Cucumber and friends

tools for security that matters

OWASP
The Open Web Application Security Project

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Overview

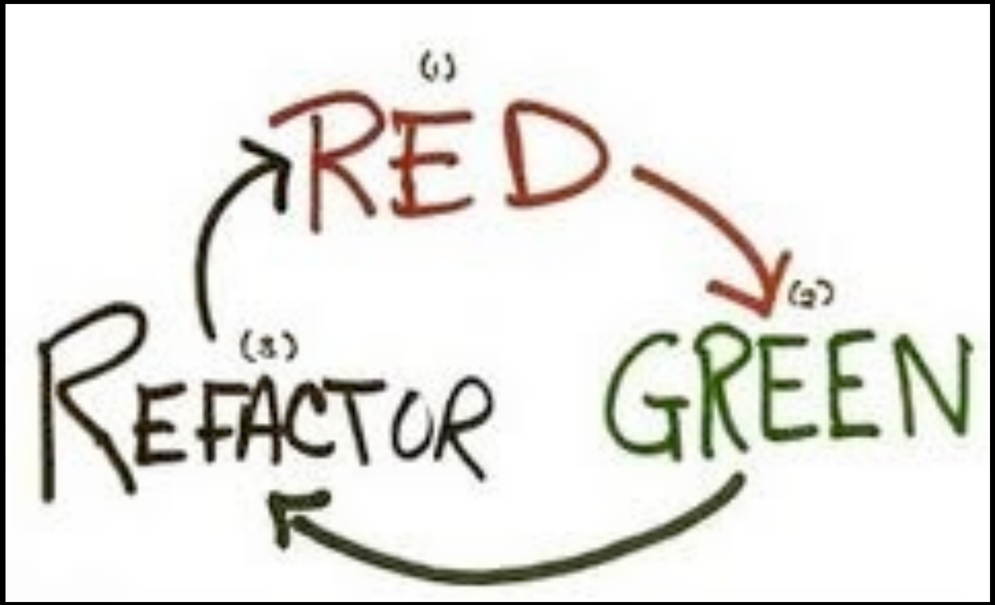
- Part 1: Cucumber & friends
  - Behavior Driven Development with Cucumber
  - Infrastructure as Code with Chef and Etch
  - Test Driven Infrastructure with Cucumber-Chef
- Part 2: Security that matters
  - Role management
  - Secure pages
  - Information Leakage
  - SSL setup
  - Complex interactions

Part 1: Cucumber & friends

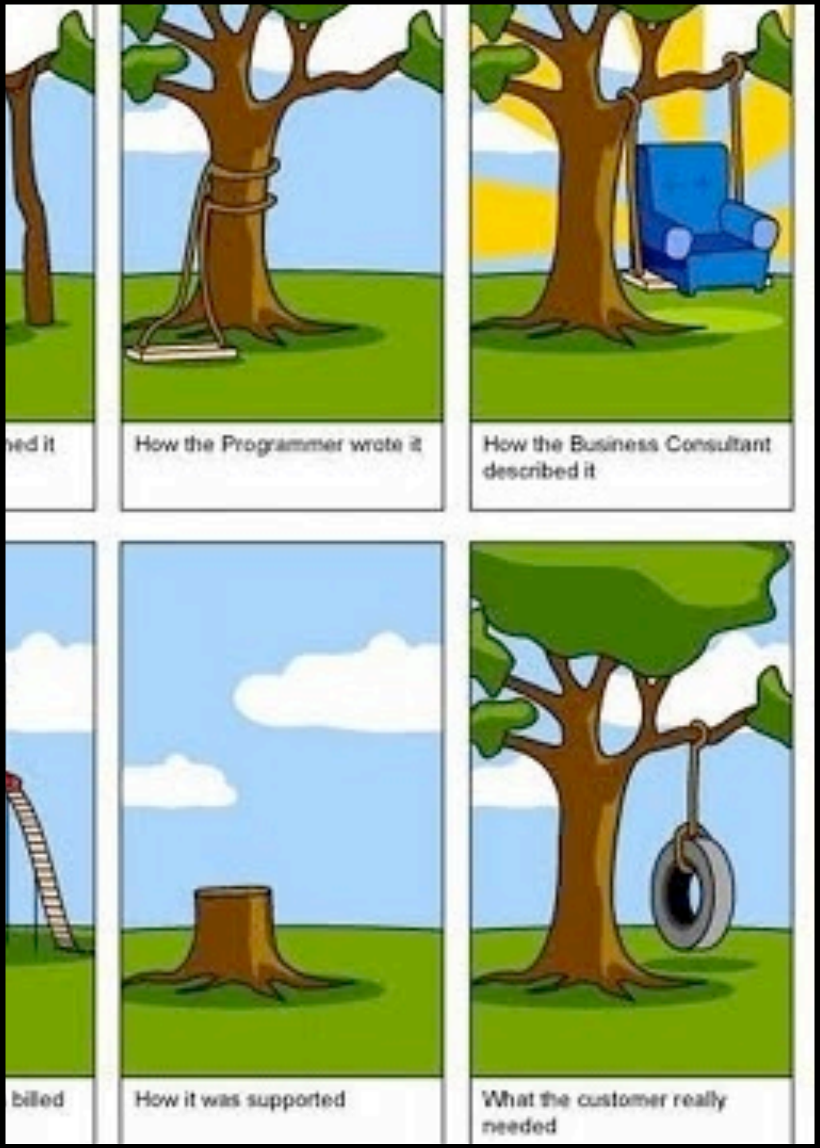
Test-Driven Development,
Behavior-Driven Development
& Beyond

