Effective Bug Management
Challenges and Best Practices

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Our jokes may be different…

…but our bug management problems are probably like everyone else's

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Agenda

- **Heaven:**
  - Bug Management in a Perfect World
- **Earth:**
  - Bug Management in Real Life
- **Heaven on Earth:**
  - Improving the Bug Management Process
- **Tips**
  - Stuff that worked for us
- **Summary**

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Heaven

Bug Management in a Perfect World

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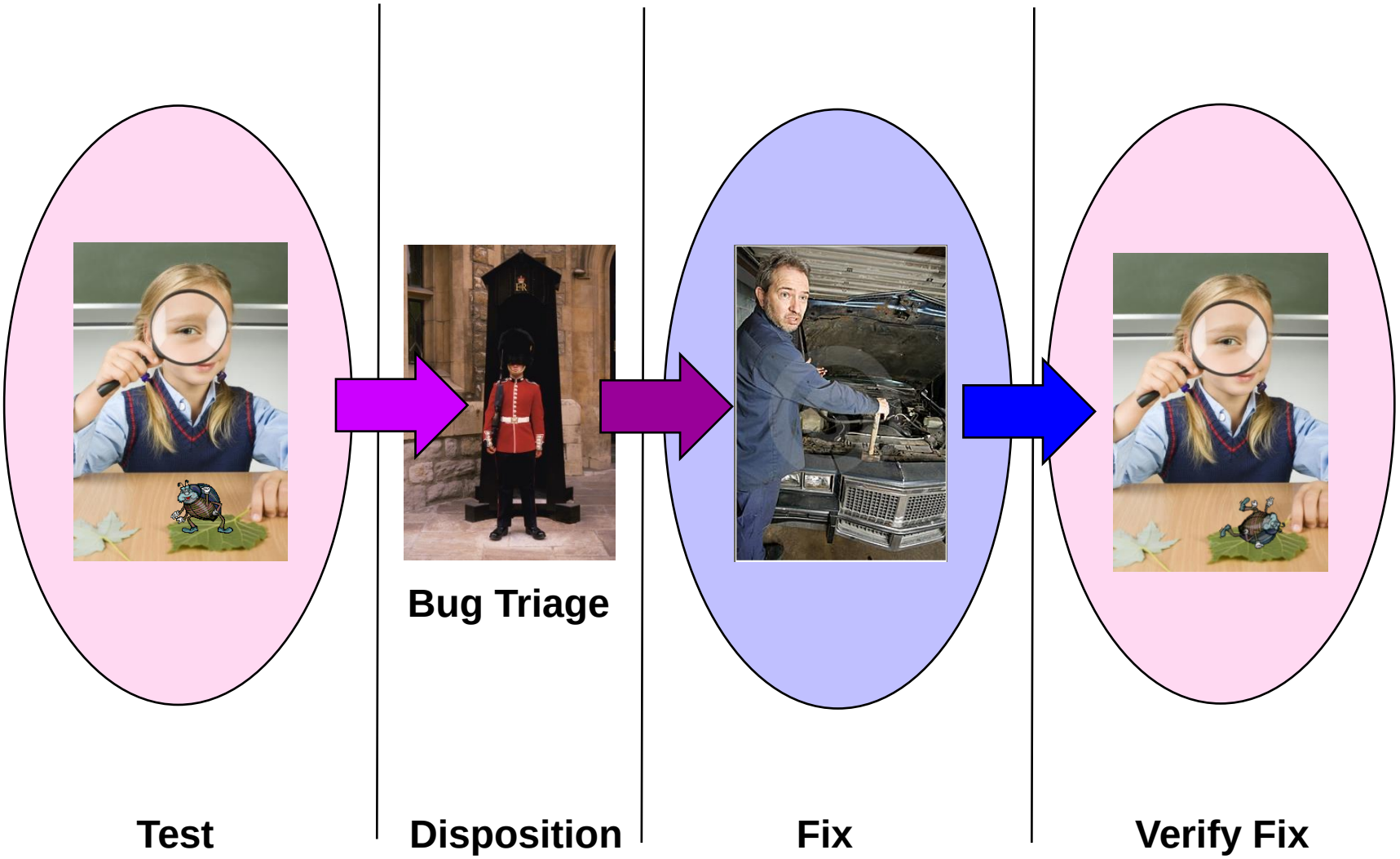
Bug Management in a Perfect World



