Ten things we know to be true

… about Testing

Mark Striebeck
Engineering Manager

Ten things we know to be true

1. Focus on the user and all else will follow.
2. It's best to do one thing really, really well.
3. Fast is better then slow.
4. Democracy on the web works.
5. You don't need to be at your desk to need an answer.
6. You can make money without doing evil.
7. There is always more information out there.
8. The need for information crosses all borders.
9. You can be serious without a suit.

We first wrote these "10 things" several years ago. From time to time we revisit this list to see if it still holds true. We hope it does-and you can hold us to that. (September 2009)

http://www.google.com/about/corporate/company/tenthings.html

Development Culture at Google

The need for information crosses all borders

Google

- One, open source code repository
- Code Reviews
- Open Tools
- No binary dependencies (build everything from HEAD)

Democracy on the web works

Google

- Very little top-down management and standards
- Delegate responsibility downwards – (almost) all of it!

How to drive change?

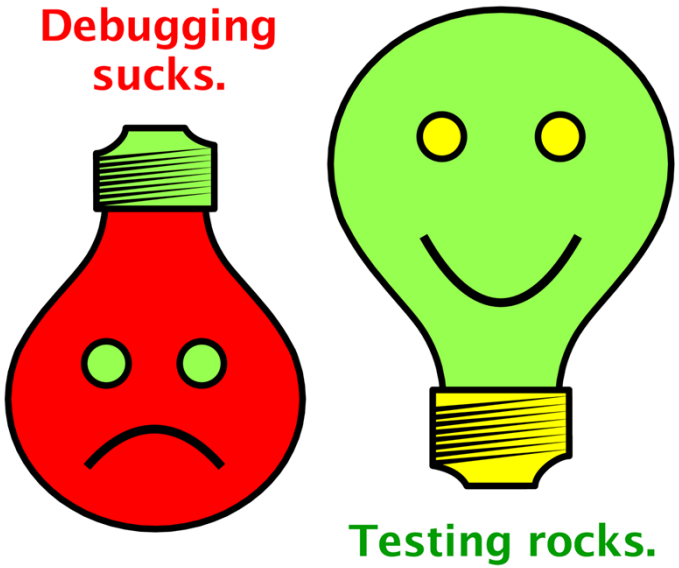
Democracy on the web works

Google

- Very little top-down management and standards
- Delegate responsibility downwards – (almost) all of it!

How to drive change?

- Grouplets (20% time)
- Sponsored/Supported by upper management



Where to start?

2006

Google

- Google grows fast (product, people, source code, dependencies)
- QA is doing mostly manual testing
- Engineers can write automated tests, but adoption isn't great, coverage is spotty
- But integration/release problems are showing up

It's better to do one thing really, really well

Google

- What to focus on (end-to-end testing, unit testing, latency testing, UI testing …)?
- Decided to focus on
  - What we feel passionate about
  - Where we have experience
  - What can make a difference
  - What we can affect

