Delivering Business Collaboration to a Whole New Level with WebSphere Portal on System z

Dirk Wittkopp
IBM Lotus Software

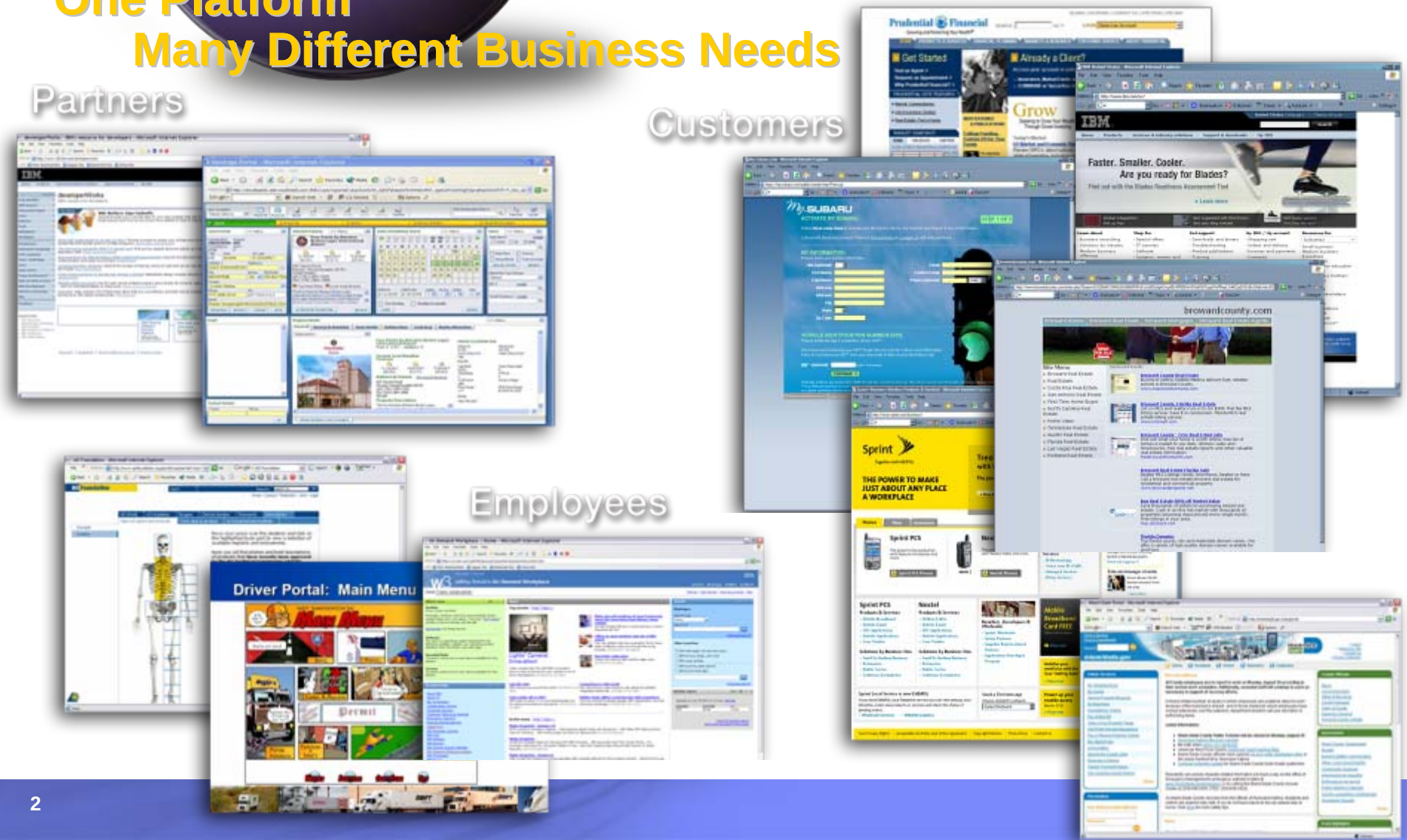
Director, Portal and Workflow Development
IBM Software Group

© 2008 IBM Corporation

Exceptional User Experiences

One Platform

Many Different Business Needs



The Evolving Portal Problem Space

Aggregate
2000 to 2003

Explosive growth of company sites led to inconsistent branding, inconsistent development, end user confusion and redundant work efforts

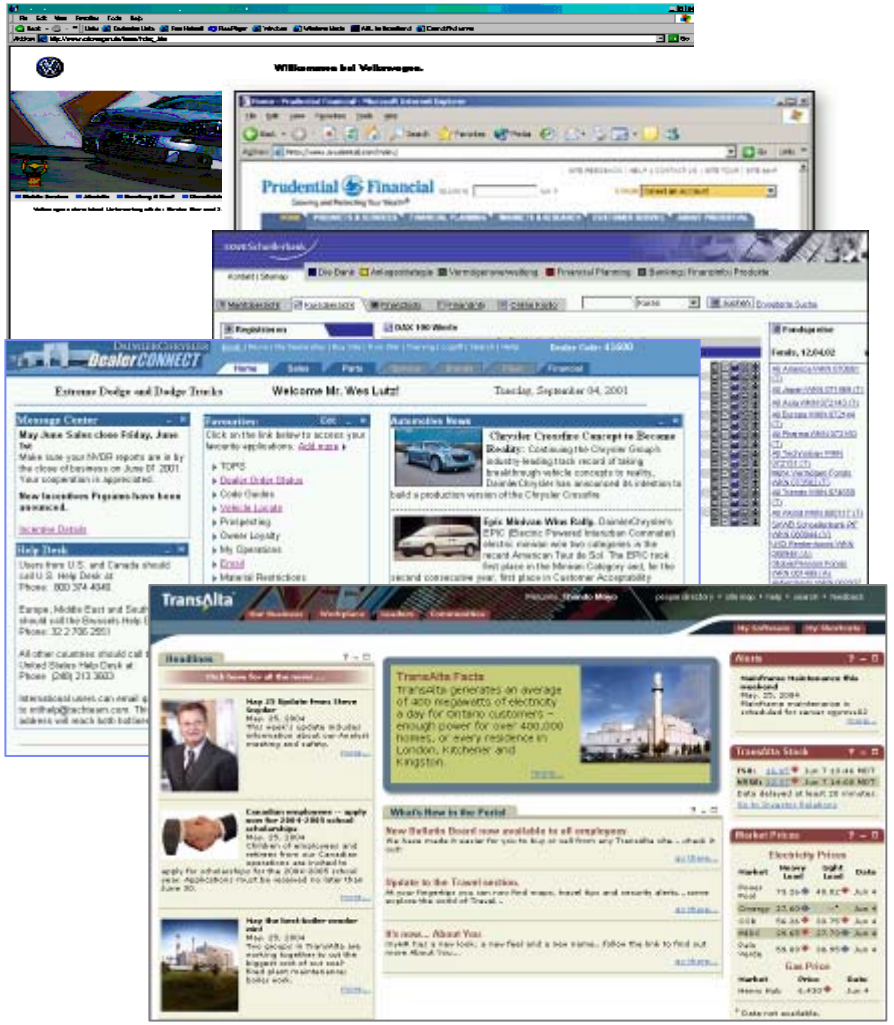
Integrate
2003 to Today

A wide array of assets that required delivery outside the firewall and no easy way to integrate the applications on the back end

© 2008 IBM Corporation

Portal Principle

- **Combines portlets (application user interfaces and/or content) together into one unified presentation**
- **Delivers a highly personalized experience, considering role, personal settings, and device settings**
- **Separates site design, site/page assembly/administration, from application design**
- **Provides application integration, collaboration, single sign-on services and much more**



© 2008 IBM Corporation

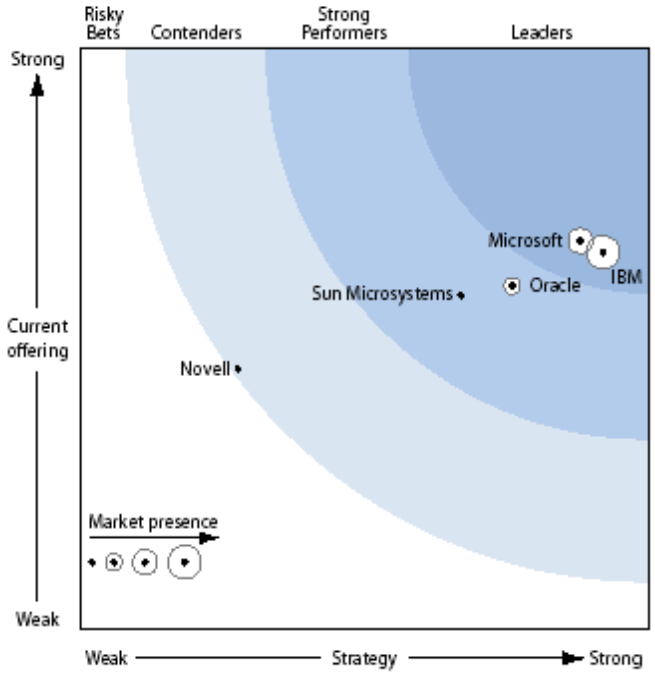
IBM is the portal and collaboration market leader

Figure 1. Magic Quadrant for Horizontal Portal Products

Source: Gartner (September 2008)

- Solutions - **We most often start with a Lotus play (documents/email), but need to converge towards unified communications view (start with Sametime).**
- Services – **IBM Global Services have a set of offerings that help clients better understand where collaborative & Portal technologies can make a difference in the organization**
- Thought Leadership - **Regulatory issues often slow the progression of collaboration in FSS, we can help our clients overcome their fear.**

Figure 3 Forrester Wave™: Collaboration Platforms, Q2 '06



Source: Forrester Research, Inc.

© 2008 IBM Corporation

The Evolving Portal Problem Space

Aggregate
2000 to 2003

Explosive growth of company sites led to inconsistent branding, inconsistent development, end user confusion and redundant work efforts

Integrate
2003 to Today

A wide array of assets that required delivery outside the firewall and no easy way to integrate the applications on the back end

Innovate
2008 and Beyond

Provide a more inclusive community and foster innovation from anywhere while providing necessary business and technical governance.

