IBM Software Group

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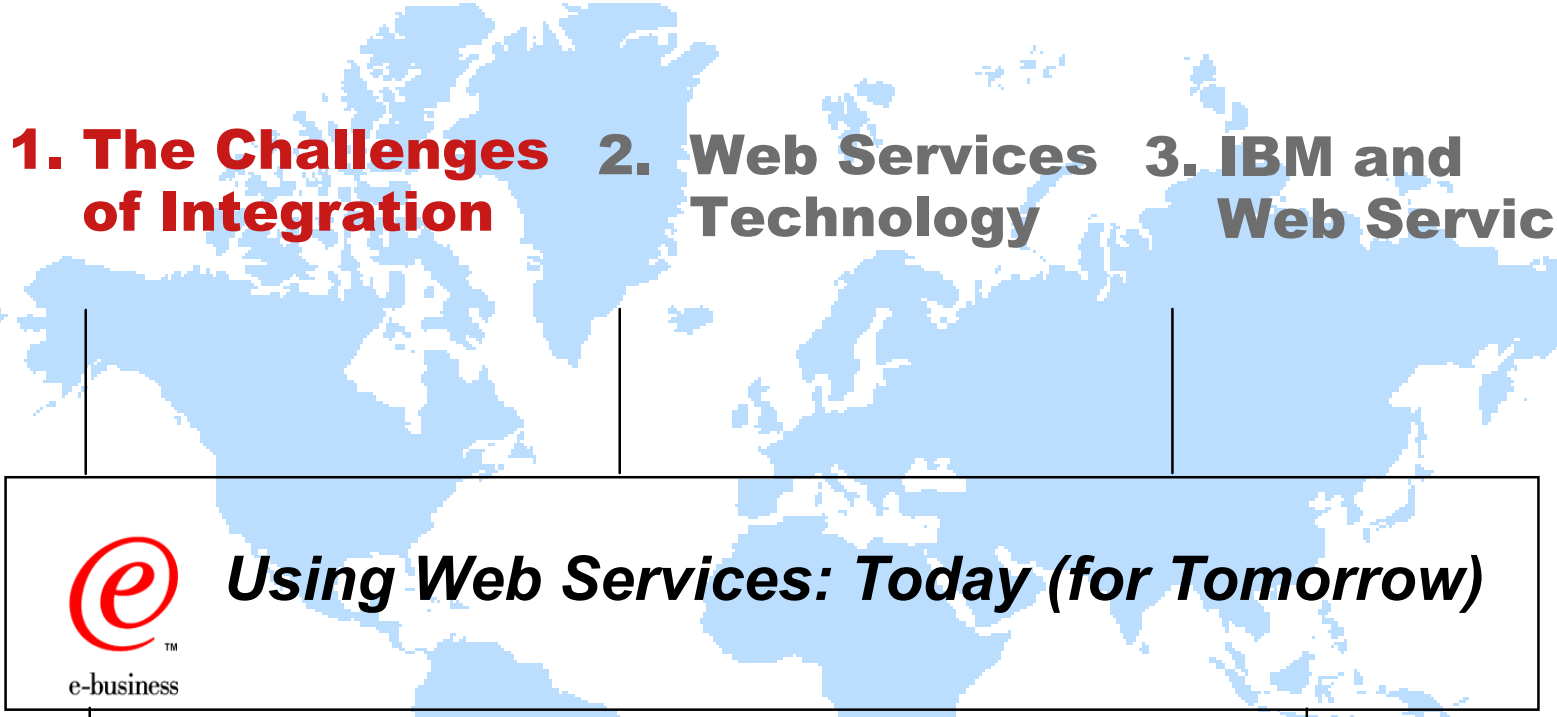
e business software

Using Web Services Today (for Tomorrow)

Mark Colan, e-business evangelist, IBM
mcolan@us.ibm.com
visit http://ibm.com/developerworks/speakers/colan for a PDF of this talk

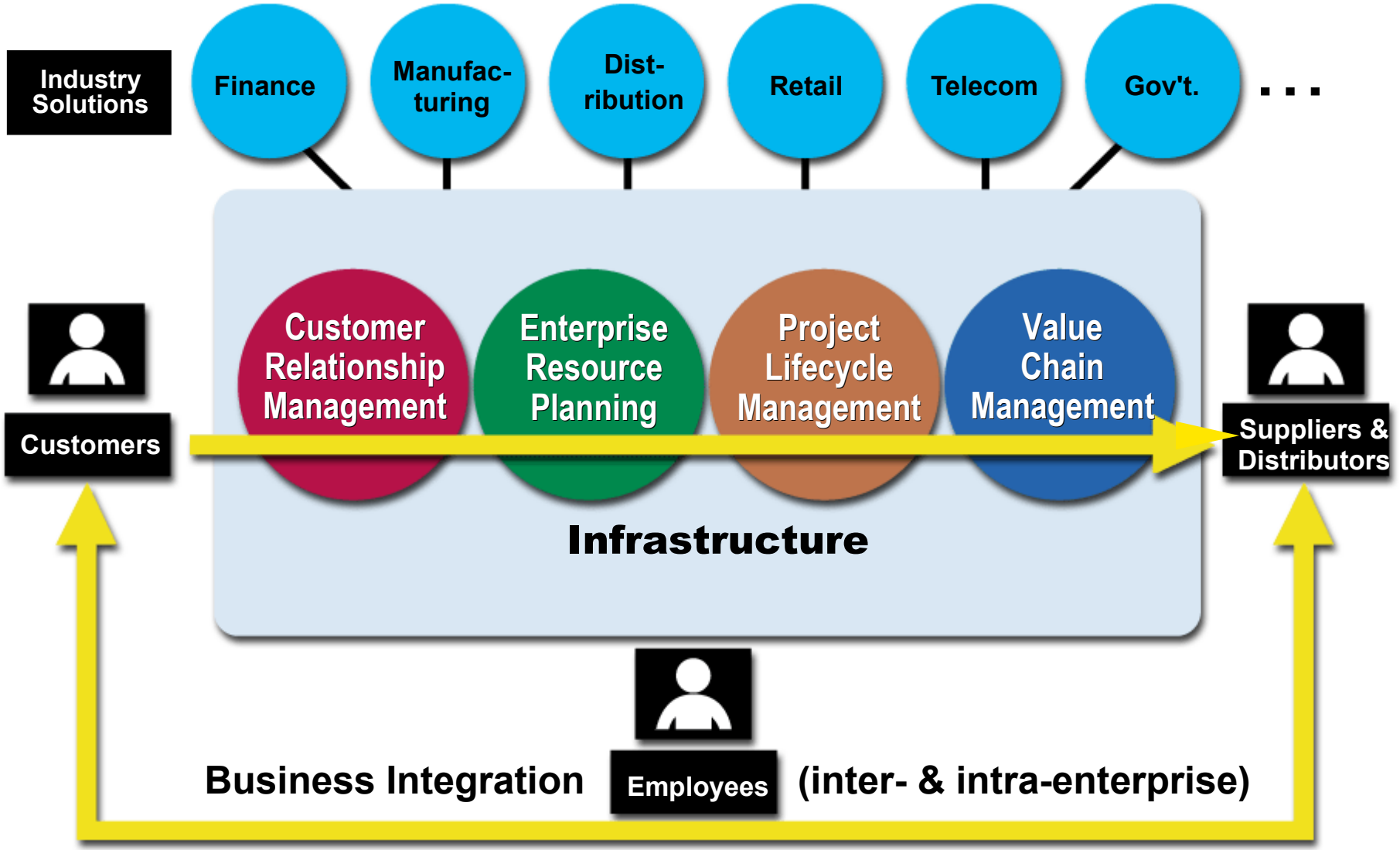
Agenda

1. The Challenges of Integration
2. Web Services Technology
3. IBM and Web Services



4. Who's Using Web Services Today?
5. Trends and Directions

Integration from Demand through Delivery



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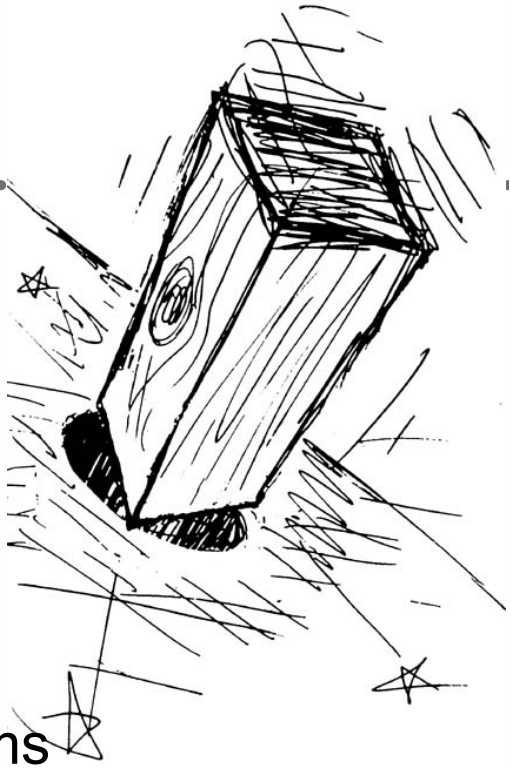
Barriers to Integration



Legacy of heterogeneous application systems gives us these challenges:

- different programming languages
- APIs that change
- file formats that change
- different operating systems or hardware platforms
- different software vendors, in-house code

Historically, integration solutions have been ad-hoc

- long hard work of integrating two systems can't be leveraged for the third one
- multiple technologies, unique for each solution, specialized
- leads to high maintenance costs and brittle infrastructure

Needed: a general/standardized solution for integration

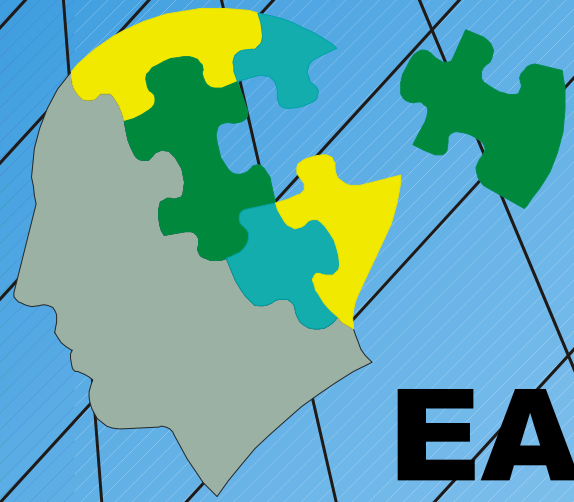
Needed: One architecture to integrate them all

Grid Computing

Browser Apps

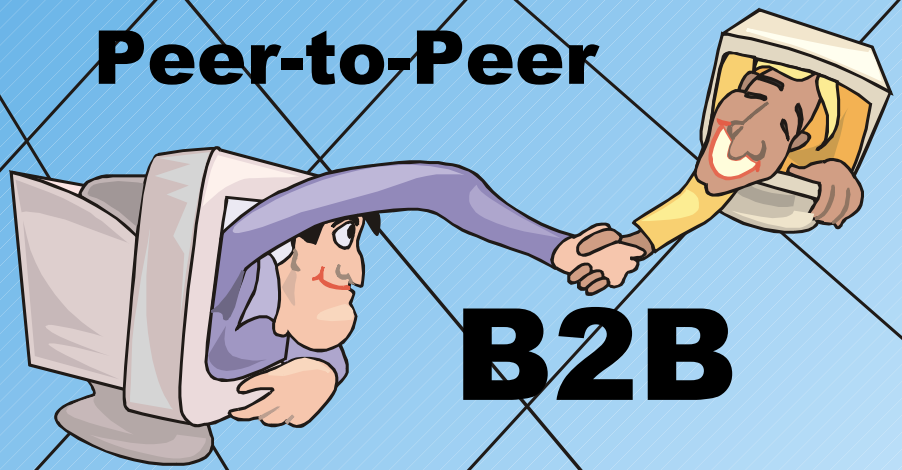
Handheld Devices

WebSphere.
Sun ONE
bea
Microsoft .net
Platforms

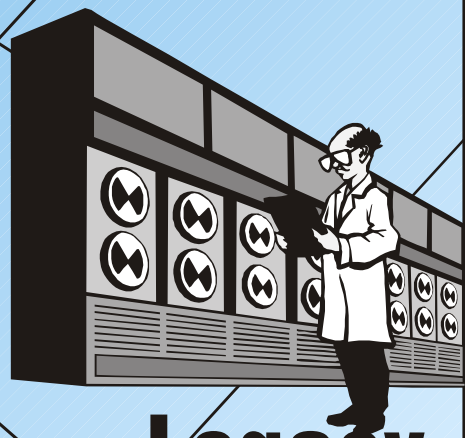


EAI

Peer-to-Peer



B2B



Legacy Apps

Advantages of Web Services Architecture

Flexibility

- universal interfaces can cope with inevitable changes in software caused by changing business needs

Agility and Productivity

- rapid application assembly tools allow integration for new business opportunities or trying new business ideas

Cost Savings

- allow automatic transactions
- replace manual methods
- reduce staffing requirements
- replace paper processing
- reduce errors