Test Driven Development

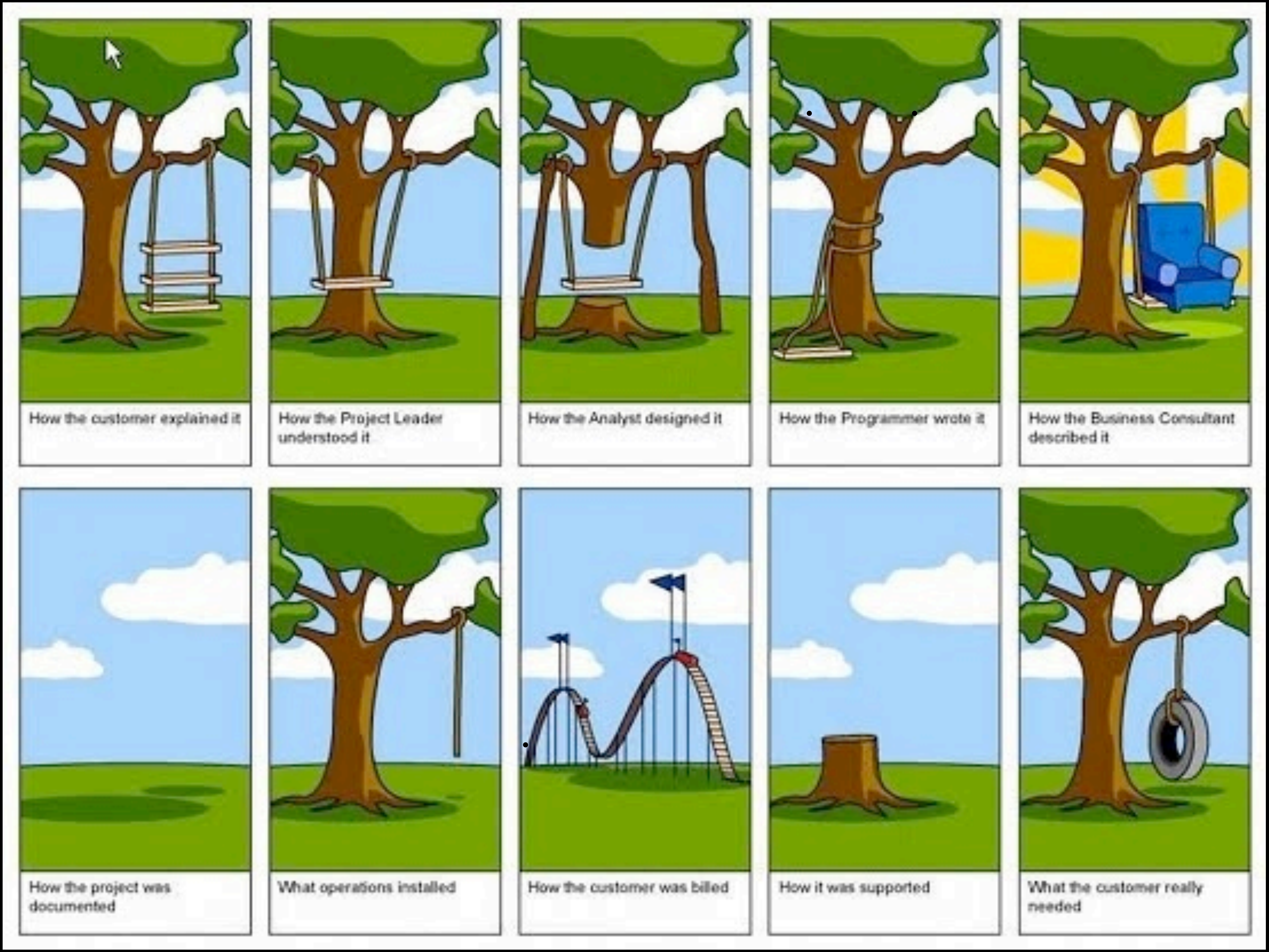
- *Verification*
- Building software right
- RSpec



