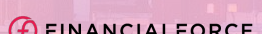
Welcome to

dreamOlé©



#dreamOle18

Barcelona 2018

dreamOlé©

SALESFORCE CERTIFIED
Administrator

SALESFORCE CERTIFIED
Advanced Administrator

SALESFORCE CERTIFIED
Platform Developer I

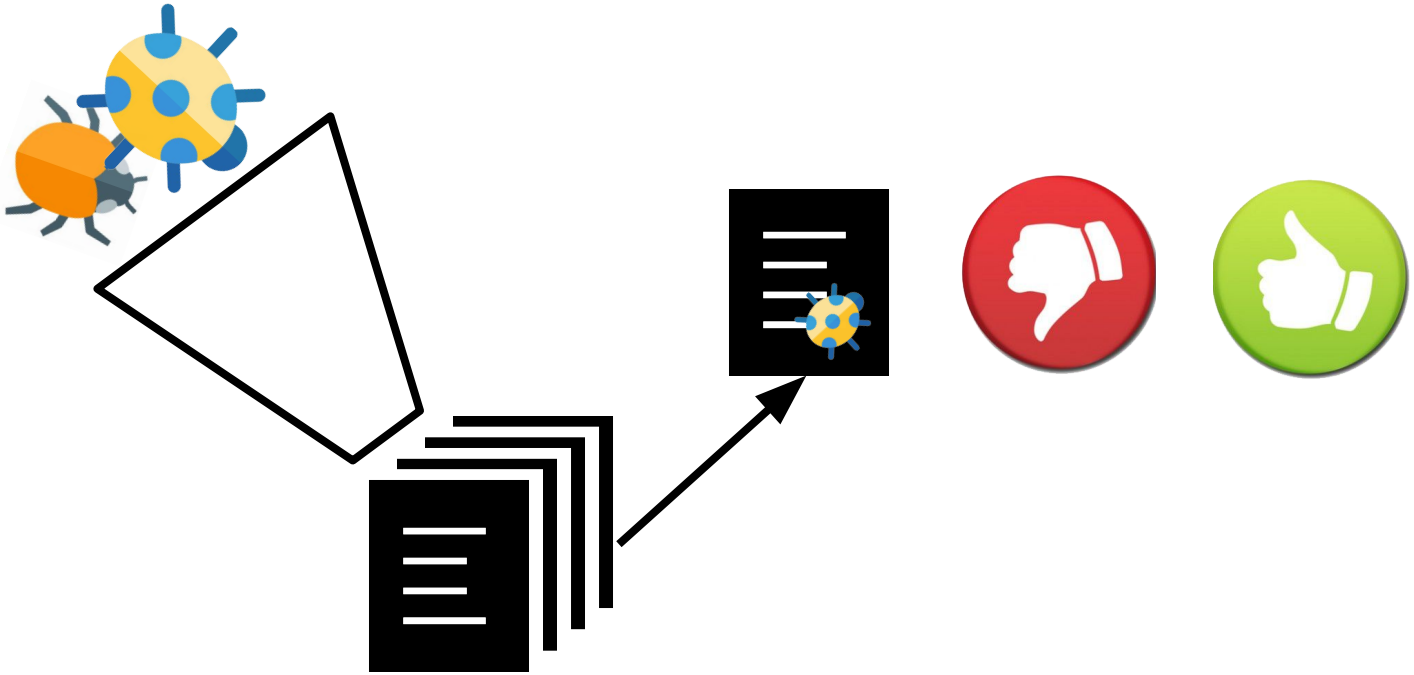
SALESFORCE CERTIFIED
Platform App Builder

