

FHIR IG dev. + CI/CD

Litt om meg

- Eirik Myklebost
- Konsulent fra Aboveit
-  Utvikler og arkitekt
-  2+ år erfaring med FHIR implementering og profilering
 - Felles Kontaktregister (FKR), Helsedirektoratet 
 - Team Helseopplysninger, NAV 

Agenda

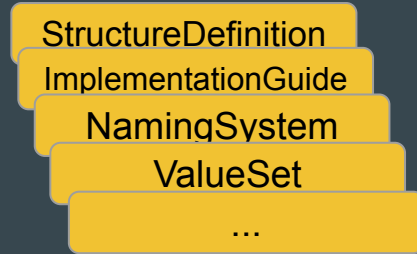
1. Hva er FHIR Implementation Guide (IG)?
2. Hva er CI/CD pipeline?
3. NAV sin IG dev. Pipeline
 - a. FHIR Shorthand (FSH)
 - b. GitHub (actions, pages, releases)
 - c. Testing & validation
 - d. IG Publisher
 - e. FHIR Package registry

Hva er FHIR Implementation Guide (IG)?

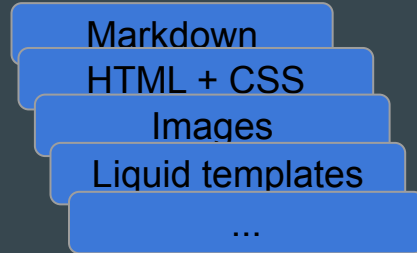
- En **IG** er **kontrakter** + **dokumentasjon**
- Kontrakter implementeres som **Conformance Resources**
- **Profiling** er å lage Conformance Resources



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Templater

HL7 DA VINCI **HL7FHIR** **Da Vinci Unolicited Notifications** **HL7FHIR**

Home Framework Admin/Transfer/Discharge Use Case FHIR Artifacts Security Examples Downloads

Change Notes

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Da Vinci Unolicited Notifications, published by HL7 International - Infrastructure and Messaging Work Group. This is not an authorized publication; it is the continuous build for version 1.0.0. This version is based on the current content of <https://github.com/HL7/da Vinci-artifacts> and changes regularly. See the Directory of published versions of this workgroup.

1 Home

This implementation guide describes a method for the communication of relevant notifications to support the real-time exchange of information that impacts patient care and value based or risk based services. Providers and Payers may need to be notified when activities occur that impact a patient's care. This may be as traditional as a notification of an admission or transfer to or discharge from a care setting. It also includes notifications and changes in treatment such as a new or different medication, or changes in patient status like a new diagnosis. These notifications provide information that can improve care management and care coordination as well as act as the trigger for quality programs and other patient focused activities (for example, risk adjustment). By allowing the patient's healthcare providers to be better informed and able to take actions and intervene earlier, the twin goals of better patient care and reduced cost of care may be met.

The 2019 CHS 45 CPE Part 135 R0909 focuses on hospitalization notifications due to significant issues that can occur if a patient is not followed appropriately after acute care. The HL7 Da Vinci Project has responded to this need by supporting the effort to provide a FHIR based standard for adoption by both providers and payers. It is anticipated that the burden of communicating the notification is also reduced by using FHIR. This guide defines a FHIR messaging based paradigm and framework to establish consistent adoptable and reproducible methods to exchange notifications. This framework is applied to the patient admission, transfer, and discharge events to generate unolicited notifications to the care team.

1.1 About This Guide

This Implementation Guide is supported by the Da Vinci[®] initiative which is a private effort to accelerate the adoption of Health Level Seven International Fast Healthcare Interoperability Resources (HL7® FHIR®) as the standard to support and integrate value-based care (VBC) data exchange across communities. Like all Da Vinci Implementation Guides, it follows the HL7® Da Vinci Guiding Principles of exchange of patient health information. The guide is based upon the prior work from the IIS core[®] and Da Vinci Health Record Exchange (HIRE)[®] of Implementation Guides. Changes to this specification are managed by the sponsoring HL7 Infrastructure and Messaging (IIM) workgroup and are incorporated as part of the standard HL7 balloting process. You can suggest changes to this specification by creating a change request tracker by clicking on the Propose a Change link at the bottom of any page.

1.1.1 How to read this Guide

This Guide is divided into several pages which are listed at the top of each page in the menu bar.

- **Home:** The home page provides the introduction and background for the Da Vinci Unolicited Notifications Project.
- **Framework:** These pages provide guidance on the set of FHIR transactions and the FHIR artifacts used in a general framework to enable unolicited notifications to care team members.
- **Admin/Transfer/Discharge Use Case:** Unolicited notifications for the Admission/Transfer/Discharge use cases are defined using the Framework.
- **FHIR Artifacts:** These pages provide detailed descriptions and formal definitions for all the FHIR objects defined in this guide.
 - **Profiles:** This page lists the set of profiles that are defined in this guide.
 - **Terminology:** This page lists the value sets and code system defined for this guide.
 - **Capability Statements:** This set of pages describes the expected FHIR capabilities of the various Da Vinci notification actors.
- **Security:** General security requirements and recommendations for actors.
- **Examples:** List of links to all the examples used in this guide.
- **Downloads:** This page provides links to downloadable artifacts.

1.2 Scope and Usage

The goal of this Implementation Guide is to define a technical framework for sending unolicited notifications to the appropriate actors when triggered by an event or request. Note that what is being communicated is a notification and not an alert which often has the expectation that something needs to be done. The assumption is that data is being transferred but not the responsibility. The data recipient determines the action it takes based upon the information it receives. The notifications should provide enough information to understand what the notification is about and to enable the Recipient to determine if and what additional steps they need to take in response to the notification. For example, additional steps may include:

- a request for more information from the Sender through a FHIR RESTful query
- creation of an encounter record in the receiving system with appropriate provenance
- making the information available to CDS and other local services.

The following table summarizes the technical scope of this guide:

Definition: Only elements necessary for the actors can be provided. For general use it is a geographic-specific profile exists. Publisher: HL7 International - Public Health Work Group. Source Keyword: RIM / RIM / Turle

The official URL for this profile is:

<https://hl7.org/fhir/r5c/svc-vaccination/StructureDefinition/shc-patient-general-0n>

Patient: Profile Group Navigation

For representing the minimal information needed to identify a patient in a SMART Health Card.