Behavior Driven Development


ned it
How the Programmer wrote it
How the Business Consultant described it
billed
How it was supported
What the customer really needed

- *Validation*
- Building right software
- SMART User Stories
- Cucumber


How the customer explained it
How the Project Leader understood it
How the Analyst designed it
How the Programmer wrote it
How the Business Consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed

```
# Specification By Example By Example

# features/profile.feature
Feature: Manage my profile

Scenario: Login
  Given the user "Huey" exists
  When he logs in
  Then he should see "Welcome, Huey!"
```

```
$ cucumber features/profile.feature
```

```
Feature: Manage my profile

  Scenario: Login                          # features/profile.feature:3
    Given the user "Huey" exists           # features/profile.feature:4
    When he logs in                        # features/profile.feature:5
    Then he should see "Welcome, Huey!"    # features/profile.feature:6

1 scenario (1 undefined)
3 steps (3 undefined)
0m0.008s

You can implement step definitions for undefined steps with these snippets:

Given /^the user "([^"]*)" exists$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end

When /^he logs in$/ do
  pending # express the regexp above with the code you wish you had
end

Then /^he should see "([^"]*)"$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end
```

```
Feature: Manage my profile

  Scenario: Login                           # features/profile.feature:3
    Given the user "Huey" exists            # features/profile.feature:4
    When he logs in                         # features/profile.feature:5
    Then he should see "Welcome, Huey!"     # features/profile.feature:6

1 scenario (1 undefined)
3 steps (3 undefined)
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You can implement step definitions for undefined steps with these snippets:

Given /^the user "([^"]*)" exists$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end

When /^he logs in$/ do
  pending # express the regexp above with the code you wish you had
end

Then /^he should see "([^"]*)"$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end
```
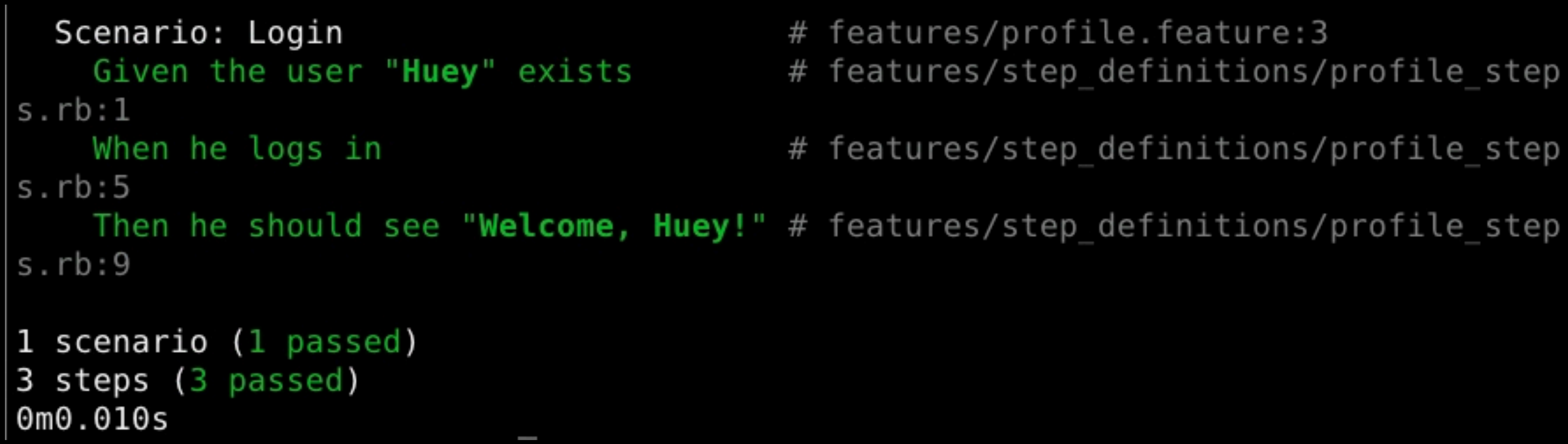

```ruby
# Create a step definition for each undefined step

# features/step_definitions/profile_steps.rb
Given /^the user "([^"]*)" exists$/ do |name|
  @user = User.create!(:name => name)
end

When /^he logs in$/ do
  visit('/login')
  fill_in('User name', :with => @user.name)
  fill_in('Password', :with => @user.password)
  click_button('Log in')
end

...
```

