

Session ID #A48

IMS XML and Web Services

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IMS e-business

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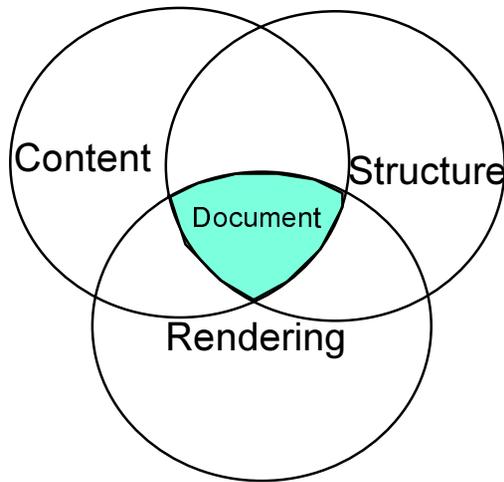
October 22-25, 2001

Agenda

- XML technology overview
- Web services overview
- IMS XML objectives
- IMS XML support today
- IMS XML and Web services future support
- Summary

XML Technology Overview

Traditional data description



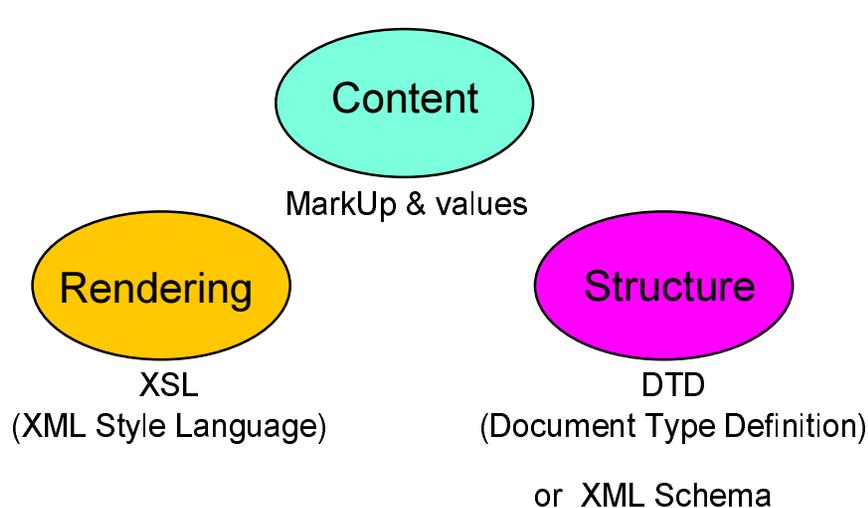
Problem :

- message structure
- message validity
- rendering method
- content coupling

depend on implementation

✗ meaning difficult to extract

XML data description

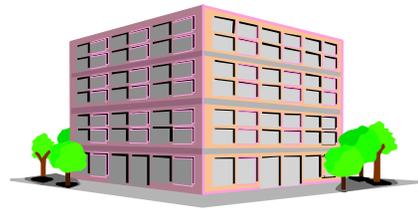


- ✓ self describing
- ✓ validation of form
- ✓ multiple renderings
- ✓ open standard vocabularies
- ✓ Internet enabled

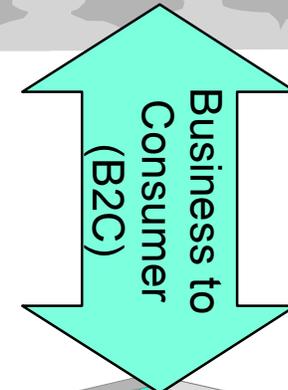
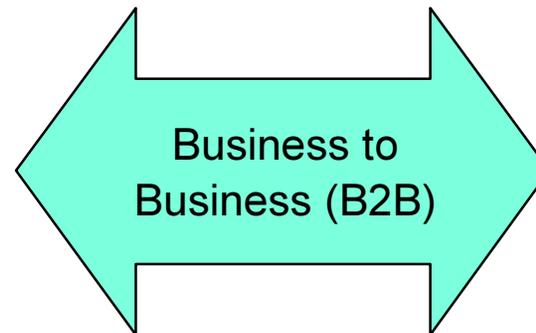
The XML Opportunity

"Business-to-business e-commerce is expected to grow rapidly, at five to ten times the rate of business-to-consumer e-commerce"

IBM's Corporate Strategy Global Market Trends (GMT), 1998



Buyer



Seller

XML B2C = request-at-a-time electronic commerce

programmed rendering & simple seller side processing

XML B2B = fully automated electronic commerce (EDI)

programmed buyer-side server & seller side processing

Web Services



- **Web Services are the next step in the evolution of the WWW and allow programmable elements to be placed on web sites where other can access in distributed behaviors**
 - ▶ A provider of information or capabilities exposed on a network through a consistent set of interfaces and protocols
 - ▶ support heterogeneous environment seamlessly
- **Connect applications to applications in other businesses quickly and easily**
 - ▶ Focus on **automation** of development and deployment
- **Establish interaction with marketplaces more efficiently**
- **Deliver business functions to a broader set of customers and partners**
- **Pursue new business models by combining applications in new dynamic ways**

Web Services: Base Technologies

- **XML - Universal data format**
- **SOAP - Simple Object Access Protocol**
 - ▶ an XML protocol to invoke a method on a server to execute a requested operation and get a response in XML
 - ▶ object-oriented programming on web-based objects
 - ▶ request message is sent by service requestor
 - ▶ response message is sent by service provider
- **UDDI - Universal Description, Discovery, Integration**
 - ▶ UDDI servers act as a directory of available services and service providers
 - ▶ SOAP can be used to query UDDI for services
- **WSDL - Web Services Description Language**
 - ▶ an XML vocabulary to describe service interface
 - ▶ operational information about the service
 - [service interface](#)
 - implementation details
 - access protocol
 - contact endpoints