Mutation Testing in Salesforce

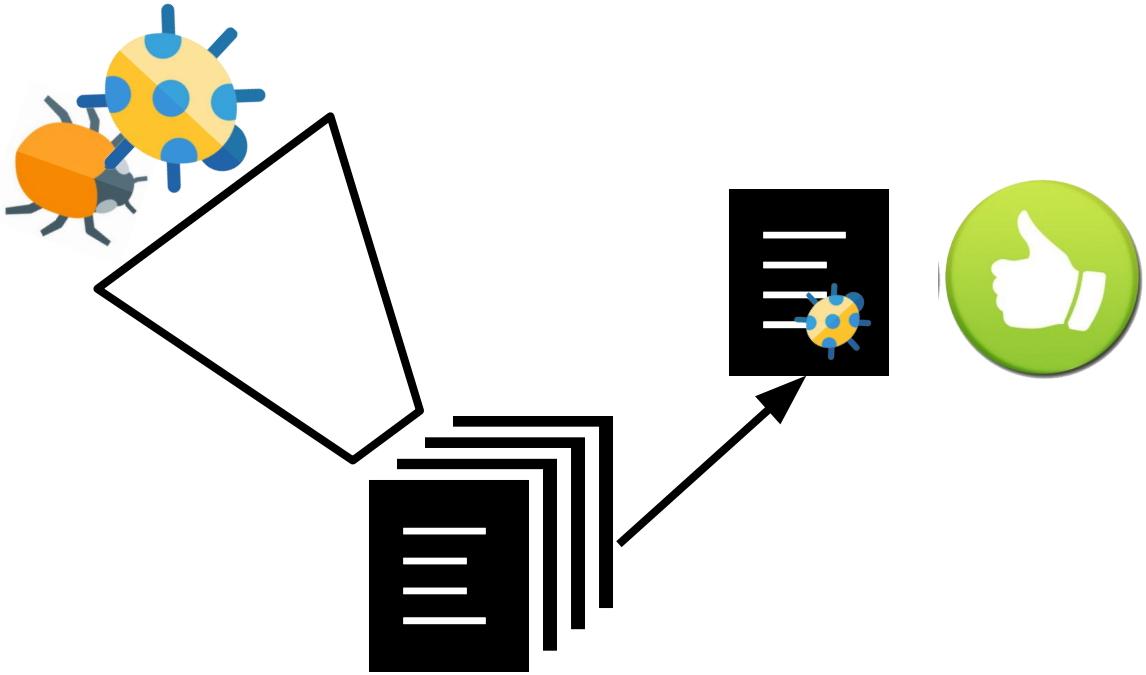
Sara Sali

Mutation Testing

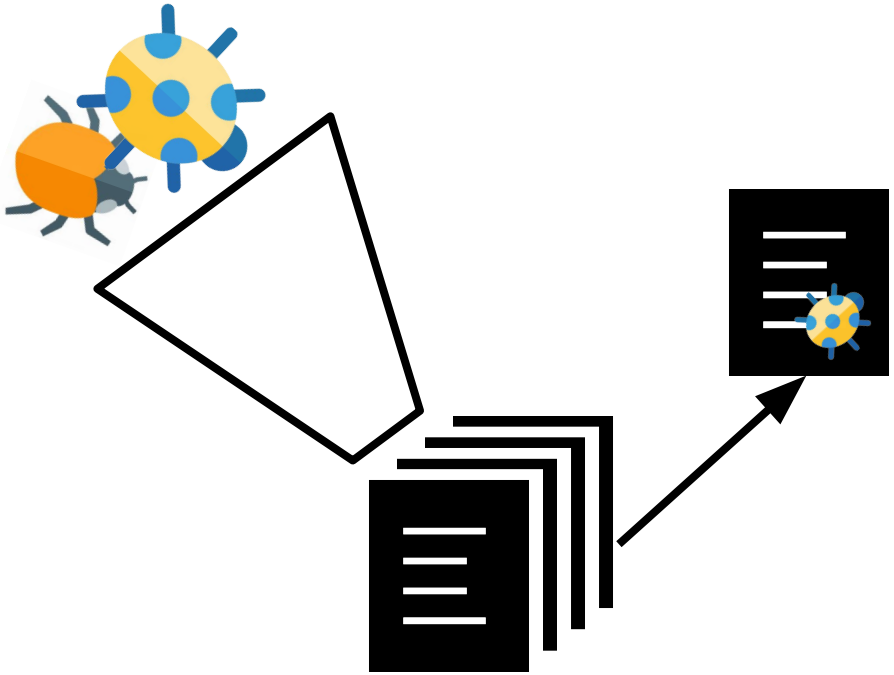
Mutation Testing



