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IMS XML, SOAP and Web Services Solutions

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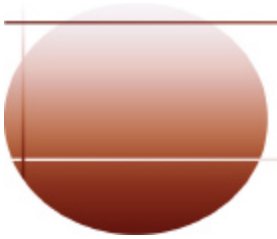

IMS

technical conference

Las Vegas, NV **September 15 – September 18, 2003**

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Agenda

- XML, SOAP and Web Services Overview
- Business Integration Challenge and Common Application Metamodel (CAM)
- WebSphere Studio Tooling
- IMS XML and Web Services Solutions
- Future Requirements

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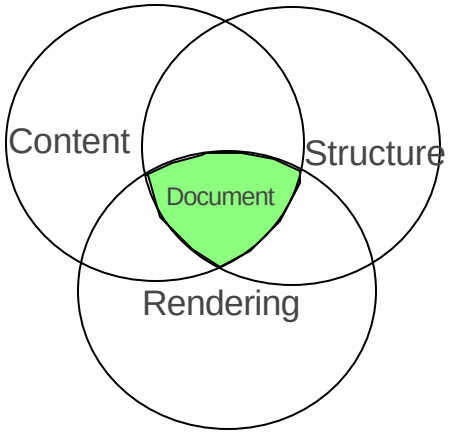
XML Technology Overview



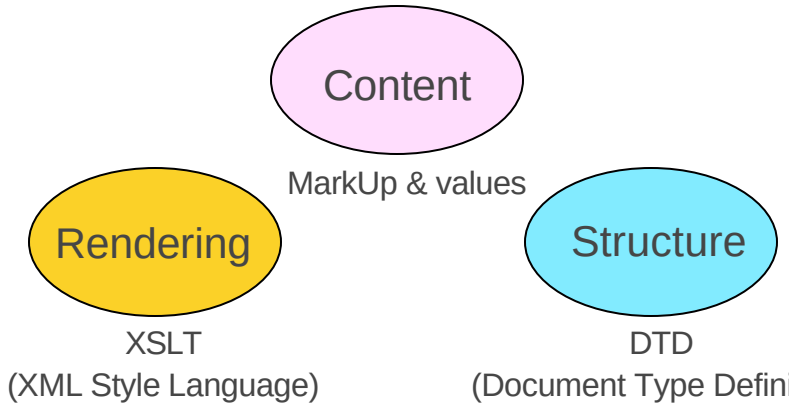
Problem :

- 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**

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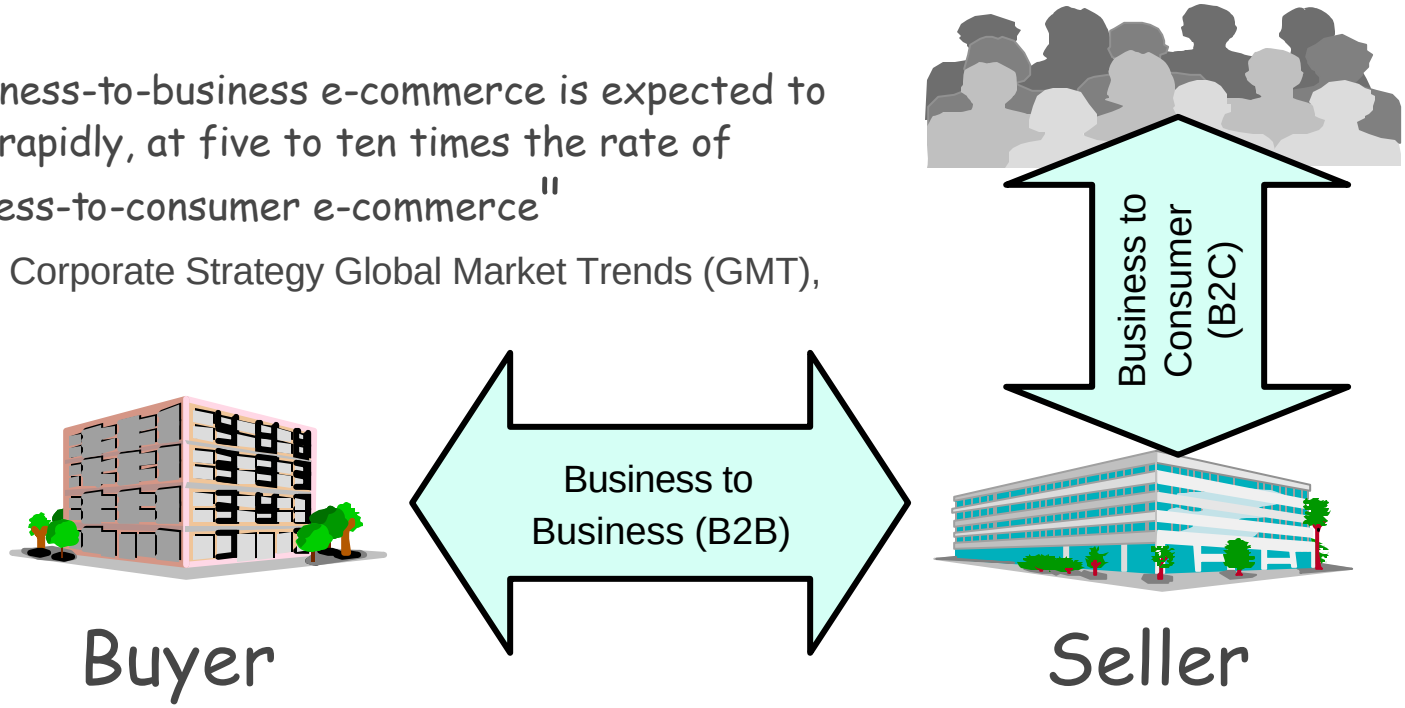
The XML Opportunity

"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



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

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What Is A “Web Service”?

1. Web service technology provides a “virtual component model” for using components.

2. When exploiting a Web service the supporting container hides “middleware idiosyncrasies” like the underlying component model of the actual target component used, the invocation protocol etc. as far as possible.

3. Web service technology does *not* provide a new component model for implementing components.

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Web Services – Basic Technologies

- **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
  - 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
    - using XML Schema to describe data types
  - operational information about the service
    - service interface
    - implementation details
    - access protocol
    - contact endpoints

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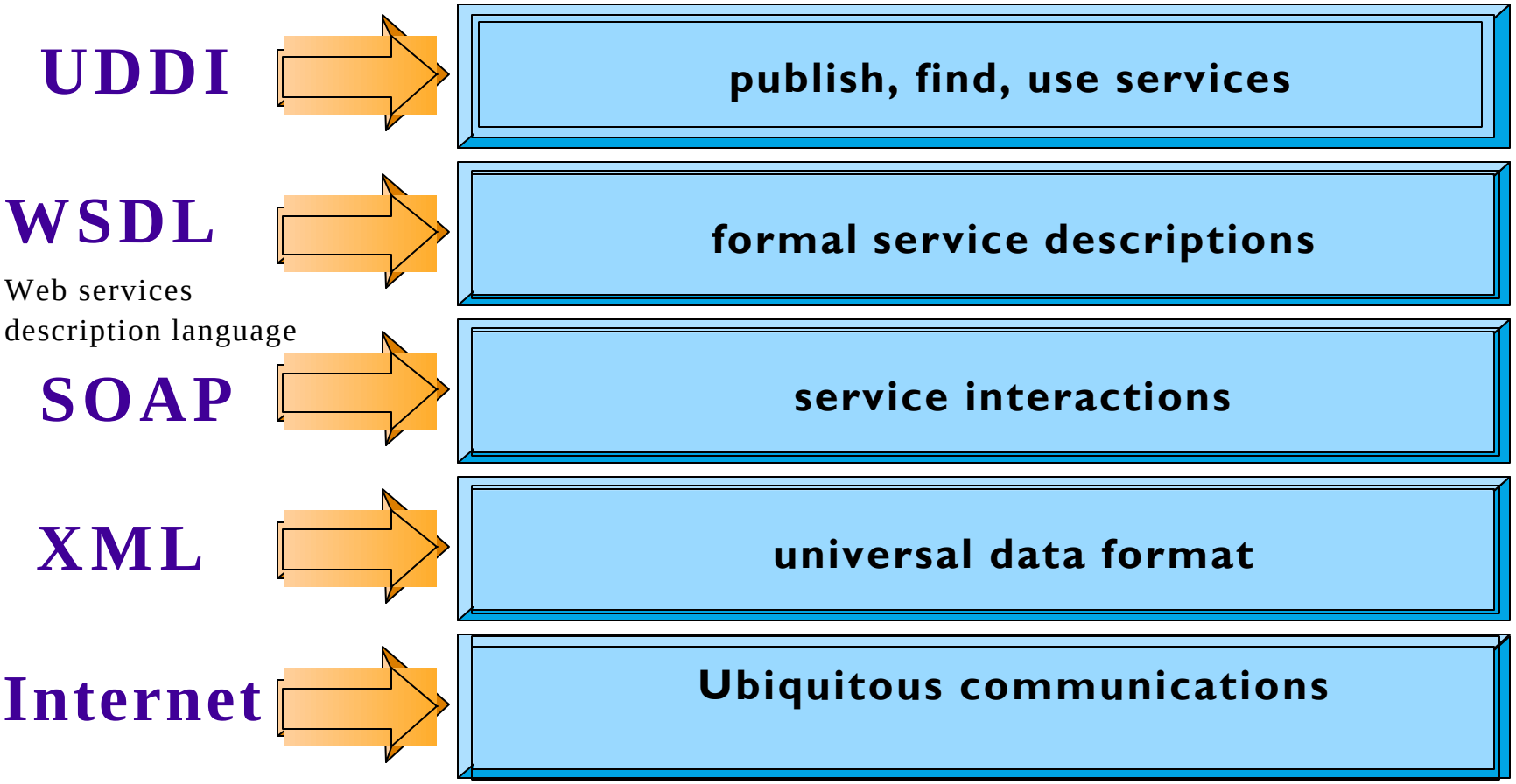
Web Services Fundamentals



