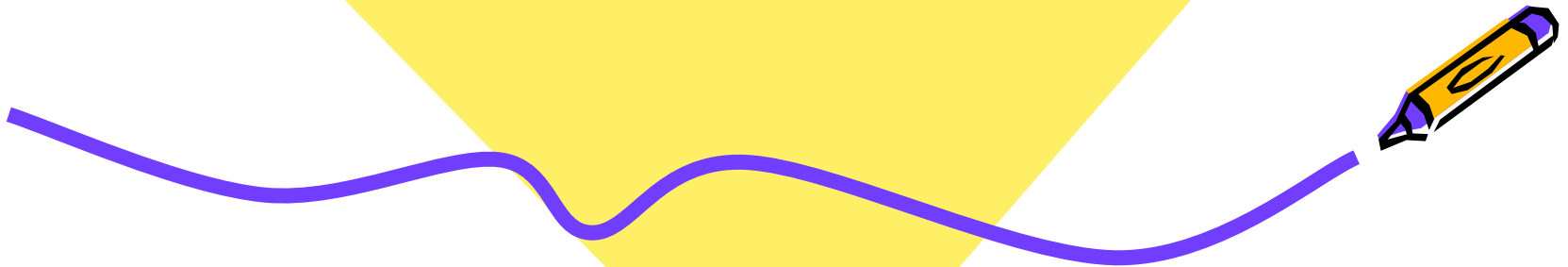




Introduction to Web Services



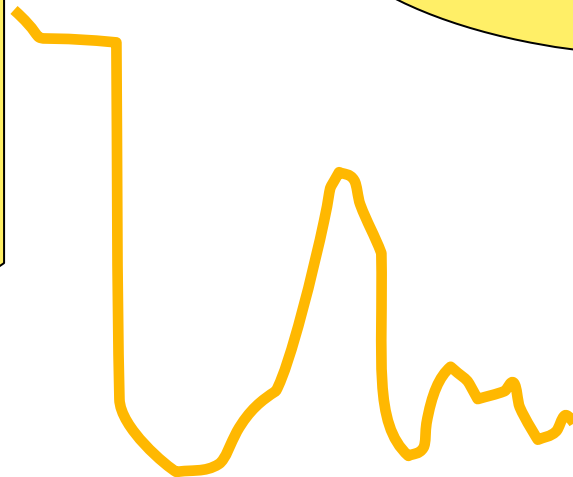
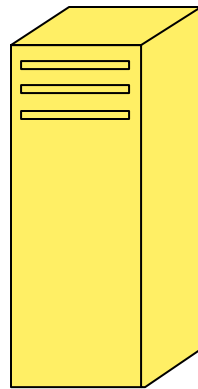
Try to Answer...

- What is web services
- Why web services is necessary
- How to use this new technology
- Some beyond basics