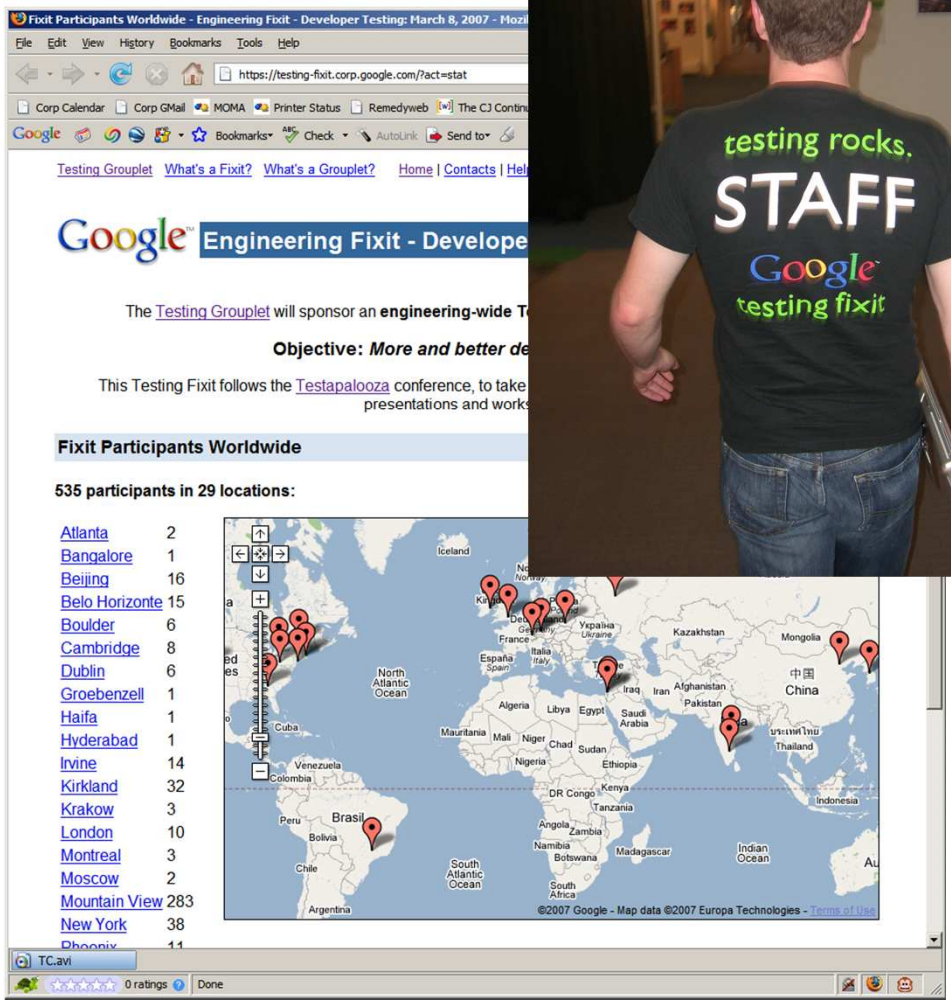
Unit / Developer testing

You can be serious without a suit

First, focus on getting the message out

- Fixits
- Tech Talks (M. Feathers, J. Kerievsky, G. Meszaros, E. Evans...)

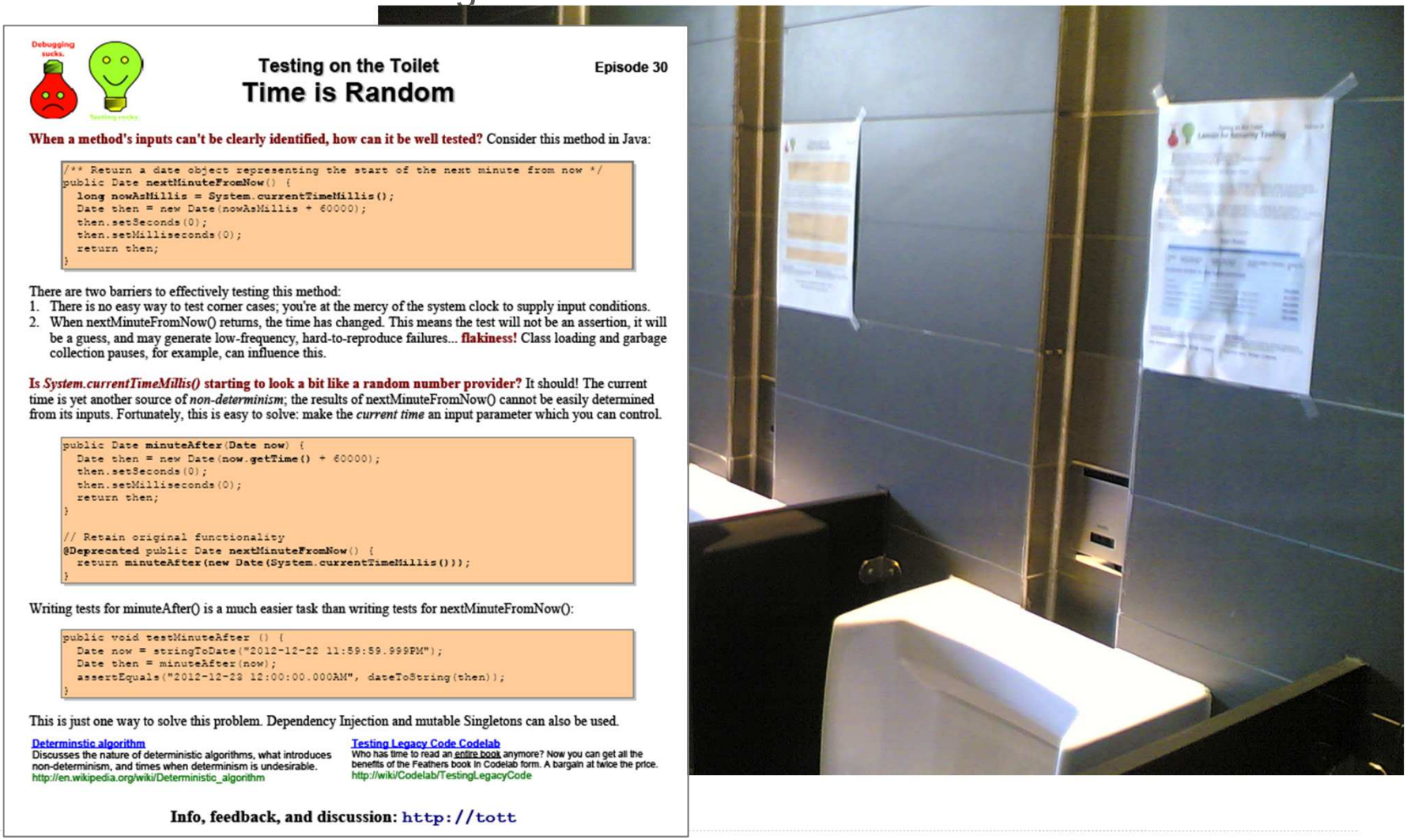
and ...