Simple, Open, Broad Internet Support

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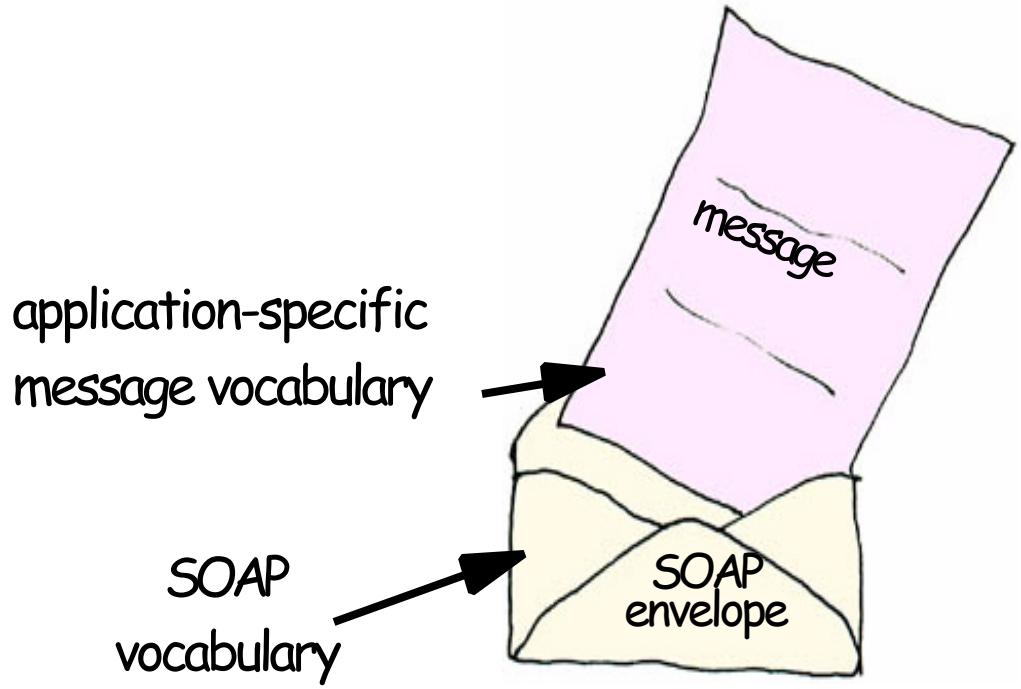
SOAP Message Structures

- Request and Response messages
  - Request invokes a method on a remote object
  - Response returns result of running the method
- SOAP defines an "envelope"
  - "envelope" wraps the message itself
  - message is a different vocabulary
  - namespace prefix is used to distinguish the two parts



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A SOAP Request Message

```
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://{soaporg}/envelope/"
  SOAP-ENV:encodingStyle=
       "http://{soaporg}/encoding/">

   <SOAP-ENV:Body>
       <m:GetLastTradePrice xmlns:m="Some-URI">
           <symbol>DIS</symbol>
       </m:GetLastTradePrice>
   </SOAP-ENV:Body>

</SOAP-ENV:Envelope>
```