© 2008 IBM Corporation

Web 2.0 & IBM Strategy

TAKE SUCCESS OF WEB 20 & MAKE IT READY FOR ENTERPRISE

Web 2.0 Sites

Techniques "Services"

Mashups

Tagging

Tag Clouds

Folksonomy

Blogging

wikis

Technology

Semantic Tagging

PHP

REST

RSS

AJAX

Atom

XML

Flex

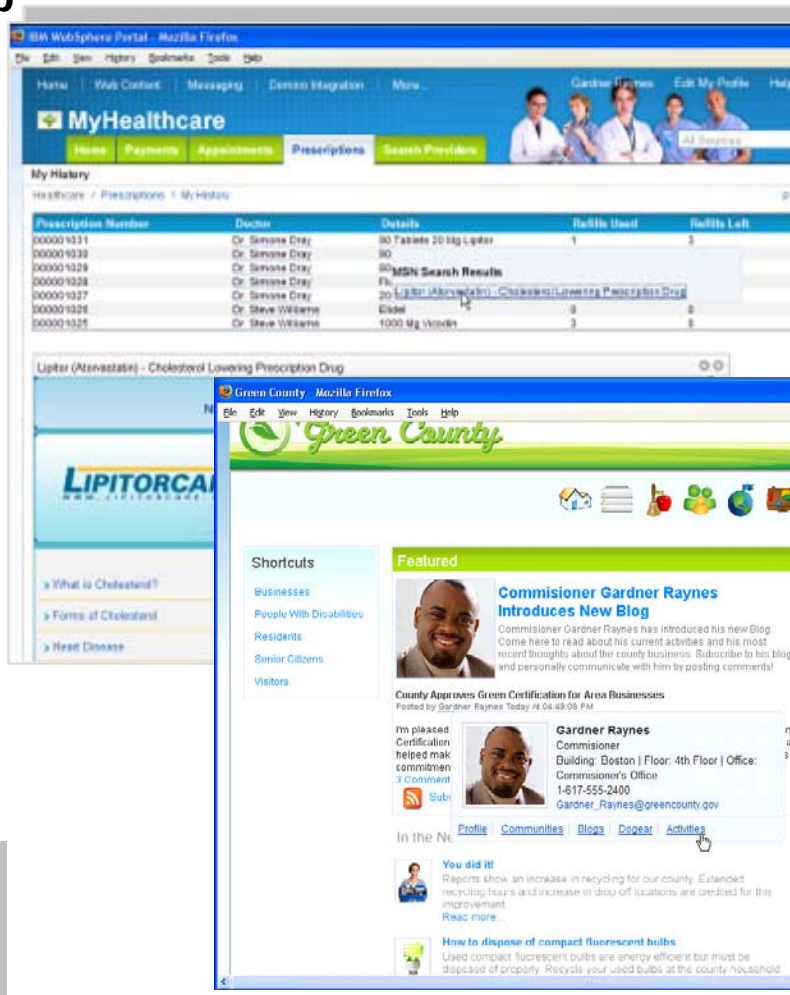
Microformats

© 2008 IBM Corporation

WebSphere Portal V6.1

Rich set of Web 2.0 Features

- **User Contribution** to portal sites through our Web Content Management
- **Situational Development** through Composite Application Templates and through Lotus Designer / Portlet Factory / Forms Designer
- **User Control** of their pages through drag & drop portlet pallete and Google Gadget catalog
- **Google Gadgets and iWidgets** – integrate thousands of additional applications
- **Application integration with AJAX and REST support** for core features - context menus, search menu, administration, drag and drop portlet palette
- **Live Text** – Give users one-click access to information that "pops" on the page

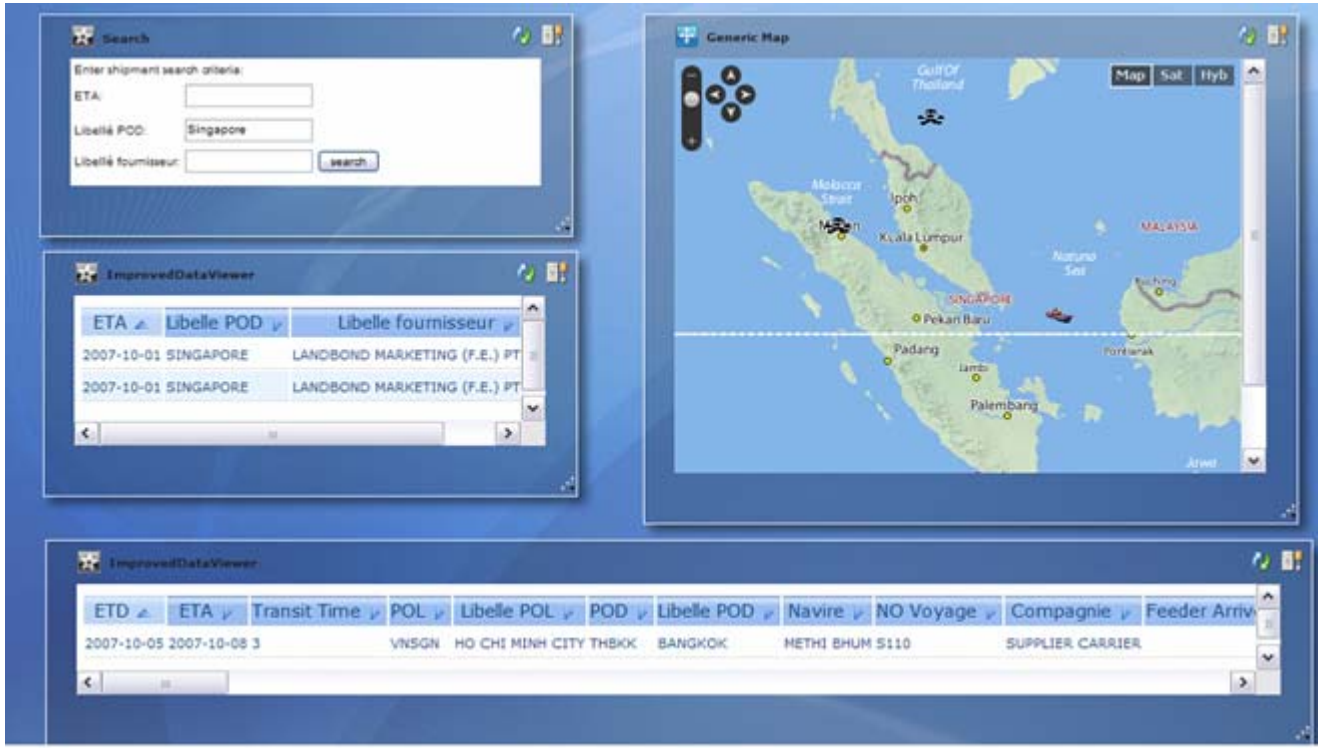


Rich, desktop-like application experiences improve performance and increase end user productivity and satisfaction

© 2008 IBM Corporation

What is a Mashup?

A "mashup" is a lightweight web application created by combining information or capabilities from more than one existing source to deliver new functions & insights.



- Rapid creation (days not months)
- Reuses existing capabilities, but delivers new functions + insights
- Requires limited to no technical skills
- Often mixes internal and external sources

© 2008 IBM Corporation

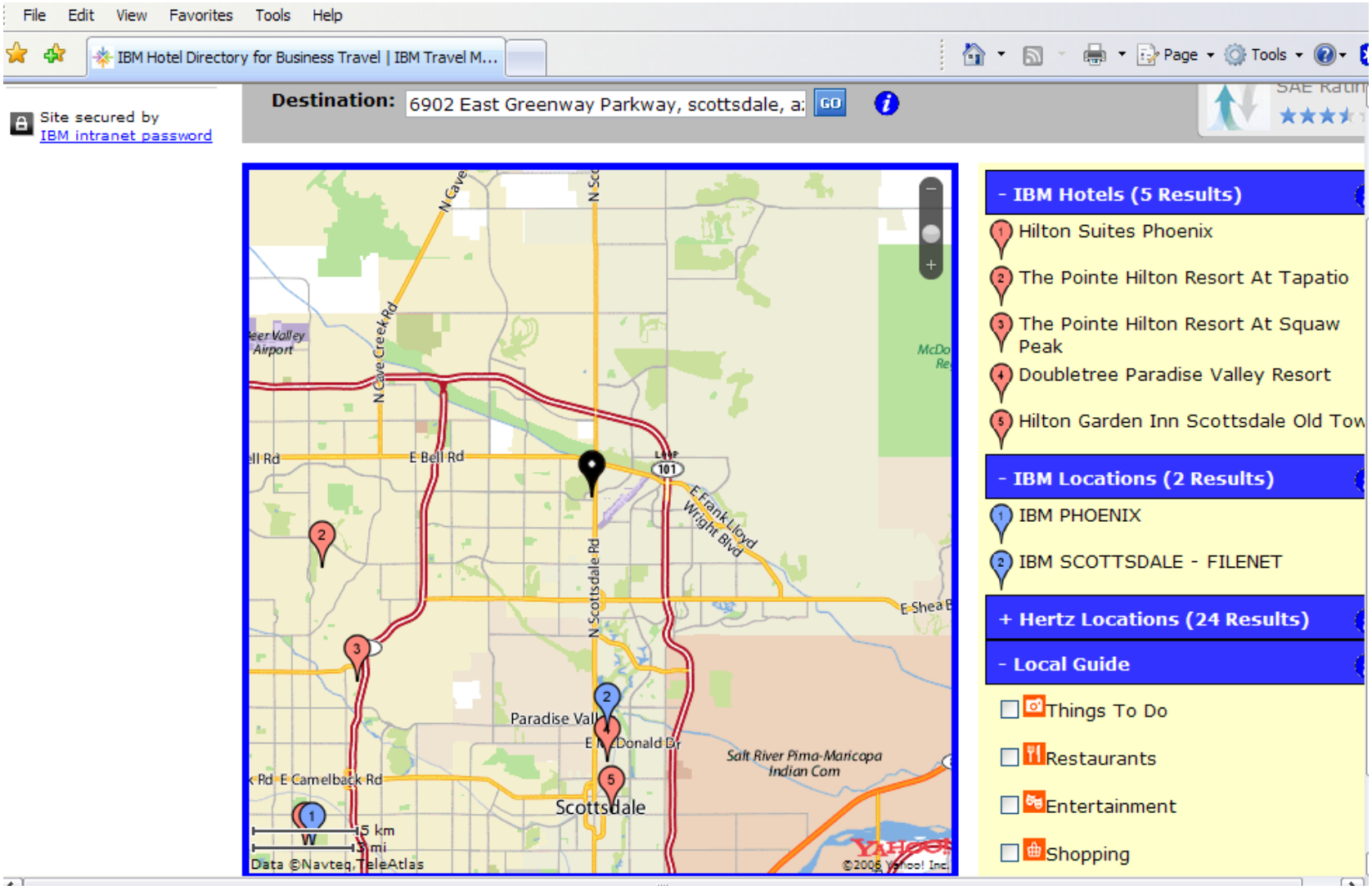
A global retail distributor's mashup

- ***Customer Motivation: Role-based visualization of data across the supply chain***
- ***Scenario: Shipment Monitoring Dashboard***
  - *In-transit shipment details*
  - *Shipment location*
  - *Events that could disrupt shipment*
- ***Mashup combines data and Internet-based data (piracy incidents and weather)***

