Enterprise 2.0 impact on software development

Martin Nally, CTO IBM Rational

What is Enterprise 2.0?

- Enterprise 2.0 is the term for the technologies and business practices that liberate the workforce from the constraints of legacy communication and productivity tools like email. It provides business managers with access to the right information at the right time through a web of inter-connected applications, services and devices. Enterprise 2.0 makes accessible the collective intelligence of many, translating to a huge competitive advantage in the form of increased innovation, productivity and agility.

Enterprise 2.0
CONFERENCE

Just buzz words?

blogging
business cool
bookmarking
collaboration
innovation
microsoft
research
software
socialsoftware
javascript
social
AJAX
interesting
del.icio.us
mashups
technology
free
sas
web
ajax
useful
ibm
rss
vsi
tagging
tags
wiki
yahoo
programming
webapps
opensource
enterprise
calendar
folksonomy
social-software
dogear
blog
google
mashup
tools
webdev
news
portal
SocialSoftware
design
search
think
community
conference

Changing expectations

	Traditionalist	Boomer	Gen X	Gen Y
Training	The hard way	Too much and I'll leave	Required to keep me	Continuous and expected
Learning style	Classroom	Facilitated	Independent	Collaborative and networked
Communication style	Top down	Guarded	Hub and spoke	Collaborative
Problem-solving	Hierarchical	Horizontal	Independent	Collaborative
Decision-making	Seeks approval	Team informed	Team includes	Team decides
Leadership style	Command and control	Get out of the way	Coach	Partner
Feedback	No news is good news	Once per year	Weekly / daily	On demand
Technology use	Uncomfortable	Unsure	Unable to work without it	Unfathomable if not provided
Job changing	Unwise	Sets me back	Necessary	Part of my daily routine

Source: Lancaster, L.C. and Stillman, D. When Generations Collide: Who They Are. Why They Clash. How to Solve the Generational Puzzle at Work. Wheaton, IL. Harper Business, 2003.

Social Computing at IBM

Profiles

IBM's internal BluePages application provided the basis for Profiles. BluePages holds more than 500,000 profiles and serves 3.5 million searches per week. It is the hub of both user requests and all app authentication for IBM.

Communities

IBM hosts more than 1000 communities with over 267,000 unique members across them.

Blogs

IBM's BlogCentral hosts 12,000 individual blogs and 1,000 group blogs with 105,000 entries and 106,000 comments, and 23,500 distinct tags.

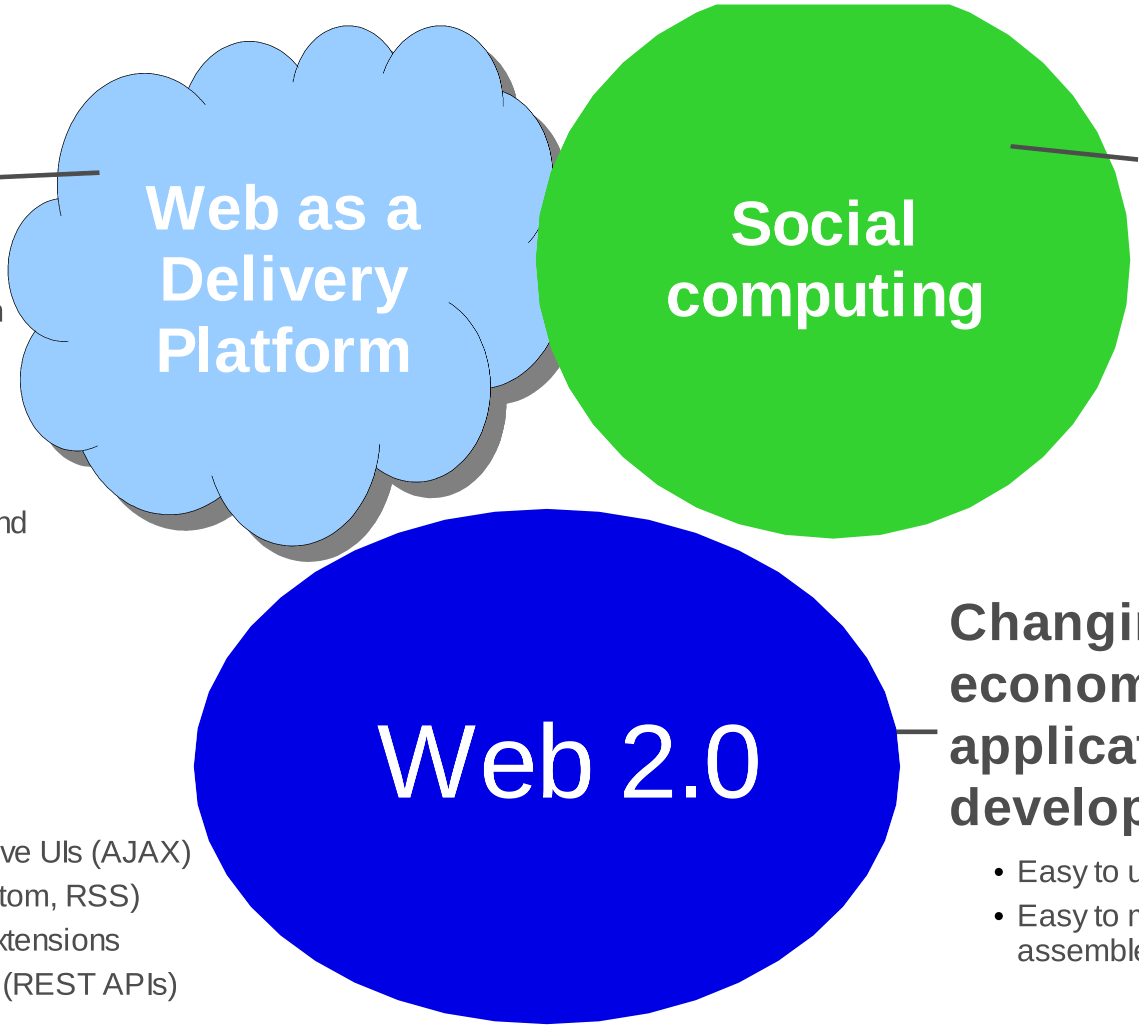
Dogear

IBM's internal Dogear system has 457,000 links from 16,000 contributors. One-third are intranet links and only 2.5% are private.