Roses are red

Violets are blue

Cucumbers are green



```
  Scenario: Login                              # features/profile.feature:3
    Given the user "Huey" exists               # features/step_definitions/profile_step
s.rb:1
    When he logs in                            # features/step_definitions/profile_step
s.rb:5
    Then he should see "Welcome, Huey!" # features/step_definitions/profile_step
s.rb:9

1 scenario (1 passed)
3 steps (3 passed)
0m0.010s
```

Chef

Infrastructure as Code

DevOps

The Cloud!

Automation & Reuse

Etch, Puppet, etc.

```
# first define a Chef recipe for sudo

package "sudo" do
  action :upgrade
end

template "/etc/sudoers" do
  source "sudoers.erb"
  mode 0440
  owner "root"
  group "root"
  variables(
    :sudoers_groups => node['authorization']['sudo']['groups'],
    :sudoers_users => node['authorization']['sudo']['users'],
    :passwordless => node['authorization']['sudo']['passwordless']
  )
end

# then use the recipe whenever you need to manage sudo
"authorization" => {
  "sudo" => {
    "groups" => ["admin", "wheel", "sysadmin"],
    "users" => ["jerry", "greg"],
    "passwordless" => true
  }
}
```

```
# how about configuring a firewall?

# recipe omitted for the sake of brevity...

# restrict port 13579 to 10.0.111.0/24 on eth0

firewall_rule "myapplication" do  # firewall_rule is defined in
the recipe
  port 13579
  source '10.0.111.0/24'
  direction 'in'
  interface 'eth0'
  action :allow
end
```

Cucumber-Chef

Test Driven Infrastructure

Verification

Setting the Infrastructure right

```
# Specify the infrastructure with cucumber

# features/server.feature

Scenario: Users can connect to server via ssh key
  Given a newly bootstrapped server
  When the technical users recipe is applied
  Then a user should be able to ssh to the server
```

```
# create_server, run_chef, set_run_list are defined in Cucumber-
Chef
# features/step_definitions/server_steps.rb
Given /^a newly bootstrapped server$/ do
  create_server("teamserver", "192.168.20.20")
end

When /^the technical users recipe is applied$/ do
  set_run_list('teamserver', 'recipe[users::techies]')
  run_chef('teamserver')
end

...
```

Part II: Security that matters

Applications & Examples

```
# Role management

Scenario: Require login to edit profile
  Given I am not logged in
  When I visit the "Edit Profile" page for "Huey"
  Then I should see "You must login to access that page!"

Scenario: User cannot edit another user's profile
  Given I am logged in as "Riley" with role: "Customer"
  When I visit the "Edit Profile" page for "Huey"
  Then I should see "You are not authorized!"

Scenario: Customer cannot access admin functions
  Given I am logged in as "Riley" with role: "Customer"
  When I visit the "Admin" page
  Then I should see "You are not authorized!"
```