"We are interested in the potential benefits of mashup software to help us quickly create applications to solve a variety of business challenges. One example is transporting food and other items to thousands of stores on time, despite bad weather, custom delays, traffic jams and road closures. This new type software could help warn us of these problems before they happen, allowing us to anticipate supply chain incidences and risk of product unavailability in stores/" – Innovation Manager and company spokesperson, 2008

© 2008 IBM Corporation

One of IBM's Internal Mashups



© 2008 IBM Corporation

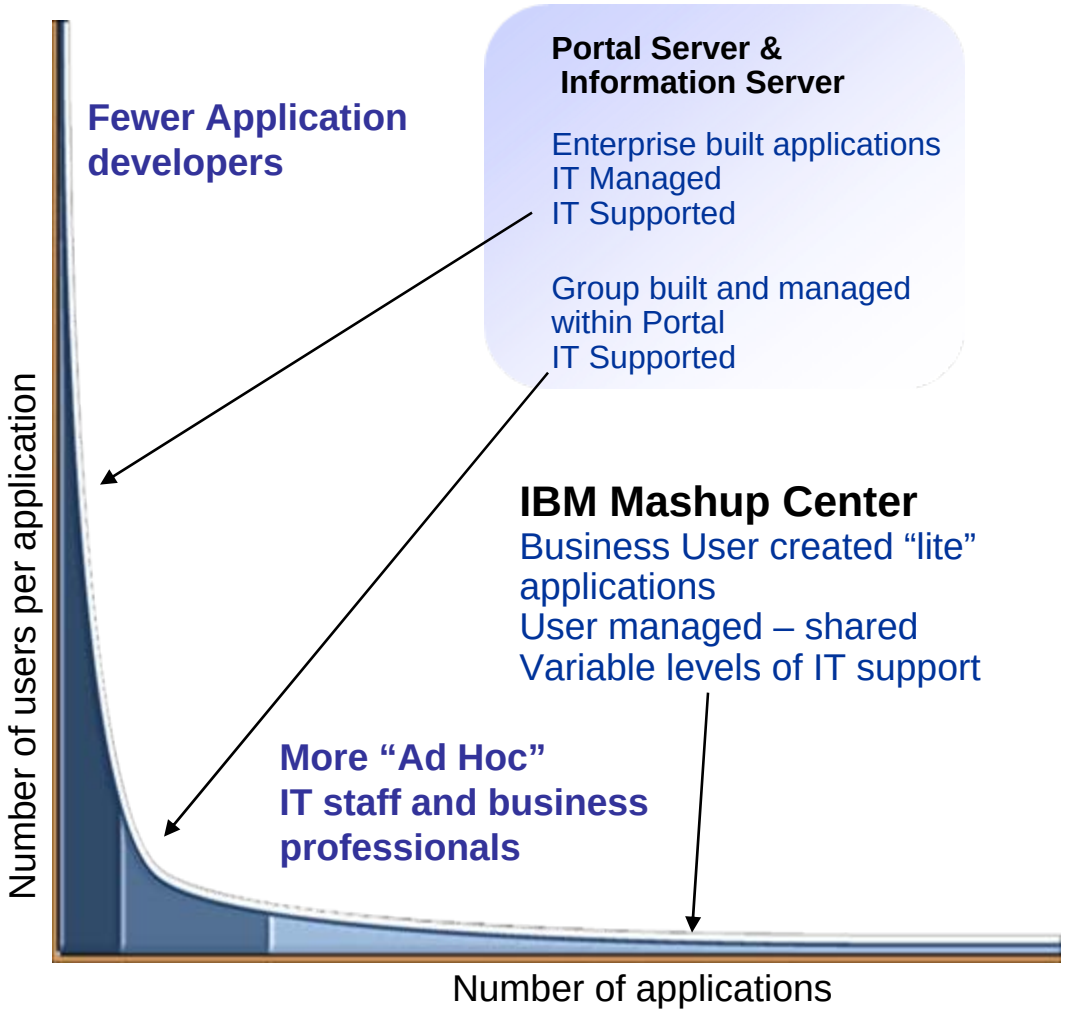
Mashups Can Solve Pent-up Demand for Applications

Situational Applications

1. Rapidly created to address an immediate need of an individual or community
2. Typically, but not necessarily, short-lived (a just-in-time solution)
3. Good enough
4. Built by domain experts (knowledge workers) to solve their own problems

Why Companies want Mashups:

- **Foster innovation** by unlocking and remixing information in ways not originally planned for
- **Quickly uncover new business insights** by easily assembling information from multiple sources on the glass
- **Increase agility** by supporting dynamic assembly and configuration of applications
- **Speed development and reduce development costs** through lightweight integration, reuse and sharing



© 2008 IBM Corporation

IBM Mashup Center

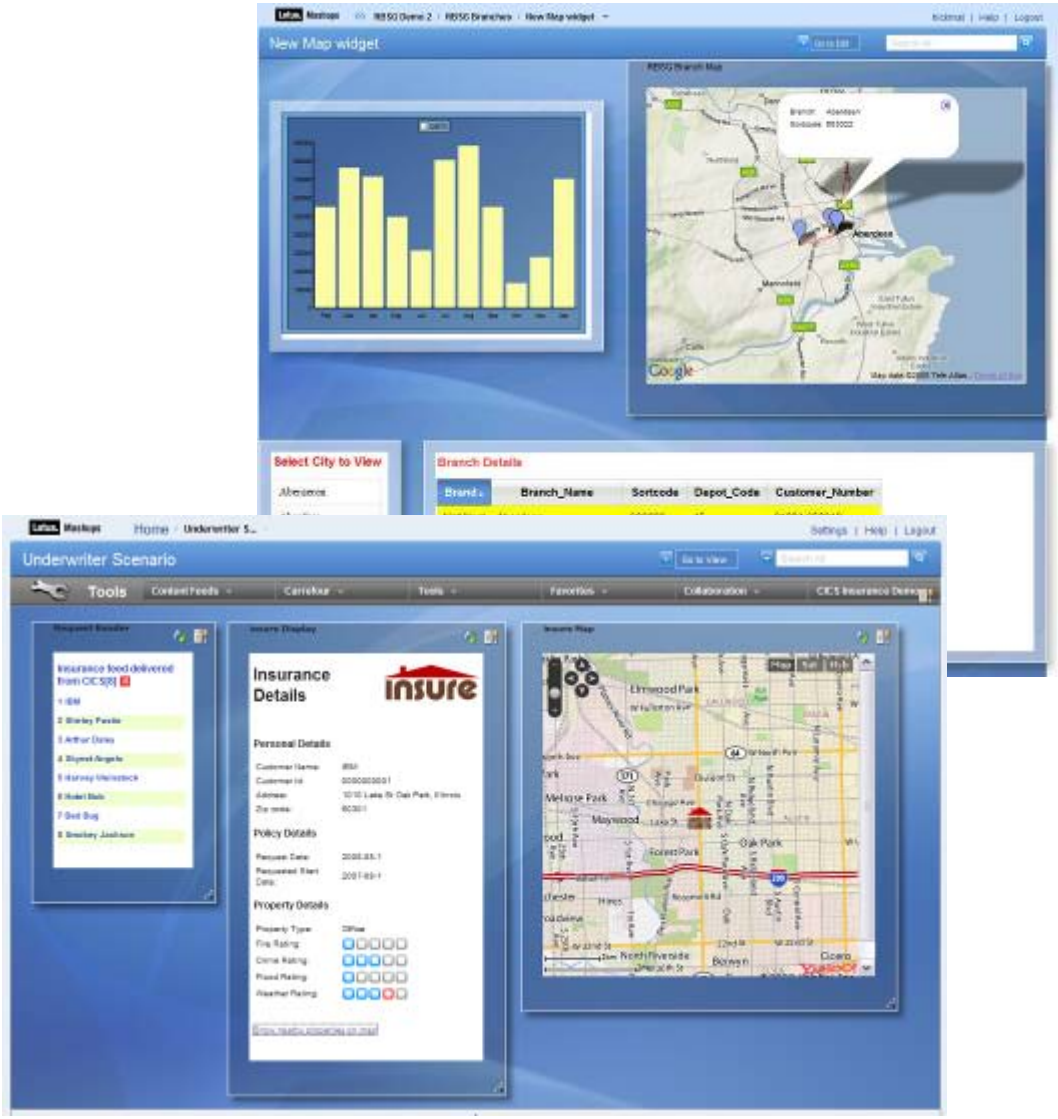
A lightweight mashup platform, supporting line of business assembly of simple, flexible, and dynamic web applications – with the management, security, and governance capabilities IT requires

- **Create and Assemble** new applications by reusing existing data and services
- **Unlock** Enterprise, Web, Personal and Departmental Information
- **Develop** widgets from enterprise systems
- **Discover and share** mashups, widgets, feeds, and services
- **Transform** information into new feeds

© 2008 IBM Corporation

Unleash services from CICS in Mashups

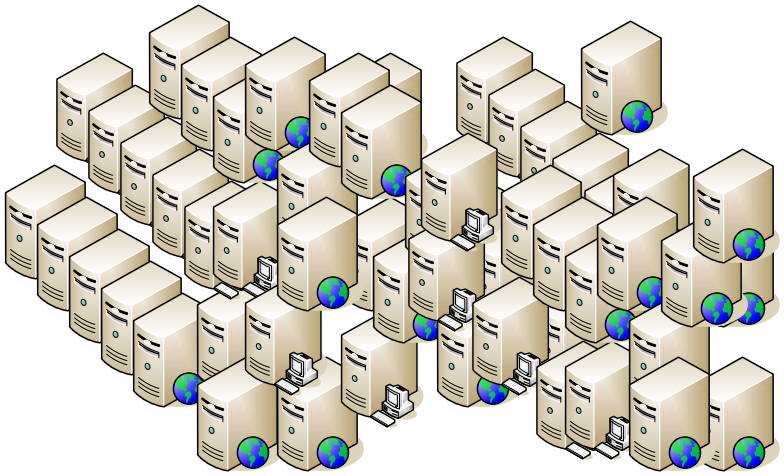
- Mashup demonstrates how CICS information can be mashed together using IBM Mashup Center
- Scenario: Risk Analysis
  - Underwriter Agent uses a mashup to look at various “risk factors” associated with a property his company is being asked to insure
  - Insurance policy data is provided to the mashup as an ATOM feed by CICS
  - Other internet based data, fire stations and crime can be mashed together with the insurance data dynamically



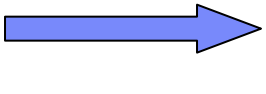
© 2008 IBM Corporation

Freedom vs. Manageable

- **How can you allow your users and lines of business to innovate, but not create chaos?**
- **You want it to be easy to construct a mashup, but also able to control who has access to the result, since that can be exposing key business data.**
- **Even if end users create mashups, you want to back them up and keep them available.**



100's of servers



1 System z server

Backup?