Activities

IBM's internal Activities service has seen content statistics grow by more than 60% over the past 8 months to 41,000 activities and 312,000 entries, with 67,000 registered members.

Enablers of Enterprise 2.0



Online Services

- User-driven adoption
- Value on demand
- Low cost of entry
- Public infrastructure
- Tight feedback loop between providers and consumers
- Can compliment on premises SW

People add value

- Recommendations
- Social networking features
- Tagging
- User comments
- Community rights management

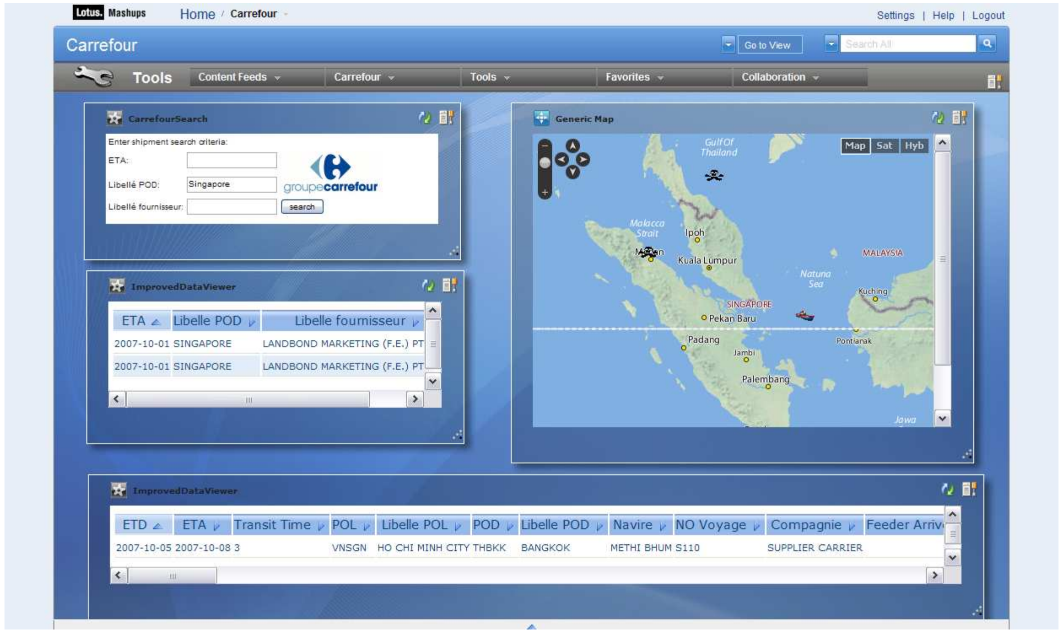
Changing the economics of application development

- Easy to use
- Easy to mix and assemble

- Responsive UIs (AJAX)
- Feeds (Atom, RSS)
- Simple extensions
- Mashups (REST APIs)

Mashup Example

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



Enter shipment search criteria:

ETA:	
Libellé POD:	Singapore
Libellé fournisseur:	

ETA	Libelle POD	Libelle fournisseur
2007-10-01	SINGAPORE	LANDBOND MARKETING (F.E.) PT
2007-10-01	SINGAPORE	LANDBOND MARKETING (F.E.) PT

ETD	ETA	Transit Time	POL	Libelle POL	POD	Libelle POD	Navire	NO Voyage	Compagnie	Feeder Arriv
2007-10-05	2007-10-08	3	VNSGN	HO CHI MINH CITY	THBKK	BANGKOK	METHI BHUM	S110	SUPPLIER CARRIER	

Carrefour

Software development digital communities

- Successful open source communities like Eclipse and Apache are leading examples

The Apache Software Foundation
http://www.apache.org/

eclipse

- Don’t deal with commercial software delivery issues
  - Financial and resource management
  - Business alignment
  - Regulatory compliance and audit support
  - Enterprise roles (business analyst, risk officer, auditor, CIO)
  - Role specialization, outsourcing, off-shoring
- Use environments based on open-source tools
  - Web 1.0 (?)

Role specialization

- Open-source communities have little hierarchy, information is transparent
- In commercial software, there is often specialization
  - Business Analysts write the requirements
    - Business skills with some technical skills
  - Development organizations design and write the code
    - Technical skills with some business skills
  - QA organizations are responsible for the test
    - Often almost exclusively business skills (users or proxies for users)
  - Operations does deployment and management
    - Technical skills
- Many software development organizations aim to emulate the flat organization of agile, open-source

But there are strong forces in another direction

Global Economy 2.0

- For many organizations, offshoring and outsourcing is driven by anticipated cost-savings, especially initially
  - Test, which is still extremely labor-intensive is often the first choice
  - Development also often outsourced
- For more and more organizations, outsourcing is a strategic goal, not an economy
  - Our business is manufacturing, retail, or whatever, not software development
  - Maybe we *could* build a world-class development shop, but then who would make the cars, sell the goods, …
  - Motivation is more repeatable, cost-effective results from specialized service provider, not (just) exploitation of cheaper labor rates in other geographies
- This shift is fundamentally enabled by the internet, the WWW and Web 2.0
  - More far-reaching than “Enterprise 2.0” – the enterprise is just one link in the value-chain

Next Step: Current IT Landscape

- **<u>As a group</u>** ABN AMRO has moved:
  - To an outsourced and offshore IT environment
  - To work in a multi-vendor model
  - To have specific competences in house to manage IT