message

SOAP envelope

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A SOAP Response Message

```
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://{soaporg}
  SOAP-ENV:encodingStyle=
       "http://{soaporg}/encoding/">

   <SOAP-ENV:Body>
       <m:GetLastTradePriceResponse
                        xmlns:m="Some-URI">
          <Price>34.5</Price>
       </m:GetLastTradePriceResponse>
   </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Result returned in Body

message

SOAP envelope

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Business Integration Challenge

The Challenge

- Simplify access to existing backend systems
- Seamlessly integrate distinct enterprises

IBM's Innovative Solution

- Common Application Metamodel (CAM) defines a metadata interchange for accessing enterprise applications
  - CAM allows development of tools that analyze existing enterprise applications and describe applications as metadata in a format that can be exchanged among tools
- CAM simplifies business integration for invoking and translating application information
  - facilitates data translations from one language and platform domain into another
- CAM enables Web services (WSDL) for enterprise applications
- CAM is OMG (Object Mangement Group) marketplace standards for EAI (Enterprise Application Integration)

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CAM and IBM Enterprise Tooling

- **CAM is a standards based technology that has already been adopted in the parts of IBM WebSphere Studio Tools to enable enterprise connectivity and Web services**
  - Underpinning for connectors and adapter tools that perform transformations and connections
  - Based on CAM, IBM is building the next generation WebSphere Studio tool suite for B2B applications
    - WebSphere Studio Application Developer Integration Edition (WSAD-IE)
    - WebSphere Studio Enterprise Developer (WSED)
    - WebSphere MQ Integrator (WMQI)
  - IMS Java tool (DLIModel Utility) is also based on CAM

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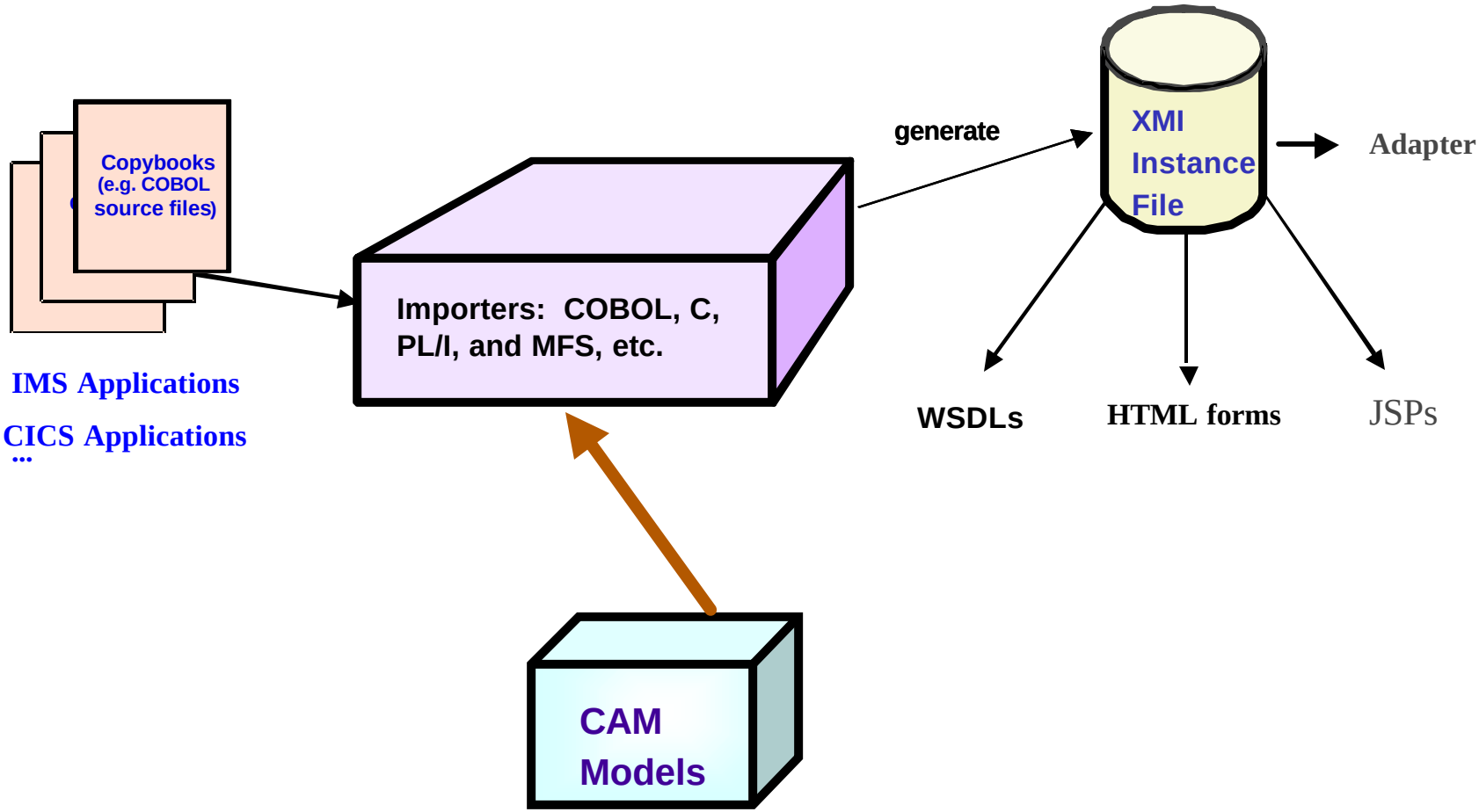
CAM and Tools Development



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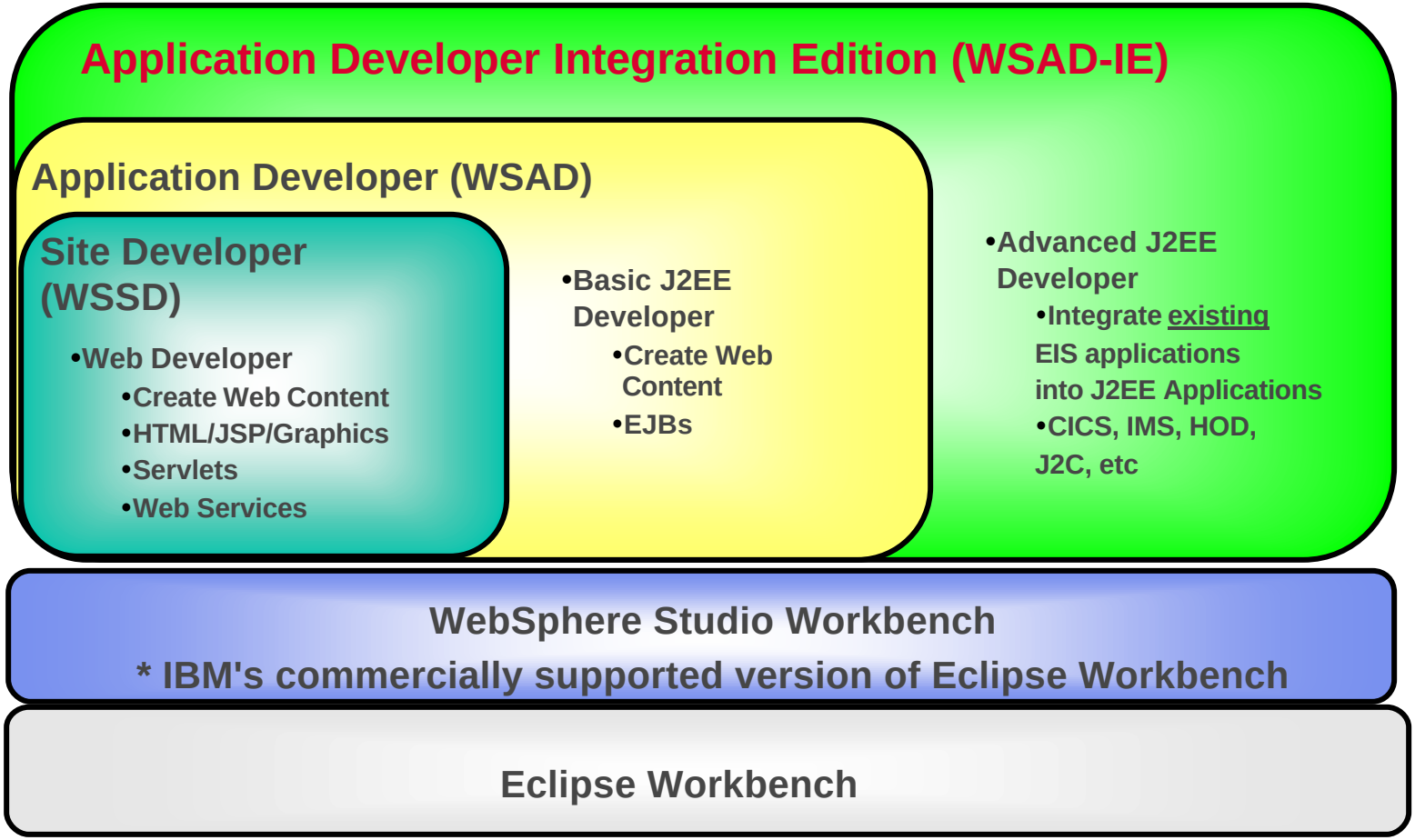
WebSphere Studio Tooling Platform



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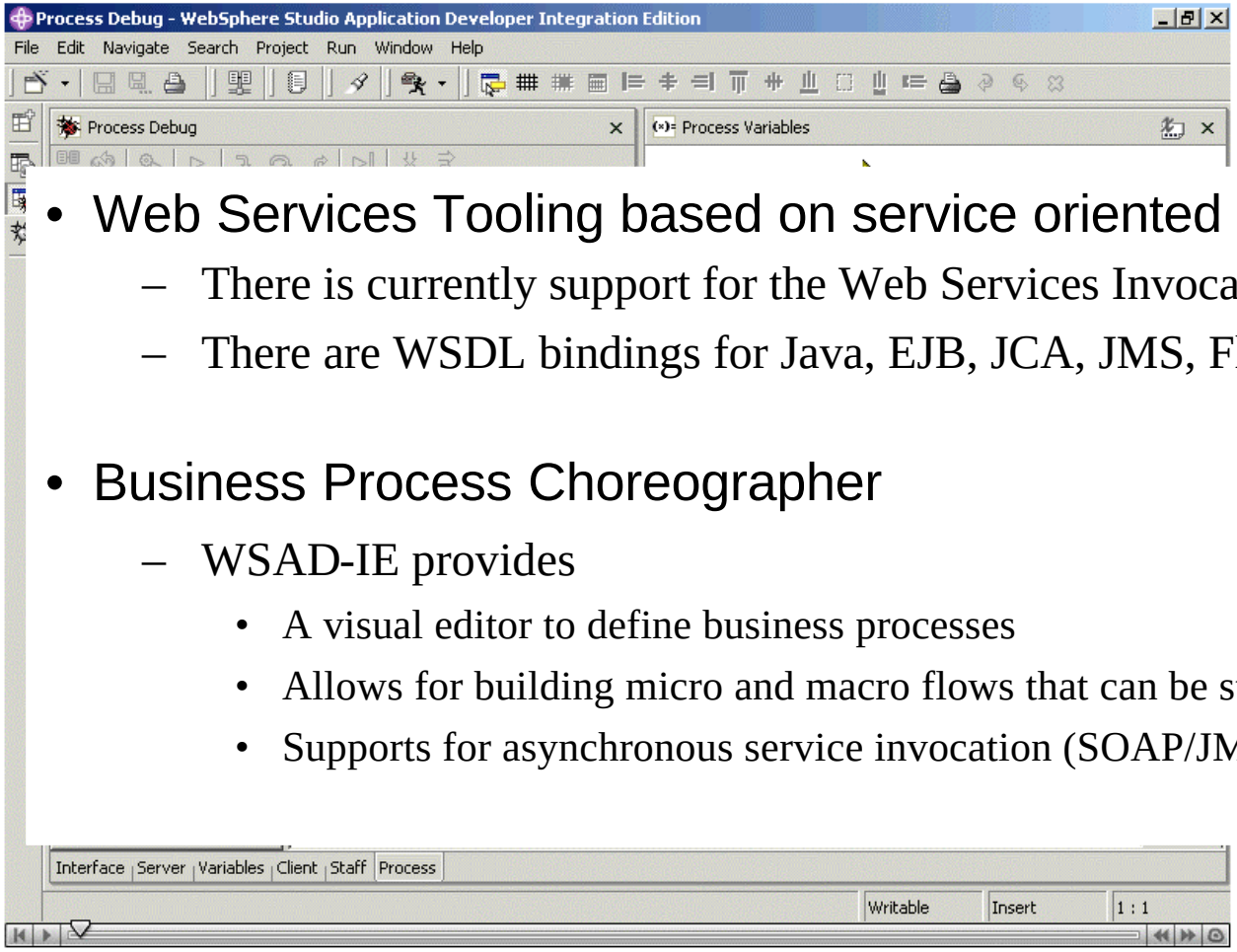
IBM WebSphere Studio Application Developer

Integration Edition for Linux and Windows, V5



Offers a highly

- Web Services Tooling based on service oriented programming model
  - There is currently support for the Web Services Invocation Framework (WSIF)
