TESTING

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POLYTECH NICE-SOPHIA

INTRODUCTION

Software quality

- What is it?

Software quality

- What is it?
- No Defects?

Software quality

- What is it?
- No Defects?
- Or….

- Known defects?

Known defects???

- Goals of quality are:
  - Know and document bugs
  - Verify them for regression
  - Find workarounds
  - Feed more requirements

How do you **choose** your defects?

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- Dev methodology
- Team culture
- Good practices
- Correct soft. Architecture
- Early Integration

- And…

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- Dev methodology
- Team culture
- Good practices
- Correct soft. Architecture
- Early Integration
- And…

- **Testing**

Types of tests

- Unit-tests
- Integration tests
- Acceptation tests

- …ok…. What else?

Types of tests

- Unit Tests
- Integration Tests
- GUI Tests
- Non-regression Tests
- Coverage Tests
- Load Tests
- Stress Tests
- Performance Tests
- Scalability Tests
- Reliability Tests
- Volume Tests
- Usability Tests
- Security Tests
- Recovery Tests
- L10N/I18N Tests
- Accessibility Tests
- Installation/Configuration Tests
- Documentation Tests
- Platform testing
- Samples/Tutorials Testing
- Code inspections

Seriously, you do all of this stuff???

How the hell do you get organized???

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How the hell do you get organized???

TEST ARCHITECT

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Test architect role

- Choose test tools
- Define practices
- Build base frameworks → reusability
- Find test data
- Global test bucket consistency, strategy

Test Tools

Criteria

- Language
  - Eg: java -> jUnit and variants (HttpUnit, etc.)
- Type of app
  - Eg: desktop, mobile
- Layer where test is applied
  - Eg: UI → Selenium, RFT and other robots
- Goals
  - Eg: Perf -> jMeter
- Phase
  - Eg: functional vs system, see later

Define Test Practices

- Coding guidelines
- Test inventory tracking
  - Inventory tooling (RQM and the likes)
- Manual vs automated
  - ROI
  - Exploratory

Define Test Practices

- Policies
  - Eg: each new defect gets a testcase
- Testability
  - Eg: naming UI elements
- Repeatability
  - Setup / cleanup guidelines
  - Or: VM snapshoting

Test Data

- Representative samples
- Customer data
  - through support ticket
- Adhoc data
  - Eg: to cause error conditions
- Need be managed
  - Inventoried
  - Anonymized (confidential info)
  - Setup (Eg: prod-like DB)

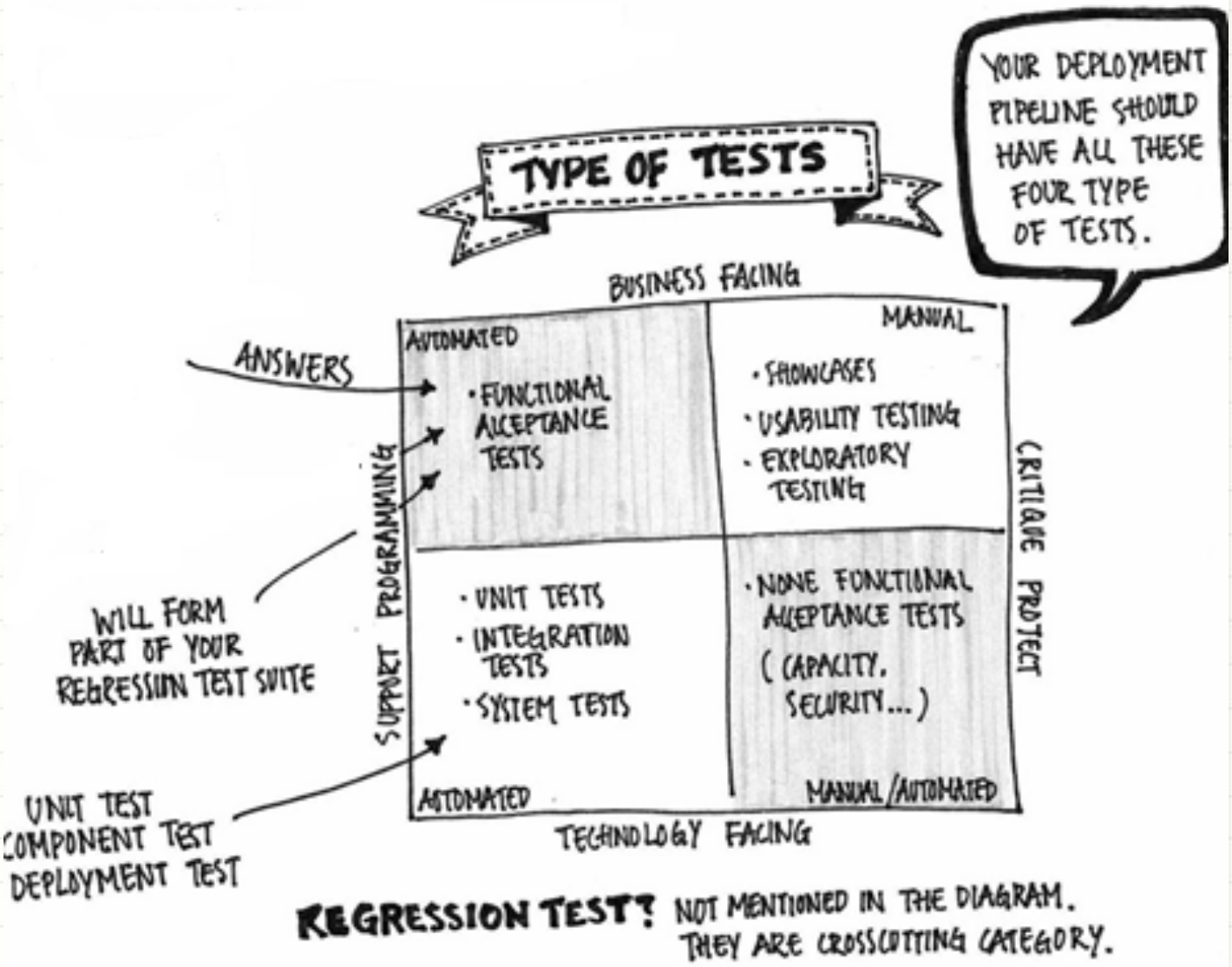
Test Strategy

- Aka: where and when to test
- Sources of information
  - User defect reports
  - Coverage data
  - User story / functional understanding
- Measure effectiveness
  - # defects / regressions found
  - Time to find next defect
  - Time spent in maintenance

Test Dimensions

Can be organized based on:

