sir Rodney's Scones | 10 | 8 | 3 | 24 Packages x 4 Stack | 3 |
| 22 | 22 Chicken | 21 | 9 | 6 | 24 - 500 g-Packages | 104 |
| 23 | 23 Turkey | 9 | 9 | 5 | 12 - 250 g-Packages | 61 |
| 24 | 24 Guacomoli | 4.5 | 10 | 1 | 12 - 355 ml-Dozen | 20 |
| 25 | 25 Milk | 14 | 11 | 1 | 20 - 450 g Bottles | 76 |
| 26 | 26 Eggs and Ham | 31.23 | 11 | 3 | 100 - 250 g-Boxes | 15 |
| 27 | 27 Butter | 43.9 | 11 | 3 | 100 - 100 g Stack | 49 |
| 28 | 28 Sauerkraut | 45.6 | 12 | 7 | 25 - 825 g-Dozen | 26 |
| 29 | 29 Bratwurst | 123.79 | 12 | 6 | 50-Boxes x 30 racks | 0 |
| 30 | 30 Meat | 25.89 | 13 | 8 | 10 - 200 g Bottles | 10 |
| 31 | 31 Spagetti | 12.5 | 14 | 4 | 12 - 100 g-Packungen | 0 |
| 32 | 32 Miller Light | 32 | 14 | 4 | 24 - 200 g-Packages | 9 |
| 33 | 33 Corona | 2.5 | 15 | 4 | 500 g-Packages | 112 |
| 34 | 34 Budweiser | 14 | 16 | 1 | 24 - 12 oz-Boxes | 111 |
| 35 | 35 Guinness Ale | 18 | 16 | 1 | 24 - 12 oz-Boxes | 20 |

IMS data (via ODBC) in a Microsoft Excel Spreadsheet

Ivory and BPMN(ActiveVOS)



ActiveVOS - CreditAccounts/bpel/CreditIncreaseRequest.bpel - ActiveVOS Designer

File Edit Navigate Search Project Run Process Window Help

Project Explorer

- CreditAccounts
 - Service References
 - bpel
 - deploy
 - form
 - sample-data
 - schema
 - test
 - wsdl
 - xsl

Process Activities

- Receive
- Lookup Customer Data
- Approve Credit Increase
- If
 - If Condition
 - Update Customer Credit Limit
 - Else
- Start/End/None

Process Name: CreditIncreaseRequest

Target Namespace: http://CreditIncreaseRequest

Systems on the mainframe

Issues with Services on the Mainframe



- SOAP/XML Processing on the GPP = More MIPS
- New Compiled programs running on GPP = More MIPS
- More installed programs/products = More Support \$\$\$
- No zIIP or zAAP use the IFL



IMS and Ivory

- Service Enable IMS transactions
 - Including Support for IMS Conversational
 - Support for MFS as service definition
 - LTERM Name if needed
 - Composite Service Support
 - MFS Mod 3
 - Outbound Support to any remote system
 - REST Support for IMS
 - JSON Support
 - JCA Support(coming.....) for IMS



