



# Getting a Jump on the Web Services Wave

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# What are we going to cover?

- What are Web Services?
- Why do we need them?
- What do they do for e-Business?
- What do they do for IBM?
- Our strategy moving forward
- Our differentiators
- Early in the game...next steps?





# We're at a Cusp

- Somewhere in-between
  - .com boom >> .bomb wake-up call >> future
  - <2 years ago>                      <NOW>                      <2 years>
- The Web connected our minds, triggered our imagination
  - ▶ new products, companies & services
  - ▶ ...and visions of sugar plums & millions (\$)
- Businesses survive only if they offer real value & real substance
  - ▶ an extension, an improvement, a real savings, an automation of something that exists






# Survival of the Fittest

- In nature
  - ▶ new species didn't suddenly appear
  - ▶ they were continuations (with improvements)
- In business, the same applies
  - ▶ Not new companies, but new improvements
  - ▶ Old businesses with new faces
  - ▶ expand opportunities, reach, automation
- Best path of survival is to evolve
  - ▶ Grow from what was there
  - ▶ tie back to solid ground & value
- In a word..      **INTEGRATE**



# Definition: In te grate

- 
- 1. To make into a whole by bringing all parts together; unify.
  - 2. - To join with something else; unite.
    - To make part of a larger unit: integrated the new procedures into the work routine.
  - 3. To open to people of all races or ethnic groups without restriction; desegregate.
  - 4. Mathematics. To calculate the integral of. \*
    - a. To perform integration on.
  - 5. Psychology. To bring about the integration of personality traits.

Etymology: [From Middle English intact, ... see tag- in Indo-European Roots.] tag- ...To touch, handle. \*



# More on Evolution...

- Evolution creates diversity, intricacy
  - "The world is heterogeneous & getting heterogeneous-er!"
- True with anything that evolves
  - ▶ nature, technology, language, business
- Nature as a model for technology
  - ▶ integration/interoperation = universal law
- Technology somehow forgot this
  - ▶ islands, fortresses, fiefdoms - no interoperation
  - ▶ even within two versions of the same product!



# The Tower of Babel



- Can't communicate, since languages evolved differently

# Different Approaches

Korean



English



German



- Force one language?
- One-off translations?
- Many-to-One?







# Why is Integration So Difficult?

- Software forms deep roots, hard to pull out
  - ▶ once used, built upon, relied on, ingrained
    - can't afford to disrupt, change
    - don't fix it if it ain't broke
  - ▶ Vendors liked this: lock-in
- Who's running whom? Software or Business?
- Barrier to dynamic business
  - ▶ company A to company B
    - work out interoperation (EDI, etc.... 2 - 5 yr process)
  - ▶ now comes company C = better company
    - can't afford to connect!
- Technology = too rigid, too tightly coupled
  - ▶ lack of context, vision in design, math/precision





business

# A History of Attempting Integration

- Integration has been tried a LOT!
  - ▶ ISO Model, DCE, CORBA, OpenDoc
- Protocols & APIs & Object Models
  - ▶ Too rigid, too big, too slow, too long!
- One-off integrations to most-used/popular
  - ▶ word->wordperfect, SAP->Baan
  - ▶ Ma&Pa->BigCorps (de facto standards)
- Some companies have died for not integrating
  - ▶ WordPerfect, dotBombs, etc...
- Or have been reprimanded for not
  - ▶ Attempts at homogeneous
    - AT&T, IBM.....Microsoft
- "No man is an island" -> No company either!

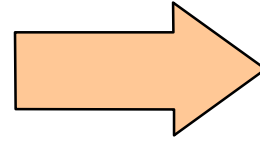


IBM

# The First Wave of the Web



"The Internet"



"The Web"

- Tim Berners-Lee's miracle ingredient
  - ▶ seed crystal in supersaturated solution
  - ▶ Lattice sprang into existence overnight
- The Internet + hypertext = The Web
- Evolution, building off what was there!
  - ▶ Previous Infrastructure + ubiquitous open stds = Next Generation Infrastructure



# A Changed IBM

“Market control is no longer a sensible or an achievable business goal. No technology company can any longer dream of coming up with the magic bullet that will establish it ...as a sole owner of a key platform.

We’re not managing IBM—or investing its resources—in the expectation of, or hope for, that kind of control. Instead, we’re building an enterprise that will thrive in a more complex, interdependent and open world.”