- Product area
- Goals (find defects, measure perf., …)
- Team in charge
- Dev. Phase
- Execution time



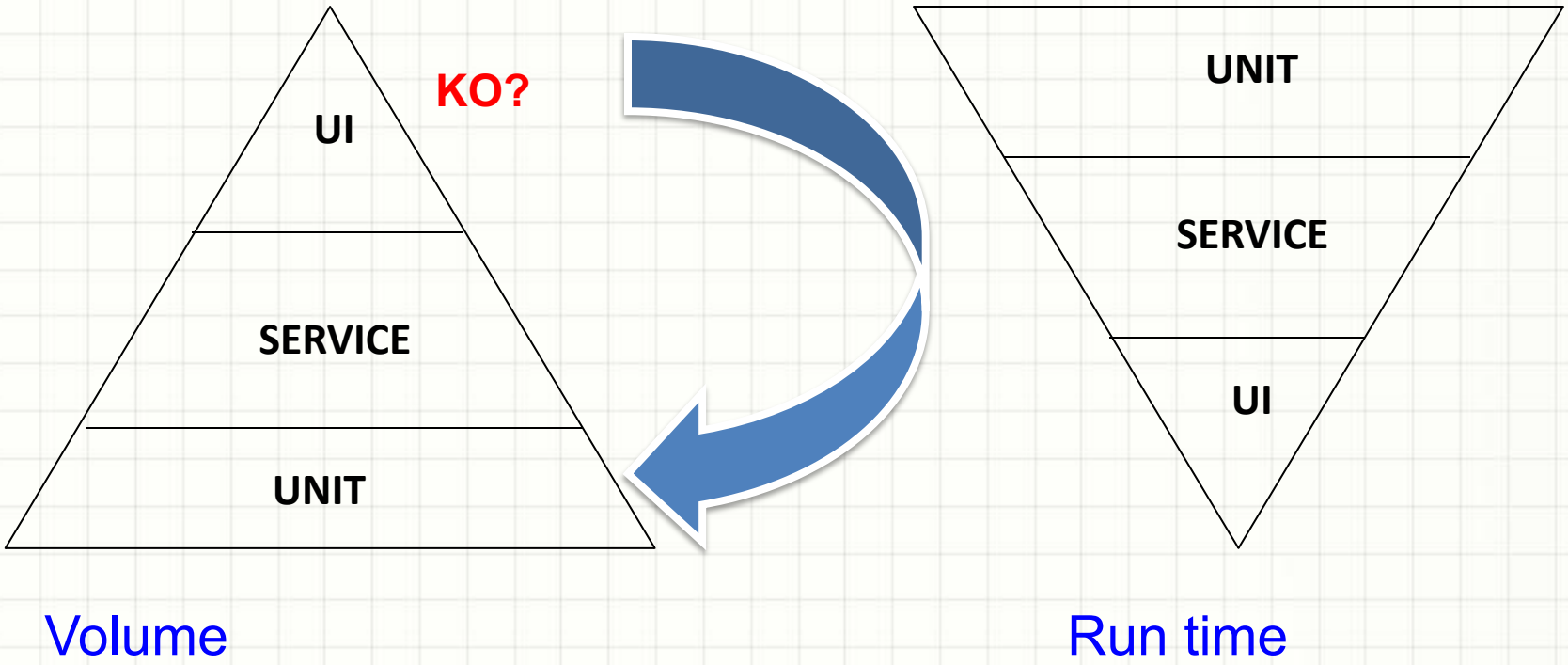
(From: Nhan Ngo)

Test Sizes

- Number
- Execution time
- Depth of paths traversed

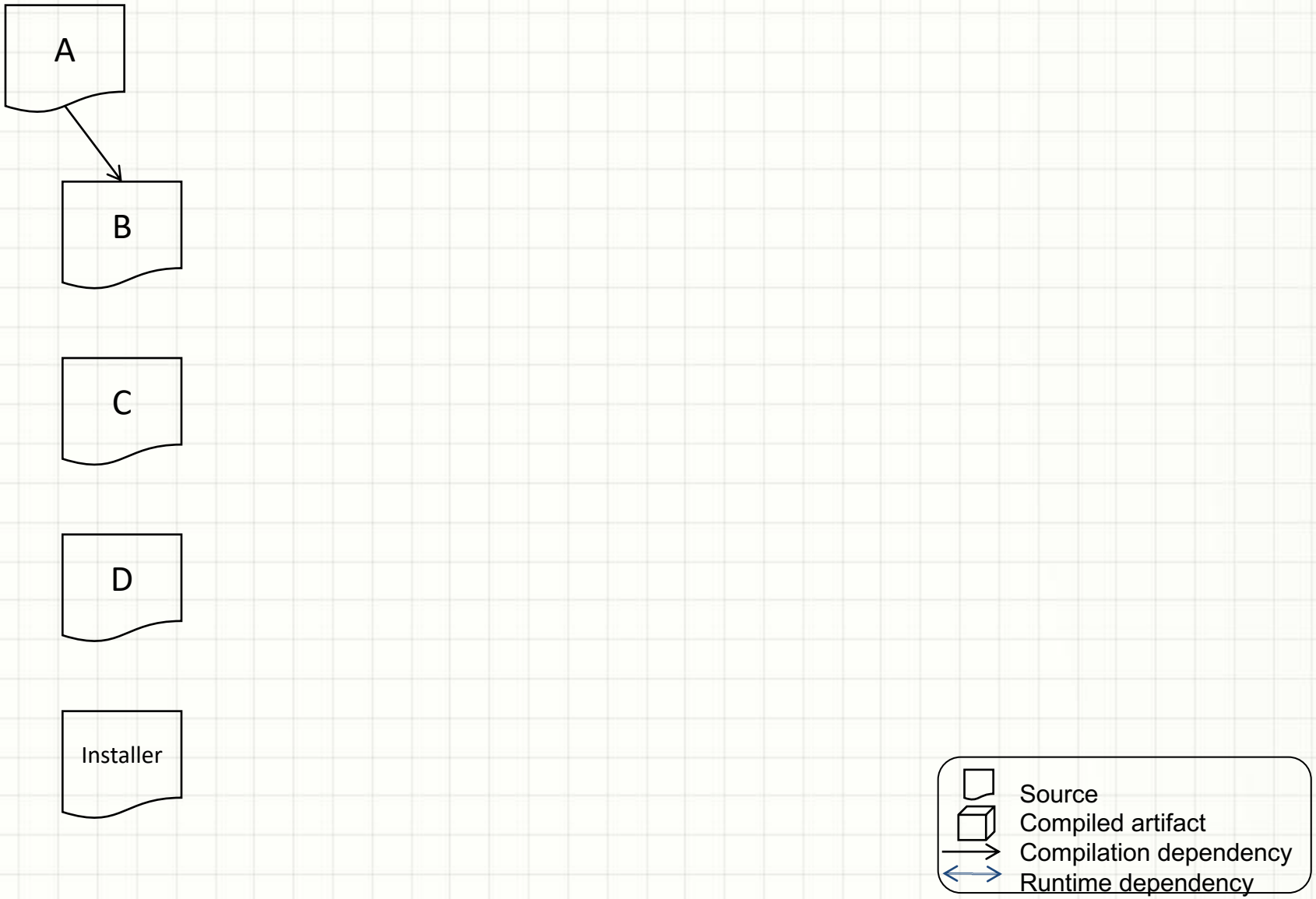
"In particular I always argue that high-level tests are there as a second line of test defense. If you get a failure in a high level test, not just do you have a bug in your functional code, you also have a missing unit test. Thus whenever you fix a failing end-to-end test, you should be adding unit tests too."