"We want to have the best IT ,
without being the best in IT <u>ourselves</u>"

- In order to achieve this we needed:
  - To be able to compare vendors and to measure their performance
  - To be able to pinpoint improvement areas both in vendor as internal areas
  - To be able to quantify the benefits of our new IT landscape and drive the business on the opportunities the new IT landscape provides

ABN·AMRO

New Landscape Focus Areas & Challenges

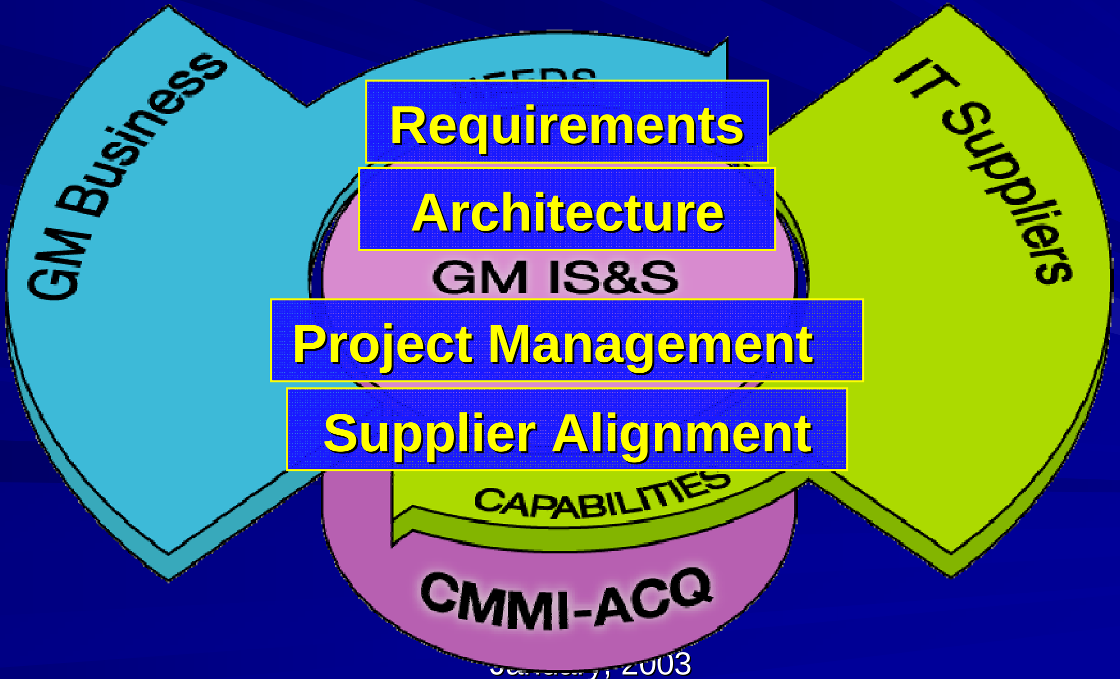
- Focus on <u>System</u> LifeCycle, not just <u>Development</u>
- Focus on 3 key areas by retained IT:
  - Requirements Management
  - Testing
  - **Governance & Control**
- Focus on:
  - Clear responsibilities: who´s doing what and when (in entire lifecycle)
  - Quality: linking requirements to testing
  - Predictability & Control over progress and cost
- Retained IT must improve capability maturity (´CMMi level 3´). All of our vendors are CMMi level 5 compliant

SDLC Programme

ABN AMRO Services IT System Development LifeCycle

CMMI-ACQ Implementation Learnings

- Key insights into successful implementation **strategy**
  - ✓ **Build core competencies in retained processes**
  - ✓ **Keep process simple and lean:**
    - Build enabling systems
    - Standardize on Acceptance
    - Standardize on Tools and Interfaces



Development Environment Goals

- Integration of people, tasks and data across the whole software life-cycle
  - But respecting and understanding organizational divisions
- Security models address organizational and role distribution
- People distributed across time, place
- Tools should be invisible
  - Users focus on tasks and data
  - Tools provide role and task appropriate views
- No boundaries between people
  - Data and tasks from one tool are seamlessly visible in others
- Creative Collaboration is enhanced
- Non-creative procedures are automated
- Governance is strong but unobtrusive

Hasn’t this been tried before?

- Many previous attempts at more integrated team software engineering environments
  - ADCycle, PCTE, …
  - None particularly successful
- Naïve approach:
  - Assume integration around a database/repository
  - Design a data model for software engineering for the repository
  - Provide some sort of framework for tools to integrate around the repository

Our assumptions

- You cannot get all the data in a single database/repository
  - Why not? Vertical specialization, outsourcing, NOT the open-source model
  - But you do have to cross-link all the data wherever it is
  - And you have to be able to query the data wherever it is
- You cannot design a single data model
  - Individual teams customize
  - Communities can't agree
- Frameworks are a two-edged sword. Powerful for some, but ….
  - Constrain language and execution environments
  - Barrier to adoption
  - Difficult to mature and evolve
  - Tend to tightly couple components
- Process awareness brings another dimension
- Social network awareness brings yet another

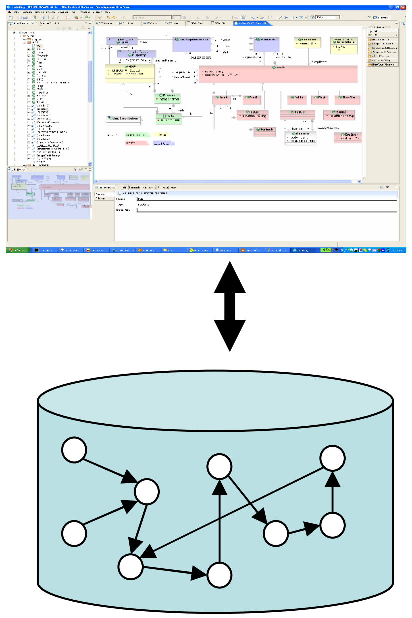
Change is needed

- Current approaches and technologies for building tools will not achieve our goals

