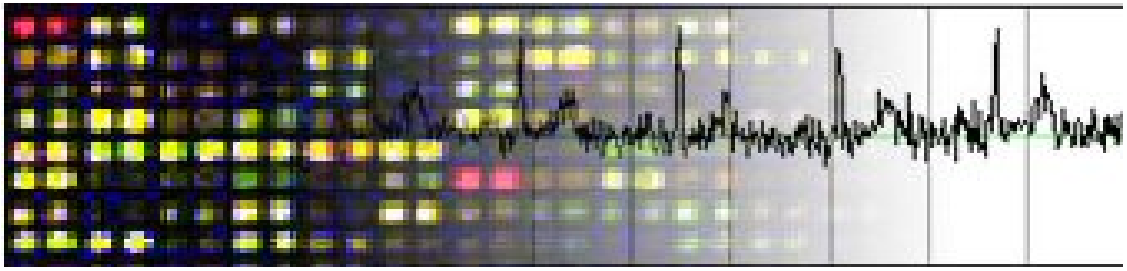
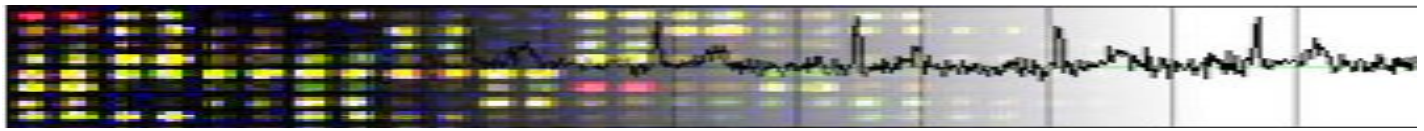


Biomedical Information Technology

2.771J BEH.453J HST.958J Spring 2005

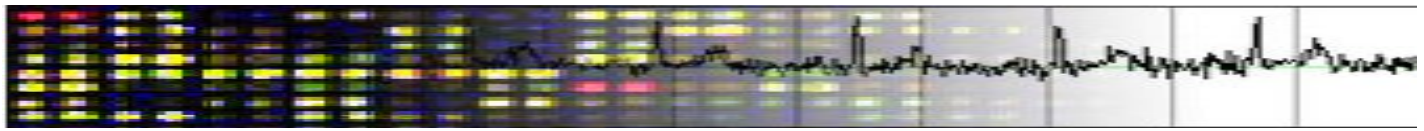
Lecture 24 February 2005

The Umbilical Cord And Alphabet Soup



THE UMBILICAL CORD AND ALPHABET SOUP

- *Java contributions*
  - *Interpreted language*
  - *Remote code without security issues*
- *Encapsulation layer: XML*
- *Use of CORBA*
- *An example*



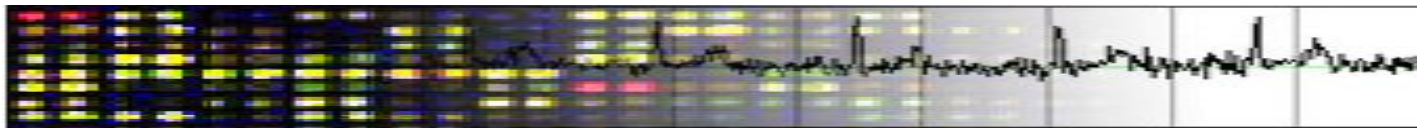
Objectives of connectivity architecture

- *Seamless, secure connections*
- *Common, reusable platform*
  - *Industry standard methods*
  - *Scalable architecture*
- *High performance*
  - *Negligible latency above 10 Mb/s network speeds for most text applications (1+ Gb/s for graphics and video)*
  - *You are sending commands, not bitmaps. So latency in sockets and connections is key.*

The contributions of Java

Java was a novel way of looking at the relation between client and server. It changed the options available to construct application architectures