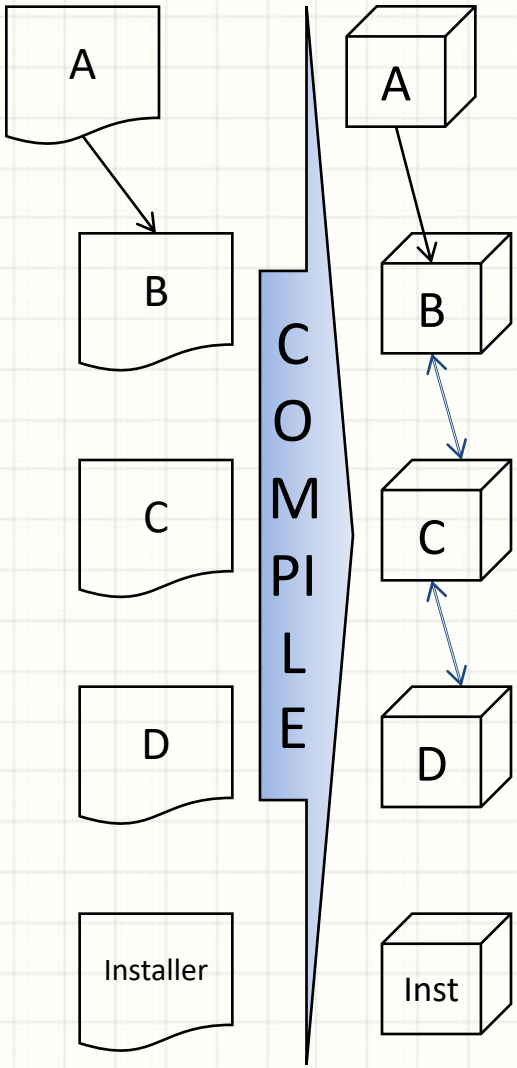
Martin Fowler


KO?
UI
SERVICE
UNIT
UNIT
SERVICE
UI
Volume
Run time

Functional vs. System

- Some make a big difference between Functional and System testing
- But
- It’s just a continuum


