

Awareness 2.0



STAYING AWARE OF PROJECTS, DEVELOPERS AND TASKS
USING DASHBOARDS AND FEEDS

- Christoph Treude
- Margaret-Anne Storey



Presented By:
Shivjot Baidwan

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INTRODUCTION

- ▶ Success of Software Projects largely depends on the effectiveness of communication and coordination within teams.
- ▶ Increase in complexity of software systems increases the need of maintaining **Awareness** with respect to:
 - ▶ The overall Status of the project.
 - ▶ Aggregation of data on Open and Closed Development Tasks.
 - ▶ Failed and Successful builds.
 - ▶ Delivered and Pending changes.
 - ▶ Failed and Successful tests.
 - ▶ Source Code changes.
 - ▶ The current bottlenecks of the project.
 - ▶ The areas that need immediate attention or improvement.
 - ▶ The change in project deadlines.
 - ▶ The conflicts in schedules.
 - ▶ The conflicts in allocation of resources.



AWARENESS



- ▶ In simple terms *Awareness* can be defined as the ability to know and perceive surrounding situations. It is the state or quality of being conscious of something.
- ▶ In terms of an organization, *Awareness* can be defined as a level of understanding the different aspects of an organization including the workings, structure and culture of the organization.
- ▶ Dourish and Bellotti define Awareness as
 - “An understanding of the activities of others, which provides a context for your own activity.”***
- ▶ Awareness includes being aware of the technical and social aspects of the development as well as the current and upcoming work.

MOTIVATION

- ▶ Lack of theoretical foundations to guide tool selection and tool design to best support awareness tasks.
- ▶ Existing awareness tools display information solely based on source code.
 - ▶ These are deemed as insufficient when individual developers need to perform managerial tasks.
- ▶ Previous work has focused on awareness tools for low-level code specific tasks rather than high level abstraction.
- ▶ Lack of understanding with respect to achieving high level awareness in project management issues and low level awareness of more fine grained activities such as source code changes and development task creation.

AIM & CONTRIBUTIONS

- ▶ **Aim:** *The primary aim of this research was to assist managers and developers in their decisions about utilizing awareness tools in the development of software projects.*
- ▶ **Contributions:**
 - ▶ Identification of the different ways in which dashboards and feeds (of Jazz) support awareness in software development.
 - ▶ How the interplay of tools provide high level and low level awareness.
 - ▶ Contribution towards knowledge on how an IDE (Integrated Development Environment) provides a comprehensive mechanism for Awareness by utilizing Jazz.
 - ▶ Suggesting tool enhancements based on the results of the study.

- ▶ Includes feeds and dashboards that aggregate data to improve awareness of high-level and low-level aspects.
- ▶ Offers Web-based **Dashboards** for projects, teams and individual contributors.
 - ▶ Dashboards are highly configurable with different types of widgets.
- ▶ Provides several **Feeds** to keep developers updated on events such as Build Results, Modifications to Tasks, Incoming Tasks and Task Approvals.

DASHBOARD

▶ What is a **Dashboard**?

- ▶ A Dashboard is a user-interface that organizes and presents information in a comprehensible way.
- ▶ Dashboards are information resources that support distributed cognition which are crucial to many business intelligence applications.

▶ **Dashboards in Jazz:**

- ▶ Displayed and Configured using a web interface.
- ▶ Intended to provide information at a glance and to allow easy navigation to detailed information.
- ▶ By default, each project and each team within a project has its own dashboard.
- ▶ Individual dashboards for developers.

DASHBOARD

- ▶ A dashboard consists of several *Viewlets*.
- ▶ *Viewlets* are rectangular widgets displaying information about some aspect of the project.
- ▶ Each viewlet is an instance of a *Viewlet Type*.
- ▶ The content shown in the Viewlet depends on the *Viewlet Type*. E.g.:
 - ▶ Visual Representation of the current workload.
 - ▶ List of members of the team.
- ▶ Developers can add Viewlets to their dashboards and configure them on the basis of various parameters.
- ▶ By default, the dashboards only display general purpose Viewlets containing information about developers and teams and further linking them to general feeds.
- ▶ Project managers are responsible for updating project dashboards.
- ▶ The team leaders are responsible for updating team dashboards.

Sample DASHBOARD in JAZZ

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COMP 5900: Mining Software Repositories