Availability?

Admin Cost?

Energy Cost?

Information Silos?

Security?

Resource Utilization?

© 2008 IBM Corporation

Portal Next

Build and Share your pages with control and confidence

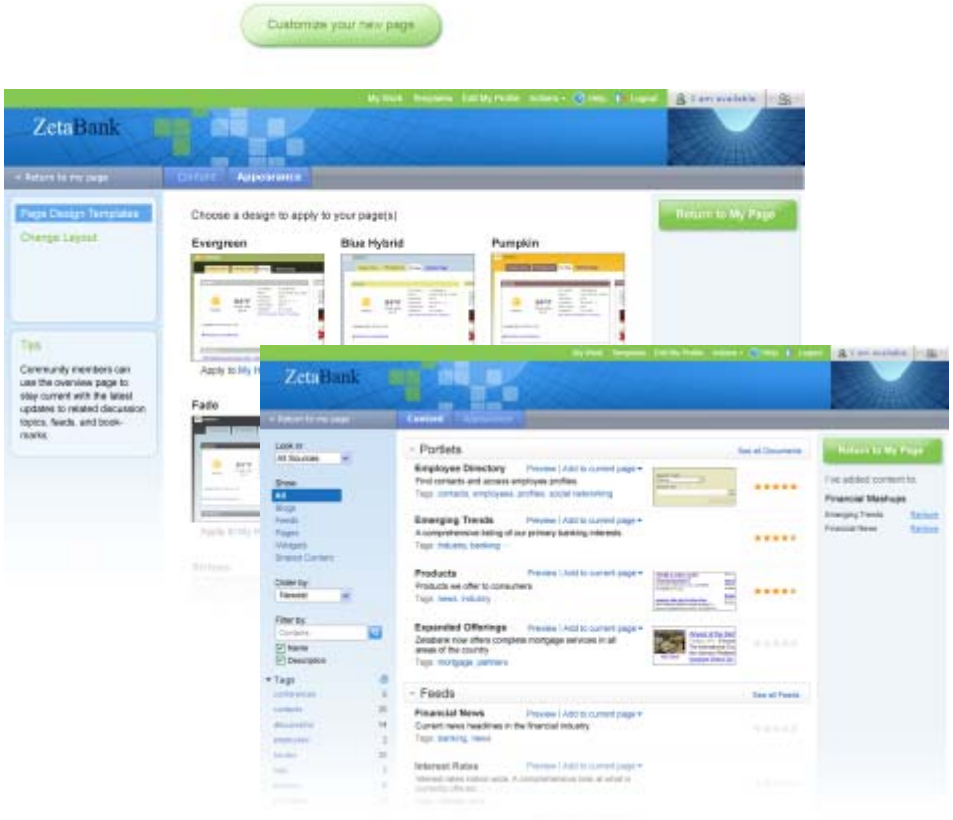
- We'll soon be enabling customers to **deploy mashups** made in Mashup Center to their portal pages, and in our next release enable portal users to **create mashups**
- **Share the results** share these mashups with other portal users quickly and easily

© 2008 IBM Corporation

Portal Next

Build and Share your pages with control and confidence

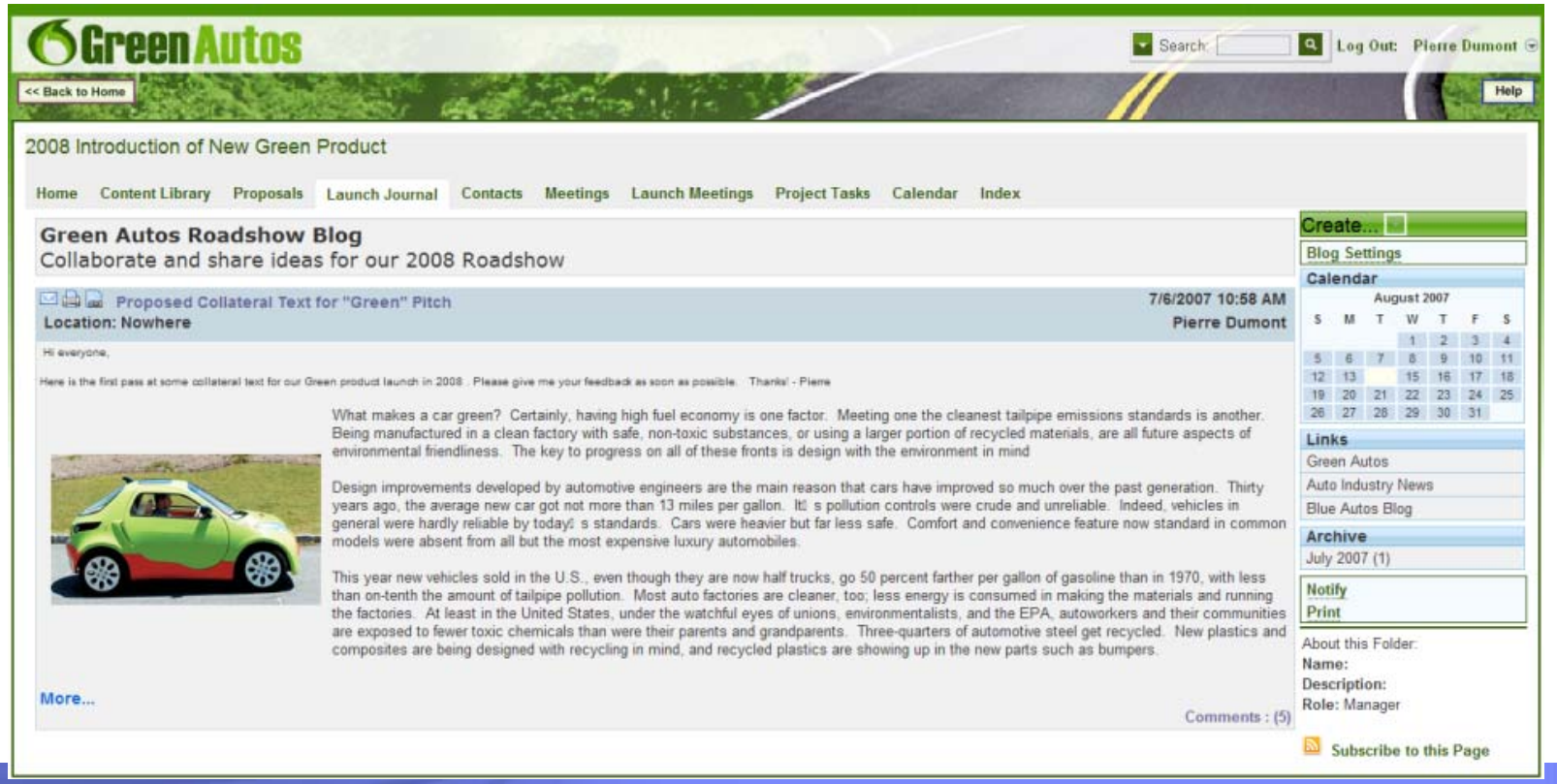
- Simplified user experience enables **authorized users** to construct mashups gathering corporate infomation, internet searches, ATOM feeds and REST services
- **Build one page or entire sites** under I/T control and management, but without I/T's direct involvement and **share** them without outside help



© 2008 IBM Corporation

Wikis and Blogs

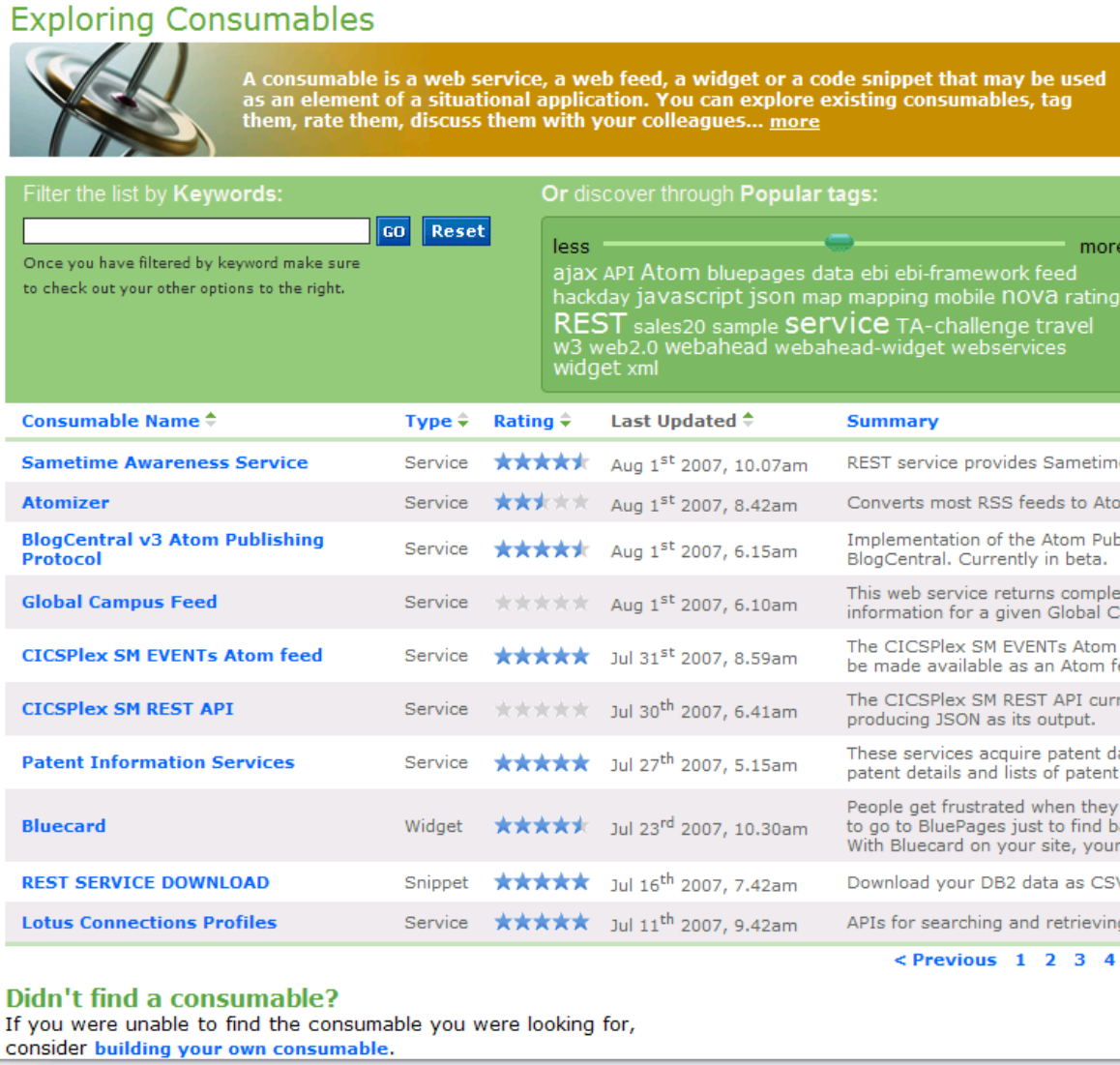
- Fully Integrate **Lotus Connections** or your existing social software
- Can be **custom built** today by leveraging **Web Content Management**
- We'll be shipping supported **wikis and blogs** via standard content authoring templates