Leverage Existing Investments

- old software can be used in new ways by building a Web services layer for universal access

Leverage Developer Skillsets

- the plumbing code (the harder part) is generated automatically
- can be integrated and tested with traditional methods

Same infrastructure for any M2M integration

- EAI, B2B, P2P, handhelds, browsers, grid computing, technologies yet to be invented

"By 2005, the aggressive use of Web services will drive a 30% increase in the efficiency of IT development projects"

Gartner Inc, "The Hype Is Right: Web Services Will Deliver Immediate Benefits", October 2001

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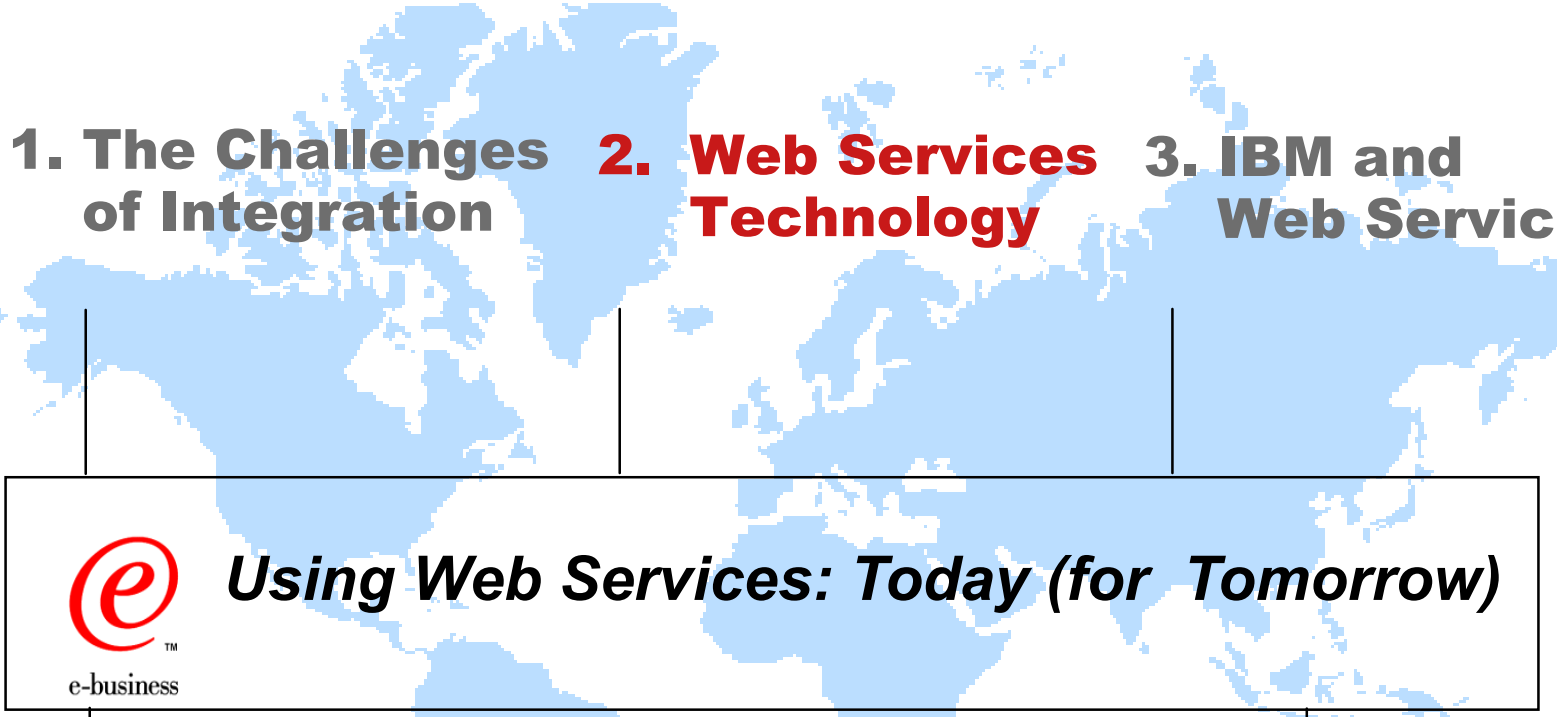

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Web Services: Emerging standards

Standardized specifications are required to make software from different vendors work together well

- **XML** defines a universal way of representing any data, making data integration simple
- **SOAP** uses XML as messages to define a universal Web service requests, making process integration simple
- **WSDL** specifies all information needed for integration, making universal application assembly tools possible
- **UDDI** is a special Web service which allows users and applications to locate required Web services

This year we have had two important advances

- **WS-I.org** formed to achieve seamless interoperability
- **WS-Security** defines message-level security for SOAP

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XML (Extensible Markup Language)

XML is the key to interoperability.

With XML we can exchange data between any applications, regardless of

- operating system
- programming language
- hardware platform
- delivery device
- software vendors

XML offers complete data-level integration.

- SOAP defines a model of sending messages between applications, giving us **process-level integration**.

XML is the basis for all Web services standards.

```
<?xml version="1.0"
  encoding="UTF-8"?>
<PurchaseOrder>
    <Customer
        name="IBM ISL"
        id="8204374">
        <ShippingAddress>
            <street>17 Hawtho
            <city>Hawthorne</
            <state>NY</state>
            <zip>10532</zip>
        </ShippingAddress>
        <Terms>30 days, cash<
    </Customer>
    <Order>
        <Item id="194103-011"
        <Item id="923012-832"
        <Item id="452722-023"
    </Order>
</PurchaseOrder>
```

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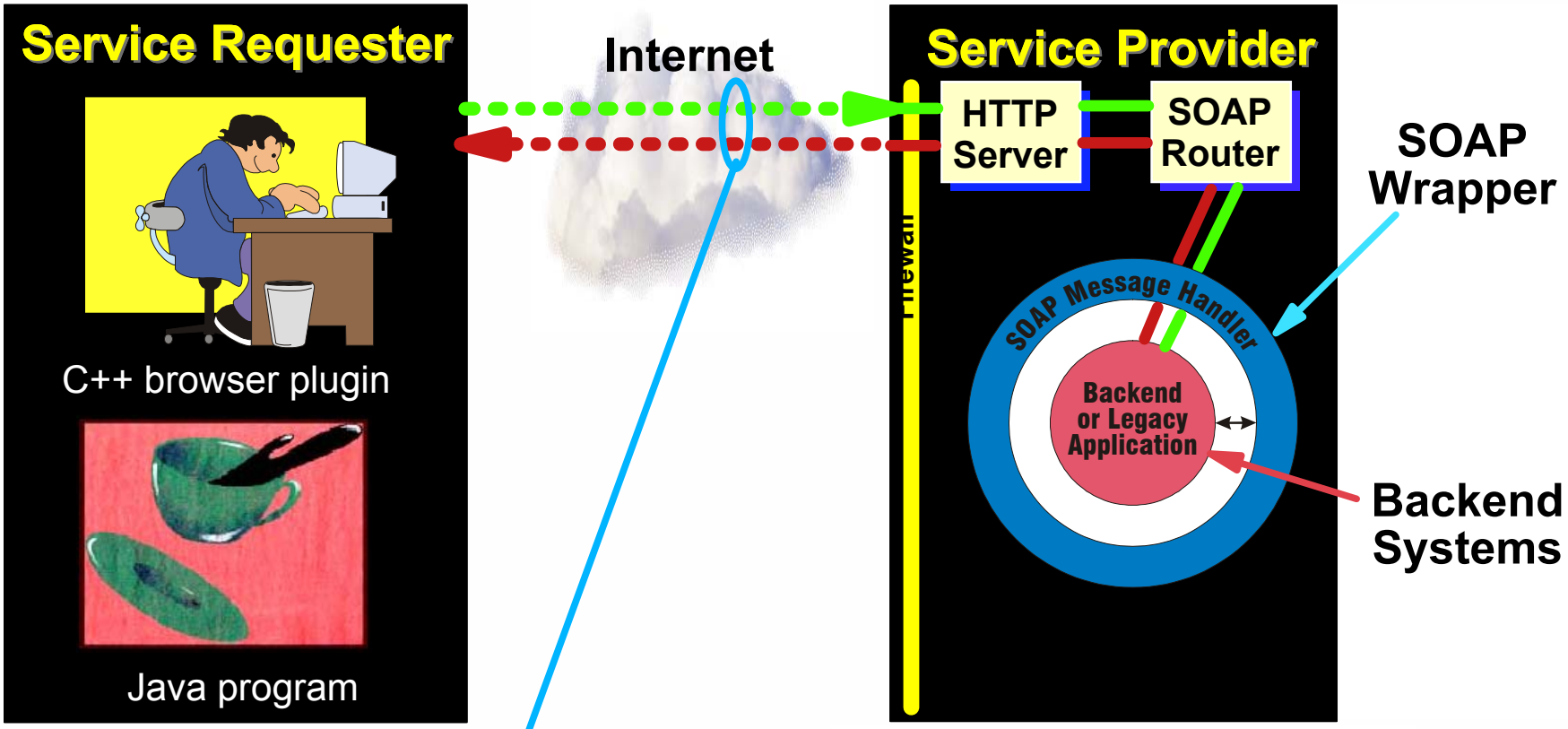
SOAP hides the technology choices and implementation details from both parties



Simple, standard XML messages

- we only care about message format and content
- the less we know about the implementation details, the less work for us!

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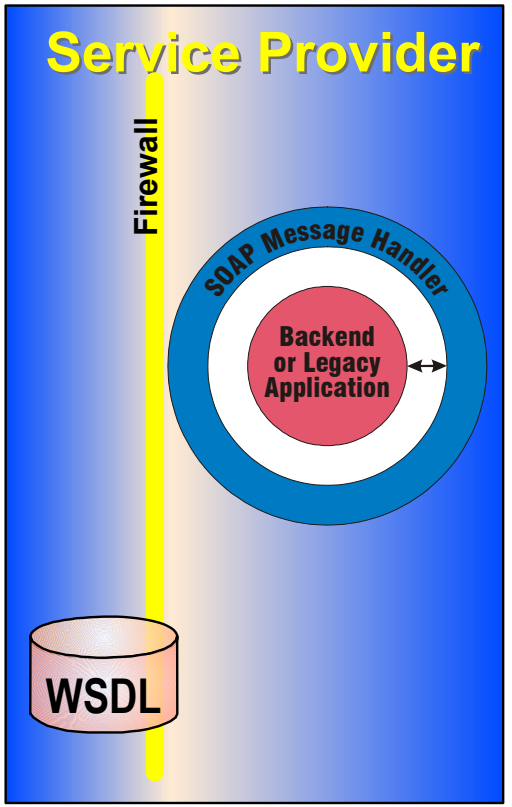
Web
Services
Description
Language

WSDL Simplifies and Speeds Integration

Complete technical details required for integrating a Web service into your application

- available from service provider
- message format, URL, etc
- independent of programming language
- used by development tools for code-generation, programmer information
- key to rapid integration and productivity gains in Web Services programming model



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Universal Description,Discovery and Integration

UDDI.org: Partnership among industry & business leaders

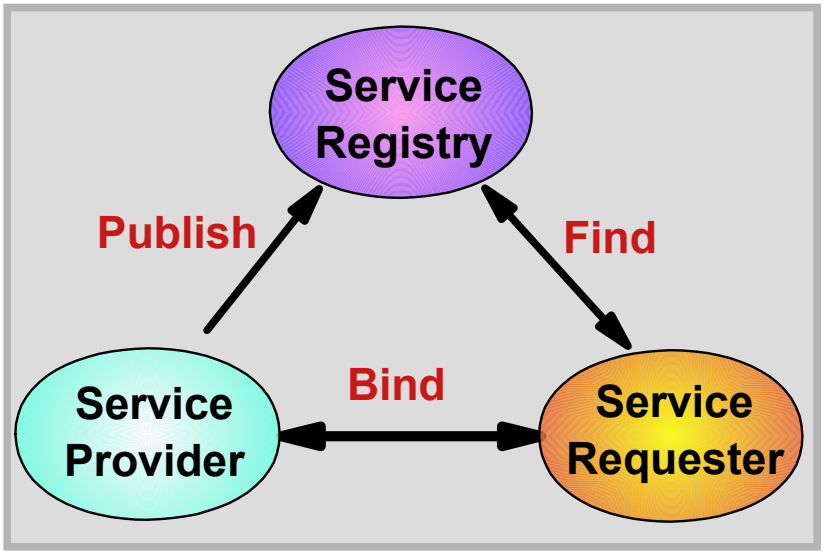
- Ariba, IBM, and Microsoft, 370 community members
- Goals of charter are now complete!

