Colorado Software Summit

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October 25, 2004
Market Dynamics

- 75% of CEOs place a high or very high priority on the ability to respond rapidly
- Only one in ten CEOs believe that their organization has the ability to be very responsive to react to changing market conditions
- CEOs recognize the need to establish effective, real-time response capabilities
- CEOs are aware of the power of IT and the weaknesses that result from lagging behind
- The rationalization and alignment of disparate applications and infrastructure are the key issues

Source: IBM’s Global CEO Survey, February 2004
Market Drivers

**Economic volatility and globalization**
- Business responsiveness
  - Global 24x7 and real time collaboration
- Business process reengineering
- Supply chain optimization

**Increasing consolidation across industries driven by:**
- Low interest rates
- Increasing valuations
- Improving economy

**Technical realities**
- Application silos (legacy and packaged applications)
- Distributed data environments

**Increasing regulations and industry standards**
- Sarbanes-Oxley, Basel II
- Global Data Sync, RosettaNet, SWIFT
- HIPAA, HL7/CCOW

"For every dollar a firm spends on content, it spends upward of $4 to get that data into a processing system where it can be used..”

*Tower Group*
*The Politics of Data Management, Nov 2003*

"The areas of highest spend are expected to be application integration and development tools, business intelligence applications and performance management software, such as management dashboards."

*Tech Trends Study*
*AMR Research, February 2004*
Connecting Platforms, Standards and Growth

- The greatest historical event in transportation
  - May 10, 1869; Promontory, Utah
  - Union Pacific joins the Central Pacific Railroad
  - 4 – 6 months travel time reduced to 6 days
- Standardization of the rail network enabled industrialized America and Europe
- A connecting platform fueling growth, creating new business opportunities
  - Connecting resources with factory efficiencies
  - Connecting goods with markets
  - Enabling new distribution models (Sears Roebuck)
- Other technology platforms: electricity grid, national highway systems, ... the internet

“Standards contribute more to economic growth than patents and licenses.”

"Economic benefits of standardization", Technical University Dresden (TUD) and the Fraunhofer Institute for Systems and Innovations
Open Standards Are the Future

An estimated 2.5 million programmers will be using Java in 2005.

Gartner, 2003

Web services software is expected to rise tenfold to $11 billion worldwide in 2008.

IDC, 2004

“Within the next three years, I believe Linux will overtake Windows as the number one operating system based on new server shipments.”

Stacey Quandt, Analyst
IBM Open Standards Leadership

<table>
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<tr>
<th>Year</th>
<th>Category</th>
<th>Accomplishments</th>
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| 1998 / 1999 | Java, XML and ebXML                   | - Co-founder and lead architect RosettaNet  
- Author XML4J  
- Chair OMG XML Metadata Interch. Format  
- Co-author W3C Document Object Model  
- Founder XML.org  
- Elected to OASIS Board of Directors |
| 2000 / 2001 | Web Services, UDDI, and Tools         | - Founder Eclipse.org  
- Co-founder UDDI.org and author original UDDI spec.  
- Co-author WSDL and SOAP 1.1 and submission to W3C  
- Co-author W3C XML Schema  
- Contribution of SOAP4J to Apache  
- Chair W3C XML Protocol WG |
| 2002     | Web Services and Security             | - Founder and chair of WS-I Organization  
- Co-author Web services business process specification (BPEL, WS-TX, WS-TC)  
- Co-author for Web Services Security roadmap and specification |
| 2003     | Web Services Interoperability         | - Submission of BPEL to OASIS and co-chair WSBPEL TC  
- Submission of Common Base Events and WS-Manageability to OASIS  
- Co-chair OASIS WSDM TC  
- Co-chair OASIS WS-Security TCs  
- Chair WS-I Basic Profile 1.0 working group  
- First WS-I Basic Profile support |
| 2004     | Web Services Management               | - Eclipse becomes independent organization  
- First integrated support for Basic Profile 1.1  
- Co-chair of OASIS WS-Notification TC  
- Co-chair OASIS WS-Resource Framework TC  
- 1,000+ developers devoted to XML and 1,500+ focused on Linux. Over 200 software products running on Linux |

Over 160 business integration technology patents
First Web Services Gateway
First integrated private UDDI directory

Apache Software Foundation

John Soyring — Conference Opening Keynote
Open Source

- Linux
- Apache Software Foundation
- Mozilla
- Cloudscape/Derby
- ibm.com/developerworks/opensource
Why Is Open Source Important?