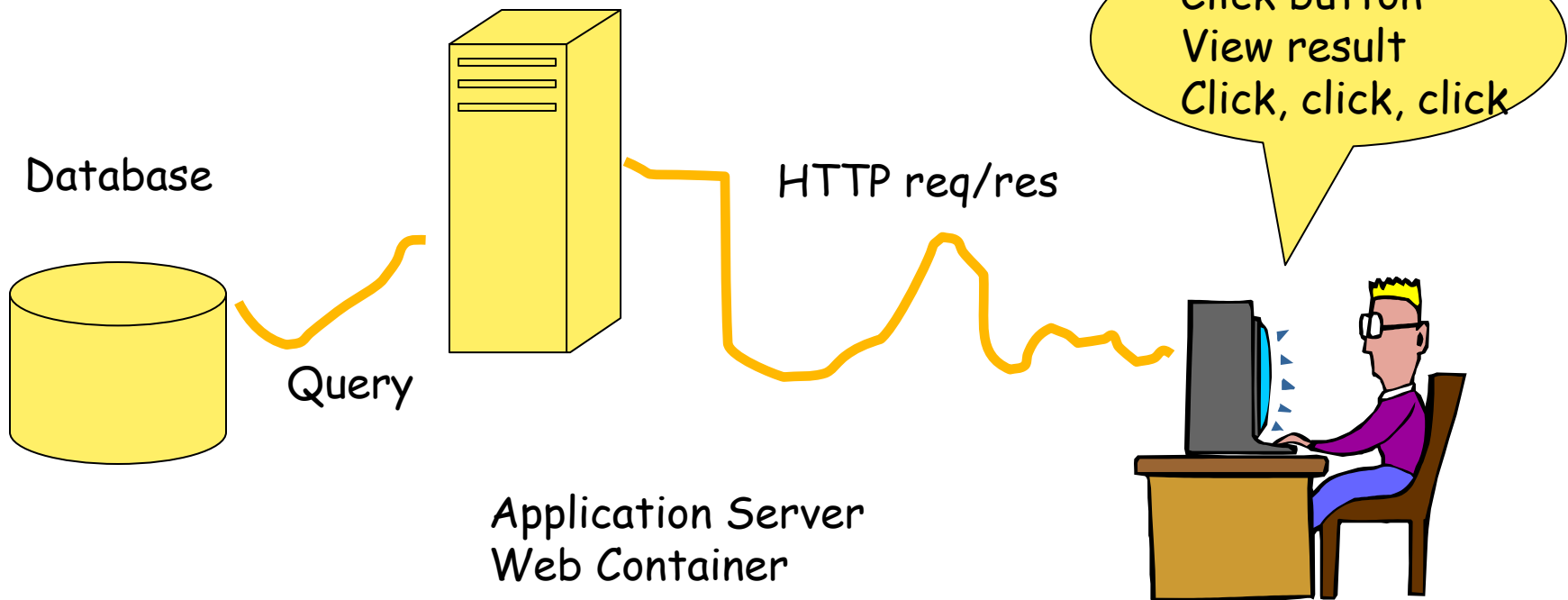


Client/server computing

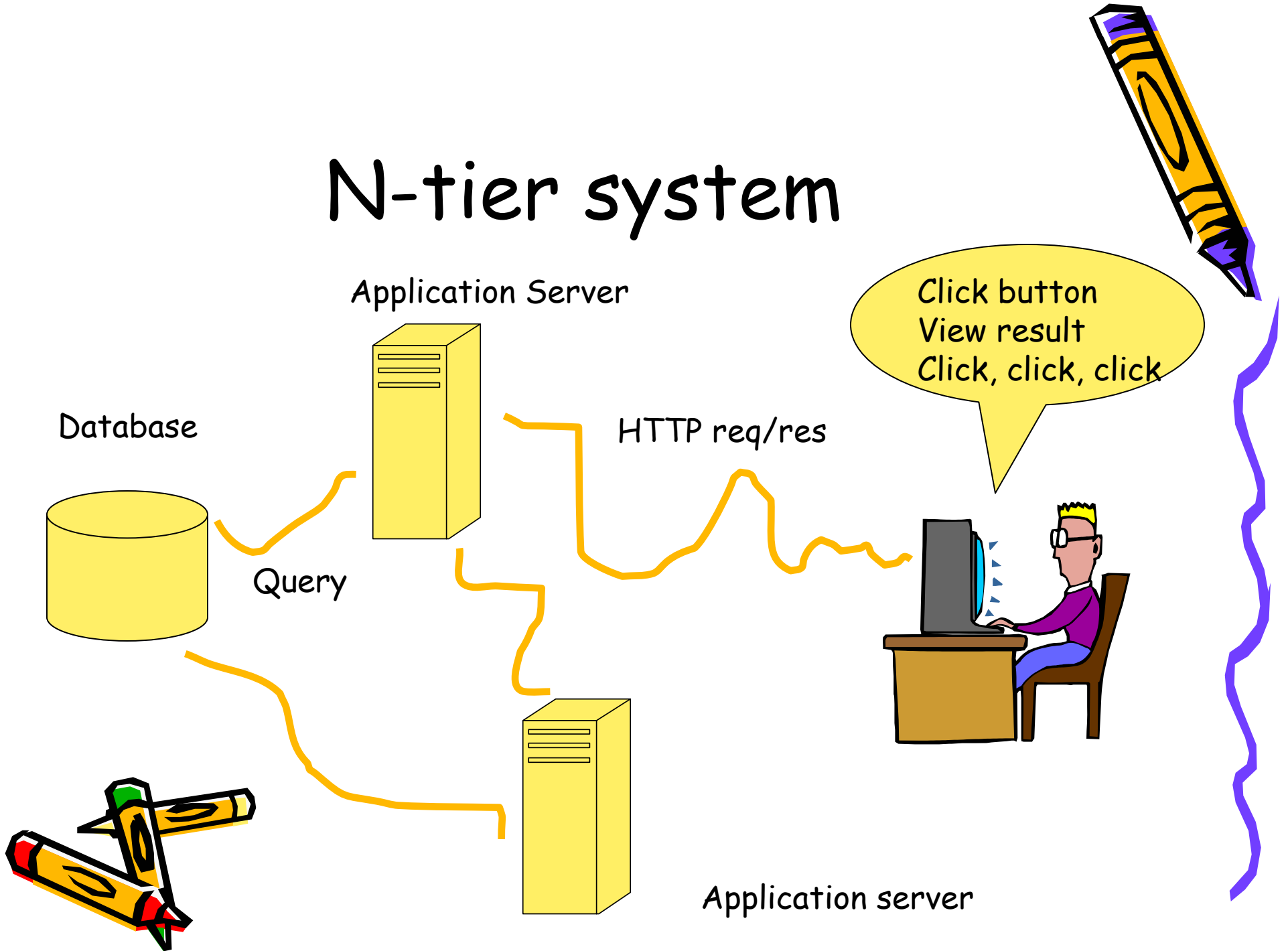
Download client side
Software
Configure, install
reinstall



