TEST COVERAGE
BEYOND UNIT TESTING

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HELSINKI • FINLAND
fooConf
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AGENDA

INTRODUCTION

AUTOMATED TESTING

TEST COVERAGE

OUR SOLUTION
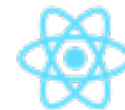
Q & A

JANE OF ALL TRADES

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2005

2010

2015

2020

VERIFIABLE DATA EXCHANGE

CRYPTOGRAPHY AS AN ENABLER FOR DECENTRALIZED IDENTITY

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HOLDER

controls

HOLDER'S AGENT

Issue Credential Protocol

DIDComm

Present Proof Protocol

DIDComm

ISSUER

controls

VERIFIER

controls

ISSUER'S AGENT

write

read

read

VDR

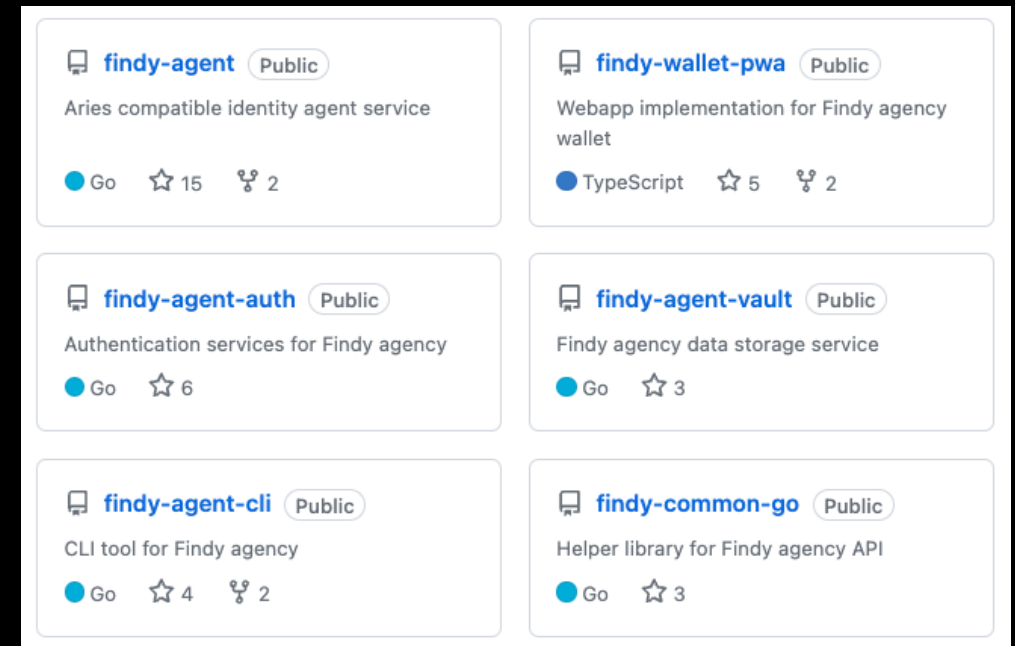VERIFIER'S AGENT

trust
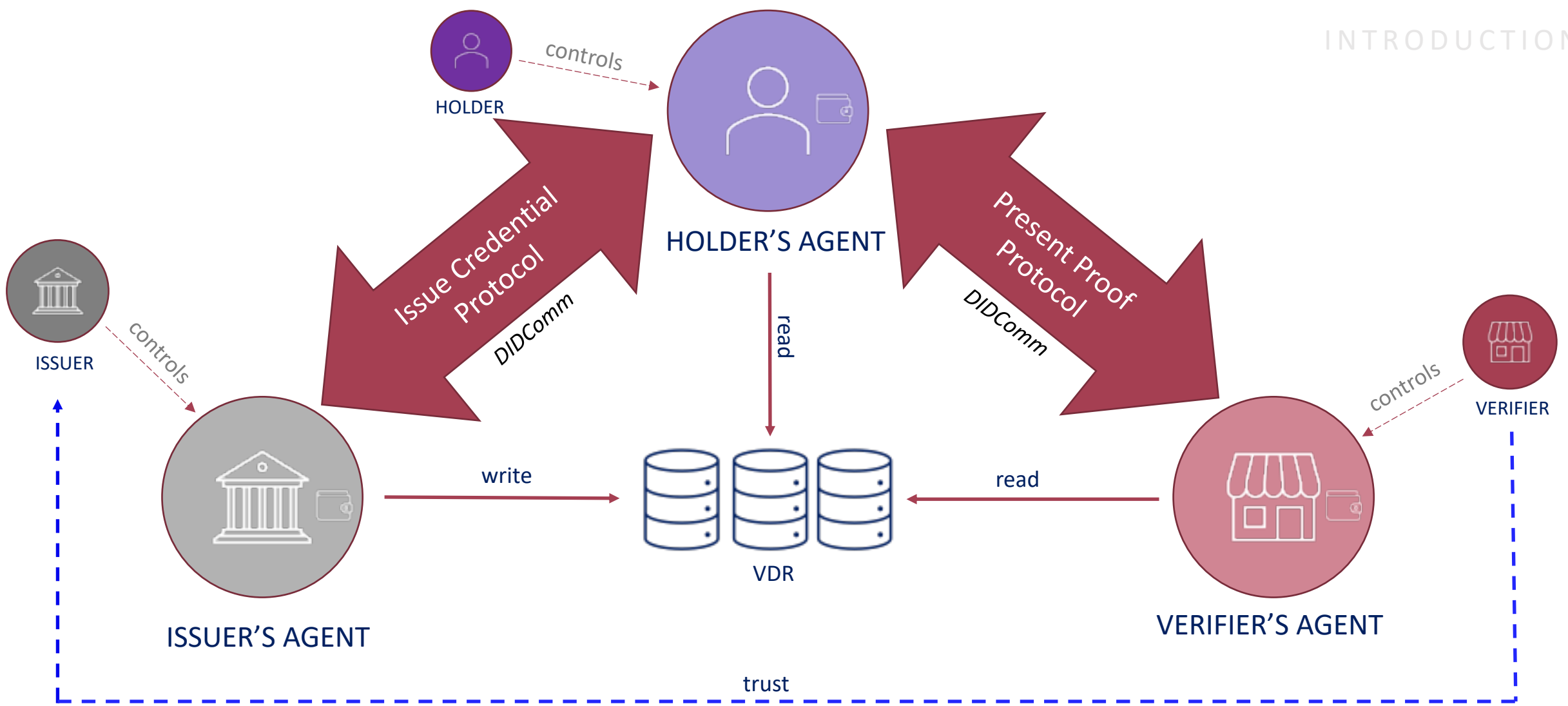
DECENTRALIZED DOMAIN

increases complexity

FINDY AGENCY
