

Exploration of Approaches to Improve Quality of Bug Triage

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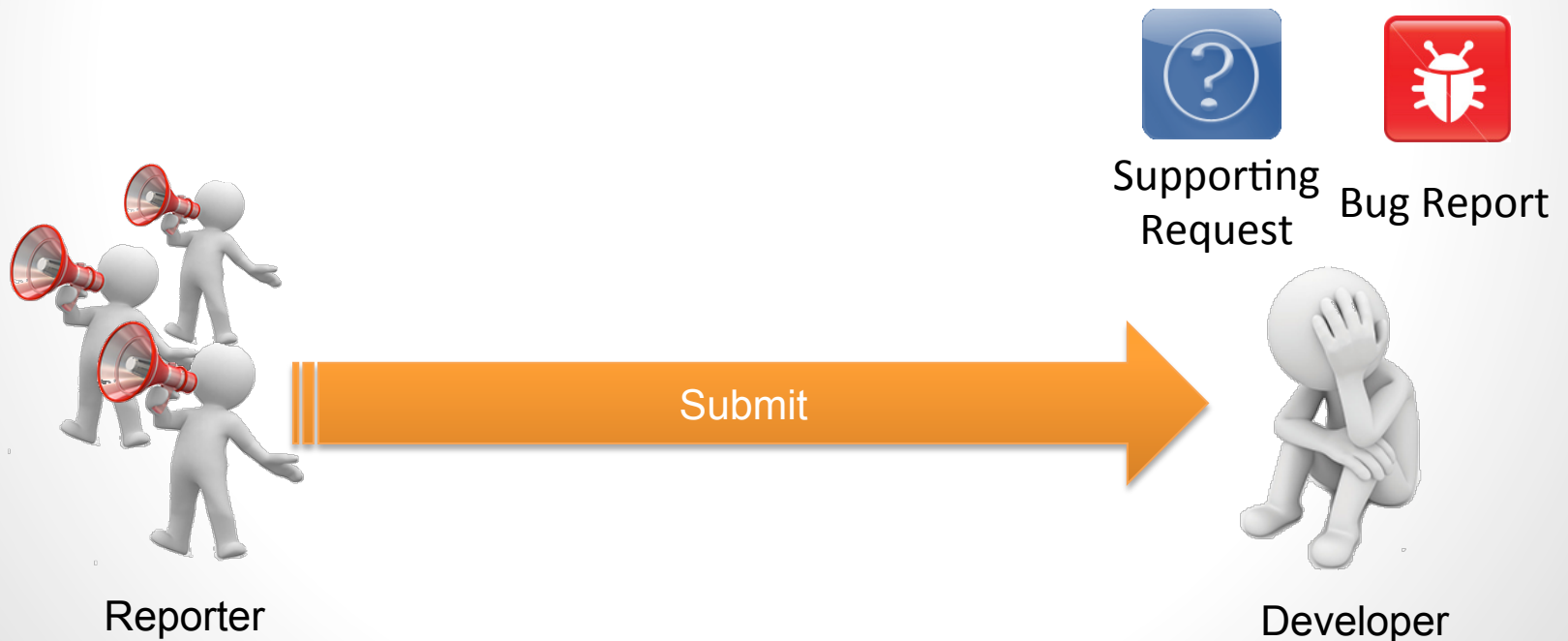
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□ Issue-tracking System in OSS

- “Release early, release often”
 - Helps to improve software quality
- Receive bug reports and supporting requests
 - Different from commercial company, which has service team for supporting requests
 - Non-bug reports come together with bug reports