© 2008 IBM Corporation

Tagging and Rating

- **Ratings** allow users to provide their input on information available through your site.
- **Tags** allows users to create a natural taxonomy of the information on your site
- In our next release, we plan to enable users to tag and rate **content you publish** with WCM
- As well as enabling users to tag and rate **content they create** in **wikis and blogs**
- **Integrate** with existing Enterprise Tagging and Rating systems



Advantages of Portal on System z

System z is IBM's fastest growing server platform

- 80% of corporate data resides on or originates on mainframes.
- 95% of Fortune 500 companies continue to run mainframes--and they have available capacity.
- 2/3 of business transactions for US retail banks run directly on mainframes.
- System z servers have less than 5 minutes down time per year.
- IBM funds over 1700 System z IT professionals and 20 System z centers worldwide.

Portal on z gives you the best access to your corporate data with the ability to mash it up with data and applications from other sources in a controlled way.

© 2008 IBM Corporation

WebSphere Portal on System z

Distributed Consolidation

System z Linux

Speedy deployment with QOS/integration.

- Applications that scale out
- Large number of smaller appls
- Lowers TCO
- Speedy deployment
- Align with distributed WebSphere family
- Unrivaled virtualization
- Centralized management
- Web Serving
- Presentation Services
- Development Platform
- Test/Migration/Prototyping Platform

Lotus. software

Integration Deployment

z/OS

High QOS and significant integration with CICS, IMS or DB2.

- Applications that scale up
- Highest QoS production environment
- Full exploitation of zSeries and z/OS
- Tight integration with DB2, CICS, IMS
- Service level agreement management
- Dynamic load balancing
- Strict security requirements
- Highest availability
- Disaster recovery
- Dynamic I/O configuration
- Storage management
- Enterprise Modernization capability

Lotus. software

A self-managing server environment with the versatility and power to help integrate your business.

© 2008 IBM Corporation

Websphere Portal on zOS

- **Industry leading reliability and availability**
  - Less than 5 minutes downtime Per Year
  - 99.999% at the application level
- **Superior workload management**
  - Workload Manager manages ALL workloads across the entire the z complex
  - Ensures that Portal gets the resources it needs to meet Service Level Agreements
- **Highest U.S. Government security level – z platform exclusive**
  - EAL Level 5 – Highest U.S. government security classification
- **Unmatched options for scalability**
  - Multi-processor models can connect in a Parallel Sysplex
- **100% processor utilization**
  - Drive mixed workloads for ultimate processor utilization
- **Specialized Engines (zAAP) to run JAVA workloads**
  - Portal, WAS, Process Server
- **zAAP processors are equivalent capacity to standard purpose processors, but the processor capacity of the zAAP processors are not included when determine traditional capacity-based software license charges or 3rd Party software charges**
- **Reduced network complexity**
  - “Network in a box” with fewer discrete components

© 2008 IBM Corporation

WebSphere Portal on z/OS (cont.)

- **Exploit proximity to enterprise data and transactions**
  - DB2 for z/OS:
    - High speed native type-2 connector (RRSAF) that is fully XA compliant and supports 2-phase commit processing
    - DB2 data sharing provides access to shared resources on an almost limitless scale in a parallel sysplex
  - CICS: Portal supports the underlying JCA connector technology for connecting to CICS via high speed 2-phase commit enabled RRS connectors as well as the newer JCA enabled connectors
  - IMS: Portal supports the underlying JCA and OTMA technologies for connecting to IMS via high speed 2-phase commit enabled RRS connectors
- **Exploit z/OS Qualities of Service that WebSphere Application Server for z/OS provides, for example**
  - WLM, LOGGER, SAF, RRS, ARM
  - Clustering : z/OS high-availablilty Parallel Sysplex clustering, Coupling Facility and GDPS

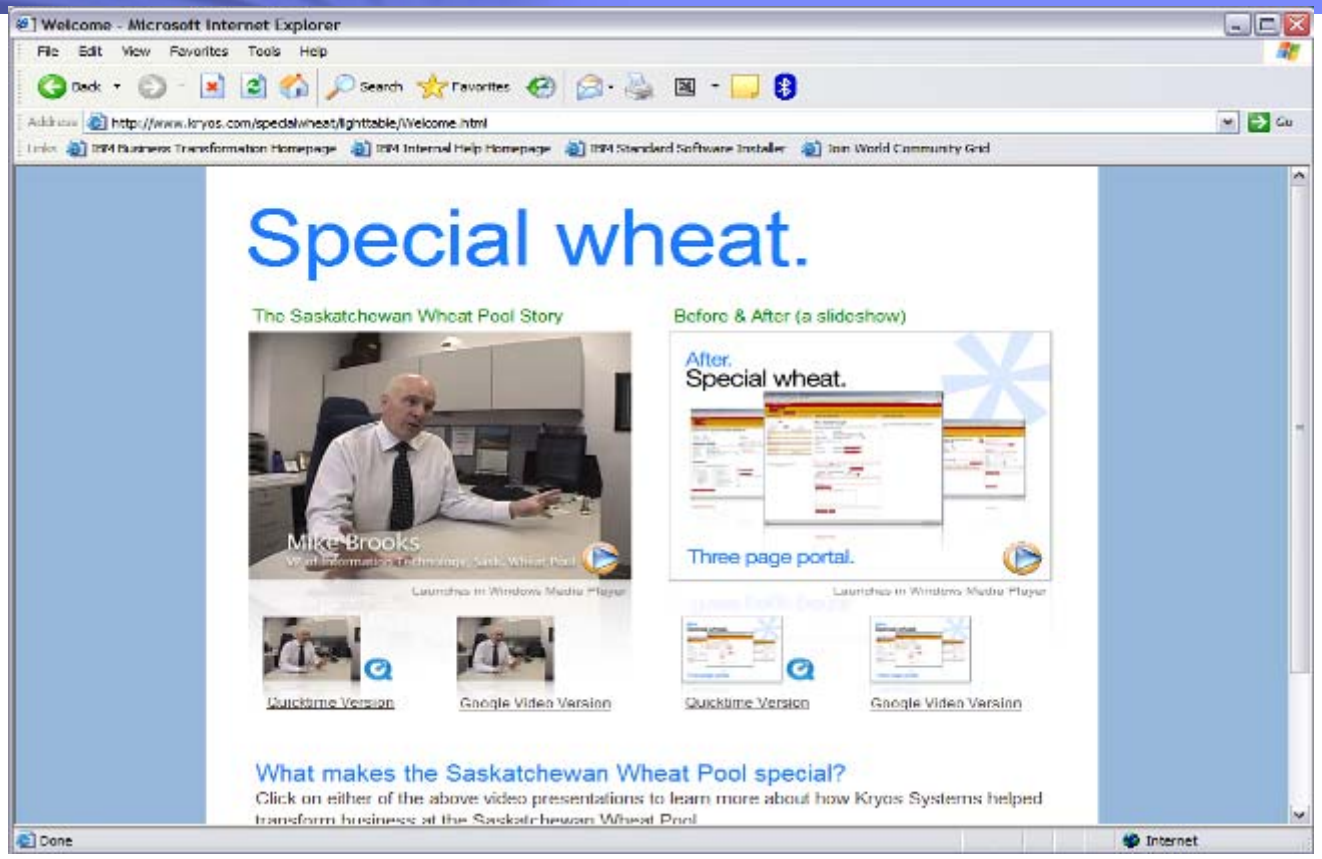
© 2008 IBM Corporation

Customer Case Study

USDA United States Department of Agriculture

- USDA needed to provide a portal strategy based on a **single web standard.**
- There were over 10 competitors including BEA, Microsoft's Sharepoint, Oracle and SAP
- The **System z server** was chosen to support the Portal because it provided the **highest availability and security**.
- The following is a customer quote: " The success and speed of IBM's implementation of WebSphere Portal Server on Linux for System z will lead to additional processor licenses of WPS for multiple portal sites across the country and additional user licenses of the WebSphere Development tools……these acquisitions will equal continued investments in System z hardware".

