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CSE681 – Software Modeling and Analysis

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ENTERPRISE COMPUTING

A Definition

- **Enterprise Computing:**

Automation or support of business processes. It usually involves:

- Creation
- Display
- Manipulation
- Analysis

of complex time-varying data relationships from distributed sources to many distributed destinations. Currency of information is one of the most important measures of the system.

- **Example systems:**

- Reservations, financial, supply chain, orders and inventory, repositories, decision support, customer relationship management

A Near-Future Scenario

- You are a high-level trouble shooter for a vendor of some important products.
 - You are planning a trip to visit a group of customers with a mix of problems, purchase plans, and technical questions.
 - Your company's enterprise system finds the 5 most important customers for you to visit in the target area and time.
 - It negotiates meeting times with each of the customer's calendar services, trying to optimize your coverage and time on-site.
 - It schedules plane, rental car, and hotel accommodations.
 - One customer cancels and two more are added, requiring changes of reservations, negotiated by machine without your intervention, but notifying you quickly, by the method of your choice (email, cell phone, pager).
 - Just before walking into each meeting you consult with your enterprise system to discover the latest problem reports, questions, and issues this customer has discussed with your company's staff.

Consequences

- This scenario makes it clear that some aspect of several computational models is needed here:
 - Repository storage and retrieval of customer information from a dedicated data storage server.
 - Agent-based calendar services provided via web communications (my calendar agent negotiates with customers' agents for date and time).
 - Messaging using a peer-to-peer model.
- None of this works without universal standards beyond the traditional web standards for routing and information access.
- W3C is trying to put that in place via the Semantic Web

Distributed Computing Models

- **Client/Server (Access to Information):**
A client computer initiates a service request. A server computer waits to reply.
- **Peer-to-peer (Collaboration):**
A communications model in which each party has the same capabilities and either party can initiate a communication session.
- **Web Services (Provide a Specialized Service):**
 - Service-oriented, component-based, application architecture.
 - Discrete tasks within business processes are distributed widely throughout an internet-based web.

HTTP Web Protocol

- HTTP has simple powerful facilities to support all three models via messaging
 - Get – retrieve a resource
 - Post – return client responses via a form
 - Put – send a resource
 - Delete – remove a resource
- Put and Delete are dangerous
 - Resources are subject to damage through ignorance or malicious intent
 - Most web servers disable them
- The REST model attempts to use the full HTTP model due to its power and simplicity
 - Developers are struggling to make it secure but keep its simplicity

Web Service

- **W3C Definition:**

A Web service is a software system identified by a URI (Uniform Resource Identifier), whose public interfaces and bindings are defined and described using XML. Its definition can be discovered by other software systems. These systems may then interact with the Web service in a manner prescribed by its definition, using XML based messages conveyed by Internet protocols.

- This focus is on machine-to-machine interaction rather than the human-to-machine interaction of the traditional web.

Service Oriented Architecture

- The scenario suggests a Service Oriented Architecture:
 - A collection of services.
 - The services can communicate with each other, perhaps through agents.
 - Communication may be simple data exchange.
 - It may also be a more complex coordination of some activity.
 - The connections need to be standardized.
- Standards are essential:
 - Data definition: XML
 - Transmission: TCP/IP, HTTP, Soap
 - Service description: WSDL
 - Service discovery: UDDI

Pieces of the Recipe

- ASP.NET and ASP.NET MVC applications:
Provide a dynamic, web page based, human-to-machine interface.
- HTML5 or Silverlight and WCF:
Support balancing application load between server and client.
- Web Services:
ASP.NET based, IIS hosted, RPC machine-to-machine interface and REST message-passing.
- .NET run-time supports component-oriented, secure, connectable environment.
 - Security, remoting, personalization through attributed programming
- COM+ supports transactions, object pooling

References :