Mutation Testing

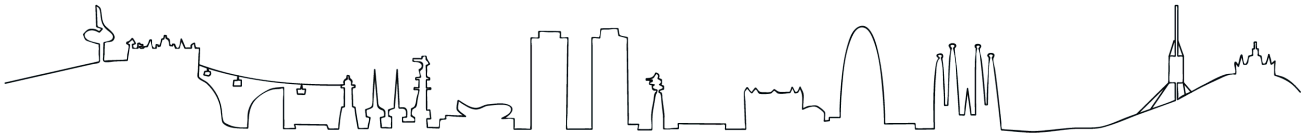


Mutation Testing

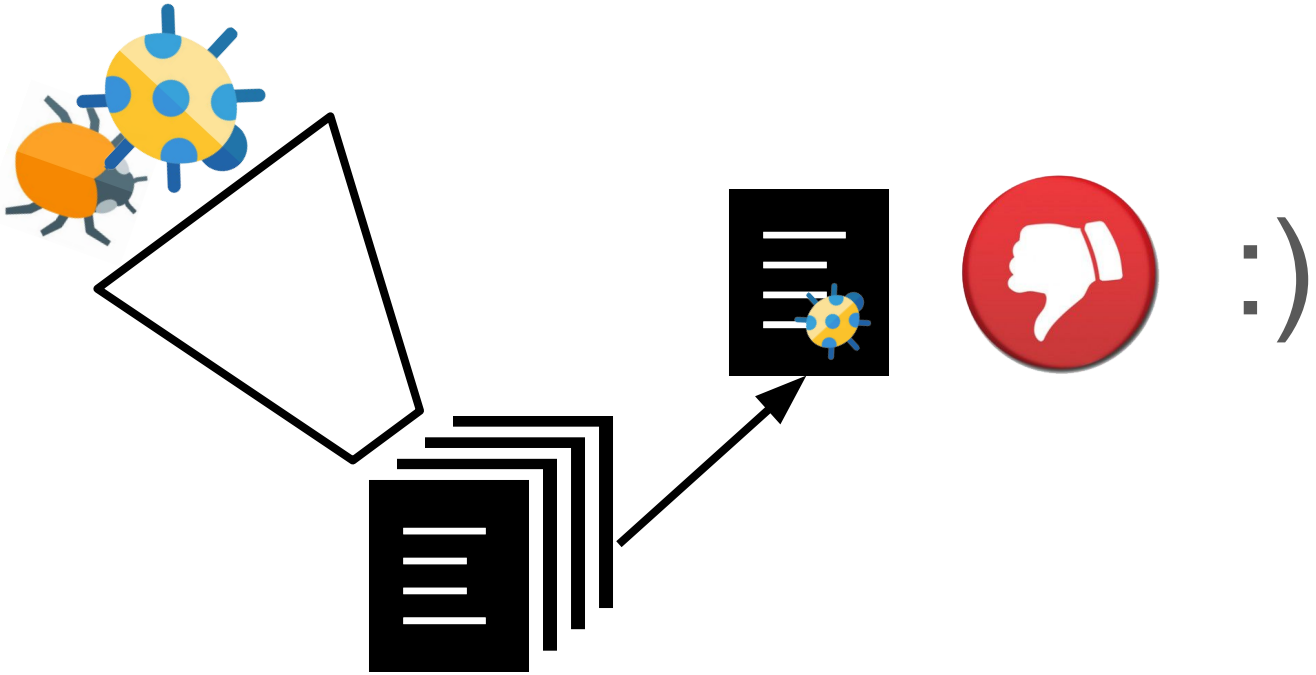


:(

Assert(x!=null)?
No assert?