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Earth

Technical, People and Organization aspects:

Bug Management in Real Life

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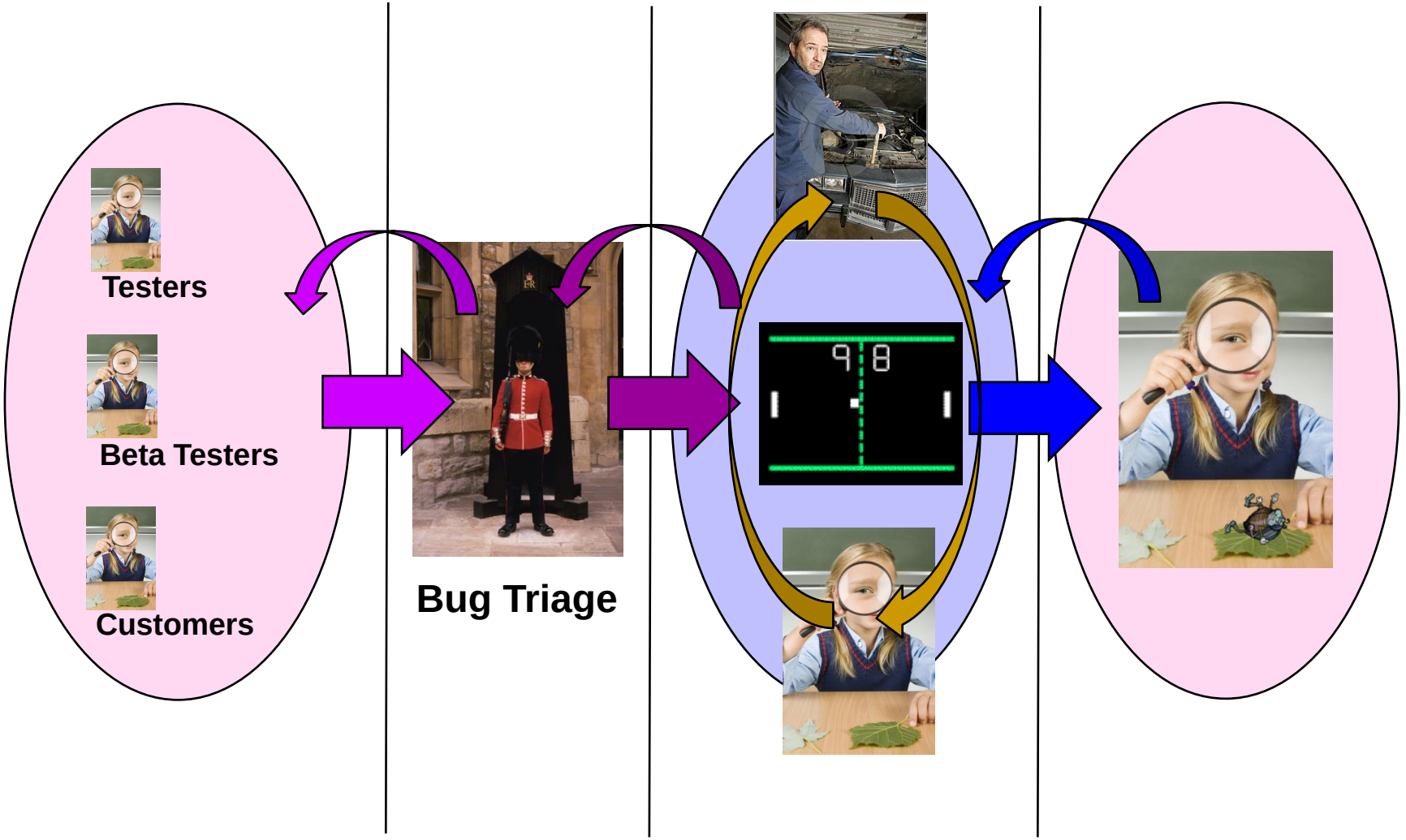
Technical Issues:
Bug Management in a Less-Than-Perfect World



