Web Services: Next Generation Computing
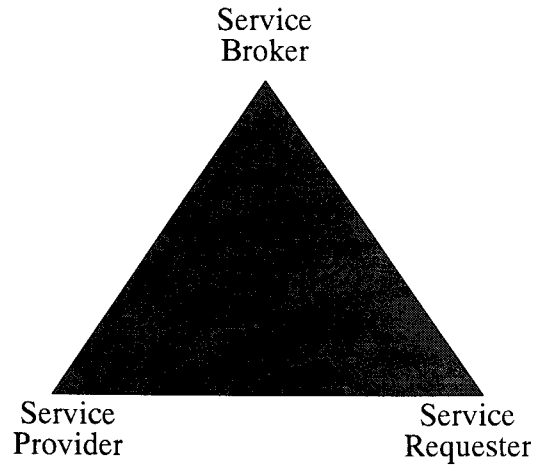
정철용
상명대학교 경영학부
cyjung@smu.ac.kr

What are Web Services?

- ● W3C
  - A software application
    - ● identified by a URI,
    - ● whose interfaces and binding are defined, described and discovered by XML artifacts
    - ● supports direct interactions with other applications (devices) using XML based messages via internet-based protocols
- ● WS-I
  - Standards-based integration and interoperability across platforms, applications, and programming languages
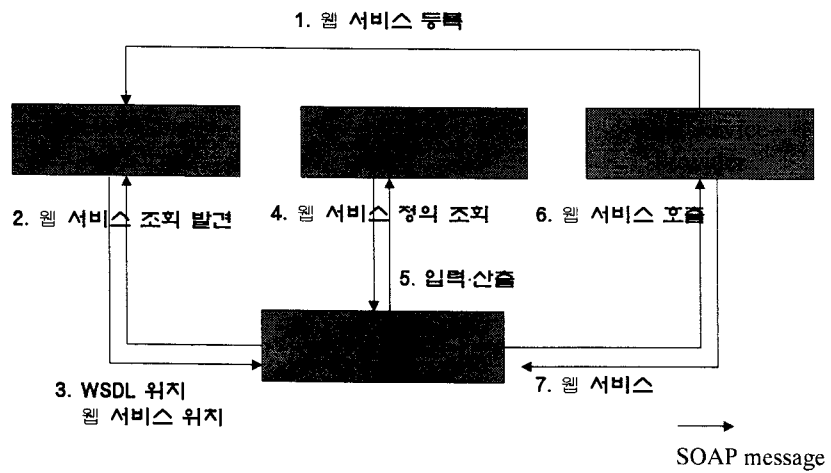
Web Services: Service Oriented Architecture

Service
Broker

Service
Provider

Service
Requester

Web Service Framework

1. 웹 서비스 등록

2. 웹 서비스 조회 발견   4. 웹 서비스 정의 조회   6. 웹 서비스 호출

5. 입력·산출

3. WSDL 위치
웹 서비스 위치

7. 웹 서비스

SOAP message

Delayed Stock Quote Web Service

WSDL http://services.xmethods.net/soap/urn:xmethods-delayed-quotes.wsdl

```
<definitions name="net.xmethods.services.stockquote.StockQuote" ...>
  <message name="getQuoteResponse1">
    <part name="Result" type="xsd:float" /> </message>
  <message name="getQuoteRequest1">
    <part name="symbol" type="xsd:string" /> </message>
  <portType name="...">
  <binding name="..." type="...">
    <soap:binding style="rpc" transport="http://schemas.xmlsoap.org/soap/http" />
    <operation name="getQuote">
      <soap:operation soapAction="urn:xmethods-delayed-quotes#getQuote" />
      <input><output></operation></binding>
  <service name="net.xmethods.services.stockquote.StockQuoteService">
    <documentation> ... </documentation>
    <port name="..." binding="...">
      <soap:address location="http://66.28.98.121:9090/soap" /> </port></service>
</definitions>
```

Delayed Stock Quote Web Service

DreamFactory Client Interface for XMethod Web Service:
http://www.dreamfactory.com/xmethods/page3.html

Stock Quote Service from XMethods

Stock Quote Portfolio

Symbol	Name	Price	Shares	Total
DIS	Disney, Incorporated	18.89	400	$7556
IBM	International Business	87.57	100	$8757
BEAS	BEA Systems	11.89	400	$4756
MSFT	Microsoft	26.13	500	$13065