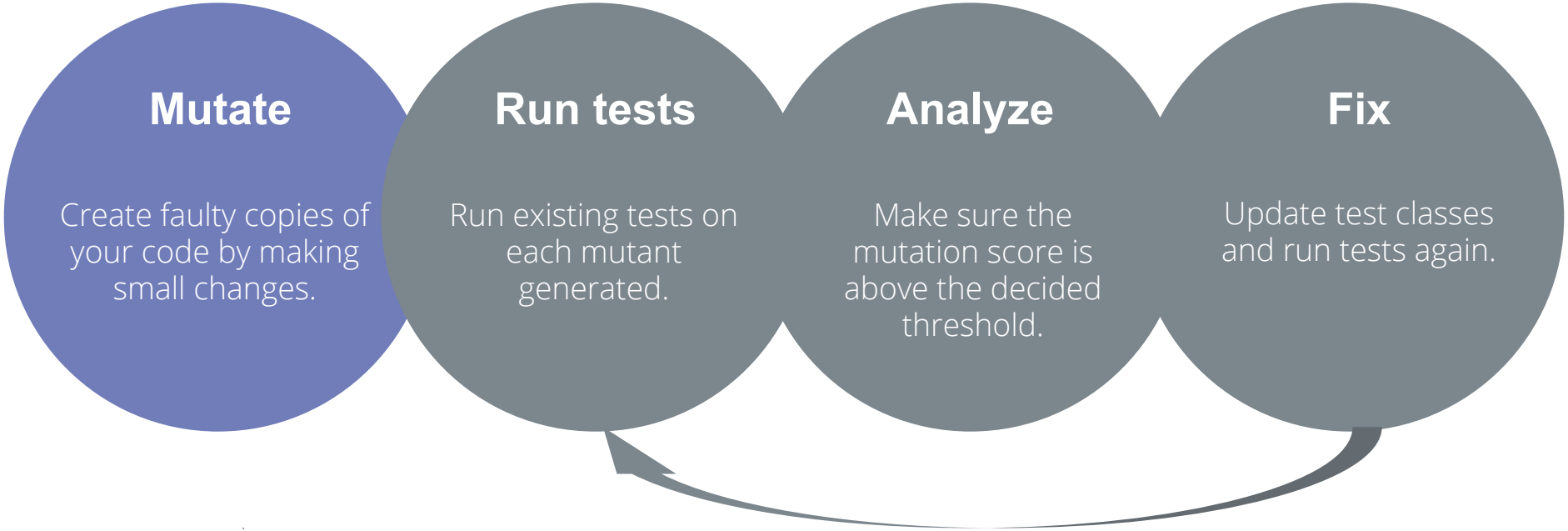
Mutation Testing



Mutation Testing

A type of software testing where we change certain statements in the source code and check if the test cases are able to find the errors.

Mutation Testing



Mutation Operators

```
List<Account> accs = [SELECT Id, Balance__c, hasGift__c FROM
Account ORDER BY Balance__c DESC];

Account max=accs[0];

If(max.hasGift__c == false || max.Balance__c > 500 000){

  removeGiftFromPrevious();

  max.hasGift__c=true;

}
```

Mutation Operators

```
List<Account> accs = [SELECT Id, Balance__c, hasGift__c FROM
Account ORDER BY Balance__c DESC];

Account max=accs[0];

If(max.hasGift__c == false && max.Balance__c <= 500 000){

  removeGiftFromPrevious();

  max.hasGift__c=true;

}
```

Mutation Operators

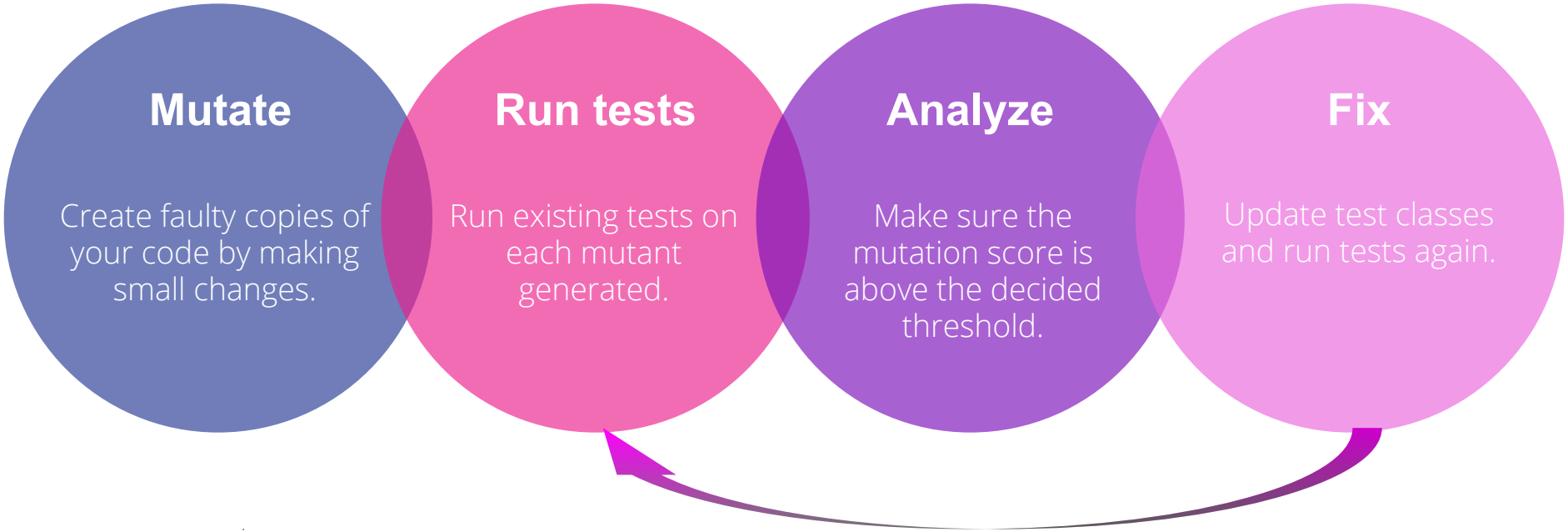
```
List<Account> accs = [SELECT Id, Balance__c, hasGift__c FROM
Account ORDER BY Balance__c DESC];

Account max=accs[0];

If(max.hasGift__c != false && max.Balance__c > 500 000){

  removeGiftFromPrevious();

  max.hasGift__c=true;

}
```