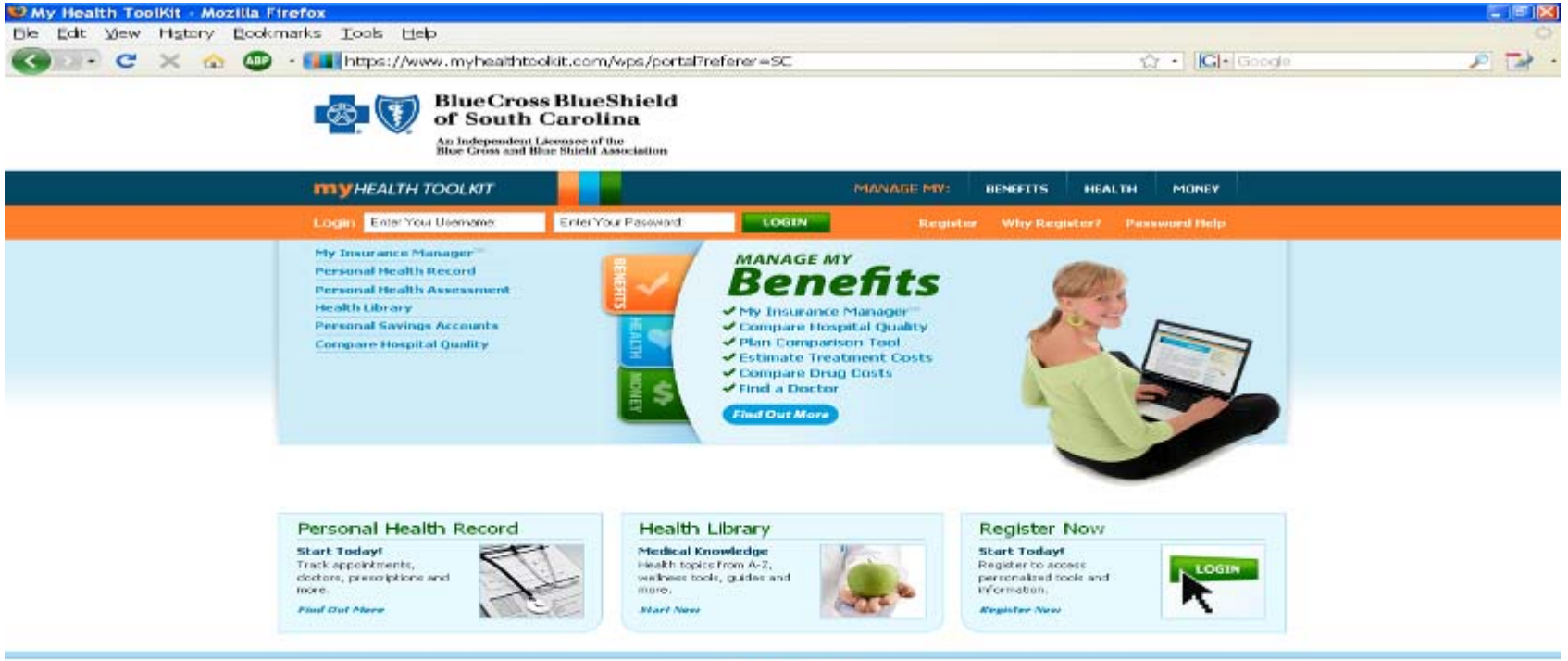
© 2008 IBM Corporation



…..A portal for 40,000 clients

Viterra (formerly Saskatchewan Wheat Pool) delivers information via their portal enabling their 40,000 clients to access their own data on the Web; checking their reports anytime in real time, seeing commodity pricing and information about shipping and delivery as well as reviewing their statements. They also find out about – and take advantage of – specials right away.

Some of the advantages are less customer facing, but no less important for the Pool. Up until business partner Kryos came along with the new portals, Viterra had an underused SystemZ mainframe. Now WebSphere Portal takes advantage of its capacity. ….



Business Need:
BCBSSC struggled to manage the increasing complexity of its distributed server environment. Specifically, the environment lacked standardized software across all servers. In addition, BCBSSC had historically utilized Web portal solutions that were hard to maintain and modify. Therefore, the organization wanted to partner with an industry leader to develop a standard Web content platform that offered the flexibility to meet its changing needs.

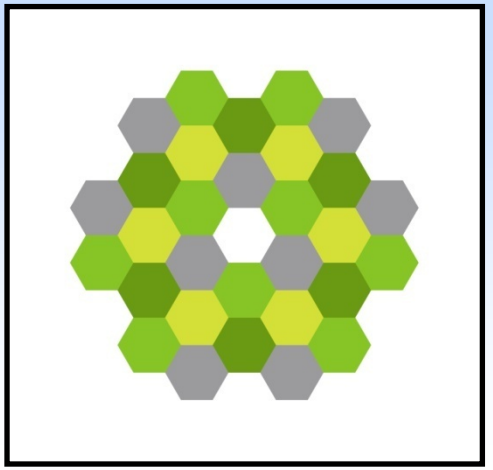
Solution:
To implement a comprehensive Web portal solution, BCBSSC engaged IBM Software Services for Lotus (ISSL). The ISSL Lab Services team, working with IBM Business Partner Ascendant Technology, LLC, assisted with development by building a plan comparison tool and personalized health toolkit. IBM Software Services for WebSphere provided the underlying WebSphere infrastructure, which included IBM WebSphere Portal Enable V6 software and IBM WebSphere Application Server V6.0.2 software.

Benefits of the Solution:
By virtualizing its Linux environments on two IFLs, BCBSSC reduced its environmental management costs and improved the efficiency of its hardware and software assets. Furthermore, the highly flexible WebSphere environment allows the organization to quickly and easily modify its Web portal to meet ever-changing business requirements.

UK Land Registry

The Challenge

UK Government is modernising many of its services to allow them to be simpler and more accessible. The Land Registry is the government organisation that holds the register of land in England and Wales with over £1,300bn worth of property ownership guaranteed. Existing processes were manual and paper intensive where there was no single view of the current state of a specific transaction.



The Solution

WebSphere Portal for z/OS provided a framework for the delivery of a new range of electronic processes to Citizens, conveyencers, financial institutions and a number of other partners.

Software	▪ **WebSphere Portal for z/OS v6.0** ▪ **WebSphere Application Server for z/OS v6.1** ▪ **DB2 for z/OS v8.1**
Hardware	▪ **IBM eServer zSeries z9-709**

Benefits

•Harness existing skills
•Keep presentation close to data
•Integrated with other technology components
•Framework for implementing new services
•Make processes accessible to outside world
•Improve transparency and reduce home movers stress

© 2008 IBM Corporation

The IBM internal On Demand Workplace based on WebSphere Portal transformed the way employees work at IBM …

- ***Providing*** **"one place" with personalized access to IBM resources**
  - 2.8 million page views per business day
  - 130 million hits per week
  - 80% of IBMers visit w3 ODW at least once per day
- ***Integrating*** **content, learning, expertise, collaboration and business applications**
- ***Enabling*** **increased productivity through role-based delivery of resources**
  - *Productivity savings estimate of $80.6 million*
- ***Reducing*** **development & deployment costs through reuse**
  - *Every major web project potentially saves over $200K in develop & deploy costs*
  - *Millions in savings from site consolidation from hosting charges to content management*

IBM demographics: roughly 380,000 employees, 160+ countries, 2000+ locations, highly mobile workforce

© 2008 IBM Corporation

Standardization of common tools and design ensures investment focus is on a single access point: a single portal

- IBM standardized on one single portal interface and platform avoiding an average $120M in competing portal investments.
- Created standards for:
  - Content Management
  - Security /Authentication
  - Data Warehousing
  - Profile Management
  - Search and Taxonomy
  - Enterprise Brand (Look, Feel, Navigation)
  - Metrics / Scorecard
- Global Web Architecture standards have been applied to ensure consistency in content and design processes yielding a 20% reduction in the cost to deploy web applications

© 2008 IBM Corporation

Reusable Services and Applications Make up Today's On Demand Workplace (w3.ibm.com)

- **News Portlet** – push profile-specific content and all IBM corporate news
- **Essential Links** – URLs to profile-specific tools/applications/resources and content
- **MyNews** – email delivery capability of internal org news and Factiva-supported external channels
- **Seller's Workplace** – employee specific client opportunities linking to Siebel, cadence reports, SSM steps
- **Working Knowledge** – timely aggregation of internal and external "actionable" content specific to unit, role, industry and work-related interests (e.g., client wins, papers)
- **Learning@IBM** – push profile-specific learning activities and manage certifications
- **Act Now** – alerts to time sensitive activities
- **What's New** – highlight new resources on ODW from profile changes to new Essential Links
- **You and IBM** – All IBM and country-specific employee HR news

© 2008 IBM Corporation

Evolution of w3.ibm.com

Launch of w3.ibm.com	Version 2.0	Versions 3 & 4	Versions 5 & 6	ODW R1 & R2	ODW 2008-2009
Corporate news and links 17k page views/day	Standard design and navigation 38k page views/day	Bluepages, MyNews, Web tools, Info Central 500k page views/day	Profile, Dynamic Content, Taxonomy, Integrated Search 1m page views/day	Business Portals, Personalization 2m page views/day	Self-deployment, Mobility, web 2.0 portal "stickiness"