Implementation Instructions — Start here!

Primary profile (DM)	Fallback Profiles (AD)	Scope
Patient - General	Fallback	For general use where no geographic-specific profile exists
Patient - United States	Fallback	United States only

For more information about the types of profiles in this IG, see the profiles page.

16.10.1.1 Formal Views of Profile Content

Description of Profiles, Differentials, Snapshots and how the different presentations work.

Text Summary	Differential Table	Snapshot Table	
Snapshot Table (Must Support) All			
Name	Flags	Card. Type	Description & Constraints
patient		0..*	SHCPatientGeneralAD
identifier	X	0..1	Identifier
name	X	1..1	HumanName
text	X	0..1	string
family	X	0..1	string
given	X	0..*	string
prefix	X	0..*	string

1.0.0 - G-build GHAD 3 Stars 3 Watches

Home Artifacts History

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Publication Build: This will be filled by the publication tooling

1 Home

This FHIR Implementation Guide (IG) describes a proposal to how the FHIR messaging pattern can be used in communication between NAV and Electronic Health Record (EHR) systems.

There are currently no national IG on how FHIR messaging shall be used in Norway, but the need for such an IG has been recognized by the Norwegian Directorate of e-Health, partially to replace the currently used eBM-based data exchange. This is why NAV is developing this IG, which hopefully can contribute in creating an official national IG accepted by the Norwegian health sector.

NAV is committed to adhere to whatever standards or best-practices the Norwegian health sector adopts, and have no interest in creating a separate custom integration pattern. It is therefore important to recognize this IG as a proposal, which is open to feedback and adjustments.

1.1 Actors

The primary actors in context of this IG are:

1. EHRs, "Elektronisk Pasient Journal (EPJ)", are systems that contains and manages health information related to a patient and the services that operate on this data.
2. NAV is the Norwegian Labour and Welfare Administration and includes all the services managed by NAV.

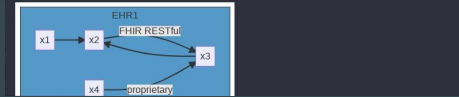
1.2 Messaging vs. RESTful

FHIR Messaging and FHIR RESTful API are two of the patterns defined in the FHIR specification. The RESTful API pattern is the most stable and widely used pattern for exchanging FHIR resources. This pattern is well suited for exchanging data between front-end apps and back-end services, e.g. SMART-on-FHIR apps.

The Messaging pattern can be more suitable for exchange between disparate organizations with low levels of process integration and/or trust. For instance, it might be preferred by an organization/system that has not necessarily adopted FHIR internally, because they can receive FHIR messages containing a coherent snapshot of a complete context. The alternative would be to pull the required resources from multiple REST endpoints, where the lifecycle and versioning of these resources also must be considered.

Figure 1 visualizes exchange of FHIR messages between three different organizations, each having multiple internal systems that communicates using different patterns and protocols.

1.2.1 Figure 1



NHS Digital Digital Child Health Service - Events Catalogue

About Change History Architecture Messages Examples Glossary Value Sets Alpha

FHIR Event Messaging Architecture

This section provides Digital Child Health implementers with the information required to build and send the Digital Child Health events.

Message Patterns and Message Structure

Digital Child Health is based on a Publish and Subscribe messaging pattern. Events are created by care providers who have provided the front line care. The events are published to a national child health hub. The national hub manages subscriptions to the published events.

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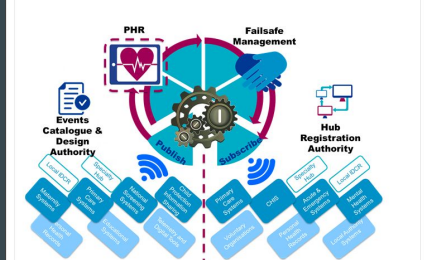
Digital Child Health event message definitions are based on the HL7 FHIR DSTU2: 1.0.1 Messaging Implementation (CH 2015) standard.

The event originator will construct an event message, as outlined in this Domain Message Specification. Events will be sent over the NHS Message Exchange for Social Care and Health (NHS) to the child health hub. NHS will be used to ensure that the event message reaches the child health hub. Error processing, for example an undeliverable message, is the responsibility of the sending system. The processing of events within and beyond the child health hub is the subject of related Digital Child Health documentation.

For further information relating to NHS see the NHS pages on the NHS Digital web site

Events Diagram

The diagram shows the Digital Child Health events (documented in the Events Catalogue) being published to the child health hub. The hub manages subscriptions to these publications (in accordance with the Hub Registration Authority):



FHIR Event Messaging

The FHIR event message is made up of the resources. These resources are bundled within an FHIR Bundle wrapper to create the FHIR structure.

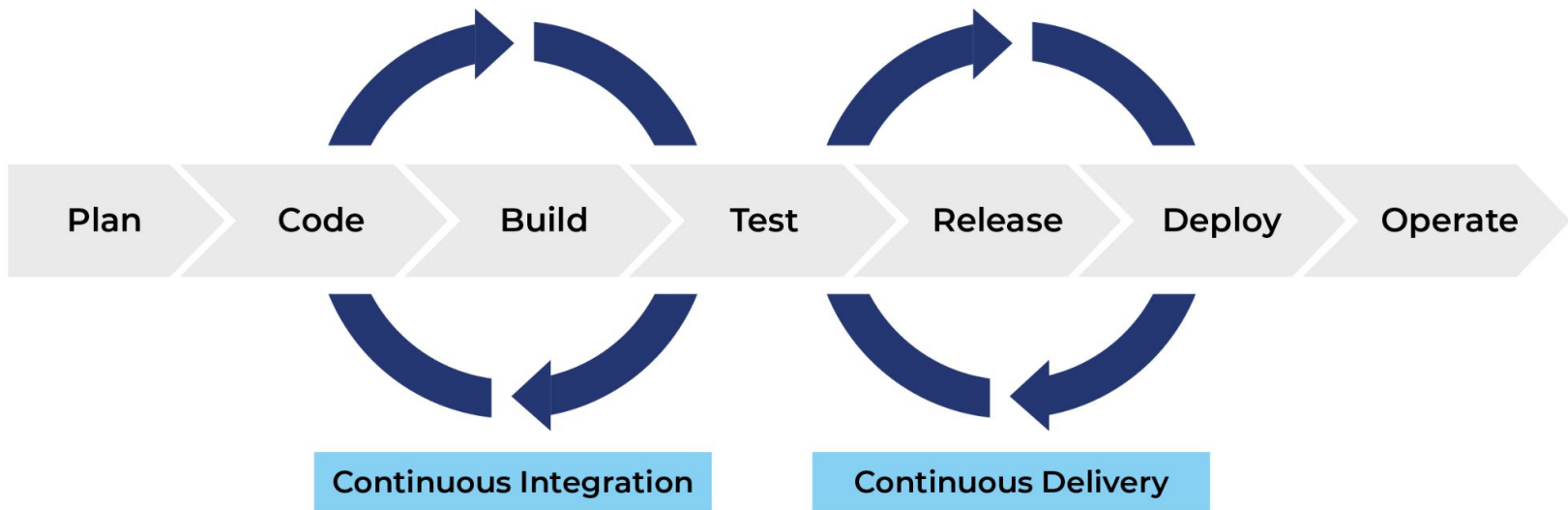
In FHIR messaging, a 'message' is sent from a source application to a destination application when an event happens.