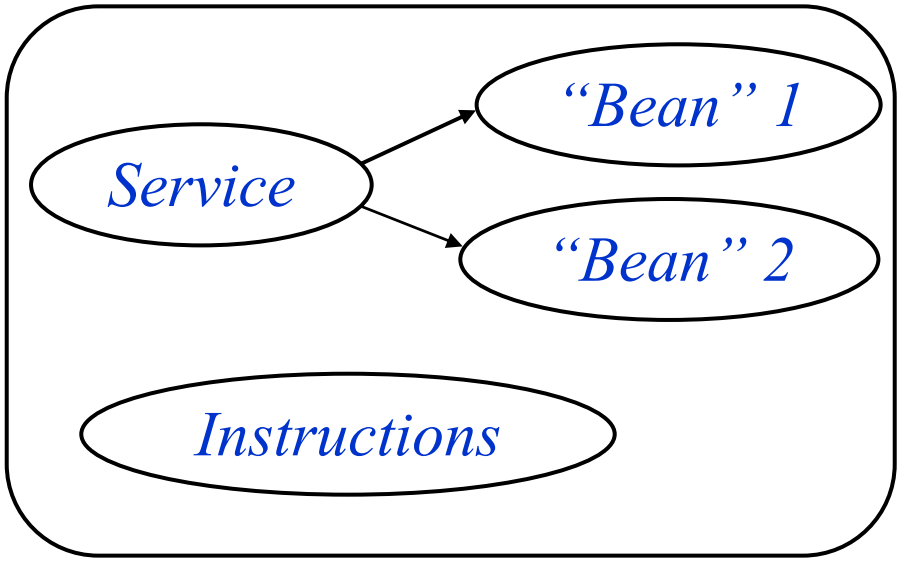
- Applications dowloaded and compiled locally to run on a remote client
- Can also use applets that run in a browser window
- Java is a serious programming language



Java as a programming environment

Java 2 Platform, Enterprise Edition (J2EE)

"The enterprise JavaBean architecture supports component-based distributed computing. Enterprise Beans are components of distributed transaction-oriented enterprise applications."