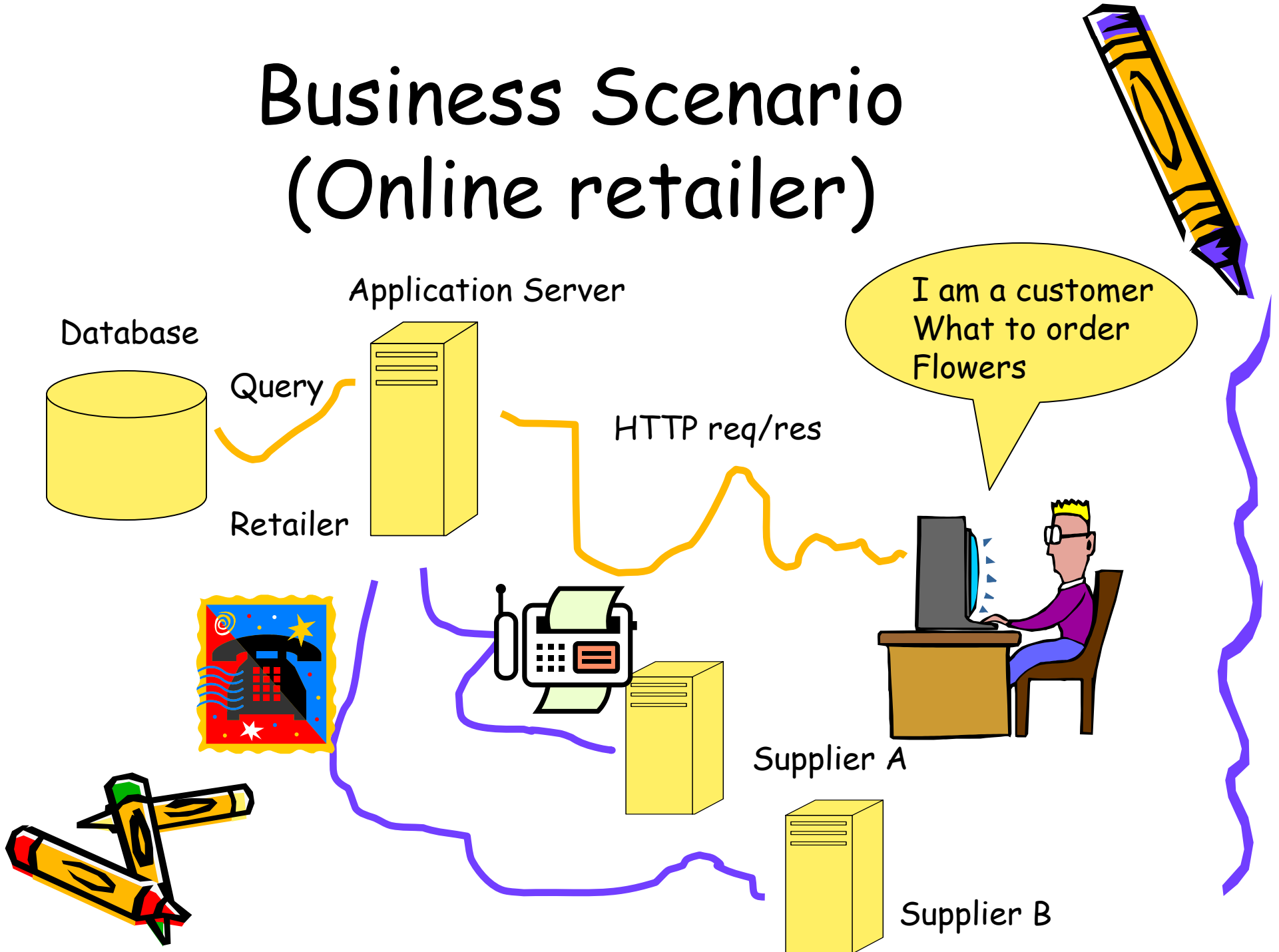
Three-tier system



N-tier system

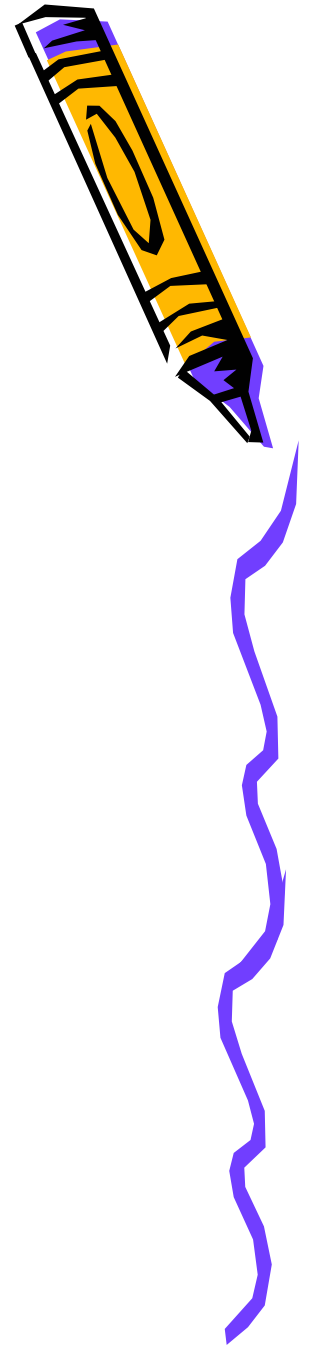


Business Scenario (Online retailer)



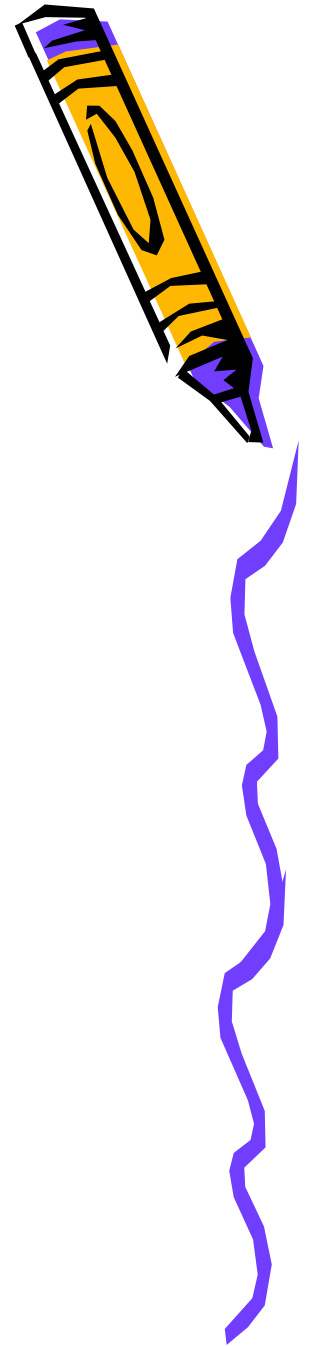
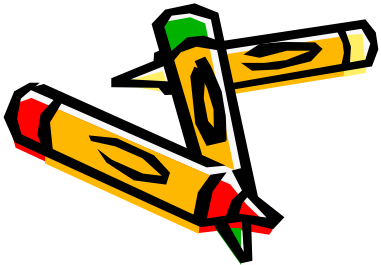
Problem

- How to talk with each other
 - Communication protocol
 - Program language
 - Operating system
 - Deployment platforms



