

BOOSTING TEST COVERAGE FOR MICROSERVICES





GoLab

Florence


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AGENDA

INTRODUCTION

AUTOMATED TESTING

TEST COVERAGE

OUR SOLUTION

Q&A



JANE OF ALL TRADES

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symbian

2005

2010

2015

2020

NOKIA

CYBERCOM GROUP

tieto

QUALCOMM

DREAMBROKER

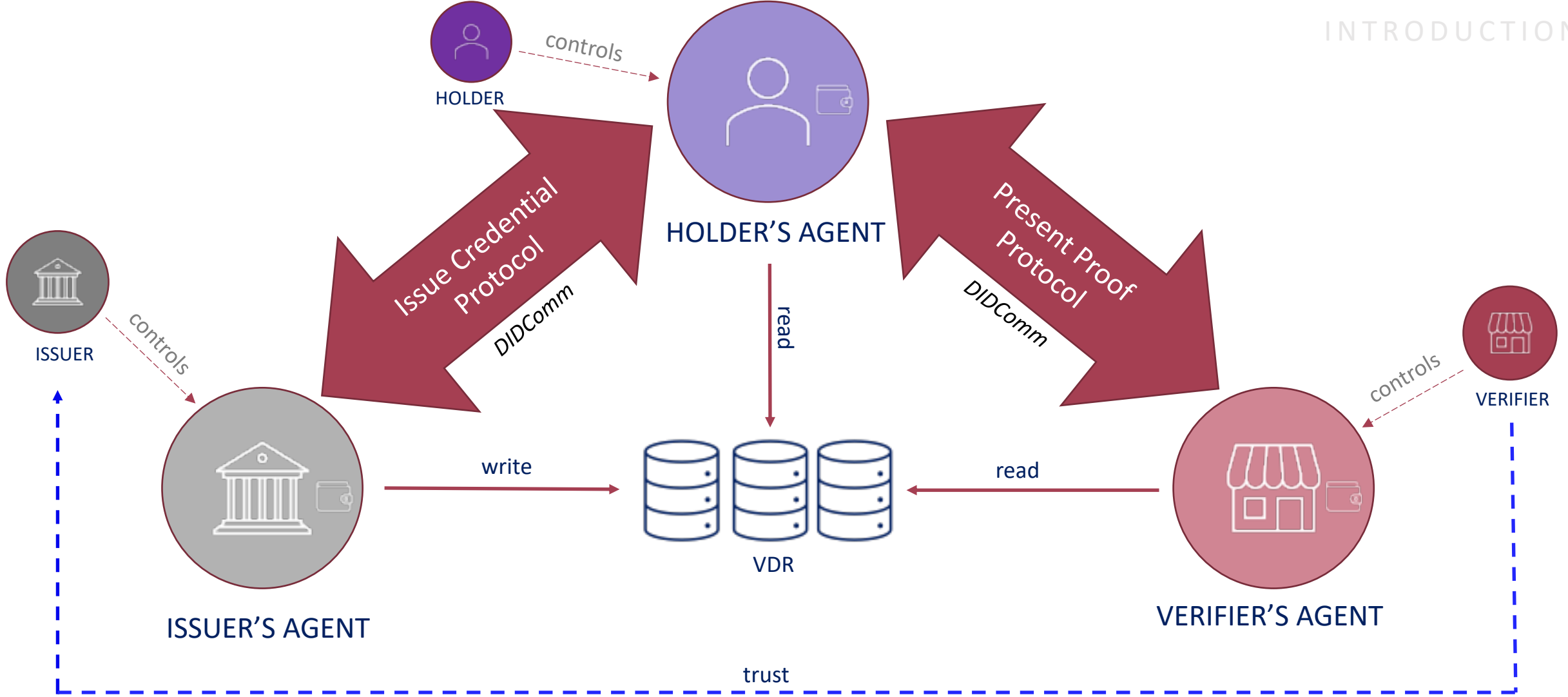
NEW THINGS CO

OP Lab



VERIFIABLE DATA EXCHANGE

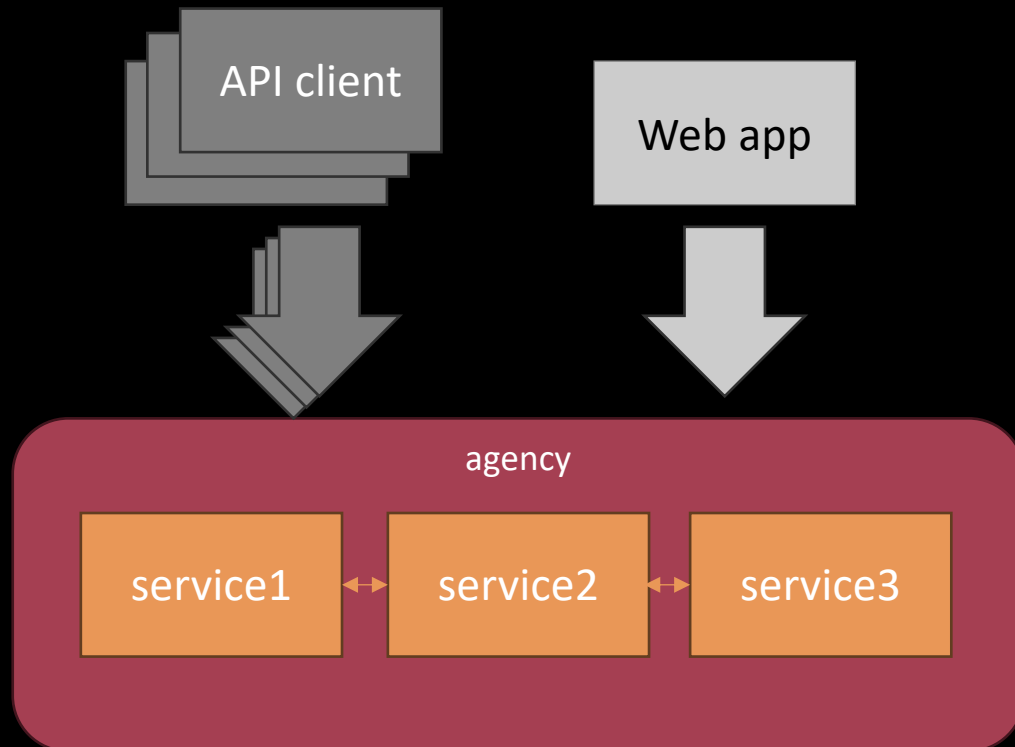
CRYPTOGRAPHY AS AN
ENABLER FOR
DECENTRALIZED IDENTITY



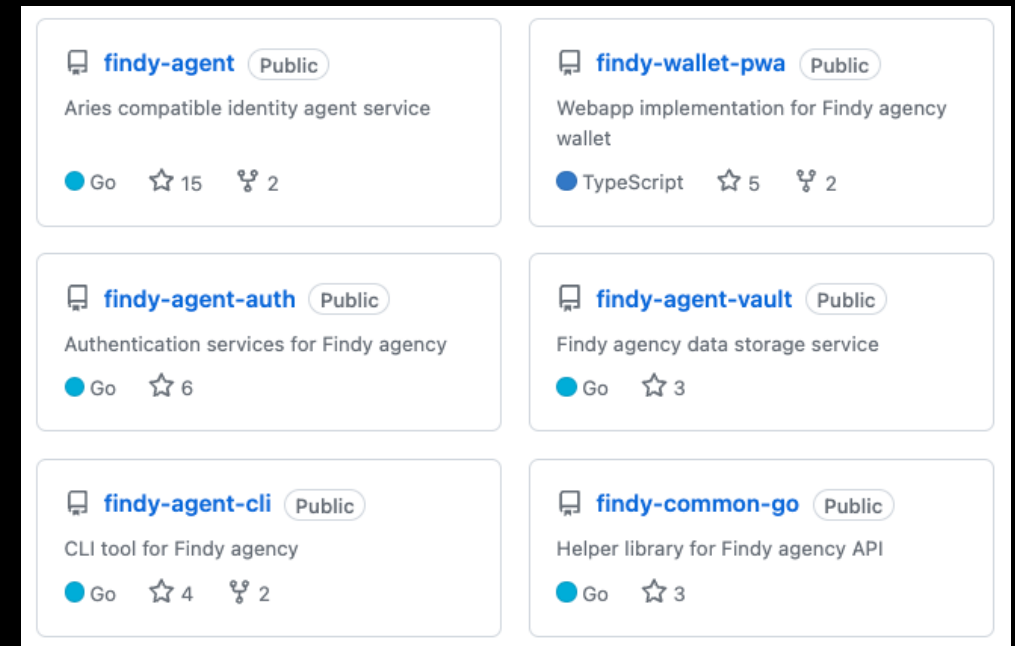
DECENTRALIZED DOMAIN