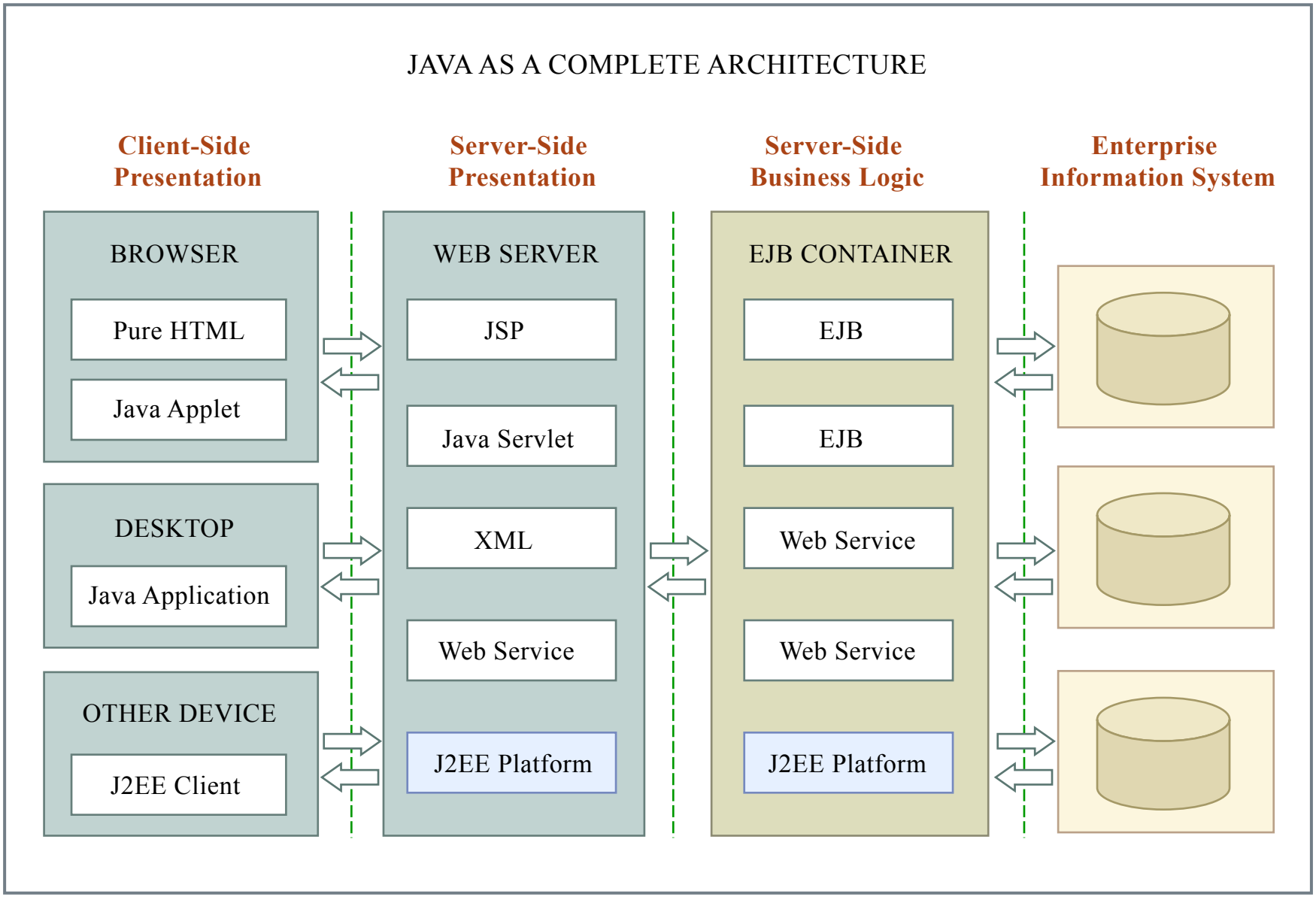


Figure by MIT OCW.

http://java.sun.com/j2ee/setstandard.html

Java as a transport layer

Java 2 Platform, Enterprise Edition (J2EE)