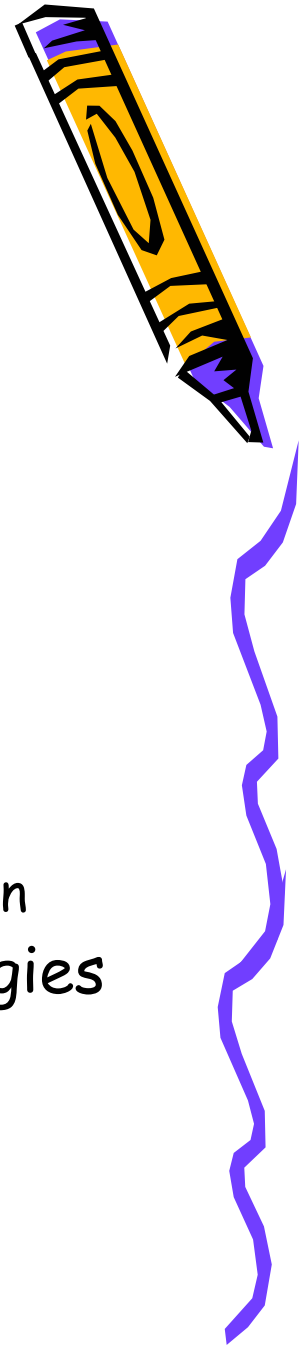
Solution

- Standard Specifications
- Middleware
- Web Services



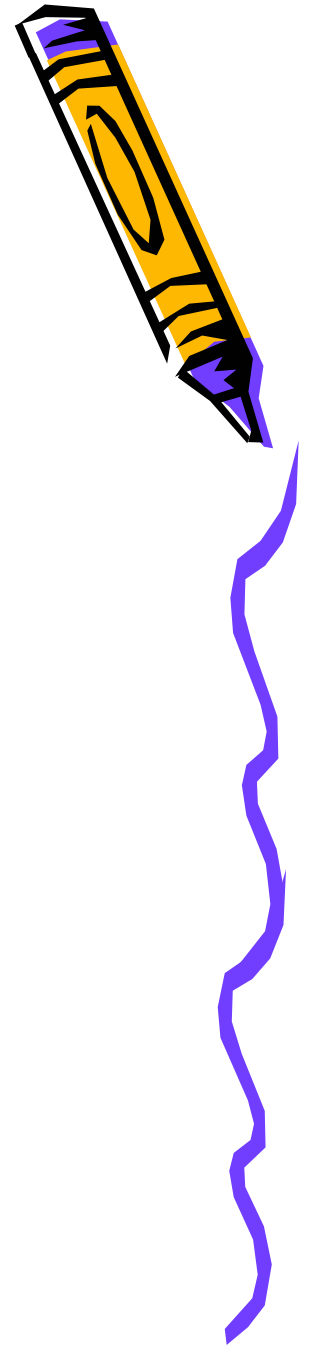
Web services characteristics

- Loosely coupled
- The latest evolution in distributed computing
- Not just client/server, also peer to peer
- Support seamlessly application integration
 - Security
 - Platform independence
 - Easy adaptive of changing application implementation
- Based upon open standards and Web technologies



Core technologies

- XML
- WSDL
- SOAP
- UDDI



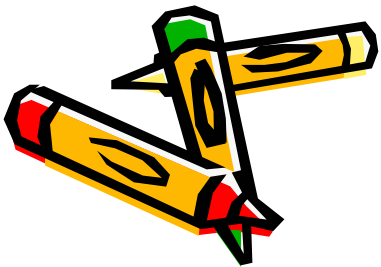
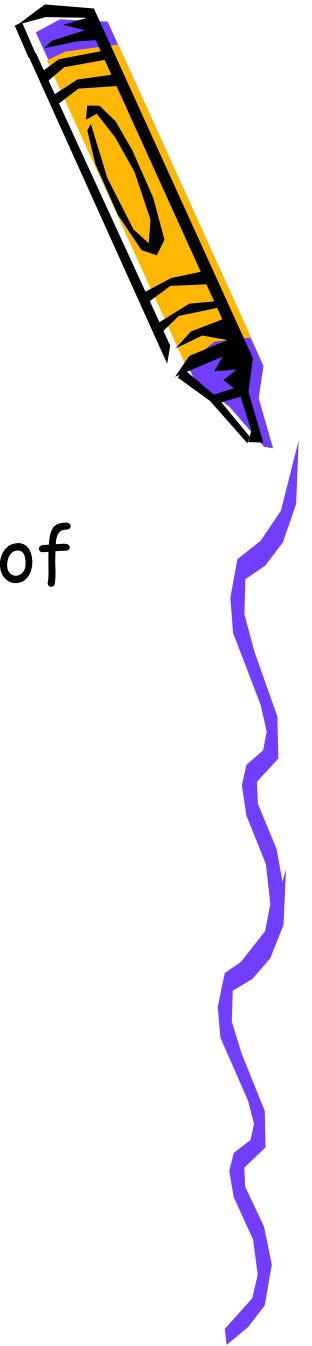
WSDL

- Web Service Description Language
 - XML based
 - Description of underlying applications
 - Interface between the underlying application and other Web-enabled applications
 - W3C standards



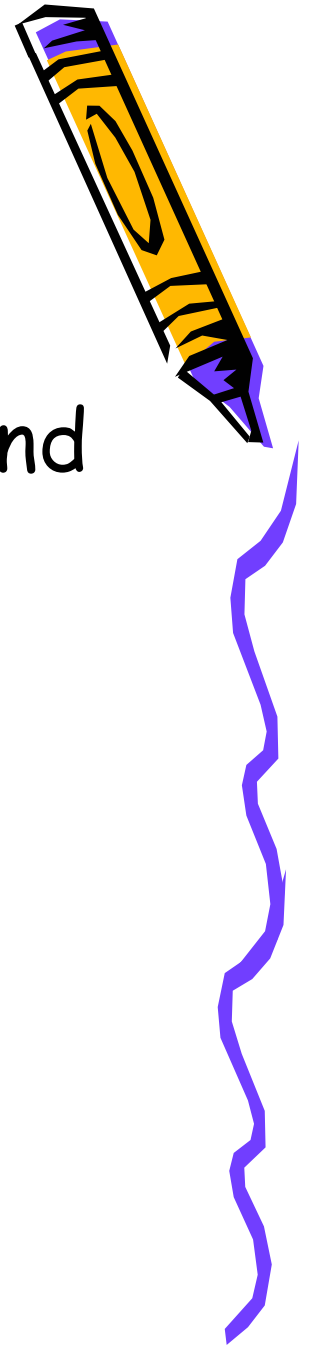
SOAP

- Simple Object Access Protocol
 - A lightweight protocol for exchange of information in a decentralized, distributed environment
 - Upon HTTP, SMTP
 - W3C Standards