Stock Quote Input SOAP
```
▼ <SOAP-ENV:Envelope
    xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/1999/XMLSchema">
  ▼ <SOAP-ENV:Body>
    ▼ <ns1:getQuote
        xmlns:ns1="urn:xmethods-delayed-quotes"
        SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
        <symbol xsi:type="xsd:string">MSFT</symbol>
      </ns1:getQuote>
    </SOAP-ENV:Body>
  </SOAP-ENV:Envelope>
```

Manage Portfolio

Stock Quote Output SOAP
```
<?xml version="1.0" encoding="UTF-8"?>
▼ <soap:Envelope
    xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/1999/XMLSchema"
    xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
    soap:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  ▼ <soap:Body>
    ▼ <n:getQuoteResponse xmlns:n="urn:xmethods-delayed-quotes">
        <Result xsi:type="xsd:float">26.13</Result>
      </n:getQuoteResponse>
    </soap:Body>
  </soap:Envelope>
```
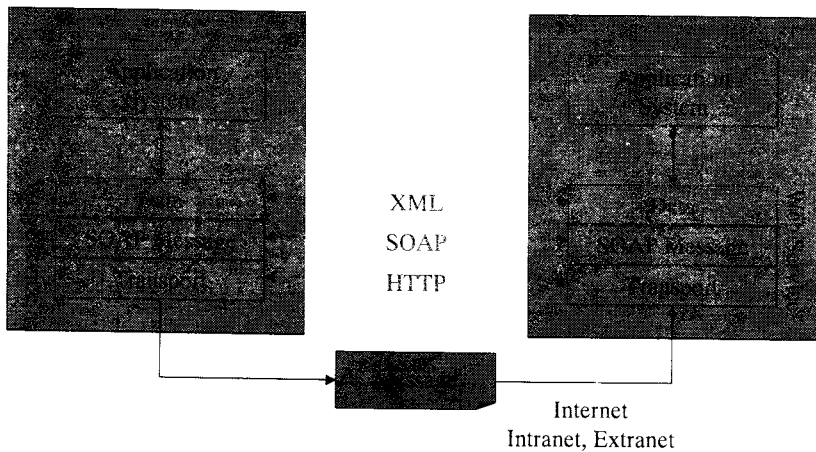
Why Web Services?

- Internet and XML-Based Open Standard
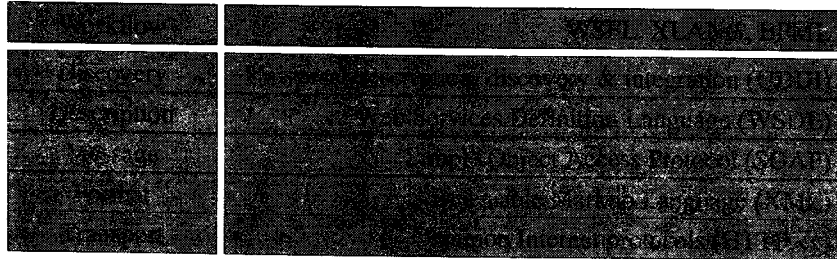
- Interoperability
- Modularity, Component-Based
- Led by large vendors: IBM, Microsoft, SUN, BEA, Oracle, ...