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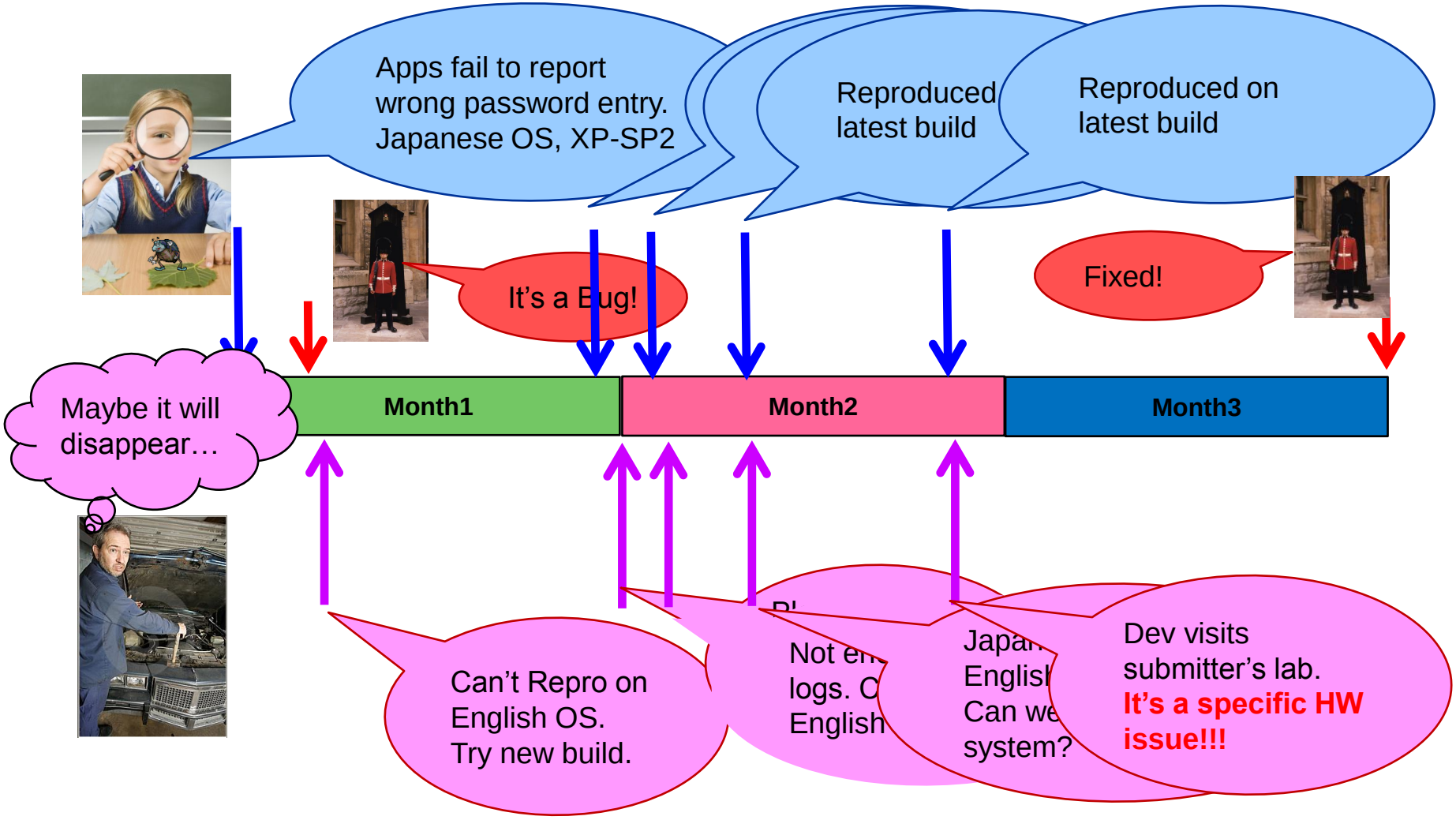
The Ping Pong Game – A real-world example