Examples of Web Services

- weather reports
- news feed
- airline schedules
- airline reservations
- rental car agreements
- credit check
- credit card validation
- request for quote
- supply chain management
- purchase order

Web Service Components

■ Service Provider

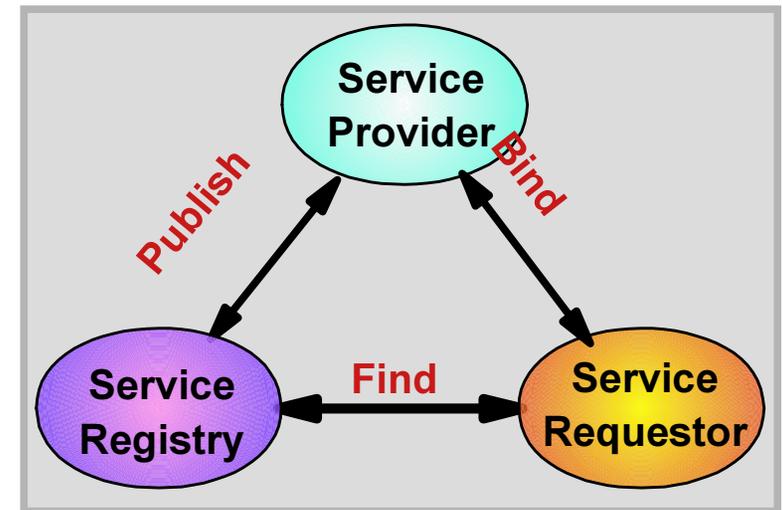
- ▶ provides e-business services
- ▶ uses WSDL to describe a service
- ▶ **PUBLISHES** availability of these services through a UDDI registry

■ Service Registry

- ▶ provides support for publishing and locating services
- ▶ like telephone yellow pages

■ Service Requestor

- ▶ **FINDS** required services via the Service Broker
- ▶ **BINDS** (invokes) to services via Service Provider



IMS XML Objectives

- **IMS XML support for transaction applications**
 1. Add a capability of sending and receiving XML documents to and from IMS transaction applications
 - enable IMS in B2B environments as the high performance XML server
 - provide complete Web-enabled connectivity for all possible IMS applications
 - support unlimited number of displayable devices, including handheld devices
 2. Transform IMS applications into Web services
 - Enable IMS customers to publish IMS applications on the Internet as **Web services** without writing any code

IMS XML Objectives ...

- **IMS XML support for DL/I database**
 - Provide enhanced usability for the IMS Java project by easing programming interfaces to IMS data via generated IMS data objects
 - Based on the DL/I database metamodels, associate database definitions with segment fields information defined in the copybooks to generate data objects
 - Provide capabilities of supporting the Stored Procedure Builder tool for IMS data

IMS and XML Today

- **MQSeries Integrator**
 - ▶ Bridging XML and IMS transaction messages
- **In IMS V7, IMS supports XML through the OS/390 XML Parser, Java Edition**
 - ▶ The XML parser's Application Programming Interfaces (APIs) can be used with the High Performance Java Compiler -- shipped as part of Visual Age for Java, Enterprise Edition for OS/390 -- to develop a new IMS Java program running in IMS
 - ▶ IMS V7 Java application programmers can invoke the APIs (i.e. DOM APIs and SAX APIs) of the OS/390 XML Parser, Java Edition, to convert an XML document from its stream form into a "parsed" form for reading, editing, or updating an XML document



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IMS XML

Future Directions

XML Support for IMS Transactions

- **Capability of IMS transaction messages to be sent and received as XML documents/SOAP messages**
 - Sent and received XML documents directly to/from IMS applications
 - Sent and received XML documents via WebSphere
- **XML support for IMS applications in COBOL, PL/I, HLAssembler, C, Java and MFS-based**
- **Transform IMS applications to Web services**
- **Dependency on enterprise tools for connectors, adapters, and Web services, etc.**

IMS Transaction XML Metamodels

- **Model IMS transactional messages in metamodels as part of the **Common Application Metamodel (CAM)** effort**
 - ▶ IMS messages without the OTMA prefix
 - uses the language metamodels
 - COBOL/PLI/C/C++/Java/HL Assembler metamodels
 - ▶ IMS OTMA messages with the prefix
 - uses the language metamodels
 - ▶ IMS basic messages to be sent and received to/from IMS transaction applications directly
 - transaction code is not included as part of the metamodel
 - uses the language metamodels
 - ▶ MFS message metamodel
- **CAM provides the underpinning for enterprise tools and connectors/adapters, including Web services tooling that perform connections and transformations**

IMS Transaction XML Deployment

(Requirements)

