

Testing in production

Losing fear, one test at a time

Jorge Marín

June 17th, 2020 – StackConf Berlin Virtual 🌐

[@chipironcin](https://jorgemarin.me)

Hidden slide

breathe

Hidden slide

breathe

no, srsly, breathe

Testing in production

My name is Jorge, and I am an engineer 🖐️🇪🇸

Poll time - Raise your hands if you...

Poll time - Raise your hands if you...



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(after the talk)



Poll time - Raise your hands if you...

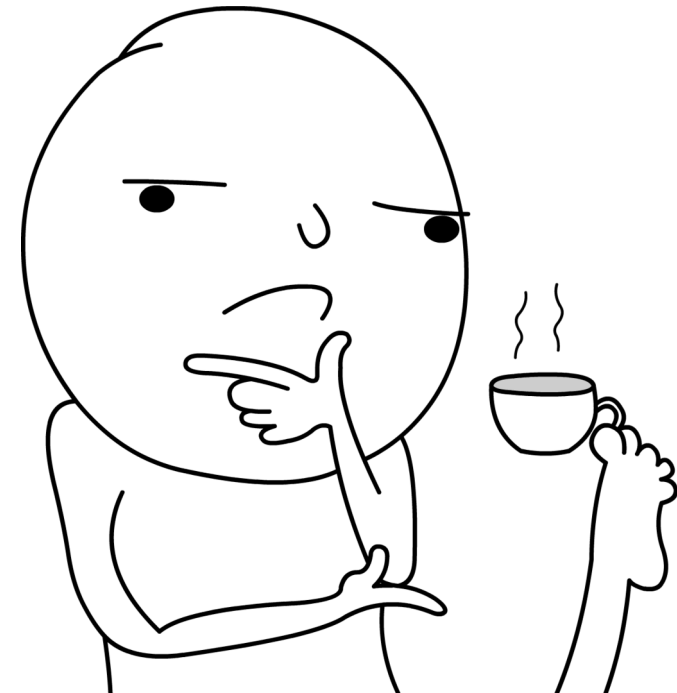
- Are having a good day
- Often forget to squash before merge
- Know what testing is
- Know about the testing pyramid or any other way of classifying different testing levels
- Have a production environment
- Are testing your services in production
- Prefer spaces to tabs 

What is this talk about

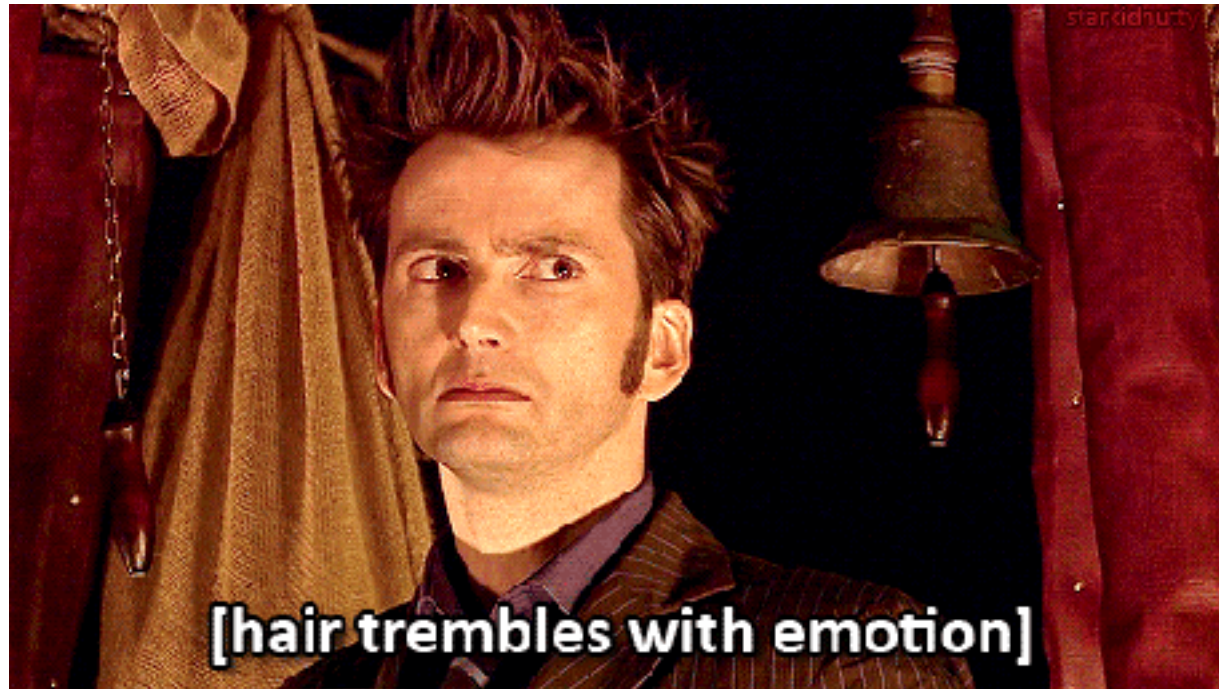
- Mostly answers to Frequently Asked Questions
- Not going to be too technical
- Based on the experience acquired working at Dyson

Main takeaways

- Why do you need tests in production
- What kind of testing is the appropriate for production
- How to build end to end tests
- How to fight dragons



Allons-y!



Why do you need testing in production? #1

What do you mean by “testing in production”?

What do you mean by “testing in production”?

lambda
service

To guarantee that your **application** continues to work
consistently after the release/deployment

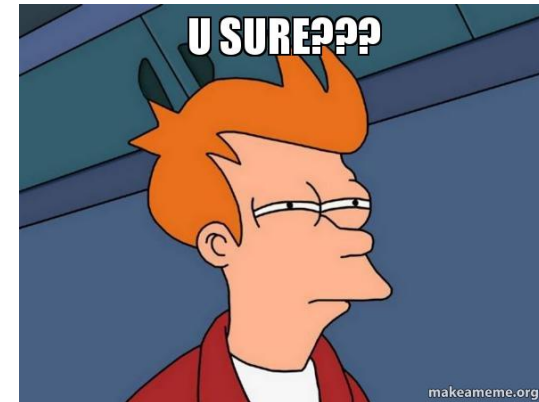
Why do you need testing in production? #1

- But I have the best real-time health dashboards in the world and will tell me when something is wrong