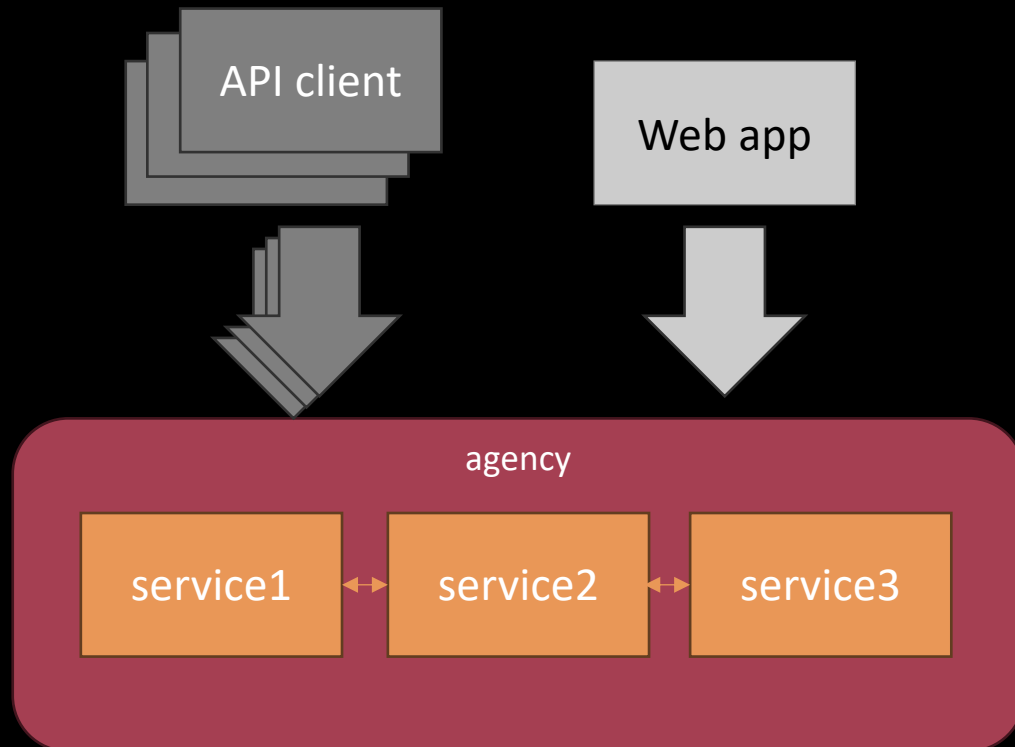
microservice architecture

multiple repositories

AUTOMATED TESTING = TESTS RUN IN CI

programmatic tests are just another form of manual testing if **NOT** run in CI

AUTOMATED TESTING

TIRELESS KNIGHT AGAINST REGRESSION

regression = previously working functionality or feature
in an application starts malfunctioning or breaks after
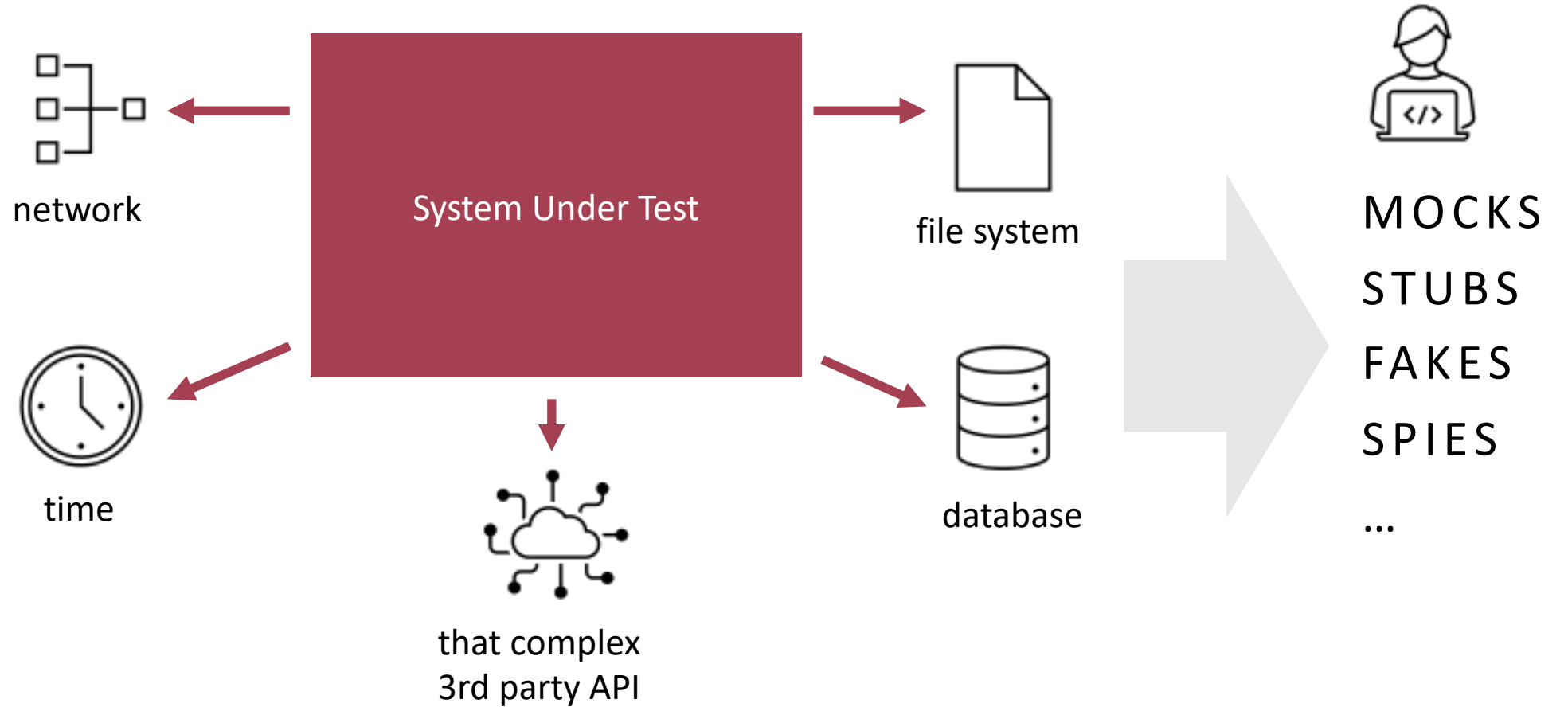making changes or updates to the software