Mutation Operators

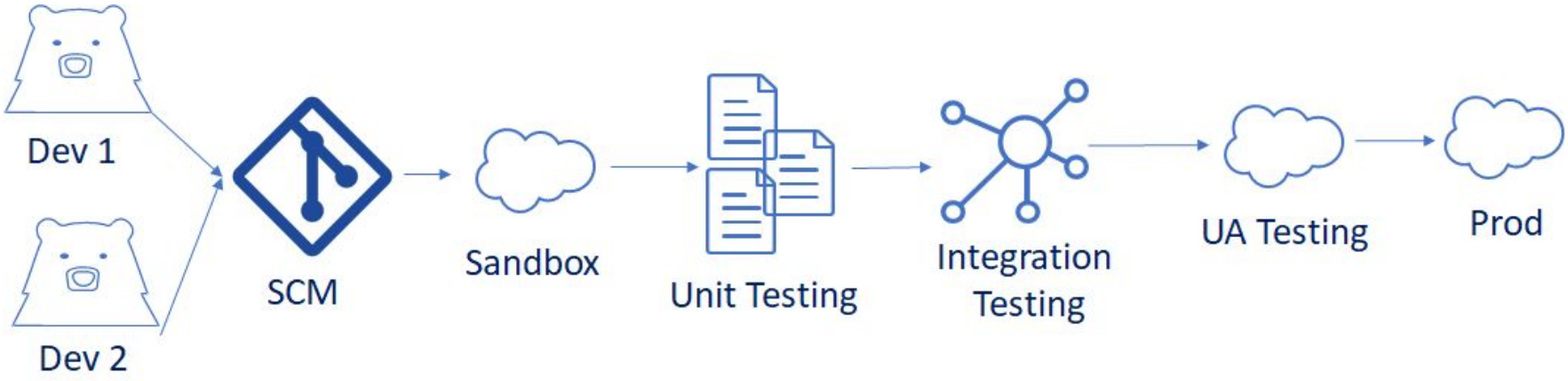
More:

1. Statement deletion, duplication or insertion
2. Replacement of boolean subexpressions with *true* and *false*
3. Replacement of some arithmetic operations with others, e.g. `+` with `*`, `-` with `/`
4. Replacement of some boolean relations with others, e.g. `>` with `>=`, `==` and `<=`
5. Replacement of variables with others from the same scope (variable types must be compatible)
6. ...