"The **Java API for XML-based RPC (JAX-RPC)** enables Java technology developers to develop SOAP based interoperable and portable web services"

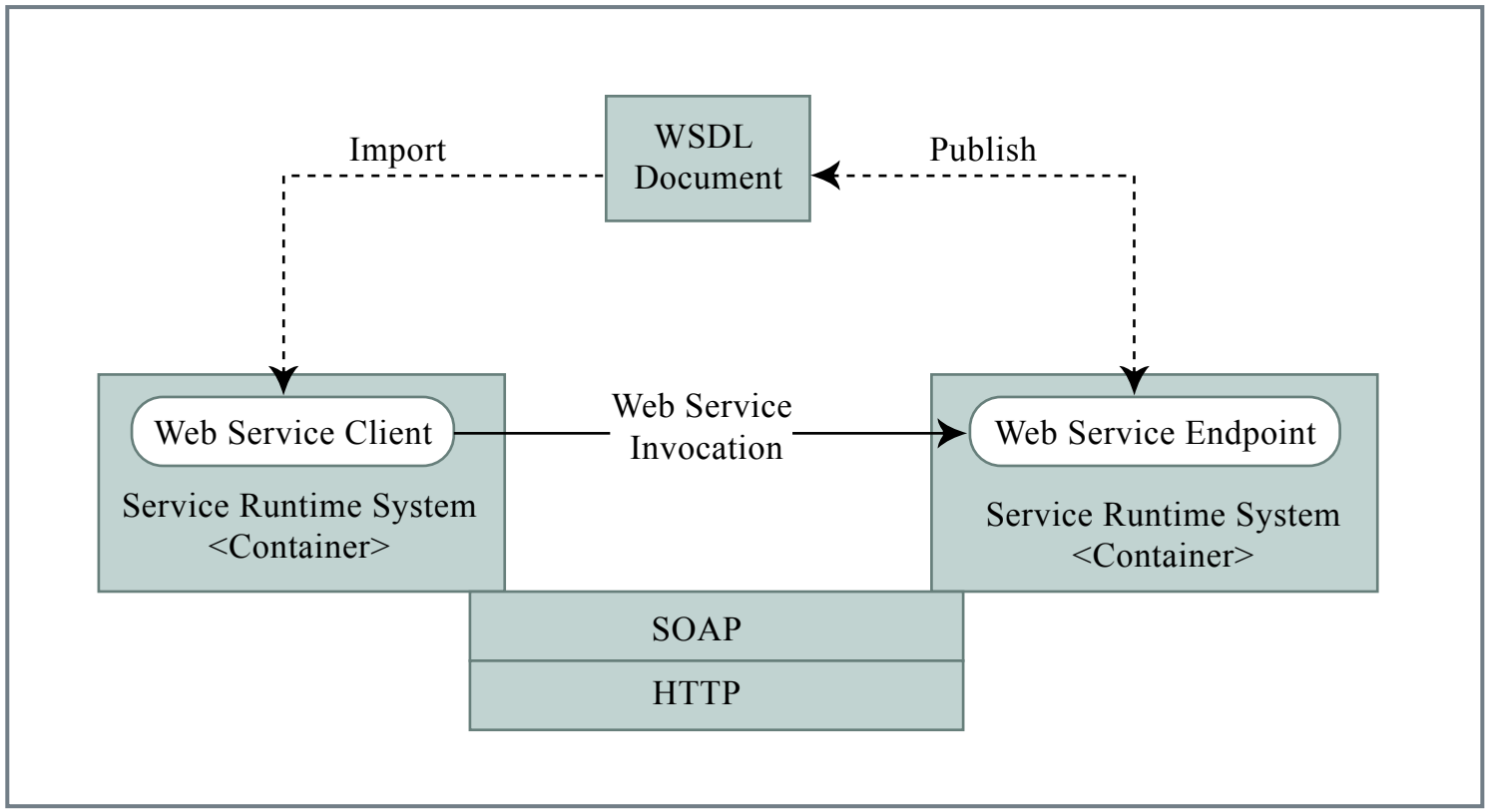
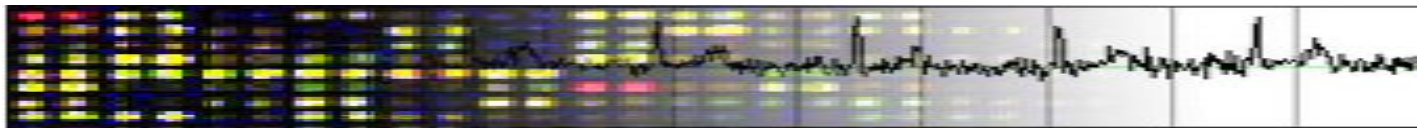