A
B
C
D
Installer
Source
Compiled artifact
Compilation dependency
Runtime dependency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Installer
COMPILE
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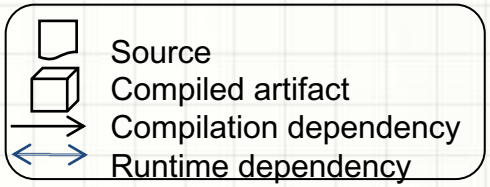
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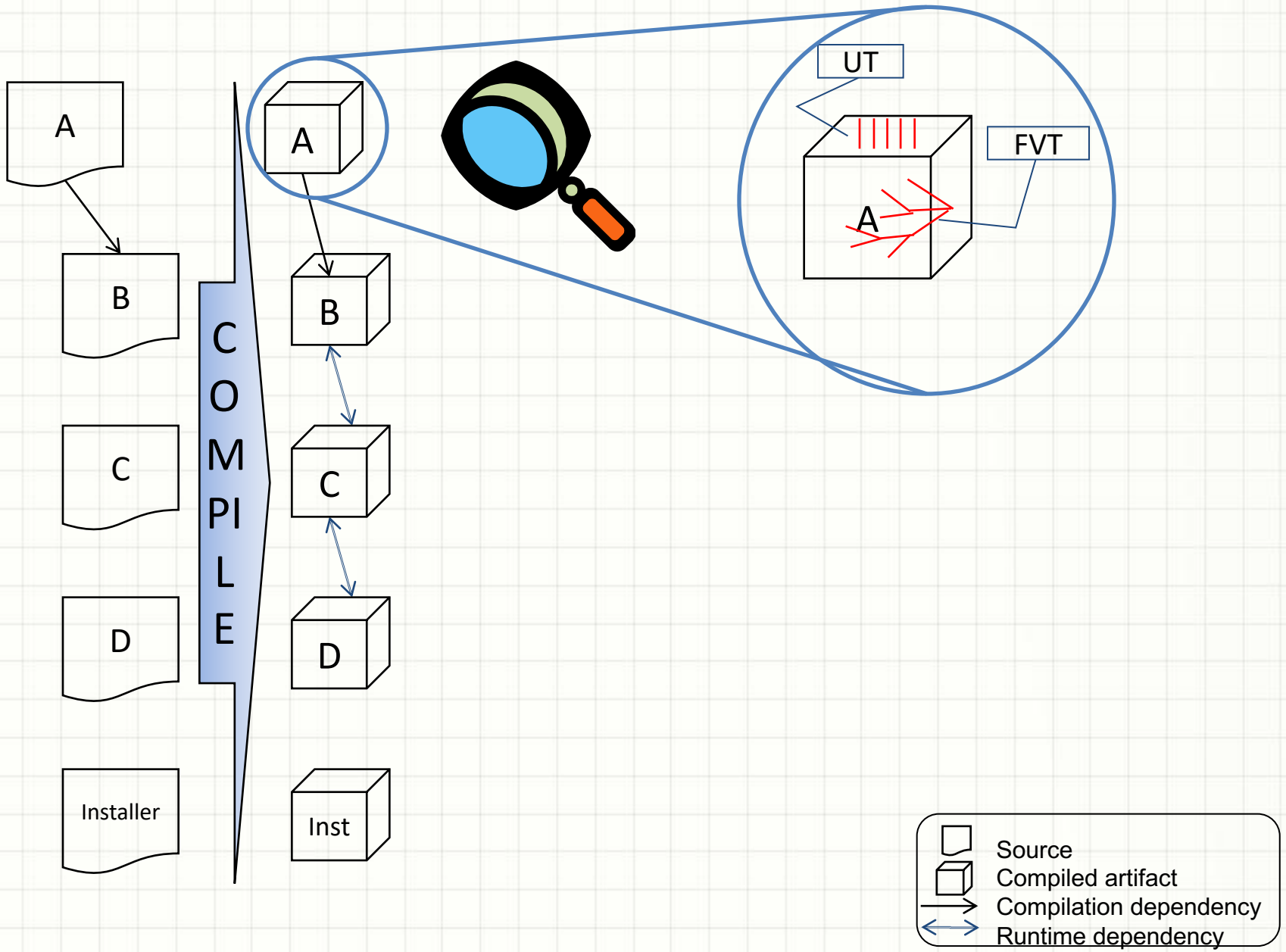
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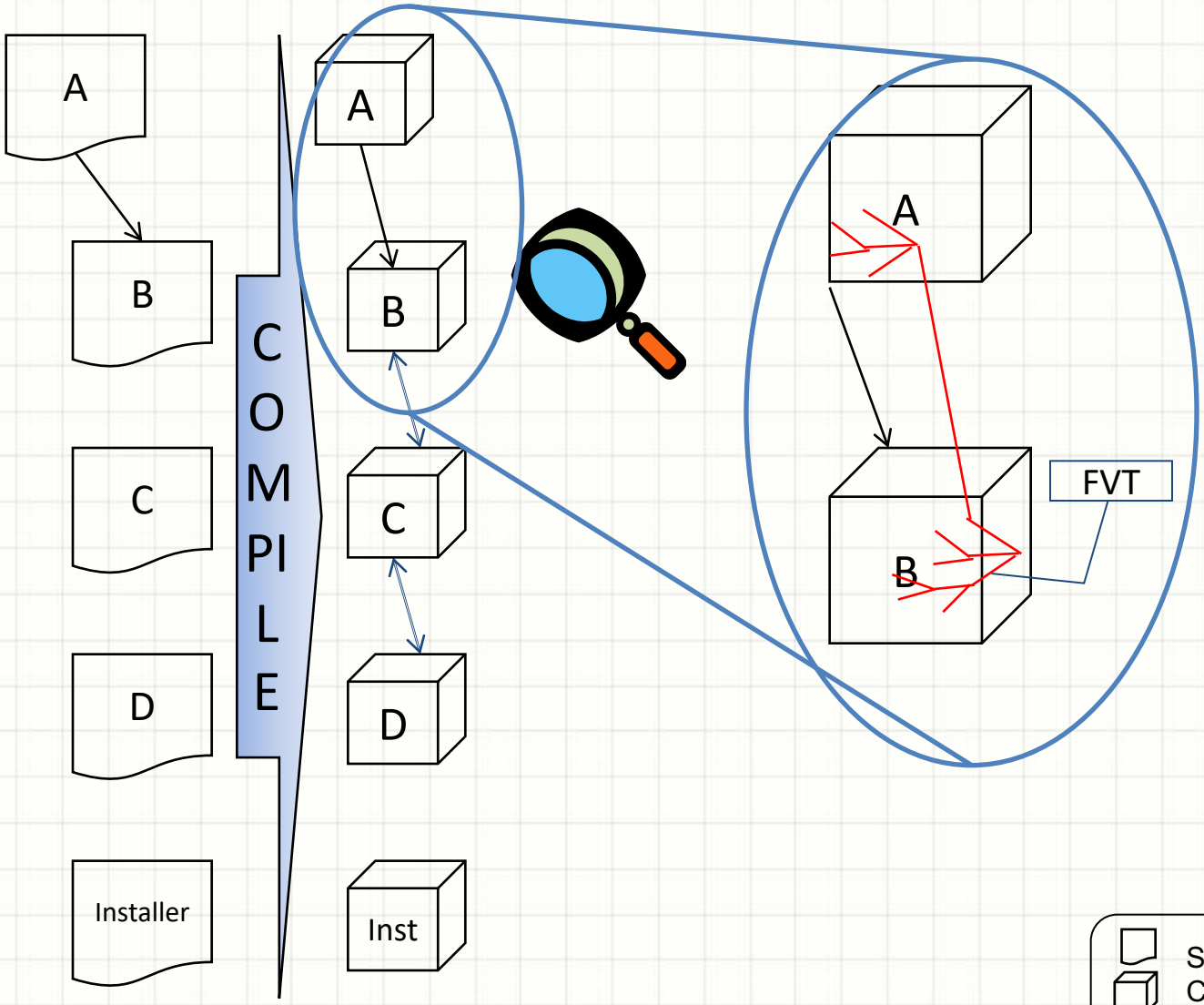