– Lou Gerstner, 1999 IBM Annual Report





# Open Standards Unlock Opportunity

"Proprietary standards often lock solution providers and their customers into one vendor's technology. Open standards allow for the use of technology from many different vendors."

- CRN, 2001/2/23





# The Rise of e-Business

- The Net Effect
  - ▶ Websites proliferated, Browser = new desktop
  - ▶ More eyeballs  $\Leftrightarrow$  More sites
- Businesses hone in
  - ▶ new ones: NewVendor.com
  - ▶ old ones: Bricks&Mortor.com
- Businesses progressed through steps
  - ▶ Internal automation (EAI, intra-nets)
  - ▶ Automate customer facing (shopping cart)
  - ▶ Automate supply chain facing (ERP,SCM)
- Proliferation of approaches
  - ▶ despite commonality of web
  - ▶ Islands and Towers (again!)





# Standards to the Rescue: XML

- eXtensible Markup Language
  - ▶ more powerful than HTML
  - ▶ not as complicated as SGML
- Allowed for universal description of anything
- Extensible, language factory
- Enables business integration
  - ▶ w/o forcing change on either side
  - ▶ just translate to XML (like Latin)
  - ▶ my PO's "address" = your PO's "addr"
  - ▶ `<address>123 Main St.</address>`
- In<tag>ration: inserting english in math
- "XML is the Calculus of the new millennium"  
- Craig Burton



# Parallel with Language

Korean

English

German

Too Busy

Freitag nacht?