Figure by MIT OCW.



The Simple Object Application Protocol (SOAP)

"SOAP is a lightweight protocol for exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined datatypes, and a convention for representing remote procedure calls and responses. "

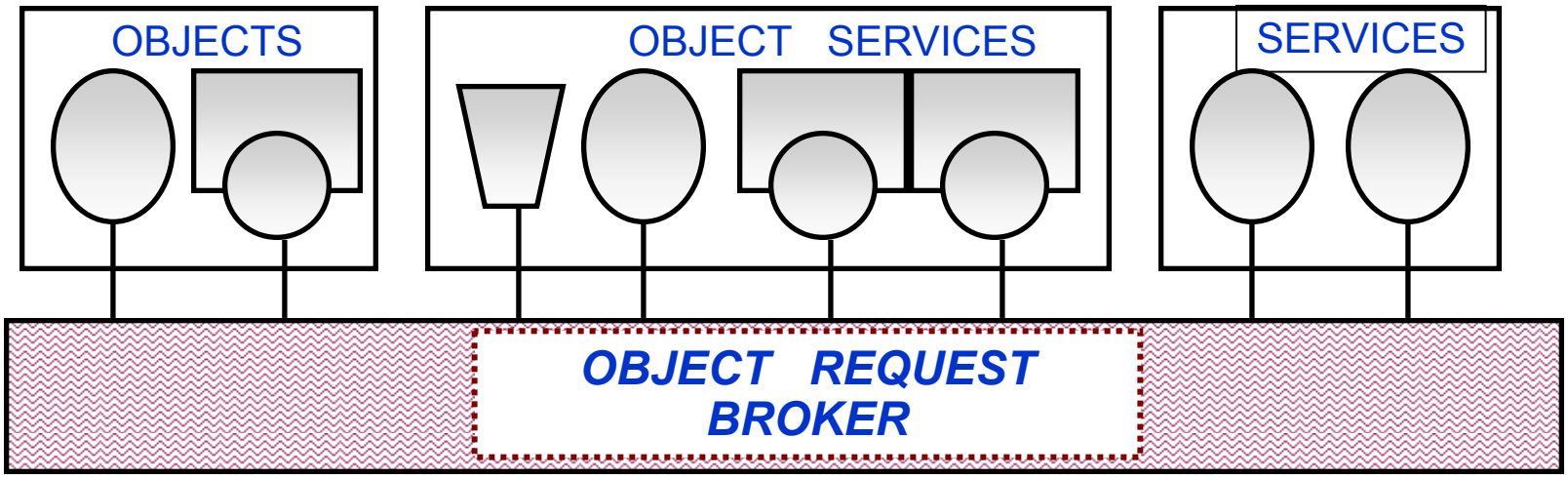
Ref: http://ws.apache.org/soap/

The Common Object Request Broker (CORBA)

"**CORBA** is the acronym for **C**ommon **O**bject **R**equest **B**roker **A**rchitecture, OMG's open, vendor-independent architecture and infrastructure that computer applications use to work together over networks. Using the standard protocol IIOP, a CORBA-based program from any vendor, on almost any computer, operating system, programming language, and network, can interoperate with a CORBA-based program from the same or another vendor, on almost any other computer, operating system, programming language, and network. "

Ref:http://www.omg.org/gettingstarted/corbafaq.htm#Scalable

CORBA architecture



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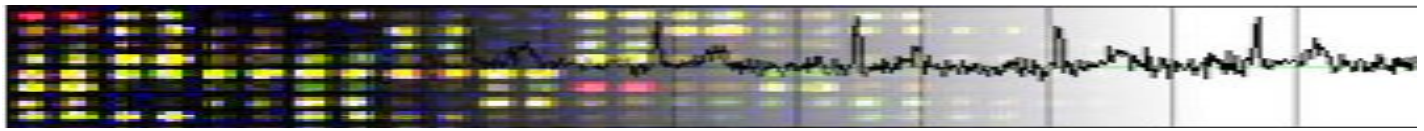
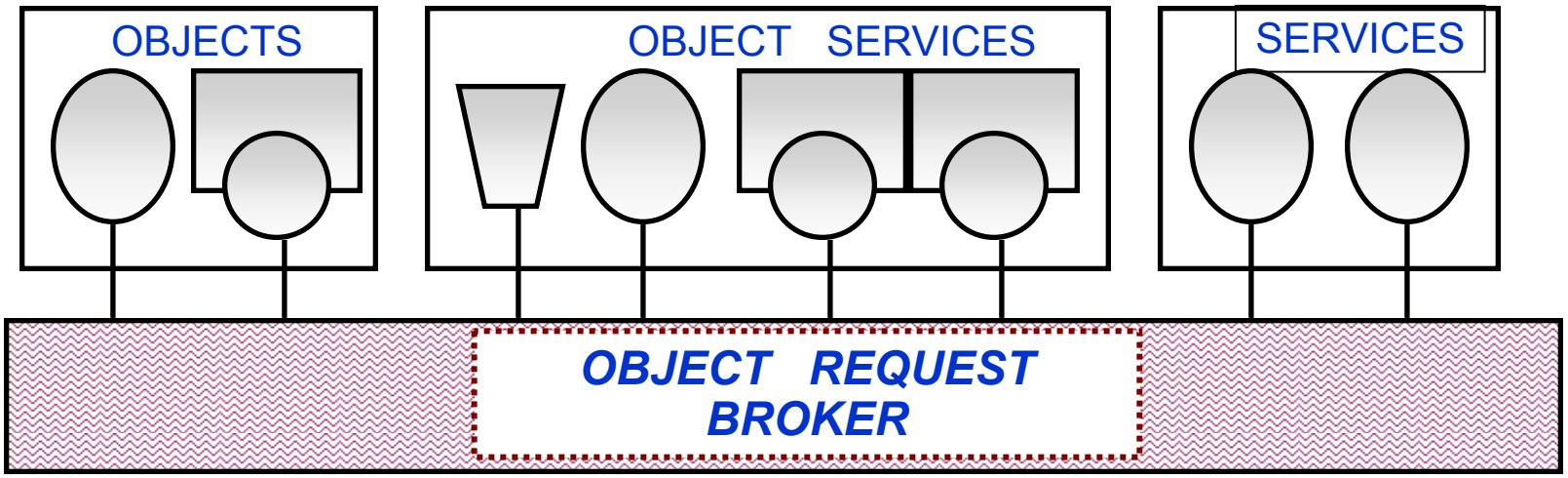
Ref:http://icmit.mit.edu/projects/infosysbd/Slide1.html



CORBA architecture



The IDL interface definition is independent of programming language, but *maps* to all of the popular programming languages via OMG standards: OMG has standardized mappings from IDL to C, C++, Java, COBOL, Smalltalk, Ada, Lisp, Python, Perl, and IDLscript.