UDDI defines a service for finding other services

Works like electronic yellow pages

Use UDDI for:

- EAI internal service catalog
- invitation-only marketplace
- searchable company portal
- internal approved supplier catalog
- public UDDI Business Registry



UDDI Technology preview available for free download

- http://www7b.software.ibm.com/wsdd/downloads/UDDIregistry.html

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Status of Base Web Services Stds

XML 1.0

- W3C recommendation

XML Schema

- W3C recommendation

Simple Object Access Protocol (SOAP)

- W3C "last call" draft spec, not final recommendation
- Final recommendation expected this year
- SOAP 1.1 (from IBM and Microsoft) is de facto standard now

Web Services Description Language (WSDL)

- WSDL 1.2 Working Drafts now available from www.w3.org
- WSDL 1.1 (from IBM and Microsoft) is de facto standard for now

Universal Description Discovery and Integration

- UDDI.org completed V3 of UDDI spec
- UDDI spec will be standardized by OASIS

Web Services Interoperability

WEB SERVICES INTEROPERABILITY ORGANIZATION

WS-I.org announced Feb 6, 2002

Industry initiative for Web services

- Open to any organization committed to Web services
- Promote and accelerate adoption, deployment

Focused on promoting Web service interoperability

- Across platforms, applications, and programming languages
- Promote a common, clear definition for Web services

Promote customer adoption & deployment

- Integrate specifications from standards bodies
- Implementation guidance & tools for customers building and deploying Web services

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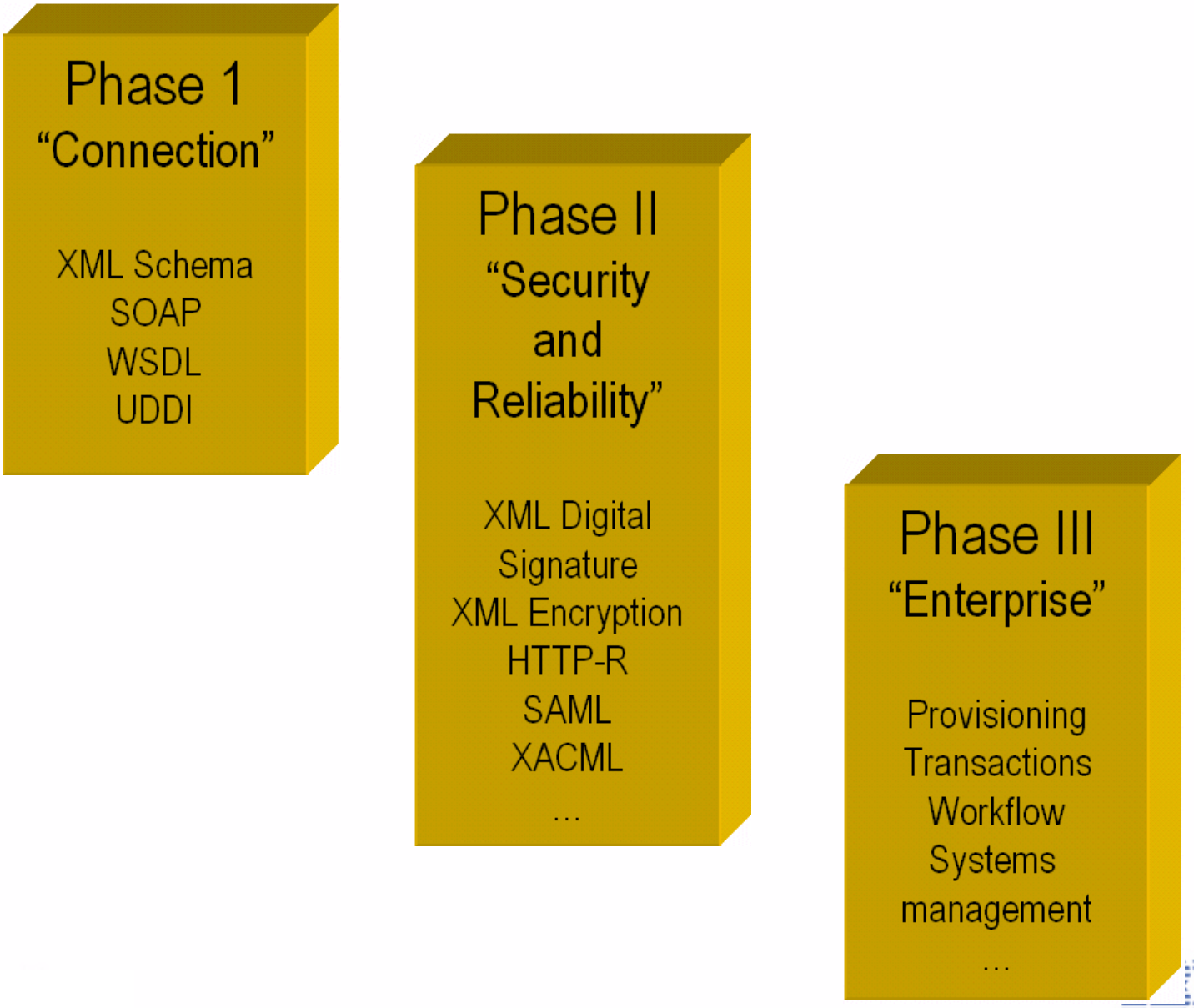
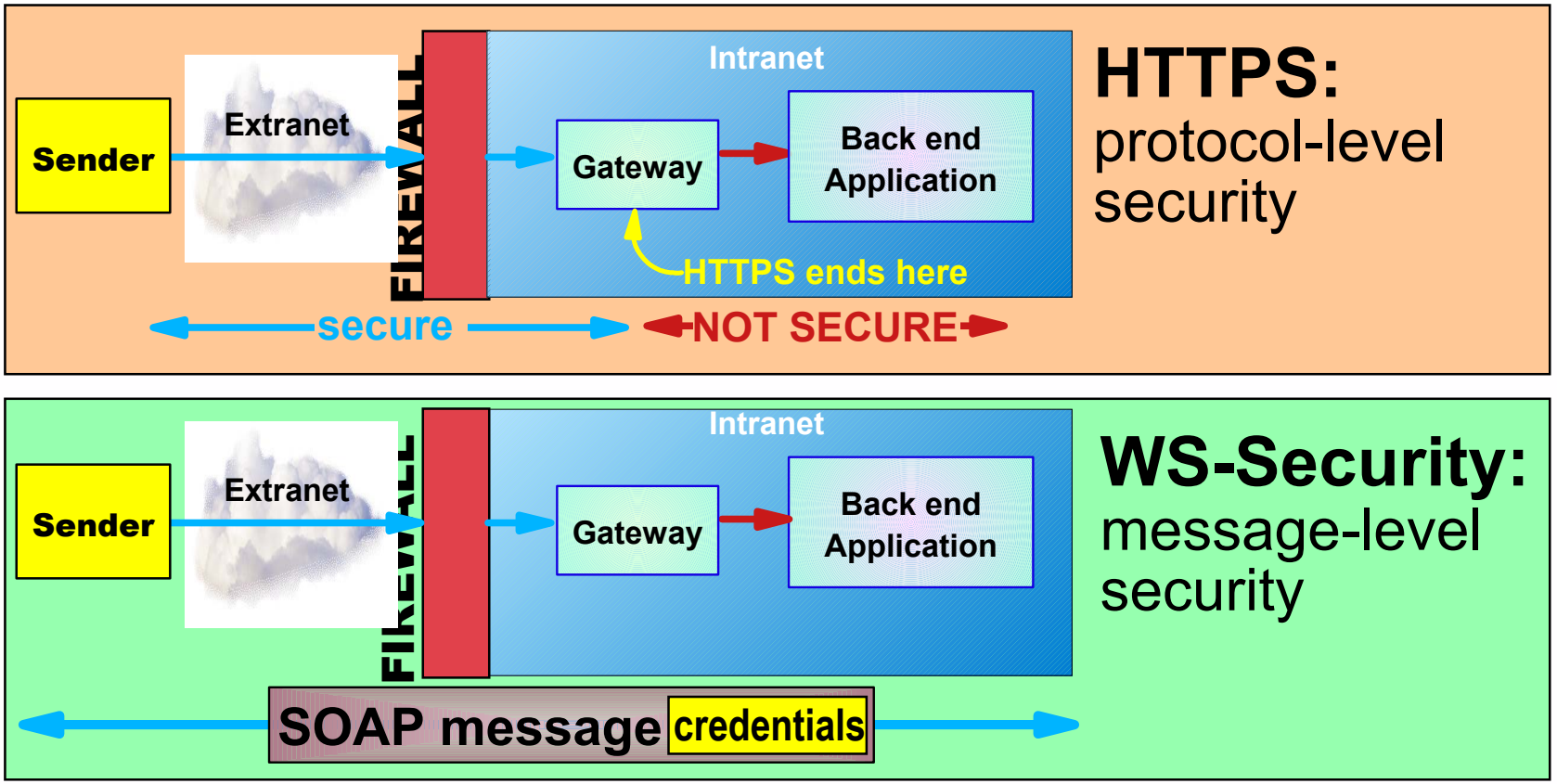
Specifications and Standards



WS-Security: message-level security



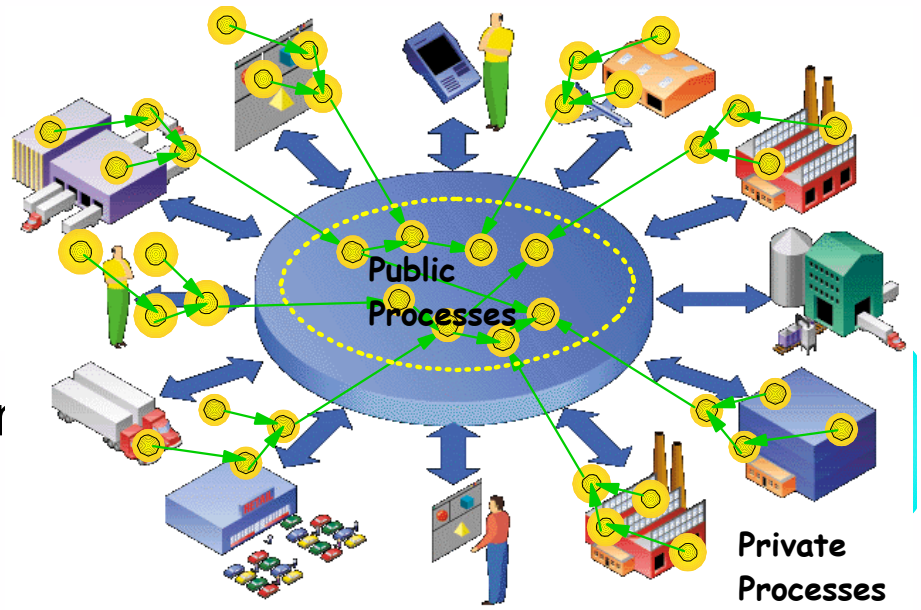
Message-level security

- credentials persist end-to-end
- allows non-repudiation
- element-wise encryption

Now interoperable with Web services:

- Kerberos, PKI, X.509, HTTPS/SSL
- W3C XML Signature, XML Encryption, XKMS
- OASIS SAML, XACML

Business Processes



BPEL4WS

- Business Process and Execution Language for Web Services
- specifies operations, data, partn for a business model in a portable XML description

WS-Transaction

- improved consistency for ACID and long-running transactions

WS-Coordination

- standard mechanisms that coordinate the execution of distributed transactions in a Web services environment

Specifications announced August 8, 2002 by IBM, Microsoft, and BEA

- will be transitioned to a standards body

Visit ibm.com/developerworks/webservices

- specs and whitepapers available now

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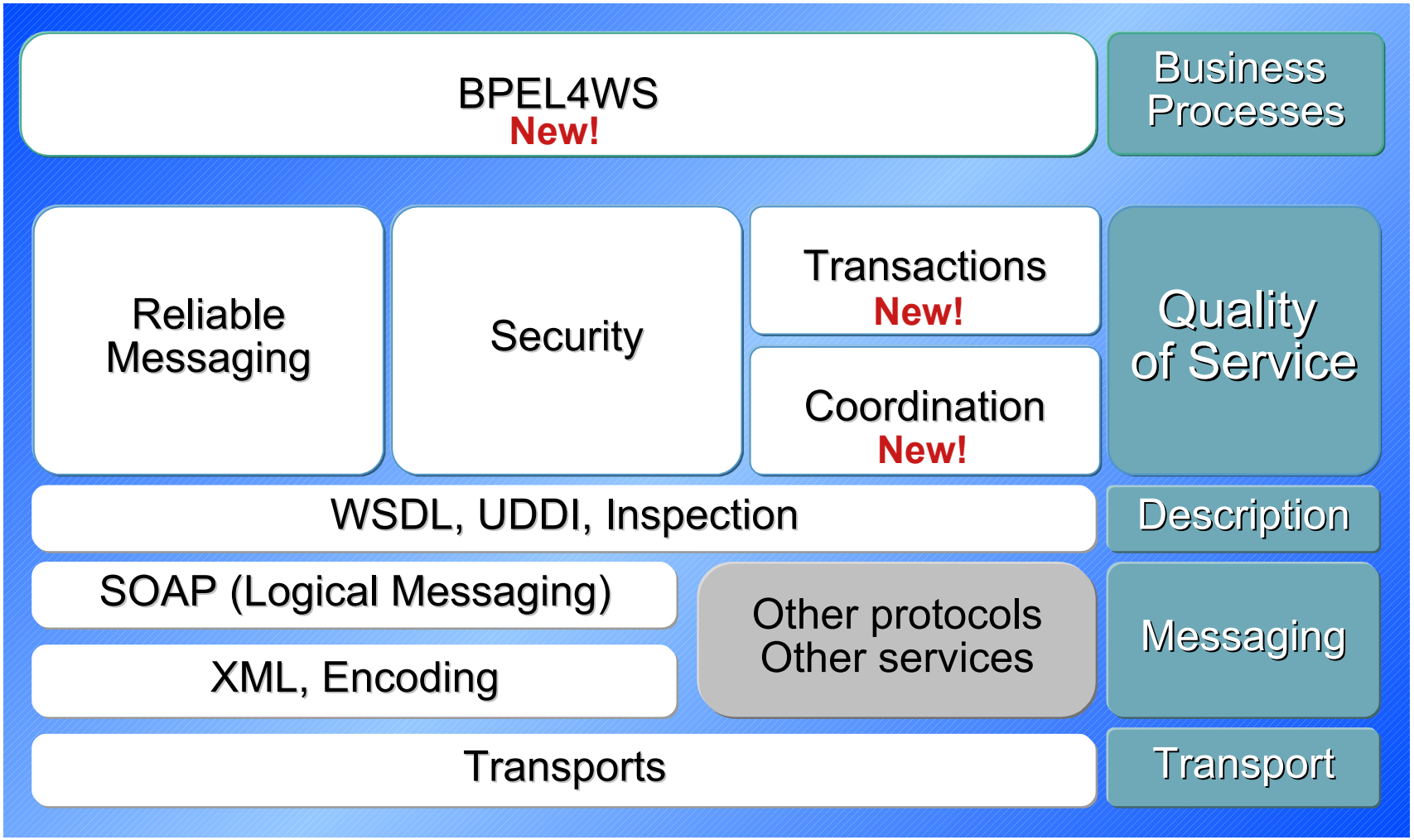
The Web Services "stack"