Humans

Airline A

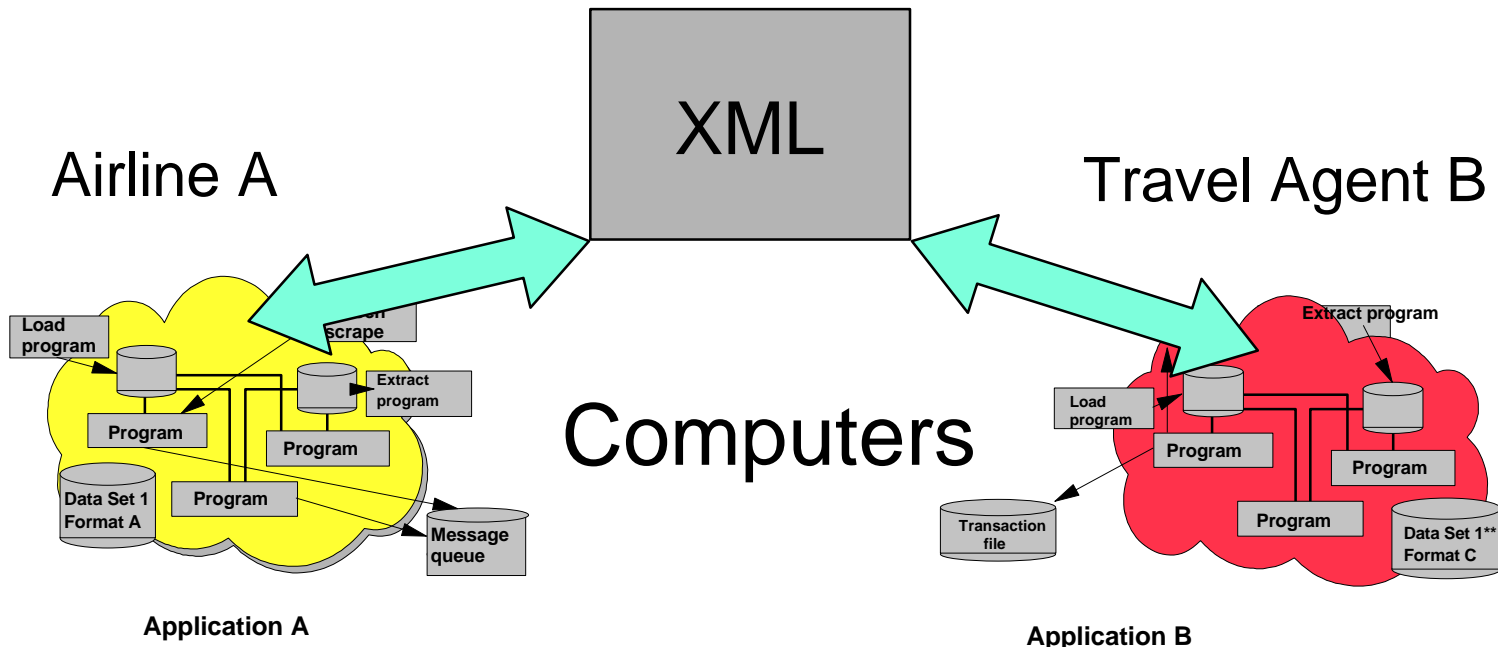
Travel Agent B

XML

Computers

Application A

Application B







# From Nouns to Verbs

- XML has resonated wildly in world of documents: the world of "nouns"
- But if it can describe anything, why not describe the infrastructure itself?
  - ▶ describe execution environments
  - ▶ **Tag the verbs!** (APIs, object models, RPCs)
  - ▶ map our processes & programs to each other
- This is where interoperation has not worked!
- Allow for loose coupling
  - ▶ symmetric tight coupling took too long
  - ▶ instead of 5 - 10 yr cycle, now weeks, months
- Don't pull out software, redress it, connect it





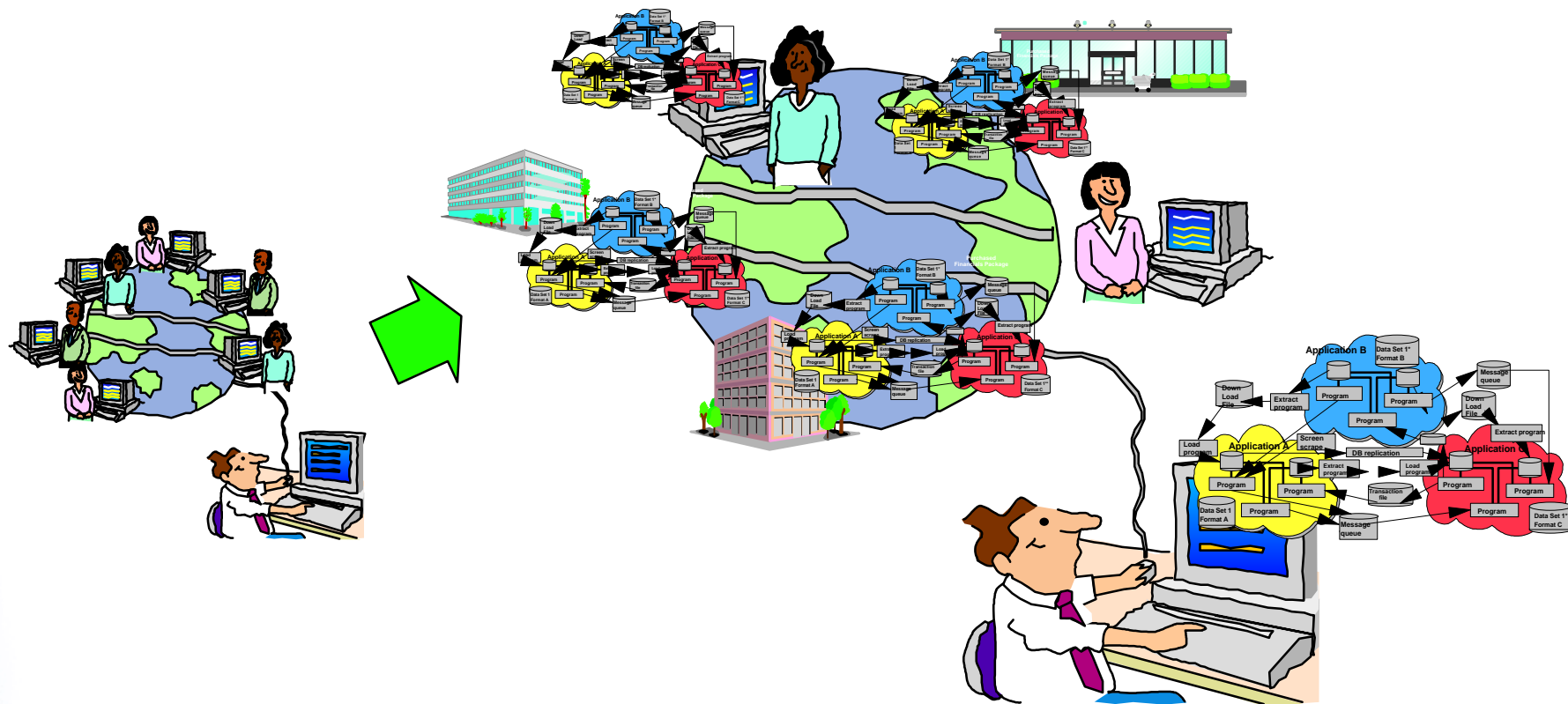
# The Next Frontier: Web Services!