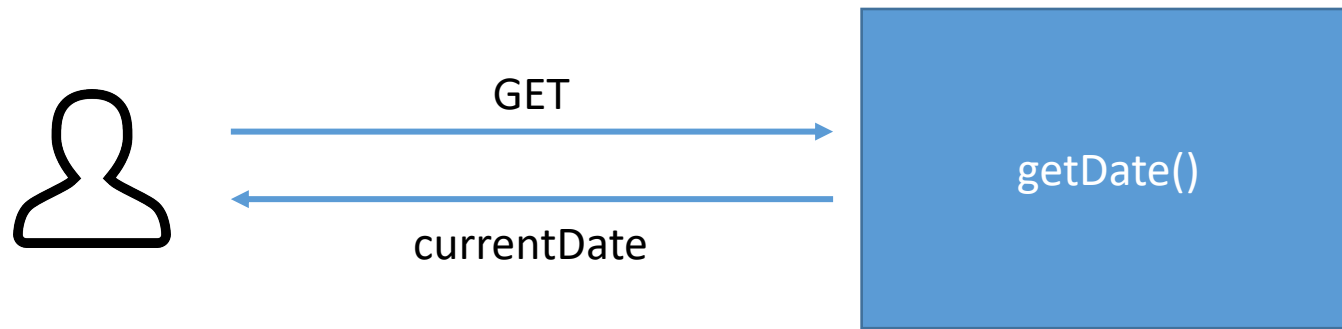
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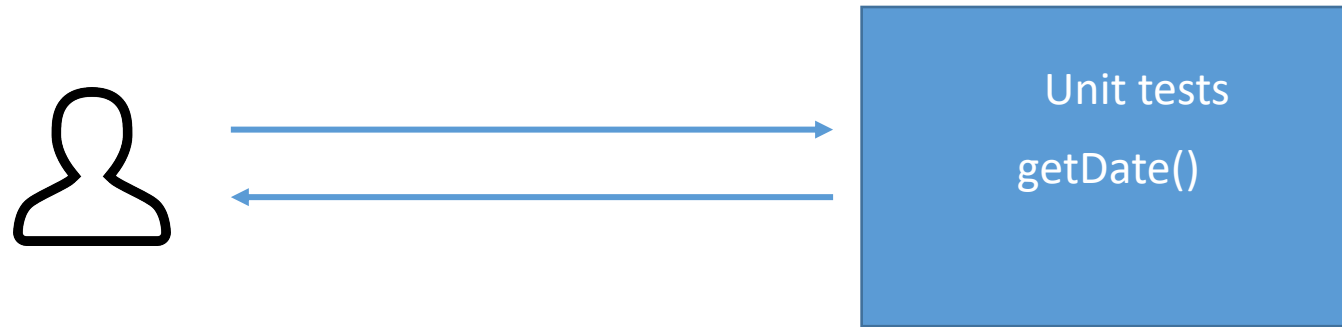
Why do you need testing in production? #1

Imagine a function (serverless)



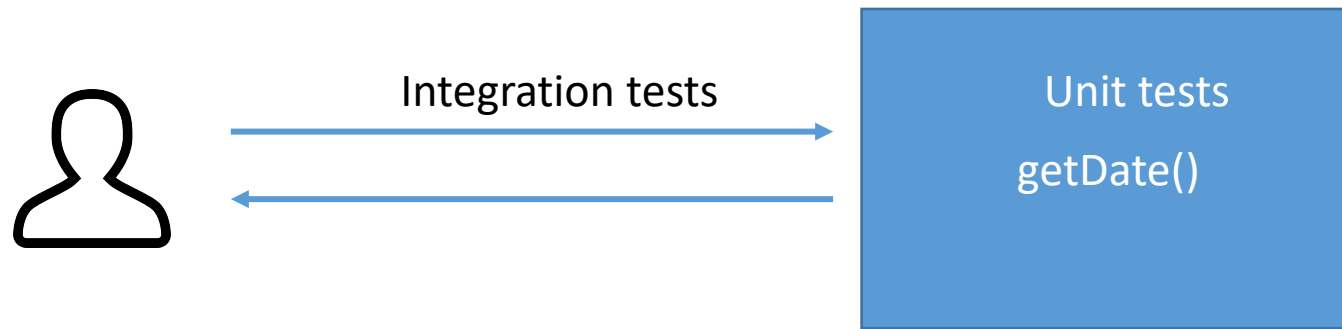
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Imagine a function (serverless)



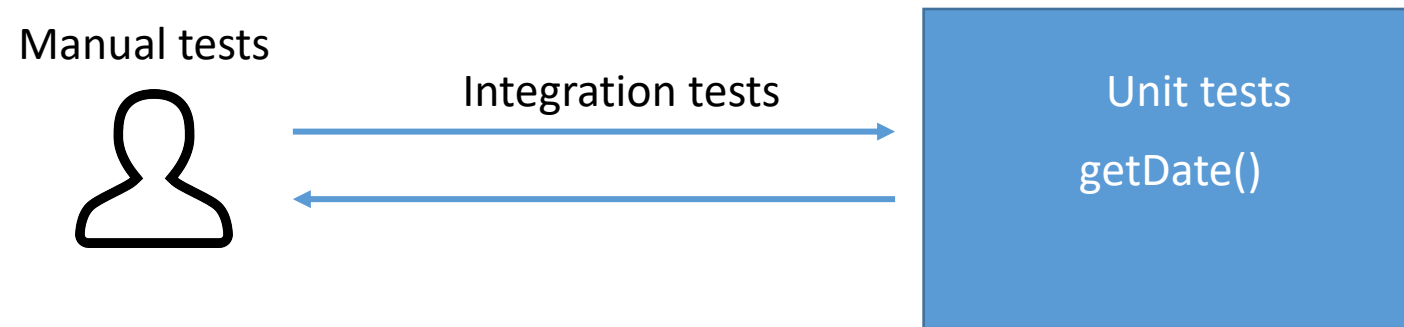
Why do you need testing in production? #1

Imagine a function (serverless)



Why do you need testing in production? #1

Imagine a function (serverless)



Why do you need testing in production? #1

Imagine a lambda function

UNTIL YEAR 2038



y2k38

- Storing dates (seconds since Jan 01 1970) as a signed 32-bit binary integer

00000000000000000000000000000000

Thursday, 01st Jan 1970 00:00:00 UTC
+0 seconds

y2k38

000

Thursday, 01st Jan 1970 00:00:00 UTC
+0 seconds

y2k38

01011110111010011100011001111000

Wednesday, 17-Jun-2020 07:30:00 UTC
+1592379000 seconds

y2k38

0111111111111111111111111111111111111111

????

y2k38

01111111111111111111111111111111111111

Tuesday, 19st Jan 2038 03:14:07 UTC
+2147483647 seconds

y2k38

100000000000000000000000000000000

y2k38

100000000000000000000000000000000

-2147483648 seconds

y2k38

100000000000000000000000000000000

Friday, **13st Dec 1901** 20:45:52 UTC
-2147483648 seconds

y2k38



Why do you need testing in production? #1

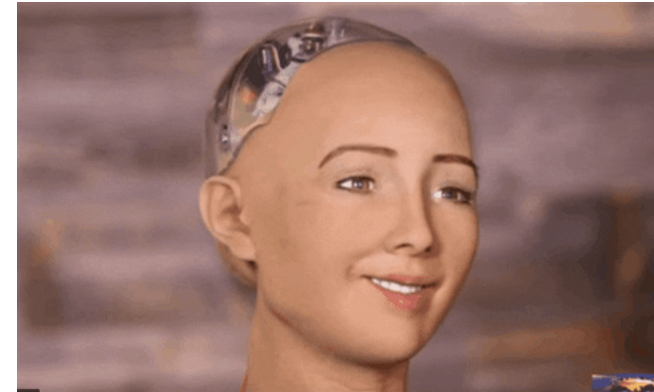
- Extrapolate to a real service
- At that moment, lots of customers will call you saying:
 - Cannot login
 - Cannot register
 - Cannot change profile picture
 - Cannot launch the app
 - Cannot order chocolate milkshakes to takeaway

Why do you need testing in production? #1

Real angry **paying** customers
calling you
because what they paid for is not working



An automated process
acting as the first real user noticing an issue
and alerting the team right away



Why do you need testing in production? #1

Still not convinced?