Ref:http://icmit.mit.edu/projects/infosysbd/Slide1.html

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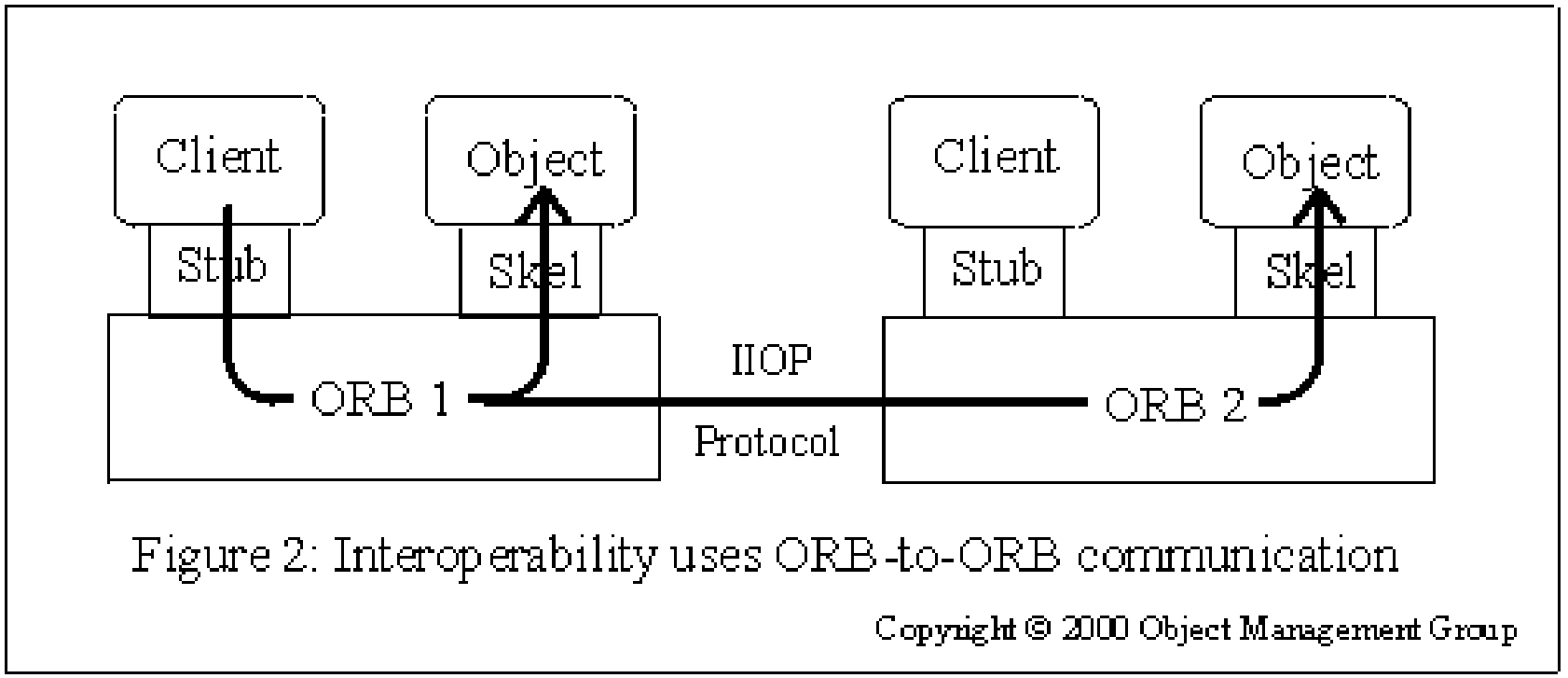
CORBA diagrammatic architecture



Note: Big issue re ORB. Very duplicative of WWW protocols re location of objects.