- Semantic Web, Scientific American, May 2001, Tim Berners-Lee, James Hendler, Ora Lassila
- Web Services and Service-Oriented Architectures, Douglas Barry, Morgan Kaufmann, 2003
- Patterns of Enterprise Application Architecture, Martin Fowler, Addison-Wesley, 2003
- Pattern-Oriented Software Architecture, Volume 2, Douglas Schmidt, et. al., Wiley, 2000
- Programming .Net Web Services, Alex Ferrara, Matthew MacDonald, O'Reilly, 2002
- Programming .Net Components, Juval Lowy, O'Reilly, 2003

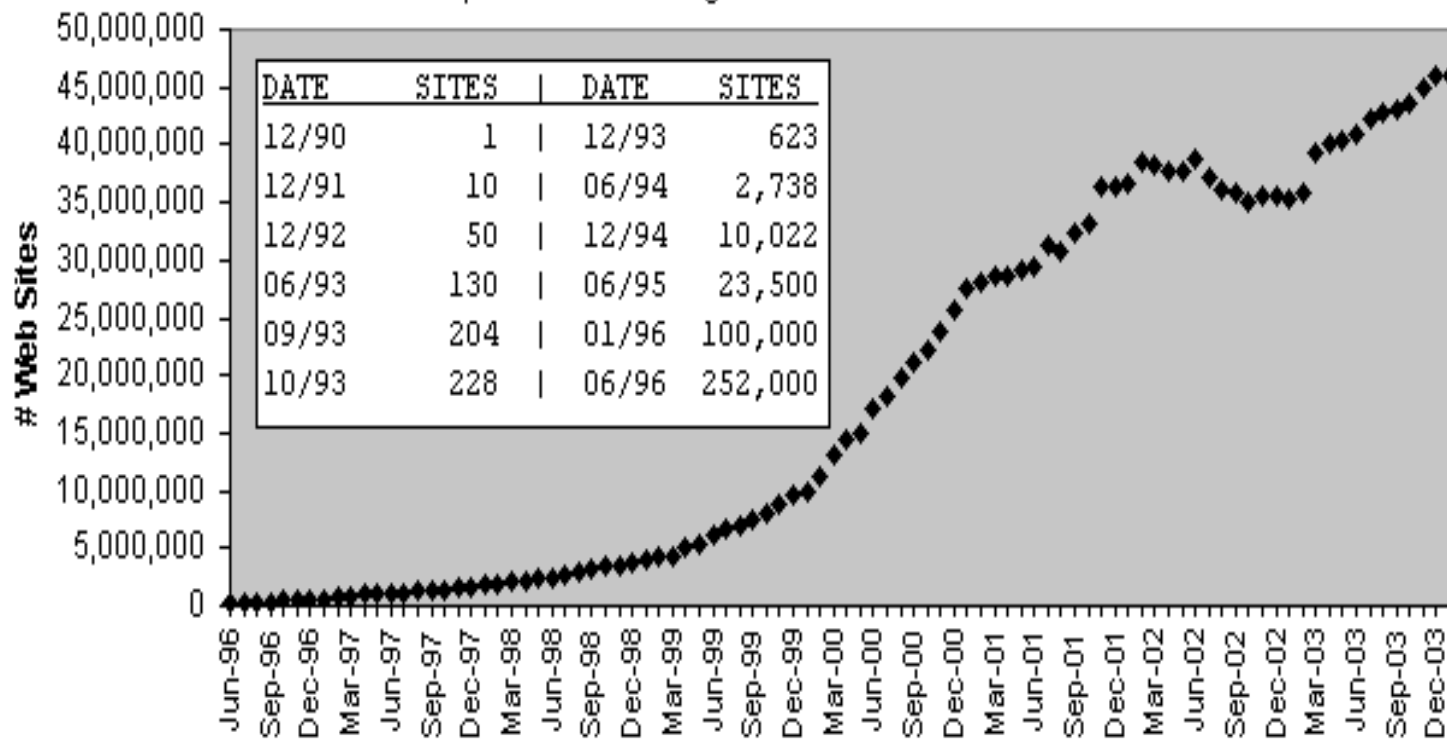
Web References

- www.learnthenet.com/english/html/7oalan.htm
- www.zakon.org/robert/internet/timeline/
- www.w3.org/TR/ws-gloss/