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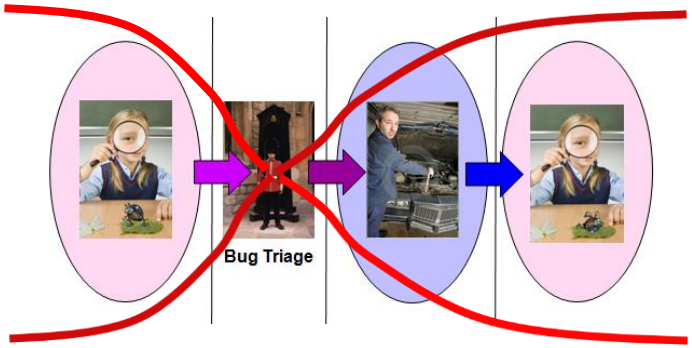
Bug Triage is a Bottleneck

The Technical side

- **Severity guidelines**
  - Ambiguous by definition
  - Subjective, yet used as hard rules
  - What's the Priority?
  - Per product? Per milestone?
  - Team diversity fosters disagreements

The Political side

- **High Severity**
  - Black eye to the Dev team; Badge of honor to Test team
  - Higher chance of getting fixed
  - Has program implications
    - A Show stopper is… a Show Stopper



Bug Triage may become an excuse not to deal with bugs

"It's not reviewed yet"

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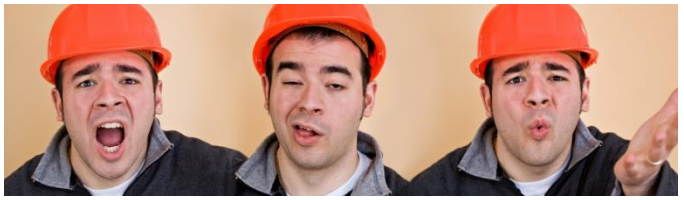
People issues: Bug Triage Meeting



- **Unprepared attendees**
  - "Let me get back to you on this one…"
- **Getting side-tracked**
  - Arguing the bug – not it's Impact
  - Solving the bug in real time

- **Inefficient decision-making process**
  - In many cases: by consensus
- **People get unreasonable**
  - The strong voice (literally!) prevails
  - The Fanatic Tester – everything is a Show Stopper
  - The Push-Back Developer – It's not a Bug!

- **Exacerbated by**
  - Logistics
  - Cultures

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Organizational issues

- **Who owns Bug Management?**
  - Validation? Development? Program Office? Marketing?
- **Resource Constraints & Attitudes**
  - **Developers**
    - Completing features is higher priority
      - Higher visibility on the project dashboard
  - **Testers**
    - Role ends with finding the bug
    - Finding more bugs is higher priority over getting bugs fixed

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Organizational issues

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    - Finding more bugs is higher priority over getting bugs fixed
    - **Throw over the wall!!!**

