Comparative Study of Open Source Bug Management Tools

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Abstract—**Traditionally bugs used to be reported and managed within excel sheets. But the problem was bugs were hard to manage, not accessible to everyone concerned in the project, difficult to monitor module wise defects, progress of the bugs resolution and on the basis of severity and priority wise defects analysis were not there. So the need of a common web based repository felt to manage and track the progress of all the reported bugs. Hence Bug Tracking tools or Bug Management Tools introduced as a web based applications. Here we are discussing and comparing four open source bug management tools named Bugzilla, AssemblaTickets, Request Tracker, MantisBT. Due to open source the cost to the companies would also managed. The detailed comparisons will help the individual or teams to choose anyone among these as per their requirements.**

Keywords—*Software testing; bug; open source; bug management tool.*

I. INTRODUCTION

As the expectations from the software are increasing day by day, the complexity of the software has also increased by many folds and that simply results into a large number of bugs in software. In traditional software development, bugs used to be traced using an excel sheet and forward the same to the project manager. But it was indeed not a good practice to follow. Process improvement practices forced to invent software that can independently handle all the related bugs of single or multiple projects. A bug tracking tool is not only able to handle the defects but also keep track of enhancements, comments by tester, test lead, developers, different status and assignments of a bug. There are two approaches to get bug tracking tool for your project. It is either provided by the development team so that Development Company's all projects can be managed at a single repository or it can be of QA team. But whatever is the way to get it, it will certainly add the cost to the project. So better way to customize an open source bug tracking tools. These open source tools are valuable to the academicians and students as well because Software Testing has been introduced as a subject in majority of the universities now [1,6,7].

In general different stages in a Bug Life

Cycle is:

- Submitted or New or Open
- Assigned - Assigned automatically as per the modules or by the Project Manager to a developer.
- Investigate - Developer checks that if he can reproduce the defect.
- Regression- Once the defect is investigated and solved, Developer change the status to Regression.
- Verified/closed - This status is given by Tester. Once the defect is verified by retesting the defect.
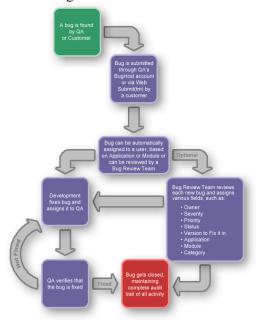- Reopen - If the defect is still reproducible during the retesting.

Figure 1: Bug Life Cycle

II. BUG TRACKING TOOLS REVIEW

Here we are providing a comparative study of four open source bug tracking tools

A. *Bugzilla*

Bugzilla is an open source tool used by the Mozilla projects, inherently web-based, written in Perl, and uses MySQL as its database back-end [3].
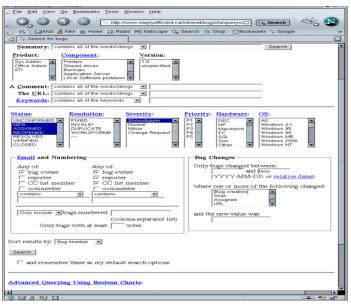

Figure 2: Bugzilla Advance Search

1) Features-For Users

- Advanced Search Capabilities
- Email Notifications Controlled By User Preferences
- Bug Lists in Multiple Formats (Atom, iCal, etc.)
- Scheduled Reports (Daily, Weekly, Hourly, etc.) by Email
- Reports and Charts
- Automatic Duplicate Bug Detection
- File/Modify Bugs By Email
- Time Tracking
- Request System
- Private Attachments and Comments
- Automatic Username Completion or Drop-Down User Lists
- Patch Viewer
- "Watch" Other Users
- Move Bugs Between Installs
- Save and Share Searches
- For Administrators
- Excellent Security
- Extension Mechanism for Highly Customizable Installations
- Custom Fields
- Custom Workflow
- Full Unicode Support
- Localization
- mod_perl Support for Excellent Performance
- Webservices (XML-RPC) Interface
- Control Bug Visibility/Editing with Groups
- Impersonate Users
- Multiple Authentication Methods
- Support for Multiple Database Engines

- Sanity Check

2) Features-For Administrators

- Excellent Security
- Extension Mechanism for Highly Customizable Installations
- Custom Fields
- Custom Workflow
- Full Unicode Support
- Localization
- mod_perl Support for Excellent Performance
- Webservices (XML-RPC) Interface
- Control Bug Visibility/Editing with Groups
- Impersonate Users
- Multiple Authentication Methods
- Support for Multiple Database Engines
- Sanity Check

B. Roundup

Roundup is a simple-to-use and -install issue-tracking system with web, e-mail and command-line interfaces. It is based on the winning design from Ka-Ping Yee in the Software Carpentry "Track" design competition [2].
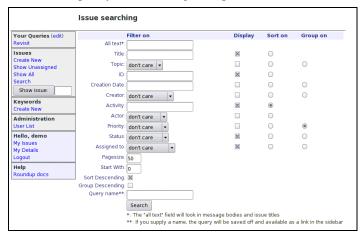