APPENDIX A – GROWTH OF THE WEB

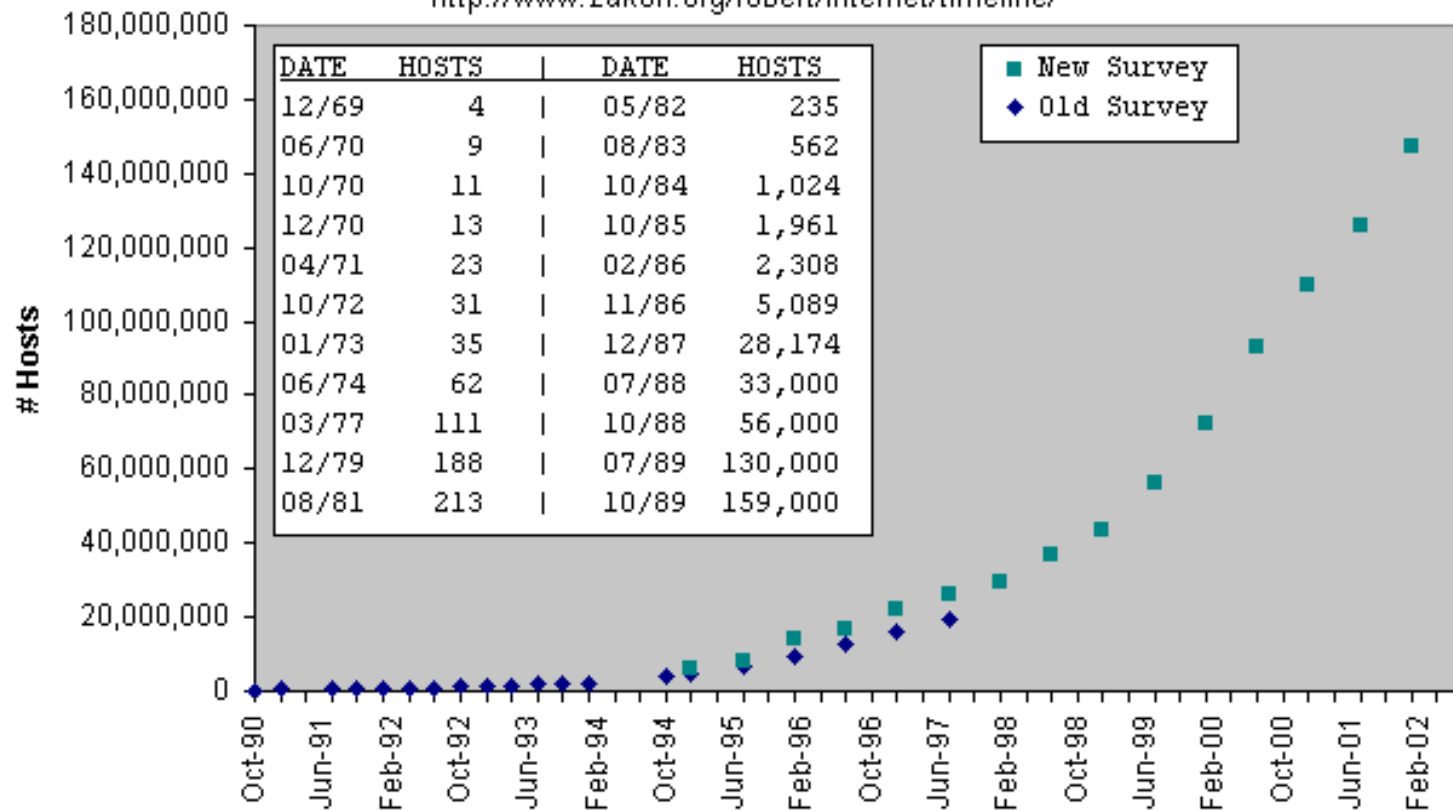
Growth of Web Sites

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Growth