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

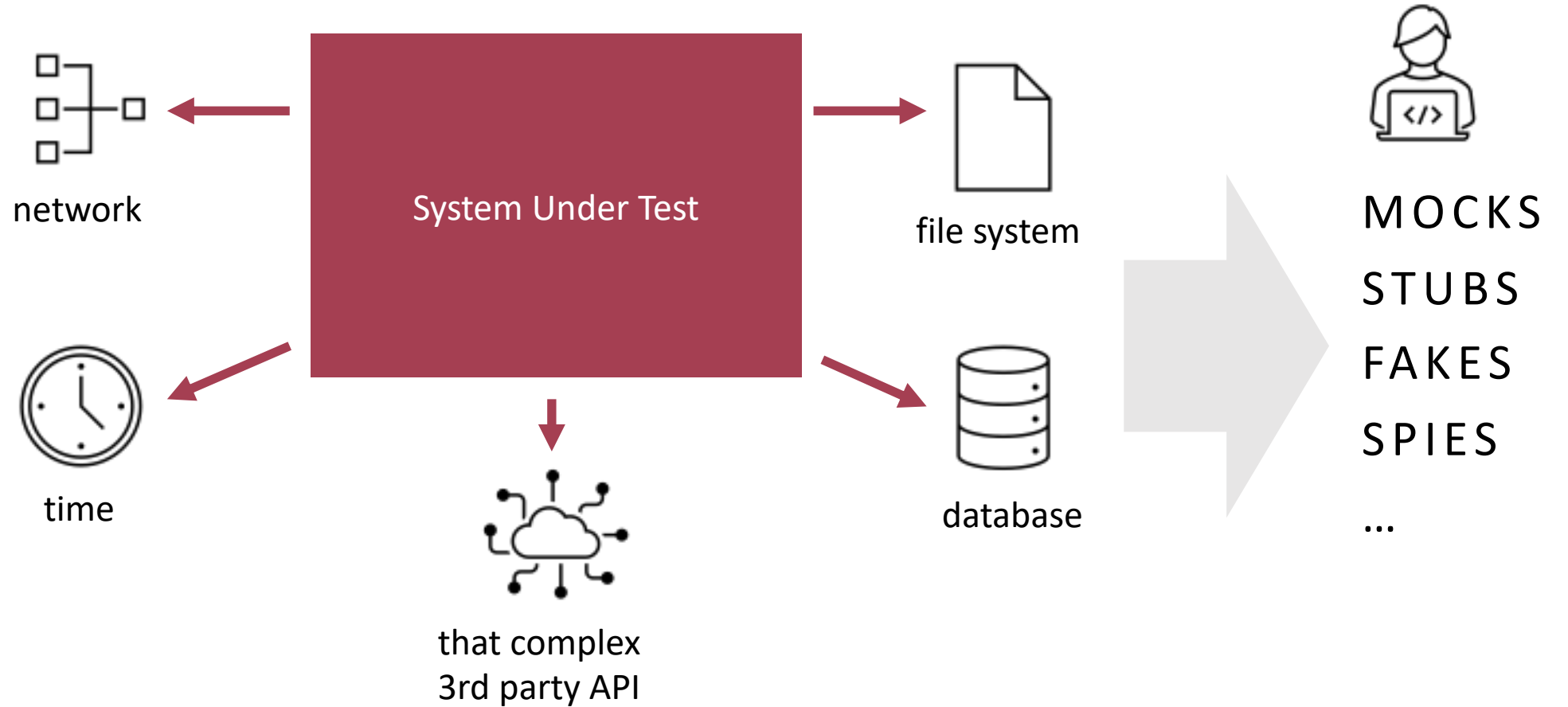
UNIT TESTS: IDEAL WORLD

```
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

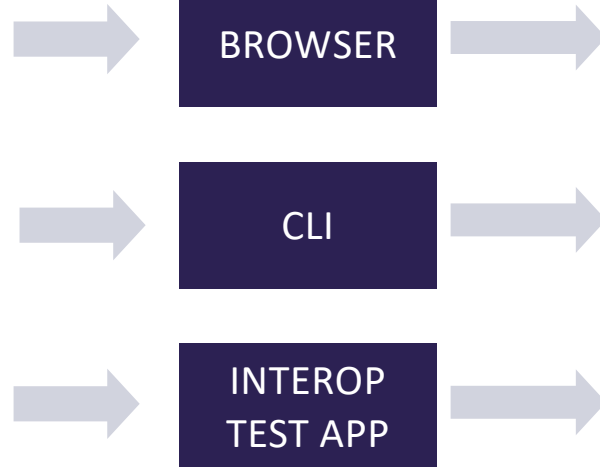
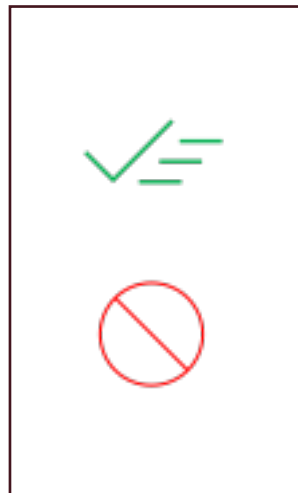


APPLICATION (INTEGRATION/E2E) TESTS