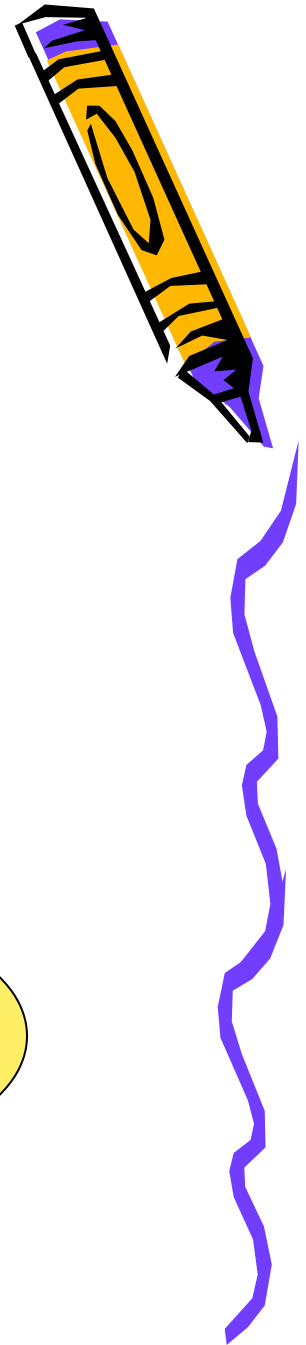
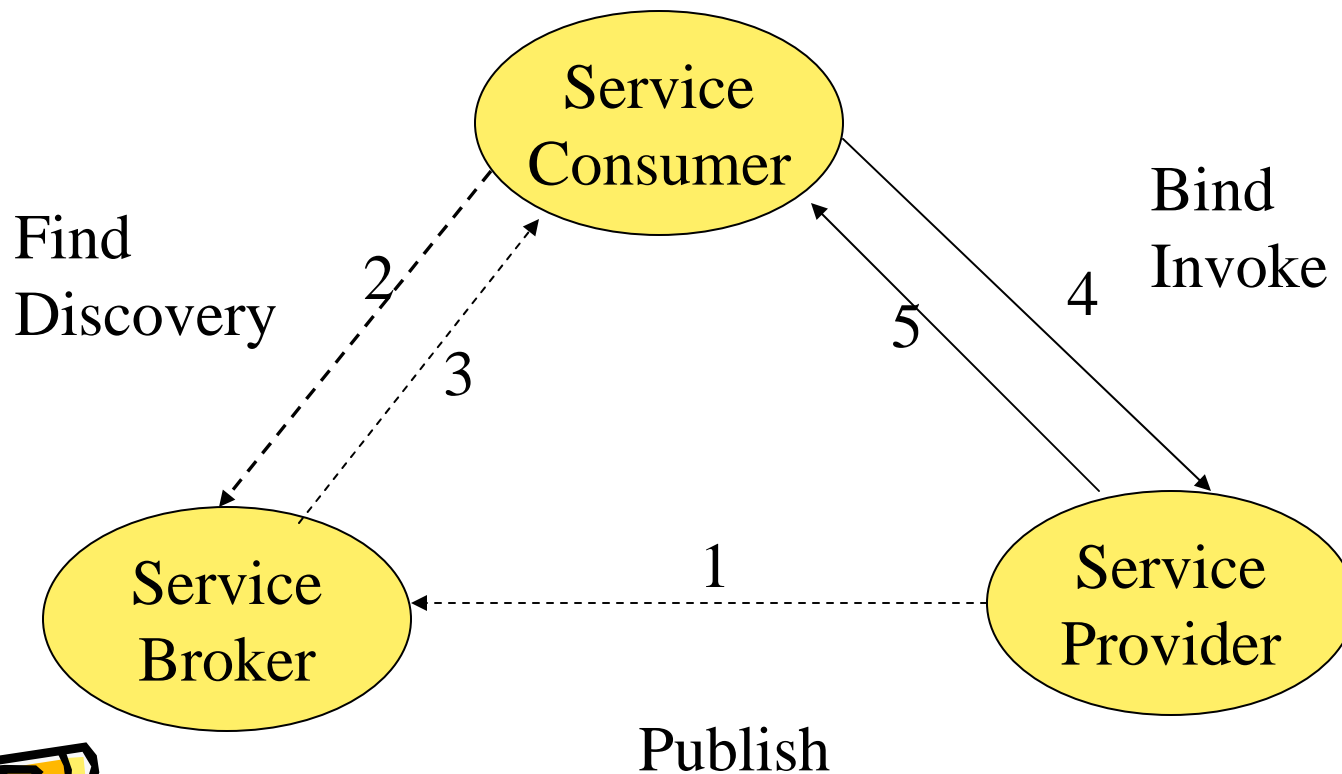