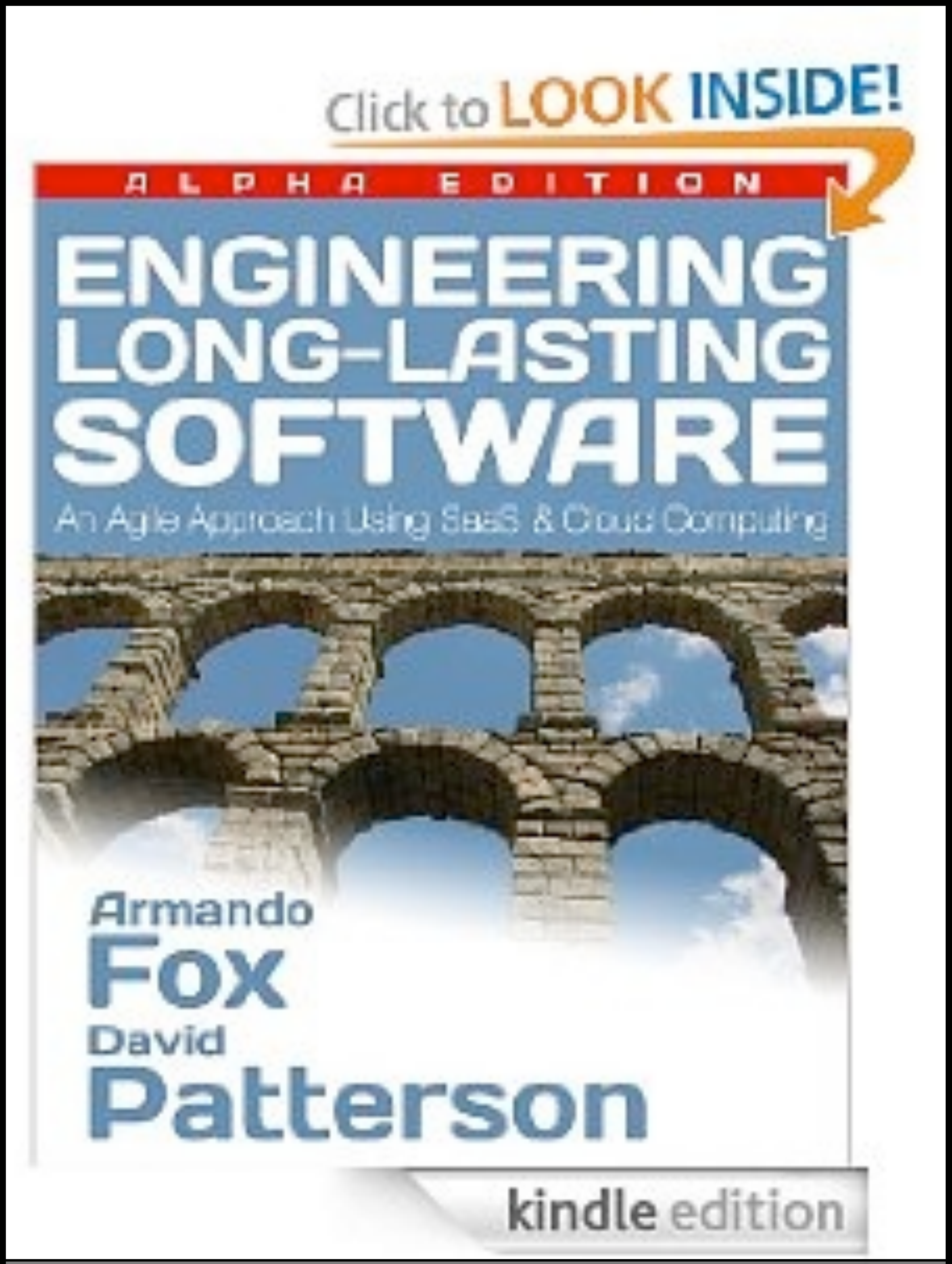
```
# Secure pages

Scenario: Require SSL for admin page
  Given I am logged in as "Grandpa" with role: "Admin"
  When I visit the "Admin" page
  Then the page should be secured with HTTPS

Scenario: Redirect HTTP requests to HTTPS
  Given I am logged in as "Grandpa" with role: "Admin"
  When I visit the "Admin" page using an HTTP link
  Then I should be redirected to HTTPS
```

```
# Information leakage

Scenario: Do not log credit card numbers
  Given I make a purchase using my credit card
  Then the log files should not contain my credit card number

Scenario: Do not show user's contact info to strangers
  Given I am not logged in
  When I view the profile for "Uncle Ruckus"
  Then I should not see his email
  And I should not see his phone number
```

```
# SSL setup

Scenario: HTTPS web server
  Given a newly bootstrapped server
  When I install nginx
  And I enable SSL on port 443
  Then the server should respond to HTTPS requests
```

```
# Complex interactions

Scenario: Request a new password
  Given a user "Huey" with email "huey@example.com"
  When he requests a new password
  Then he should receive an email with a password reset link

Scenario: Reset password
  Given "Huey" has received an email with a password reset link
  When he clicks the password reset link
  Then his password should be reset
```

http://saas-class.org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