- **Can be a major source of innovation**
  - Innovation can happen anywhere – any time
  - Development through "open communities" leads to potentially broad ideas & creativity

- **Community Approach**
  - Internet has changed how enterprises address technical innovation
  - Enterprises engaging early in
  - Shapes IBM technical leaders thinking & approach to broad collaboration

- **Good approach to developing emerging standards**
  - Reference implementation for open standards
  - Popular Open Source projects can become de facto / open standards
  - Wide distribution/deployment

- **Enterprise customers are asking for it**
  - Increase choice & flexibility – adoption/use of open source can reduce time to market
  - Example – want Linux to be part of an overall, vendor-supplied and supported total solution
Acceptance of Open Source Initiatives

![Web Servers Market Share](chart1.png)

**Web Server Market Share (Percentage)**

- Apache
- Microsoft

**Operating Systems**

![Operating Systems Shipments](chart2.png)

**Server Shipments by OS (Thousands)**

- Windows
- Linux
- Unix

Source: Netcraft, Sept 2004

IDC: Server Market Quarterly Forecaster, 1Q04 2004
Linux

Linux Is Fastest Growing Server OS Since 1999

Server Shipments by OS

Source: IDC Server Tracker 1Q04, IDC Server Forecaster 1Q04
Eclipse

- Over 39 Million download requests to date; over 100 Terabytes of data (not including data from 50 mirror sites worldwide)
- [eclipse.org](http://eclipse.org) site continues to see days with downloads in excess of 10,000
- Over 2.2M developers, companies, or organizations from over 150 countries
- 12% Linux downloads, 86% Windows downloads
- Broad community growth
  - 20 Eclipse information sites worldwide
  - 400 to 500 plug ins offered
  - Books in English, German, Japanese, Korean
- [eclipse.org](http://eclipse.org)
Capgemini Finland needed to meet client demands for faster software development and more reliable and higher quality software.

**Challenge:** Facing increased competitive pressures, Capgemini Finland needed to meet client demands for faster software development and more reliable and higher quality software.

**Solution:** Capgemini Finland established an Accelerated Delivery Center (ADC) to speed the development of value-added applications. The ADC approach is founded upon the Rational Unified Process methodology and integrated tools of the Eclipse platform.

**Result:** Company-wide, Capgemini has experienced a 30% productivity improvement. The initial Helsinki ADC project was delivered on schedule – a schedule based on productivity 15% higher than the industry average. Based on the success of that project, the client initiated four more projects with Capgemini.
Tools

Emerging Technologies Toolkit

- Autonomic and Web service technologies

- Contains: architectural overview, sample programs, utility services, helpful tools, fully-functioning SOAP and grid infrastructure, and fully-functioning SOAP engine and embedded application server.

- www.alphaworks.ibm.com/tech/ettk
Grid

- Global Grid Forum
  - gridforum.org
  - Promotes and supports the development, deployment, and implementation of Grid technologies and applications via the creation and documentation of "best practices"

- Globus Alliance
  - globus.org
  - Conducts research and development to create fundamental technologies behind the "Grid," which lets people share computing power, databases, and other on-line tools

- ZetaGrid – J2EE interfaces for adapting applications in multi-computer grids in order to distribute applications securely and reliably
United States Tennis Association

Challenge: Grow the US Open base of fans and maximize revenue by providing online fans with a differentiated Web experience

- **Solution:** A “virtual US Open” using publish-subscribe technology for content distribution; caching and sophisticated load balancing which enable unparalleled resiliency.

- **Result:** 100% availability; Reduced bandwidth requirements resulting in better cost control; Real time scores; 19% increase in site traffic; 250% increase in online sponsorship revenue and 19% increase in online merchandise sales; Variable cost structure
Autonomic Computing

Increased Responsiveness
Adapt to dynamically changing environments

Business Resiliency
Discover, diagnose, and act to prevent disruptions

Operational Efficiency
Tune resources and balance workloads to maximize use of IT resources

Secure Information and Resources
Anticipate, detect, identify, and protect against attacks

“Autonomic computing allows companies to operate more efficiently and achieve more from their existing IT environments, enabling increased responsiveness, business continuance and availability.” — Rick Sturm
Privacy and Security

- P3P Platform for Privacy Preferences (P3P) Specification
  - [w3c.org/TR/P3P/](http://w3c.org/TR/P3P/)
  - Enables Web sites to express their privacy practices in a standard format that can be retrieved automatically and interpreted easily by user agents

- P3P Policy Editor – visual tool, with an easy-to-use interface, for creating a Web site’s privacy policy in the P3P language

- IBM Tivoli Access Manager for Microsoft .NET – extends the power and flexibility of Tivoli’s enterprise security solutions to .NET environments

- WS Security is now an Oasis Standard
J2EE

- J2EE 1.4
  - Integration of portable Web services application environment
  - Pluggable Messaging
  - ISV enablement providing architected plug points

- J2EE 5 – Ease of Development

  - [java.sun.com/j2ee](http://java.sun.com/j2ee)
XML

- XML Security Suite
  - Rated JARS TOP 5%
  - Provides security features such as digital signature, encryption and access control for XML documents
Pervasive and Wireless