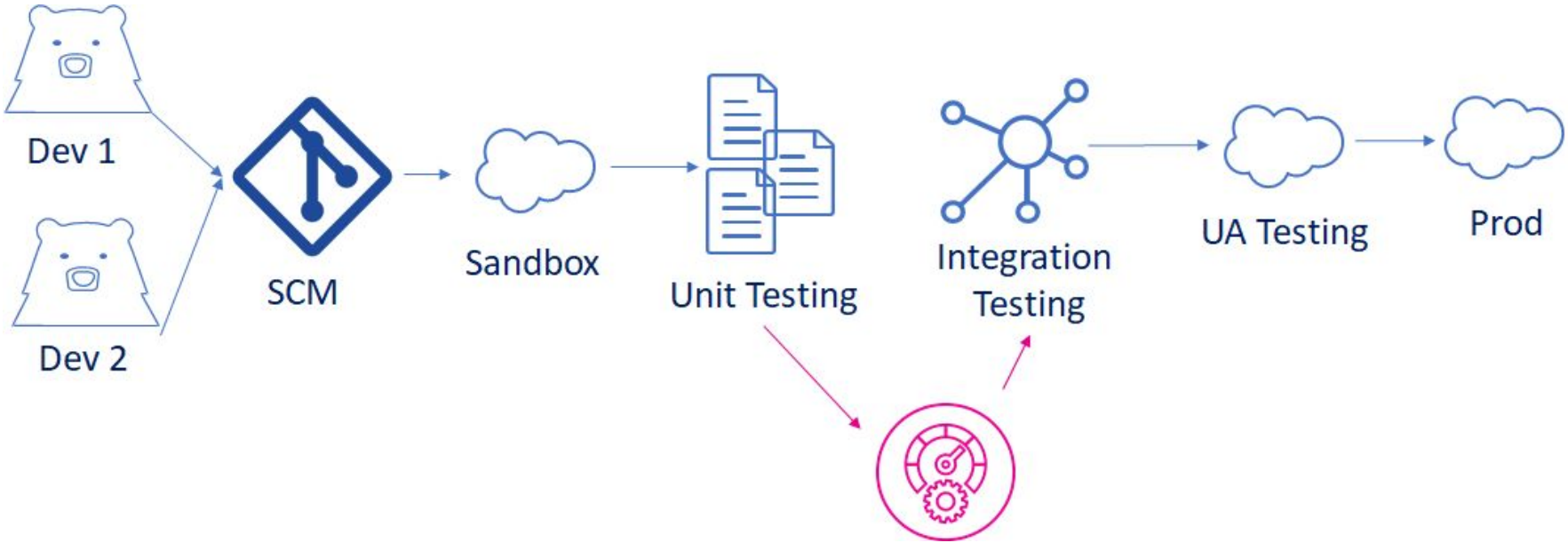
Mutation Testing



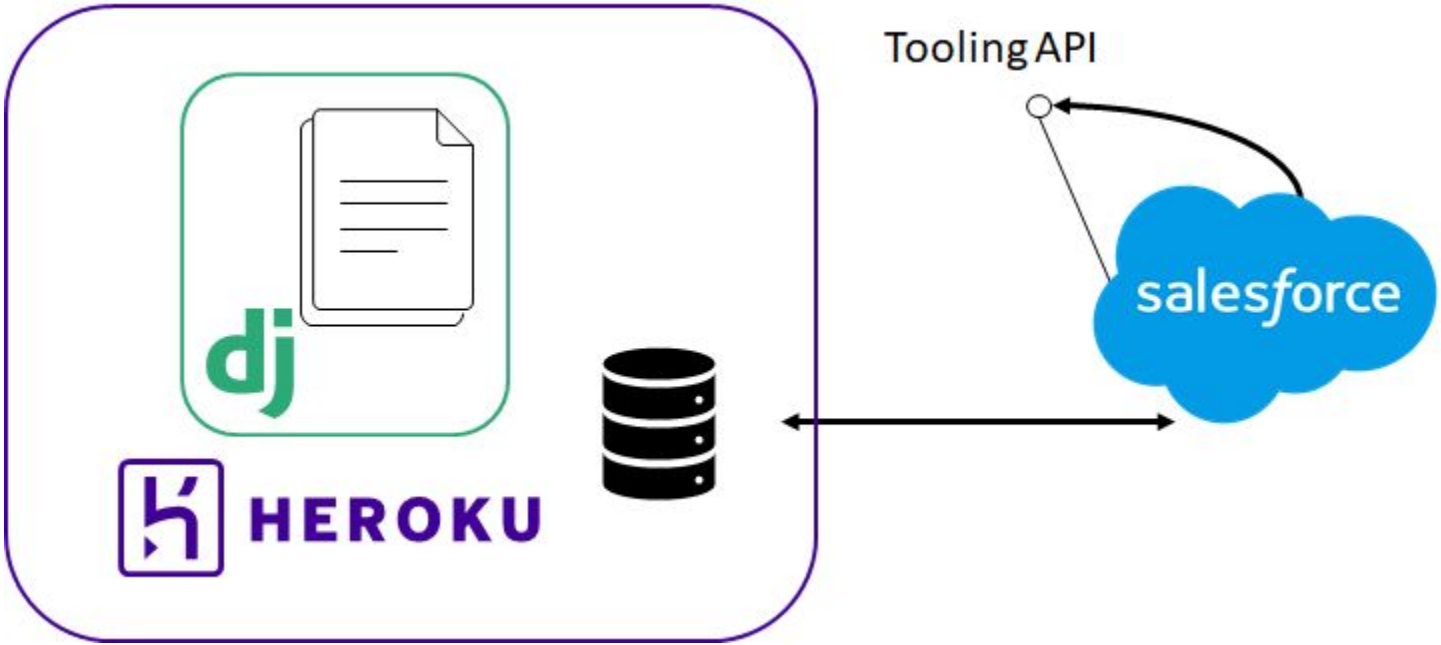
Deploy Process



Mutation Testing in the Process



Mutation Testing in Salesforce



Demo

Mutate, Run, Analyze, Fix and repeat...

