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Social Software as Key Enabler of Collaborative Development Environments

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Software development as an intense collaborative process

- “an exercise in complex interrelationships” *
- Research question:
How can social software be used to mitigate the negative effects of distance in global distributed development?





Collaborative Development Environments

- Project workspaces with integrated tool set
 - version control
 - tracker
 - event notification
 - documentation
 - communication
- Most tools are now implemented as social software



Trac

Social software

- Wiki
- RSS feeds
- Plugin for tagging tickets and wiki pages *
- Plugin for discussion forums



<http://trac.edgewall.org>

The screenshot shows the Trac project website. The browser title is 'The Trac Project - Mozilla Firefox'. The address bar shows 'http://trac.edgewall.org/'. The page content includes the Trac logo, a search bar, and a navigation menu. The main heading is 'Welcome to the Trac Open Source Project.' followed by a paragraph describing Trac as an enhanced wiki and issue tracking system. A 'Try it Free' banner is visible on the right side of the page.



<http://code.google.com/>

Google Code

Social software

- Wiki
- RSS feeds
- Google Groups

The screenshot shows a Mozilla Firefox browser window displaying the Google Code project page for 'hackystat'. The browser's address bar shows the URL <http://code.google.com/p/hackystat/>. The page header includes the user 'lanubile@gmail.com' and navigation links for 'My favorites', 'Profile', and 'Sign out'. The main content area features the project title 'hackystat' with a blue icon containing a white 'P' inside a house shape. Below the title is a descriptive paragraph: 'A framework for collection, analysis, visualization, interpretation, annotation, and dissemination of software development process and product data'. A search box with the text 'Search projects' is located to the right. Below the description are tabs for 'Project Home', 'Downloads', 'Wiki', 'Issues', and 'Source'. The 'Project Home' tab is active, showing a 'Summary' section with a paragraph of text and a bulleted list of two points. The right sidebar contains several sections: 'Star this project' with a star icon, 'Code license: GNU General Public License v2', 'Labels: hackystat', 'Featured downloads:' with two links: 'hackystat-8.4.127-sensors-bin.zip' and 'hackystat-8.4.127-services-bin.zip', 'Feeds: Project feeds', and 'Groups: Announcements, Developers, Users, Svn Log, Issue Changes'. The footer of the browser window shows 'Lettura di i3.ytimg.com'.



Assembla

<http://www.assembla.com/>

Social Software

- Wiki
- RSS feeds
- Plugin for Twitter
- Standup reports for remote Scrum meetings
- Synchronous communication
 - XMPP
- Activity stream
 - Follow projects and software artifacts (tickets, wiki pages)

The screenshot shows a web browser window with the URL http://www.assembla.com/spaces/clojure/tickets/custom_report/2729. The page title is "Active by Milestone 2 | Clojure". The navigation bar includes "Login / Register", "Search space", and "Go". Below the navigation bar are tabs for "Dashboard", "Wiki", "Support", "Tickets", "Milestones", "Stream", "Chat", "GitHub", "Files", "Twitter", and "Team". The "Tickets" tab is active, showing a filter for "Active by Milestone 2" and a "Go" button. The main content area displays a table of tickets under the heading "Active by Milestone 2" with a "Report RSS Feed" link.

No Milestone					
#	Summary	Milestone	Assigned To	Status	Approval
195	Documentation: Where are the docs for clojure.test, clojure.walk, etc?			New	
196	*file* returns "NO_SOURCE_PATH", but the doc says it should be nil			New	
204	clojure.test/throw-with-msg? uses re-match, should use re-find			New	
207	for macro does not allow :let clause in first position			New	

Next Release					
#	Summary	Milestone	Assigned To	Status	Approval
30	GC issue 26: agent error queue	Next Release	Chouser	Test	Ok
79	GC issue 76: adding sorted-set-by	Next Release	Chas Emerick	Test	
91	GC issue 87: *-seq should return seq/nil	Next Release	drewr	Test	
120	GC issue 116: partition with pad	Next Release	Steve Gilardi	Test	
135	zipper: children does not check node type	Next Release		Test	Ok
138	Enhancement: give meaningful names to	Next Release		Test	None

Jazz

<http://jazz.net/projects/rational-team-concert>



Social Software

- Synchronous communication
 - XMPP, Skype
- Wiki
- RSS feeds and built-in RSS reader
- Tagging work items *
- Project community
 - Integration to the IBM Connections suite