Why do you need testing in production? #1

Still not convinced?

SPEED

Why do you need testing in production? #1

Still not convinced?

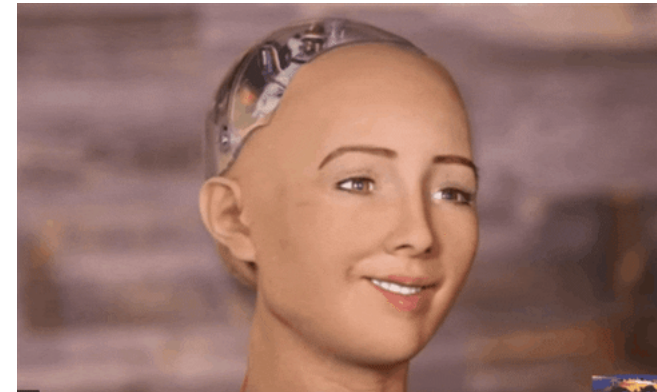
SPEED



Why do you need testing in production? #1

Still not convinced?

SPEED



Why do you need testing in production? #1

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SPEED



LOSES

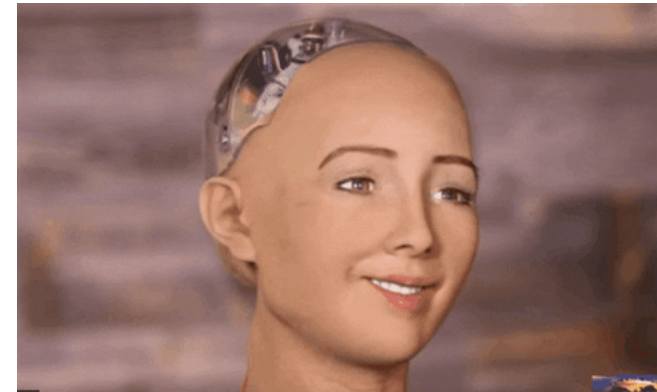
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SPEED



LOSES



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LOSES

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SPEED

LOSES

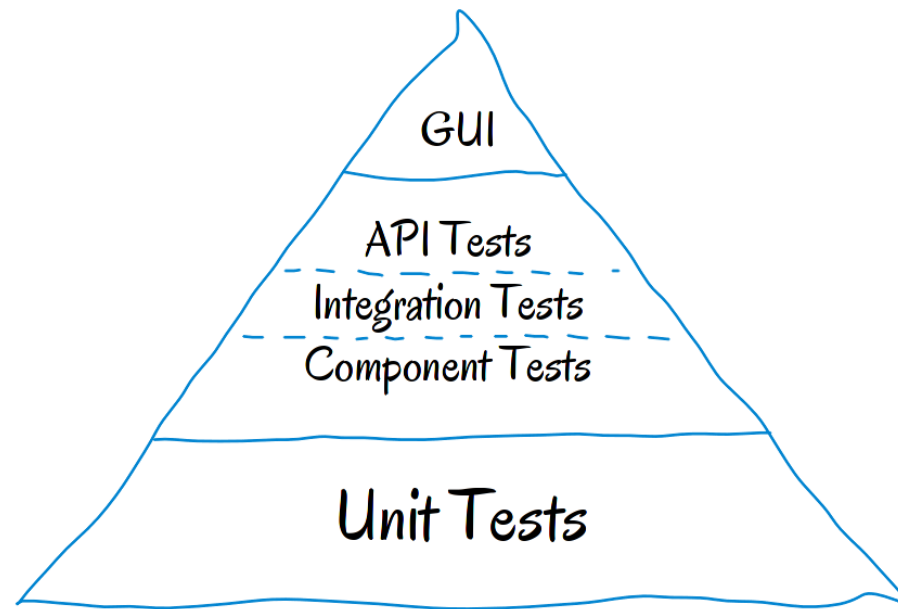
REPUTATION

Why do you need testing in production? #1

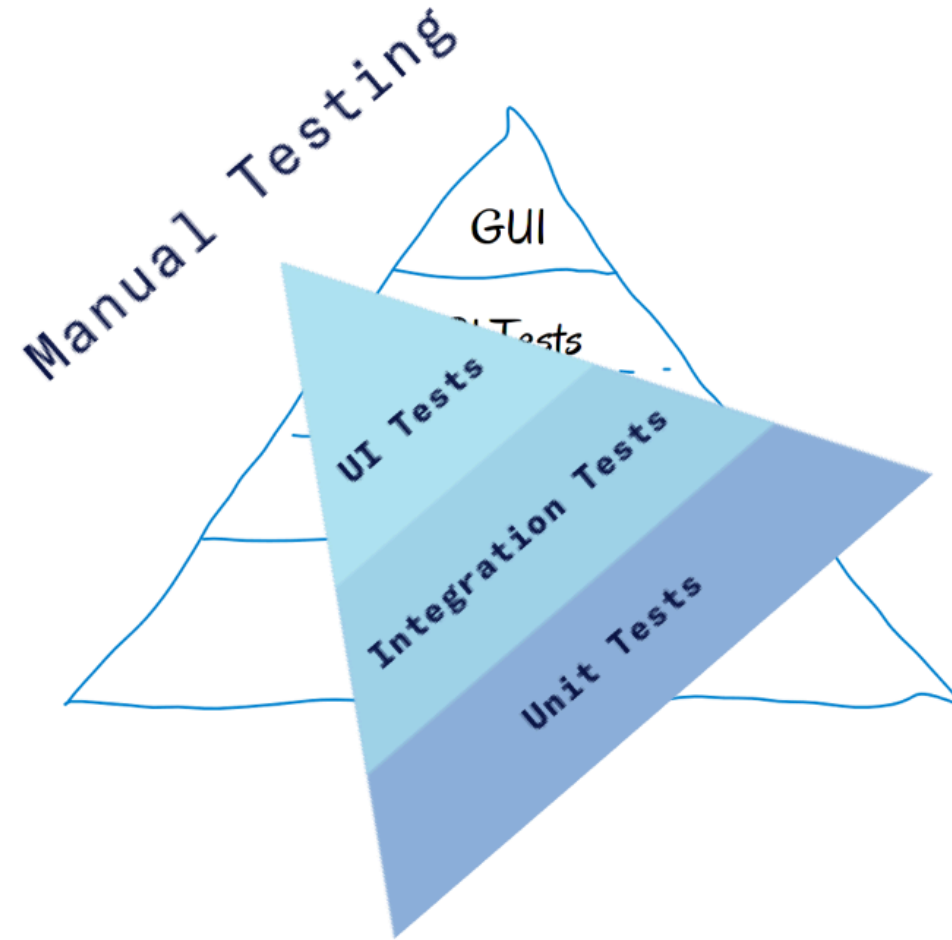
Are you convinced already?