of Internet Hosts

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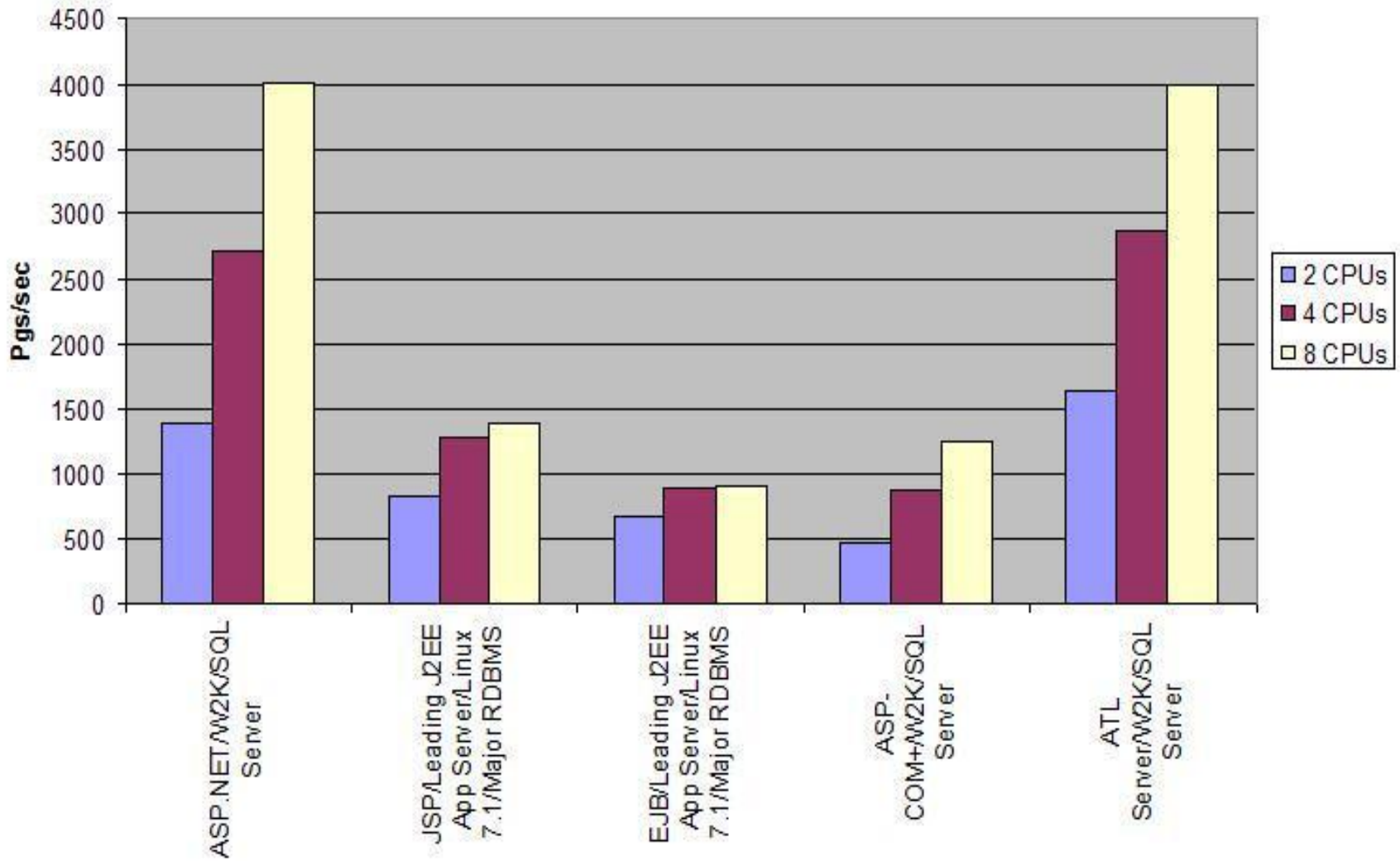