UNIT TESTS: IDEAL WORLD

```go
package abs

import "testing"

func TestAbs(t *testing.T) {
    got := Abs(-1)
    if got != 1 {
        t.Errorf("Abs(-1) = %d; want 1", got)
    }
}
```

UNIT TESTS: REALITY

network

System Under Test

file system

time

that complex
3rd party API
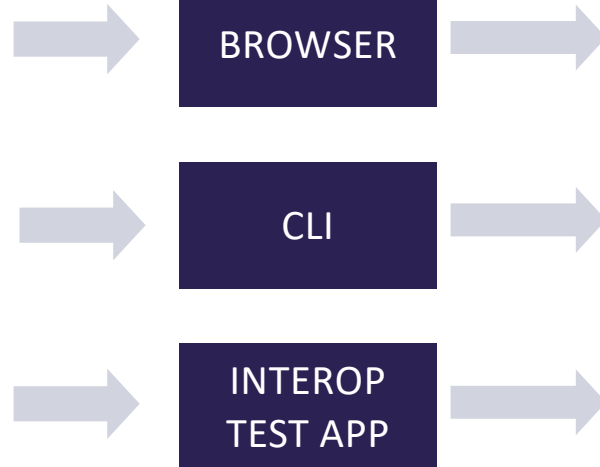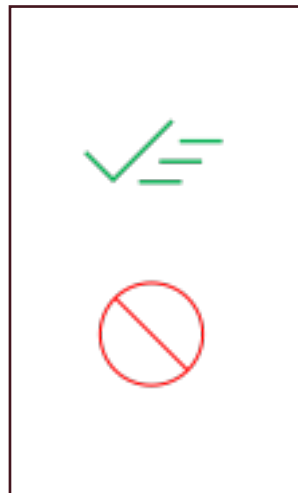
database