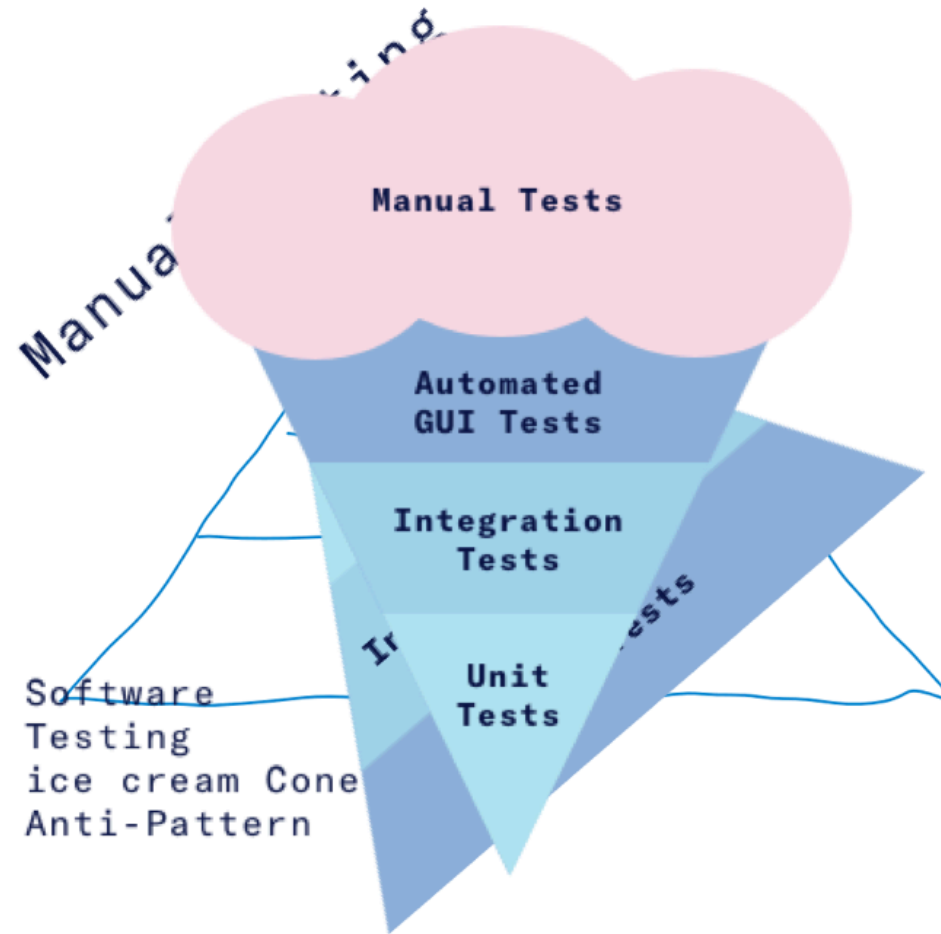
What is the right testing level against production systems? #2



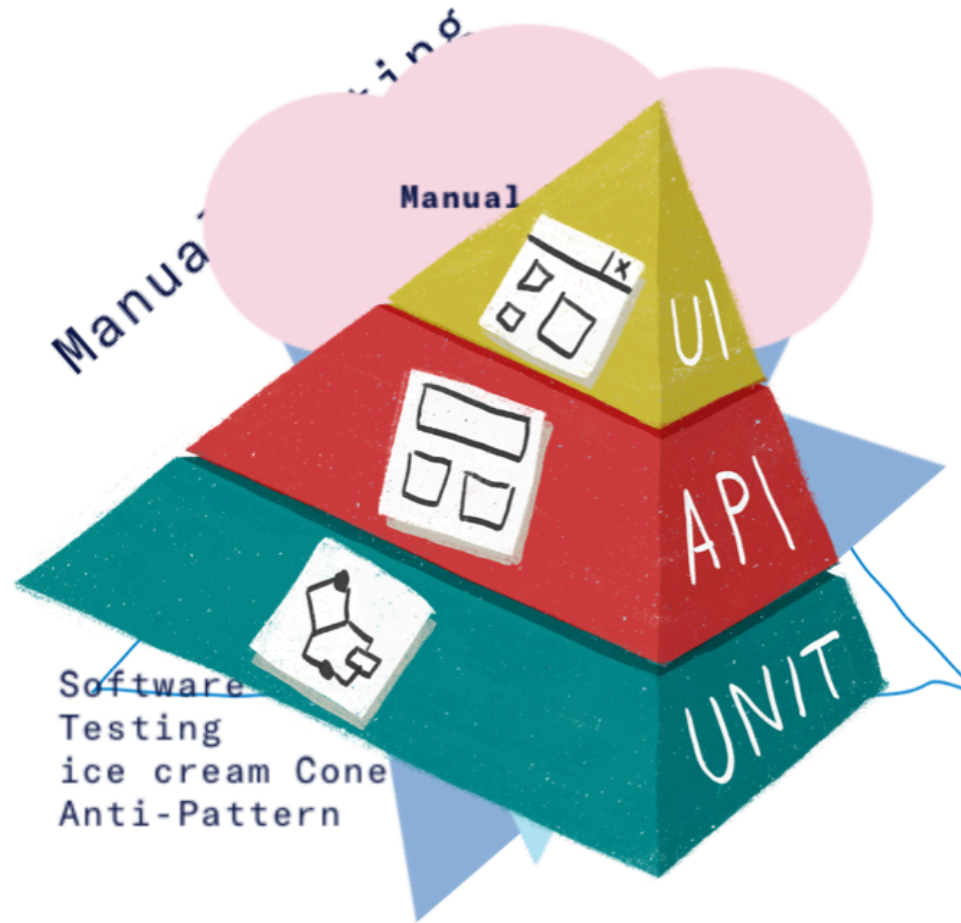
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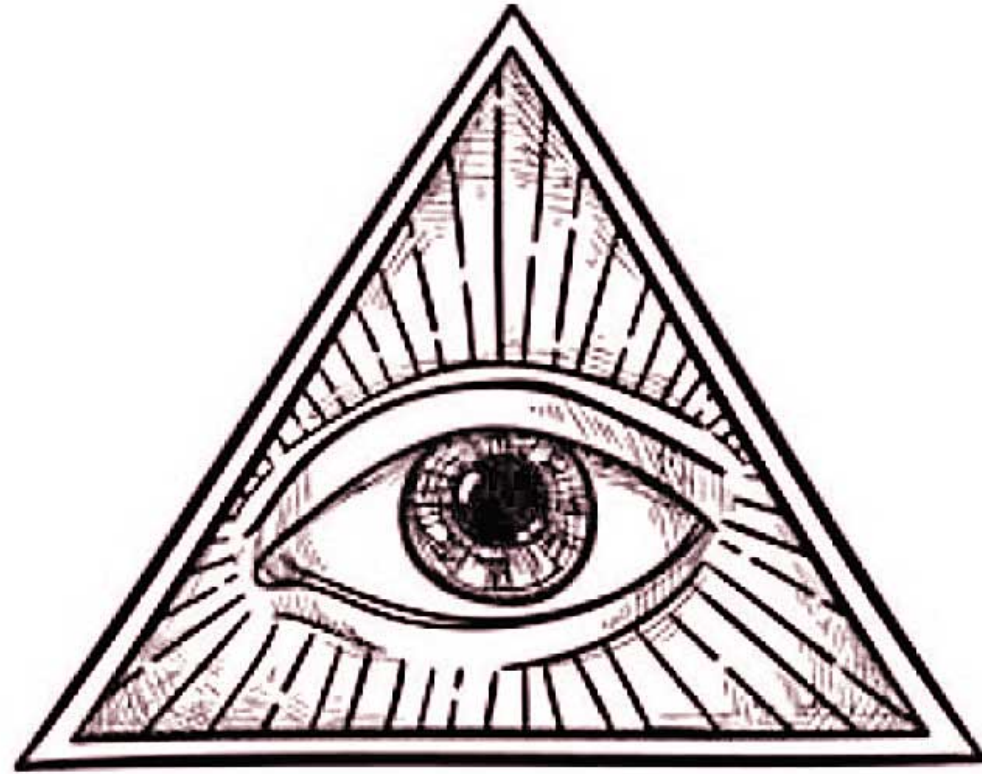