  - There are WSDL bindings for Java, EJB, JCA, JMS, Flows
- Business Process Choreographer
  - WSAD-IE provides
    - A visual editor to define business processes
    - Allows for building micro and macro flows that can be stateful
    - Supports for asynchronous service invocation (SOAP/JMS via WSIF)

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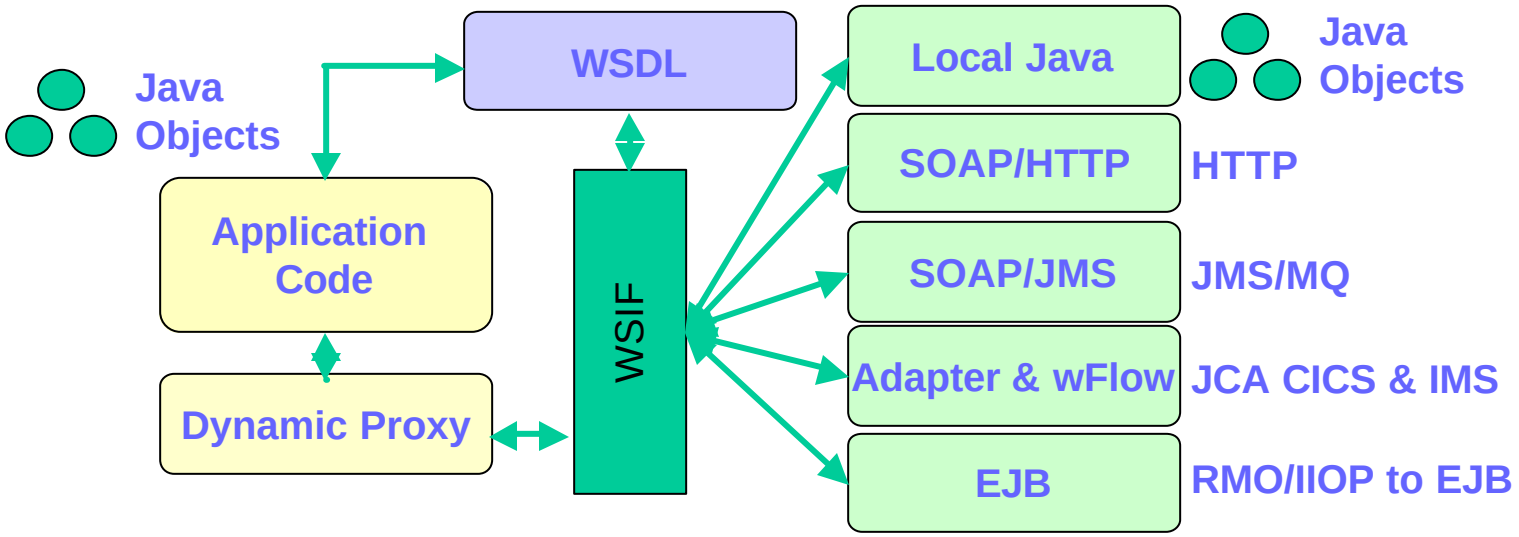
Web Services Invocation Framework

"WSIF enables developers to interact with abstract representations of WSDL descriptions instead of working directly with the SOAP APIs. With WSIF, developers can work with the same model regardless of how the Web service is implemented and accessed."



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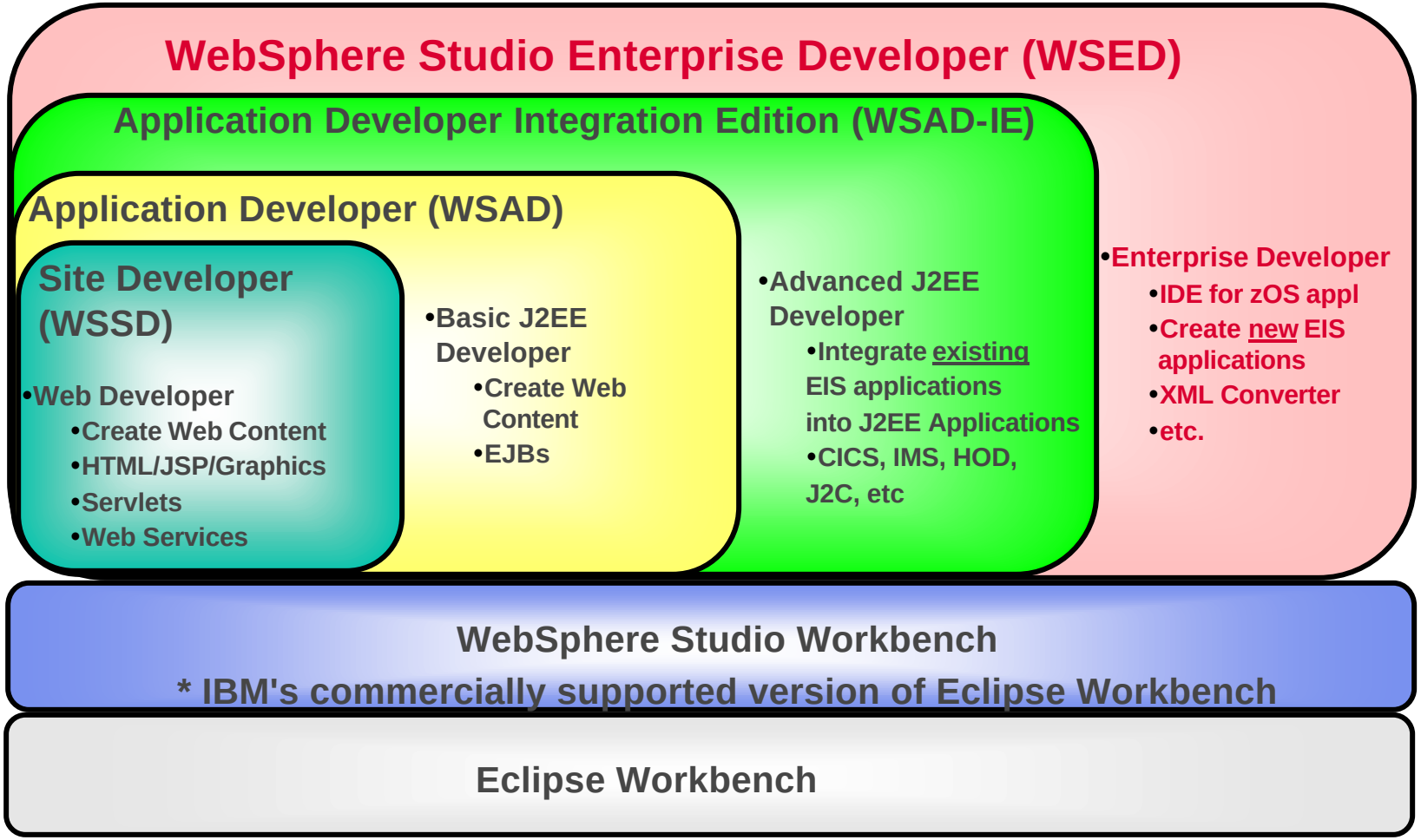
WebSphere Studio Tooling Platform



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WSED and XML Converters

WSED is WSAD-IE plus

- IDE for zOS traditional applications
- XML converter tools based on **CAM** models for supporting COBOL and PL/I XML
- V5.0: Generated XML Converter for COBOL
  - Inbound XML Converter
    - use XML PARSE verb of the new Enterprise COBOL V3.1 compiler to parse incoming XML messages
    - convert parsed messages to COBOL byte streams