PARAMETERS for DASHBOARDS

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COMP 5900: Mining Software Repositories

type	project	team	individual	sum	description
Feeds	7 (24%)	77 (9%)	545 (26%)	629 (21%)	internal or external feed
Work Item Statistics	3 (10%)	120 (15%)	298 (14%)	421 (14%)	chart of work item query result
Work Items	0 (0%)	149 (18%)	168 (8%)	317 (11%)	result of work item query
Reports	6 (21%)	111 (14%)	178 (8%)	295 (10%)	predefined reports
Bookmarks	2 (7%)	18 (2%)	241 (11%)	261 (9%)	customizable list of bookmarks
HTML	0 (0%)	56 (7%)	188 (9%)	244 (8%)	snippet of HTML mark-up
Work Item Queries	1 (3%)	10 (1%)	176 (8%)	187 (6%)	links to executable queries
About Me	0 (0%)	3 (0%)	168 (8%)	171 (6%)	information about a contributor
Builds	2 (7%)	73 (9%)	64 (3%)	139 (5%)	notifications from the build engine
Team Members	0 (0%)	70 (9%)	28 (1%)	98 (3%)	list of contributors with roles
Plans	1 (3%)	47 (6%)	32 (2%)	80 (3%)	progress of plan for an iteration
Description	1 (3%)	65 (8%)	7 (0%)	73 (2%)	description of a project or team area
Other	6 (21%)	20 (2%)	34 (2%)	60 (2%)	e.g., server status, list of sub-teams
Sum	29 (100%)	819 (100%)	2127 (100%)	2975 (100%)	

FEEDS

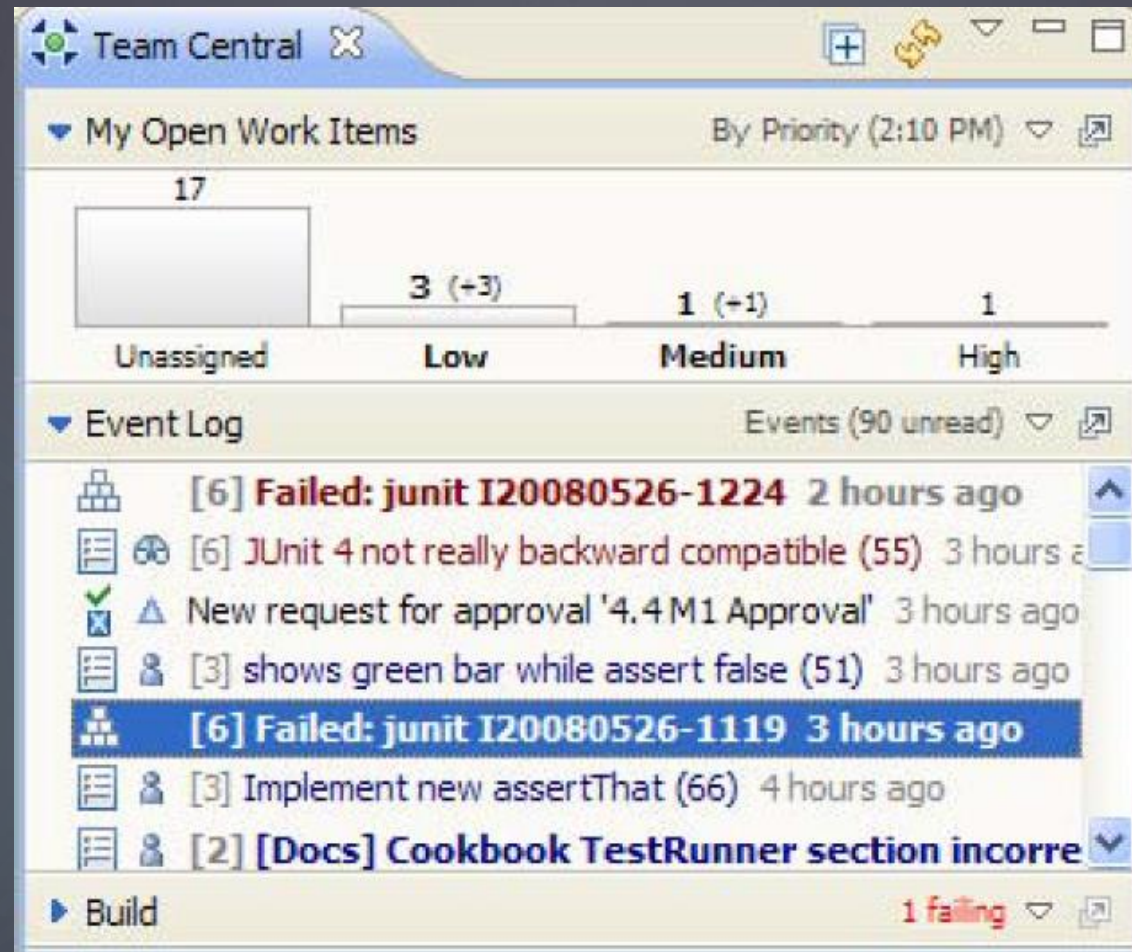


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- ▶ A **Feed** in terms of Dashboards, is a data format used for providing users with frequently updated content.
- ▶ Feeds can either be displayed in the client application or a Viewlet as a part of a web-based dashboard.
- ▶ In Jazz, the most common way to view a feed is through the **Team Central View** in the client application.
 - ▶ *Team Central is not available in the web interface.*
- ▶ **Team Central View** organized into multiple sections that are updated continuously with the latest events.
- ▶ By default, Team Central displays a bar chart of current work for the signed-in developer by priority.
- ▶ Configured to include the build events for all the teams that the signed-in developer belongs to, work item changes for the developer as well as the changes to the teams.