MOCKS

STUBS
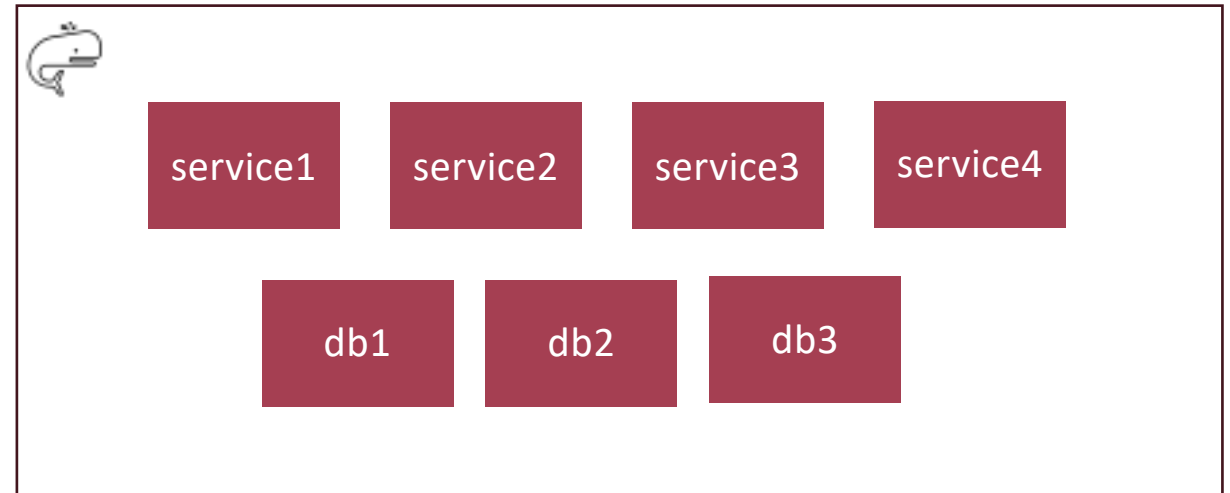
FAKES

SPIES

…

APPLICATION (INTEGRATION/E2E) TESTS

SOFTWARE RUN WITH ITS EXTERNAL DEPENDENCIES, WITHOUT UNIT TESTING TOOLING

FINDY AGENCY APPLICATION TESTS

gh-worklow.yml

docker-compose.yml

BROWSER

CLI

INTEROP
TEST APP

service1   service2   service3   service4

db1   db2   db3

TEST COVERAGE

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PURPOSE OF COVERAGE MEASUREMENT

IS NOT TO BE THE BONUS CRITERIA FOR YOUR BOSS

it determines how well the tests cover the various aspects of the software

AUTOMATED MONITORING

- new PR
- tests in CI
- result file upload
- analysis
- PR check OK/NOK
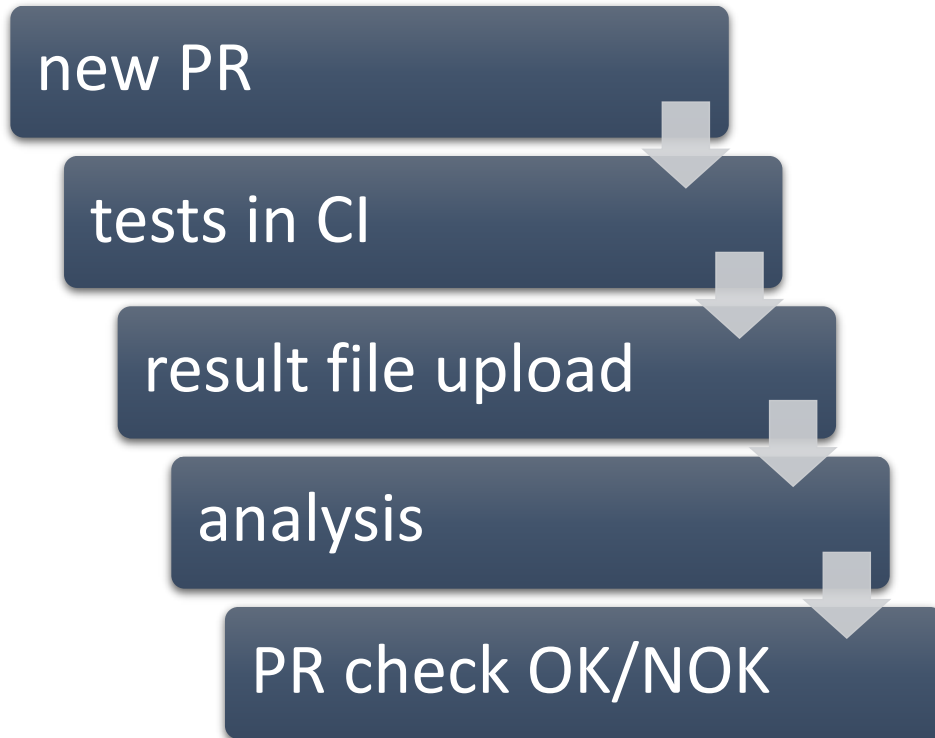
codecov [bot] commented 9 hours ago

Codecov Report

Patch and project coverage have no change.

Comparison is base (b91f7d3) 87.30% compared to head (5d4fe0c) 87.30%

▼ Additional details and impacted files

```
@@              Coverage Diff            @@
##            dev       #204     +/-   ##
==========================================
  Coverage  87.30%    87.30%
==========================================
  Files         57         57
  Lines       4466       4466
==========================================
  Hits        3899       3899
  Misses       486        486
  Partials      81         81
```

🚩 View full report in Codecov by Sentry.
📣 Do you have feedback about the report comment? Let us know in this issue.