What is the right testing level against production systems? #2

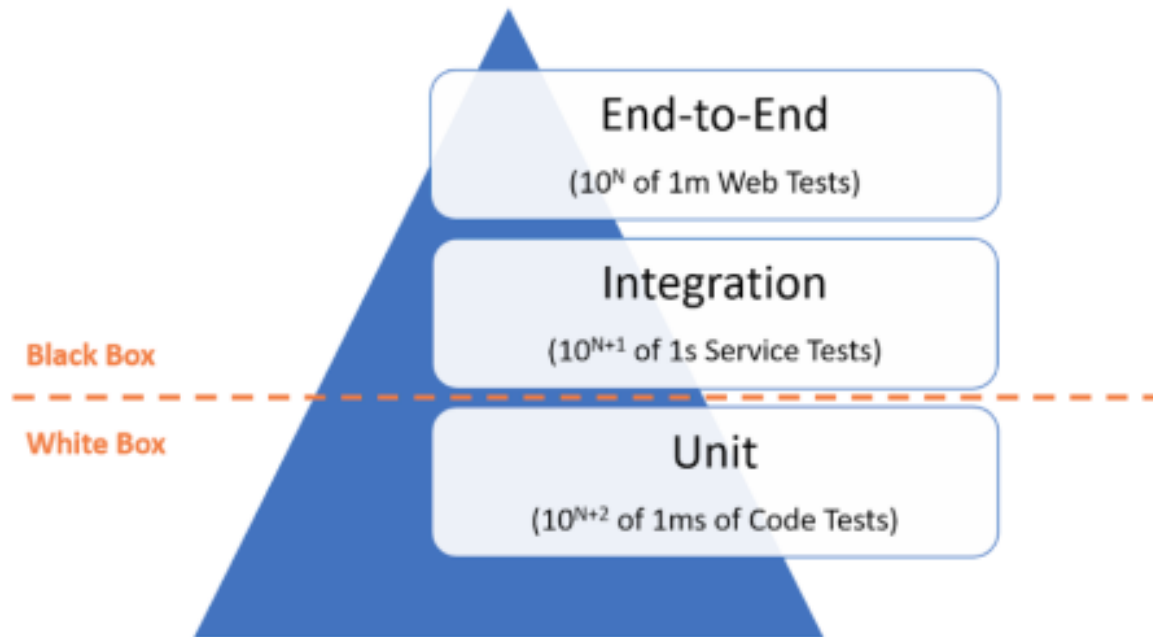


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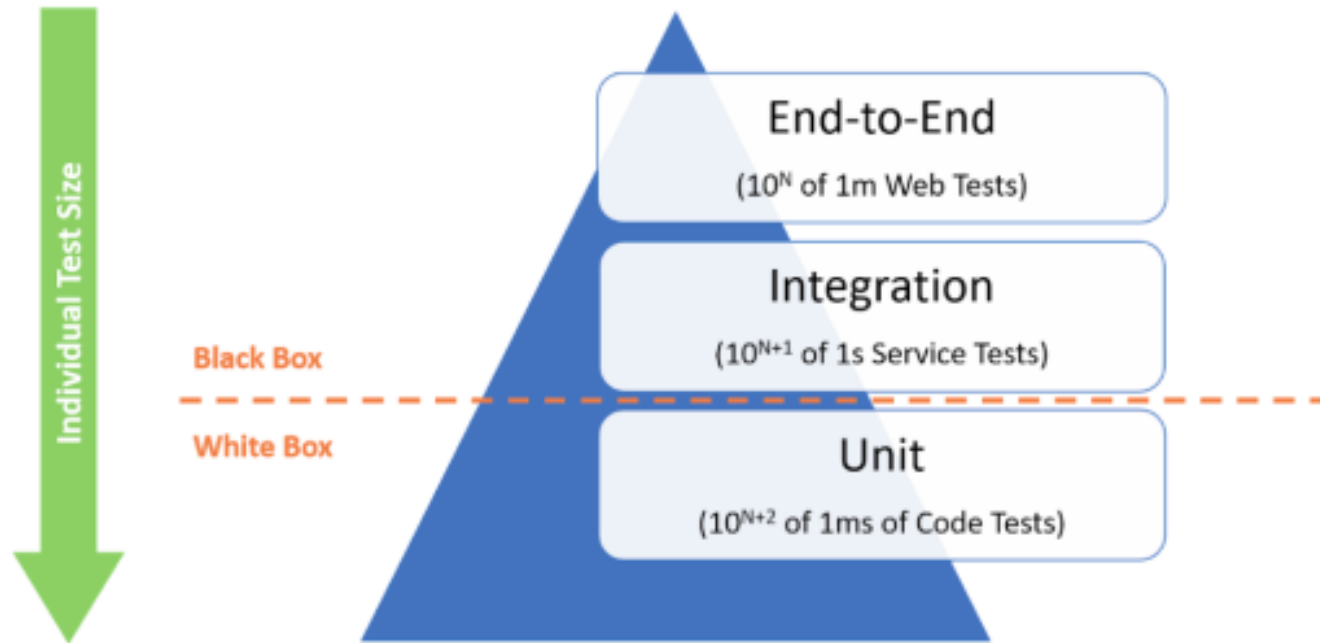