Sample FEED in JAZZ

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RESEARCH QUESTIONS

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- ▶ What is the role of Dashboards in supporting individual and collaborative software engineering activities?
 - ▶ How are dashboards adopted and adapted?
 - ▶ Why are dashboards used and which roles they support?
 - ▶ How does the use of dashboards evolve over the life cycle of the project?
- ▶ What is the role of Feeds in supporting individual and collaborative software engineering activities?
 - ▶ How are feeds adopted and adapted?
 - ▶ Why are feeds used and which roles they support?
 - ▶ How does the use of feeds evolve over the life cycle of the project?
- ▶ What is the impact of dashboards and feeds on development practices?
- ▶ What are the potential tool enhancements?

FINDINGS

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► **Adoption & Adaption of Dashboards:**

- 36/74 participants indicated that they utilize dashboards whereas 38 indicated that they do not use the dashboard at all.
- Use of Dashboard varies significantly depending upon the role of the user.
 - Project Administrator and Development Manager used it at least once a day.
 - Only 26 able to recall last time they looked at the dashboard.
 - 2 participants had utilized dashboard within 10 minutes of filling the survey.
 - 7 participants had utilized dashboard within the last 24 hours.
- Most viewed Viewlets were Feeds and Work Item Statistics.

► **Reasons and Roles for Dashboard Use:**

- Gaining a high-level **Overview of the Project Status**.
- Dashboards help with the **Identification of Bottlenecks** in the development process.
- For project managers, Dashboards provide the opportunity to **Compare Teams** against each other.
- For individuals, the Viewlets in the Dashboards provide the means to **navigate** to the queries.

► Adoption and Adaption of Feeds:

- 52/86 participants indicated they used the Team Central View to access feeds.
- 10/78 participants indicated that they utilized the feeds outside of Team Central View.
- When was the last time, users accessed the feeds:
 - 9 had looked in the last 10 minutes.
 - 7 had looked in the last hour.
 - 12 did not remember the last time they checked the feed.
- 'My Work Item Changes' feed was the most popular among the developers.

► Reasons and Roles for Feed Use:

- **Track Work** at small scale.
- Event Log in feeds is seen as a **Personal Inbox** and can further **help plan the tasks for the day**.
- Helps to **quickly gather information** such as due date for particular features.
- New developers utilize feeds to get an **overview of the project** and comprehend **the common work practices**.

- ▶ **Dashboards evolve over the project life cycle:**
 - ▶ Project and Team Dashboards contain release specific information.
 - ▶ This dependence on releases implies that dashboards need to be changed when a product version has been released.
 - ▶ Jazz doesn't offer means to automate the process.
 - ▶ 25/36 developers indicated that their use of dashboards is constant across different project phases.
- ▶ **Feeds evolve over the project life cycle:**
 - ▶ 14/52 participants indicated that their use of Team Central is not constant over time.
 - ▶ New developers were the only exceptions as they were unsure as to how the views work.

► **Impact of Dashboards and Feeds:**

- Awareness Tools increase the transparency in collaborative software development.
- Competition between teams is one of the reasons why dashboards are used by Project Managers and Component Leads.
 - **Peer Pressure** arisen from this competition.
 - *"That's partly why we use them, they definitely create peer pressure. I mean, it increases the exposure and visibility a great deal. An executive is probably unlikely to be going in writing a query and browsing around in work items but it is easy for them to just go here and just see right away."*
 - *"The need to look like you're making progress is useful. I mean we're showing the data that's already there, it's just making it visible at a glance."*
- **Data can be misleading.** Therefore, extra steps need to be taken to ensure that data is not misleading.
 - *"The problem is work items are only as good as the data that's in the work items and the way they're being filled, so obviously if all of this is going to be useful, we need to ensure that the data that's in the open work items is useful too "*

FINDINGS

contd..

► Potential Tool Enhancements:

► Enhancements for Dashboards:

- Developers are unaware of the full functionality of the dashboards. Therefore, the utility of the dashboards could be made more apparent by adding **advanced default dashboards**.
- Ability to **unite data from different projects** in a single dashboard.
- Requests to **improve the visualizations**.
- Support should be added for Dashboards in the client applications.

► Enhancements for Feeds:

- **Burndown**: A graphical representation of the remaining work vs time.
- Useful to **identify the relationships between tasks** that are affected by events. After a sub-task is completed, we should still be able to see the parent task.
- Useful to offer more **filter** and **grouping** options.

CONCLUSION

- ▶ Awareness is very important for Software Development Process.
- ▶ The main contribution of this paper is the identification of different uses for dashboards and feeds in collaborative software development as well as concrete suggestions for tool enhancements.
- ▶ Results of this research show that several teams of developers using Jazz use a combination of feeds and dashboards to maintain awareness of various development aspects.

DISCUSSION

- ▶ Do you think that the Aim of this research was achieved?
- ▶ What are your opinions about the use of Awareness Tools in software project development?
- ▶ Do you use some sort of dashboards and feeds in your software projects?
- ▶ What are your general opinions about this research?