IMS and Ivory Other Implementations



- Batch Support

Enabling IMS Batch jobs to call external services

Server can be linked in for performance

All necessary code and linkage created

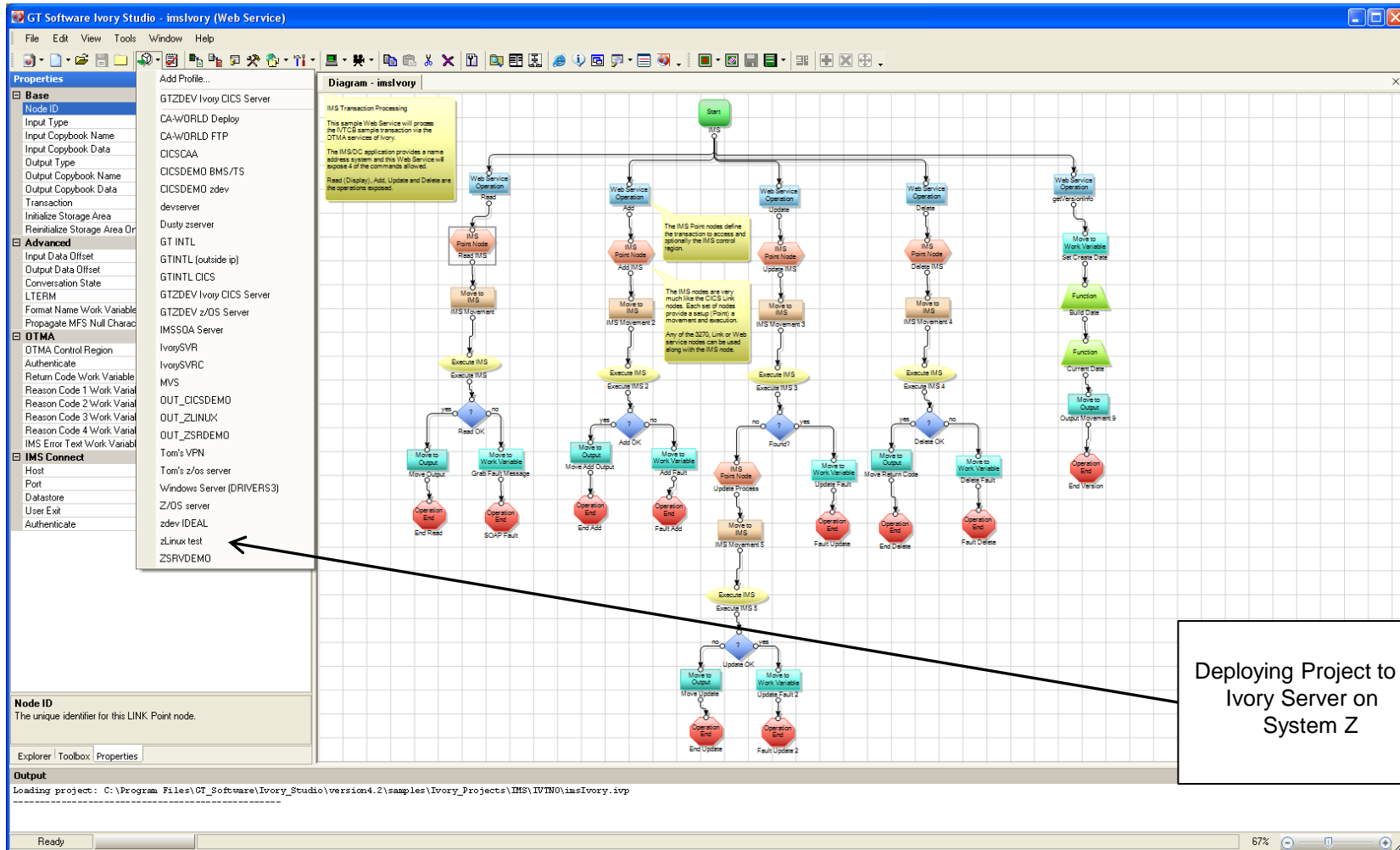
- Complete IMS Outbound Support

IMS transactions enabled to call external services

(like SAP, Oracle, Sharepoint etc)