  - Outbound XML Converter
    - convert output COBOL byte streams to XML messages
- Future: XML Converter for PL/I

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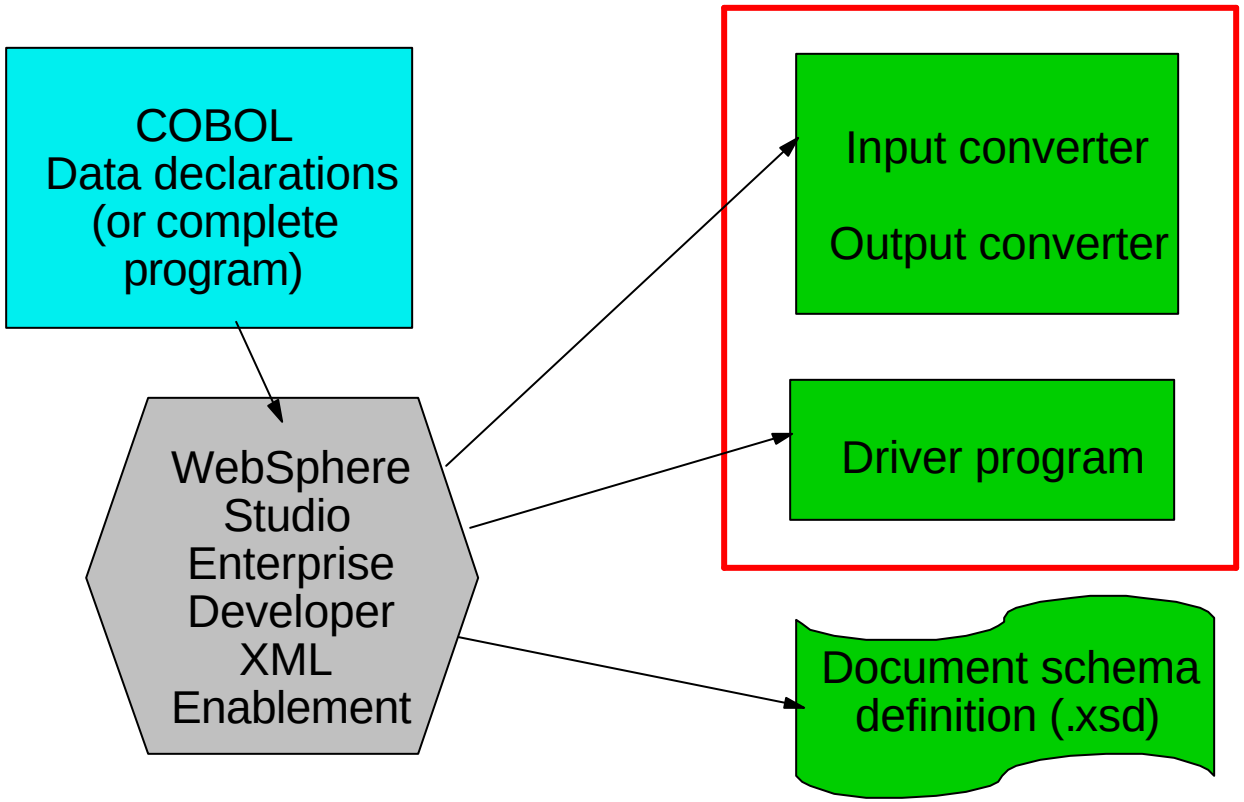
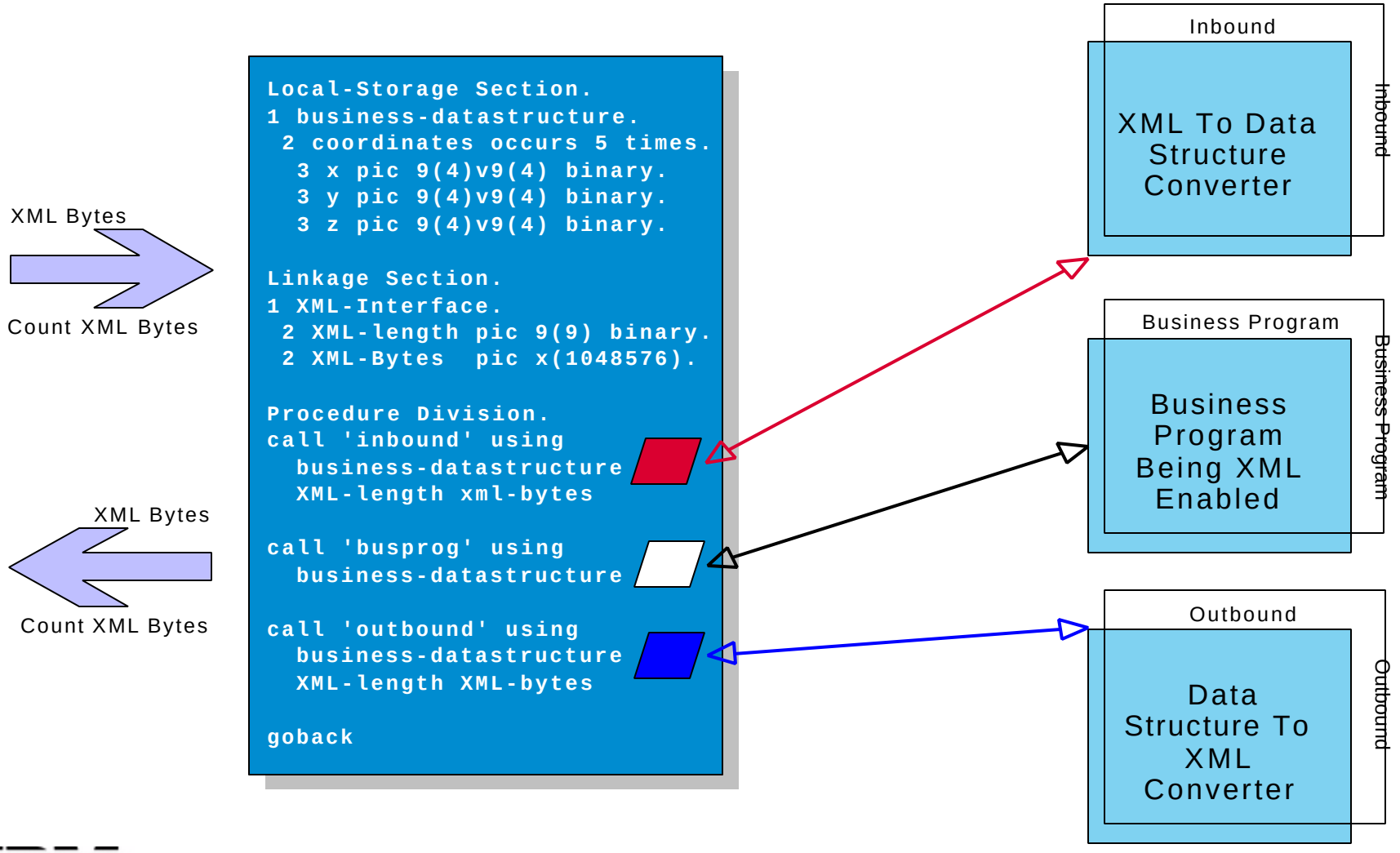
How WSED Generates Message Adapter



WSADIE generates WSDL

XML Converters



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IMS XML and Web Services Solutions

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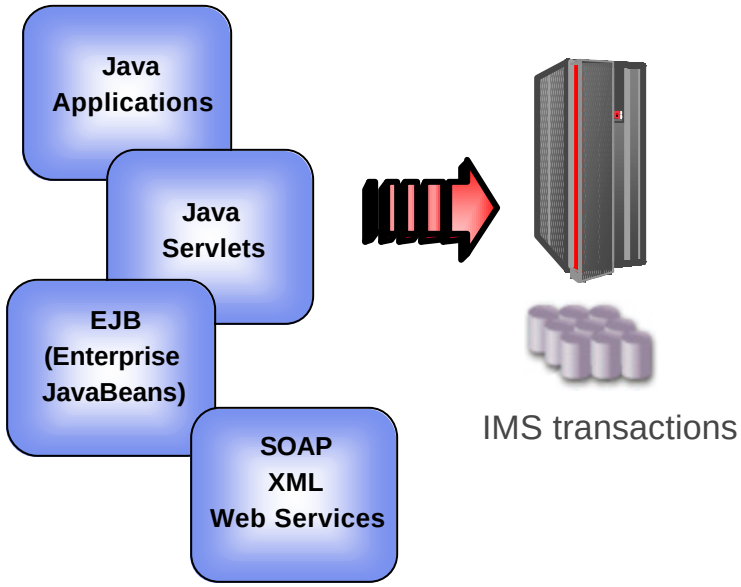
IMS Resource Adapter:
IMS Connector for Java

Helping IMS Users make the transition to e-business easier



- **One of the IBM e-business Connectors (also called WebSphere Resource Adapters)**
- **Consists of Java components and class libraries which allows Java applications (Java servlets, Enterprise JavaBeans), or SOAP clients to submit IMS transactions via IMS Connect**
- **Implements J2EE Connector Architecture and IBM Common Connector Framework (CCF)**

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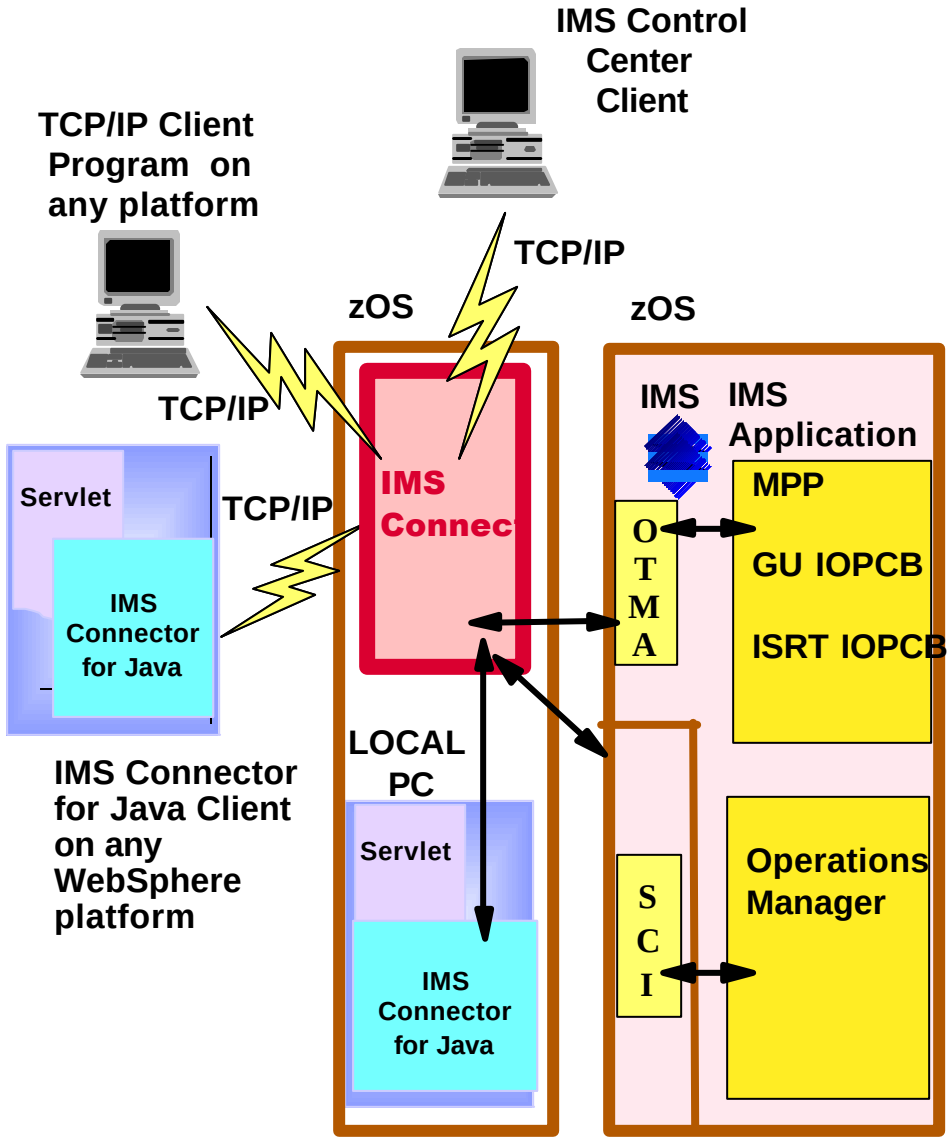
IMS Connect

Capability

- Provides High Performance TCP/IP or local access to IMS applications
- Provides e-business access to IMS applications
- Provides flexible communications and workload balancing