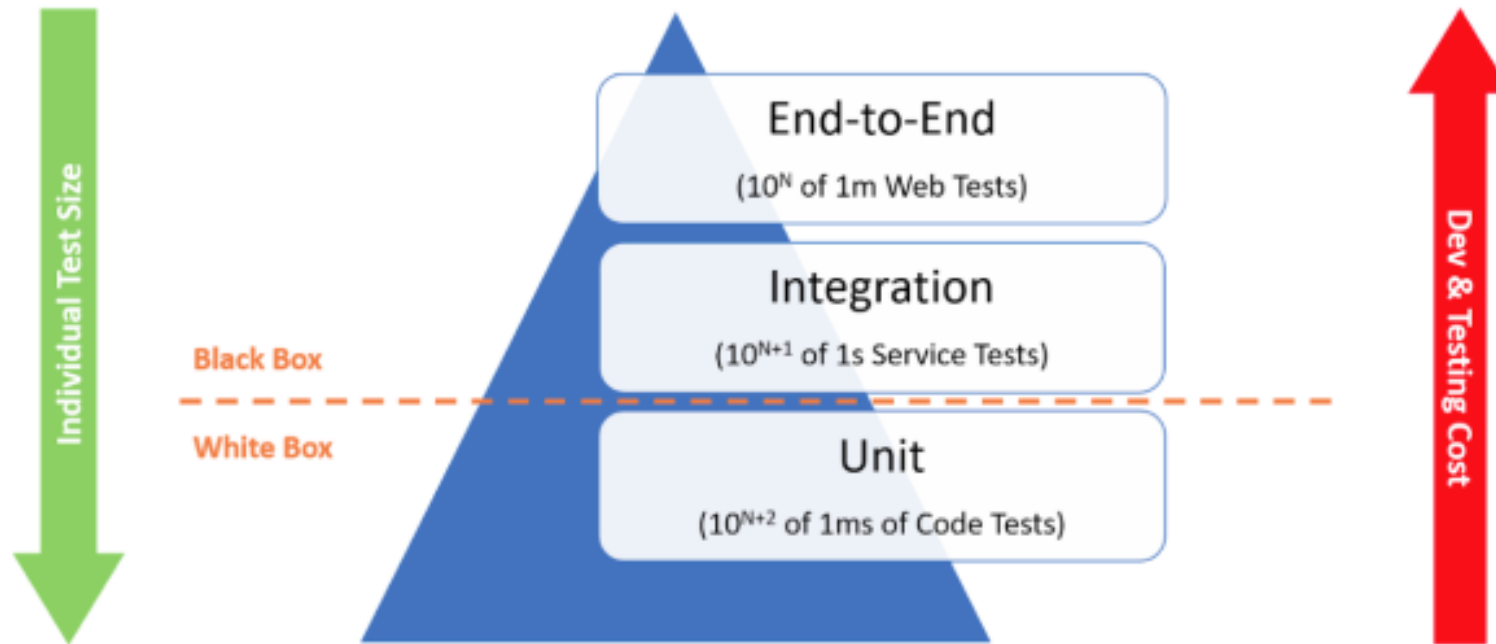
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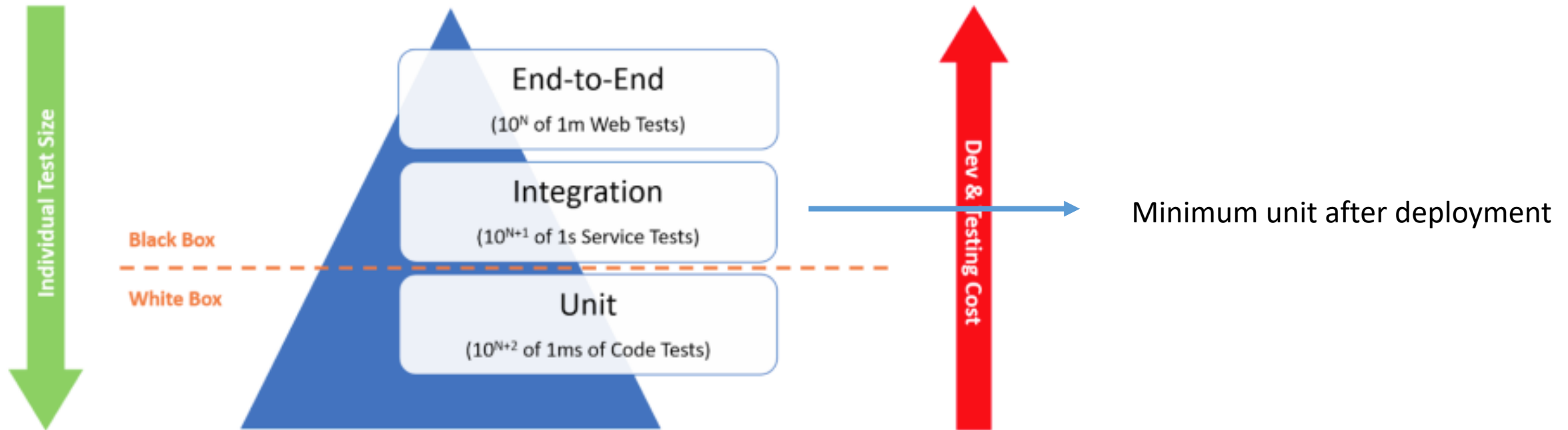
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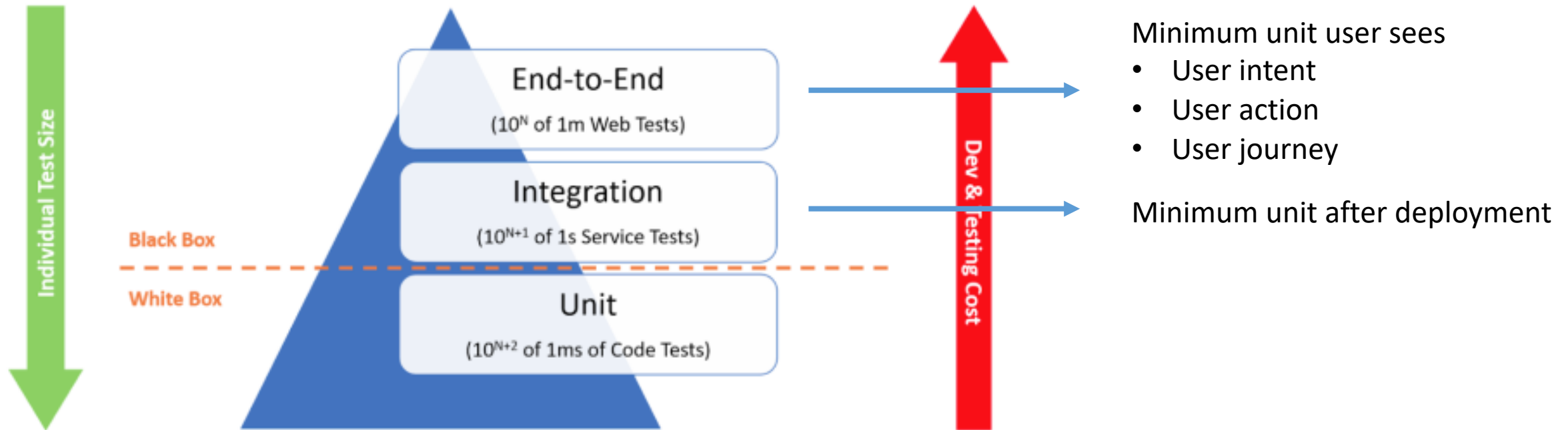
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What is the right testing level against production systems? #2



What is the right testing level against production systems? #2



Example of end to end tests #3

Example of end to end tests #3

- More than 1 million connected

dyson

Example of end to end tests #3

- More than 1 million connected
- Users all over the world
 - actions as simple as renaming your cleaning robot from 'Dyson 360 Eye' to 'RoboMop9000'

The Dyson logo, consisting of the word "dyson" in a lowercase, bold, sans-serif typeface.