The screenshot displays the Rational Team Concert (RTC) web interface. At the top, a browser window shows a 'Defect 23' for 'Tuning dei plugin Gravatar e Post Star Rating del Blog'. The defect details include: Type: Defect, Severity: Normal, Found In: Unassigned, Created: 20/giu/08 11:23, Created By: Fabio Calefato, and Team Area: Ugres.Migration.Team / Ugres.Migration. The description mentions a duplicate comment issue and a link to a blog post. Below the defect view is a 'Dashboard' section with a 'Status' dropdown and an 'Add Viewlet' button. The dashboard contains several viewlets: 'Dashboard Event Log (34 new)' with a list of recent events; 'Bookmarks' listing 'Design Documents' and 'Development Tools'; 'Open Dashboard items (130) Tags' with a list of tags like 'testcandidate' and 'testing'; 'Open vs Closed Work Items' showing a line graph of work item counts over time; and 'Open Dashboard items (130) Owned By' showing a pie chart of item ownership by team members.

* C. Treude and M.A. Storey. Work Item Tagging: Communicating Concerns in Collaborative Software Development. IEEE Trans. Soft.. Eng. 38(1) 2012

Team Foundation Server (TFS)



Social Software

- Plugins for synchronous communication

- SIP/SIMPLE, Skype

My Bugs [Results] Active Bugs [Results] Active Tasks [Results] Completed Tasks [Results] Default.aspx.cs 0 Build Explorer - Test First Website

Query Results: 1 items found (1 currently selected).

ID	Stack Rank	Priority	Severity	State	Title
1		2	3 - Medium	Active	Fix Response.Write

Save Work Item Previous Next

Bug 1: Fix Response.Write

Title: Fix Response.Write

Assigned To: Raymund Macalay Area: Test First Website

State: Active Iteration: Test First Website

Reason: New

Resolved Reason:

Planning

Stack Rank: Priority: 2 Severity: 3 - Medium

Details System Info Test Cases All Links Attachments

Steps to Reproduce: History:

Error List 3 Errors 0 Warnings 0 Messages

Description	File	Line	Column	Project
1 d:\Documents\Visual Studio 2010\WebSites\My First Website\Default.aspx.cs(12): error CS1002: expected				
2 ; expected	Default.aspx.cs	12		
3 ; expected	Default.aspx.cs	12	38	d:\...My First Website\

Stories Overview - Report Viewer - Microsoft Visual Studio (Administrator)

Iteration: All (No Filter) Area: All (No Filter) View Report

14 of 1 of 1 100% Find | Next | Select a format | Export

Stories Overview

Helps you track how far each user story has been implemented. Shows each story's actual number of hours of work remaining and completed, its acceptance test results, and the number of bugs that are linked to each story.

Related Reports

- Bug Status
- Status on All Iterations
- Stories Progress
- Test Case Readiness
- Test Plan Progress

Title	Work Progress		Tests	Test Status	
	% Hours Completed	Hours Remaining		Test Results	Bugs
As the team working on the Tailpin Toys site, we have the original app checked into version control and have updated the unit tests to use the VS unit testing framework, so that we're ready to implement user stories.	100 %	0	0		
The Tailpin Toys storefront site features the new Tailpin toys branding	100 %	0	4	47 % 33 %	
Tailpin Toys only supports username and password auth, no other forms of ID.	100 %	0	4	47 % 33 %	1
As a customer visiting the Tailpin Toys site, I see a list of the new toys, so that I don't miss a toy I might want.	100 %	0	5	80 % 40 %	
As a shopper on the Tailpin Toys site, I can use a gift certificate code in place of a coupon and the site returns the amount remaining, if any, on the gift certificate, so customers can use store gift certificates on line.	100 %	0	6	50 % 50 %	
As a child shopping the Tailpin Toys site, I can easily add items to my wish list, so that my parents (or other relatives) know I want them.	100 %	0	8	50 % 50 %	
As a child or parent looking at a particular item on the Tailpin Toys site, I see a list or related items that I might be interested in.	43 %	4	1	100 %	
As a toy marketer, I can offer bundles of products, so that a customer can buy a set at once (usually at a discount).	0 %	27	1	100 %	
As a customer of Tailpin Toys, I can subscribe to a product line, so that I don't have to look out for new releases.	50 %	7	0		
Ship new products for subscriptions as they are released.		3	0		
As a customer who has selected a bundle on the Tailpin Toys site, I can configure that bundle to select between options like colors or alternate parts.		0	0		



www.codeplex.com

CodePlex

Social Software

- Wiki
- RSS feeds
- Activity stream
 - Follow projects

The screenshot shows the ASP.NET CodePlex website in a Mozilla Firefox browser. The page features the Microsoft .NET logo and the ASP.NET CodePlex Open Source Community branding. A navigation menu includes Home, Downloads, Issue Tracker, Source Code, People, and License. A search bar is present for CodePlex projects. The main content area displays the 'Download' section for ASP.NET MVC 2 RTM, including details like the current version, date, status, and ratings. A 'Recent reviews' section shows a user review for the MVC Futures project. An activity stream at the bottom shows 7 new items in the last 30 days, with 32,829 page views and 11,717 visits.