Compiled artifact
Compilation dependency
Runtime dependency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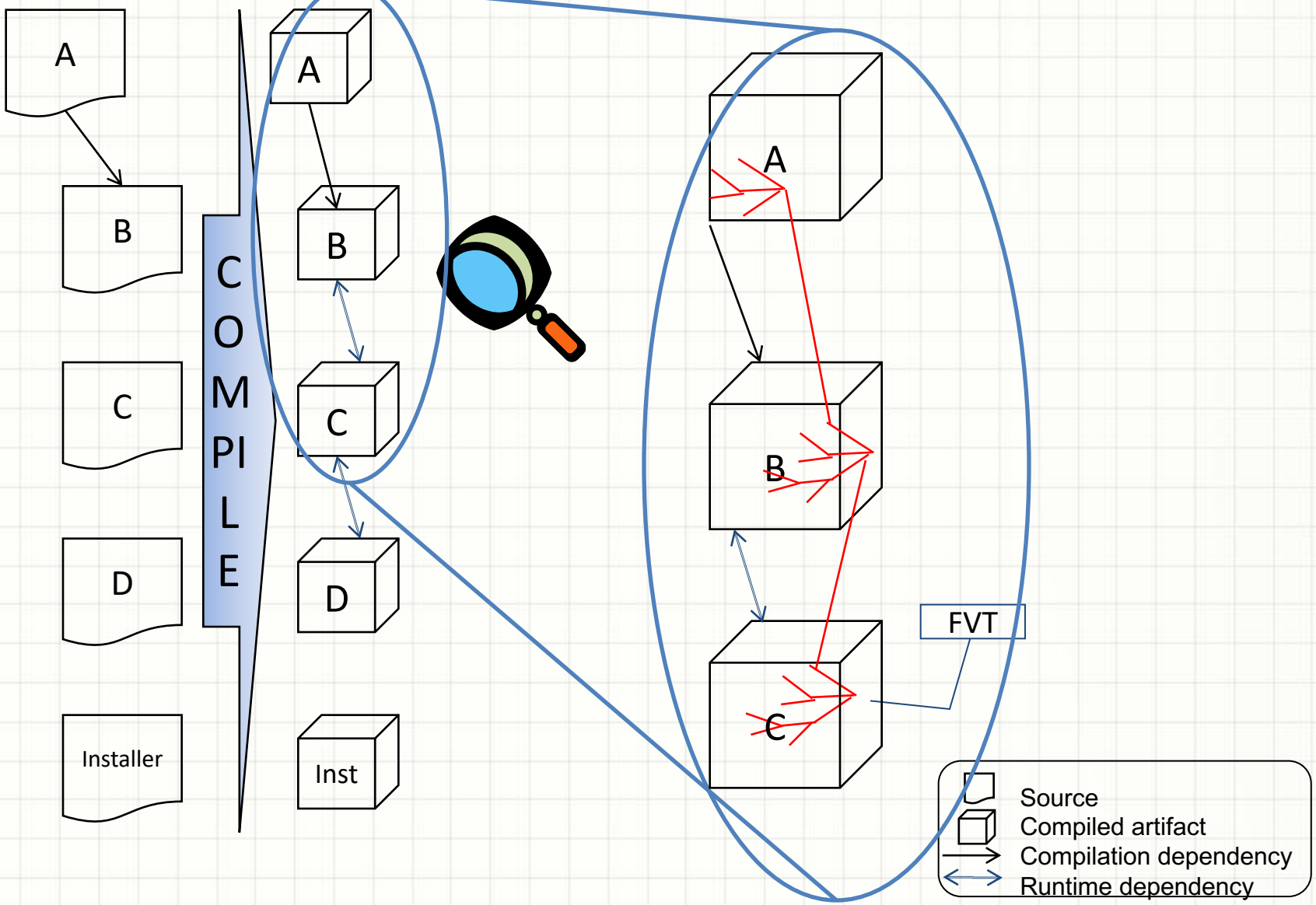
Runtime dependency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Installer
COMPILE
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FVT
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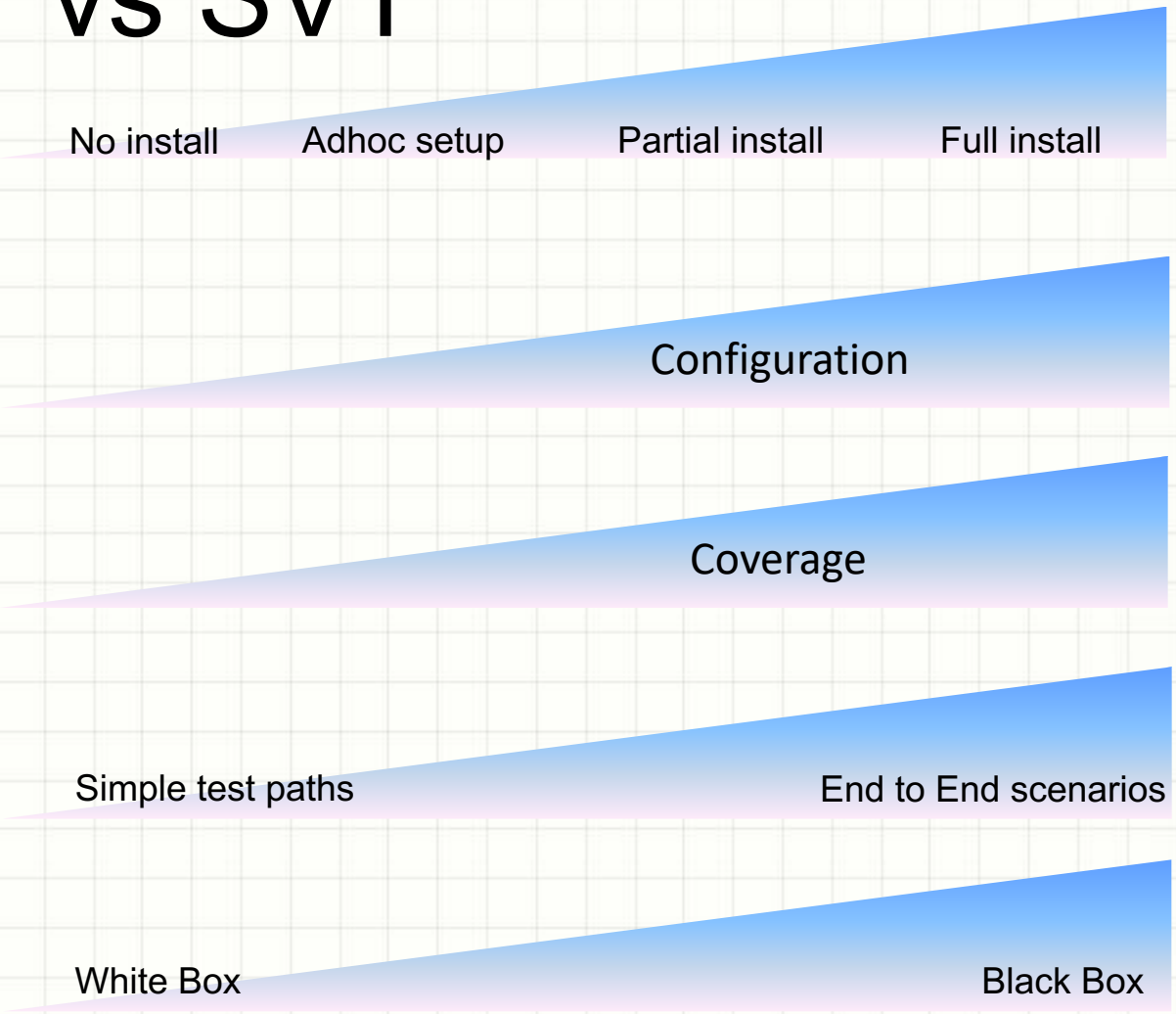
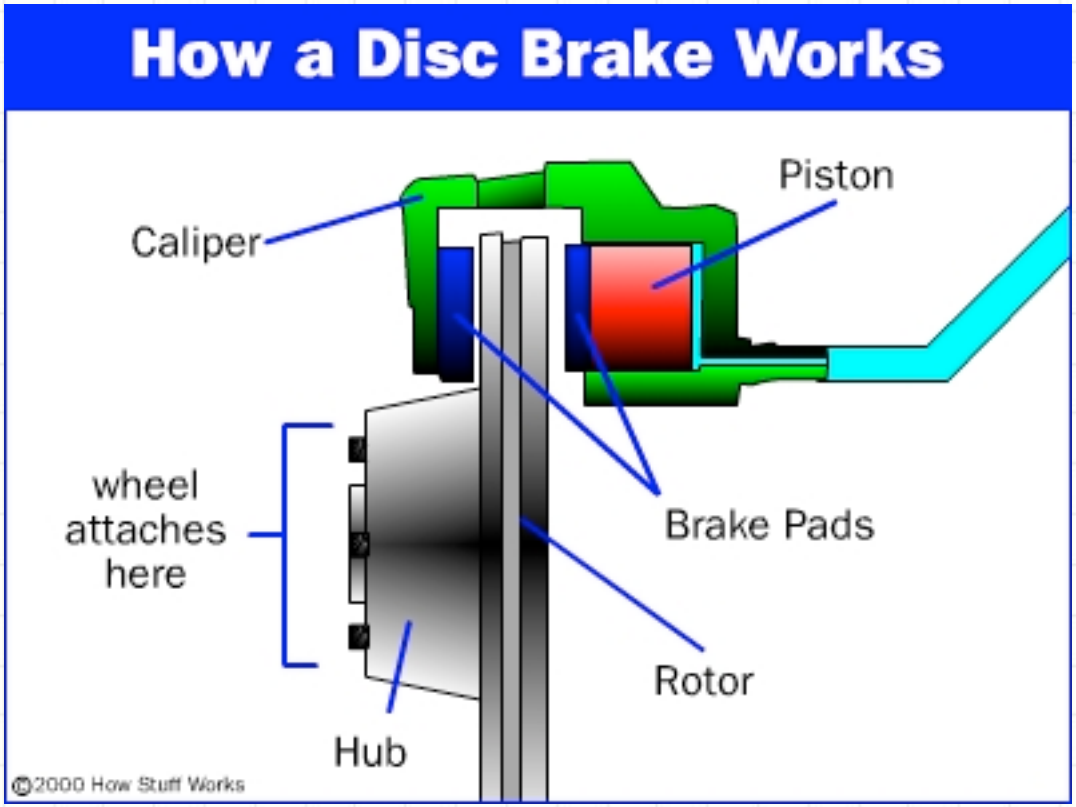
Runtime dependency