APPENDIX B - BENCHMARKS

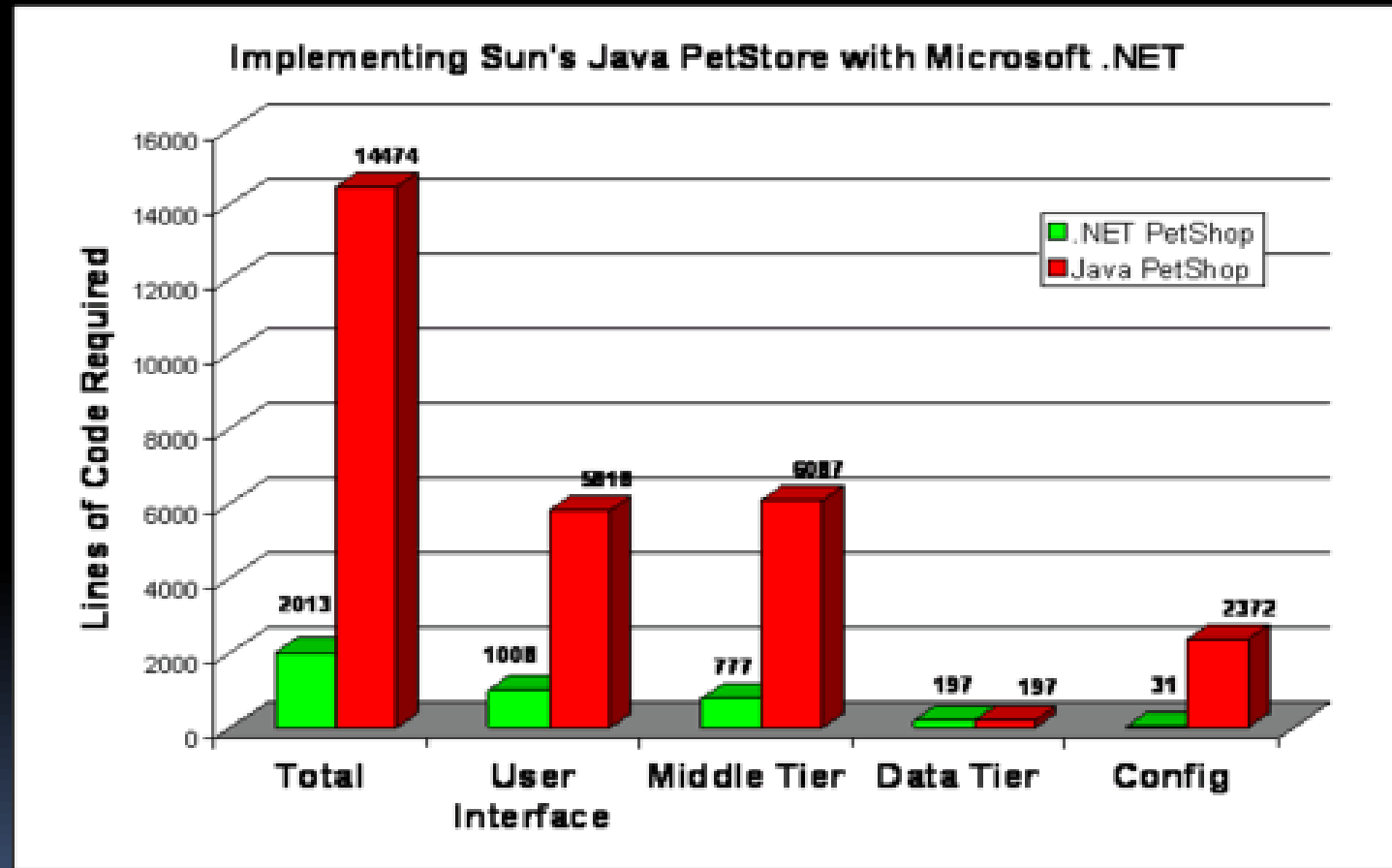
Some Benchmarks

- "There are three kinds of lies: lies, damned lies and statistics." Attributed to Disraeli in Mark Twain Autobiography (1924) vol. 1, p. 246
- That reminds me of the observation that "87% of all statistics are made up on the spot".

Nile Benchmark Peak Throughput



msdn.microsoft.com/library/default.asp?url=/library/en-us/dnbda/html/psimp.asp



END OF PRESENTATION