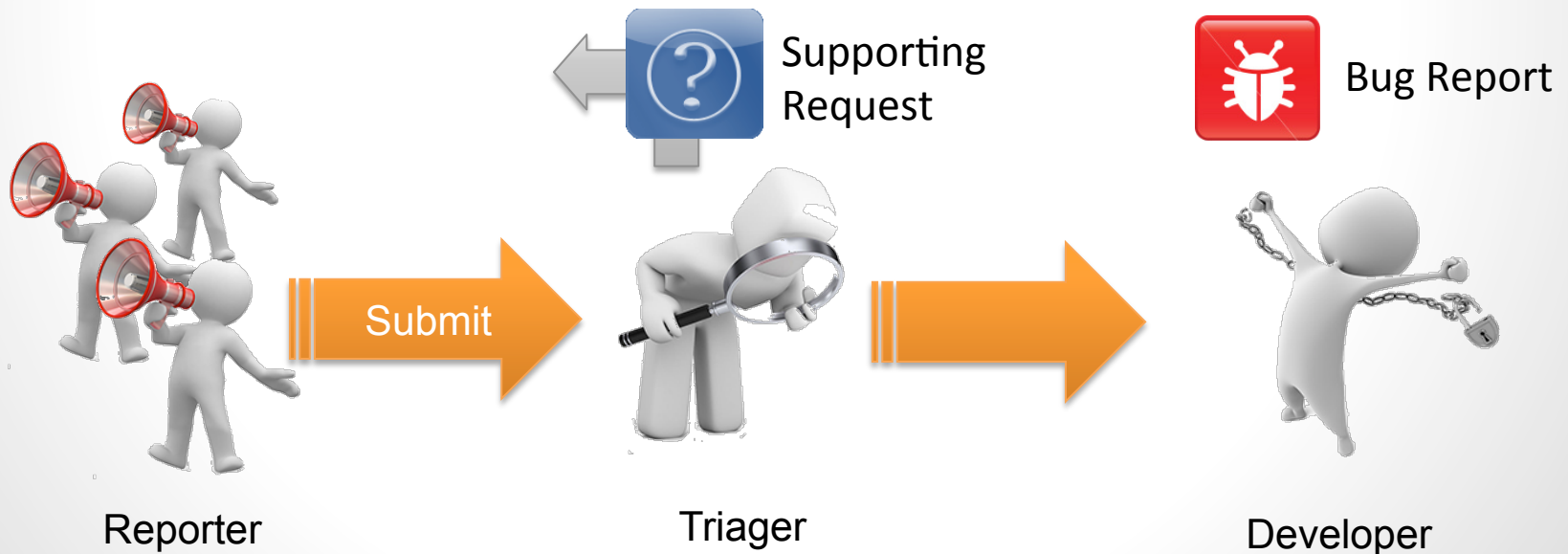
□ Has to Face the Problem

- Distinguishing real reports from supporting requests is tedious and time-consuming
- Also, the feedback to reporter may be slow



□ Bug Triage and Triager

- Bug triage need less expertise than bug fixing
- Also, it is a good entrance for beginners
 - Some LTC began by doing triage
 - Volunteer begins with bug triage has more chance to be LTC



□ Communities are hesitating

- On one hand
 - They are building triage team and making guidelines to facilitate triage mechanism
 - GNOME has Bug-Squad and Triage Guideline
- On the other hand
 - They wonder whether triage team can do good jobs
 - Some developers prefer to pick reports from UNCONFIRMED status, because they don't fully trust triagers
 - GNOME are considering remove triage phase from process

□ Motivation and Research

- How triagers do their work in practice
- Can triagers do their work well
 - What kind of tasks they are good at
 - What kind of tasks call for more expertise
- How to improve quality of bug triage
 - Can we give any assists to beginners
 - Are there any mechanism to make improvement

□ Approaches







- Interview
 - Mail interview triagers and bug-masters of Gnome and Mozilla
- Investigate
 - Investigate the on-going bug-triaging process and bug-tracking system
 - Read the blogs of experienced bug triagers
- Data Analysis
 - Analysis issue-tracking system data of Gnome and Mozilla
 - Gnome, 502K reports from 1999-2010
 - Mozilla, 610K reports from 1999-2010

□ Tasks of Triagers

- Confirmation
 - confirm or reject a report
- Getting information
 - getting information for reproducing
 - getting information for fixing
- Assign reports to developer
 - assign to a product or maybe component
 - assign to a certain developer
- Cleaning up
 - close the zombie reports







□ How do the jobs are done

- Getting minimal information
 - Version, OS, severity and priority

Field	role	correctness	bar
Version	triager	88.1%	
	dev	90.6%	
	maint	85.8%	
OS	triager	97.6%	
	dev	97.3%	
	maint	96.6%	







□ How do the jobs are done

- Getting minimal information
 - severity and priority

field	role	correctness	
Severity	triager	93.2%	
	dev	94.1%	
	maint	93.5%	
Priority	triager	87.7%	
	dev	92.0%	
	maint	76.9%	

□ How do the jobs are done

- Triage reports to products and components

field	Role	correctness	bar
product	triager	75.8%	
	dev	86.4%	
	Maint	76.3%	
Product & Component	triager	59.2%	
	dev	74.5%	
	maint	53.8%	

□ How do the jobs are done

- Triage reports to products and components
 - Level the triage by the triage they've made




Exp	1~200	201~500	501~2500	2500~
level	1	2	3	4

The error-prone products for each level

level	primary mistaken product
1	Browser(24.3%), Core(22.6%), MailNews(11.2%)
2	Core(29.7%), Browser(25.9%)
3	Core(26.1%), Browser(20.8%), PSM(19.2%), MailNews(16.1%)
4	Core(59.9%), PSM(10.7%)

□ How do the jobs done


- Confirming whether it is “good” report

field	Role	correctness	bar
confirming	triager	79.6%	
	dev	87.4%	
	maint	81.9%	

□ How do the jobs done

- Confirming whether it is “good” report

Confirm	DUPLICATE	INCOMPLETE	INVALID	WONTFIX	WORKSFORME
40%	99%	99%	98%	97%	98%



DUPLICATE	EXPIRED	INCOMPLETE	INVALID	MOVED	WONTFIX	WORKSFORME
12428	749	1199	3077	3	2822	10189
40.8%	2.5%	3.9%	10%	-	9.3%	33.4%

□ Tactics in Practice

- Double phase assigning
 - Triager assign the reports to a virtual developer, which is bind to a products or components
 - Developer assigns the report in NEW to specific developer(s)

□ Tactics in Practice

- “NeedInfo” flag v.s. “NeedInfo” status
 - When additional information is need, report is put to “NeedInfo” status in GNOME. Reporter gives feedback and put status to Unconfirmed
 - In Mozilla, “needinfo” flag is attached. And the flag will disappear as soon as reporter give feedback

□ Conclusion

- Triagers are good at
 - Graps information of version, os, severity and priority
 - Rejecting some “bad” reports
- Triager need assists at
 - Finding right product and component
 - Finding Duplicate bugs and reproducing the bugs