Figure 3: Roundup – Issue searching

1) Simple to install

o Installation (including web interface) takes about 30 minutes
o Instant-gratification
o Two templates included in the distribution for you to base your tracker on
o Play with the demo, customize it and then use it as the template for your production tracker
o Requires no additional support software - python (2.3+) is enough to get you going
o Easy to set up higher-performance storage backends

2) Simple to use

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o Accessible through the web, email, command-line or Python programs
o Used to track bugs, features, user feedback, sales opportunities, milestones
o Automatically keeps a full history of changes to issues with configurable verbosity and easy access to information about who created or last modified any item in the database
o Issues have their own mini mailing list
o Users may sign themselves up, there may be automatic signup for incoming email and users may handle their own password reset requests

3) *Highly configurable*

o Web interface HTML is fully editable
o Database schema is also fully editable (only the "user" class is required) with a full set of data types (including dates and many-to-many relations) across all storages available
o Customised automatic auditors and reactors may be written that perform actions before and after changes are made to entries in the database, or may veto the creation or modification of items in the database
o Samples are provided for all manner of configuration changes and customisations

4) *Fast, scalable*

o With the sqlite, mysql and postgresql backends, roundup is also fast and scalable, easily handling thousands of issues and users with decent response times
o Database indexes are automatically added for those backends that support them (sqlite, mysql and postgresql)
o Indexed text searching giving fast responses to searches across all messages and indexed string properties
o Support for the Xapian full-text indexing engine for large trackers

5) *Documentation*

o Documentation exists for installation, upgrading, maintenance, users and customisation

6) *Web interface*

o Fully editable interfaces for listing and display of items
o Extendable to include wizards, parent/meta bug displays, ...
o Differentiates between anonymous, known and admin users
o Can be set up to require login, and may also only allow admin users to register new users

o Authentication of user registration and user-driven password resetting using email and one time keys
o May be run using WSGI or through CGI as a normal cgi script, as a stand-alone web server, under mod_python or through Zope
o Searching may be performed using many constraints, including a full-text search of messages attached to issues
o File attachments (added through the web or email) are served up with the correct content-type and filename
o Email change messages generated by roundup appear to be sent by the person who made the change, but responses will go back through the nosy list by default
o Flexible access control built around Permissions and Roles with assigned Permissions
o Generates valid HTML4 or XHTML
o Detects concurrent user changes
o Saving and editing of user-defined queries which may optionally be shared with other users

7) *E-mail interface*

o May be set up using sendmail-like delivery alias, POP polling or mailbox polling
o May auto-register users who send in mail and aren't known to roundup
o Nosy list configuration controls how people are added and when messages are sent to the list
o Auto-filing of "unformatted" messages into a particular class
o E-mail attachments are handled sanely, being attached to the issue they're intended for, and forwarded on to the nosy list
o Sane handling of content-type and content-encoding of messages (text/plain preferred in all situations)
o Email packages that display threading will show issue messages correctly threaded
o Users may send in messages from multiple addresses and be associated with the same roundup username
o Built-in security features like TLS and APOP

8) *Command-line*

o May be used to interactively manage roundup databases
o May be scripted using standard shell scripting
o Roundup's API may also be used by other Python programs - a sample is provided that runs once a day and emails people their assigned issues
o A variety of sample shell scripts are provided (weekly reports, issue generation)

9) *Xmlrpc interface*

o Simple remote tracker interface with basic HTTP authentication
o Provides same access to tracker as roundup-admin, but based on XMLRPC calls

C. BugTracker.NET

BugTracker.NET is a free, open-source, web-based bug tracker or customer support issue tracker written using ASP.NET, C#, and Microsoft SQL Server. It is in daily use by thousands of development and customer support teams around the world.

BugTracker.NET is easy to install and learn how to use. When you first install it, it is very simple and you can start using it right away. Later, you can change its configuration to handle your needs if they are more complex [4].

1) *Features of BugTracker.Net*

◊ Highly configurable. You can configure it to use as a simple bug tracking system for a small team, or configure it with a workflow, permissions for a larger organization. Works great as a helpdesk system, a customer support ticket system.

◊ Email integration. Sending and receiving emails is integrated with the tracker, so that the email thread about a bug is tracked WITH the bug. You can setup an email address and BugTracker.NET will turn those incoming emails into items in the database.

◊ Search. Fast, easy, powerful search, both full-text and based on selected criteria like status, project, etc.

◊ Screen capture utility. Take a screenshot, annotate it, and post it as a bug with just a few clicks.

◊ Custom fields, custom workflow.

◊ Customized lists, filtered and sorted the way you want, with the columns that you want, with the colors that you want.

◊ Email notifications. Get an email whenever any bug has been added or changed. Fine tune your settings so you only get notified about the bugs you care about.

◊ Link related bugs. You can even merge duplicates.