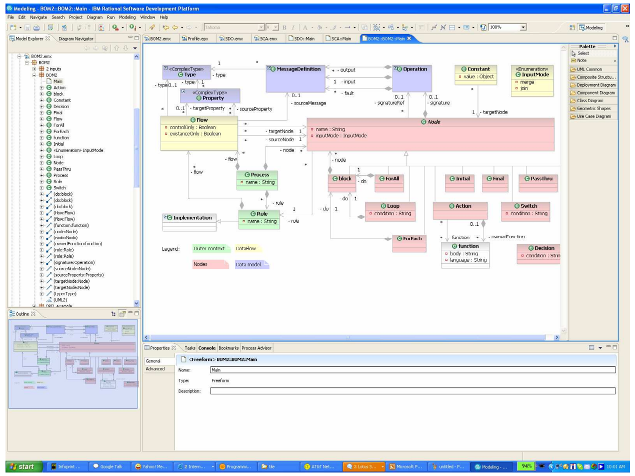
"We can't solve problems by using the same kind of thinking we used when we created them."
A. Einstein

What thinking led us to here?

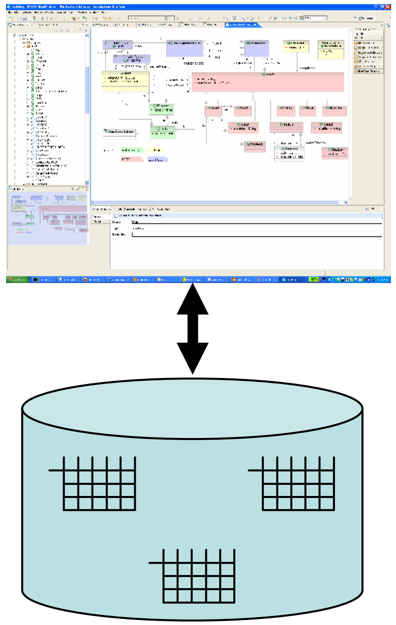
File-based tools tradition



Eclipse UI



Repository-based tools tradition



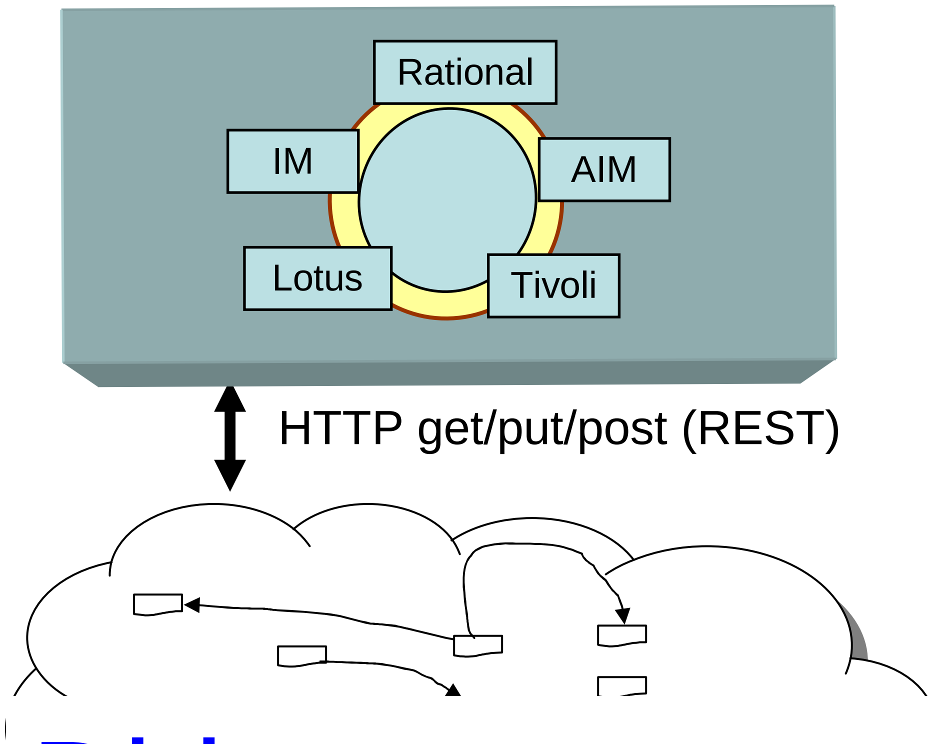
BS Alert!

- By now, you are probably deeply skeptical
  - Is Martin going to claim he’s invented a new way to write tools that fixes this?
- Yes, and No
  - I think there is another way
  - I didn’t invent it …

…Al Gore did

Put the data (not just the UI) on the internet

What does this mean?



Did someone say "semantic web"?

- Data specified independently of tools
- All data are resources with URLs
  - Ubiquitous access
  - "Model in your browser" (literally)
- Tools (multiple) access data through HTTP/APP
  - Multiple tools same data
  - Data integration without forcing same tool for multiple roles
- References are embedded URLs
  - Cross technology/location
- Resources have representations
  - XML encouraged, not required
- Easily extended
  - Extend "web"
  - New [mime-] types
  - Extend representations

Search and query through text indexes and "structured indexes"
  - "Google for models" (maybe literally)

Major paradigm shift

Before	**After**
Models, class hierarchies	URIs and representations
Closed systems, special tricks	Open systems, simplicity
Data ***in*** files, rows	Data ***are*** web resources
Lists, trees, graphs	Flat resource space with query, search
Assume what’s at the end of a “link”	Discover what’s at the end of a “link”
Fixed “scope” of the UI	No boundaries on UI
Data formats are proprietary	Data formats are open
Data formats are fixed	Data formats are extensible