The event is a bundle of resources of a Bundle identified by the Bundle ID, with the Bundle ID being the ID of the event.

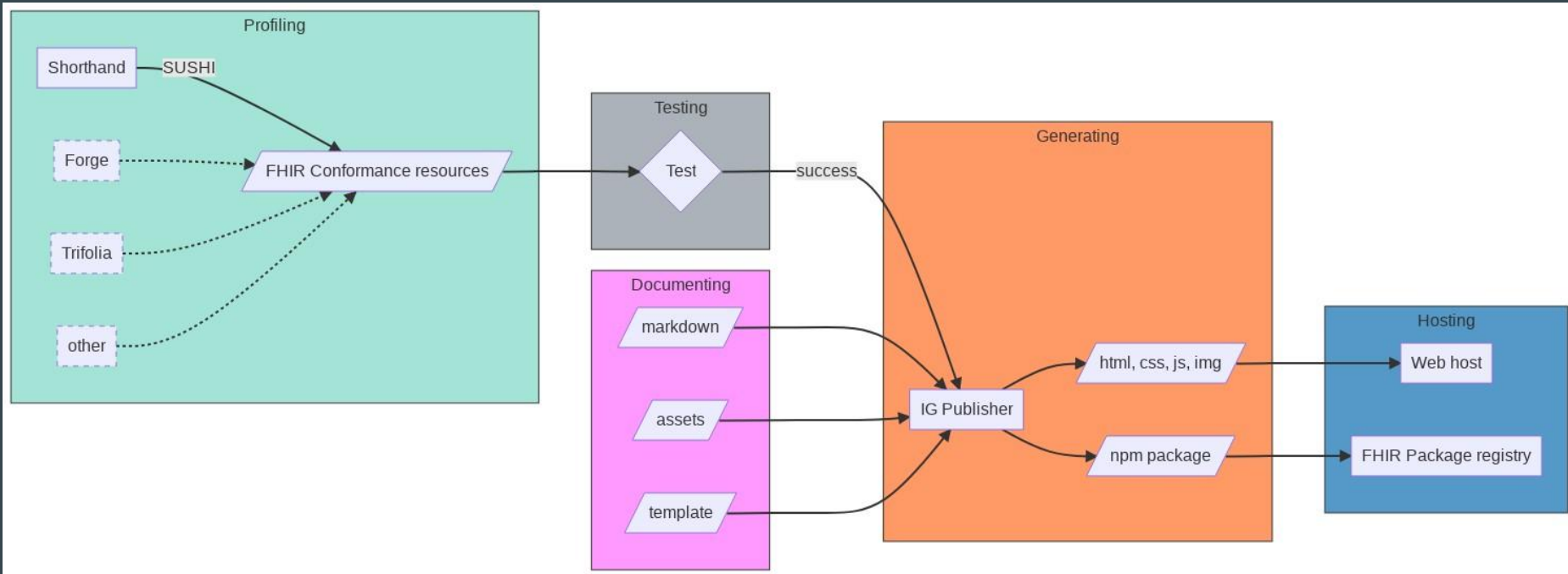
Hva er CI/CD pipeline?



Automatisering av steg



IG Pipeline



CI/CD Pipeline

source code

Code - FHIR Shorthand (FSH)

- Utviklervennlig språk for å lage Conformance ressurser
- Kompileres til FHIR JSON vha. **SUSHI** 🍣
- Eksempel: <https://fshschool.org/FSHOnline/#/share/3ADW6SE>



FSH Examples

Convert to JSON ▶

◀ Convert to FSH

Save All

Configuration



Code

- Utv
- Kon
- Eks

FSH

```

1 Profile: MyExample
2 Parent: Bundle
3 * id obeys valid-uuid
4 * meta
5   * id 0..0
6   * profile 1..1
7   * security 0..0
8   * tag 0..0
9 * implicitRules 0..0
10 * language 0..0
11 * identifier 0..0
12 * type = #message (exactly)
13 * timestamp 1..1
14 * total 0..0
15 * link 0..0
16 * entry 2..
17   * ^slicing.discriminator.type = #type
18   * ^slicing.discriminator.path = "resource"
19   * ^slicing.rules = #open
20   * id 0..0
21   * extension 0..0
22   * modifierExtension 0..0
23   * link 0..0
24   * fullUrl 1..1
25   * resource 1..1
26   * search 0..0
27   * request 0..0
28   * response 0..0
29 * entry contains messageheader 1..1
30 * entry[messagesheader].resource only MessageHeader
31 * signature 0..0
32
33 Invariant: valid-uuid
34 Description: "Must be a valid uuid"
35 Expression: "$this.matches('^([0-9a-f]{8})-[0-9a-f]{4}-[0-9a-f]{4})$')
36 Severity: #error