Deploying to Linux on System Z

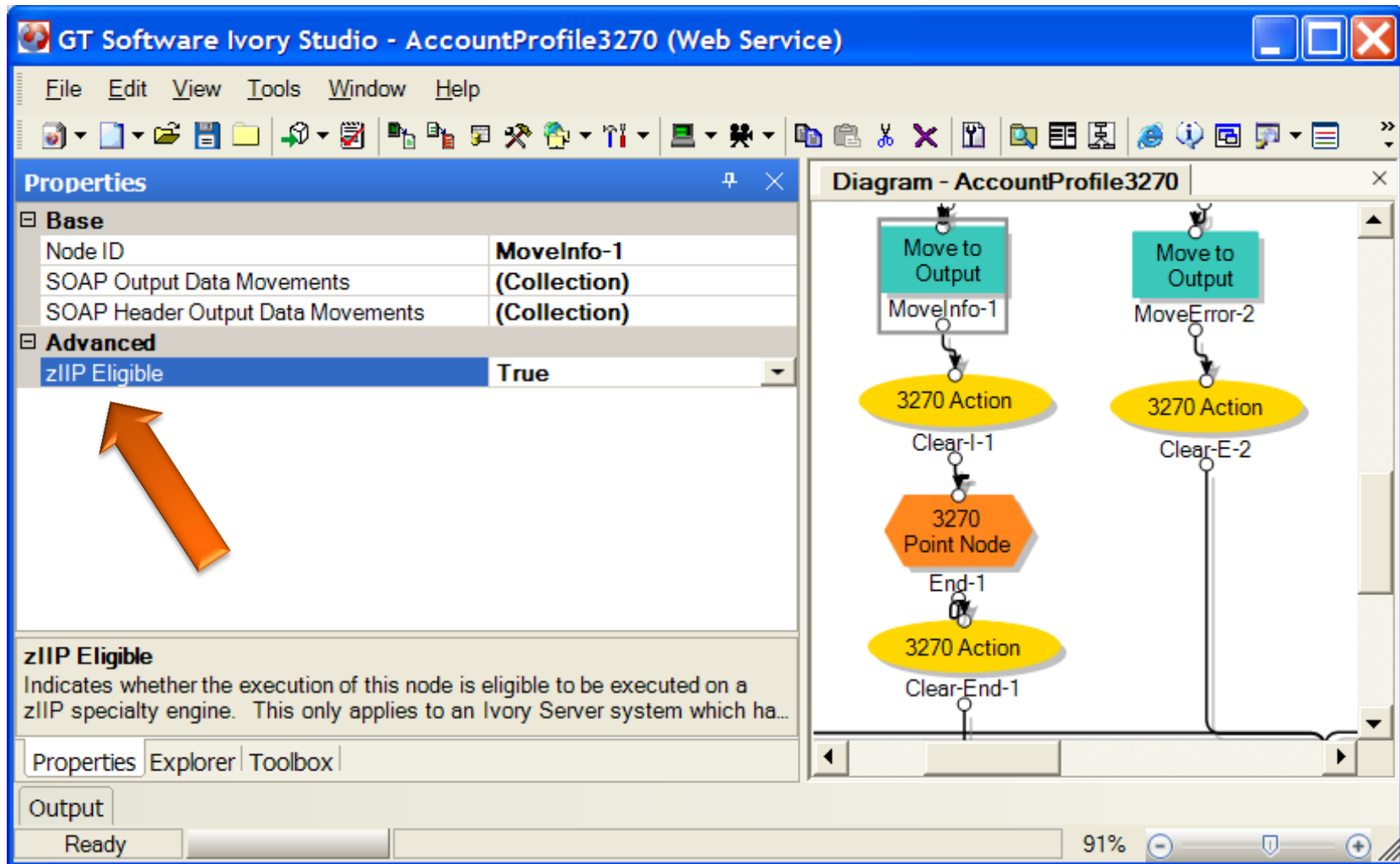


The screenshot displays the GT Software Ivory Studio interface. The main window shows a workflow diagram titled "Diagram - imsvory" for "IMS Transaction Processing". The diagram starts with a "Start" node, followed by a "Web Service Operation Read" node. It then branches into five parallel paths, each starting with a "Web Service Operation" (Add, Update, Delete, Delete, get/personID) and an "IMS Point Node" (Read IMS, Add IMS, Update IMS, Delete IMS, get/personID). Each path includes "Move to IMS" and "Execute IMS" nodes, followed by decision diamonds (e.g., "Found?", "Update Process", "Update Fault", "Delete OK", "Fault Update"). The paths conclude with "Move to Output" or "Move to Work Variable" nodes and "Operation End" nodes. A text box in the center of the diagram explains: "The IMS Point nodes define the transaction to access and optionally the IMS control region. The IMS nodes are very much like the CIC's Link nodes. Each set of nodes provide a setup (Point), a movement and execution. Any of the 3270, Link or Web service nodes can be used along with the IMS nodes." The left sidebar shows the "Properties" panel with "Base" and "Advanced" sections. The "Base" section lists properties like "Node ID", "Input Type", and "Output Type". The "Advanced" section lists "Format Name Work Variable" and "Propagate MFS Null Charac". The "OTMA" section lists "OTMA Control Region" and "Authenticate". The "IMS Connect" section lists "Host", "Port", "Datastore", "User Exit", and "Authenticate". The "Output" section shows the project path: "Loading project: C:\Program Files\GT Software\Ivory_Studio\version4.2\samples\Ivory_Projects\IMS\IVTNO\imsIvory.ivp". The status bar at the bottom shows "Ready" and "67%".