UDDI

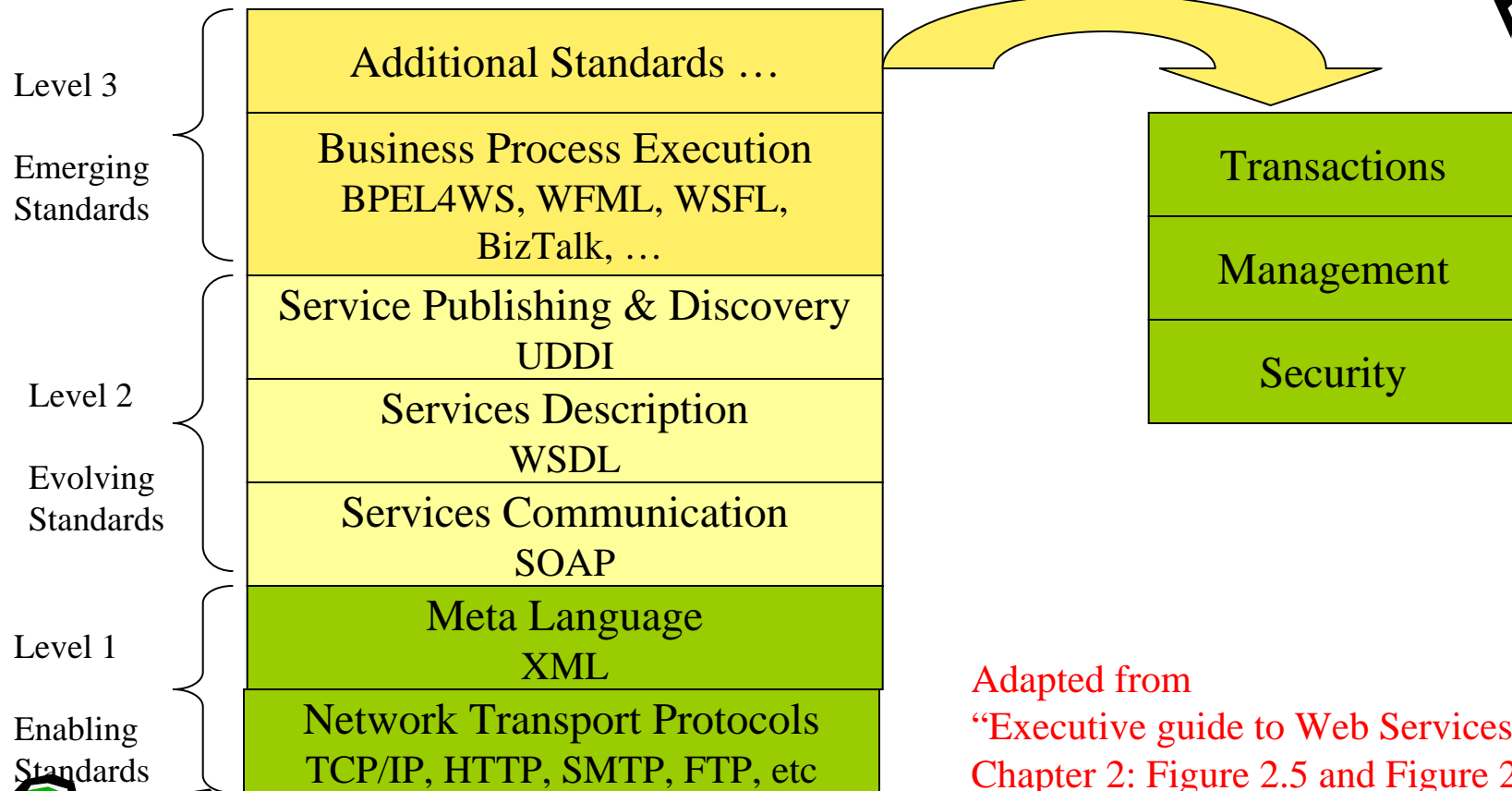
- Universal Description, Discovery and Integration (UDDI) registry
 - Publish web services
 - Discover web services
 - Reuse web services
 - Find good one
 - Private and public



Web Service Architecture



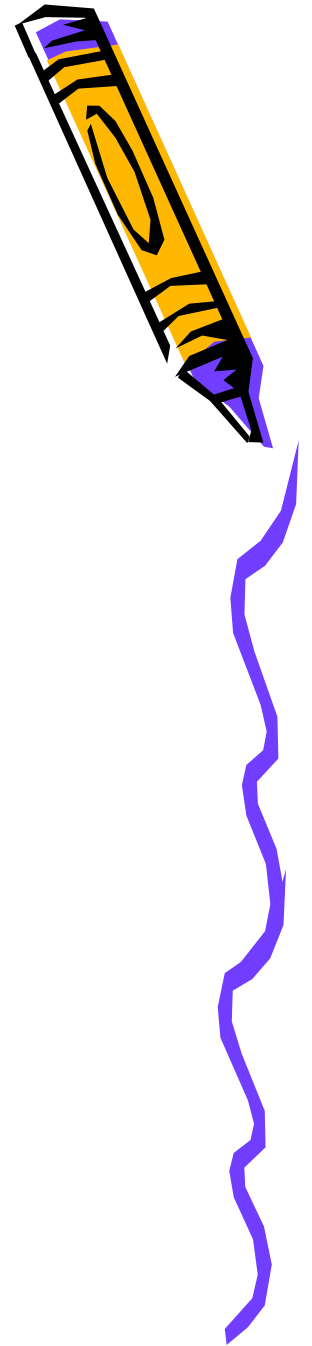
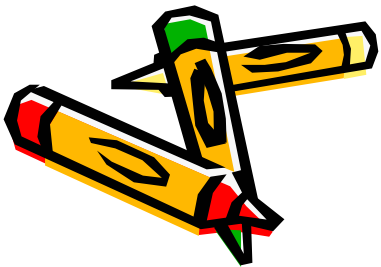
Standards of Web services stack



Adapted from
"Executive guide to Web Services
Chapter 2: Figure 2.5 and Figure 2.12"

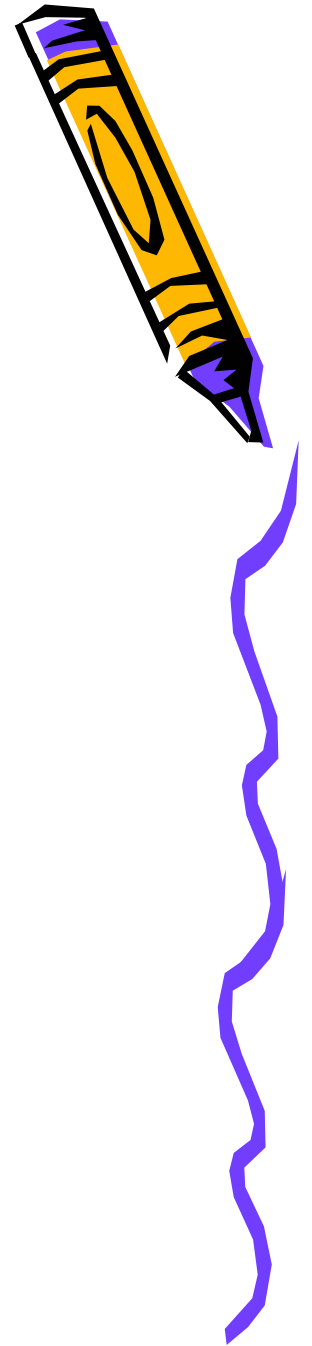
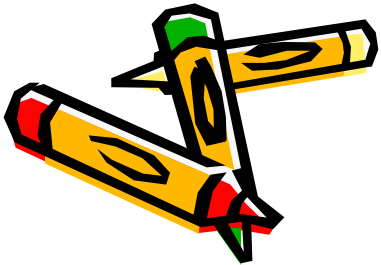
Implementation Platforms