How can we define an end to end test? #3

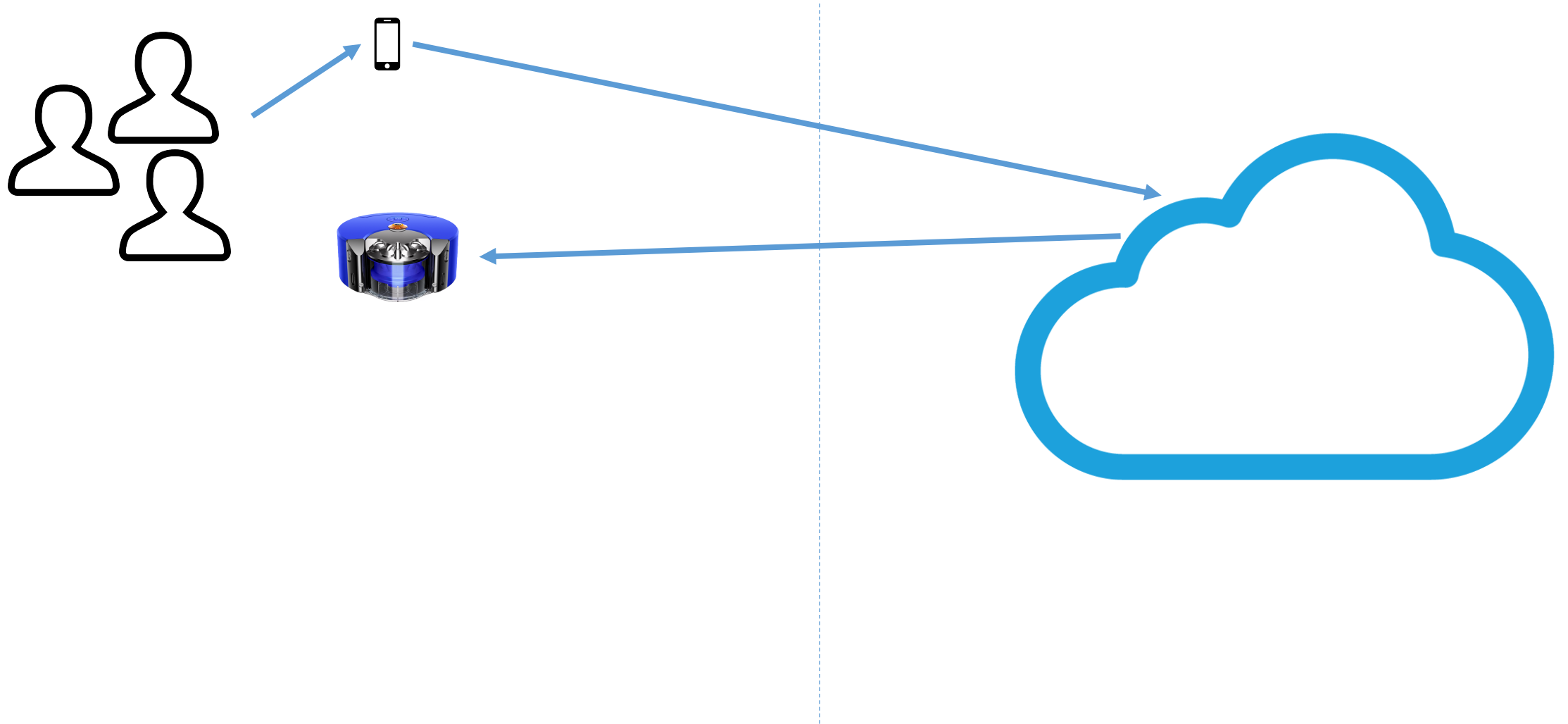
- Given an existing user with this configuration
- And the user logs in
- And the user changes robot name to 'RoboMop9000'
- Then the robot name has changed to 'RoboMop9000'

How can we define an end to end test? #3

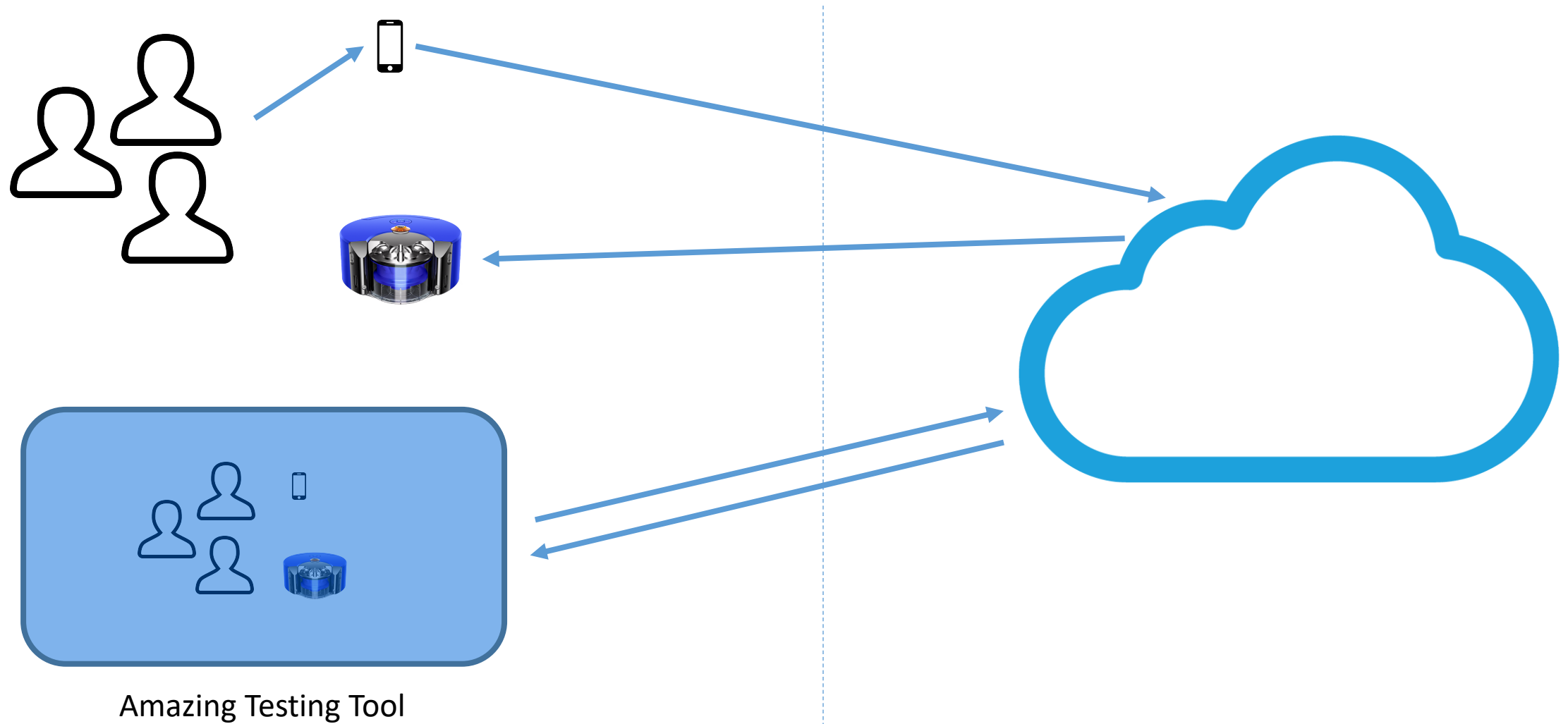
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How can we define an end to end test? #3