FVT vs SVT


No install
Adhoc setup
Partial install
Full install
Configuration
FVT
Coverage
SVT
Simple test paths
End to End scenarios
White Box
Black Box

Unit-, Functional- & Integration tests

Unit-Test


How a Disc Brake Works
Piston
Caliper
wheel attaches here
Brake Pads
Rotor
Hub
©2000 How Stuff Works

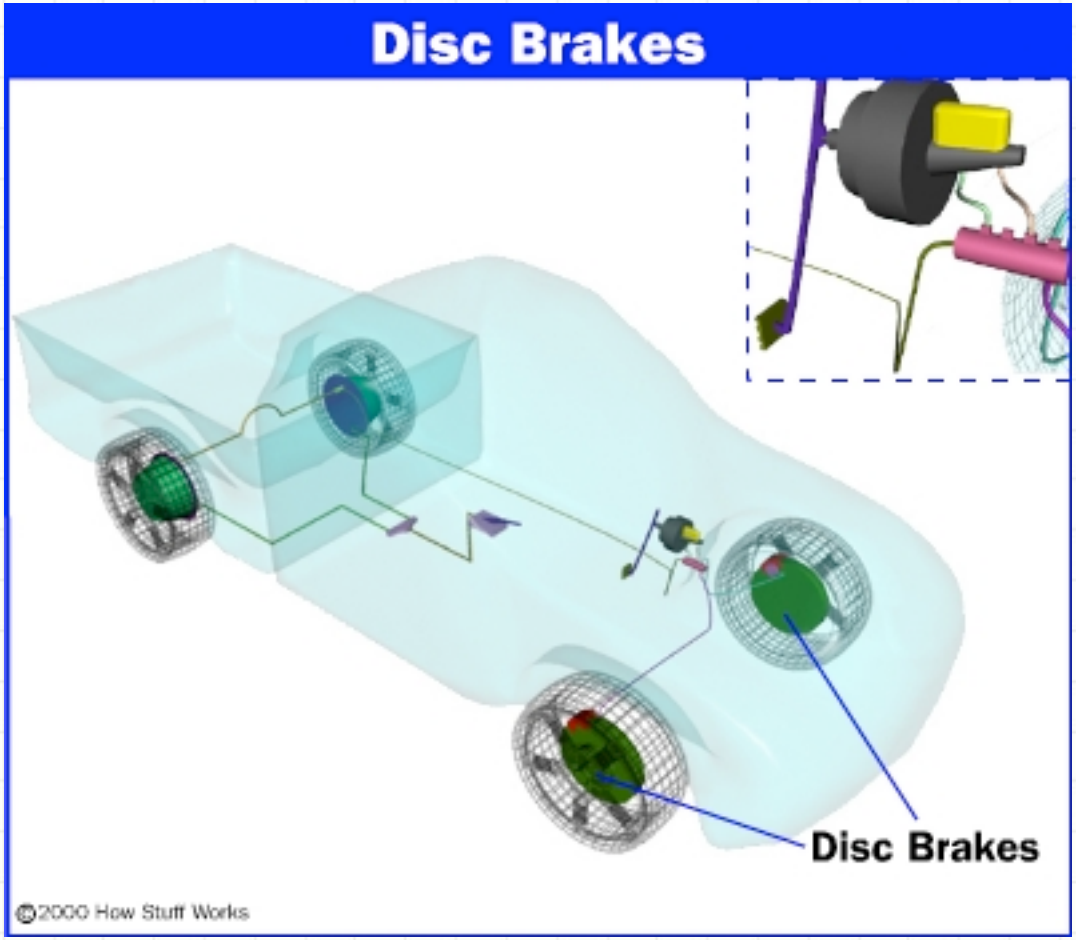
Unit-Test

Example:

CartModifier add(Customer, Item)

KitchenBean process(Order)

Functional Test



Functional Test

Example:

CartWebService
addItemToCustomerCart(String, Item)

Functional - specs

GIVEN

The Cookie Factory server and its Webservices

The customer Bob

WHEN

Bob calls the CartWebService addItemToCart WS with 3 chocolate cookies

THEN

- Bob’s cart is updated (incremented by 3 items)
- TCF inventory is updated (3 cookies removed)
- …