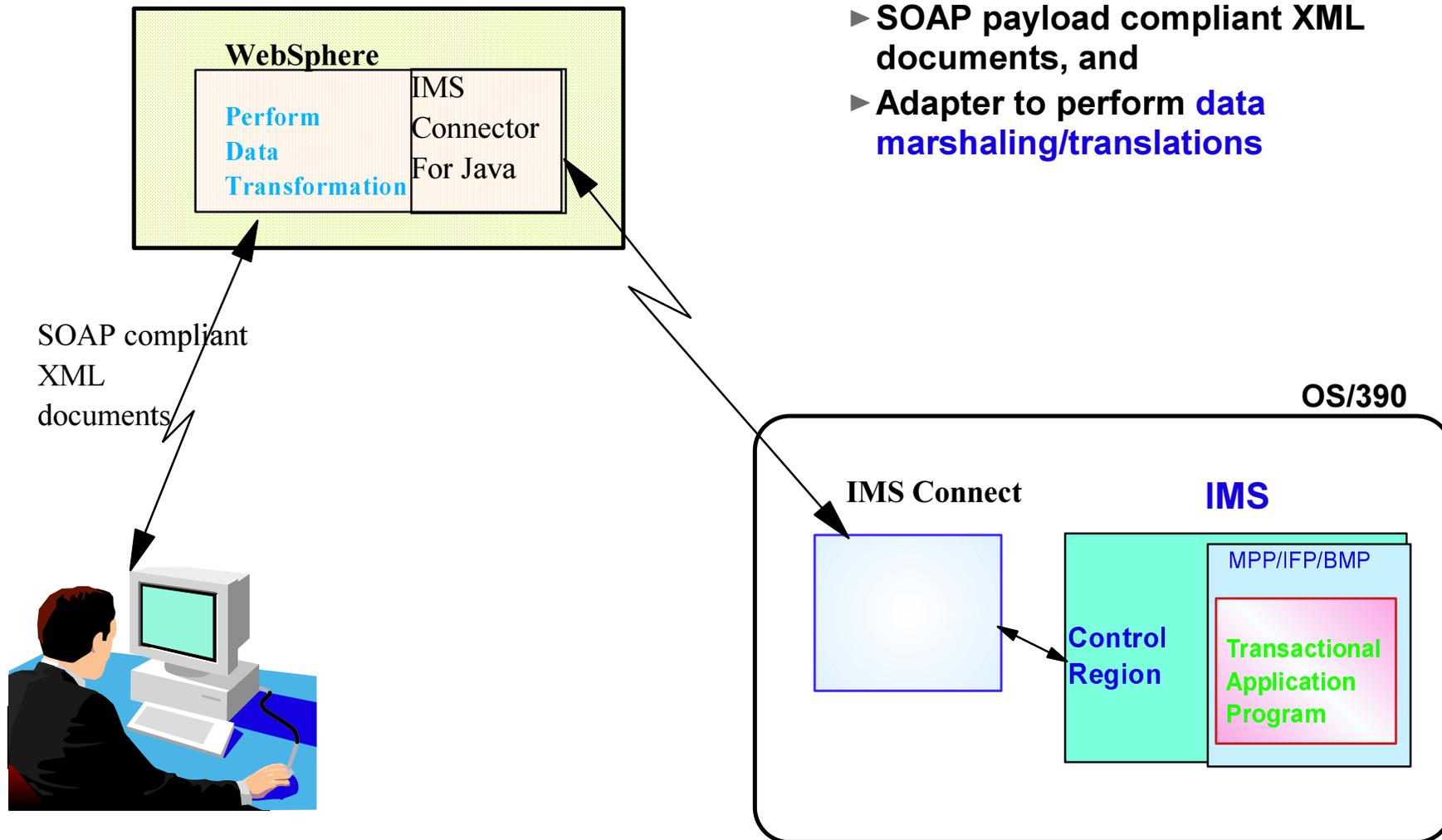
- **Send and receive XML documents via IMS connector for Java**
 - ▶ Support **MFS** services for IMS transaction application programs
 - ▶ Support IMS transaction application programs in languages other than **COBOL**, e.g. **PL/I**, **C**, **Java**, **HL Assembler**, etc.
- **Gateway transformation**
 - ▶ Driving **existing** IMS transaction application programs by sending and receiving XML documents via **parsing** and **transformation** outside of IMS application programs
 - ▶ Translation between XML documents and IMS transaction message data structures can occur in clients or adapters
 - Web Server (e.g. WebSphere)
 - IMS Connect
- **Dependency**
 - ▶ Connector tools support (importers)
 - ▶ Adapters for WAS J2EE and non-Java adapters for IMS gateway
 - Translate between XML documents and IMS input/output message data structures
 - ▶ Web services tool for enterprise applications