Corporate Communications

Common Function

Personalization

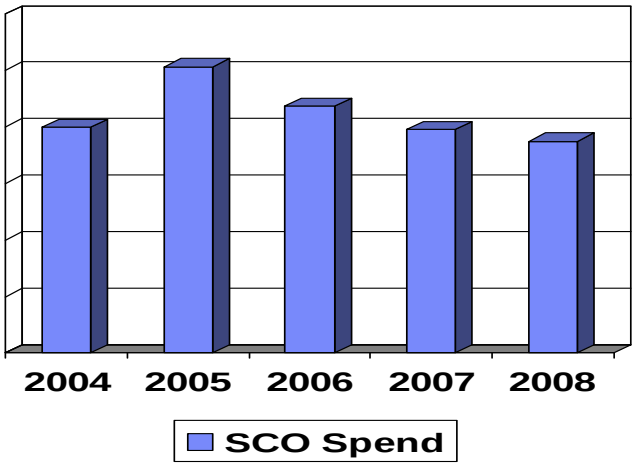
Participation

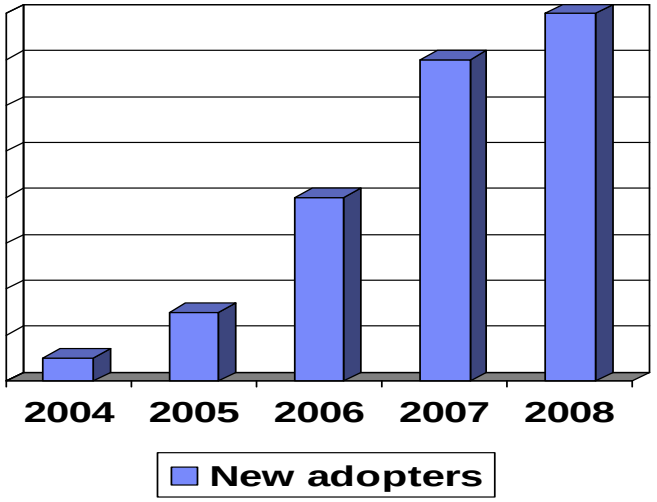
CONSUME ⟷ CONTRIBUTE

1996 1998 2000 2002 2004 2006 2008

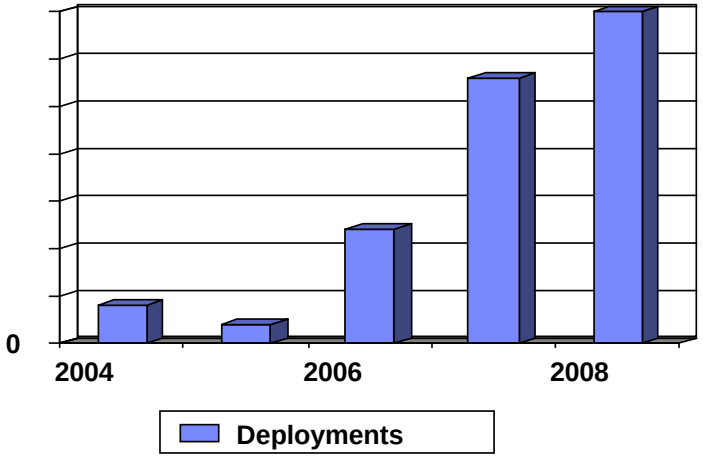
© 2008 IBM Corporation

Intranet (ODW) Spend and Growth



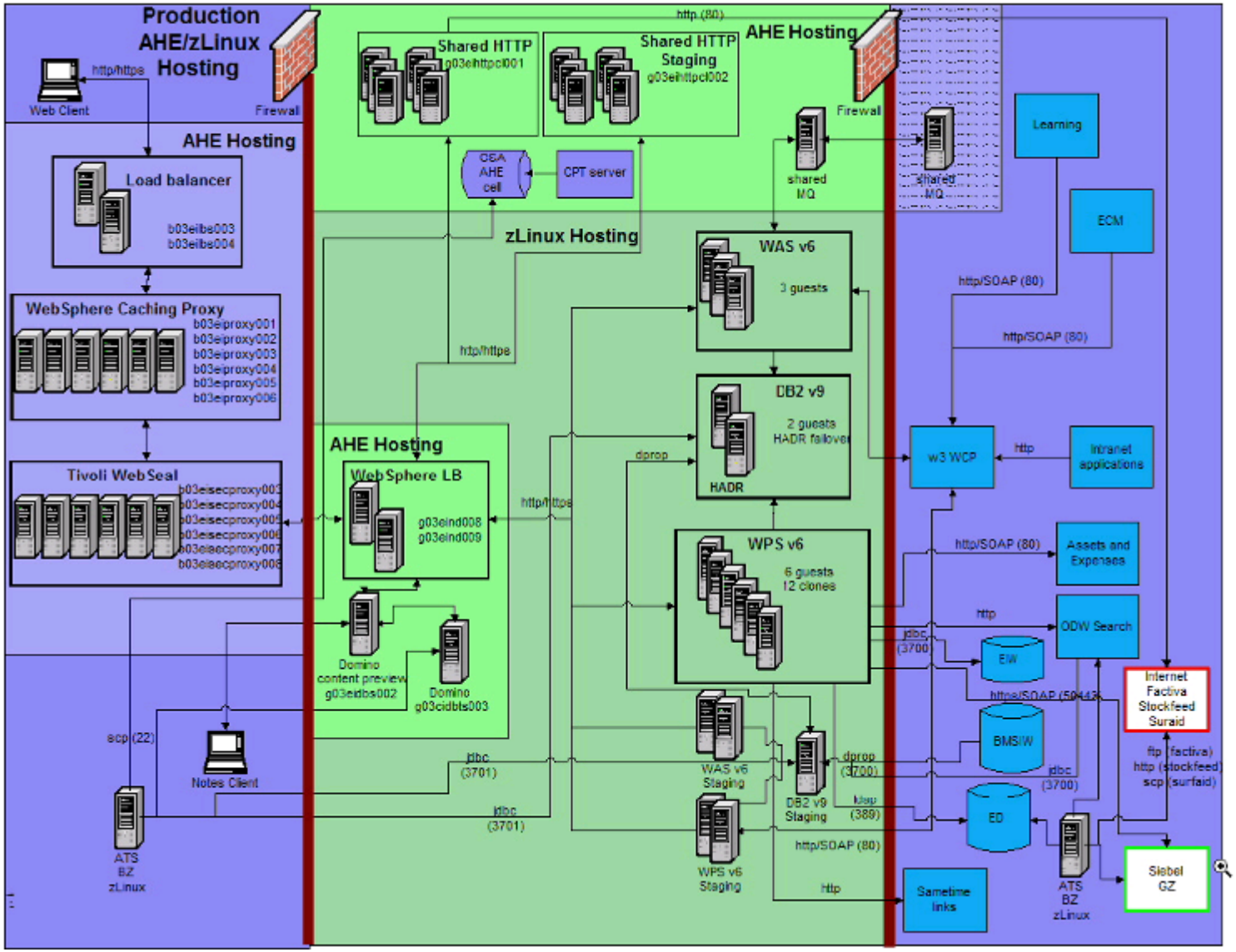


- 2 M requests per hour for our Photo API
- 8 M home page hits / day
- 23 k / minute average active users
- 276 k average unique visitors per day



© 2008 IBM Corporation

Intranet (ODW) Infrastructure



© 2008 IBM Corporation

Laying the foundation to move into the future….

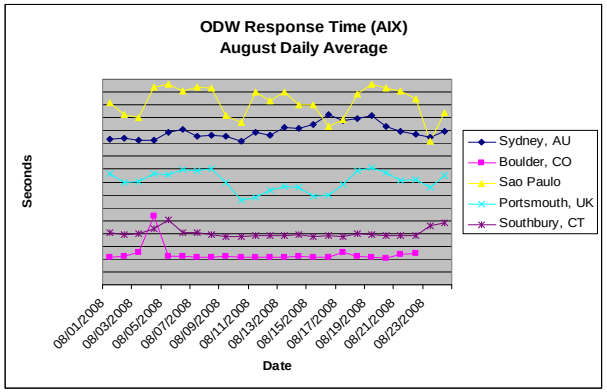
- System z Linux
  - **Scalability – support exponential growth**
    - Ability to clone systems easily: days, not weeks
    - Add CPU and other resources in hours, not days
  - **Performance – Response time**
    - More consistent results
    - Quicker results
  - **Efficiency**
    - I/O Intensive applications
  - **Reliability**
    - Improved availability of business critical applications
  - **Cost**
    - Moving to better utilized System z Linux images
    - Less labor costs for less manual intensive tasks

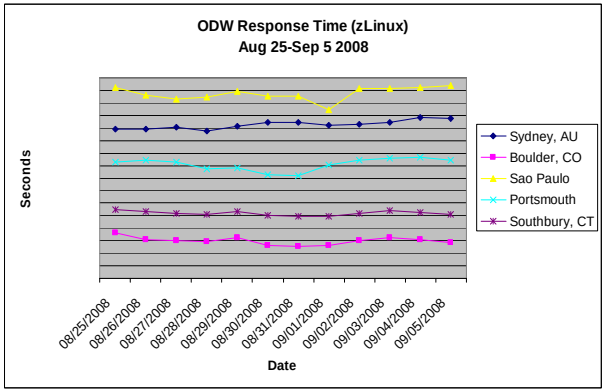
- Portal R6.1
  - **Web 2.0 capabilities**
    - participatory business applications
    - Allows social interaction
  - **Scalability – support exponential growth**
    - JVM improved performance (Java Virtual Machine)
  - **Portlet Independence**
    - CSA – Client Side Aggregation
  - **Shorter development time/cost**
    - Identified state – allows us to remove home grown functionality

© 2008 IBM Corporation

ODW Benefits Realized in first month running on zLinux

- **Performance:**
  - More consistent response times on ODW
  - Average 2 seconds quicker for our BluePages application
- **Scalability:**
  - Immediate results to add CPUs to environment
    - Task completed in hours; labor cost minimal
- **Go Green!**
  - Energy Efficiency Certificates verify savings





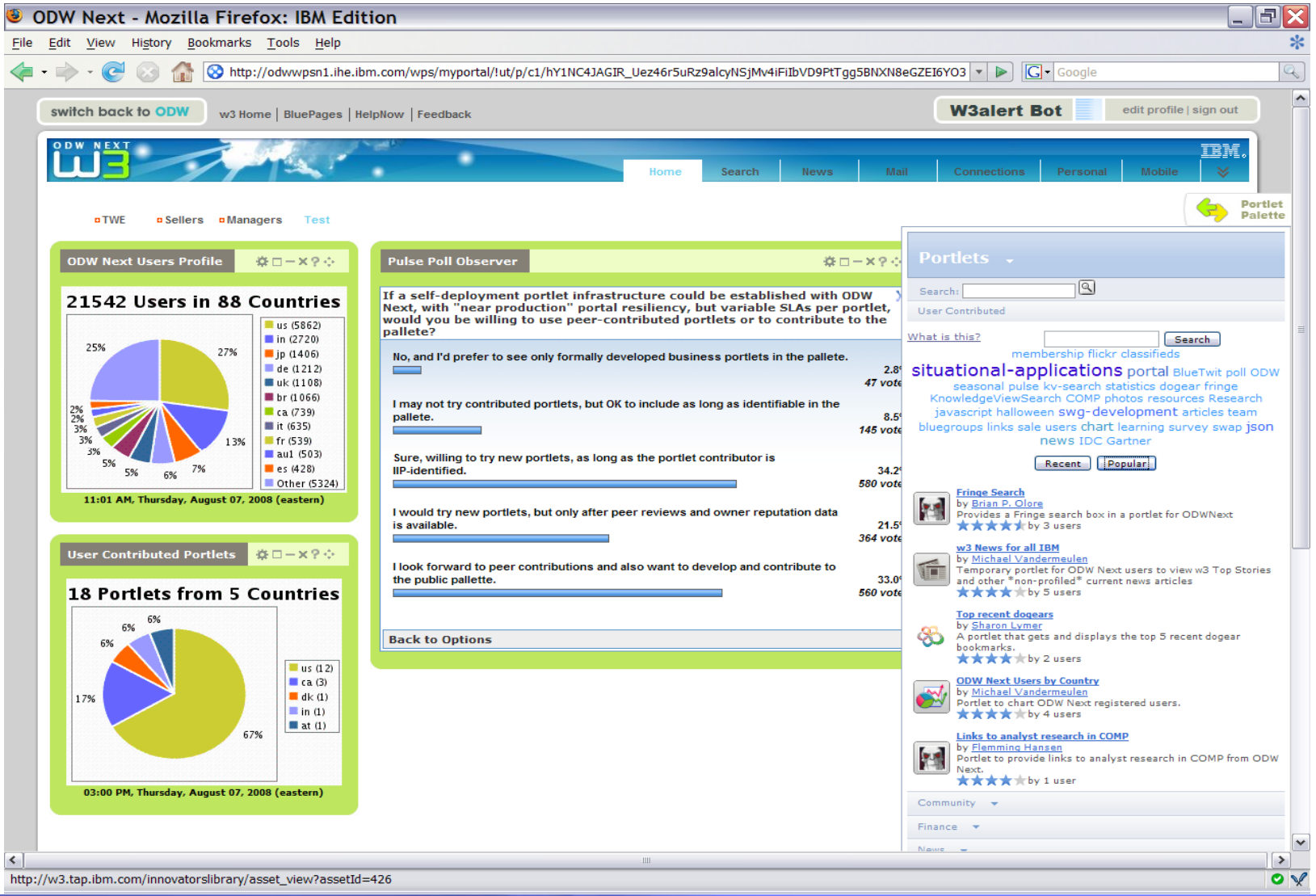
© 2008 IBM Corporation

Our continued intranet evolution and innovation: ODW Next

- Perpetual Beta
- Dynamic switching between ODW and ODW Next
- Enables integrated innovation
- Built on Portal 6
- Web 2.0
- Google Gadgets
- New model for self deployment
- Remote portlets