You can be serious without a suit

Google

… and of course: Testing on the Toilet



You can be serious without a suit

Google

… and of course: Testing on the Toilet

Forbes, January 10, 2007

Google is No. 1: Search and enjoy The people are brilliant. The perks are epic. But can Google's founders build a culture that doesn't depend on the stock price?

I'm sitting on a heated toilet in my pajamas. I'm in engineering building 40 at Google on "pajama day," and directly in front of me, attached to the inside door of the toilet stall, is a one-page flier, printed on plain white paper, titled "Testing on the Toilet, Episode 21." The document, which is designed to prod the brains of engineers who test software code, explores such subjects as "lode coverage" and reminds engineers that even biobreaks need not interrupt their work.

Presuming that ones's stay here isn't sufficient to process that lesson, the sheet provides a link to two internal Web sites, http://tott/ (for Testing on the Toilet) and http://botw/ (Bug of the Week). Not being a software engineer, I understand little of what I'm reading. Yet it reminds me of the first two sentences of the now famous founders' letter Page and Brin distributed to prospective Google shareholders before the company's 2004 IPO: "Google is not a conventional company. We do not intend to become one." Mission accomplished.

San Jose Mercury News, October 22, 2007

"Tech Notebook: Google embraces workers in unlikely places"
By Vindu Goel, Scott Duke Harrisand Dean Takahashi

We were at Google recently, working on a story, and after consuming a little too much of that free Google water, we felt the need to visit the restroom.
We were surprised to find that Googlers can't escape the Mountain View company's warm embrace even in the loo. Not only are the toilet seats heated, but the company also strategically posts tips on testing software code. Engineers can ponder them while they're, ahem, doing their business.
...
"We'll be putting episodes on this blog on a regular basis and providing PDFs so you can print them out and put them up in your own bathrooms, hallways, kitchens, moon bases, secret underground fortresses, billionaire founders' Priuses, wherever," the company said.

You can be serious without a suit

Google

… and of course: Testing on the Toilet

Forbes, January 10, 2007

Google is No. 1: Search and enjoy The people are brilliant. The perks are epic. But can Google's founders build a culture that doesn't depend on the stock price?

I'm sitting on a heated toilet in my pajamas. I'm in engineering building 40 at Google on "pajama day," and directly in front of me, attached to the inside door of the toilet stall, is a one-page flier, printed on plain white paper, titled "Testing on the Toilet, Episode 21." The document, which is designed to prod the brains of engineers who test software code, [illegible] "lode coverage" and reminds enginee[illegible] not interrupt their work.

Presuming that ones's stay here isn't s[illegible] lesson, the sheet provides a link to tw[illegible] sites, http://tott/ (for Testing on the T[illegible] of the Week). Not being a software e[illegible] of what I'm reading. Yet it reminds m[illegible] of the now famous founders' letter Pa[illegible] prospective Google shareholders befo[illegible] "Google is not a conventional compa[illegible] become one." Mission accomplished.

San Jose Mercury News, October 22, 2007

"Tech Notebook: Google embraces workers in unlikely places"
By Vindu Goel, Scott Duke Harrisand Dean Takahashi

We were at Google recently, working on a story, and after consuming a little too much of that free Google water, we felt the need to visit the restroom.
We were surprised to find that Googlers can't escape the Mountain View company's warm embrace even in the loo. Not only are the toilet seats heated, but the company also strategically posts tips on testing software code. Engineers can ponder them while they're, ahem, doing their business.
...