  - –through OTMA (Open Transaction Manager Access) and exits
- Separately managed address space with command interface

Benefits and Value

- Supports TCP/IP sockets access to IMS transactions and commands
- No requirement to modify existing IMS transactions
- Provides a general purpose and structured interface
  - – For the IMS Connector for Java clients
  - – For user-written clients



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IMS Transaction and 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 behaviours**
- **Transform IMS applications into Web Services using WebSphere Studio Application Developer Integration Edition (WSAD-IE) and WebSphere Application Server (WAS)**
  - IMS COBOL and C applications
    - WSAD-IE 4.1
    - WASEE 4.1 & WAS zOS 4.0.4
  - IMS MFS-based applications
    - WSAD-IE 5.0
    - WASEE 5.0 & WAS zOS 5.0
  - IMS PL/I applications (direction)

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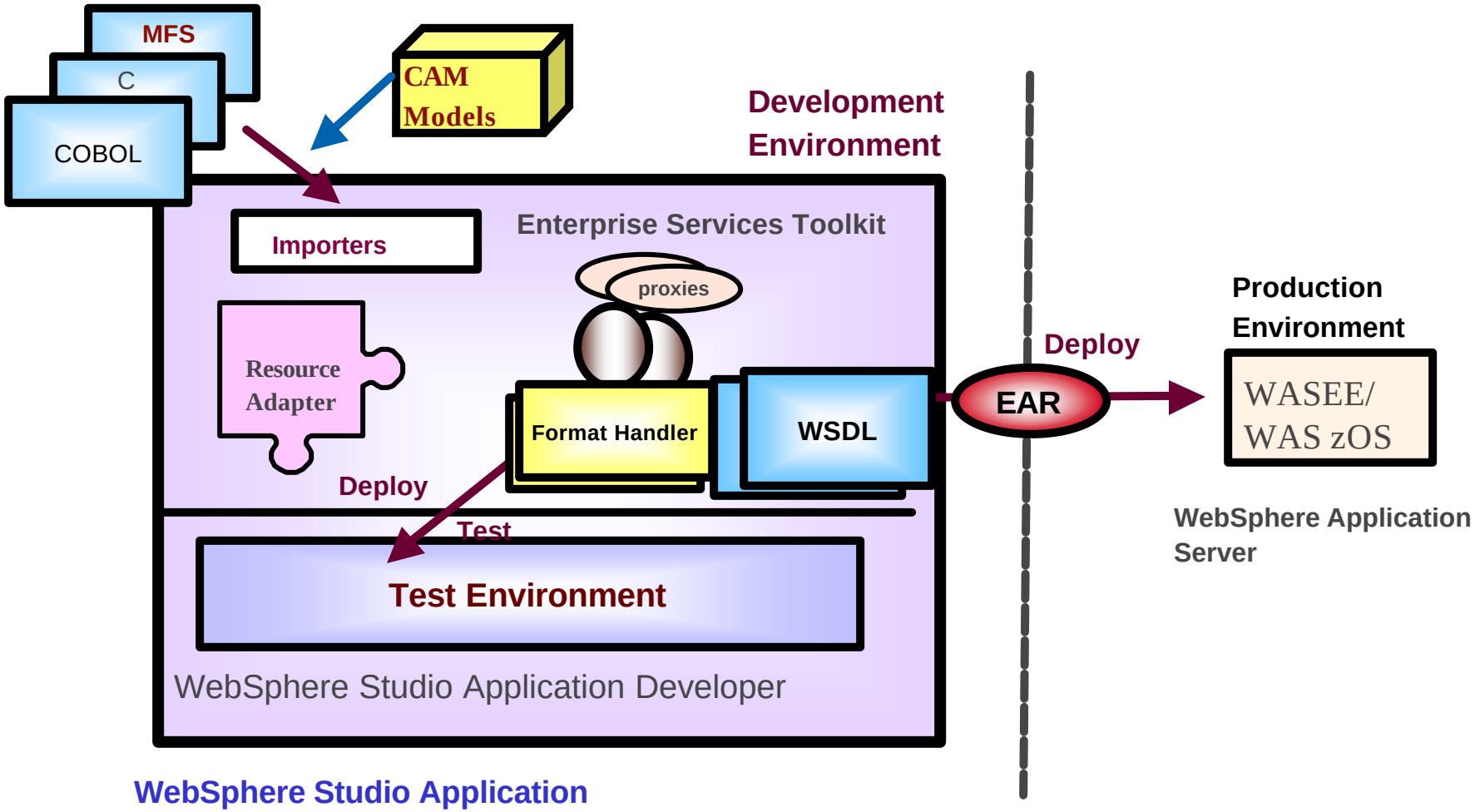
IMS & CAM & WSAD-IE 4.1 and 5.0



WebSphere Studio Application Developer Integration Edition (WSAD-IE)

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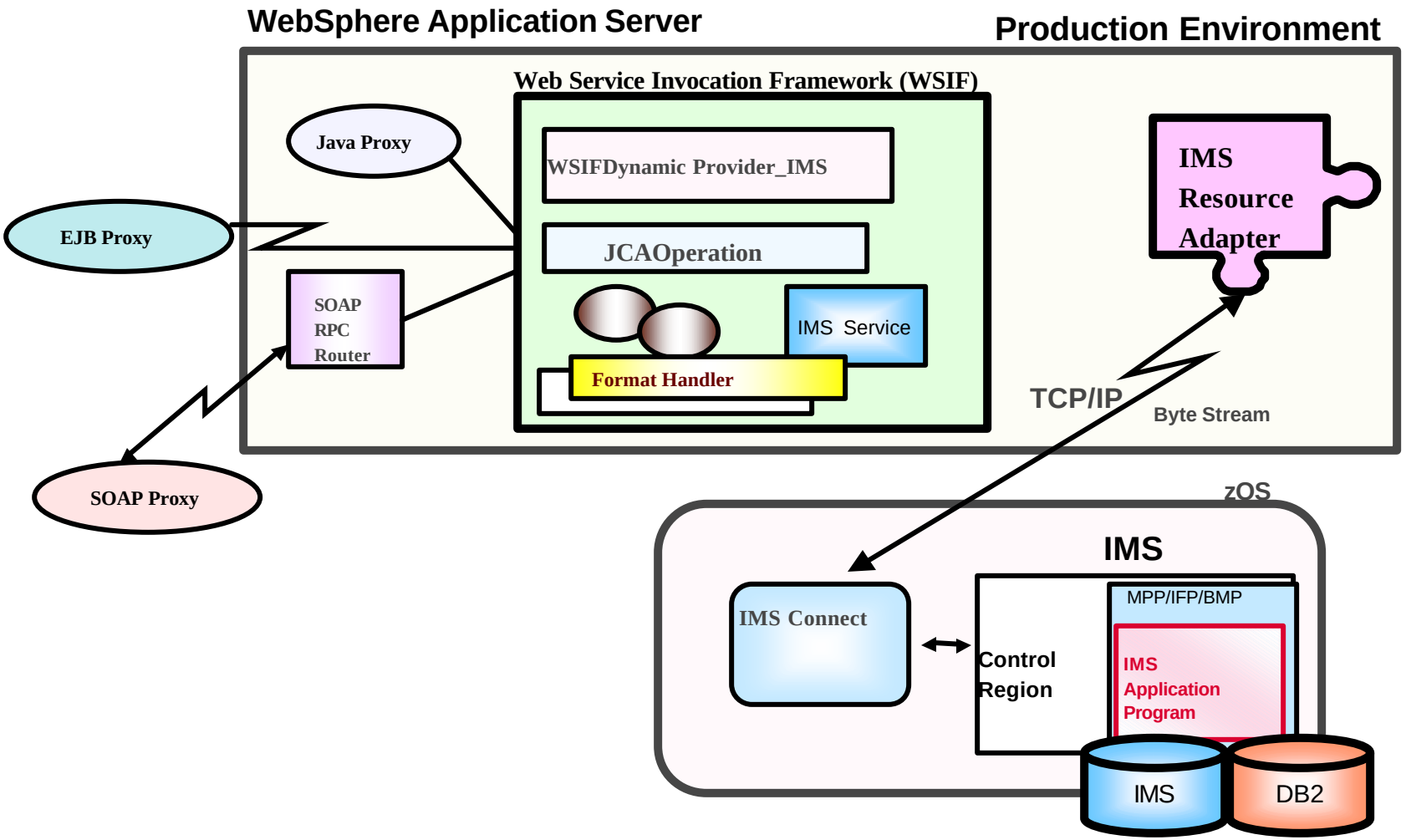
IMS Web Services & WASEE



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IMS Transaction and XML