Example resources

- http://example.org/server1/r1

```
<glossary>
    <rdfs:label>Project glossary</rdfs:label>
    <dc:description>
        <p>This glossary contains terms for the Jazz project. See <a
            href="http://ibm.com/server1/r5">IBM glossary</a> for IBM standard terms</p>
    </dc:description>
</glossary>
```

- http://example.org/server1/r2

```
<term>
    <dc:description>Project glossary</dc:glossary>
</term>
```

- http://example.org/sever1/r345

```
<rdf:decription rdf:about="http://example.org/server1/r1">
    <term-link rdf:resource="http://example.org/server1/r2">
</rdf:description>
```

Data not in a repository

- All data represented as resources on the internet
  - URLs, HTTP
  - no exceptions, no special stuff (e.g. “links”)
- All data access through HTTP GET/PUT/POST/DELETE
- Data formats defined as resource representations
- Resources cross-linked by putting url of one resource in another
- We like XML but not a requirement
  - JPEG, Java, other formats

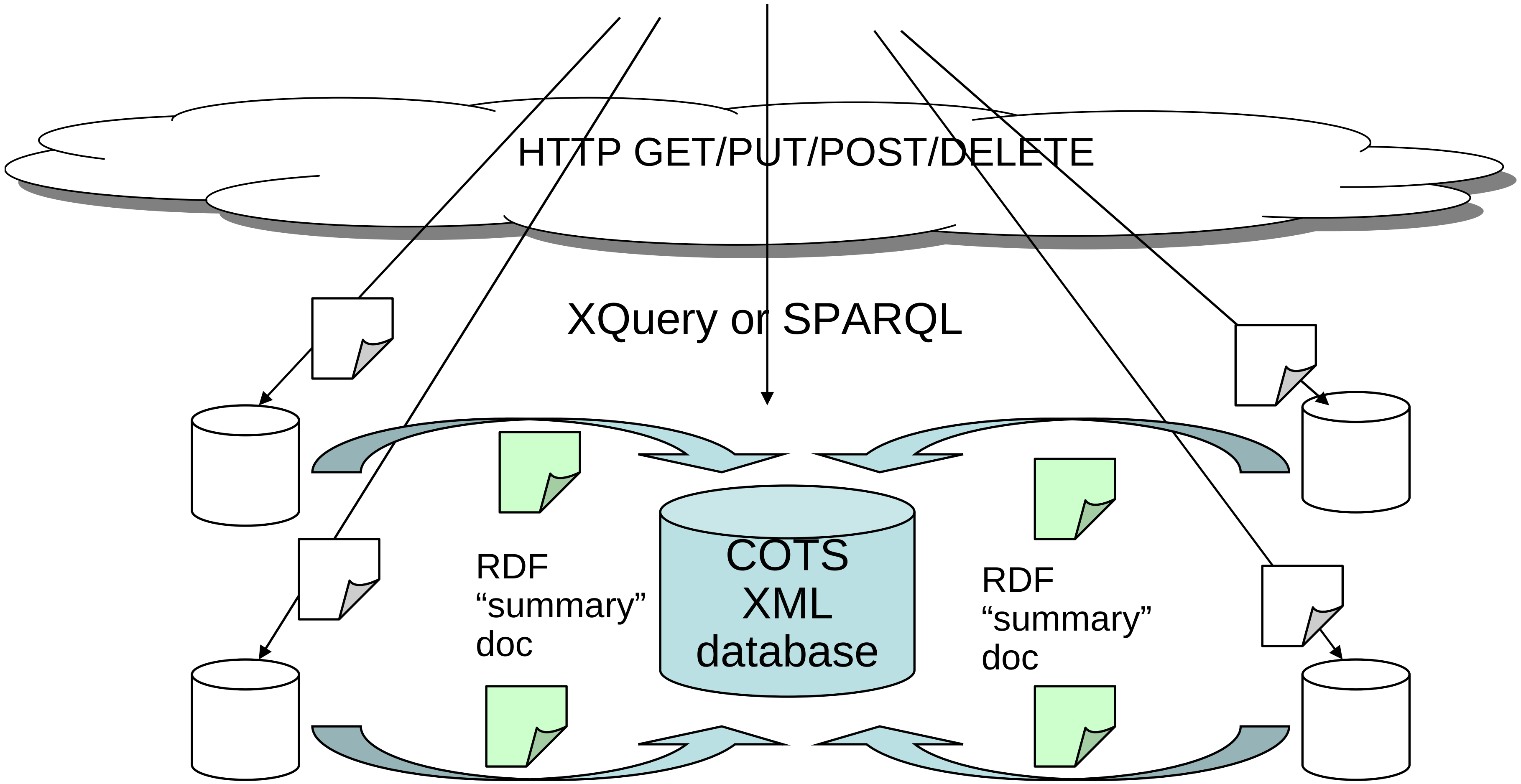
Query on data not in a repository

- We need real query, not just search
  - “Give me a list of all the new test cases that should be run on last night’s build”

- Query is enormously powerful
  - HTTP is like database CRUD on the internet
  - HTTP+APP allows the web to work like a universal hierarchical database
  - HTTP+Query allows the web to work like a universal relational (or better) datastore

- Static Database Schemas aren’t possible (we don’t know the data ahead of time)
  - How do you implement query without a fixed schema (and without complex administration)?