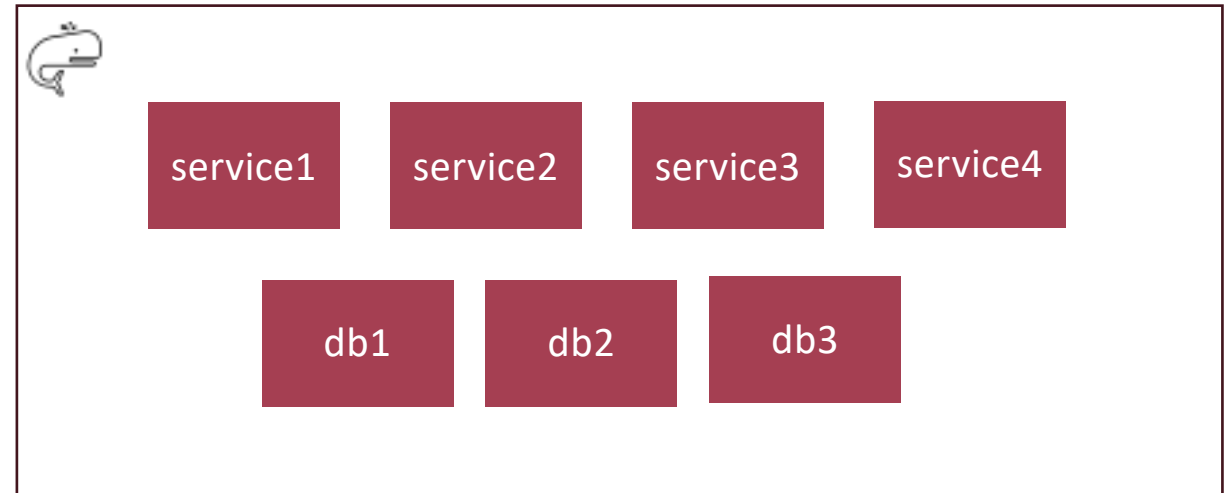
SOFTWARE RUN WITH
ITS EXTERNAL DEPENDENCIES,
WITHOUT UNIT TESTING TOOLING

FINDY AGENCY APPLICATION TESTS

gh-workflow.yml





docker-compose.yml



TEST COVERAGE

findy-agent / protocol / connection / connection_protocol.go

Uncovered  | Partial  | Covered