IMS XML Transaction/Web Services Access

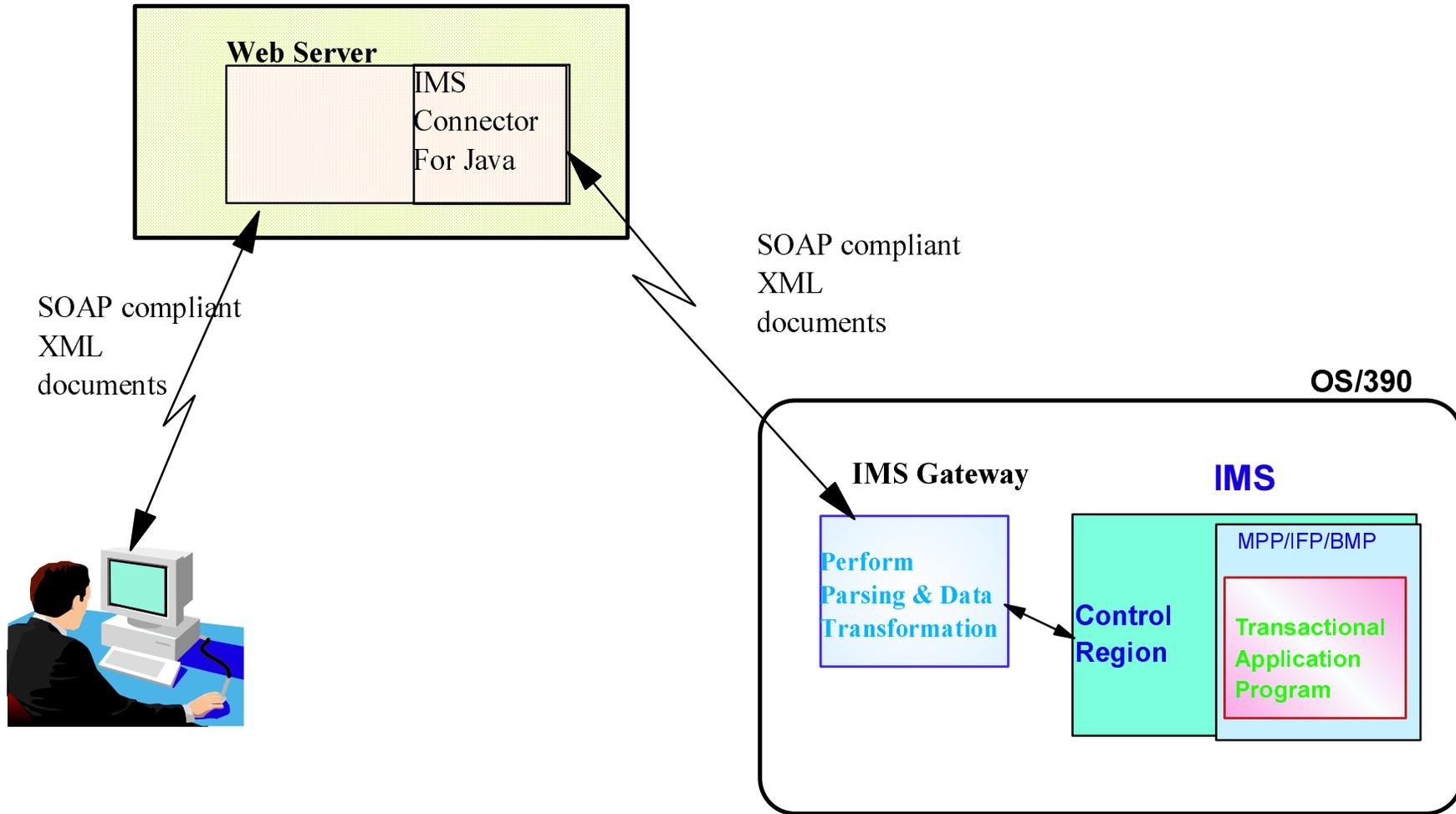
Gateway Transformation: WebSphere

- According to the information captured by CAM, tools can generate
 - ▶ SOAP payload compliant XML documents, and
 - ▶ Adapter to perform data marshaling/translations



IMS XML Transaction/Web Services Access

Gateway Transformation: IMS Gateway

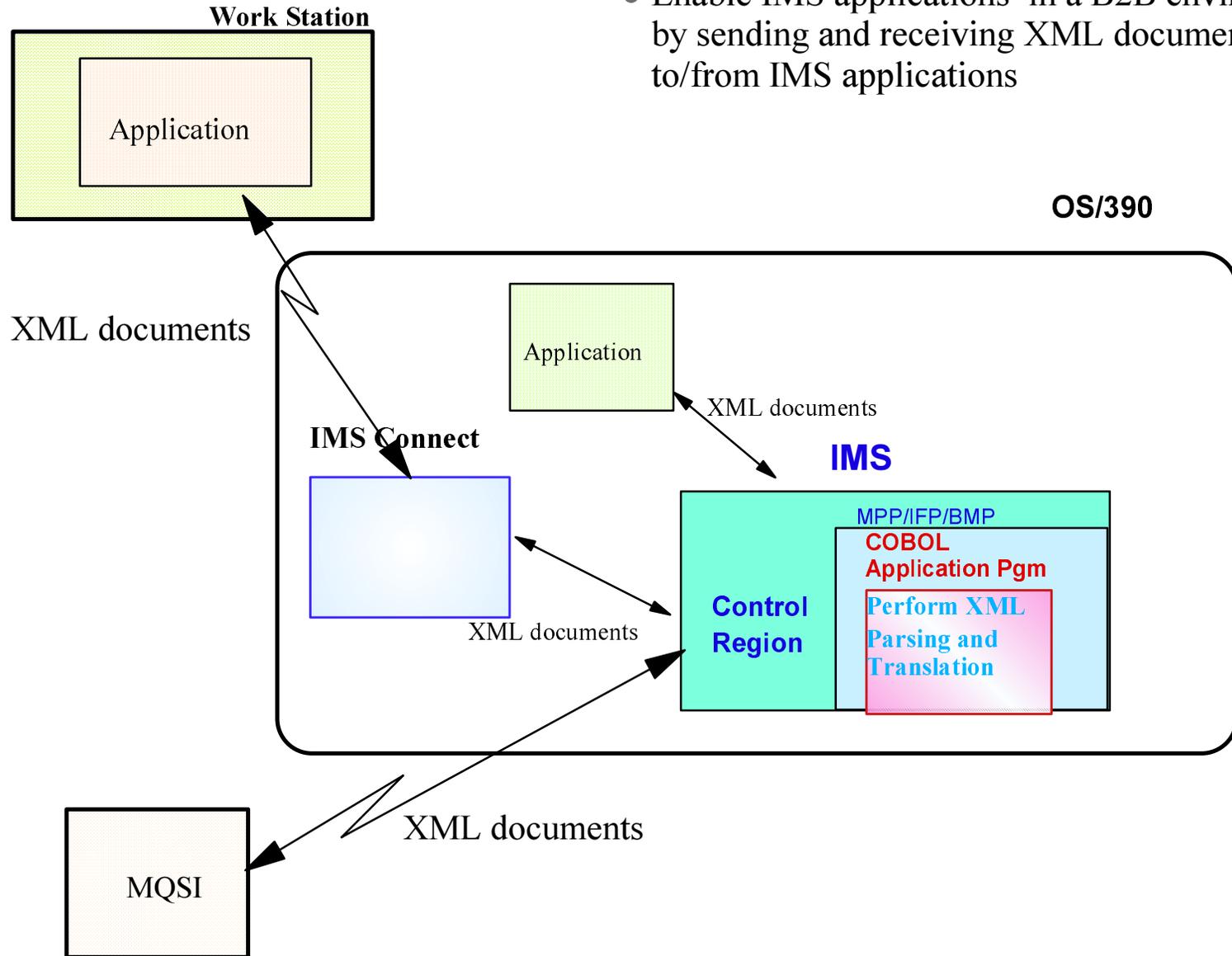


IMS Transaction XML Deployment (Requirements) ...