Deploying Project to
Ivory Server on
System Z



Ivory uses the zIIP



The screenshot shows the GT Software Ivory Studio interface for a web service named 'AccountProfile3270'. The 'Properties' window on the left is expanded to the 'Advanced' section, where the 'zIIP Eligible' property is set to 'True'. An orange arrow points to this property. Below the properties, a descriptive text for 'zIIP Eligible' is visible. The main 'Diagram - AccountProfile3270' window shows a flowchart with two parallel paths. The left path starts with a 'Move to Output' node (MoveInfo-1), followed by a '3270 Action' (Clear-I-1), a '3270 Point Node' (End-1), and another '3270 Action' (Clear-End-1). The right path starts with a 'Move to Output' node (MoveError-2), followed by a '3270 Action' (Clear-E-2). Both paths converge at the bottom.

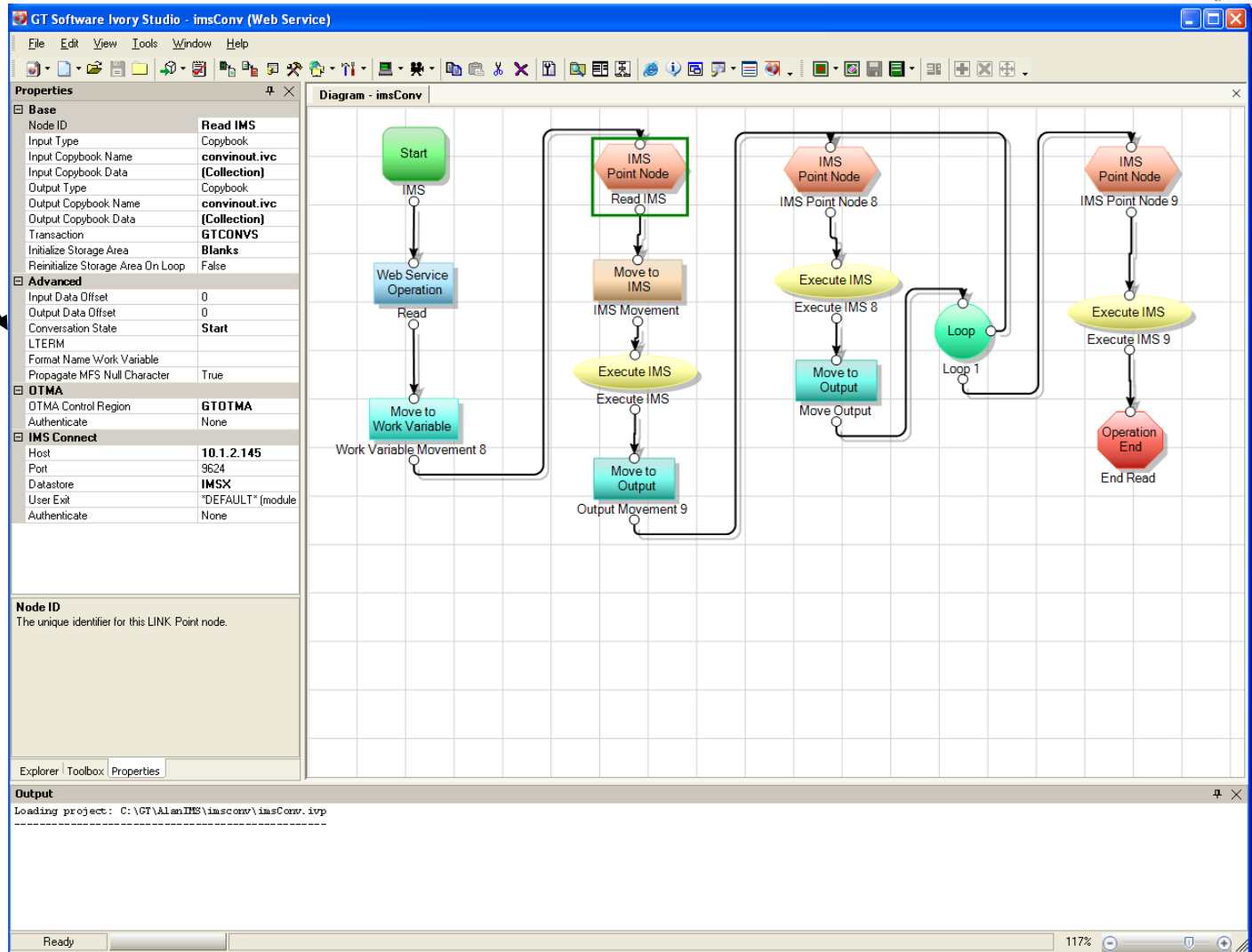
| Properties | |
|-----------------------------------|--------------|
| Base | |
| Node ID | MoveInfo-1 |
| SOAP Output Data Movements | (Collection) |
| SOAP Header Output Data Movements | (Collection) |
| Advanced | |
| zIIP Eligible | True |

zIIP Eligible
Indicates whether the execution of this node is eligible to be executed on a zIIP specialty engine. This only applies to an Ivory Server system which ha...