What is hateful to you, do not to your fellow man

Talmud, Shabbat 31a

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Heaven on Earth

Improving the Bug Management process

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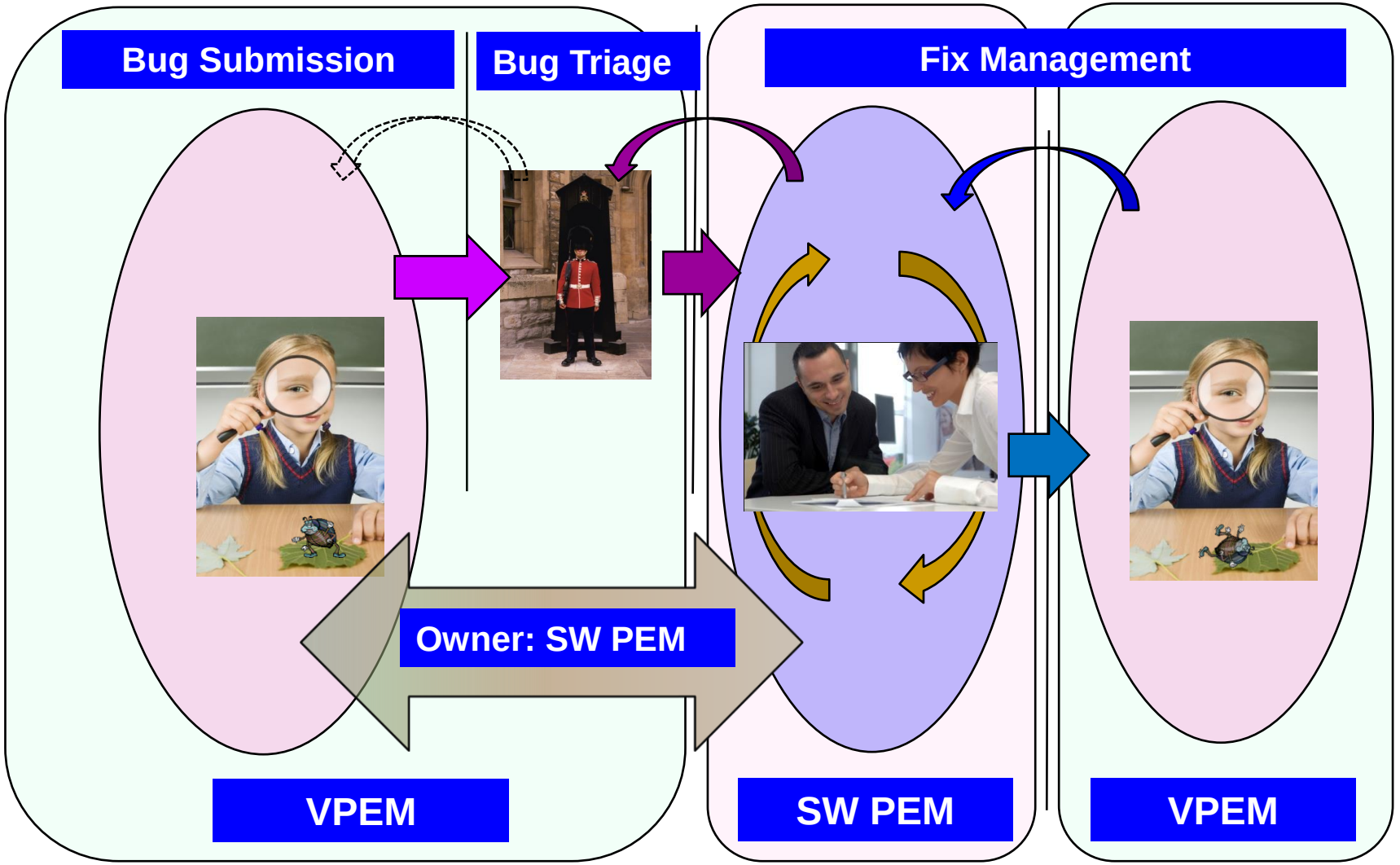
Define the Process; Change the Attitude

- **Make Bug Management a clearly defined Process**
  - Bug Submission
  - Bug Triage
  - Fix Management
- **Change the attitudes**
  - Testers:
    - Getting a bug fixed is **as important** as finding it
    - Sometimes, a bug can't get fixed without the tester's involvement
  - Developers:
    - A submitted bug is (usually) a real one
    - Don't wait for Bug Triage's approval stamp
    - **YOU** are the bug owner
  - PEMs:
    - Internalize that from a certain point, Bug Management is the **critical flow** of the program

"Attitude is a little thing that makes a big difference."