Integration and Interoperability

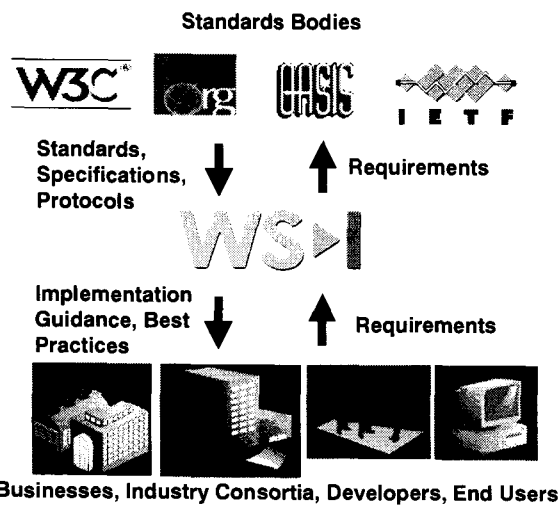Vendor, Platform, PL, and Device Neutral
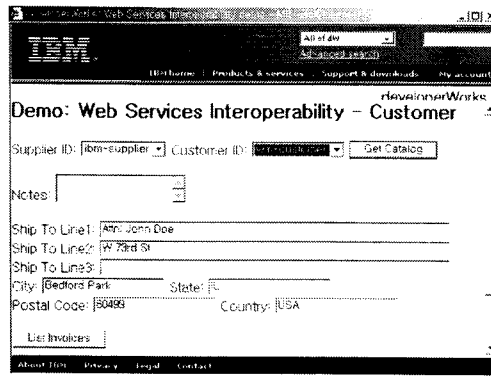
XML
SOAP
HTTP
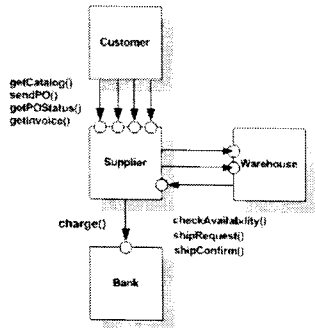
Internet
Intranet, Extranet

WS-I

- The fundamental characteristic of Web services is *interoperability*
  - An Internet-native distributed computing model based on XML standards
  - Within an enterprise
  - Between business partners
  - Across a heterogeneous set of platforms, applications and programming languages
- Web Services Interoperability Organization
  - Consistent, reliable interoperability between Web services technologies from multiple vendors
  - A *standards integrator* to help Web services advance in a structured, coherent manner

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WS-I, Standards and Industry

Standards Bodies

W3C   OrG   OASIS   I E T F

Standards, Specifications, Protocols ↓   ↑ Requirements

WS-I

Implementation Guidance, Best Practices ↓   ↑ Requirements

Businesses, Industry Consortia, Developers, End Users

Web Services Interoperability Demo

- http://www.xmethods.net/wsid/online/
- IBM, IONA E2A, webMethods

EAI and Web Services

- Types of EAI
  - Data-oriented Integration
    - ETL to Data Warehouse, Data Mart
  - Function or Method-oriented Integration
    - API, RPC, CORBA, Java RMI, DCOM, Web Services
  - User Interface Integration
    - Enterprise Portal
  - Business Process-oriented Integration
    - Integration Broker

- Web Services
  - Loose, partial, ad hoc integration
  - Convergence of EAI solutions and Web services
    - Tibco, BEA, IBM, webMethods, ...
    - SAP, PeopleSoft, Siebel, ...

B2Bi

- Collaborative commerce, SCM, CRM, ...
- Connectivity & Interoperability
  - Standardization of Information Communication and Technology
  - Business Process Integration
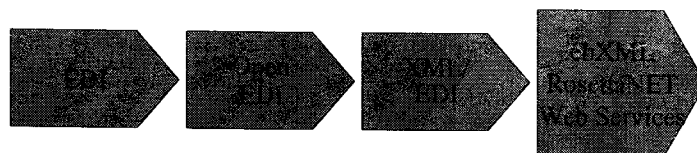
Barriers in B2Bi

- Efficient Consumer Response

Retailers

Manufacturers

Category Management

Product Replenishment

Barriers between trading partners

Barriers between internal functions
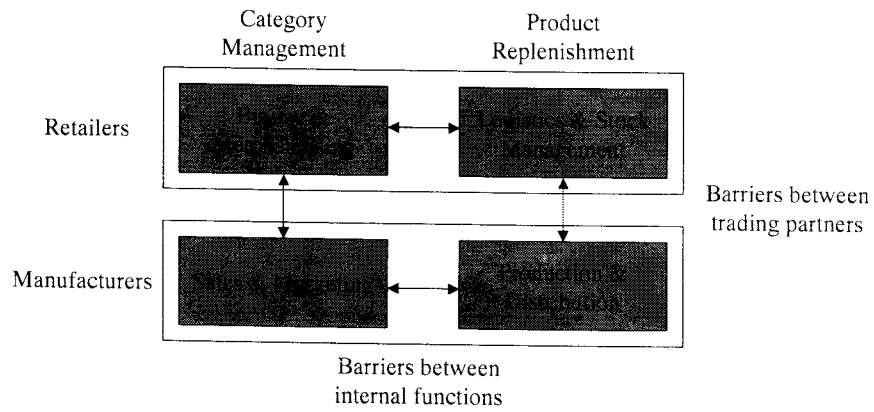
Application Systems Acquisition