- WS-Security was announced in April, 2002
- BPEL4WS, WS-Transaction, WS-Coordination were announced in August, 2002

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Using Web Services: Today (for Tomorrow)

e-business

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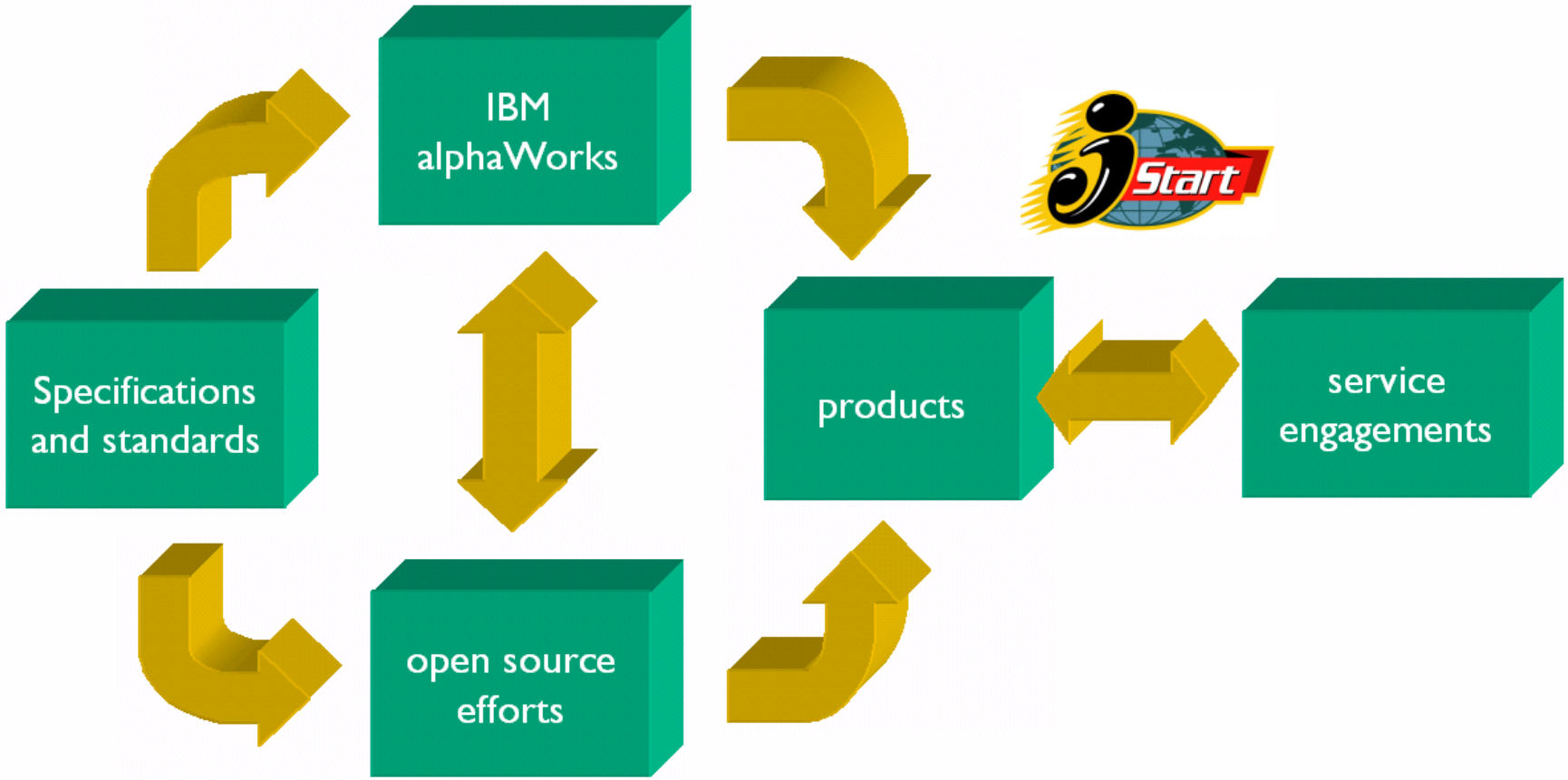
The IBM emerging technologies lifecycle



We have evolved this over the last 6 years
with Java, XML, and Web services.

IBM

Cooperation and Competition

We cooperate with our competitors

- to create the standards that are essential to seemless connection of products created by different vendors, no matter
- no matter how difficult the intra-industry politics become, and
- no matter how skeptical some observers are of the attempt to cooperate

IBM will compete aggressively

- to produce and sell the best possible middleware across our entire product line (WebSphere, DB2, Lotus, Tivoli, …) to build, invoke, and manage Web services.

"Cooperate on Standards...
Compete on Implementations"

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Web Services in WebSphere Application Server 4.0

WAS4 is the industry's premier production-ready Web app server for deploying Web Services solutions for dynamic e-business

Integrated support for Web Services

- SOAP - Simple Object Access Protocol
- UDDI - Universal Description, Discovery, Integration
- WSDL - Web Services Description Language
- enables powerful interoperability between Web Services and J2EE applications

Security:

- HTTPS support
- Implementations of XML Signature and Encryption

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Web Services in WebSphere Application Server 5.0

Production support

Base

- ApacheSOAP 2.3 (performance and bug fixes from 2.2)
- Web Services Invocation Framework (WSIF)
- ApacheSOAP 2.3 Client
- UDDI4J client v2
- WSDL4J technology

Network Deployment option

- UDDI v2 server
- WebServices Gateway

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WebSphere Studio Application Developer

A rich set of tools to develop for Web services development

- a set of tools to speed the deployment of a Web service
- a set of tools to help you find and speed the integration of a Web service

Built on eclipse open-source development platform

- add third-party tools, or write your own!

Tight integration with WebSphere App Server

- works with other app servers, too

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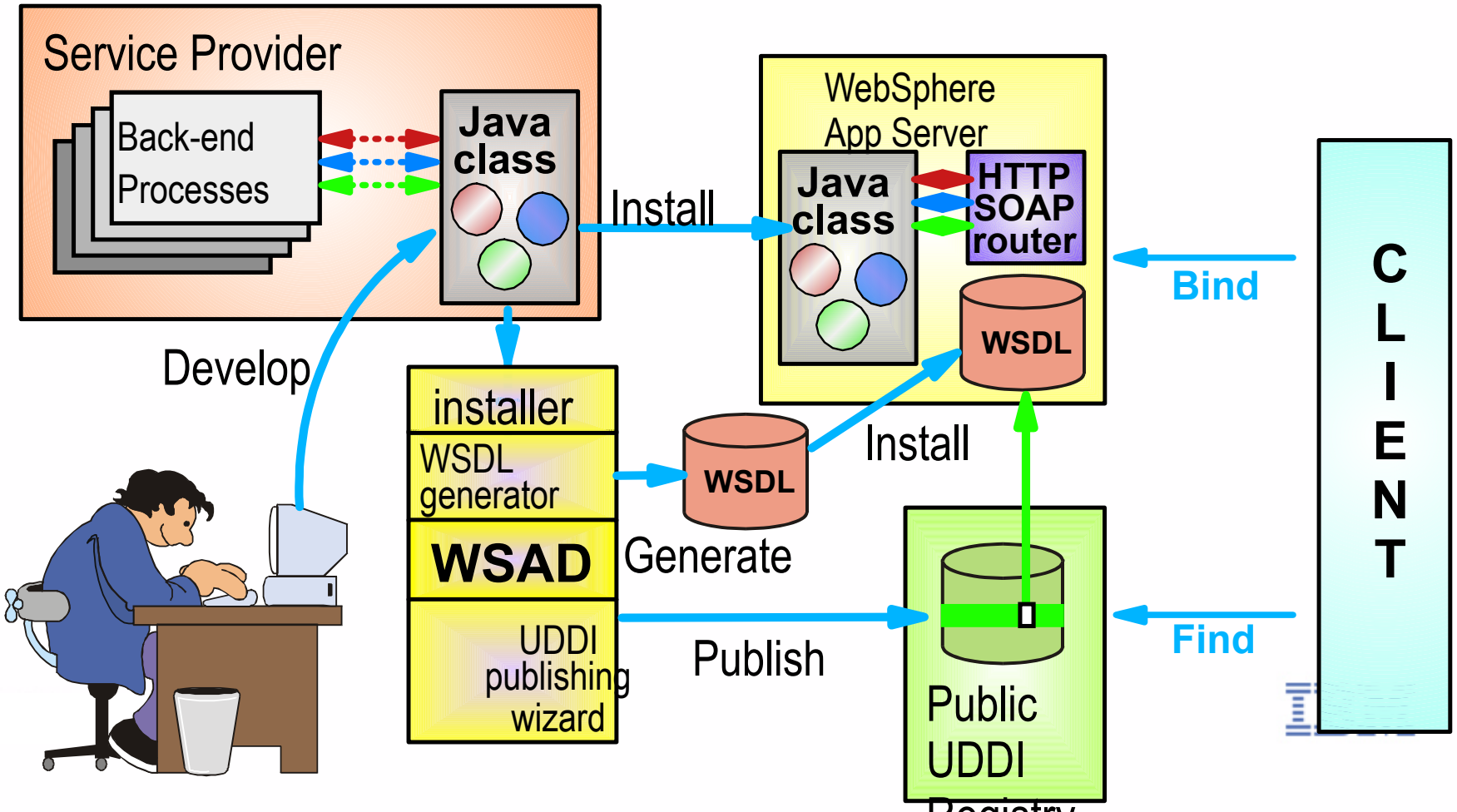
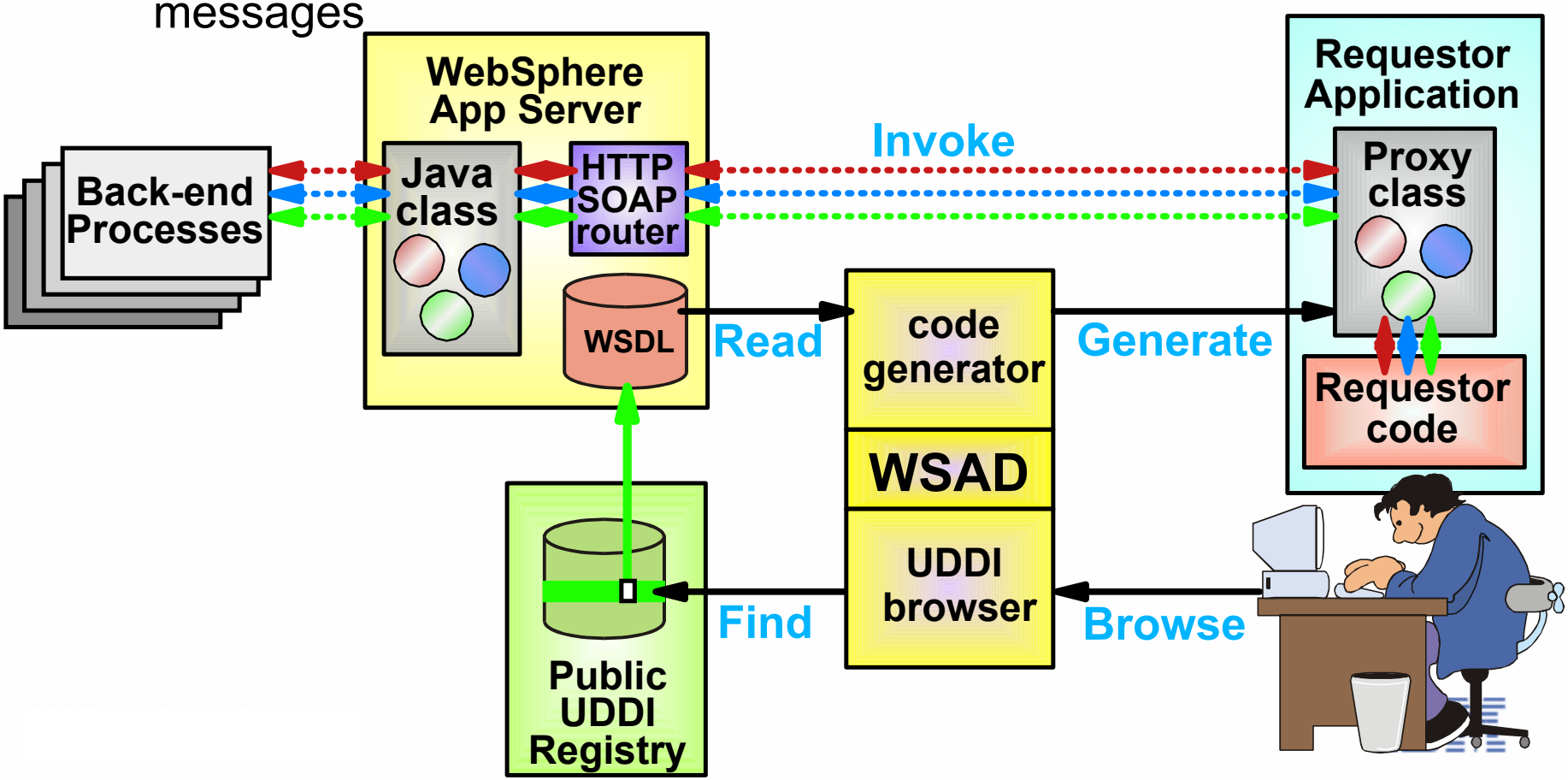
WebSphere Studio App Developer: speeding deployment of Web Services