- Winston Churchill

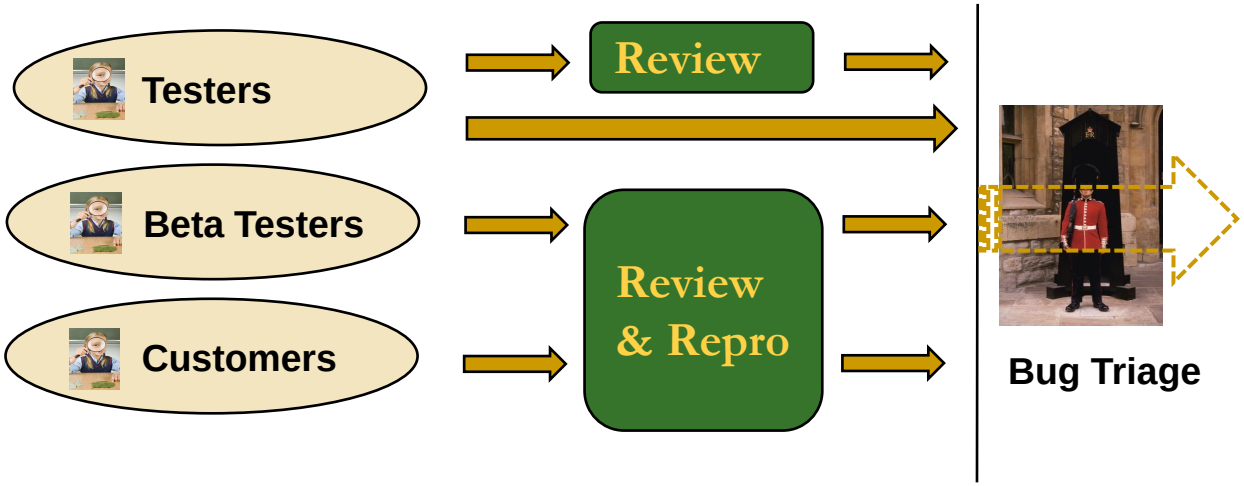
Bug Management Process



Intel Dictionary:
PM: Program Manager **PEM:** Program Engineering Manager; we have: **SW PEM**; **VPEM** (Validation PEM)

Bug Submission Quality

- Define bug templates
- Define mandatory fields and data
  - Keep choose lists updated
- Provide tools for easy collection of the information
- Train, train and re-train
- Review reports of new testers until they can be trusted
- Always review Beta and Customers bugs



Strive to achieve "Workable Bugs"

Bug Triage Process - Notes

- **Owner: Validation. Attendees:**
  - Owns the meeting, the process and the “DB Freshness”
- **Charter: Escalation path for bug disposition**
  - Most bugs are straight forward and can skip the Bug Triage involvement
  - Remove the bottleneck: Dev/Test interact from submission
- **Preparation is key**
  - Bug-list for discussion – sent ahead of the meeting
  - Attendees mark items for discussion
- **Keep tight control of the meeting**
  - Keep a fast pace. Nip irrelevant discussions in the bud
  - Address unreasonable behaviors offline
- **Publish Severity guidelines**
  - Emphasize the word “guidelines”…

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Bug Triage Process (Cont.)

- **Adopt an efficient decision making process**
  - Benevolent Dictatorship
  - Escalation path is the Program Manager
- **Avoid setting Priority**
  - Exception: Special cases (Low customer impact; High operational impact => high priority)
- **Avoid being pulled into Bug Management**
  - It's a Program Management activity
- **Deal with the environment**
  - Get a good phone; use screen-sharing software; learn the culture
- **Optional: Monitor Bug Management process metrics**
  - e.g. Time to fix, bug age, time to fix-verify, time in "waiting for inputs"; ping-pongs; false-alarm bug reports

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Tips

Stuff that worked for us

… but will it work in Europe?

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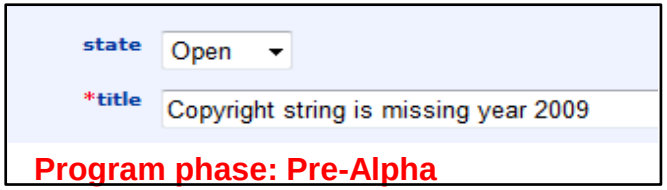
Bug Triage tips: Local or Global Severity?

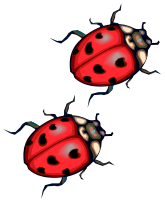
Problem:

- Severity is read as Priority and is a Release Criteria
- What's the severity of this bug?
  - Can't ship without fixing. So: Show Stopper!
  - Can wait till Gold. So… Medium?...



- How do you assign a Show Stopper, but mark it for later fix?
  - Priority? (Show Stopper / Low Priority)
  - Severity? (e.g. Medium for Alpha, Show Stopper for Beta)
  - Milestone Release Criteria must be relaxed to allow delay of non-urgent Show Stoppers

Our Solution:



- Severity, Milestone are set "Globally" – by Bug Triage
  - Priority set by SW PEM and re-evaluated after each milestone
  - Release criteria: Zero SS for the milestone, X SS for the program

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Bug Triage tips: Non-reproducible bugs

Problem:

- Can't fix them, can't close them, and can't decide the severity…

  …but we want them reported!