Implementing query on data not in a repository



Don’t want a database schema, but do need joins

- Database Schema constrains the data you can store and query
  - Things known ahead of time, things that don’t change shape
- Others recognize need for schema-less storage
  - E.g. Google BigTable, Amazon SimpleDB, but they don’t support joins
- DB2 PureXML is a thing of beauty
  - Does not require a schema
  - Supports rich XQuery
  - Solves perennial storage/query problems
- Our database is beautiful too
  - Single xml table/column stores all data about resources
  - A few extra columns for creator, timestamp etc
  - A couple of housekeeping columns (id of “summarizer”)

Query table	Summary data column (XML)
	<rdf:description> … </rdf:description>

Not a single data model

- Define representations of resources for “atomic” concepts
  - For developers: Requirement, use-case, actor, class, package, diagram, defect, change-set, build, iteration plan, test plan, test-case, test-result, deployment package etc.
  - For other stakeholders: process, program, task, organization unit, many more
- Typeless hrefs connect resources
  - Name the role/link, not the type
- Mime-type of retrieved resource determines processing, not assumption about “appropriate” type
- Result
  - A loosely-coupled federation of small data models
  - Resources from customized or alternative data models can substitute in the same resource graph
  - Use query rather than GET to find information about neighboring resources without understanding the resource representation (“summarizer” knew that)

Make Frameworks optional

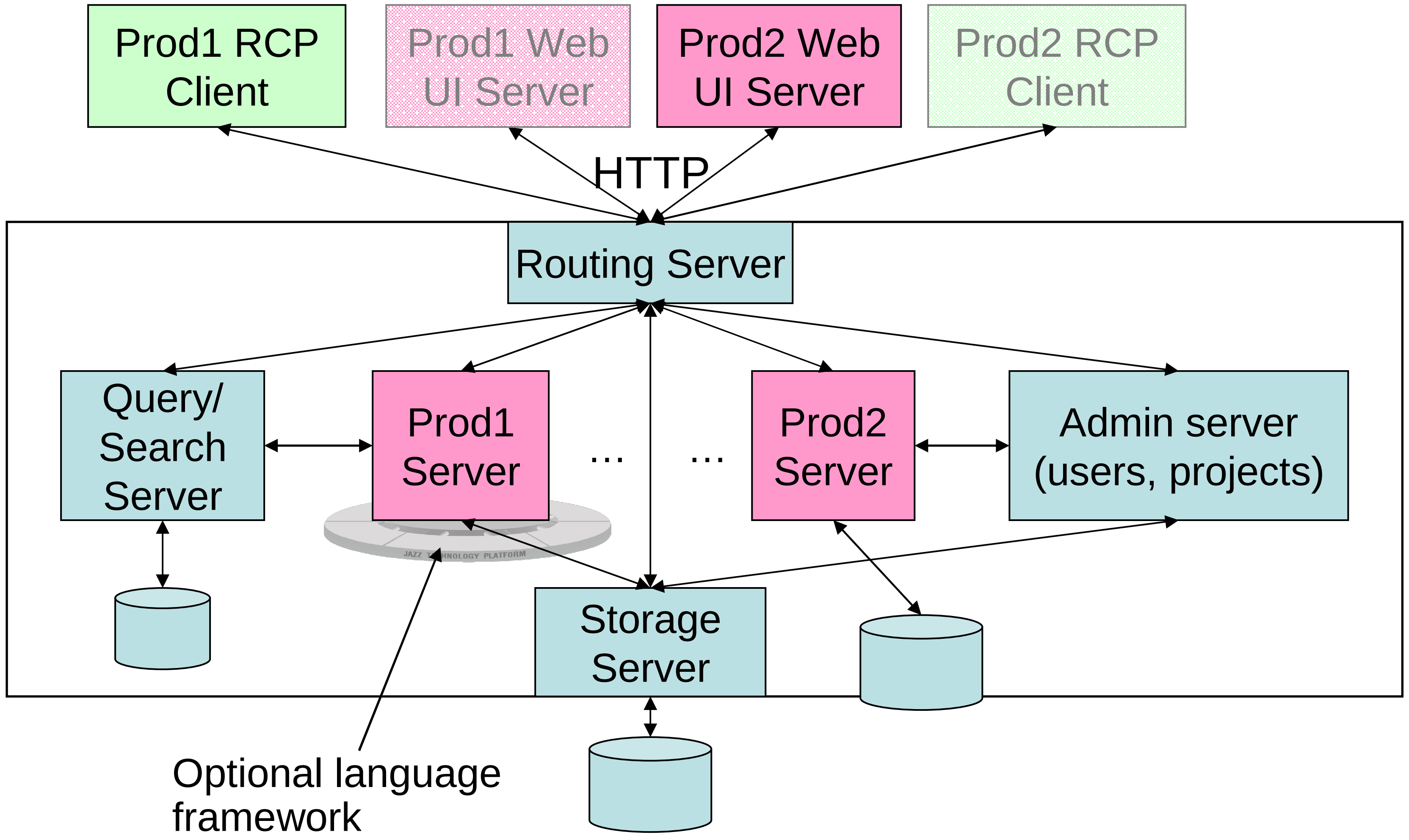
- We don’t like mandating frameworks, but we want …..
  - To avoid every product team having to implement its own server infrastructure
  - A unified administration and backup experience for IBM products used singly and together
    - What is a user? What is a project? How are resources secured?
  - Rich query across all data and all products
  - Standard collaboration features everywhere
      - Social network awareness, instant messaging, blogs, wikis, email integration, review/feedback/comment/annotate
  - Support for process enactment everywhere

Resource Design Guidance

- Currently learning and providing guidance and coordination within IBM
  - Focus on granularity, modularity, composability, evolvability

- Open Services for Lifecycle Collaboration

A SOA architecture with optional frameworks



Process support is key in Enterprise 2.0

Creative Collaboration -> Communication, guidance

Artifact/Resource-centric
Resource life-cycle guided
State-machine programming models
(state guards and transitions)

Repetitive -> Automation

Task/Function/Activity-centric
Task order, input, outputs
procedural programming models
(e.g. BPEL & WSDL)