```

FHIR JSON: MyExample

```

1 * {
2   "resourceType": "StructureDefinition",
3   "id": "MyExample",
4   "extension": [
5     *
6     {
7       "url": "http://hl7.org/fhir/StructureDefinition/structuredefinition-category",
8       "valueString": "Foundation.Other"
9     }
10    {
11      "url": "http://hl7.org/fhir/StructureDefinition/structuredefinition-security-category",
12      "valueCode": "not-classified"
13    }
14  ],
15  "url": "http://example.org/StructureDefinition/MyExample",
16  "version": "1.0.0",
17  "name": "MyExample",
18  "status": "active",
19  "fhirVersion": "4.0.1",
20  "mapping": [
21    *
22    {
23      "identity": "v2",
24      "uri": "http://hl7.org/v2",
25      "name": "HL7 v2 Mapping"
26    },
27    {
28      "identity": "rim",
29      "uri": "http://hl7.org/v3",
30      "name": "RIM Mapping"
31    },
32    {
33      "identity": "cda",
34      "uri": "http://hl7.org/v3/cda",
35      "name": "CDA (R2)"
36    },
37    {
38      "identity": "w5",
39      "uri": "http://hl7.org/fhir/fivews",
40      "name": "FiveWs Pattern Mapping"
41    }
42  ],
43  "kind": "resource",
44  "abstract": false,
45  "type": "Bundle",
46  "baseDefinition": "http://hl7.org/fhir/StructureDefinition/Bundle",
47  "derivation": "constraint",
48  "differential": {
49    *
50    "element": [
51      *
52      {
53        "id": "Bundle.id",
54        "path": "Bundle.id",
55        "constraint": [
56          *

```

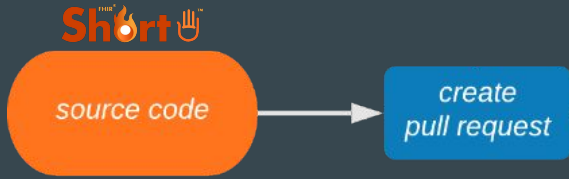
W6SE

CI/CD Pipeline

Short

source code

CI/CD Pipeline



Automation - GitHub actions

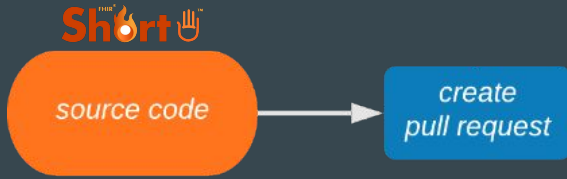
- Automatiserte arbeidsflyter
- Kjøres ved events i repo

on-pull_request 👉 run tests

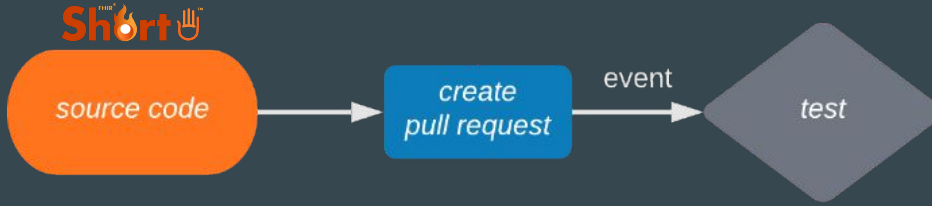


```
3 on:
4   push:
5     branches: [main]
6     paths:
7       - ig-template/**
8       - igs/MessagingCore/input/**
9       - igs/MessagingCore/ig.ini
10      - igs/MessagingCore/sushi-config.yaml
11 workflow_dispatch:
12
13 env:
14   IG: MessagingCore
15
16 # The following jobs are equal for all IGs and can be moved to a common composite-action if 'uses'-support is d
17 # https://github.com/actions/runner/blob/main/docs/adr/1144-composite-actions.md
18 jobs:
19   publish:
20     runs-on: ubuntu-latest
21     steps:
22       - uses: actions/checkout@v2
23
24       # Persist the FHIR Package cache between runners.
25       # Doc: https://confluence.hl7.org/display/FHIR/FHIR+Package+Cache
26       - name: 📦 Cache FHIR Packages
27         uses: actions/cache@v2
28         with:
29           path: |
30             ~/.fhir/packages
31             key: fhir-packages
32
33       # Persist the IG Publisher input-cache between runners.
34       # Doc: https://build.fhir.org/ig/FHIR/ig-guidance/using-templates.html#igroot-input-cache
35       - name: 📦 Cache IG Publisher input-cache
36         uses: actions/cache@v2
37         with:
38           path: |
39             igs/${{ env.IG }}/input-cache
40             key: ig-publisher-input-cache
41
42       # Downloads the newest version of the IG Publisher, this could probable be cached.
43       - name: 📄 Download IG Publisher
44         run: wget -q https://github.com/HL7/fhir-ig-publisher/releases/latest/download/publisher.jar
45
46       # Builds the HTML page for the IG.
47       - name: 🏃 Run IG Publisher
48         uses: docker://hl7fhir/ig-publisher-base:latest
49         with:
50           args: java -jar publisher.jar publisher -ig igs/${{ env.IG }}/ig.ini -publish https://navikt.github.io
51
52       # Publishes the HTML page to a separate branch in order to host it using GitHub-Pages.
53       # This will overwrite the currently published HTML page.
54       - name: 🚀 Deploy to GitHub-Pages
55         uses: peaceiris/actions-gh-pages@v3
56         with:
57           github_token: ${ secrets.GITHUB_TOKEN }
58           publish_dir: igs/${{ env.IG }}/output
59           destination_dir: igs/${{ env.IG }}
60           exclude_assets: '**.zip,**.tgz,**.pack'
61           commit_message: '${{ env.IG }}: ${ github.event.head_commit.message }'
```

CI/CD Pipeline



CI/CD Pipeline



Test - FHIR Validator & JUnit5

- FHIR Validator validerer ressurser med hensyn til Conformance ressurser 🙋 Info, Warning, Error
- Test at eksempel ressurser gir forventet valideringsutfall
- [fhir-validator-junit-engine](#)
tar inn tester i YAML og output som JUnit test report