◊ Management reports with pie, line, and bar charts. Create your own reports.

◊ 'Skinnable' _using CSS and/or your own custom HTML. Brand it with your company name, your logo, custom links to your own pages.

◊ Subversion, Git, and Mercurial integration.

◊ LDAP/Active Directory integration. You can configure BugTracker.NET so that users are automatically registerd when they visit BugTracker.NET for the first time.

◊ Time tracking.

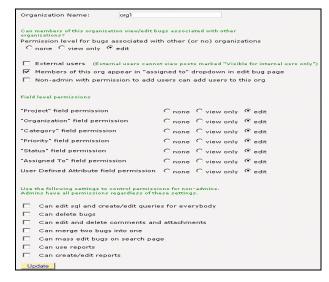◊ Supports Unicode (Chinese characters)

Figure 4: BugTracker.NET -Permission Management

III. COMPARISONS

The comparisons about general information, features, input interfaces, notification interface and Authentication method are given below:

TABLE 1: GENERAL INFORMATION

System	Creator	License	Implementation language(s)	Back end	Launch Date
Bugzilla	Mozilla Foundation	MPL	Perl	MySQL, Oracle, PostgreSQL	19-09-1998
Roundup	Ka-Ping Yee, Richard Jones	MIT license (ZPL v 2.0 for the template system)	Python	SQLite, MySQL, PostgreSQL, Berkeley DB	2001
BugTracker.NET	Corey Trager	GPL	ASP.NET, C# on Windows	SQL Server, SQL Server Express	2002

TABLE 2: FEATURES

System	Dynamic documentation integration/generation	Test planning integration	Customizable workflow	Unicode support	Custom Fields	SLA	Plugin API	Multiple Projects
Bugzilla	Reporting: integrated reports and charts, scheduled reports by mail	Yes	Yes	Yes	Yes	No	Yes	Yes
BugTracker.NET	Integrated charts and reports	No	Yes	Yes	Yes	No	No	Unknown
Roundup	Wiki can be integrated or linked	No	Yes	Yes	Yes	No	No	Yes

TABLE 3: INPUT INTERFACES

System	Web	Email	CLI	GUI	REST	SOAP	Mylyn	Visual Studio	Others
Bugzilla	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
BugTracker.NET	Yes	Yes	No	No	No	No	No	No	No
Roundup	Yes	Yes	Yes	No	No	No	No	No	No

TABLE 4: NOTIFICATION INTERFACE

System	Email	RSS	Atom	XMPP	Twitter
Bugzilla	Yes	Yes	No	No	No
Roundup	Yes	No	No	No	No
BugTracker.NET	Yes	No	No	No	No

TABLE 5: AUTHENTICATION METHODS

System	Form based	Public key cryptography	Two-factor	OpenID	OAuth	LDAP	Shibboleth	Others
Bugzilla	Yes	No	No	No	No	Yes	Unknown	No
Roundup	Unknown	Unknown	Unknown	Unknown	Unknown	Yes	Unknown	Unknown
BugTracker.NET	Unknown	Unknown	Unknown	Unknown	Unknown	Yes	Unknown	Unknown

IV. CONCLUSION

Shakespeare said what's there in the name. By simply naming a bug tracking tool and pointing that it is an open source is not enough to go for a tool to track the bugs. Actually It's all depends upon the requirements of the project teams. Although there is a number of bug tracking tools available in today's market. Through this paper we have evaluated the essential features required for an effective bug tracking tool and explored the features in detail of four open source bug tracking tools. User can choose any one of these and start working as these are open source and easy to use.

Acronyms & Definitions

SLA	Service Level Agreement is a part of a service contract where the level of service is formally defined
API	Application Programming Interface
Mylyn	It is a subsystem of Eclipse for task management.
GUI	Graphical User Interface

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CLI	Command Line Interface
MPL	Mozilla Public License- is the license for the Mozilla Application Suite, Mozilla Firefox, Mozilla Thunderbird and other Mozilla software.
SOAP	Simple Object Access Protocol
RSS	Really Simple Syndication is a family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio, and video—in a standardized format.
LDAP	Lightweight Directory Access Protocol is an application protocol for reading and editing directories over network. shibboleth
Oauth	Open Authorization- is an open standard for authorization.
Shibboleth	It is any distinguishing practice that is indicative of one's social or regional origin. It usually refers to features of language

REFERENCES

[1] Abaee and Guru, Enhancement of Bug Tracking Tools; the Debugger, 2010 2nd International Conference on Software Technology and Engineering(ICSTE).

[2] http://roundup.sourceforge.net/

[3] http://www.bugzilla.org/

[4] http://bugtracker.net/

[5] Introduction-DeMillo R.A., and Offlut. A. J. "Constraint-Based Automatic Test Data Generation", IEEE Transactions on Software Engineering, 17, 9, 910, 1991.

[6] Introduction-Handbook software engineering, Edited by C.R.Vick, C.V.Ramamoorthy