© 2008 IBM Corporation

Web 2.0 is about user participation – a goal of the future ODW is to be an employee Participatory Portal



© 2008 IBM Corporation

Outlook: "innovation with integration"

- Web 2.0 features - WP 6.1
- Social Tagging
- Social Search
- Profiling - Personalization
- Integration with web mail, calendar
- Harvesting via "natural selection"
- New model for self-deployment

© 2008 IBM Corporation

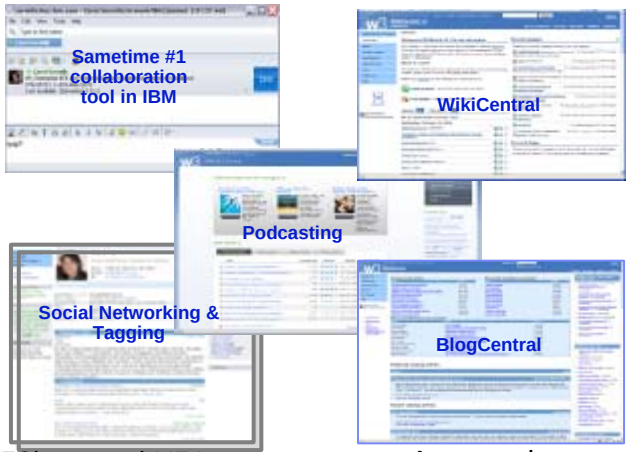
Using Lotus products, e.g. Lotus Connections to achieve Web 2.0: - Services based – collective intelligence – Light Weight UIs -

60% of IBM population Role Enabled (e.g Sellers Workplace, Managers Portal, Finance Workplace)
- Services Based

Dogear & ETS (Tagging)
Improved content relevancy & employee satisfaction. Estimated $3.3M productivity increase

Bluepages – highest employee sat at 89%
- *Base for Profiles*

- Sametime – 380K users - largest installation of Sametime in the world. What users are saying: $80M Productivity increase
- 97 portals integrated



•250k tagged URLs
•75k unique tags
•adopted by 100+ apps

- Access via mobile devices
- 15K Wikis,
- 217K readers,
- 34K IBM Authors
- *Device Independent*
- *Participatory beginnings*

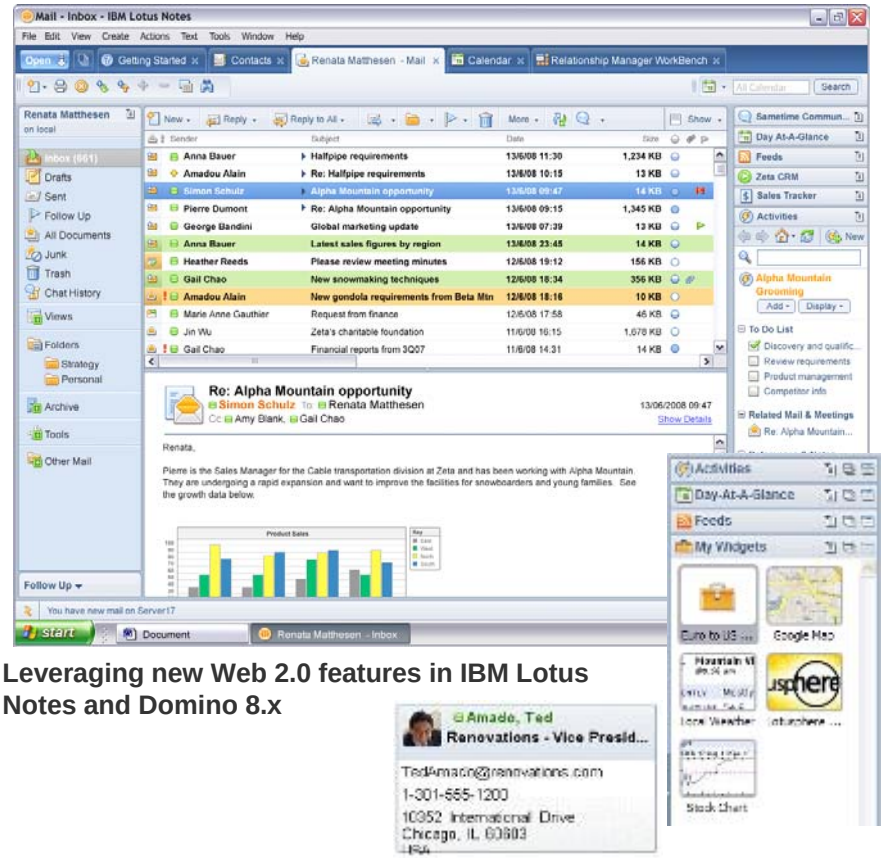
Jams drove $50M Services & SW Revenue

ThinkPlace:
•16K+ ideas
•$574M impact
•20 Exec Challenges

© 2008 IBM Corporation

Notes and Domino for System z

Collaborating in context from a single, customized view



Leveraging new Web 2.0 features in IBM Lotus Notes and Domino 8.x

Unified and intuitive workspace

email, calendaring, contact management, to do

Instant messaging and presence awareness

Office productivity tools

Personal library for easy file sharing

Teamroom, blog templates and Search Center

Web 2.0: My Widgets / Live Text and RSS feeds

Access from web, rich and mobile clients

Mac, Linux and Windows

Support Google Calendar and .vCard format

Evolution from z/OS to System z Linux 64 bit

IBM CIO office is consolidating Domino messaging on z

- **Significant cost reductions**
- **Easier to administrate**
- **Green savings (smaller footprint, etc.)**

© 2008 IBM Corporation

Summary

- **Web 2.0, Social Software and user contribution and collaboration are hot topics and will be leveraged by leading companies to spur innovation and accelerate their business goals**
- **WebSphere Portal provides a proven, enterprise class solution that enables I/T to deploy these web 2.0 user experiences, with more web 2.0 and social elements coming in the future.**
- **WebSphere Portal when deployed on z systems provides a centralized, scaleable and manageable platform with unmatched price/performance for integrating core business processes with user contributed and customized content to maximize business impact.**

© 2008 IBM Corporation

Resources

Learn more

- **WebSphere Portal:** http://www-01.ibm.com/software/websphere/portal/
  - zOS: http://www-01.ibm.com/software/genservers/portalzos/
  - Library: http://www-306.ibm.com/software/genservers/portal/library/
  - Webcasts
    - "WebSphere Portal and Dashboards on System z: http://www-01.ibm.com/software/os/systemz/telecon/10sep/
    - "Unleash the power with WebSphere Portal 6.1 and Web 2.0": http://www.ibm.com/software/info/people/portalwebcast/index.jsp
    - "IBM WebSphere Portal Web 2.0 Features": http://www.youtube.com/watch?v=Mr5g2Lh4HmA

- **Lotus Notes & Domino:** http://www-01.ibm.com/software/lotus/notesanddomino/index.html
  - Library: http://www-01.ibm.com/software/lotus/notesanddomino/library.html

- **IBM Mashup Center:** http://www-01.ibm.com/software/info/mashup-center/
  - Library: http://www-01.ibm.com/software/info/mashup-center/library.html
  - Try out IBM Mashup Center on Lotus Greenhouse: https://greenhouse.lotus.com/home/product.jsp?p=mashups
  - Other sources:
    - Keep Up with New Developments at our "Mix and Mash" blog: http://www.mix-and-mash.com
    - IBM Mashup Center on DEMOZone: http://demos.dfw.ibm.com/on_demand/Demo/IBM_Demo_IBM_Mashup_Center-Jul08.html
    - How-to Details for IBM Mashup Center: http://youtube.com/user/ItsMashtastic

© 2008 IBM Corporation

Thank You!

Dirk Wittkopp

Director, Portal and Workflow Development

IBM Germany R&D

Schönaicher Strasse 220
71032 Böblingen
Germany

Phone +49-7031- 16- 2357
wittkopp@de.ibm.com

© 2008 IBM Corporation

Trademarks

Trademarks

The following are trademarks or registered trademarks of the International Business Machines Corporation in the United States and/or other countries. For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml: AS/400, DBE, e-business logo, ESCO, eServer, FICON, IBM, IBM Logo, iSeries, MVS, OS/390, pSeries, RS/6000, S/390, VM/ESA, VSE/ESA, Websphere, xSeries, z/OS, zSeries, z/VM, IBM Systems, IBM System z9®, IBM System z10™, IBM System p5®, IBM System i5®, IBM System Storage™ , IBM system Storage DS®, IBM BladeCenter®, IBM TotalStorage®, IBM eServer™, IBM System z®, IBM System p®, IBM System i®, IBM System x™, IBM IntelliStation®, IBM Power Architecture®, IBM SureONE®, IBM SurePOS™, IBM Power™ Systems, IBM z/OS®, IBM z/OS.e, IBM AIX®, IBM z/VSE™, IBM z/TPF, IBM z/VM ®, IBM i5/OS®, IBM AIX 5L™, IBM 4690 Operating System

The following are trademarks or registered trademarks of other companies

Lotus, Notes, and Domino are trademarks or registered trademarks of Lotus Development Corporation
Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries
LINUX is a registered trademark of Linux Torvalds
UNIX is a registered trademark of The Open Group in the United States and other countries.
Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.
SET and Secure Electronic Transaction are trademarks owned by SET Secure Electronic Transaction LLC.
Intel is a registered trademark of Intel Corporation
* All other products may be trademarks or registered trademarks of their respective companies.

NOTES:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

Any proposed use of claims in this presentation outside of the United States must be reviewed by local IBM country counsel prior to such use.

The information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

© 2008 IBM Corporation