☺

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ADD SOME FLAGS TO UNIT TESTS AND ENJOY THE RIDE

but what about the application tests?

EXAMPLE: GO COVER

Cover

Go 1.20 supports collecting code coverage profiles for programs (applications and integration tests), as opposed to just unit tests.

HOW

```
# build with -cover flag
go build -cover -o ./program

# define folder for result files
export GOCOVERDIR="./coverage"

# run binary
./program

# convert and analyze result files
go tool covdata textfmt -i=$GOCOVERDIR -o coverage.txt
```

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SERVICE DOCKERFILE

```
🐳 Dockerfile > …
 1   FROM golang:1.20-alpine3.17          ← build stage
 2
 3   ARG GOBUILD_ARGS=""
 4
 5   WORKDIR /work
 6
 7   COPY go.* ./
 8   RUN go mod download
 9
10   COPY . ./
11
12   RUN VERSION=$(cat ./VERSION) && \
13     go build ${GOBUILD_ARGS} \
14     -ldflags "-X 'github.com/findy-network/findy-agent-vault/utils.Version=$VERSION'"\
15     -o /go/bin/findy-agent-vault
16
17   FROM alpine:3.17          ← run stage
18
19   LABEL org.opencontainers.image.source https://github.com/findy-network/findy-agent-vault
20
21   EXPOSE 8085
22
23   # used when running instrumented binary
24   ENV GOCOVERDIR /coverage
25
26   COPY --from=0 /work/db/migrations /db/migrations
27   COPY --from=0 /go/bin/findy-agent-vault /findy-agent-vault
28
29   ENTRYPOINT ["/findy-agent-vault"]
```

19

APPLICATION TESTING STEPS

Build service image with instrumented binary ➤ Launch test environment with docker-compose ➤ Run test set ➤ Convert and send coverage files

CONFIG FOR SERVICE UNDER TEST

docker-compose.yml

```yaml
vault:
  #image: ghcr.io/findy-network/findy-agent-vault:latest
  build:
    context: .
    dockerfile: Dockerfile
    args:
      GOBUILD_ARGS: -cover
  volumes:
    - ./cert:/grpc
    - .data/vault/coverage:/coverage
```

AFTER TEST RUN: CONVERT AND STORE DATA

```yaml
e2e:
  runs-on: ubuntu-latest
  steps:
    - name: test e2e flow
      uses: findy-network/e2e-test-action@master
      with:
        service: "vault"
    - uses: actions/setup-go@v3
      with:
        go-version-file: "./go.mod"
    - name: convert coverage to txt
      run: go tool covdata textfmt -i=coverage -o coverage-e2e.txt
    - name: store coverage file
      uses: actions/upload-artifact@v3
      with:
        name: ${{ github.sha }}-coverage-e2e.txt
        path: ./coverage-e2e.txt
        retention-days: 1
```

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SEND DATA FOR ANALYSIS

Triggered via push 6 hours ago

🌐 lauravuo-techlab pushed —◦— b375098 **dev**

Status
Success

Total duration
4m 35s

Artifacts
2

test.yml
on: push

| ✅ test | 1m 20s | | ✅ upload-coverage | 6s |
| ✅ e2e | 2m 37s | | | |

Artifacts
Produced during runtime

Name	Size
📦 b37509805fd020b1ca384c76b4893665d0aad616-coverage-e2e.txt	470 KB
📦 b37509805fd020b1ca384c76b4893665d0aad616-coverage.txt	1020 KB

GREAT SUCCESS

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PROJECT OVERVIEW

REMEMBER!
SHUTDOWN GRACEFULLY

COVERAGE DATA IS LOST IF PROGRAM DOES
NOT EXIT "NORMALLY"

servers need to handle the SIGTERM signal
-> ensure that Docker container passes
the signal to the server process

TAKEAWAYS

USE KNIGHTS TO FIGHT
REGRESSION

COMPLEMENT UNIT TESTS WITH
APPLICATION TESTS

WRITE OPEN SOURCE

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THANK YOU!

QUESTIONS?

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