- **Direct communication with IMS applications**
 - ▶ Support IMS transaction application programs that will directly receive, create, and edit XML documents
 - ▶ **New** IMS applications will be able to invoke and access XML parser and transformers
 - Support new Java IMS applications
 - Support new COBOL or other 3GLs IMS applications with XML-formatted messages
- **Dependency**
 - ▶ XML parsers for COBOL, and other 3GLs languages
 - ▶ Non-Java adapters for IMS or gateway
 - Translate between XML documents and IMS input/output message data structures

Direct XML Communication with IMS Applications

- Enable IMS applications in a B2B environment by sending and receiving XML documents directly to/from IMS applications





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IMS XML for MFS

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August 15, 2001



IBM

IMS MFS XML support

- **Provide integrated tool solutions to enable Internet access to existing IMS transaction programs with MFS services**
- **Insulate business from further evolving technology and facilitate reuse of IMS transactions in the new B2B environment without changing the existing MFS-based IMS applications**
- **Help modernize customers' 3270 applications and support the execution of MFS-based IMS applications from cutting edge new software using industry-standard mechanisms**
 - ▶ render 3270 screen format on Web browser, but not require 3270 emulator
 - ▶ support unlimited number of displayable devices, including Web browser
- **Add a capability of sending and receiving XML documents to and from MFS-based IMS applications**