- Microsoft's .NET
 - .NET Framework
 - Visual Studio .NET
 - .NET Enterprise Servers
- J2EE and Application Servers, toolkits
 - Apache Tomcat, Axis, Eclipse
 - BEA WebLogic, WebLogic Workshop
 - IBM WebSphere, WSTK, WebShpere Studio
 - Oracle AS, Jdeveloper
 - Sun SunONE
 - ...



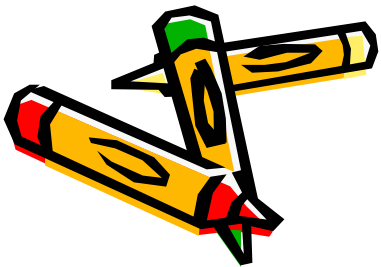
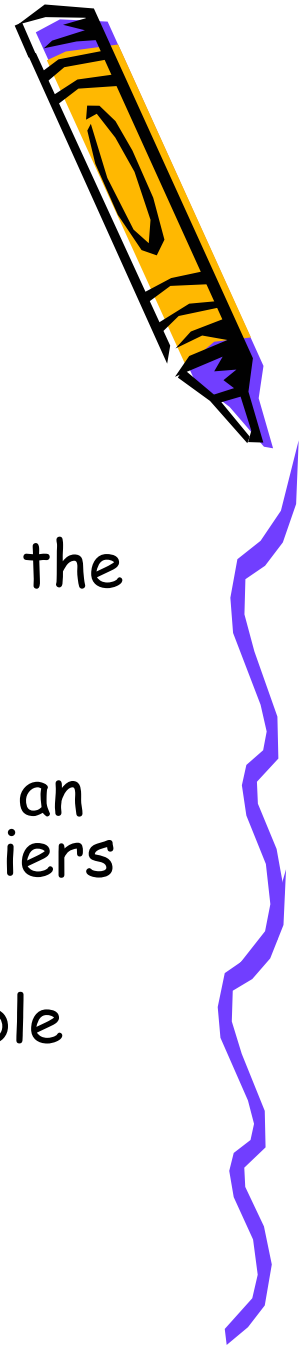
Other platforms

- Other Language and environment
 - C/C++
 - eSOAP, gSOAP, Axis, WASP
 - Perl
 - SOAP:Lite
 - Python
 - SOAPy, Zolera Soap Infrastructure (ZSI)
 - PHP
 - PEAR::SOAP



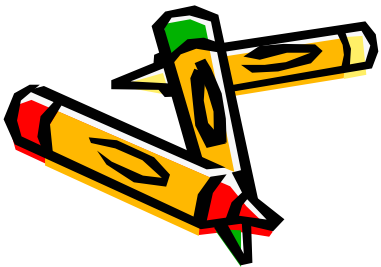
Web services for online retailer

- Static inquiry on supplier
 - The Retailer turns the existing Web application into a Web service for checking the inventory of its main wholesale supplier
- Dynamic inquiry on supplier
 - The retailer uses Web services to perform an inventory search of several wholesale suppliers
- Cross supplier inquiry
 - The retailer makes its Web service available for use by others who need the service.



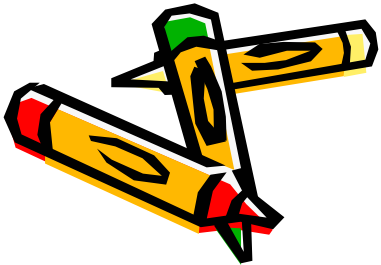
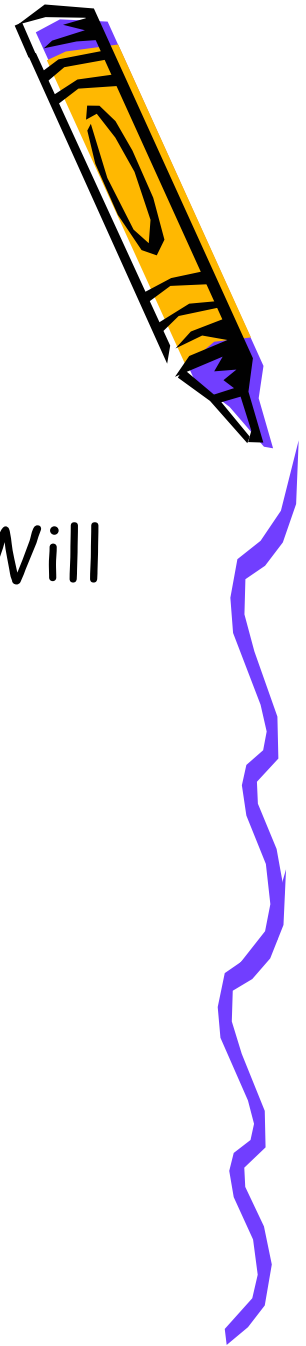
More application integrations

- Monitor the book market
 - Users enters search information of a book (title and ISBN)
 - Application tracks
 - Amazon.com for prices, availability, release date, and sales rank based ISBN
 - Google for ranking based on the title
 - eBay for number of matching listings, highest price, and number of bids