1. You **develop** a Java class for the service provider to be deployed
2. WSAD **generates** a service description by introspecting your class
3. WSAD **installs** code and WSDL description on the server
4. WSAD wizard **publishes** the availability of the service to UDDI
5. Client **finds** your service via UDDI then **binds** to your code

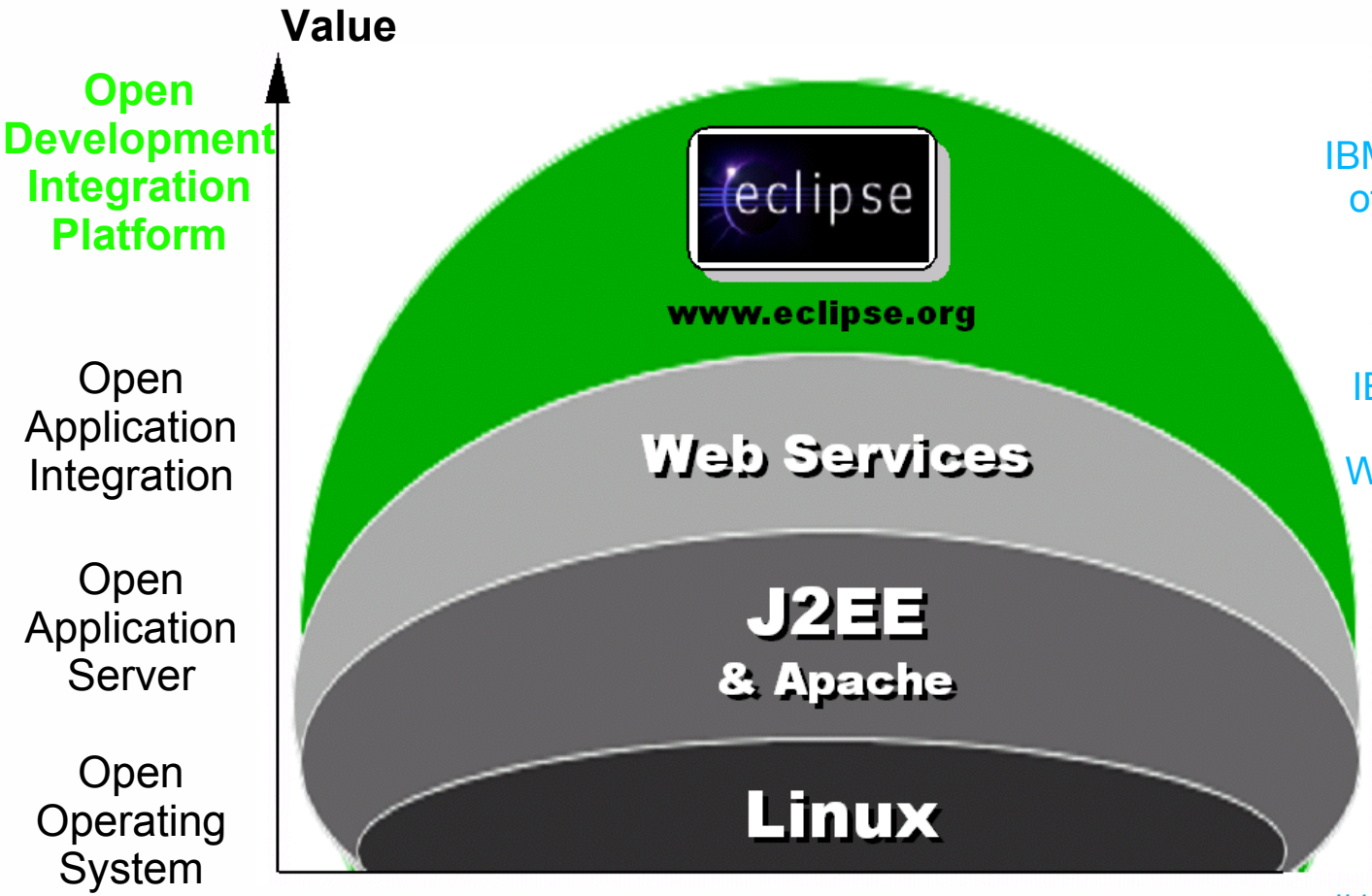


WebSphere Studio App Developer: speeding integration of Web Services

1. You use UDDI browser in WSAD to **find** the service you want
2. WSAD **reads** the service description and sets up environment
3. WSAD **generates** a Web service proxy class for local use
4. You **call methods** on the service proxy class just like local code
5. Service proxy class **invokes** the service for you via SOAP messages



The Open Platform approach



IBM contributed $40M of initial technology

IBM led or co-led the creation of SOAP, WSDL, UDDI &WSFL

IBM contributed to 80% of J2EE

IBM helped form Apache SW Foundation, #1 commercial investor

Over 1200 developers from 150 companies are participating in the Eclipse universal tool platform open source project

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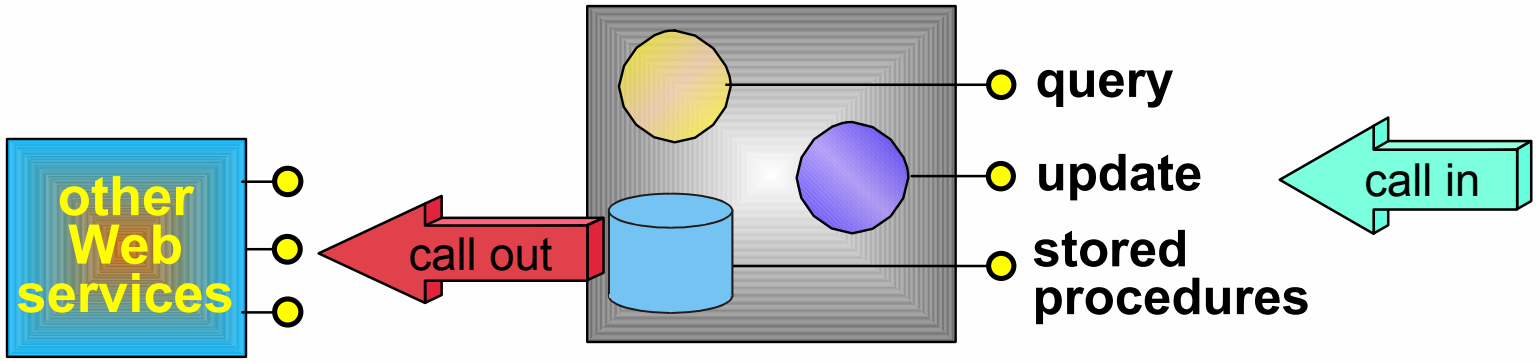
DB2 Universal Database / XML Extender

XML Extender current version:

- XML import and shred across tables
- XML export and recomposition
- XML document repository with high-speed native searching

Web Services features coming in next version:

- query and update functions are available as Web services
- stored procedures can be called as Web services
- stored procedures can call out to other Web serivces



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Web Services in other IBM Products

WebSphere MQ Series

- technology preview of SOAP in WSTK 2.3
- integrated into next release of the product

Lotus:

- enable Domino Services as Web Services
- incorporate SOAP interfaces, XML-based messaging
- other products will explore web services features for collaborative products like instant messaging

Tivoli:

- management and security for Web Services deployment

jStart Engagement Model

Business Qualification

Project Definition

Project Readiness

Customer Commitment

Solution Building

We use a "jumpstart" approach to help customers successfully build e-business solutions using XML and Web Services, starting with education and ending with services.

ibm.com/software/jstart

jstart@us.ibm.com

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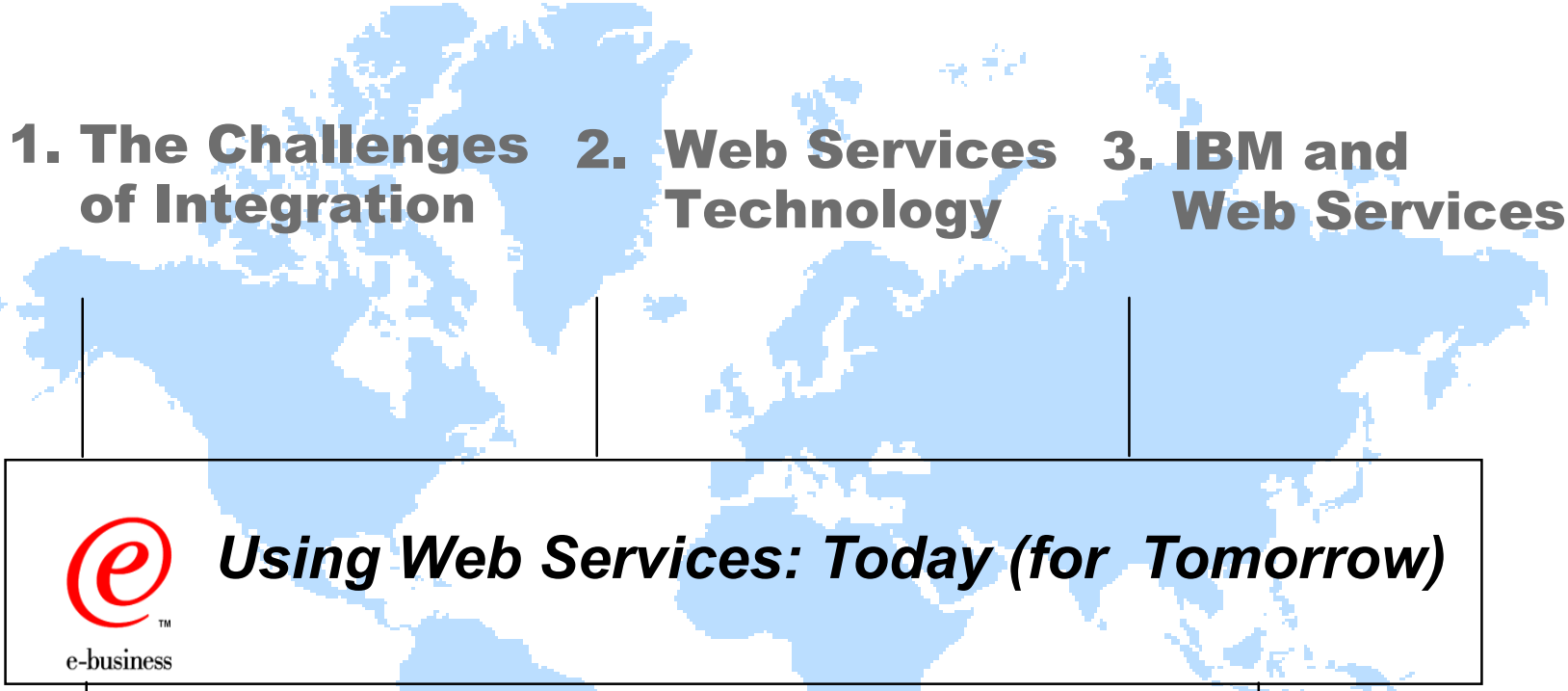