- Hosting models of software services

Productivity	Flexibility
Integration	Best Practice

IT Performance

Make

Product

Service

Buy
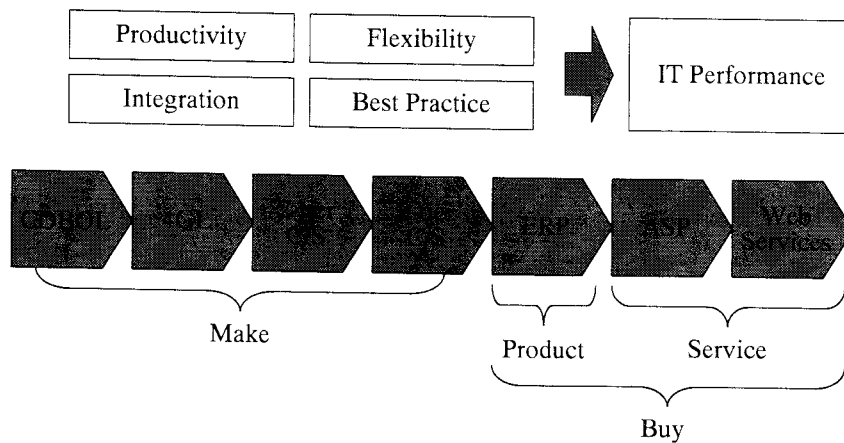
ASP: Pros and Cons

• Pros	• Cons
– Low Cost of Entry	– Loss of Control (Security)
– Time-to-Market Advantage	– Limited Customization Ability
– Usage-Based Pricing Model Facilitates ROI	– Integration Challenges Can Negate Cost Advantage
– Displacement of Risk Burden onto Vendor	– Few Best Practices for Critical Applications

Greater operational efficiency, but slow adoption of ASP model

Enabling Virtual Enterprise
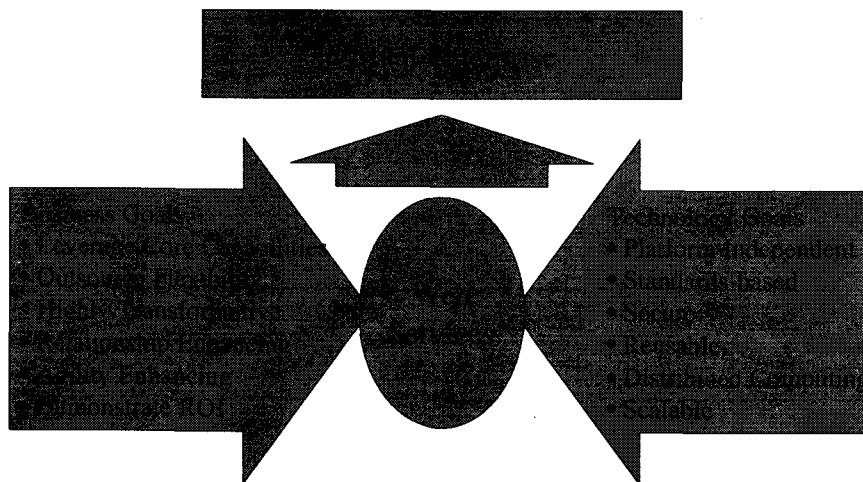
Business Goal of Web services
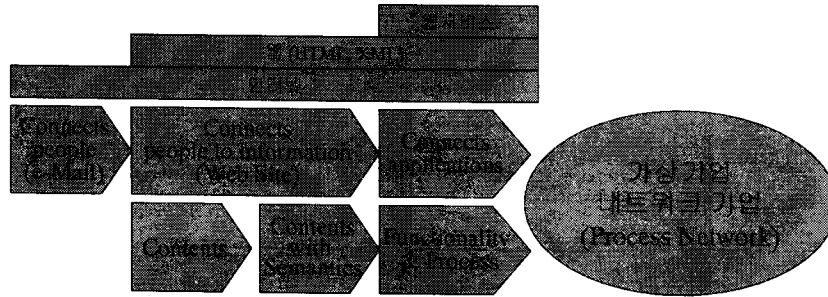
- Provision of software as a service in a distributed environment
- To enable enterprises to focus on core competencies while outsourcing all other functions
  - Ex: Credit authorization, Just-in-time productivity and quality-of-service monitoring

Architecture Principles

- Challenges Addressed
  - Distributed centers of control
  - Diversity of technology platforms
  - Dynamic business environment
- Architecture Principles
  - Openness
  - Simplicity
  - Loose coupling

Web Services Architecture

Customer profile module	Credit scoring module	Pricing module	Risk analysis module	Under-Writing Appl.	Billing Appl.