IMS Conversational as Service Easy!

Conversation
State

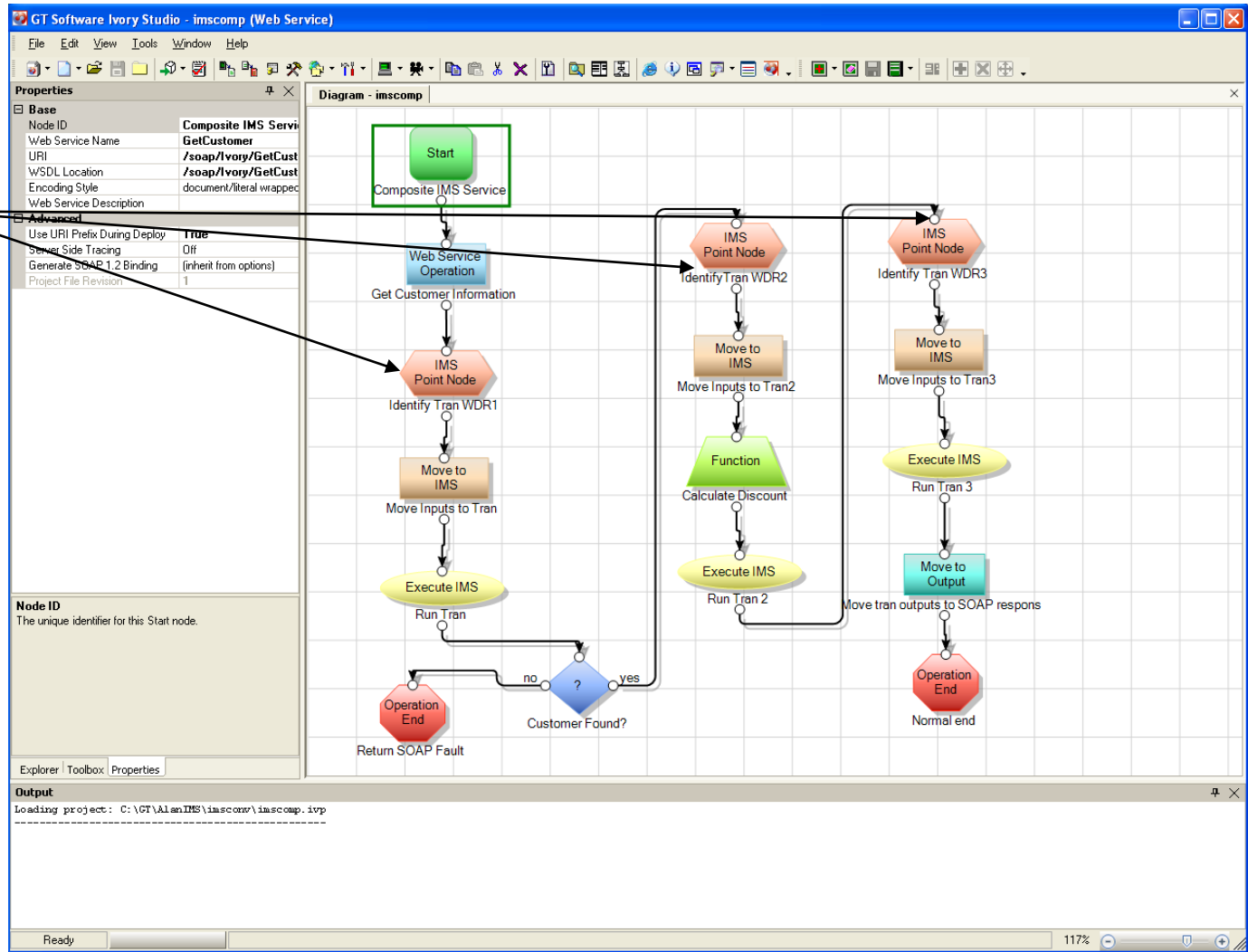


IMS Composite as Service