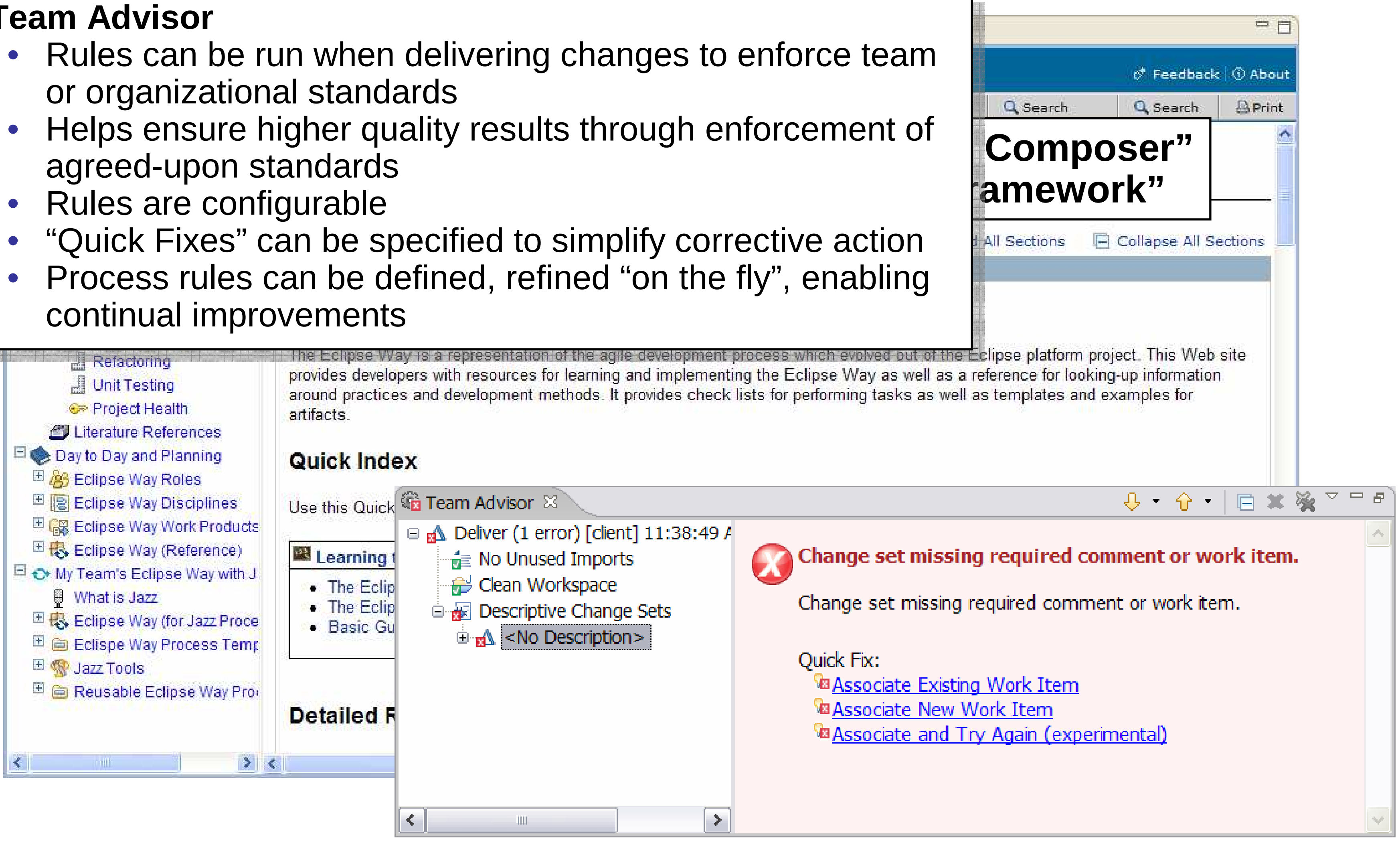
e.g. SDLC tools

e.g. BuildForge, Watchfire

In Creative and Collaborative work, the focus is on the “artifacts”
- workflow is expressed by changes in “artifact” states

Process Example

- **Team Advisor**
  - Rules can be run when delivering changes to enforce team or organizational standards
  - Helps ensure higher quality results through enforcement of agreed-upon standards
  - Rules are configurable
  - “Quick Fixes” can be specified to simplify corrective action
  - Process rules can be defined, refined “on the fly”, enabling continual improvements



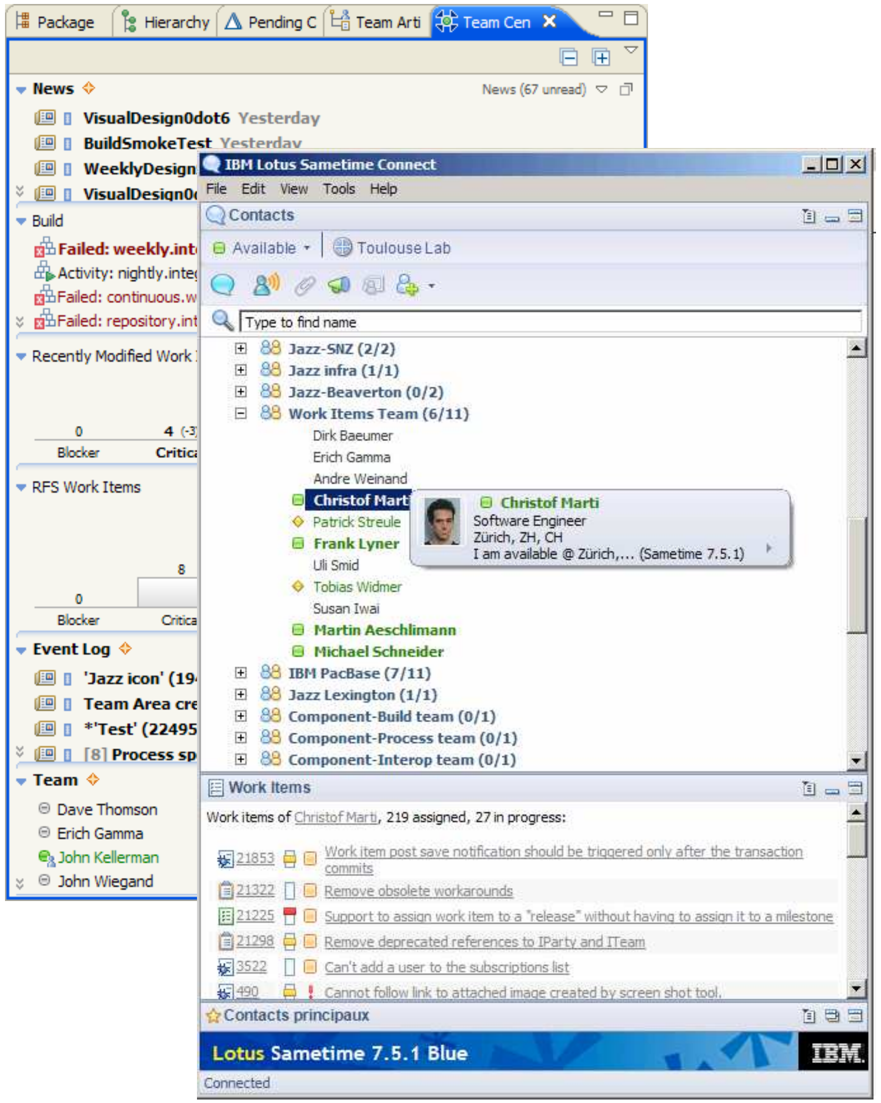
The Eclipse Way is a representation of the agile development process which evolved out of the Eclipse platform project. This Web site provides developers with resources for learning and implementing the Eclipse Way as well as a reference for looking-up information around practices and development methods. It provides check lists for performing tasks as well as templates and examples for artifacts.