Mobility delivers ROI
- Increase Productivity
  - Same personnel, more requests completed
- Customer Loyalty & Retention
  - Less customer churn with value-add services
- Generate Additional Revenue
  - More time with customers
- Increase Profitability
  - New business models, higher margins

Enabling the Ecosystem
- Enterprise & Service Providers
  - Scalable Middleware, Application Model, Device Management
- ODMs/OEMs
  - Provisioning of devices
- ISVs & Developers
  - Laptops, PDAs, Smartphones

In 2004 . . .
- 625M WW Cell phone shipments
- 11.7M PDAs will be sold
- 30M total hotspot users
- 50% business laptops will have WiFi
- LAN’s, WLAN’s, WMAN’s, WIMAX’s
RFID

- Major retailers proceeding with RFID pilots around carton and pallet tagging with suppliers
- Mandates from retailers, DOD now part of supplier relationships, driving near-term RFID market activity
- RFID tag prices are declining (a long way from "magic" 5 cent tags)
- Standards emerging to support supply chain information sharing
- Interest in traceability for Pharmaceutical and Food & Beverage from point of origination to consumption
- Business value will be revealed by RFID (i.e., automated insight when coupled with product information management)
Web Services and SOA

- A universal bridge that allows different kinds of architecture & machines to interoperate in a common language
  - Each component uses the same way of talking to other components, based on platform-neutral standards
- Individual software assets become building blocks that can be reused in developing other applications
- Web services allows the use of legacy code – CICS can be built into the Service Orientated Architecture which is enormously powerful
  - Microsoft is not as strong on connecting legacy adaptors or configurations
- Approach in general is to reduce or eliminate the coding necessary to accomplish integration – to utilize development tools to enable integration
  - [www.ibm.com/webservices](http://www.ibm.com/webservices)
Model Driven Architecture (MDA)

- Models help people understand and communicate complex ideas.
- Models offer different views of the world that must ultimately be reconciled.
- Transform models into other models and artifacts.
- OMG has provided a set of standards to express models, relationships and transformations.
- Tools can help to make it practical and efficient.

**Challenge:** Improve speed to market for new services to maintain competitiveness in a market traditionally dominated by large banks

- **Solution:** Consolidation of disparate systems onto an open, J2EE/Web services server for a service-oriented architecture for increased flexibility to enable continued growth and innovation

- **Result:** New service development cycle time reduced by 30%; Administrative and application support costs reduced by 20%; Transaction processing time reduced by 85%; Easy integration with partners using the open IT platform that is compatible with virtually any customer’s systems
Addressing a Worldwide Technology Challenge

- The need for skilled developers and IT professionals is greater than ever
  - In the U.S. alone, 1.5 million additional skilled IT professionals are expected to be needed by 2006 (US Dept. of Labor)
  - There are over 8.5 million developers worldwide (IDC 2002)
  - IDC forecasts there will be 12.9 million developers in 2007
  - The fastest growing occupation in the next decade is projected to be computer software engineers (Watson Wyatt, Monster.com, 2003)
  - The number of students graduating with science and engineering degrees in the U.S. has been declining over the last 10 years (National Science Board, 2004)

- Other trends are converging as well
  - The steady retirement of Baby Boomers
  - Tighter immigration policies
  - An economy that increasingly demands better educated, more highly skilled workers

- And there are global implications – Emerging markets have a large impact in the software development marketplace (e.g., India, China, Central Europe, Brazil)
In Demand Skills for an On Demand World

- System or Solution Architects
- Business Process Integration
- Portal Design and Legacy Integration
- Performance Analysis & Tuning
- Security and Privacy
- Orchestration & Provisioning
- Linux Servers
- Virtualization (grids, SANs, etc.)
- zSeries
IBM Prepares for the Future

- $750M investment on training with $200M toward skills in: open standards, high-value services, business integration, and pervasive and wireless technologies

- Human Capital Alliance – $25M for employees and partners to develop critical skills

- National Innovation Initiative for the Council on Competitiveness, Co-chair – American business and academia stimulating innovation in the US and major countries in which we do business

- IBM Academic Initiative – Partner with higher education institutions that support open standards to train the IT workforce and ensure curricula meets workforce demands
Value of Certification

- Validate your skills
- Demonstrate your expertise and proficiency
- Differentiate yourself
- Add value for yourself, and your employer
- Collaborate with certified peers

Mission-critical Knowledge
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Thank You

October 25, 2004
Manifesto for Agile Software Development

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

agilemanifesto.org
Aspect-Oriented Software Development

- Helps control the complexity that plagues modern software development
- AspectJ project on Eclipse: eclipse.org/aspectj
- aosd.net

AspectJ in Action
by Ramnivas Laddad