Unit vs Functional

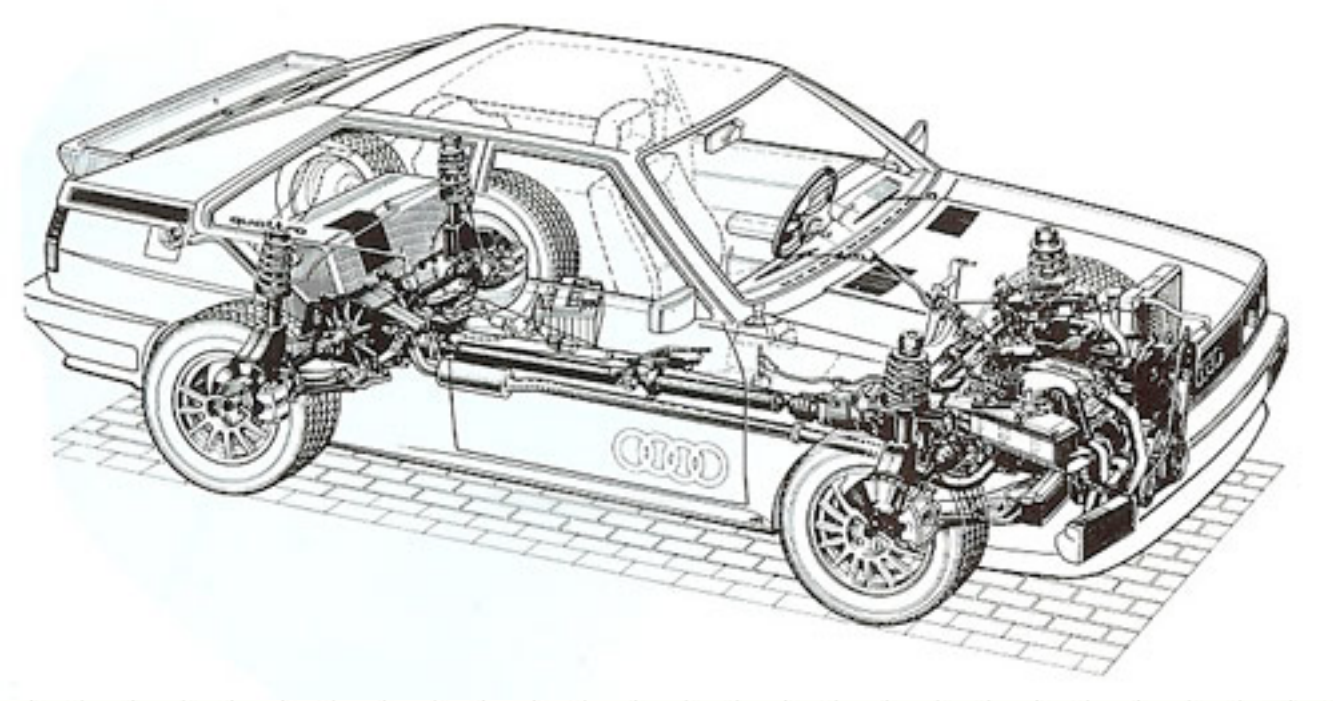
Technology <-> Function

Programmer <-> User

Does it work? <-> Does it implement the function I need?

Small <-> Bigger

Integration Test



Integration Test

Example:

CLI

OrderCookie.execute

Integration Test - specs

GIVEN
- TCF server, connected to “a” (*) bank system
- The CLI client
- The right sample data (Bob, some cookies…)

WHEN
- Bob builds a cookie order and calls OrderCookie.execute

THEN
- TCF inventory is updated (3 cookies removed)
- Bob’s cart is updated (added 3 chocolate cookies)
- Bob’s bank accounted is billed

(*: real or mocked)