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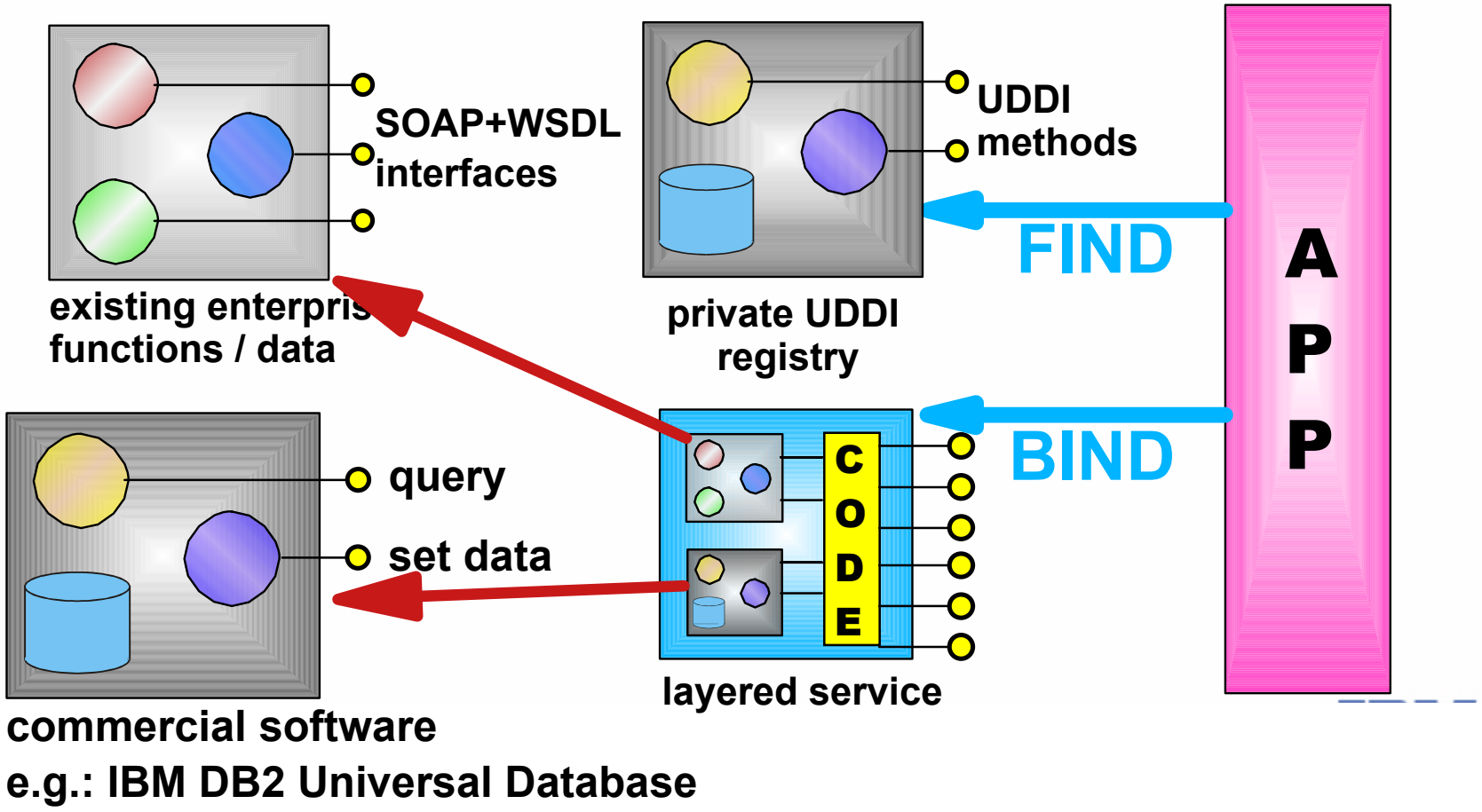
Web Services: Flexibility for EAI architectures

SOAP+WSDL is a useful strategy for application or data integration with loose coupling

- Especially helpful in mergers and acquisitions
- Often fits into existing architectures, making them more flexible and adaptable



Who is Using Web services today?

We have many customers who are using Web services now

- to build a flexible enterprise infrastructure to solve today's problems while simplifying future development
- to reduce the cost of doing business with existing partners
- to prepare for more flexible e-business of the future

We can help you get started too...

- we have the middleware products
- we have the developer tools
- we have a services team to work with you

visit **http://ibm.com/software/jstart** for case studies

CIBC

IBM

JPMorganChase

CommerceQuest

GRAND CENTRAL

transactTools

Hitachi Software

eWAND
GLOBAL TRADE DIRECTORY

Storebrand
FOND · BANK · FORSIKRING

VISUALIZE INC
GET THE PICTURE

Hewitt

E2OPEN

versata

Adobe
everywhere
you look™

dti

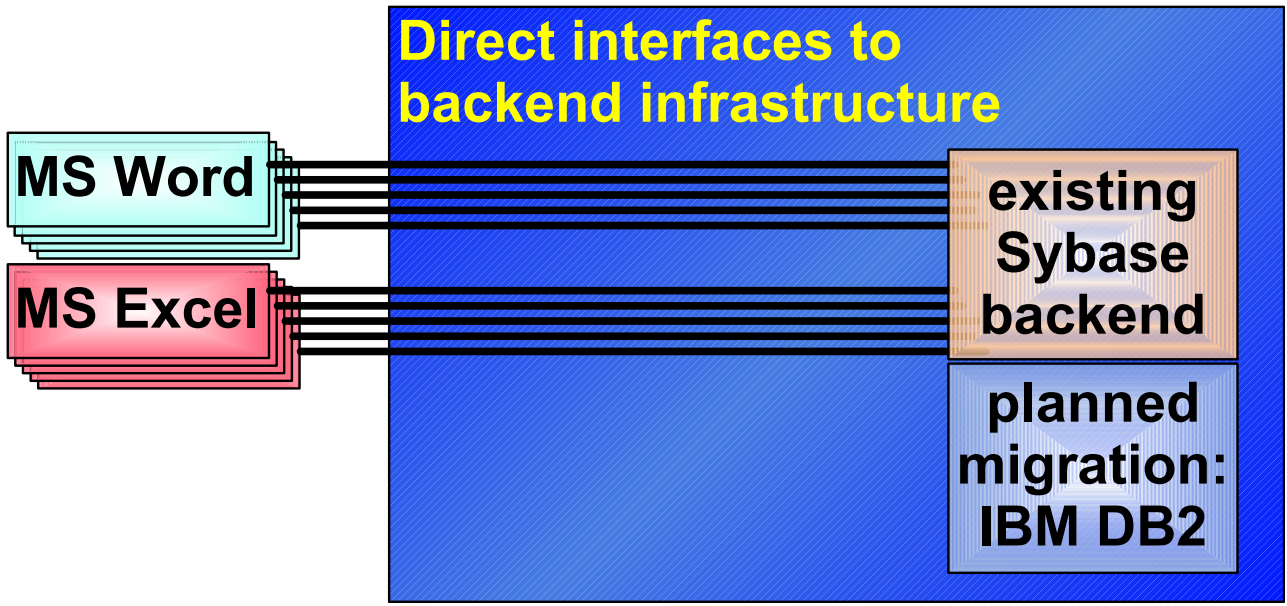
BEKINS
Since 1891

Canadian Imperial Bank of Commerce

Challenges: **Achieve interoperability and reusability for all financial data services**

- fix income coupon schedules
- equity information
- moving markets
- other static descriptive instrument data that is not price dependant

Migrate to new backend systems with no disruption to existing applications



Canadian Imperial Bank of Commerce

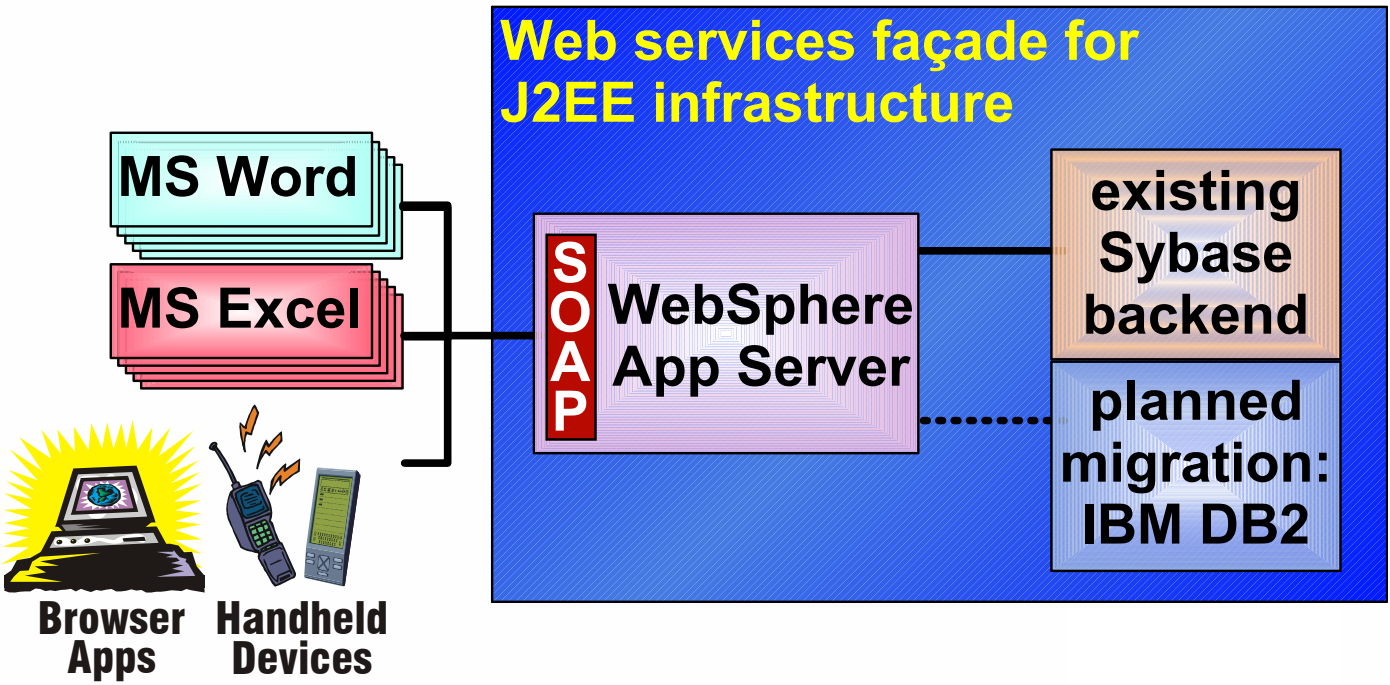
Solution: **Customer Account Data Service available across all lines-of-businesses**

The benefits:

- "One interface, many clients."
- No change to client apps from database migration

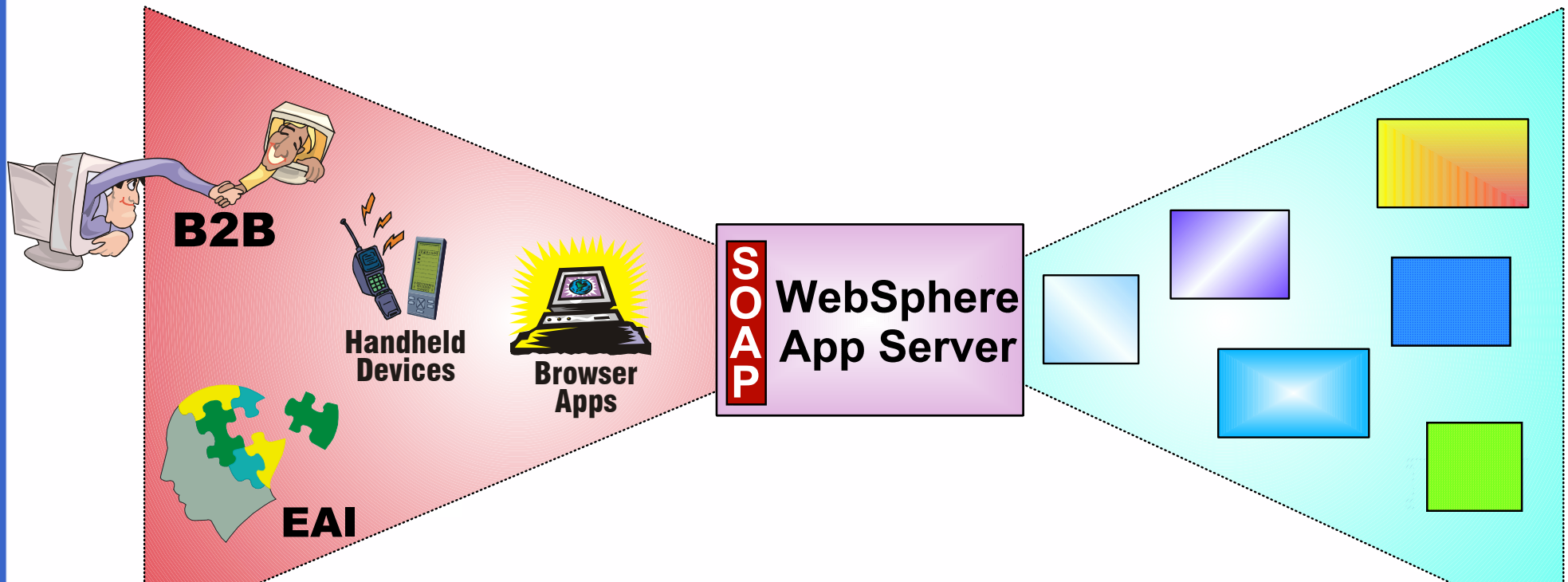
Read all about it!