- The next wave: Application Integration
  - ▶ Instead of linking documents together, link programs and processes!
- Model it after the first wave
  - ▶ get the model right (resonate with real world!)
  - ▶ simple protocols (like HTTP, HTML)
  - ▶ ubiquitous implementation
    - IBM catalyzing with Open Source
- Whole new dimension to the web!
  - ▶ if a web of inter-linked documents was powerful
  - ▶ imagine a web of inter-linked programs!!
  - ▶ Automation is reborn!
- Inter-linked companies = inter-linked logical machines





# The Second Wave of the Web



People-to-People Web

Application-to-Application Web



# Business Value of Web Services

- Access to more customers thru automation
  - ▶ not just human eyeballs, now their programs too!
- Speeds integration between businesses
  - ▶ from 2-5 year projects to weeks-months
- Allows for dynamism & change
  - ▶ a must for business
- Reduces IT costs
  - ▶ leverage existing expertise/training
  - ▶ single translation, rather than multiple
- Protects Investment
  - ▶ don't have to rip & replace





# Web Services Overview

- What is a web service?
  - ▶ any program that is callable by another program across the web in a platform/language/object model independent fashion (using standard web service protocols)
- Primate web services
  - ▶ stock quotes, weather forecasts, maps
  - ▶ round pegs in square holes
    - old integration problem: vendor lock-in
- Web Service protocols allow for loose coupling
  - ▶ plug-n-play, polygon pegs in polygon holes
  - ▶ frees up businesses to be dynamic, free-forming!





# The Power of Loose Coupling

*"big blue"*

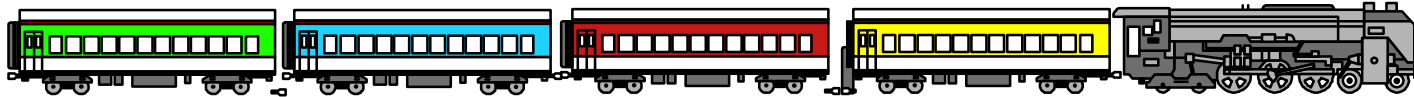
vendor driving



Single Vendor Solution

*"java<sub>(tm)</sub>"*

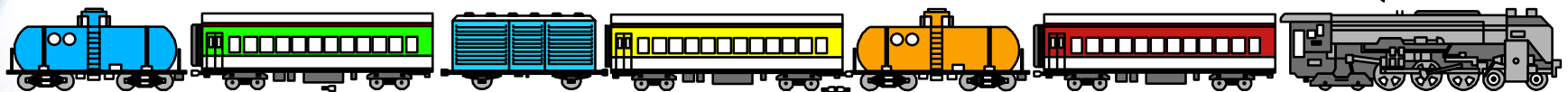
platform owner driving



Single Platform, Multi-Vendor Solution

*"web services"*

customer driving



Multi-Platform, Multi-Vendor Solution





# How it got started?

- IBM & Microsoft join forces!
  - ▶ Started last year
  - ▶ Reverberated across the planet...
  - ▶ Now every major vendor aligned
- Desktop not the focus anymore
- The Server-side is the "in" spot
  - ▶ 6 million Visual Basic programmers
  - ▶ 3 million Java programmers (growing faster)
- These worlds need to bridge to each other
  - ▶ VB client program can now call Java server program (w/o forcing DCOM or Java RMI)





# The Web Service Open Standards

- Web Services are distinct from web service open standards
- The Standards are enabling technologies
- The Services are the real work horses
- The Web Service Standards:
  - ▶ SOAP: Simple Object Access Protocol
  - ▶ WSDL: Web Services Description Language
  - ▶ UDDI: Universal, Description, Discovery & Integration