Test - FHIR Validator & JUnit5

en eller flere YAML filer med tester

```
1 ---
2 validator:
3   version: "4.0"
4   ig:
5     - "../fsh-generated/resources"
6 tests:
7   - title: Validate conformance resources
8     fileMatch:
9       - ../fsh-generated/resources/**
10      - "!../fsh-generated/resources/ImplementationGuide-*"
11   - fileMatch: instances/message-with-invalid-her-id.json
12     profile: http://fhir.nav.no/StructureDefinition/HopsMessage
13     expectedIssues:
14       - severity: ERROR
15         message: valid-her-id
```

Test - FHIR Validator & JUnit5

test kjøring

en eller flere YAML filer med tester

```
1 ---
2 validator:
3   version: "4.0"
4   ig:
5     - "../fsh-generated/resources"
6   tests:
7     - title: Validate conformance resources
8       fileMatch:
9         - ../fsh-generated/resources/**
10        - "!../fsh-generated/resources/ImplementationGuide-*"
11     - fileMatch: instances/message-with-invalid-her-id.json
12       profile: http://fhir.nav.no/StructureDefinition/HopsMessage
13       expectedIssues:
14         - severity: ERROR
15           message: valid-her-id
```

```
Run tests
1 ▶ Run java -jar junit-platform-console-standalone-1.8.1.jar -cp fhir-validator-junit-engine.jar
2 # SUITE: messaging-core.test
3 Load FHIR v4.0 from hl7.fhir.r4.core#4.0.1 - 4575 resources (00:05.0970)
4 Load hl7.fhir.r4.core#4.0.1 - 3767 resources (00:01.0848)
5 Load hl7.fhir.r4.core#4.0.1 - Version n/a: No Terminology Server (00:00.0000)
6 Get set... go (00:00.0072)
7
8 > TEST: Validate conformance resources
9 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:18
10 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/fsh-generated/resources/StructureDefinition-
11 0 unexpected errors!
12 Found 0 of 0 expected issues!
13 Finished: 0 errors, 0 warnings, 0 notes
14
15 > TEST: Validate conformance resources
16 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:18
17 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/fsh-generated/resources/StructureDefinition-
18 0 unexpected errors!
19 Found 0 of 0 expected issues!
20 Finished: 0 errors, 0 warnings, 0 notes
21
22 > TEST: message-with-invalid-her-id
23 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:18
24 Profiles: [http://fhir.nav.no/StructureDefinition/HopsMessage]
25 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-invalid-her-
26 0 unexpected errors!
27 Found 1 of 1 expected issues!
28 Finished: 1 errors, 0 warnings, 2 notes
29 1. Source: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-in-
30 Severity: ERROR
31 Type: INMARIANT
32 Expression: Bundle.entry[0].resource.ofType(MessageHeader).destination[0].endpoint
33 Message: valid-her-id: 'Must be a valid HER-ID prefixed with OID namespace' Rule 'Must be a
34 Severity: INFORMATIONAL
35 Type: INFORMATIONAL
36 Expression: Bundle.entry[1]
37 Message: This element does not match any known slice defined in the profile http://fhir.nav
38 Severity: INFORMATIONAL
39 Type: UNKNOWN
40 Expression: Bundle.entry[0].resource.ofType(MessageHeader).event.ofType(Coding)
41 Message: Code System URI 'http://fhir.nav.no/test/CodeSystem/Message' is unknown so the co
42
43 Thanks for using JUnit! Support its development at https://junit.org/sponsoring
44
45 |
46 |
47 |
48 |
49 |
50 |
51 |
52 |
53 |
54 | JUnit Jupiter ✓
55 | JUnit Vintage ✓
56 | FHIR Validator ✓
57 |   messaging-core.test ✓
58 |     Validate conformance resources ✓
59 |     Validate conformance resources ✓
60 |     message-with-invalid-her-id ✓
61 |
```

Test - FHIR Validator & JUnit5

test kjøring

en eller flere YAML filer med tester

test rapport

```
1 ---
2 validator:
3   version: "4.0"
4   ig:
5     - "../fsh-generated/resources"
6   tests:
7     - title: Validate conformance resources
8       fileMatch:
9         - ../fsh-generated/resources/**
10        - "!../fsh-generated/resources/ImplementationGuide-*"
11     - fileMatch: instances/message-with-invalid-her-id.json
12       profile: http://fhir.nav.no/StructureDefinition/HopsMessage
13       expectedIssues:
14         - severity: ERROR
15         message: valid-her-id
```

GitHub Actions / Unit Test Results
succeeded 19 days ago in 0s

All 2 tests pass in 9s

3 files	3 suites	9s	🟢
2 tests	2 ✓	0 +z	0 ✖
3 runs	3 ✓	0 +z	0 ✖

Results for commit [2052ef6](#).

ANNOTATIONS

📄 Check notice on line 0 in [github](#)

🔗 [github-actions / Unit Test Results](#)

2 tests found

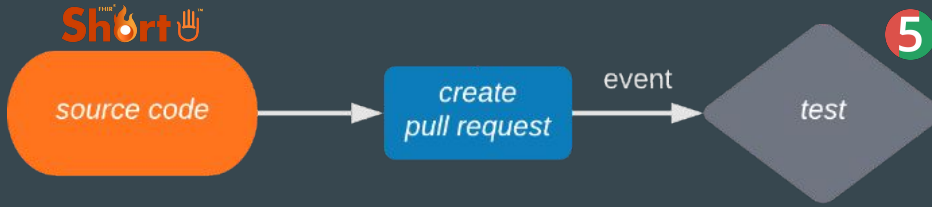
There are 2 tests, see "Raw output" for the full list of tests.