Change set missing required comment or work item.

Change set missing required comment or work item.

Web 2.0 in a sw dev env

- Team Central
  - Shows what is happening on project
    - News & events
    - Build status
    - What's being worked on
    - Changes
  - Configurable (RSS feeds) - New kinds of information easily added
  - Personalizable - Each team member can tailor to their needs
- Team Awareness
  - Shows team members and their online status
  - Shows what the team is working on


Package | Hierarchy | Pending C | Team Arti | Team Cen

News (67 unread)

VisualDesign0dot6 Yesterday
BuildSmokeTest Yesterday
WeeklyDesign
VisualDesign0

Build
Failed: weekly.int
Activity: nightly.inte
Failed: continuous.w
Failed: repository.int

Recently Modified Work

RFS Work Items

Event Log
'Jazz icon' (19
Team Area cre
*'Test' (22495
[8] Process sp

Team
Dave Thomson
Erich Gamma
John Kellerman
John Wiegand

IBM Lotus Sametime Connect
File Edit View Tools Help
Contacts
Available | Toulouse Lab
Type to find name

Jazz-SNZ (2/2)
Jazz infra (1/1)
Jazz-Beaverton (0/2)
Work Items Team (6/11)
Dirk Baeumer
Erich Gamma
Andre Weinand
Christof Marti
Patrick Streule
Frank Lyner
Uli Smid
Tobias Widmer
Susan Iwai
Martin Aeschlimann
Michael Schneider
IBM PacBase (7/11)
Jazz Lexington (1/1)
Component-Build team (0/1)
Component-Process team (0/1)
Component-Interop team (0/1)

Christof Marti
Software Engineer
Zürich, ZH, CH
I am available @ Zürich,... (Sametime 7.5.1)

Work Items
Work items of Christof Marti, 219 assigned, 27 in progress:

21853 Work item post save notification should be triggered only after the transaction commits
21322 Remove obsolete workarounds
21225 Support to assign work item to a "release" without having to assign it to a milestone
21298 Remove deprecated references to IParty and ITeam
3522 Can't add a user to the subscriptions list
490 Cannot follow link to attached image created by screen shot tool.

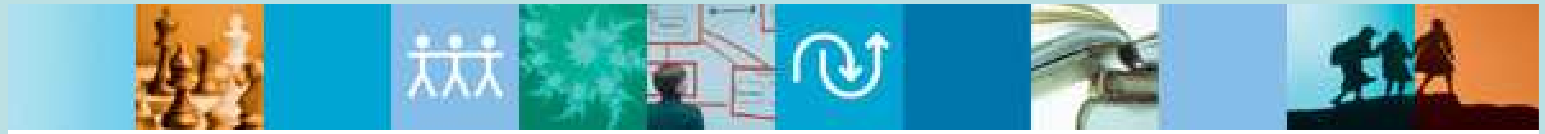
Contacts principaux
Lotus Sametime 7.5.1 Blue
Connected

Brief Commercial

- Most of what I describe exists – we call it Jazz
- The foundation technology as well as the code of our first product is at http://www.jazz.net
- The first product is called “Rational Team Concert”
  - Integrated collaborative IDE for developers
  - 3-person license is free
- Other products are announced and will ship this year
  - Rational Quality Manager
    - Integrated IDE for professional test/quality organizations
  - Rational Requirements Composer
    - Integrated tool suite for business analysts and product owners discovering, defining and documenting requirements
- More In 2009
  - Enterprise reporting, Enterprise Project Management, …

Summary

- Enterprise 2.0, built on Web 2.0, is part of a larger “Economy 2.0”
- Leading vendors (IBM, Microsoft, others) are rolling out Enterprise 2.0 environments for general knowledge work based on Web 2.0
  - Basic building blocks for everyone
- Enterprise 2.0 will change the software we write
- Enterprise 2.0 will change the ways in which we create software
  - Communities
  - Software “value chains” (off-shoring, outsourcing)
- Software Development tools and environments will evolve
  - Web 2.0 techniques address perennial hard problems for digital work environments
  - This is hard, ground-breaking, will take time
  - Integration of general tools and techniques with specialized function



Thank You

Martin Nally

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