Solution:

- Status = "Suspended"
- Num_reported_instances = 1, and incremented per bug occurrence
- IF num_reported_instances > **X** => Status = "New Bug"
- IF State = "Suspended" for **Y** weeks => Status = "Tabled" (bug is closed)

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Fix Management: Daily Ops Meeting

An option for effective Fix Management activities

- **Frequent, Operation-focused meeting**
  - Led by SW PEM, attended by Dev leads, Test lead
  - Sets immediate priorities for the day
- **Frequency and length vary**
  - Typically: Daily or once in two days, for 30-60 min.
- **Works well for short bursts of focused activity**

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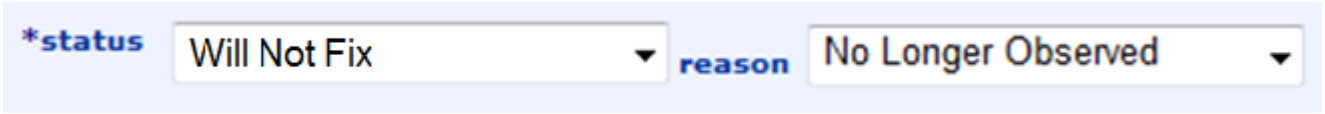
Fix Management tips: Bug "Disappearance"

Problem:

- A bug is reported, with supporting data
- Next build, it is gone
- What has changed?
  - A lot!
  - Dev don't have the bandwidth to investigate what caused the fix
  - Test don't agree to "Can't Reproduce"

Solution:

- Add "Reason" field to the system; value= "No Longer Observed"



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Fix Management tips: Late fix scramble

Problem:

- Development is busy with new functionality, and delays bug fixes
- Fix verification (and resulting bugs) are pushed towards the deadline
- Risk of missing the Release Criteria

Solution:

- Monitor “projected opens” VS Release criteria
- Alerts development early how bad their backlog is

Panic early and avoid the rush

- ?

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Fix Management tips: Avoid late-fix scramble

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Summary

- **Bug Management:**
  - Simple in theory, complicated in practice
  - Three main parts:
    - **Bug Submission process**
    - **Bug Triage**
    - **Fix Management**
  - Impacted by Organizational, People and Technical issues
- **Defined, agreed-upon process is key**
  - Training is a must
  - Ongoing effort to keep up
- **Specific issues call for innovation**
  - New bug states: “Suspend”, “Fixed Indirectly”
  - Forward-looking reports

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Acknowledgement

- **Menahem Zukerman (Program Manager, Intel, Israel)**
  - Menahem lead a task force to analyze current practices and suggest new process for Bug Management. Some of the insights in this paper are due to his work.

… and Thank You!

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Backup

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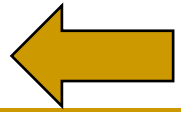
Bug Triage Team Members

- **Bug Triage Lead (VPEM)**
- **Engineering Leads**
  - SW PEM
  - Development reps (per component: e.g. Application, FW, Driver)
- **Validation & Test Leads**
- **Marketing**
  - Customer Application Engineers Rep
- **Optional or “As needed" Attendees:**
  - Tools Engineering leads
  - Localization & Documentation Engineering leads
  - Project Program Manager
  - Other Technical Leads (Mfg, Planning, dependent projects)
  - Other submitter’s of bugs (i.e. as needed once a bug is submitted)
  - QA/QRE



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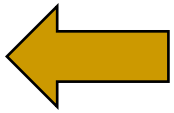
Bug Template



Title:

Summary:

Steps to Reproduce:
1.
2.
3.

Expected Results:

Actual Results:

Recovery steps:

Setup:

- **Name and type of machine:**
- **Processor(s), speed, memory, BIOS version:**
- **Release Version:**
- **Clean System (y/n)?:**

Additional Info:

- **Reproducibility (Frequency):**
- **Log Data, Screen captures, Video**
- **Configurations:**
  - **Different OS -**
  - **Different Machine/Platform -**
  - **Different card/sku -**
  - **Different environment variables -**

Suggested Severity:

Reason for Suggested severity (include User Impact!):