[Raw output](#)

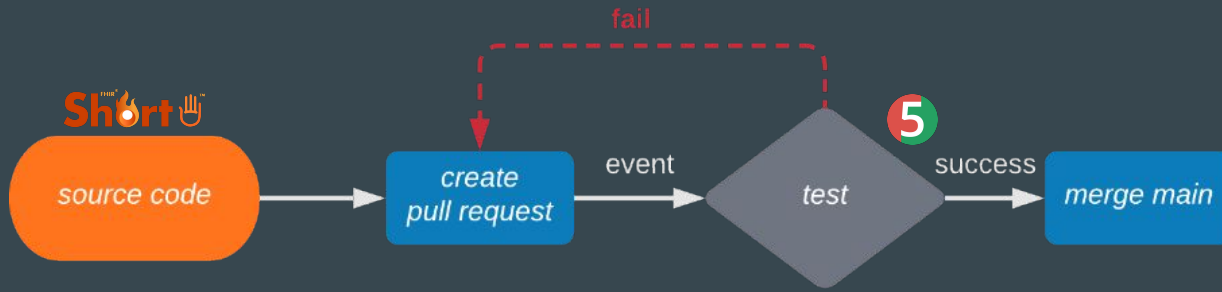
[View more details on GitHub Actions](#)

```
Run tests
1 ▶ Run java -jar junit-platform-console-standalone-1.8.1.jar -cp fhir-validator-junit-engine.jar
2 # SUITE: messaging-core.test
3 Load FHIR V4.0 from h17.fhir.r4.core#4.0.1 - 4575 resources (00:05.0970)
4 Load h17.terminology#2.1.0 - 3767 resources (00:01.0048)
5 Load h17.terminology#2.1.0 - Version n/a: No Terminology Server (00:00.0000)
6 Get set... go (00:00.0072)
7
8 > TEST: Validate conformance resources
9 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:10
10 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/fsh-generated/resources/StructureDefinition-
11 0 unexpected errors!
12 Found 0 of 0 expected issues!
13 Finished: 0 errors, 0 warnings, 0 notes
14
15 > TEST: Validate conformance resources
16 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:10
17 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/fsh-generated/resources/StructureDefinition-
18 0 unexpected errors!
19 Found 0 of 0 expected issues!
20 Finished: 0 errors, 0 warnings, 0 notes
21
22 > TEST: message-with-invalid-her-id
23 Location: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/messaging-core.test.yaml:10
24 Profiles: [http://fhir.nav.no/StructureDefinition/HopsMessage]
25 Validate /home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-invalid-her-
26 0 unexpected errors!
27 Found 1 of 1 expected issues!
28 Finished: 1 errors, 0 warnings, 2 notes
29 1. Source: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-in-
30 Severity: ERROR
31 Type: INVARIAANT
32 Expression: Bundle.entry[0].resource.ofType(MessageHeader).destination[0].endpoint
33 Message: valid-her-id: 'Must be a valid HER-ID prefixed with OID namespace' Rule 'Must be a
34 2. Source: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-in-
35 Severity: INFORMATIONAL
36 Type: INFORMATIONAL
37 Expression: Bundle.entry[1]
38 Message: This element does not match any known slice defined in the profile http://fhir.nav
39 3. Source: file:///home/runner/work/fhir/fhir/igs/MessagingCore/test/instances/message-with-in-
40 Severity: INFORMATION
41 Type: UNKNOWN
42 Expression: Bundle.entry[0].resource.ofType(MessageHeader).event.ofType(Coding)
43 Message: Code System URI 'http://fhir.nav.no/test/CodeSystem/Message' is unknown so the co
44
45 Thanks for using JUnit! Support its development at https://junit.org/sponsoring
46
47
48 |
49 |
50 |
51 |
52 |
53 |
54 | JUnit Jupiter ✓
55 | JUnit Vintage ✓
56 | FHIR Validator ✓
57 |   messaging-core.test ✓
58 |   | Validate conformance resources ✓
59 |   | Validate conformance resources ✓
60 |   | message-with-invalid-her-id ✓
61 |
```