IMS MFS Importer

- **Content:**

1. IMS MFS metamodel (part of CAM)
2. MFS importer
3. Default 3270 style sheet for HTML forms

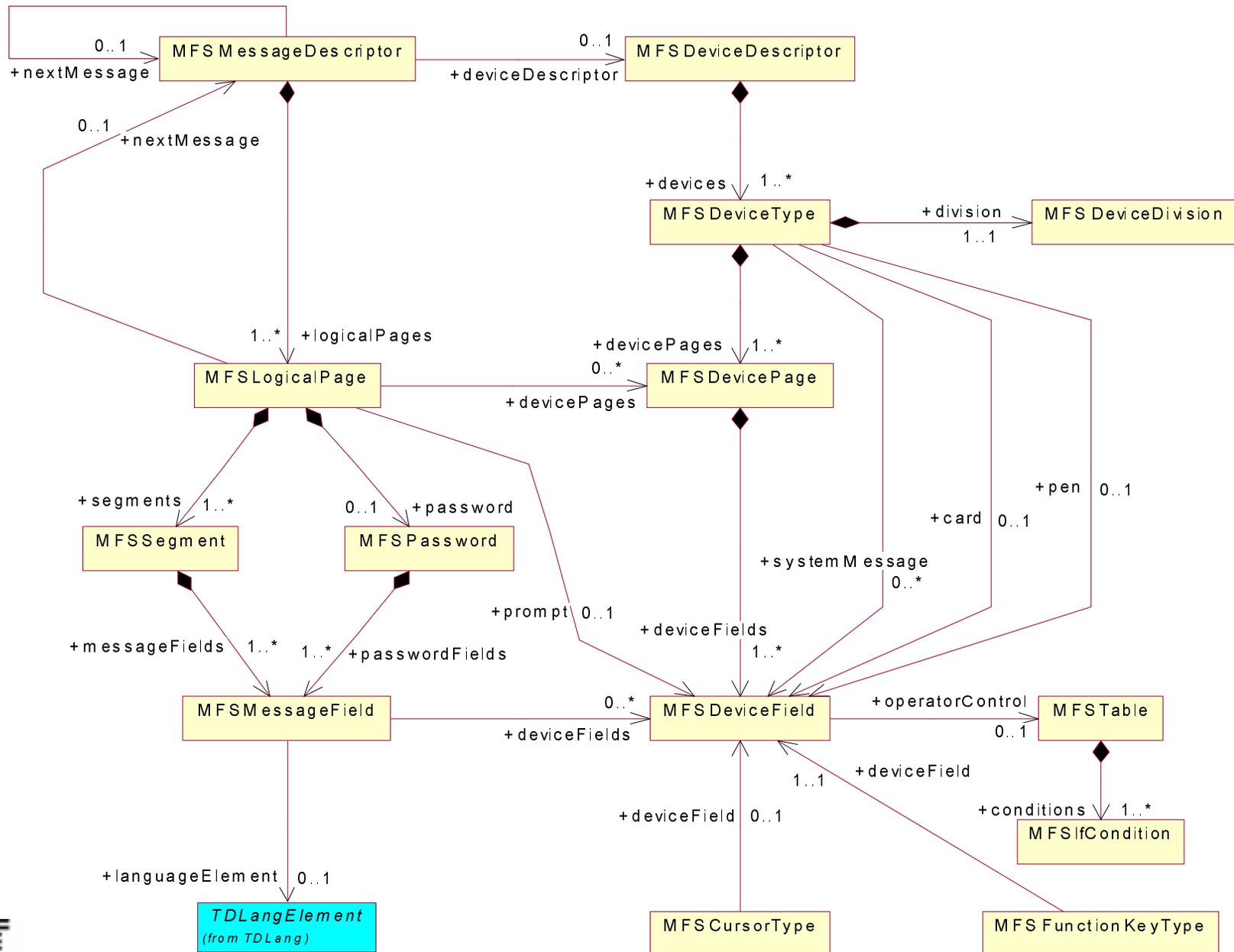
- **Outcome:**

- ▶ Render 3270 screen formats on Web browser

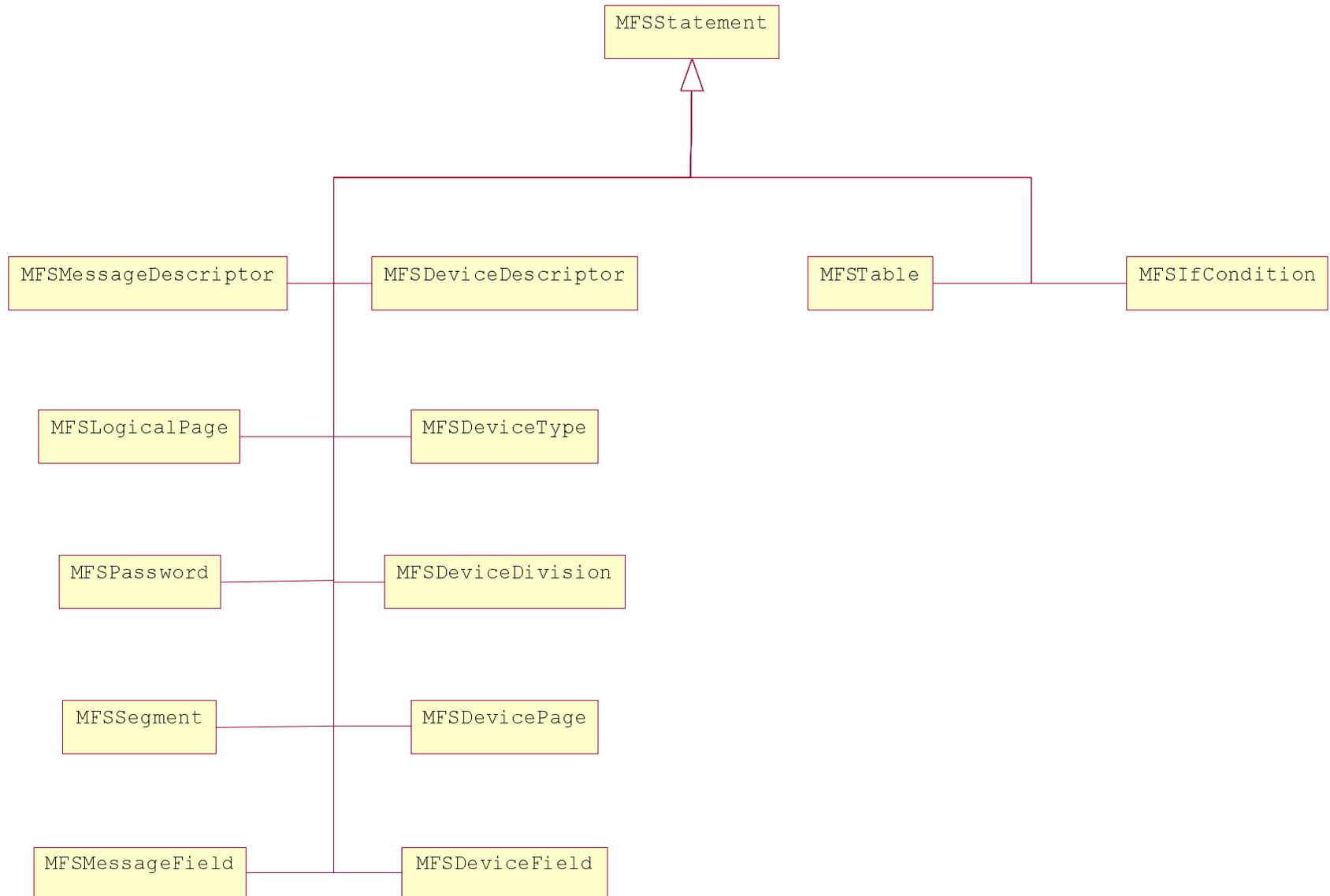
- **Shipping vehicle**

- ▶ WebSphere Studio Application Developer (WSAD) tool

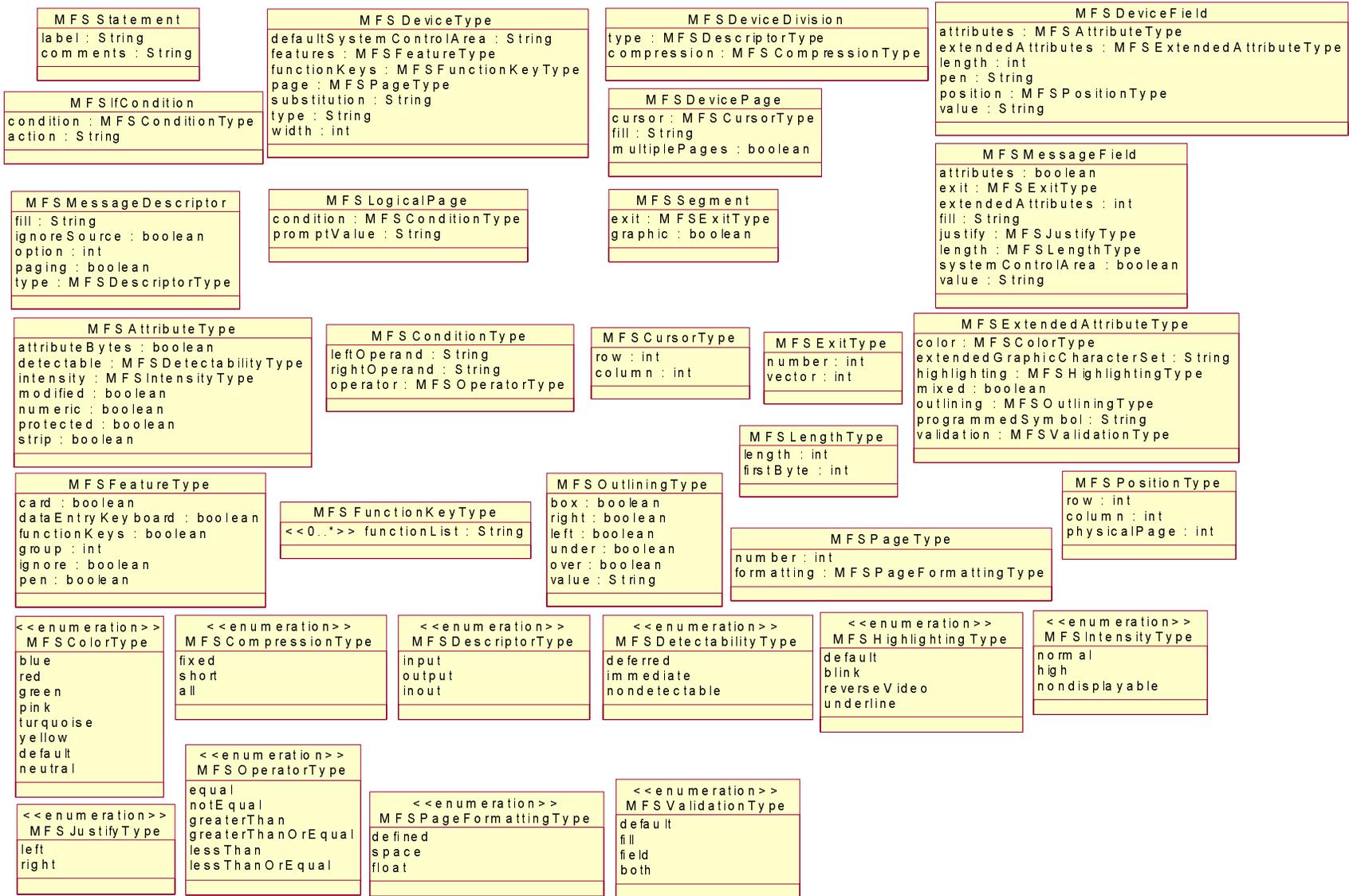
MFS Metamodel (Relationship View)



MFS Metamodel (Hierarchical View)



MFS Metamodel (Attributes)