http://www-3.ibm.com/software/ebusiness/jstart/casestudies/cibc.html

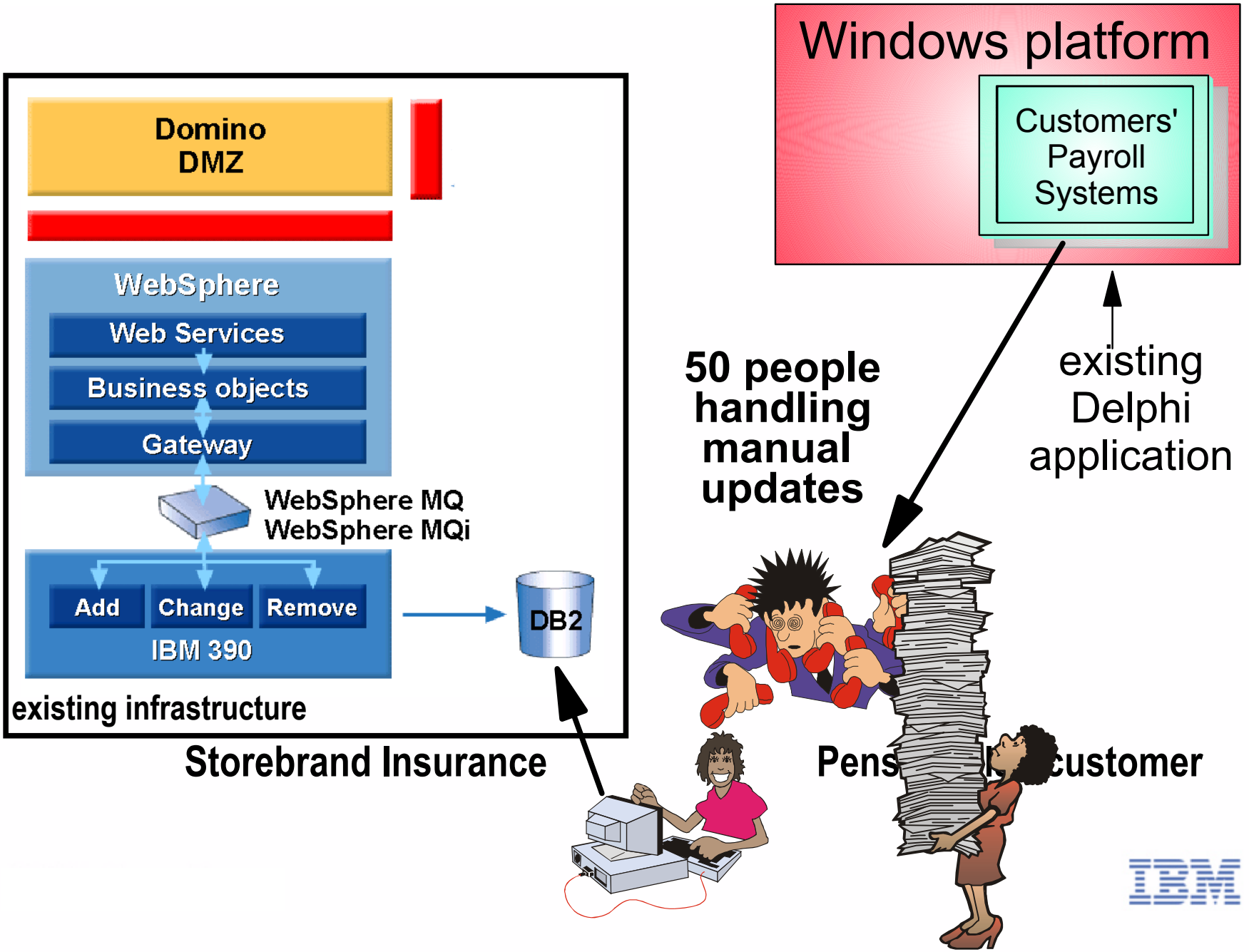


Web Services brings Flexibility and Stability to Enterprise Application Integration

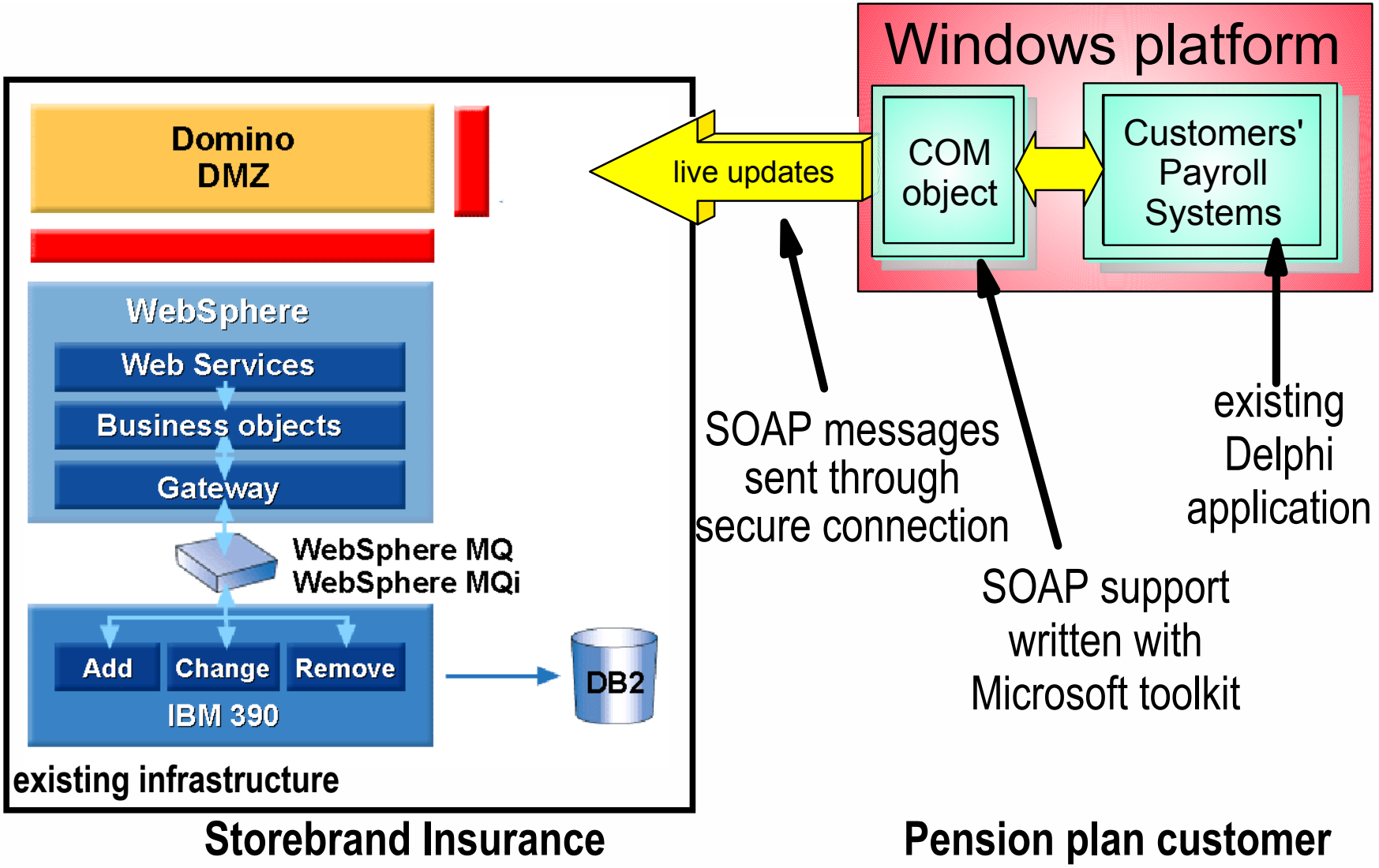
1. Isolate changes in backend infrastructure from applications, eliminate disruption to clients
2. Interface more backend systems incrementally to support richer applications
3. Add new types of clients as required with no changes to backend systems



Storebrand ASA - before Web services



Storebrand ASA - after Web services



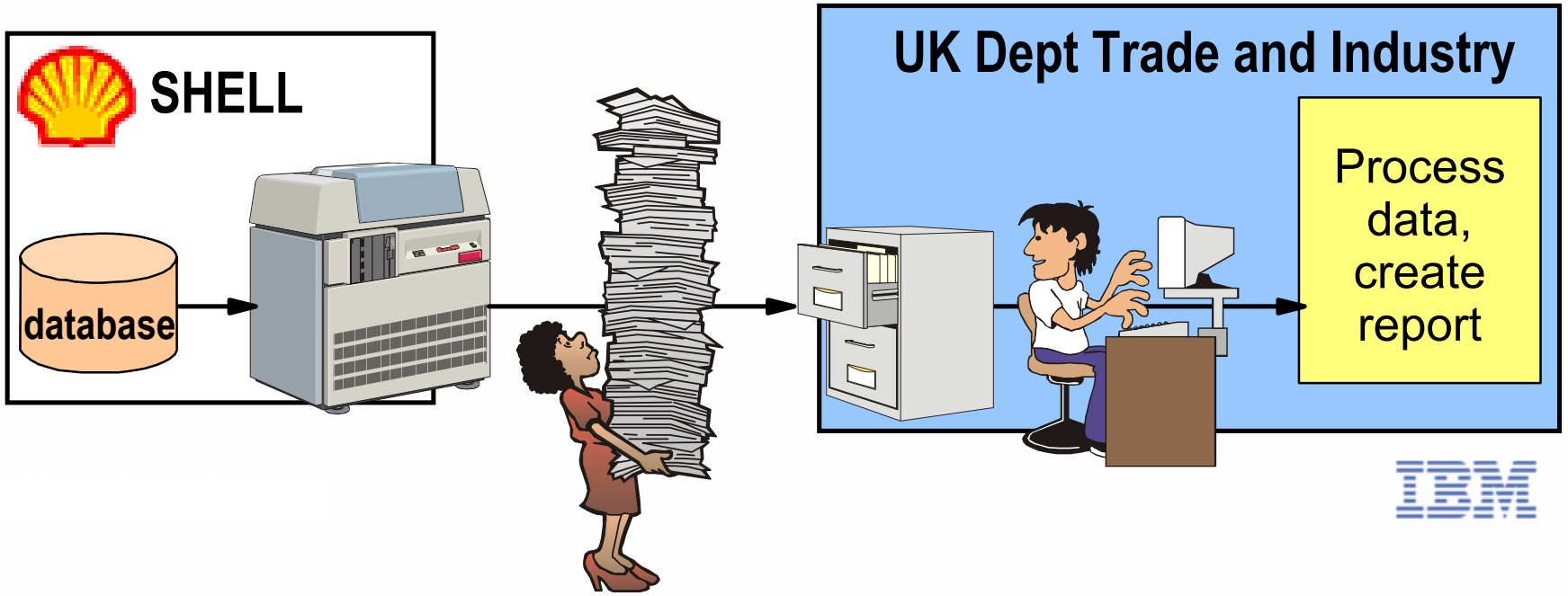
Read all about it!

http://ibm.com/developerworks/webservices/library/ws-asa

UK DTI - Royal Dutch/Shell

UK Department of Trade and Industry requires reports for oil drilling sites it licenses

- well information: production, quality, hazards
- information is maintained on databases of oil companies, printed in full "**just in case**" it is needed
- when needed, DTI searches paper files and, if found, manually enters information for reporting purposes



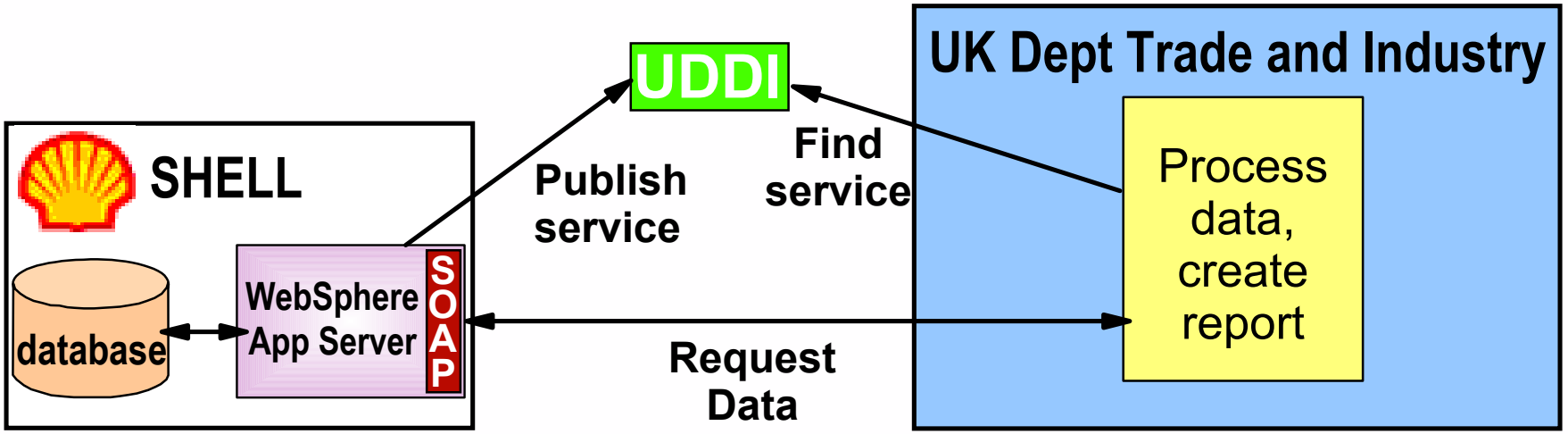
UK DTI - POSC - Royal Dutch/Shell

Shell and POSC will create direct Web services access to information needed by UK DTI