Unit vs Integration

http://imgur.com/qSN5SFR
Another one

Scenario Testing

Scenario Testing - specs

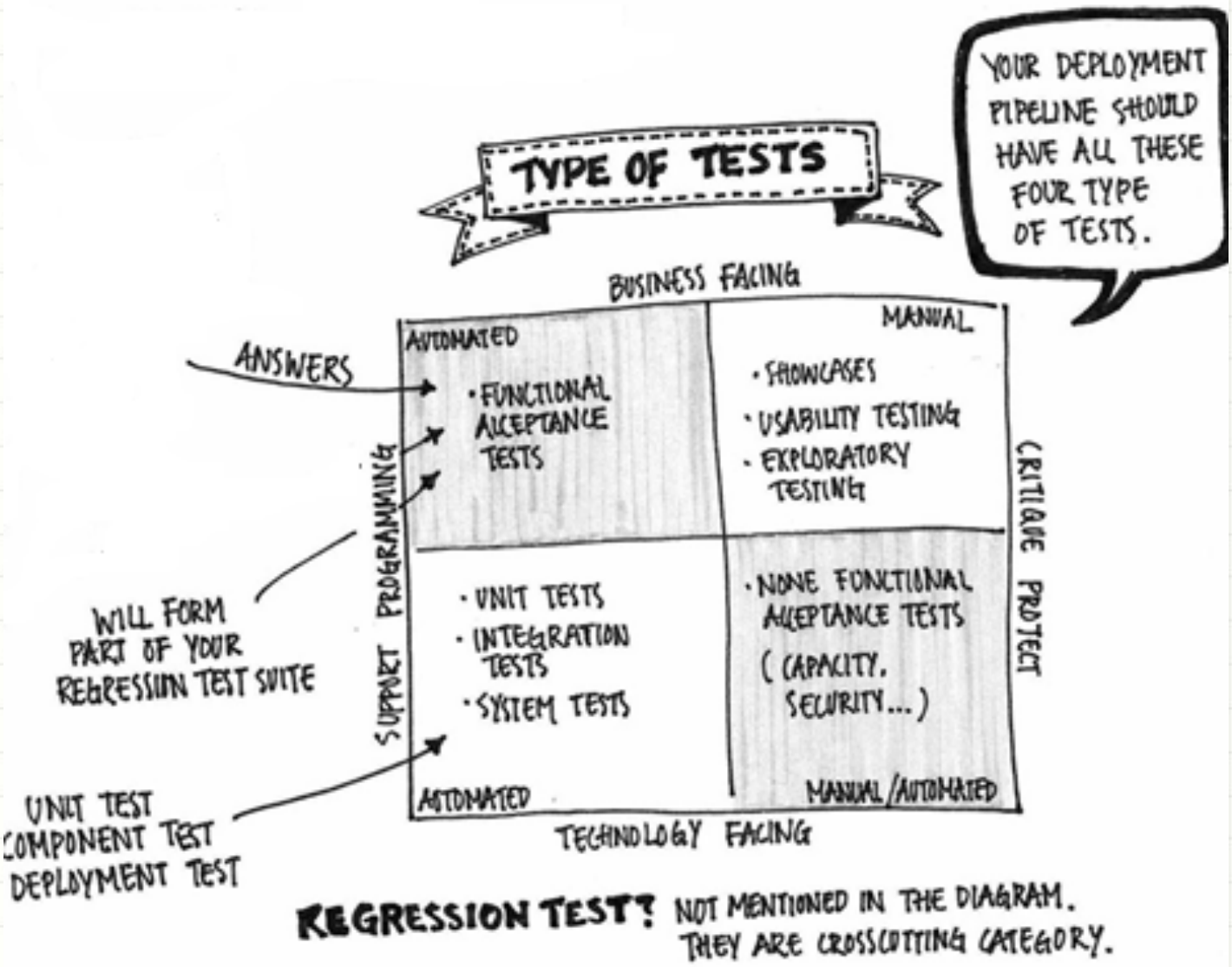
GIVEN

- TCF server, complete
- The CLI client

SCENARIO

- Create a customer Bob through the CustomerCare API
- Add some cookies in the factory
- Bob uses the CLI to order some cookies
- If TCF has enough cookies, fulfill the order and check for appropriate updates
- If TCF is running short on cookies, check for error conditions
- Keep going with more tests

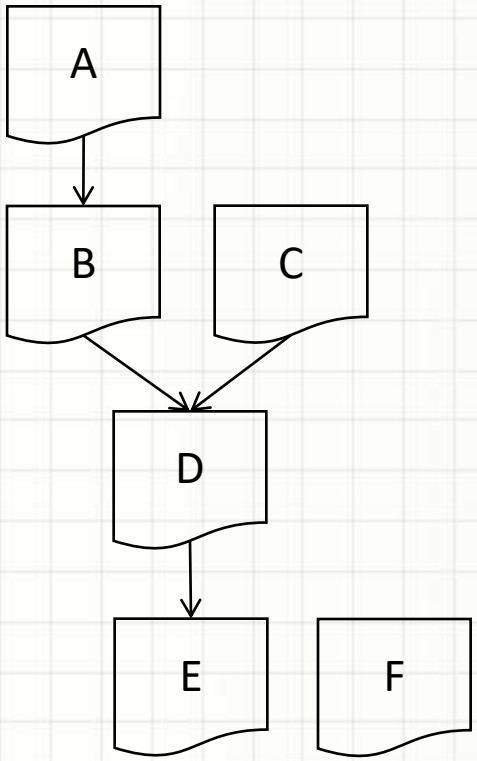
- → What tool would you use?



(From: Nhan Ngo)

Building components

- What does B consume of A?
- Contract
  - API
  - Teams
- Enforced through tests



WRITING TESTS

Things to consider

- Start state
- Sample data
- Asserts
- Clean up

Asserts

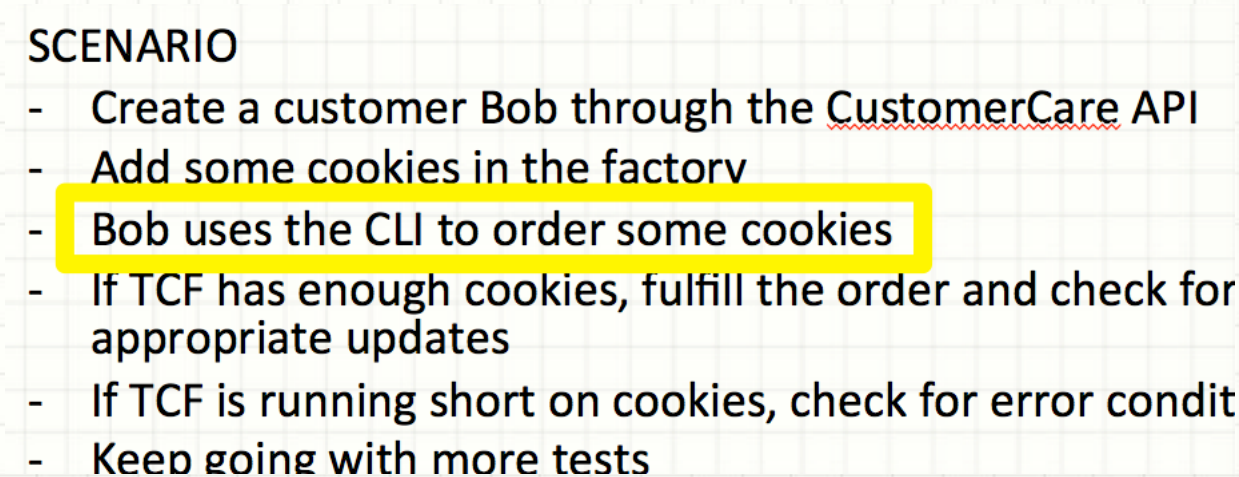
```
testSomething {
Customer c = customerRegistry.find(“Bob”);
assertNotNull(c,”didn’t get Bob”);
String orderRef =“FR12345”;
Order o = Util.findOrder(c.getOrders(),
orderRef)
assertNotNull(o, “didn’t get order”);
PaymentService ps = …
assertNotNull(ps “didn’t get PS”);
boolean status = ps.pay(o,c);
assertNotNull(status, “payment didn’t work”);
```

Asserts

- Too many or too few asserts?
- Only assert what you're really testing
- But write tests to cover for other aspects
- Each test should have ONE purpose

More things to consider

- Test maintenance
- Reusability
- → key for functional testing
- → and integration testing
  - Nesting test functions!



Where to run

- Unit
  - Dev command line / dev. Env
  - Build plan, right after compile
  - Prevents artifactory publication
  - Because
    - it’s fast
    - It’s the contract with dependents

Where to run

- Functional
  - Dev command line / dev. Env
  - Build plan, dedicated
    - Use profiles
  - Prevents artifactory publication – or not…
  - Not so fast anymore
  - May require to be run in-container
    - Arquilian, Cactus → server-side

Where to run

- Integration
  - Dedicated env
    - Use VM if possible
  - Separate build plan
  - Long running
  - Requires prod-like env.

QUESTIONS?

Next

- This week:
  - TD: DevOps on TCF Testing
  - TD: Livrair project work

APPENDIX