Dynamic Objects for Service Oriented Architecture (SOA) Programming

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Who is Franz?

- Founded in 1984
- Founders out of UC Berkeley
- More than 16 years experience developing and marketing Common Lisp and CLOS object systems
- Creator of Allegro Common Lisp development environment and tools
Outline

- Why Service Oriented Architecture (SOA) and why now
- What is SOA and Web Service (WS)
- Why Lisp is good for SOA
- What are Lisp web service tools
- Live demo of Lisp web service programming

A Lesson from B2B

Who is Dell?
Dell Is A Bank!

- Free cash flow of $3.2B of customers’ money at any time
- ZERO inventory cost
- Lowest cost producer

How Does Dell Do It?

- Automatic B2B transactions
- Symphony used by Dell sales
- Direct EDI link accessed by suppliers
- Build it much cheaper, faster and better
But, It’s Very Expensive

- Only 5% of US companies use full B2B
- Proprietary EDI
- Hub and Spoke B2B
- $40K per EDI adapter
- Fixed, not portable nor scalable
- “Should I embrace B2B now?”

Central Business Dilemmas on Technology

- When to embrace a new technology to improve business performance?
- Which technology to embrace?
- How much longer to continue with the current technology?
The Perfect Storm

- **Technology**: Internet
- **Market**: Globalization and outsourcing
- **Wal-Mart**: Economy of scale
- **Companies have no choice but to truly embrace B2B e-Commerce NOW!**

But, How?

- Integration within enterprise and across business partners
- Close-end, one-to-one system won’t work
But, How?

- Integration within enterprise and across business partners
- Close-end, one-to-one system won’t work
- IBM’s 36,000 customers spent 40% of IT budget on EAI

Old Component Technology Won’t Do it!

- COM/DCOM, CORBA, Java/RMI
- Heavy weight solution
- Not leverage on HTTP Internet
- Difficult to integrate across enterprise boundaries
- Not platform neutral
- A stack of supposedly “reusable” objects
Service Oriented Architecture (SOA) and Web Service (WS) may help us get there!

- Service enabled not function call
- **Document** centric exchange model
- Web Service (WS)
- Composite applications
SOA Web Services

- A light-weight software component architecture

Why SOA?

**SOA**
- Loosely coupled
- Middleware transparency
- Dynamic composition
- Flexible

**Old Component**
- Tightly coupled
- Middleware compatibility
- Static development
- Brittle
Uniform service “APIs” for business functions

Separation of business processes from business functions

Replace process rigidity with flexibility

Market condition changes

New technology, materials, tools, etc

Collaboration with new partners; merger and acquisition

The only constant is change and the pace of changes is accelerating

SOA makes frequent changes possible

Speed and flexibility
Why Lisp is good for Service Oriented Architecture (SOA)?

Lisp Unique Strengths

- Single programming and deployment model
- Lisp Dynamism
- Lisp Macros
- Speed and flexibility
Lisp Programming Model

- Lisp programmers hardly:
  - Leave their programming environment; code edited, compiled and loaded incrementally at run time (no stopping)
  - Recompile an entire set of programs
  - Worry about memory management

- Lisp programming model is deal for:
  - Interactive code composition
  - RAD for programmers and “business” people

Lisp Dynamism

- CLOS dynamic objects
  - Most comprehensive object model
  - Changes to an object class update all its object instances automatically and lazily
  - Update class methods and functions on the fly

- Rapid Application Evolution
Lisp Macro

- Both Lisp code and data are s-expression
  - S-Expression ➔ atom [number, character, symbol, string, array, etc.]
  - S-Expression ➔ ( S-Expression * )
- Code transformation and generation
- Syntax extension for specific domain (DSL)
- Up to 10x code base reduction and 3 to 5x productivity improvement
- Unparalleled speed and flexibility!

An HTML Macro Example

<table>
<thead>
<tr>
<th>X</th>
<th>X**2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

$n = 5; @headings = ('x','x**2'); @rows = th(@headings); for ($i = 0; $i < $n; $i++) { push @rows, td($i, $i**2); }

print table(-border=1) {
  th('x') th('x**2')
  dotimes (i 5)
  (td (princ i) (princ (* i * i)))
}
B2B e-Commerce entails sequences of peer-to-peer, stateful, long-running, dynamic interactions

Need a protocol (e.g., BEPL4WS) to script and execute these sequences

Lisp (with macros) best for scripting and executing complex business process.

What are the Lisp web service tools?
CL Tools: Networking

- Allegroserve
  - HTTP server
  - Static and dynamic pages,
  - Access control, logging, SSL/TLS

- Webactions
  - Model/View/Controller paradigm (a la Struts)
  - Session and State Support
  - CLP dynamic pages (a la ASP or JSP)

CL Tools: XML

- Very fast (SAX) XML Parser
- XHTML
- CL-Schema*
  - Compile XML-Schema directly into CLOS class hierarchies
  - Read in XML directly as CLOS objects
  - Reason over it with Lisp and Prolog
CL Tools: Web Service

- SOAP client and server interfaces
- WSDL compiler and generator
  - Compiled against Xmethods.com
- Other Web Services infrastructure tools*
  built on XML, SOAP and WSDL

Demo
Lisp dynamism
Simplicity in dynamic HTML and XML parsing and generation
Interactive WS development and application composition
Developing, debugging and evolving Lisp applications are fast

Truth Reality
Lisp is fast Compile directly into machine instructions running at C speed
Lisp is small Lisp has a smaller memory footprint than Java
Lisp is more than AI Many non-AI mission-critical apps deployed in Lisp
Where Lisp is Used Today (Samples)

- MCAD: Boeing 777 airframe, Airbus Super Jumbo A380
- B2C e-Commerce: Yahoo! Store
- Search: Orbitz.com, Amadeus.com
- Scheduling: Hubble Telescope, Mars Pathfinder, London/Heathrow airport
- Game: Super Mario 64, Crash Bandicoot, Jak and Daxter: the Precursor
- Telecom: France Telecom Recife DSS
- BioInformatics: Harvard SNPer, SRI Ecocyc, Stanford Biolingua, MDLI HT Chemistry
- Roomba uses Lisp too!

Summary

- Need to embrace Service Oriented Architecture now
- Compose SOA applications in “real time”
- SOA applications must evolve constantly
- Lisp is ideal for SOA application development
Happy Programming!

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Allegro CL 7.0 Beta (for Linux) Download:
  http://www.franz.com/beta70_c73276/

Seminar Demo Download:
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