- "**just in time**" replaces "just in case"
- eliminate manual processes like searching and entering
- automate reporting; more accurate and timely information

Same information is needed by drilling partners

- interfaces implemented for UK DTI can also be used by partners
- doubles the value of the work



Read all about it!

http://www-3.ibm.com/software/ebusiness/jstart/casestudies/shell.html

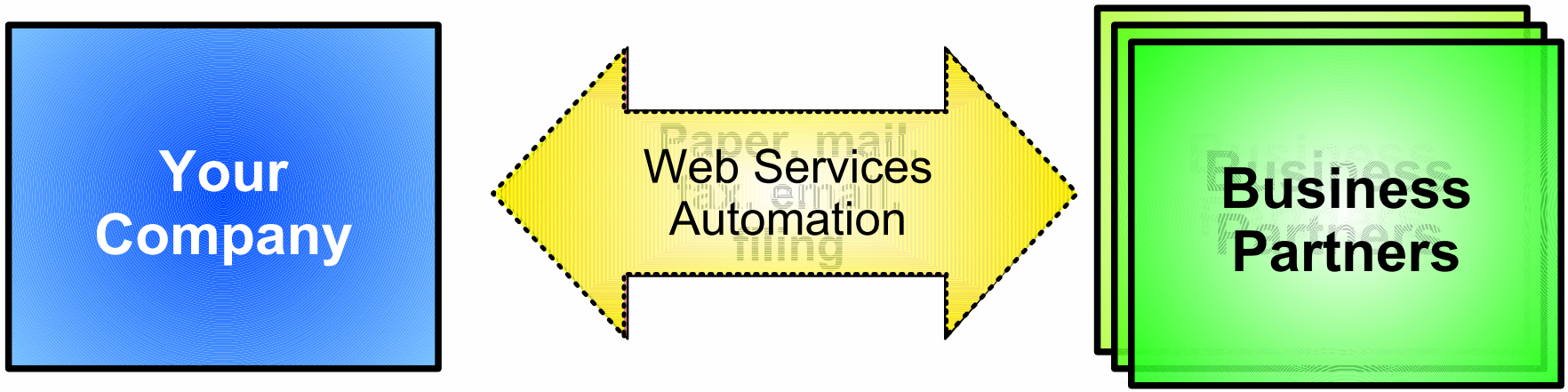
Web Services improves Business Partner communications

Eliminate manual, paper processes

- Redeploy handler staff to do more interesting work

Reduce cost of doing business

More accurate information on demand - "just in time"



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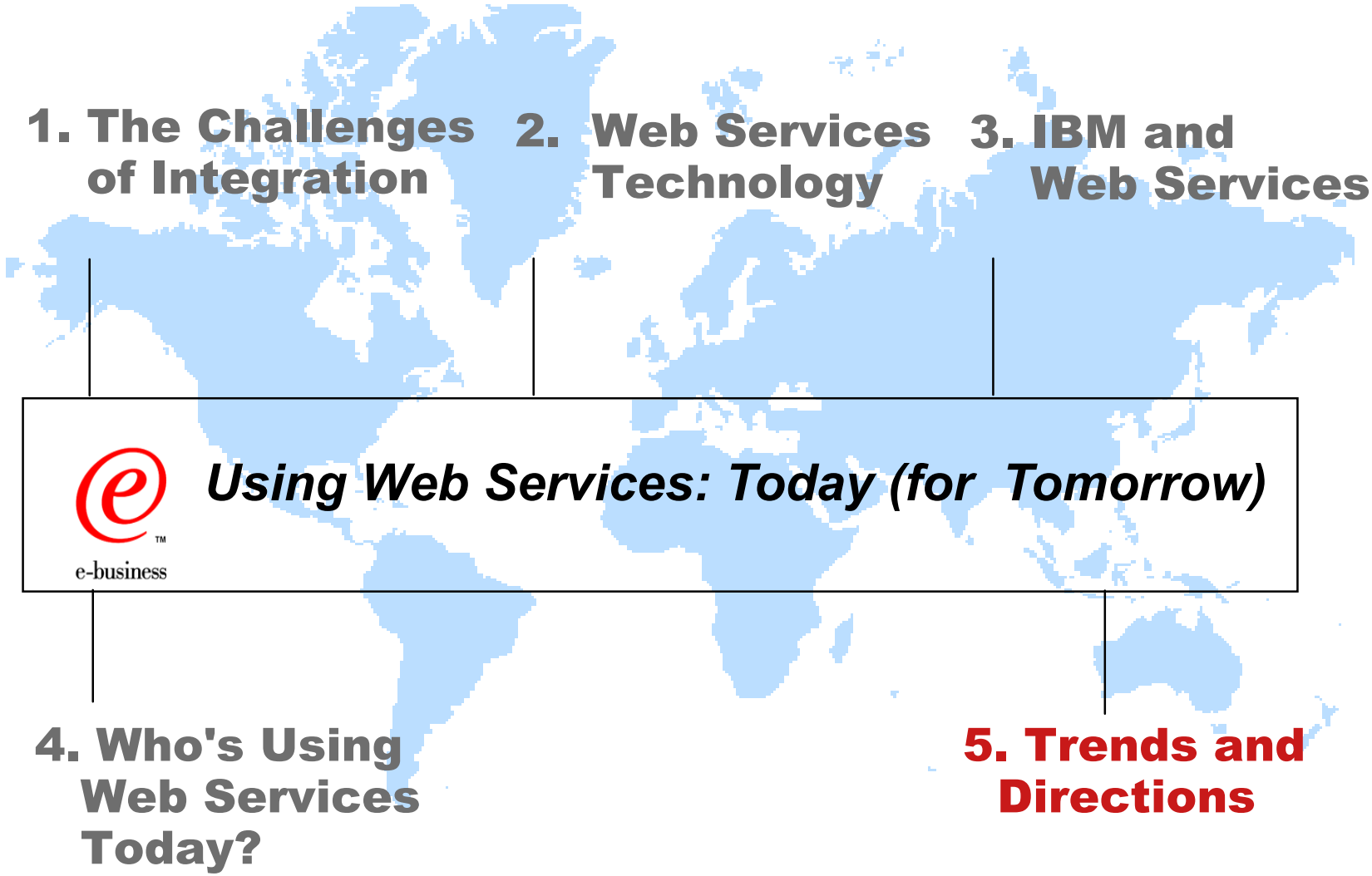
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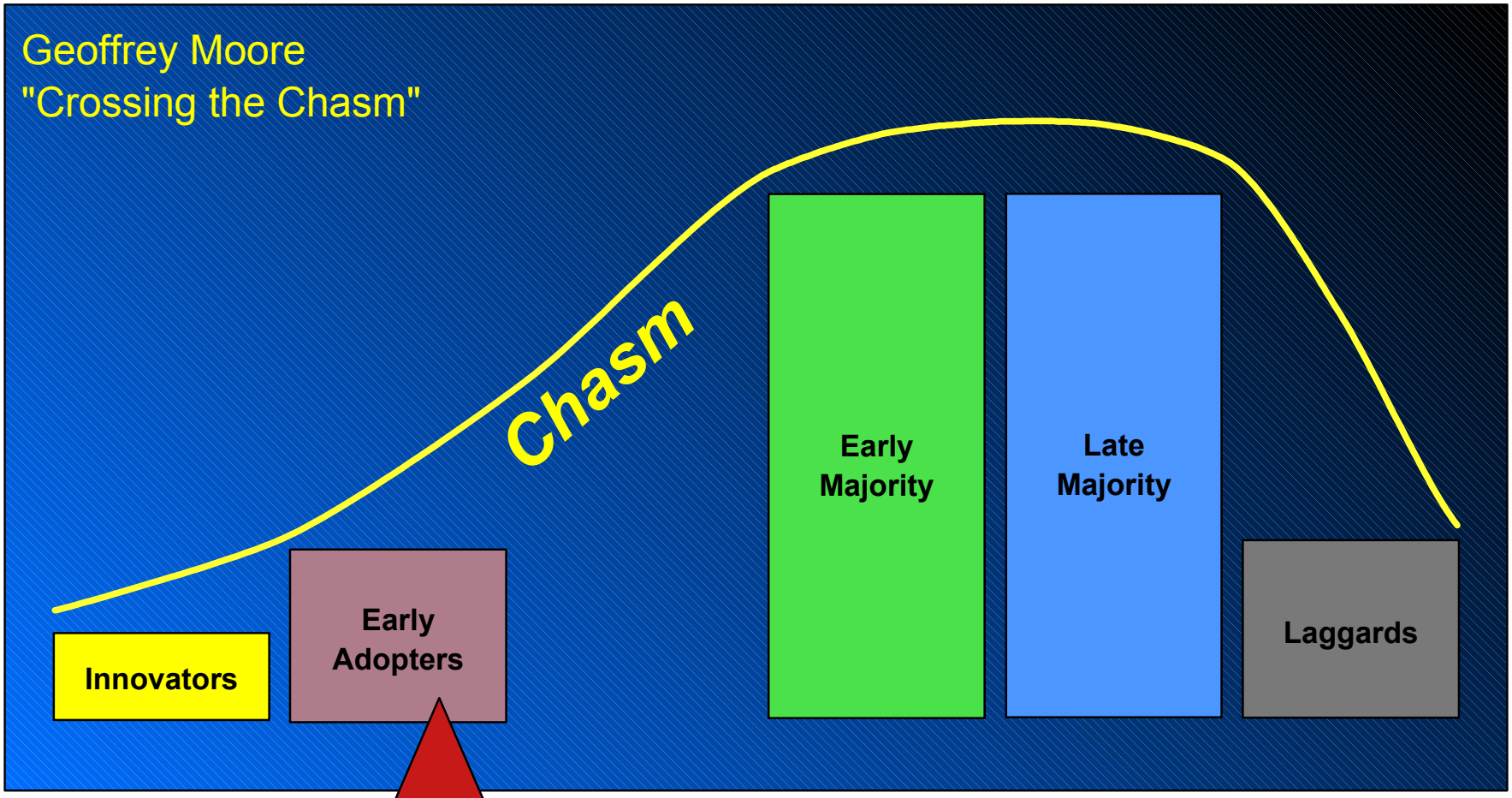
Technology Adoption Life Cycle



Many pilots, prototypes, studies, and first-time solutions are in progress now

Web Services today

IBM

Today..it's about *Integration*

EAI and B2B efforts characterize today's work...

...and standards are the key.

IBM

Tomorrow: dynamic e-business

e-business

- Pre-defined
- Static
- Point solutions
- All competencies
- Simpler
- Labor intensive
- Information

dynamic e-business

- Flexible
- Adaptive
- Integrated solutions
- Core competencies
- Complex
- Automated
- Actionable intelligence

Get Started NOW with Web Services

Visit http://ibm.com/developerworks/webservices

- tutorials, in-depth articles, industry news
- learn about emerging technologies for Web services

Read about what others are doing

- http://ibm.com/software/jstart

Check out the product tryout versions, alphaworks tools

- http://ibm.com/software, click "Downloads"
- http://ibm.com/alphaworks

Choose a small pilot study

- one which can be implemented in a short time
- prove the value of the technologies to your organization
- get help from IBM's **jStart** team if you need it

Start small, grow fast!

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Summary

Web services:

- can speed development with a more flexible infrastructure
- can give you the agility to cope with changes in business requirements, or experiment with better business processes
- can make you more profitable by reducing the cost of doing business with existing customers today and new customers later
- helps you find and quickly integrate with new business partners
- leverages your existing software investments

IBM can help you get started with Web services

- we have the middleware and developer tools NOW as released, supported products
- we have teams of experts to work with your developers and architects to build solutions
- we're ready to work with you NOW!

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Resources

Register for the Web services newsletter at:

- www.ibm.com/developerworks/newsletter/

Check out the Web services Zone at:

- www.ibm.com/developerworks/webservices/

Attend a local seminar or workshop:

- www.developer.ibm.com/spc/events

Need help getting started? Contact jStart at:

- www.ibm.com/software/ebusiness/jstart/

Free! Dev Tools and Resources from Apache and IBM

- download PDF from ibm.com/developerworks/speakers/colan

Are you an ISV? Check out IBM's new Web services on WebSphere (WoW) partner program:

- www.ibm.com/websphere/wow/

Get WebSphere Studio:

- www-3.ibm.com/software/info1/websphere/index.jsp

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