- **Send and receive XML documents to and from IMS transaction applications - Processing XML documents inside IMS applications**
  - Transaction code must be EBCDIC
  - New IMS Java applications
    - use XML Toolkit for OS/390
  - New or modified IMS COBOL and PL/I applications
    - use XML parsers for COBOL and PL/I
    - parse incoming XML documents
    - XML generation for both input and output XML documents
      - XML Converter for COBOL (WSED 5.0)
      - XML Converter for PL/I (direction)
- **IMS database - future direction**
  - IMS XML storage
- **Operations Manager**
  - Command responses in XML

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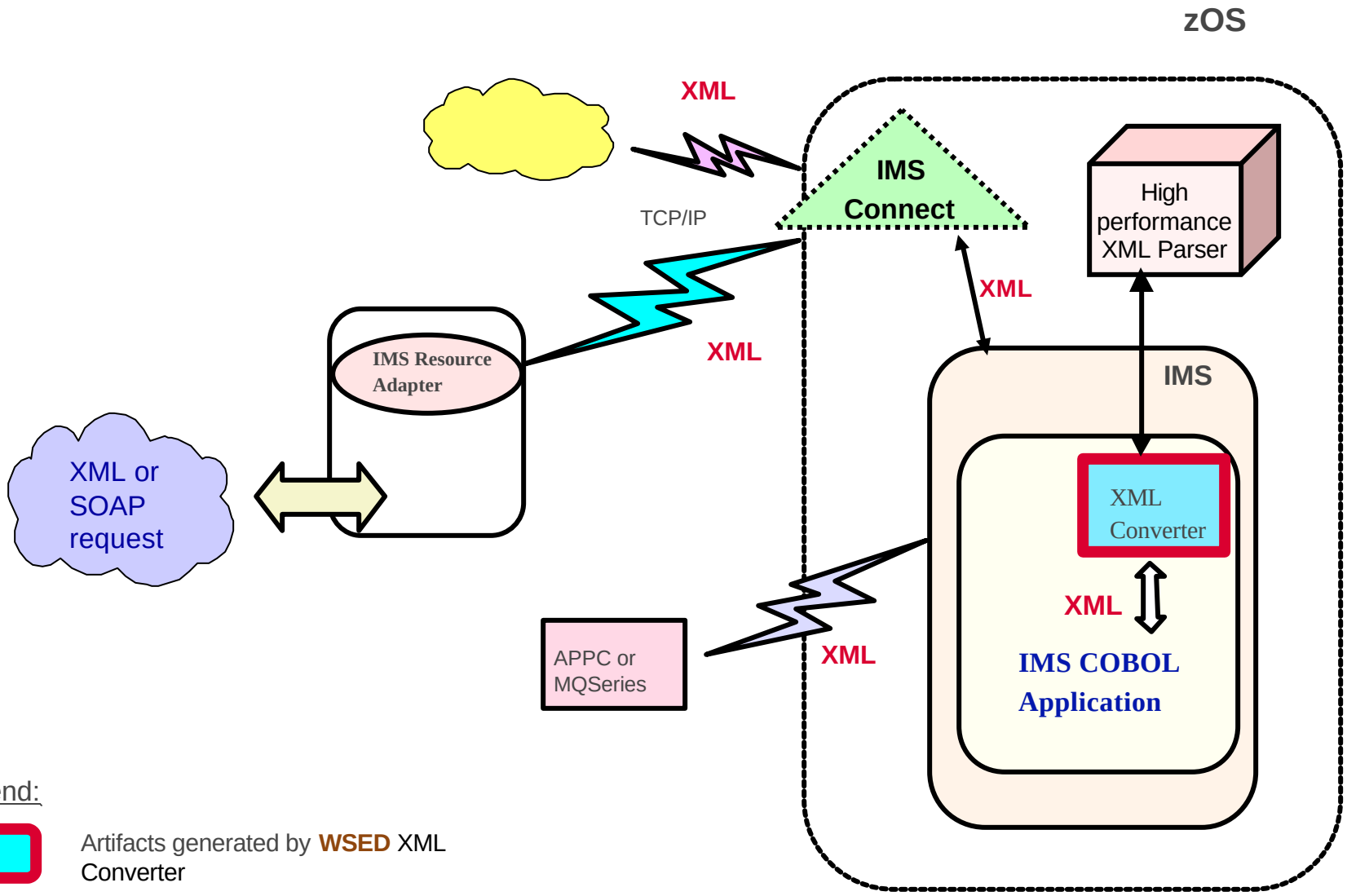
IMS XML Enablement using WSED



Legend:

Artifacts generated by **WSED** XML Converter

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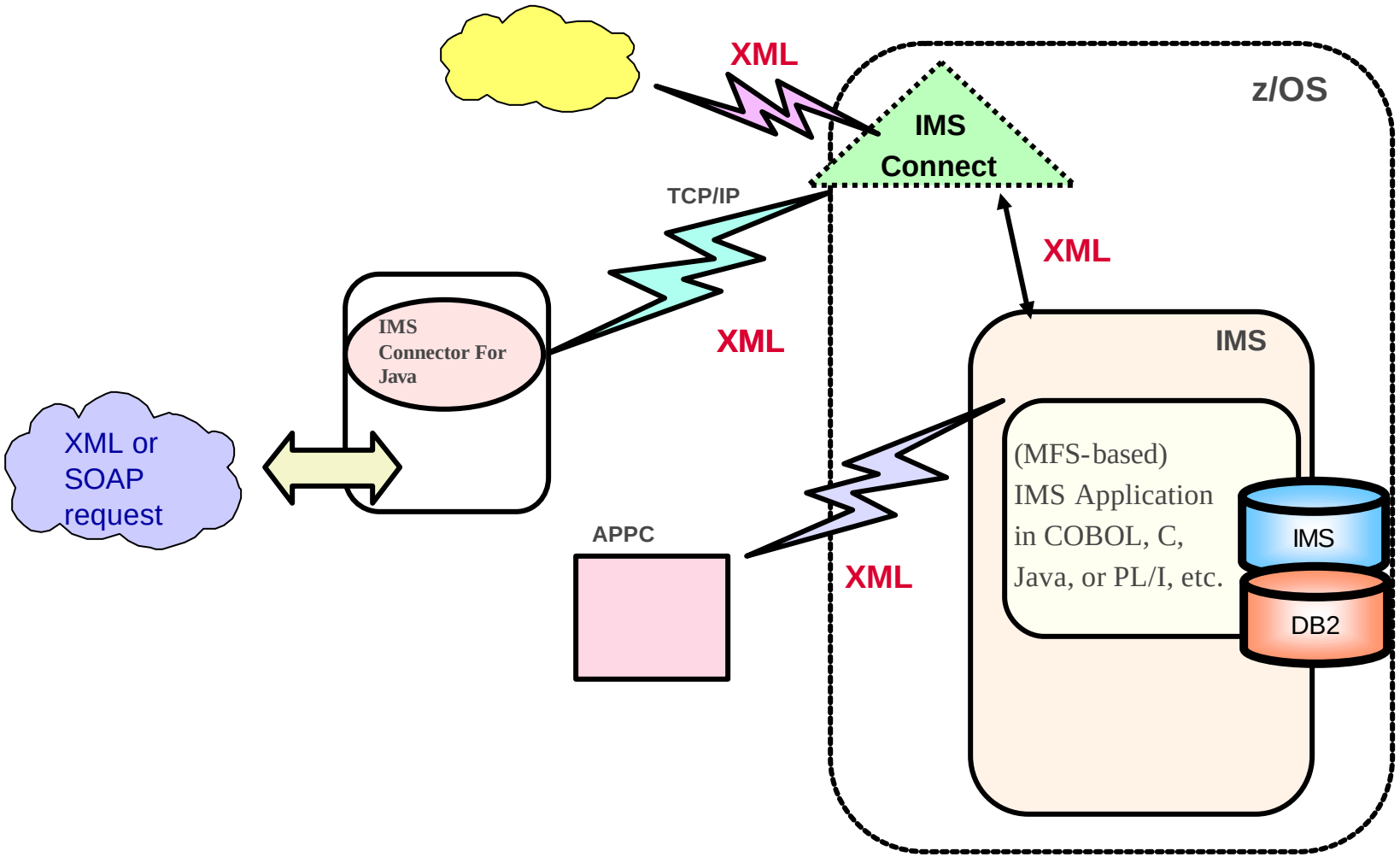
Requirement: XML Processing in IMS; Enable existing IMS applications to send and receive XMLs



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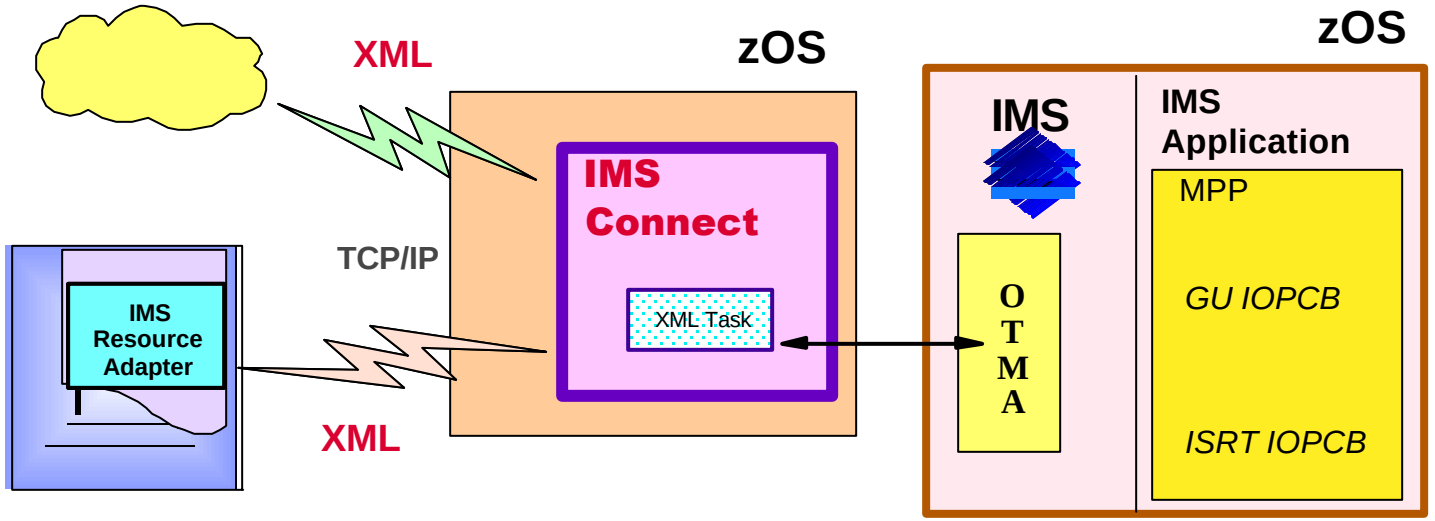
Requirement: XML Processor in IMS Connect



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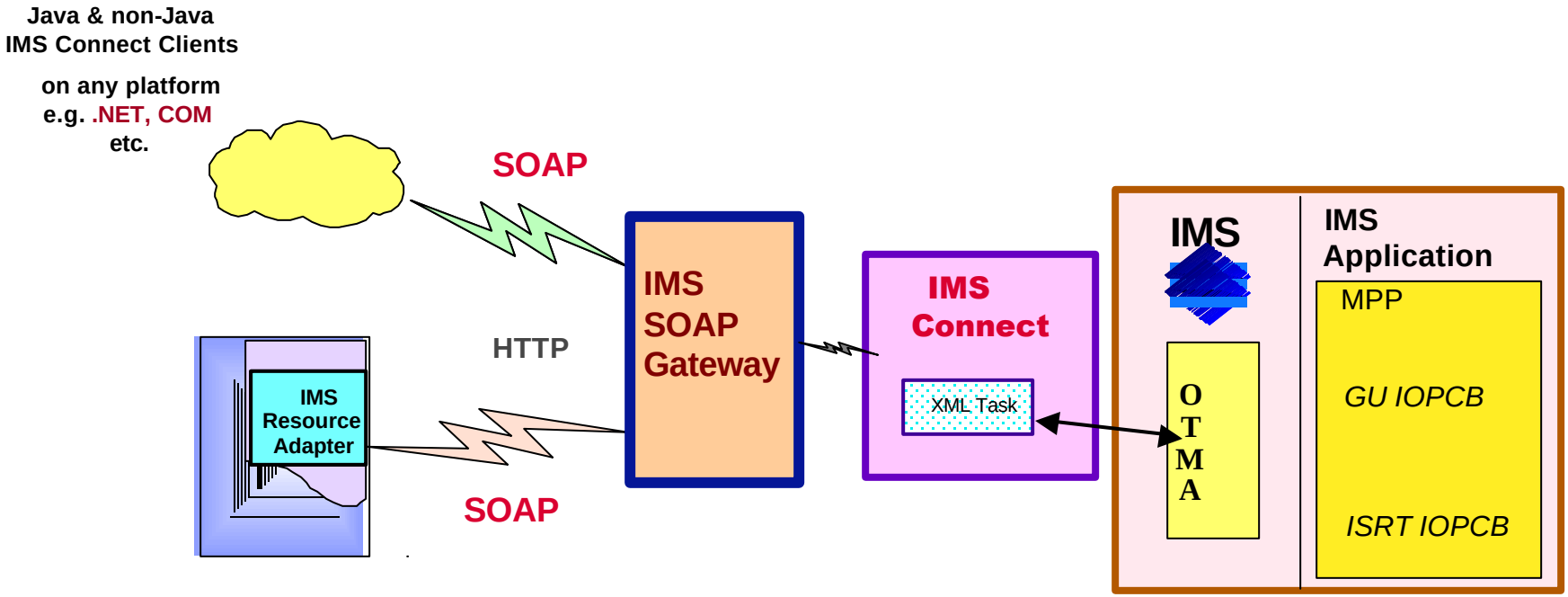
Requirement: IMS SOAP Gateway



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