Examples of Application Services

Shared utilities • Security • Third-party performance auditing/ assessment • Billing and payment	Service management • Provisioning, monitoring, quality of service (QoS), synchronization, conflict resolution
	Resource knowledge management • Directories, brokers, registries, data transformation
	Transport management • Message queuing, filtering, metering, monitoring, routing, resource orchestration

Service Grid

Web Services

| Foundation Standards
• WSDL (Web Services Description Language)
• UDDI (Universal Description, Discovery, and Integration)
• XML | Foundation Protocols
• SOAP (Simple Object Access Protocol)
• HTTP
• TCP/IP |

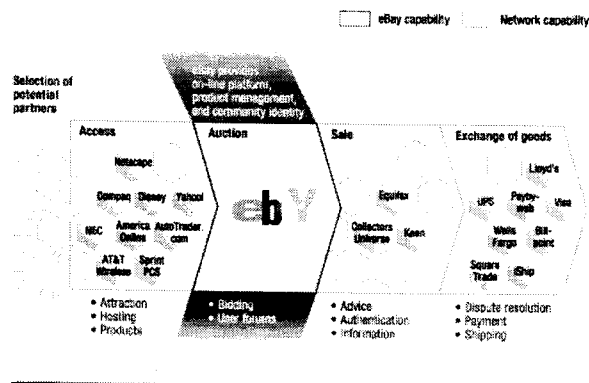Ref: John Hagel III

Web Services Networks

- Security
- Reliability
- Manageability

  − Grandcentral: Hub and Spoke
  − Kenamea
  − Flamenco Network: P2P
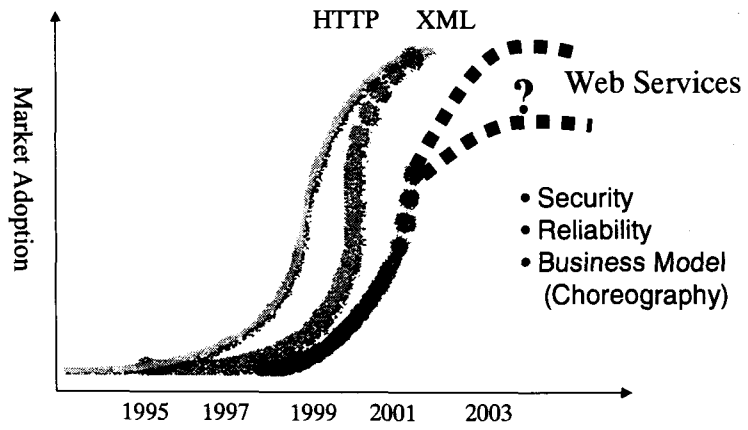 − Transact Plus
  − Bang Network

기업의 분해 및 집중

	Customer Relationship Management	Product Innovation & Commercialization	Infrastructure Management
Economic Driver	• Economies of scope • High cost of customer acquisition makes it imperative to gain large wallet share	• Speed of development • Early market entry allows for a premium price and large market share	• Economies of scale • High fixed costs make large volumes essential to achieve low unit cost
Skills	• Direct marketing	• Innovation	• Efficient operations
Competition	• Battle for scope; rapid consolidation; a few big players dominate	• Battle for talent; low barriers to entry; many small players thrive	• Battle for scale; rapid consolidation; a few big players dominate
Culture	• Customer focused; service oriented	• Employee focused; creativeness	• Cost focused; standardization and efficiency

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Strategic Symphony

● Network Orchestrator + Specialists

The Opportunity

Market Adoption

HTTP   XML

? Web Services

• Security
• Reliability
• Business Model
  (Choreography)

1995   1997   1999   2001   2003

Conclusion

VS.