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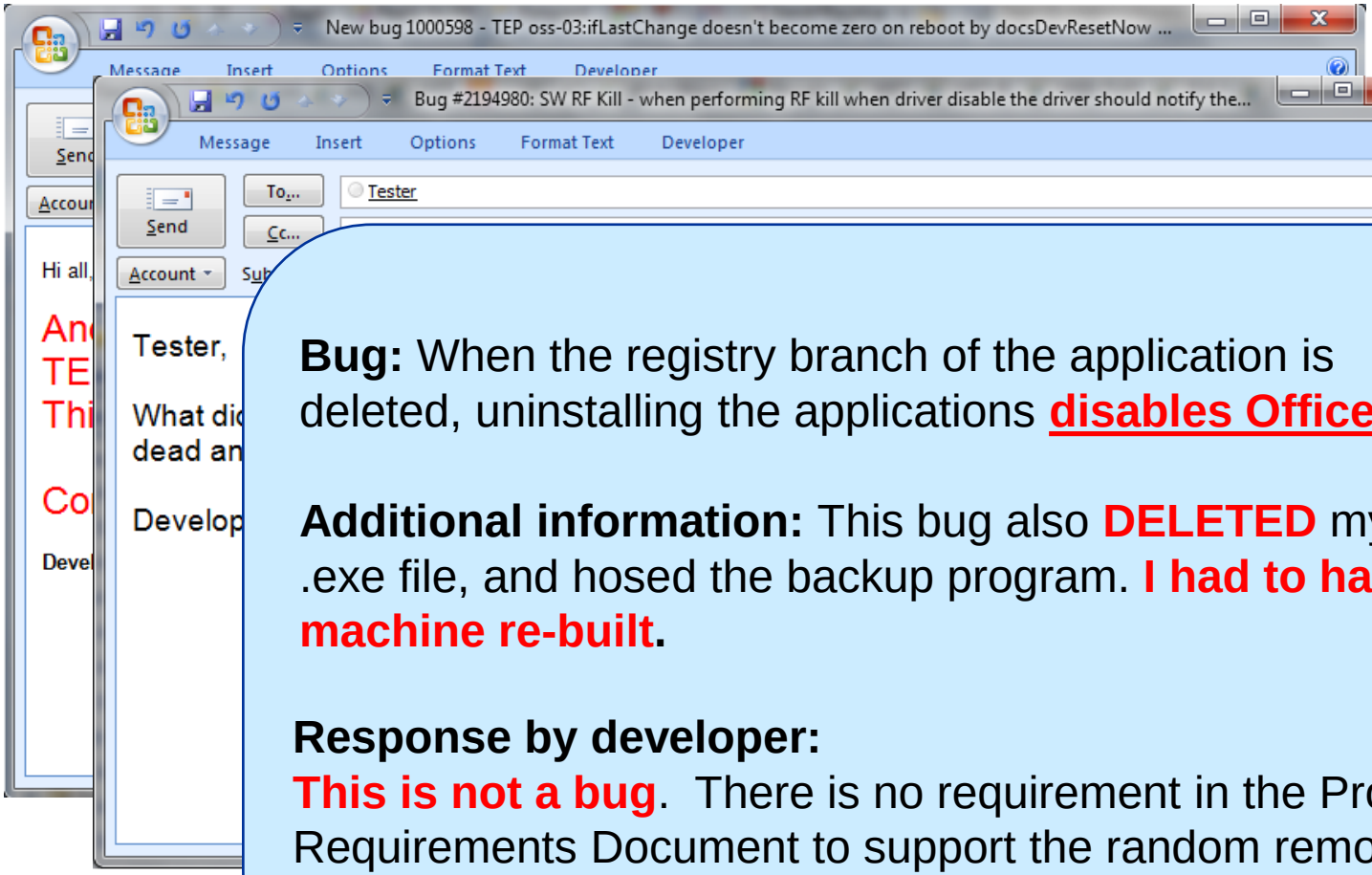
Dev/Test examples



Bug: When the registry branch of the application is deleted, uninstalling the applications **disables Office 2003**

Additional information: This bug also **DELETED** my VPN .exe file, and hosed the backup program. **I had to have the machine re-built.**

Response by developer:
This is not a bug. There is no requirement in the Product Requirements Document to support the random removal of registry keys.

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