Activity	7	30	All	days
Page Views	32829			
Visits	11717			



<http://github.com/>

GitHub

Social Software

- Wiki
- RSS Feeds
- Activity stream
 - Follow projects
 - Follow developers' activities
- View developers' connections
- Twitter-like interaction (@mentions)

The screenshot shows the GitHub repository page for 'rails/rails'. The browser address bar displays 'http://github.com/rails/rails'. The page header includes the GitHub logo and navigation links: Home, Pricing and Signup, Explore GitHub, Blog, and Login. Below the header, there are tabs for Source, Commits, Network (746), Downloads (59), Wiki (4), and Graphs. The repository name 'rails / rails' is shown with options to fork, watch, and download. The description is 'Ruby on Rails' with a homepage link to 'http://rubyonrails.org' and a clone URL 'git://github.com/rails/rails.git'. A commit history table is visible, showing a commit by 'jeremy' about 3 hours ago with details like commit hash, tree, and parent.

The screenshot shows the GitHub profile page for 'nagaozen (Fabio Zendhi Nagao)'. The profile includes a bio, email address, website, location, and bio link. It also displays statistics: 24 public repositories and 15 followers. A section titled 'Following 12 coders and watching 68 repositories' shows a grid of avatars. Below this, there are sections for 'Public Repositories (24)' and 'Public Activity'. The activity feed shows recent commits, such as 'nagaozen pushed to master at nagaozen/gtdl-kunago August 25, 2011' and 'nagaozen forked chriswray/moochtable August 13, 2011'.

Social software engineering



= CSCW \cap SE

- CSCW emerged from HCI to address collaboration problems in workgroups:
 - communication breakdowns
 - coordination problems
 - lack of knowledge about colleagues' activities
- Same problems faced by software developers in large scale teams
 - especially true for globally distributed projects



Group awareness

*“an understanding of the activities of others which provides a context for your own activity” **

- Informal awareness
- Group-structural awareness
- Workspace awareness
- Social awareness



Group awareness in collaborative development environments

	Informal awareness	Group-structural awareness	Workspace awareness	Social awareness
Trac	—	YES	YES	—
Google Code	—	YES	YES	—
Assembla	—	YES	YES	—
Jazz	YES	YES	YES	partial (IBM Connections)
TFS	YES	YES	YES	—
CodePlex	—	YES	YES	—
GitHub	—	YES	YES	partial (view developers' connections and @mentions)

Is social awareness needed? (1/4)



- 25% of new coordination requirements involve project members that do not often work together
- Support the sharing of personal and contextual information to increase the likelihood of successful interaction

Is social awareness needed? (2/4)



- Distance of a collaborating partner affects
 - willingness to initially cooperate,
 - ability to persuade another
 - deception of that partner
- Effects of distance can be overcome through repeated interactions over time, if people felt being close
 - Trust-building effect

Is social awareness needed? (3/4)



- Whom to contact when getting a list of experts from an expertise search tool?
 - Decisions based on participation in social software
 - focus on people likely to respond
 - Decisions based on social closeness
 - avoid cold calls

Is social awareness needed? (4/4)



- Professionals use internal social networking
 - to build stronger bonds with their weak ties and
 - to reach out to employees they do not know
- Different motivations for new connections
 - Desire to connect personally
 - Desire to connect professionally
 - Desire to gather support

How can social software be used to mitigate the negative effects of distance in global distributed development?



- Current approach: Have all team members use a single, project-oriented, social networking site
- Problems
 - Project-oriented networking sites do not capture the full social identity of a software engineer
 - On the other hand, nobody would like to get project news feeds into the personal timelines of Facebook or Twitter
 - In large global teams, you might do not know people you should be aware of (awareness network)
 - The awareness network can be very dynamic *

* de Souza, C.R.B., Redmiles, D.F. *The Awareness Network, To Whom Should I Display My Actions? And, Whose Actions Should I Monitor?*, IEEE Trans. on Sw Eng, 37(3), 2011.



Conclusions

- Great impact of social software on collaborative development environments
 - but how to provide social awareness is an open issue
- Challenge for empirical studies
 - How can we measure the actual benefit of being personally connected to other developers, whenever they are located?