How can we define an end to end test? #3



How can we define an end to end test? #3

- Combination of:

- CucumberJS
- Request & Assert library

- Lots of single steps defining calls to APIs and data transformations
- Grouped together under user journeys or scenarios



How can we define an end to end test? #3

- Given an existing user with this configuration
- And the user logs in
- And the user changes robot name to 'RoboMop9000'
- Then the robot name has changed to 'RoboMop9000'

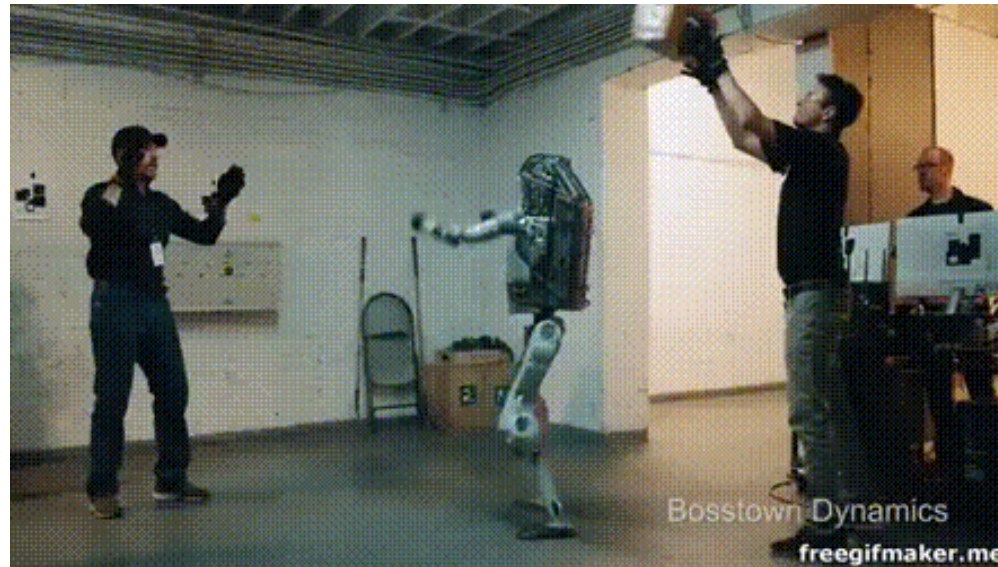
- Given an existing user with this configuration
- And the user logs in
- And the user schedules a
- Then the robot starts a clean within 10 seconds

- Given an existing user with this configuration
- And the user logs in
- And the user stops the clean
- Then the robot returns to the base within 10 seconds

BUT...

How avoid disrupting real users? #4 problem

- If your test is too close to real users and real actions...



How avoid disrupting real users? #4 solution

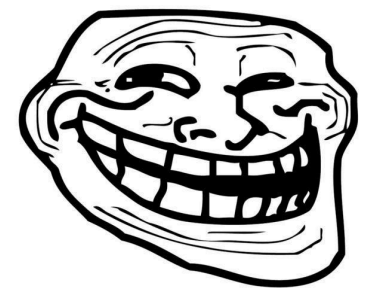
- Spacing these end to end tests
 - The more often you run them the faster you will notice an issue
 - Noise
 - Slowing down your production systems
 - Balance

How avoid disrupting real users? #4 solution

- Spacing these end to end tests
 - The more often you run them the faster you will notice an issue
 - Noise
 - Slowing down your production systems
 - Balance
- Virtual users registered in production like real users with their own configuration

How to keep your tests out of statistics? #5

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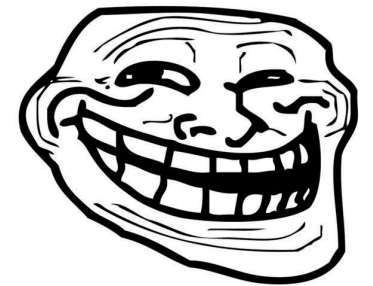


problem?

How to keep your tests out of statistics? #5

problem

- They can also skew some of the metrics you record like:
 - Number of users interacting with your system
 - API usage
 - Error count
- Even mixed logs
 - How to discern what was part of a test or part of a real interaction?



problem?

How to keep your tests out of statistics? #5

solution

- Correlation id

ffffffff-0000-0000-0000-000000000000

- User agent

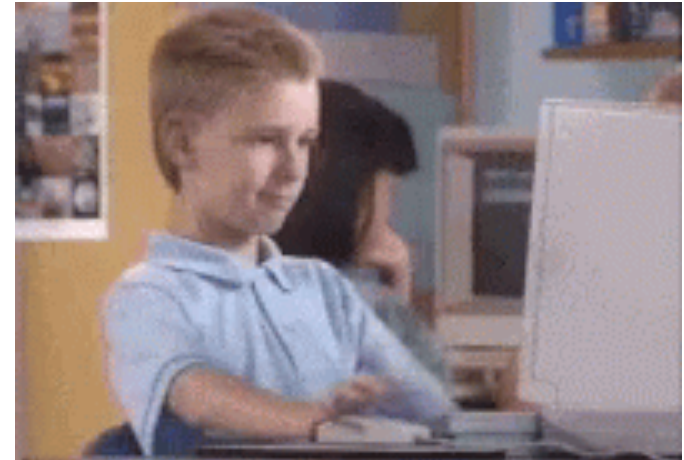
AppId/AppVersionId (Language=LanguageNameAndOptionallyVersion)

- Custom HTTP headers

TestToolVersion=1.1.2

Cleanup? #6

- Running tests in production 👍



Cleanup? #6

- But... what about the all the fake data they generated?



Cleanup? #6

- Automatically clean as much testing items as possible after each test
- Objective: Leave the system as you found it



Cleanup? #6

- Helps starting tests from a clean state
 - Avoiding false negatives
- Avoids cluttering your production databases
- Avoids exhausting other limited resources
- Avoids making real data more difficult to retrieve and search



That's interesting, new questions!

- Can your E2E Tests pass and you still have problems?
- By their nature E2E Tests span multiple services and teams
Who is responsible for them and how do teams collaborate to write them?
- How do E2E Tests compare to dark or canary Deployments?
Do you need both?
- How do you avoid E2E Tests becoming fragile?



Recap

- Testing in production is good and necessary 🎉
- Think like an user, act like an user 🧠
- CucumberJS is a good start
- Think about your system's capacity 📈
- Mark test intents to differentiate them from real user interactions
- Clear your test data and reset connections/status after each test

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and you?
are you brave enough to test in production?

Questions round