# SOAP in a nutshell

- SOAP: Simple Object Access Protocol
  - ▶ Common envelop for messages
  - ▶ Microsoft started, IBM noticed, joins & leads with implementation
    - SOAP4J now with Apache (just like Xerces)
- Off to W3C it goes!
  - ▶ XML Protocol working group formed
    - chaired by David Fallside of IBM
- Update: ebXML has agreed to adopt SOAP





# UDDI in a nutshell

- Universal Description, Discovery, Integration
  - ▶ protocol & org
  - ▶ 3 founders -> 30+ at announce
    - now over 200 companies
- Free web-wide Business Registry
  - ▶ register businesses as white page entries
  - ▶ under yellow pages categories
  - ▶ *\*also\** list web services so software can automate the integration between e-Businesses!!
- Distributed (like DNS)
- Three phases of development, then -> Stds





# WSDL in a nutshell

- Web Services Description Language
  - ▶ an XML dialect/vocabulary to describe the web's "verbs", interfaces, APIs, processes
  - ▶ the "Braille" for programs to understand the shape of other programs
- Wrap existing software, regardless of language
  - ▶ keep results in UDDI
  - ▶ ... or right on your web page
- Update: sent to W3C in March 2001
- Tool vendors will automate process
  - ▶ auto-inspection of current components
    - IBM's WSDE kit for Java on AlphaWorks
    - Microsoft Studio.net for VB, other languages...





# "Coopetition": Grow the Pie

- "The network effect"
- Very large snowball to begin with
  - ▶ IBM & Microsoft: SOAP->UDDI
- All the major vendors have announced plans around Web Services
- *"Cooperate on Standards, Compete on Implementations"*





# What is IBM's Web Services Strategy?

- Build on IBM's e-business strategy
- Provide industry leadership in the creation of Web services standards
- Enable software platform and tools to support development, deployment, and management of Web services
- Help customers and business partners take advantage of Web services to grow their business





# How We Differentiate?

- Unparalleled standards leadership
- Leader with implementations
  - ▶ alphaWorks, preview technologies, products
- Embracing Open Source
  - ▶ Apache, Linux (= new catalysts for our business)
- Lead in bridging Java (still best server-side execution) to non-Java world
- We have more of the existing world to integrate to
  - ▶ CICS, IMS, MQ, etc





# Provide best of breed support for Web services

- **Today**
  - ▶ **Web Services Toolkit on alphaWorks**
  - ▶ **Web Services Development Environment**
  - ▶ **WebSphere Technology for Developers (TD)**
  
- **Later this year**
  - ▶ **WebSphere Studio**
  - ▶ **WebSphere Business Components**
  - ▶ **DB2**
  - ▶ **MQ Family support for SOAP**
  - ▶ **Tivoli Web Services Manager**
  - ▶ **Lotus Domino**