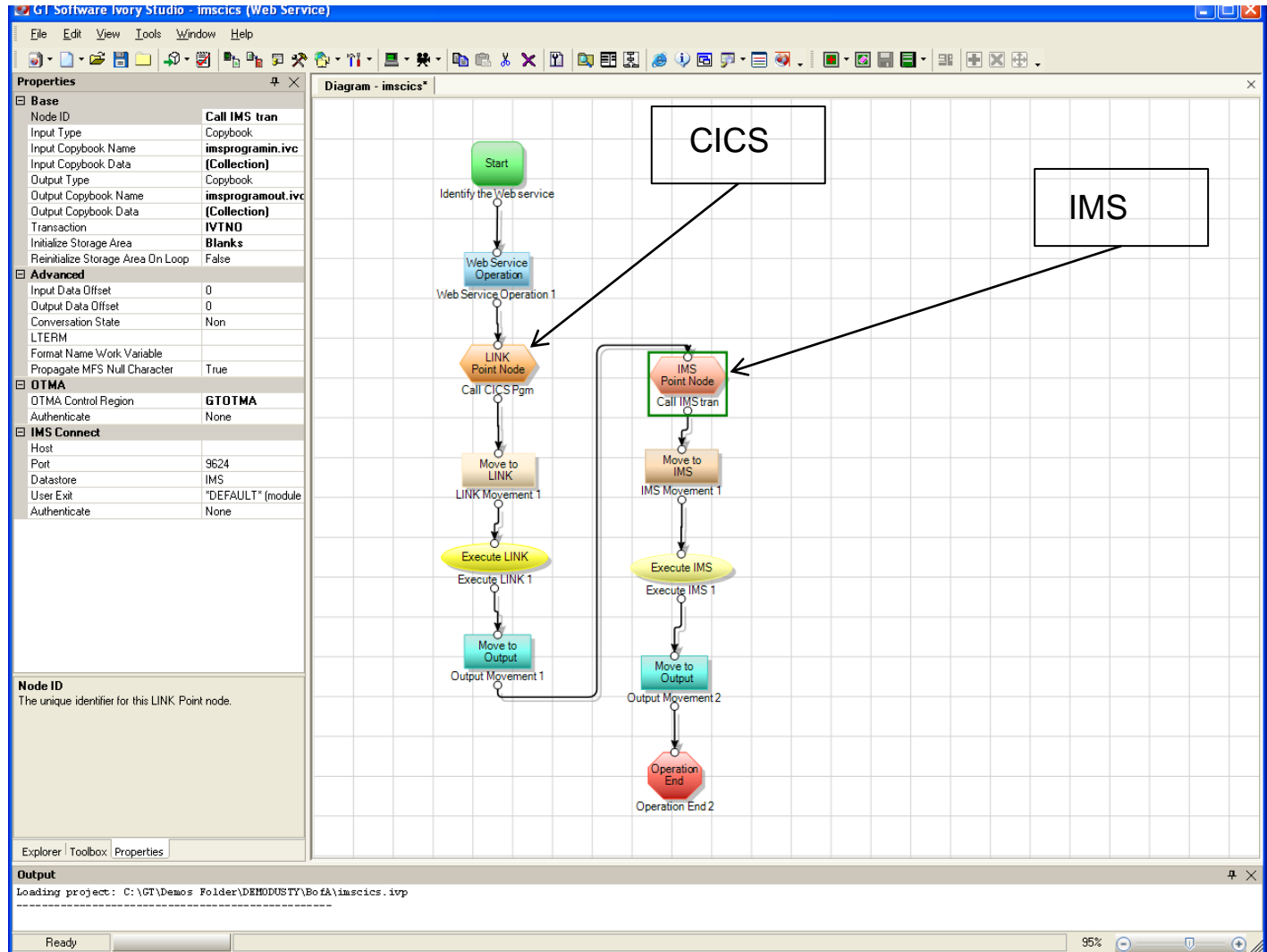
Easy!!!



Multiple
IMS
Transactions



IMS & CICS in the same Service Easy!



Custom code, MQ and IMS

Easy!