Ref:http://www.omg.org/gettingstarted/corbafaq.htm#Scalable

Figure 2: Interoperability uses ORB-to-ORB communication. Reprinted with permission. Object Management, Inc. (C) OMG. 2000.

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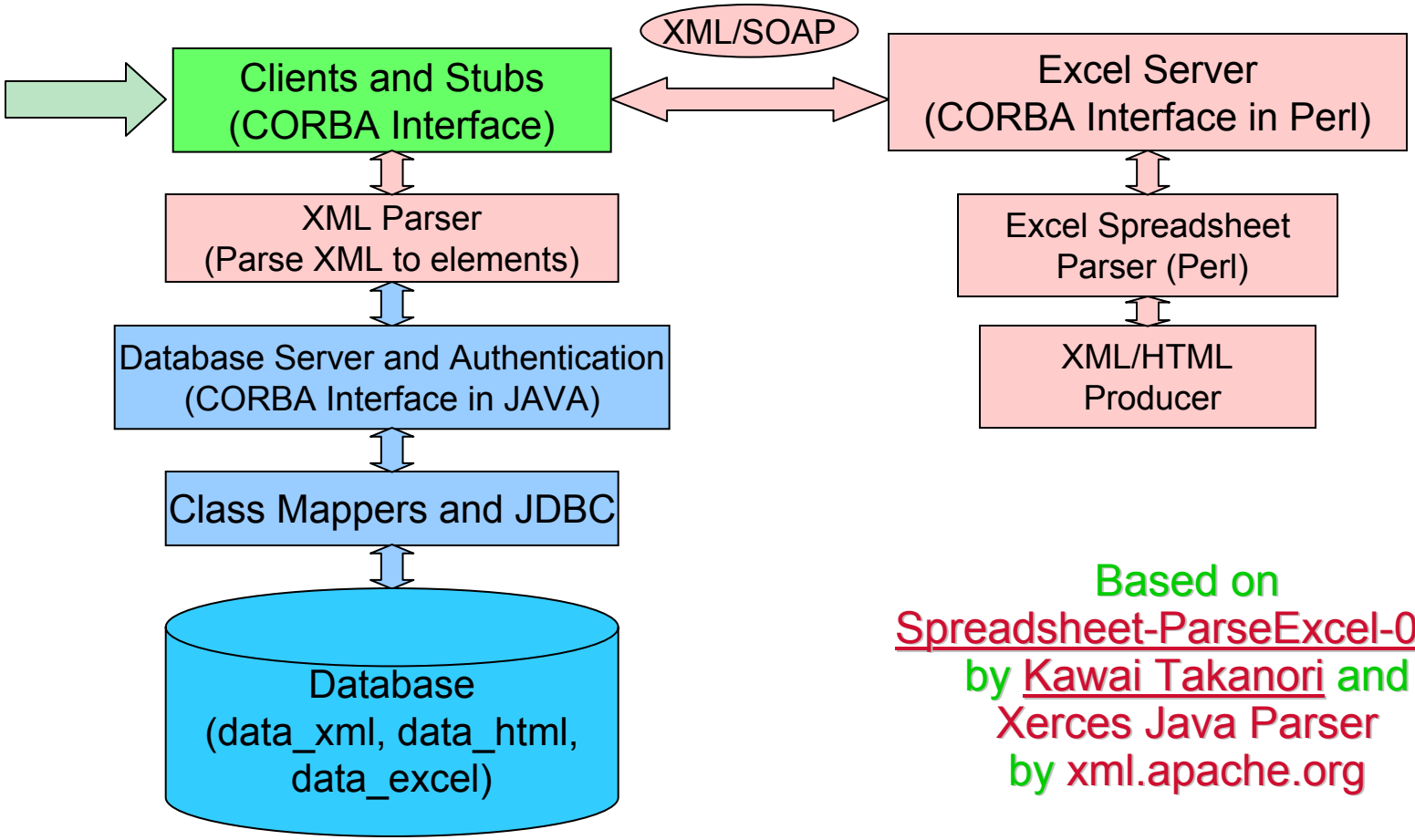
CORBA example in biological modeling