A Sample MFS Source

IVTNO MSG

TYPE=OUTPUT,SOR=(IVTNOF,IGNORE),NXT=IVTNOMI1

SEG

MFLD MSG,LTH=40

MFLD CMD,LTH=8

MFLD NAME1,LTH=10

MFLD NAME2,LTH=10

MFLD EXT#,LTH=10

MFLD ZIP,LTH=7

MFLD SEGNO,LTH=4

MFLD (SDATE,DATE2)

MSGEND

IVTNOMI1 MSG

TYPE=INPUT,SOR=(IVTNOF,IGNORE),NXT=IVTNO

SEG

MFLD 'IVTNO ',LTH=10

MFLD CMD,LTH=8

MFLD NAME1,LTH=10

MFLD NAME2,LTH=10

MFLD EXT#,LTH=10

MFLD ZIP,LTH=7

MSGEND

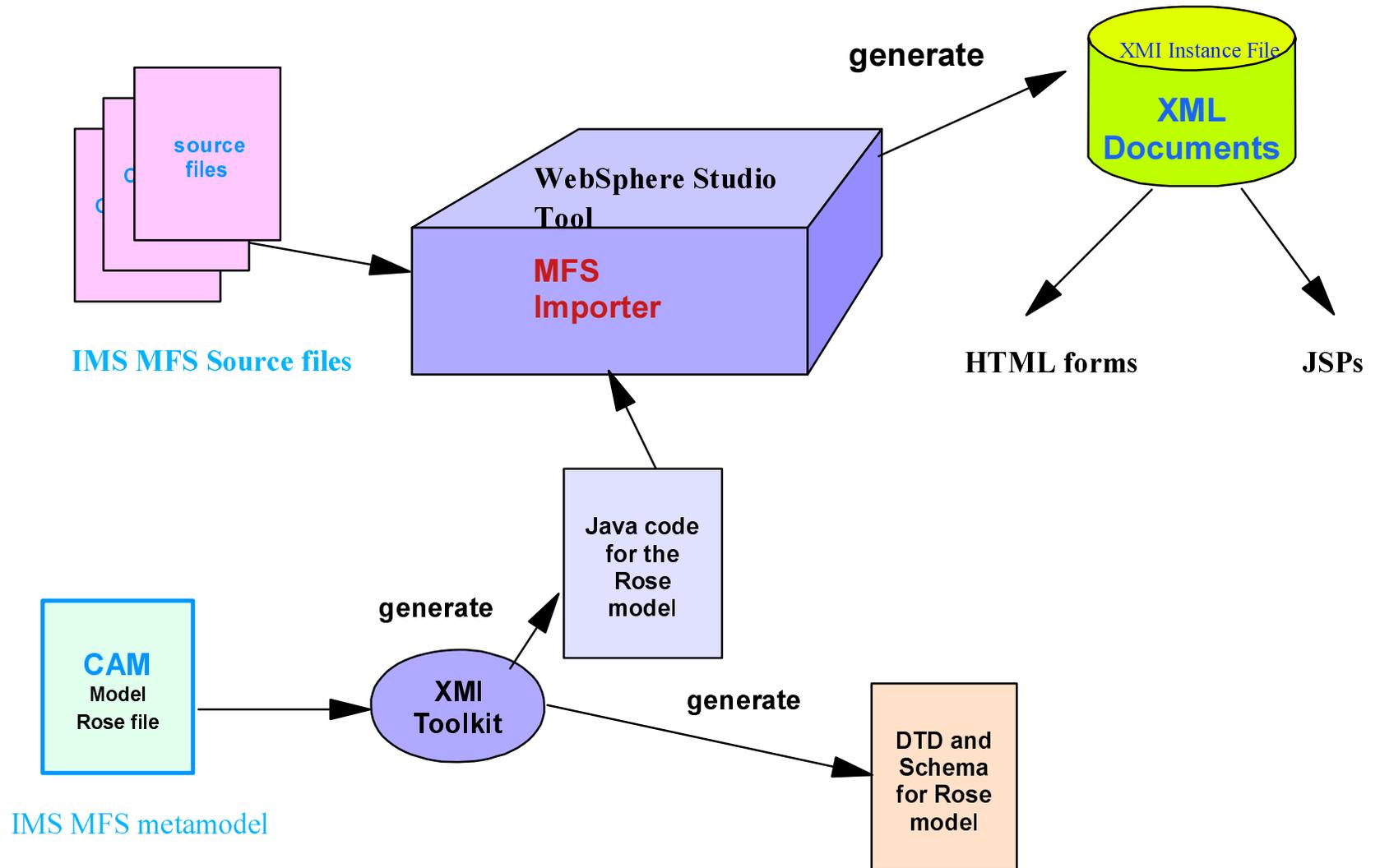
A Sample MFS Source ...