```
---
102 func startConnectionProtocol(ca comm.Receiver, task comm.Task) {
103     defer err2.Catch(func(err error) {
104         glog.Error("ERROR in starting connection protocol:", err)
105     })
106
107     deTask, ok := task.(*taskDIDExchange)
108     assert.That(ok)
109
110     invMsg := aries.MsgCreator.Create(didcomm.MsgInit{
111         Type: deTask.Invitation.Type(),
112         AID:  deTask.Invitation.ID()}).(didexchange.PwMsg)
113
```

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.](#)



ADD SOME FLAGS TO UNIT TESTS AND ENJOY THE RIDE

but what about the application tests?



SOLUTION:
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
```

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"]
```

APPLICATION TESTING STEPS






CONFIG FOR
SERVICE
UNDER TEST

docker-compose.yml

```
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

```
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
```

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
e2e 2m 37s

upload-coverage 6s

Artifacts
Produced during runtime

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

GREAT SUCCESS


codecov bot commented on Mar 13 • edited ▾


Codecov Report


Patch coverage: **79.06** % and **project coverage change: +4.66** 🎉

Comparison is base (**8b6f15f**) 82.80% compared to head (**0ace2da**) 87.47%.

▶ Additional details and impacted files

 [View full report in Codecov by Sentry.](#)

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PROJECT OVERVIEW

findy-network / findy-agent-vault / `dev`

Coverage [Flags](#) [Commits](#) [Pulls](#) [Settings](#)

Branch Context

dev

Coverage on branch

87.30%

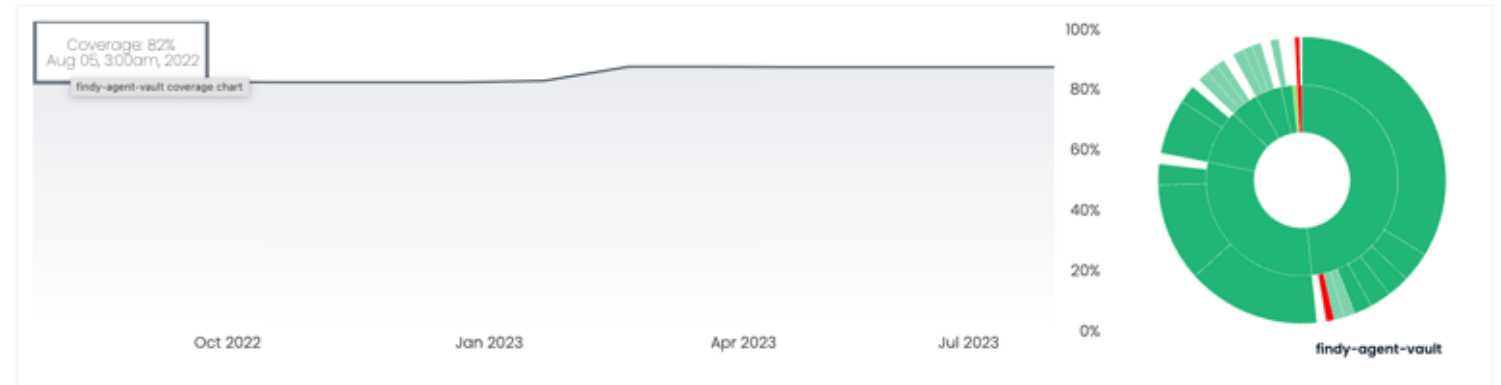
12 Months trend

+4.81%

Source: latest commit [b375098](#)

3899 of 4466 lines covered

Hide Chart



Code tree [File list](#) findy-agent-vault

Search for files

Files ↑	Tracked lines	Covered	Partial	Missed	Coverage %
agency	586	463	21	102	79.01%
db	2187	2093	20	74	95.70%
graph	95	20	0	75	21.05%
paginator	74	56	2	16	75.68%
resolver	1332	1106	26	200	83.03%
server	69	65	1	3	94.20%
utils	76	65	4	7	85.53%
main.go	47	31	7	9	65.96%

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




THANK YOU!
QUESTIONS?

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