Demo

In case things go wrong.

Mutation Testing Score

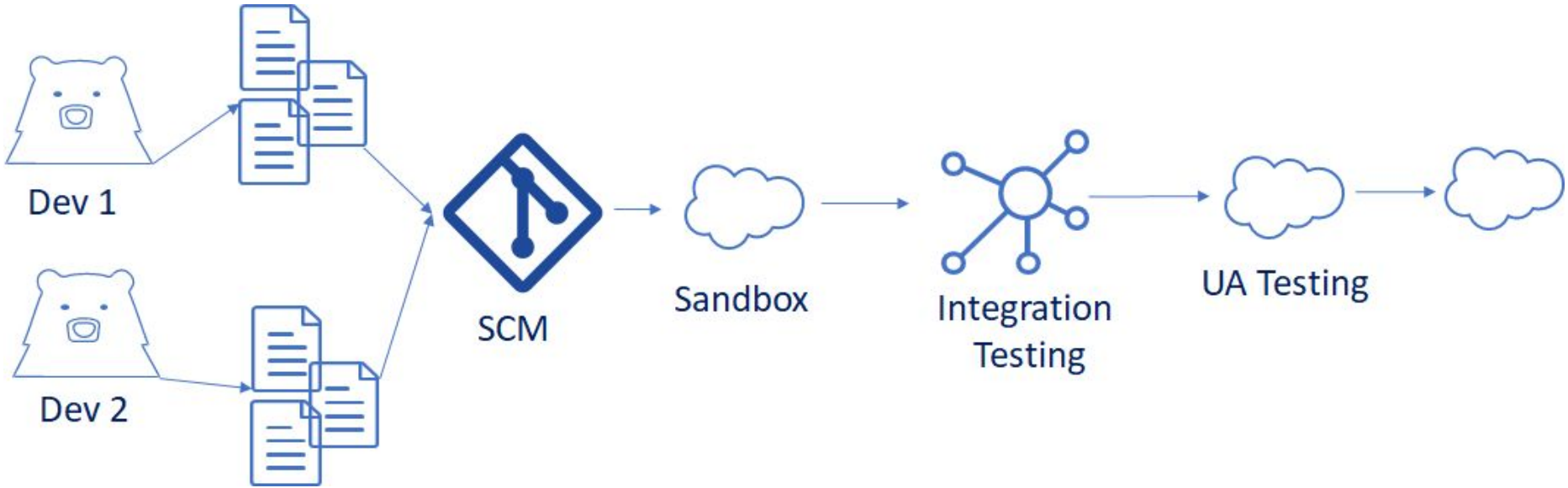
mutation score = killed mutants / all mutants (%)

Managers, Team leads and deploy masters measure the quality of test suites.