Based on
Spreadsheet-ParseExcel-0.26
by Kawai Takanori and
Xerces Java Parser
by xml.apache.org

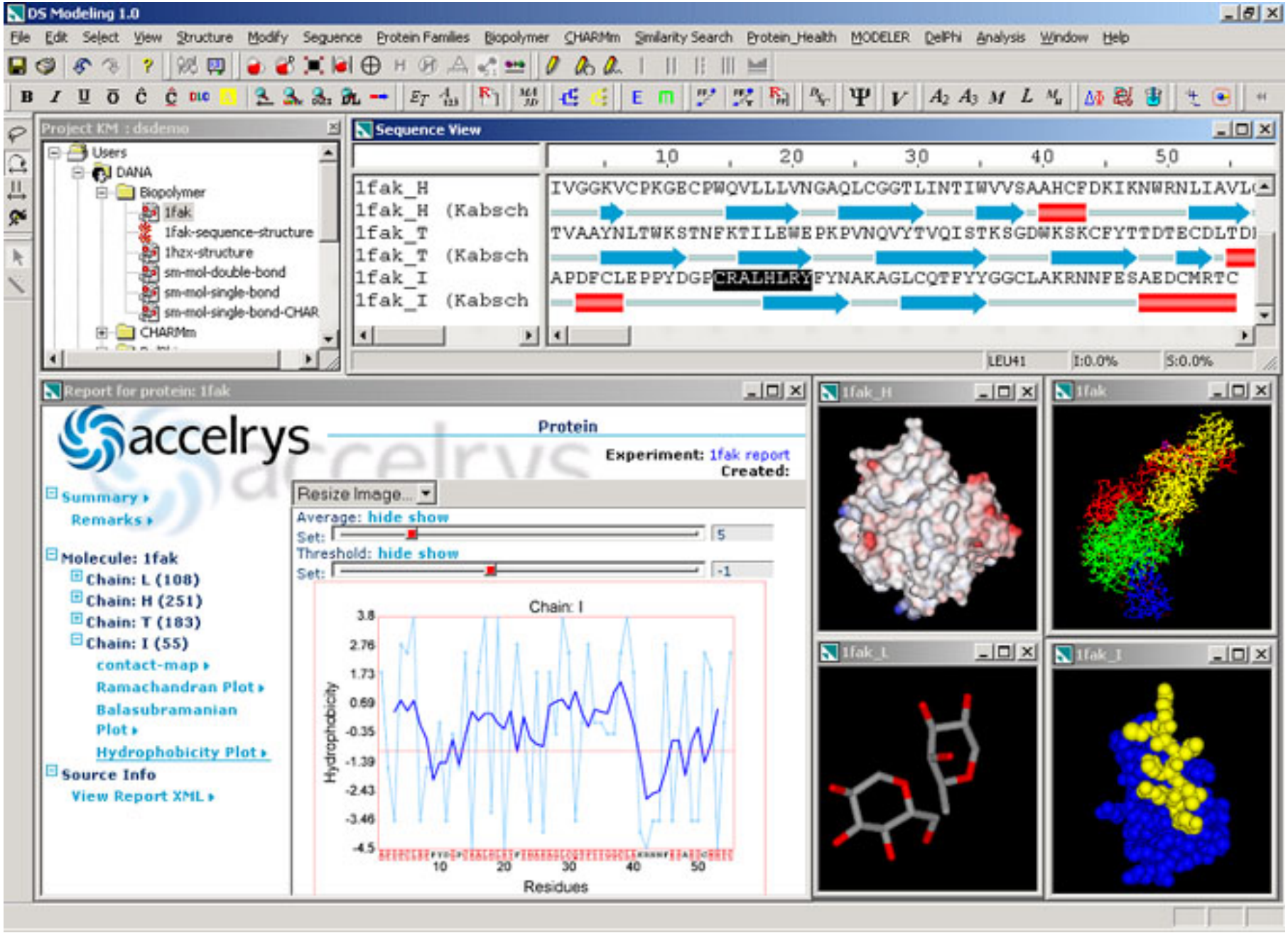


Image courtesy of Accelrys, www.accelrys.com. Used with permission.

Don’t overload your application