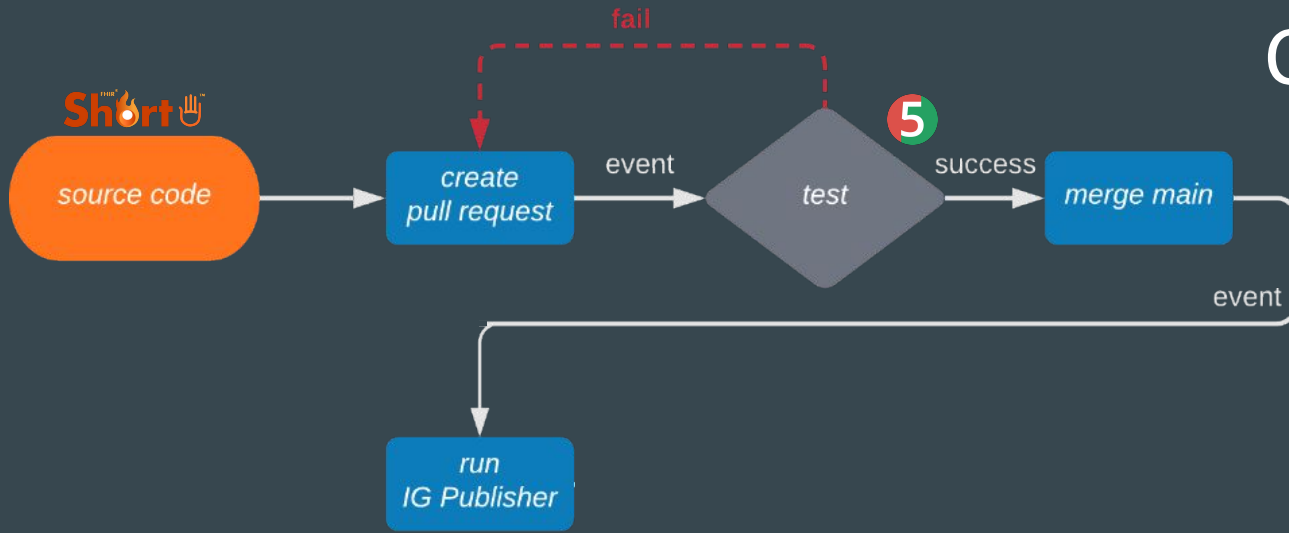
CI/CD Pipeline



CI/CD Pipeline



CI/CD Pipeline

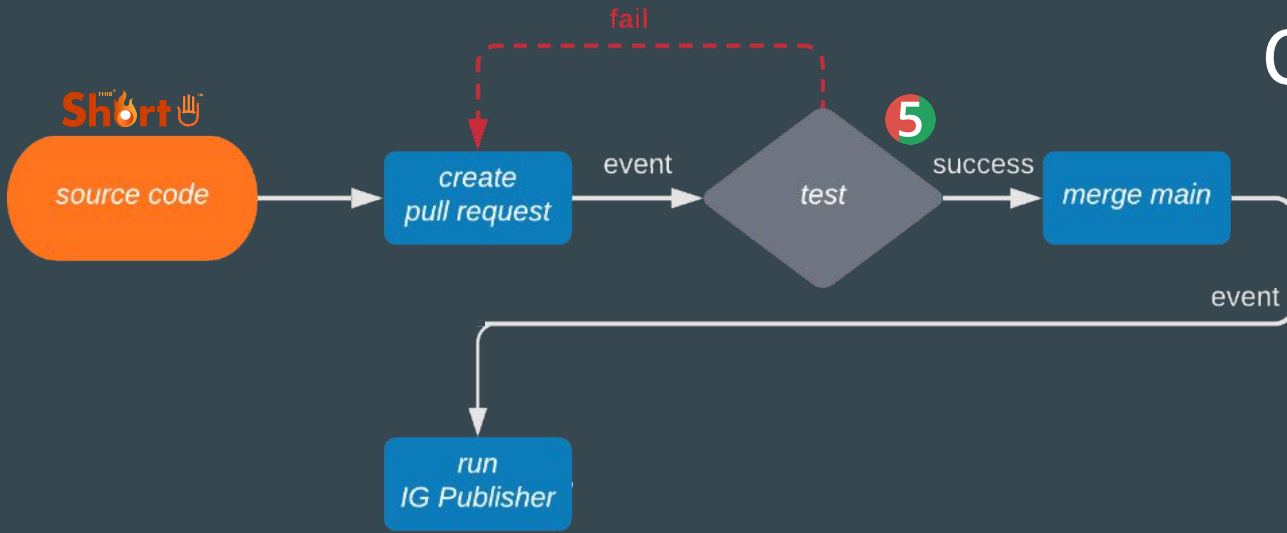


Build - IG Publisher



- Java CLI app + Jekyll (static site generator)
- **Input:** conformance-resources, markdown, assets og template
Output: web-side og NPM-pakke
- Kan brukes med SUSHI