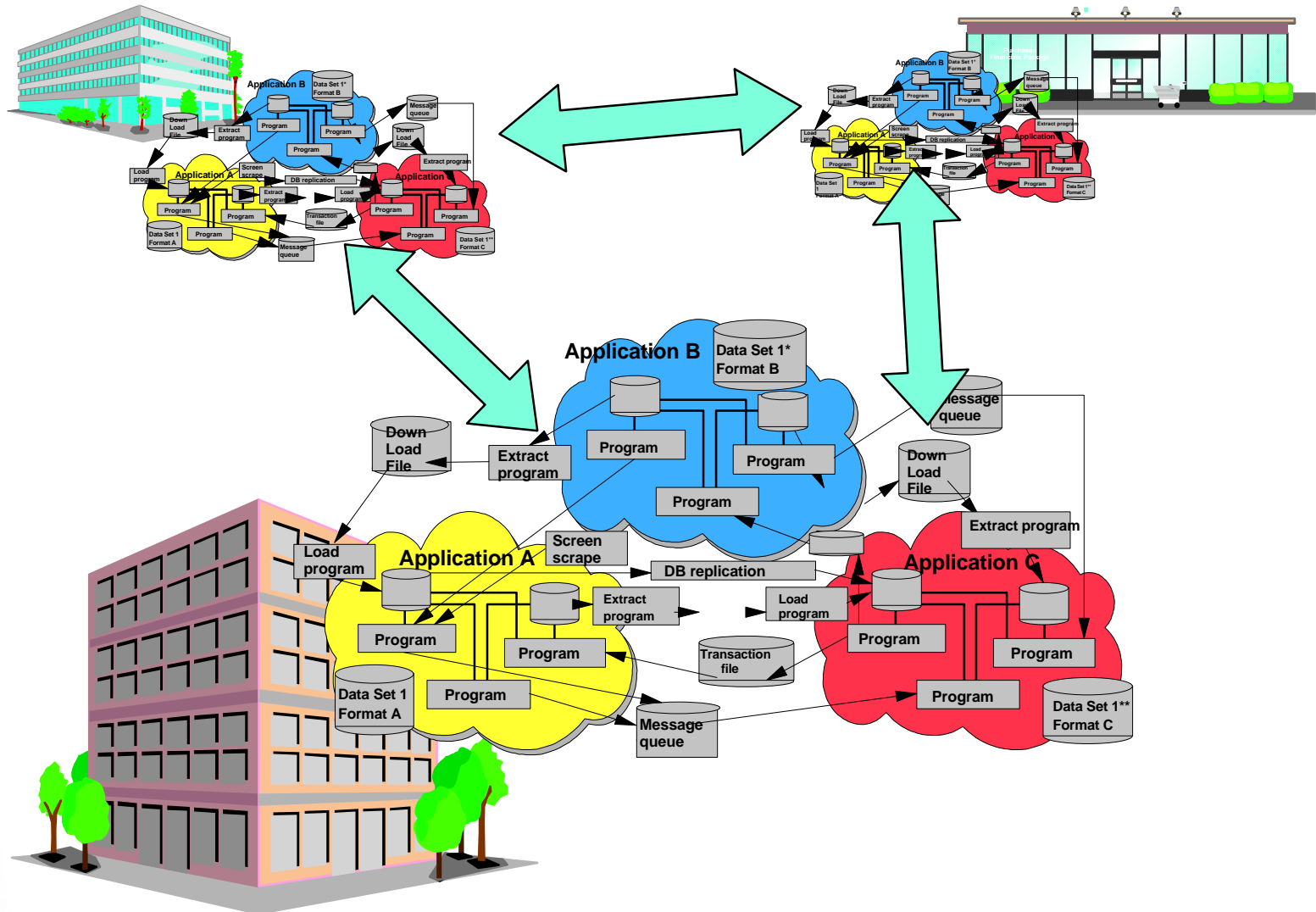
# e-Business Still Means Business

- Lack of "Business" value is the key reason for the .com slowdown
- IBM has a LONG history of using technology to automate business
  - ▶ "Business" is our middle name
- We envision a world of businesses that are inter-linked across the web
  - ▶ documents & programs/processes
- If every business is seen as a "business machine"
  - ▶ we envision a world of
    - integrated business machines
- Our motivation is clear:
  - ▶ Bigger Market to sell Hardware, Software & Professional Services into





# Integrated Dynamic e-Businesses





# Web Services: Summary

- Web services is an e-business evolution
  - ▶ describe, discover, integrate services
  - ▶ increase market reach, syndicate assets, decrease connection costs, speeds the automation of processes
  - ▶ In a word: Integration!
- Open standards are required now more than ever
  - ▶ Open Source will also play a catalytic role
- IBM leading in the adoption of emerging standards
- Get started now with IBM
  - ▶ WebSphere Technology for Developers (TD) is leader
  - ▶ Web Services Toolkit & Web Services Development Env.
  - ▶ jStart Web services consulting (part of Emerging Technologies in SWG)
    - Partnerships with the early adopters
    - [jstart@us.ibm.com](mailto:jstart@us.ibm.com)





# References

- [ibm.com.alphaworks](http://ibm.com.alphaworks)
  - ▶ site for free emerging tools and technologies from IBM
- [ibm.com.developerworks](http://ibm.com.developerworks)
  - ▶ "the" place to go for resources, communities and updates on Web Services and XML for developers
- [xml.apache.org](http://xml.apache.org)
  - ▶ open source XML tools from Apache Software Foundation
- [www.w3.org](http://www.w3.org)
  - ▶ World Wide Web Consortium site (Tim Berners-Lee & gang)
- [uddi.org](http://uddi.org)
  - ▶ Universal, Description, Distribution Integration consortium
- [xmethods.com](http://xmethods.com) & [xmltoday.com](http://xmltoday.com)
  - ▶ news on SOAP services

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