[illegible]g PDFs so you can print them [illegible] bases, secret underground

Washington Post, October 21, 2006

“Building a 'Googley' Workforce Corporate Culture Breeds Innovation”
By Sara Kehaulani Goo Washington Post Staff Writer Saturday, October 21, 2006; Page D01

MOUNTAIN VIEW, Calif. -- To understand the corporate culture at Google Inc., take a look at the toilets.
Every bathroom stall on the company campus holds a Japanese high-tech commode with a heated seat. If a flush is not enough, a wireless button on the door activates a bidet and drying.
Yet even while they are being pampered with high-tech toiletry, Google employees are encouraged to make good use of their downtime: A flier tacked inside each stall bears the title, "Testing on the Toilet, Testing code that uses databases." It features a geek quiz that changes every few weeks and asks technical questions about testing programming code for bugs.
The toilets reflect Google's general philosophy of work: Generous, quirky perks keep employees happy and thinking in unconventional ways, helping Google innovate as it rapidly expands into new lines of business.

Problem solved?

Focus on the user and all else will follow

Google

After all these events and education, engineers knew the value of unit testing

… yet nothing material changed!

“Well, they don't get it!”

Focus on the user and all else will follow

Google

After all these events and education, engineers knew the value of unit testing

… yet nothing material changed!

“Well, they don't get it!” “What did we do wrong?”

Focus on the user and all else will follow

Google

After all these events and education, engineers knew the value of unit testing

… yet nothing material changed!

“Well, they don't get it!” “What did we do wrong?”

“Why did engineers not do what they knew is the right thing to do?”

2 main issues:

- Where to start?
- Legacy code

Focus on the user and all else will follow

Google

Test Certified 

- Small steps to get teams started
  1. Setup Tools – get familiar with testing
  2. Learn techniques and technologies that enable your team to write tests for all new code and refactor code accordingly
  3. Improve test suite and get all code under test
  4. ... 



Focus on the user and all else will follow

Google

Test Mercenaries

- Internal consulting group that embedded itself into teams to
  - Refactor code to make it testable
  - Educate and train team
  - Start writing tests
  - Drive development process changes

Now problem solved?

Fast is better then slow

Google

If it takes 30+ minutes to build and run your tests...
… you just don't bother

Fast is better then slow

Google

If it takes 30+ minutes to build and run your tests...
… you just don't bother

- Parallelized all builds and test runs into the cloud – build+test time went down to minutes
- Company-wide continuous integration system (“Run all affected tests at each change!”)
- Presubmit system that runs all tests *before* submitting

Today:
- 10,000+ developers across 40+ offices around the world
- 20+ changes per minute; 50% code base changes every month
- More than 50 million test cases executed every day

http://google-engtools.blogspot.com/

There is always more information out there

Google

Needed a BIG test storage system

- Created an open system with a web UI, an API and a query interface
- Integrated into all build/test tools
- Result: EVERY build/test run is logged

There is always more information out there

Google

Needed a BIG test storage system

- Created an open system with a web UI, an API and a query interface
- Integrated into all build/test tools
- Result: EVERY build/test run is logged

Today:

- Engineers send URL's to build runs instead of copy/paste build logs
- Used by many Dashboard and other systems
- Lots of quality analysis (bug trends, flakiness, code quality...) - per team, but also Google-wide

Today

Great just isn't great enough

Google

Could vastly increase release frequency (“push on green”)

Some teams were asked to release less often because other teams/systems can't deal with the high churn!

Main bottleneck: Time to release and to analyze if a release causes issues.

You don't need to be at your desk to need an answer

And now do all this again – for mobile!

Observations

Google

Changing the culture takes a LOOOOOOOONG time

You need the right change agents (passionate, knowledgable, respected...)

Bottom-up is harder then top down – but it sticks!

Don't fall into the “They just don't get it” trap!

Focus on the next important thing!

Changing the culture takes a LOOOOOOOONG time

You need the right change agents (passionate, knowledgable, respected...)

Bottom-up is harder then top down – but it sticks!

Don't fall into the “They just don't get it” trap!

Focus on the next important thing!

… and seriously: Don't take yourself too serious!

Lean...

Google

Is Google a lean company?

What could Google learn from lean?

What could lean learn from Google?