IVTNOF FMT

```
DEV TYPE=3270-A02,FEAT=IGNORE,SYSMSG=SYSMSGGA,DSCA=X'00E0'
DIV TYPE=INOUT
DPAGE CURSOR=((10,34))
DFLD '*****',
  ATTR=PROT,POS=(2,14),LTH=50
DFLD '* IMS INSTALLATION VERIFICATION PROCEDURE *',
  ATTR=PROT,POS=(3,14),LTH=50
DFLD '*****',
  ATTR=PROT,POS=(4,14),LTH=50
DFLD 'TRANSACTION TYPE : NON-CONV (OSAM DB)',
  ATTR=PROT,POS=(7,40),LTH=37
DFLD 'DATE      :',ATTR=PROT,POS=(8,40),LTH=18
SDATE DFLD POS=(8,59),LTH=8,ATTR=PROT
DFLD 'PROCESS CODE (*1) :',ATTR=PROT,POS=(10,10),LTH=21
CMD DFLD POS=(10,34),LTH=8,ATTR=(HI,MOD)
DFLD '(*1) PROCESS CODE ',ATTR=PROT,POS=(11,60),LTH=18
DFLD 'LAST NAME      :',ATTR=PROT,POS=(12,10),LTH=21
NAME1 DFLD POS=(12,34),LTH=10,ATTR=(HI,MOD)
DFLD '  ADD      ',ATTR=PROT,POS=(12,60),LTH=18
DFLD '  DELETE   ',ATTR=PROT,POS=(13,60),LTH=18
DFLD 'FIRST NAME   :',ATTR=PROT,POS=(14,10),LTH=21
NAME2 DFLD POS=(14,34),LTH=10,ATTR=(HI,MOD)
DFLD '  UPDATE   ',ATTR=PROT,POS=(14,60),LTH=18
DFLD '  DISPLAY  ',ATTR=PROT,POS=(15,60),LTH=18
DFLD 'EXTENSION NUMBER :',ATTR=PROT,POS=(16,10),LTH=21
EXT# DFLD POS=(16,34),LTH=10,ATTR=(HI,MOD)
DFLD '  TADD     ',ATTR=PROT,POS=(16,60),LTH=18
DFLD 'INTERNAL ZIP CODE :',ATTR=PROT,POS=(18,10),LTH=21
ZIP DFLD POS=(18,34),LTH=7,ATTR=(HI,MOD)
MSG DFLD POS=(21,10),LTH=40,ATTR=PROT
SEGNO DFLD POS=(21,72),LTH=4,ATTR=PROT
SYSMSGGA DFLD POS=(23,1),LTH=79,ATTR=HI
FMTEND
END
```



MFS Importer Development Phase



3270 Default Styling Sheet

- 3270 look
- PF keys
- system literals
 - ▶ dates (MM/DD/YY)
- PA keys
 - ▶ next page
 - ▶ next message
 - ▶ copy

Render a MFS source on Web Browser

```
*****  
*           IMS INSTALLATION VERIFICATION PROCEDURE           *  
*****
```

```
TRANSACTION TYPE : NON-CONV (OSAM DB)  
DATE              :
```

```
PROCESS CODE (*1) : ADD
```

```
LAST NAME       : Brown
```

```
FIRST NAME      : Charlie
```

```
EXTENSION NUMBER : 3-3333|
```

```
INTERNAL ZIP CODE :
```

```
(*1) PROCESS CODE  
ADD  
DELETE  
UPDATE  
DISPLAY  
TADD
```

```
SEGMENT# :
```

Submit



IMS MFS Transformer (follow-on)

- **New MFS transformation and conversion routine to translate MFS XML documents**
- **The new routine should be general enough to be invoked by**
 - IMS gateway (i.e. IMS Connect), or
 - Web servers (e.g. WebSphere Application Server)

Summary

- **Enable Internet access to existing IMS transaction programs with integrated tool solutions**
 - ▶ WebSphere Studio tool
- **Insulate business from further evolving technology and facilitate reuse of IMS transactions in the new B2B environment without changing the existing IMS applications**
- **Add a capability of sending and receiving XML documents to and from IMS transaction applications**
 - ▶ enable IMS in B2B environments as the high performance XML server
- **Help modernize customers' 3270 applications and support the execution of MFS-based IMS applications from cutting edge new software using industry-standard mechanisms**
- **Enable IMS customers to publish IMS applications on the Internet as Web services without writing any code**