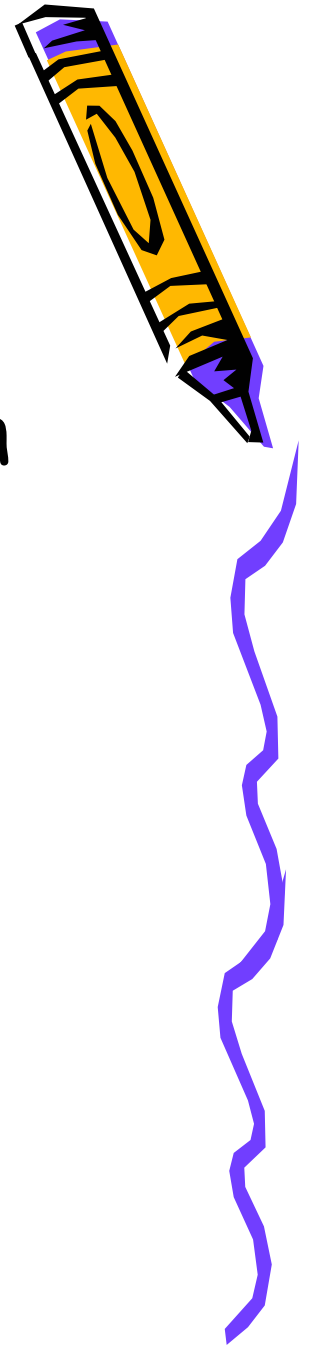
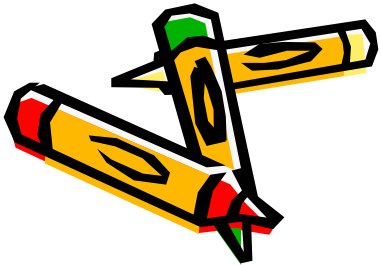
More ...

- Reference
 - Real World Web Services (O'Reilly, Will Iverson)
- Audio CD Catalog



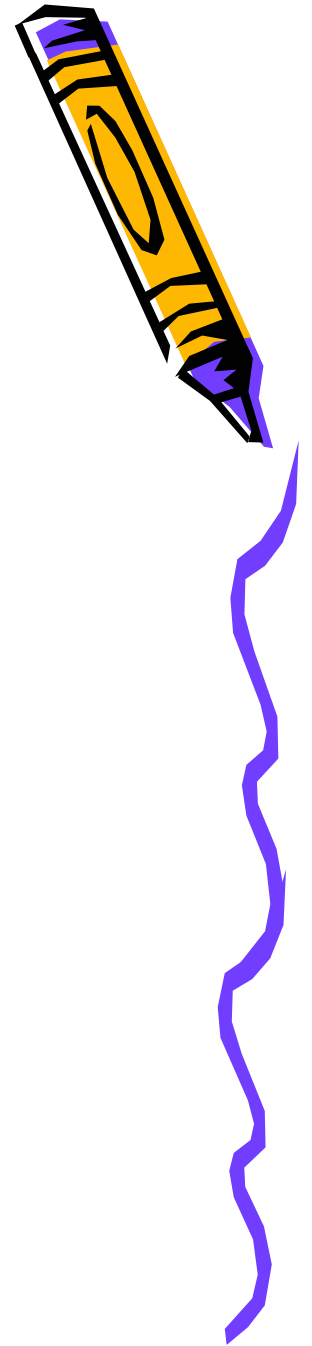
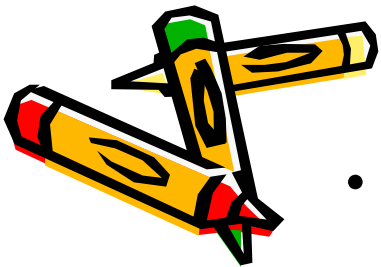
Web Service Adoption

- Enterprise Application Integration
 - Inside organization
 - Cross organization boundary
- E-Science
 - Grid computing
 - Scientific application portal
 - BioInformatics



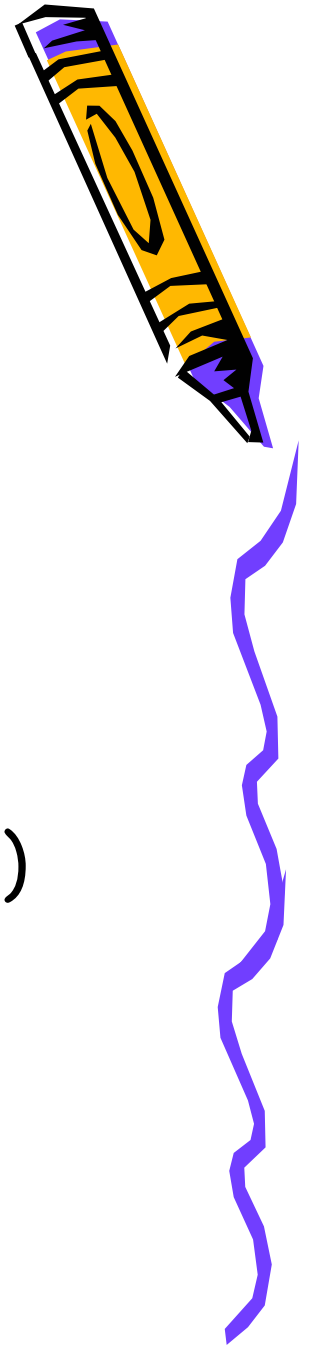
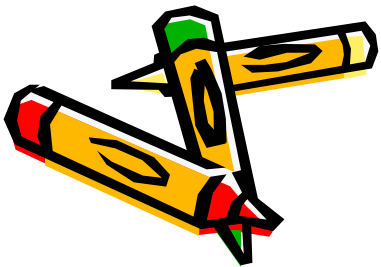
Beyond Basics

- Service description:
 - Syntactic description, WSDL
 - Semantic description, OWL-S
- Service discovery
 - Static
 - Dynamic
- Service composition
 - Manual
 - Semi-autonomous
 - Autonomous
- And more ...



Practice

- Tomcat web server
- Axis soap server
 - <http://ws.apache.org/axis/>
- Demo
 - Use existing services (xmethods.com)
 - Deploy a service
 - Monitor



- <http://xmethods.com/>
- Temperature Conversion Service
 - Dynamic invocation
- Hash Service
 - Try online