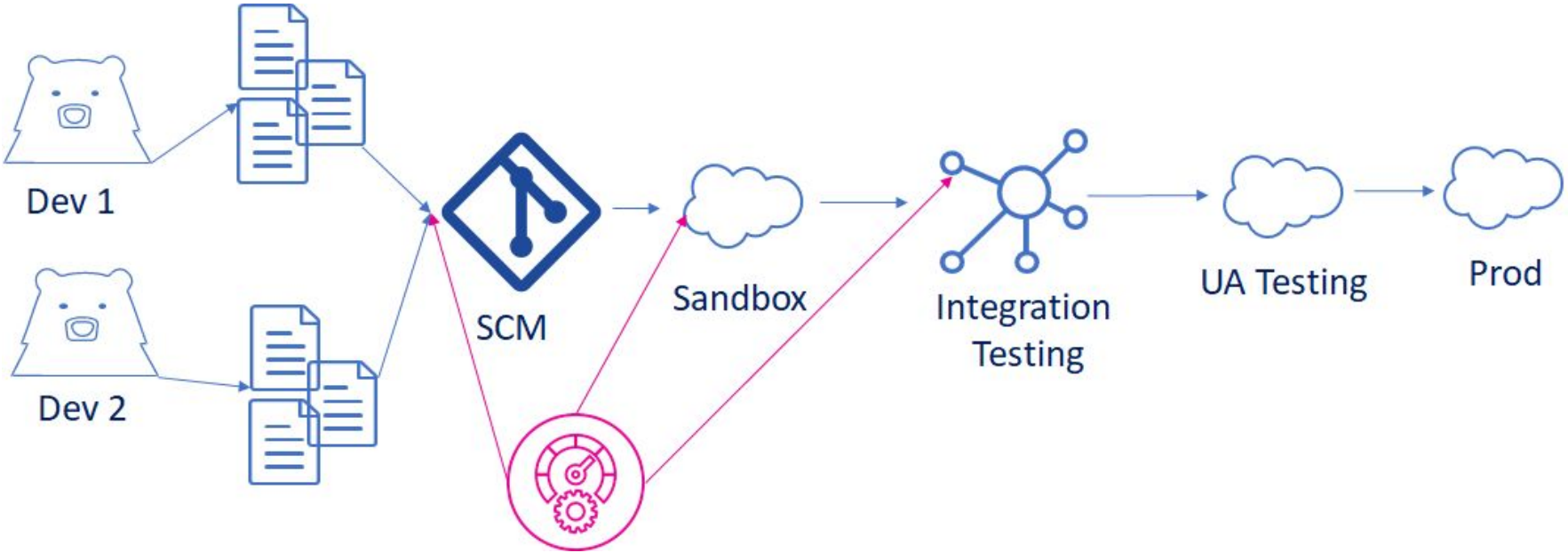
Developers rely on the tests created by other members of the team.

Developers understand which classes need better tests.

DX



Mutation Testing in DX

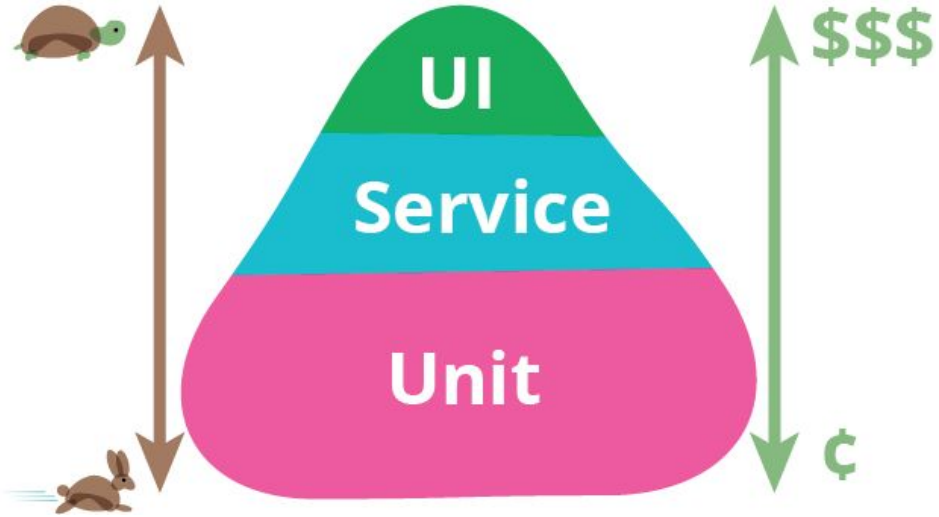


Mutation Testing

Know that your **test suite is** valuable and **future proof**

Integrate smoothly with changes from other team members

Go to the manual testers with higher **confidence**



Thank you!

References and more...

Find out more: **bit.ly/sfmutants**

https://en.wikipedia.org/wiki/Mutation_testing

https://martinfowler.com/bliki/TestPyramid.html

https://github.com/aliparsai/LittleDarwin

https://success.salesforce.com/ideaView?id=0873A0000003TUzQAM

sara.sali@weare4c.com LinkedIn: linkedin.com/in/sarasali/

Q & A

copa.do

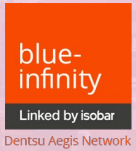
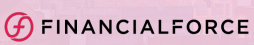
omega crm

Cognizant

FORMTITAN

resco.net
technology on the move

MAKEMECLOUD
consulting

aircall

blue-
infinity
Linked by isobar
Dentsu Aegis Network

FINANCIALFORCE

wefox

BLACKBIRD