GT Software Ivory Studio - delegatIMS (Web Service)

File Edit View Tools Window Help

Properties

| | |
|-----------------------------------|---------------------|
| Base | |
| Node ID | IMS Point Node 2 |
| Input Type | Copybook |
| Input Copybook Name | imsprogramin.ivc |
| Input Copybook Data | (Collection) |
| Output Type | Copybook |
| Output Copybook Name | imsprogramout.ivc |
| Output Copybook Data | (Collection) |
| Transaction | IVTNO |
| Initialize Storage Area | Low Values |
| Reinitialize Storage Area On Loop | False |
| Advanced | |
| Input Data Offset | 0 |
| Output Data Offset | 0 |
| Conversation State | Non |
| LTERM | |
| Format Name Work Variable | |
| Propagate MFS Null Character | True |
| OTMA | |
| OTMA Control Region | GTOTMA |
| Authenticate | None |
| IMS Connect | |
| Host | |
| Port | 9624 |
| Datastore | IMS |
| User Exit | "DEFAULT" (module G |
| Authenticate | None |

Diagram - delegatIMS*

Node ID
The unique identifier for this LINK Point node.

Explorer | Toolbox | Properties

Output

Error parsing COBOL project file Could not find file 'C:\GT\Demos Folder\MSstuff\imsprogramout.ivc'.

Ready

56%



IMS Calling external services

Easy!!



The screenshot displays the GT Software Ivory Studio interface for a project named 'calltest (Callable Service)'. The left pane shows the 'Properties' for the 'Callable Service Operation 1' node, including details like 'Node ID', 'WSDL Location', and 'Advanced' settings. The main workspace shows a flowchart with the following steps:

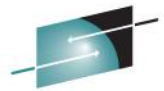
- Start
- Identify the Callable service
- Callable Service Operation (Callable Service Operation 1)
- Web Service Client Point Node (Web Service Client Point Node 1)
- Move to Web Service Client (Web Service Client Movement 1)
- Execute Web Service Client (Execute Web Service Client 1)
- Move to Output (Output Movement 1)
- Operation End (Operation End 1)

The bottom status bar shows 'Ready' and '100%' zoom level.



- IMS transactions calling SAP processes
- IMS transactions calling Tandem processes
- IMS transactions calling Oracle processes
- IMS transactions calling Microsoft Sharepoint
- IMS Batch jobs calling distributed services



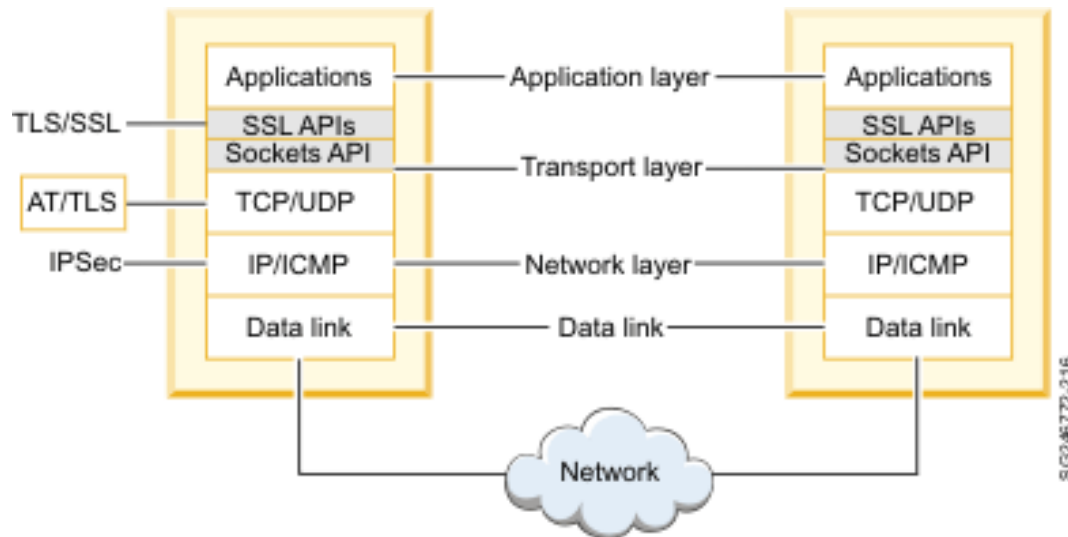


SHARE
Technology · Connections · Results



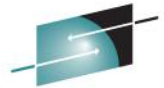
Security

- ❖ Use AT-TLS(Application Transparent Transport Level Security)



- <http://gtzdemo.gtsoftware.com:10080/JSONExample/Example2/directions.html>





SHARE
Technology · Connections · Results

IMS