CI/CD Pipeline



CI/CD Pipeline

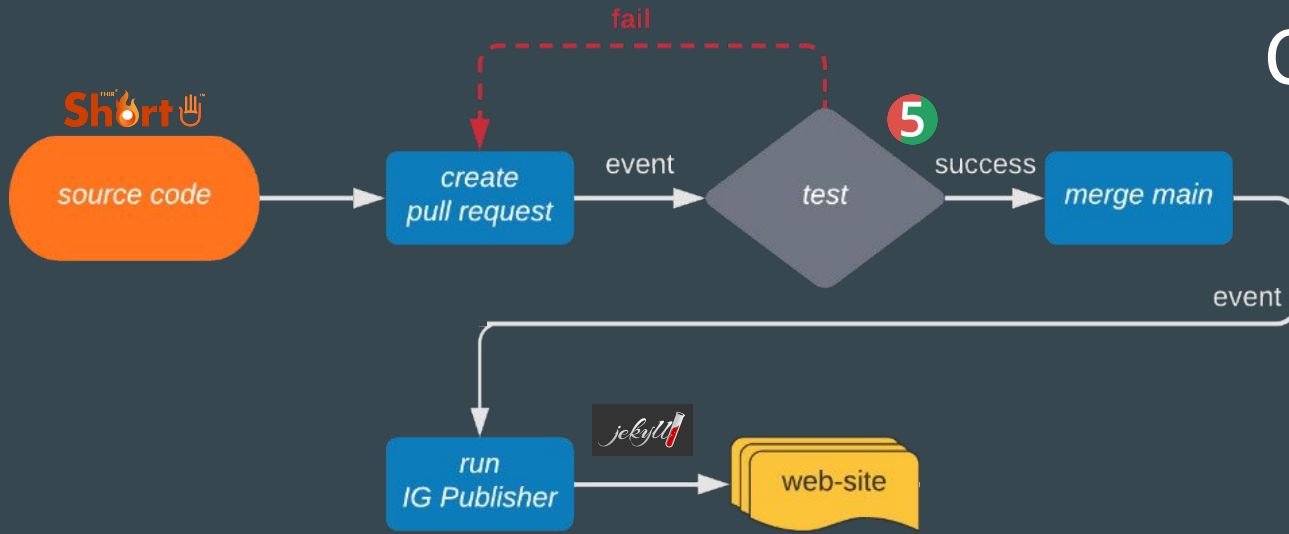


Hosting - GitHub pages

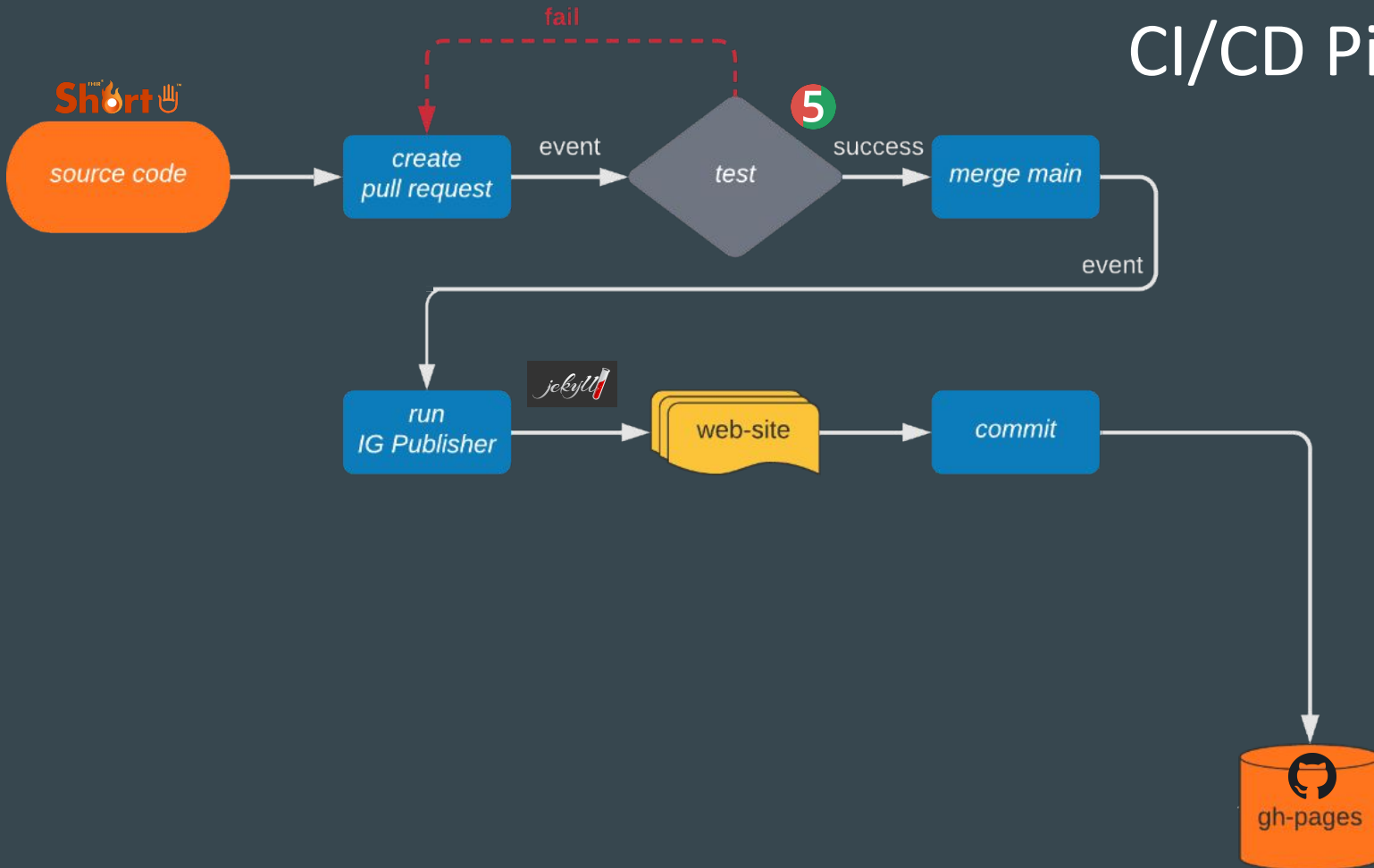
- Web host for statiske nettsider lagret i GitHub repo
- Enkelt alternativ til egen web-server

```
https://{org}.github.io/{repo}
```

CI/CD Pipeline



CI/CD Pipeline

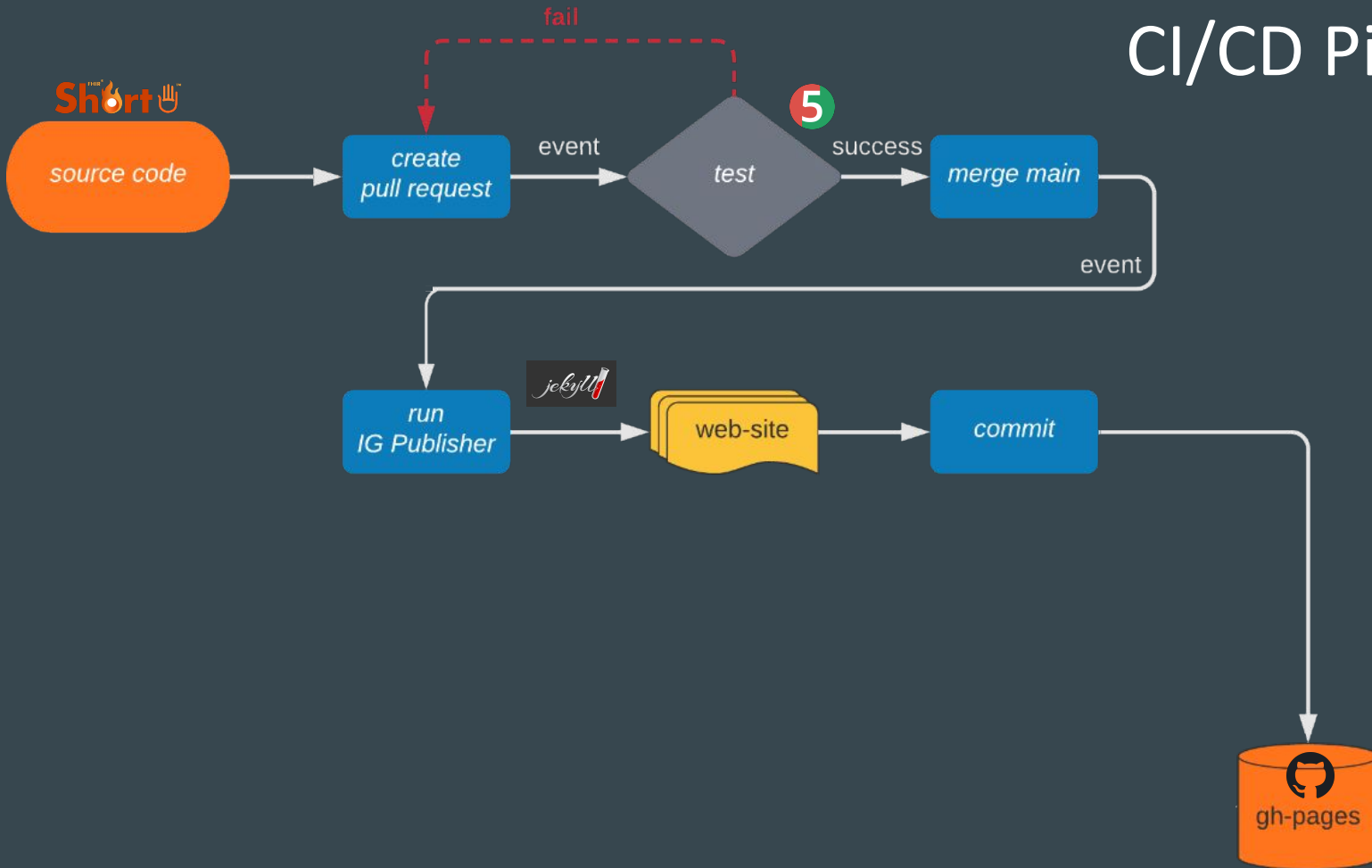


Build - IG Publisher

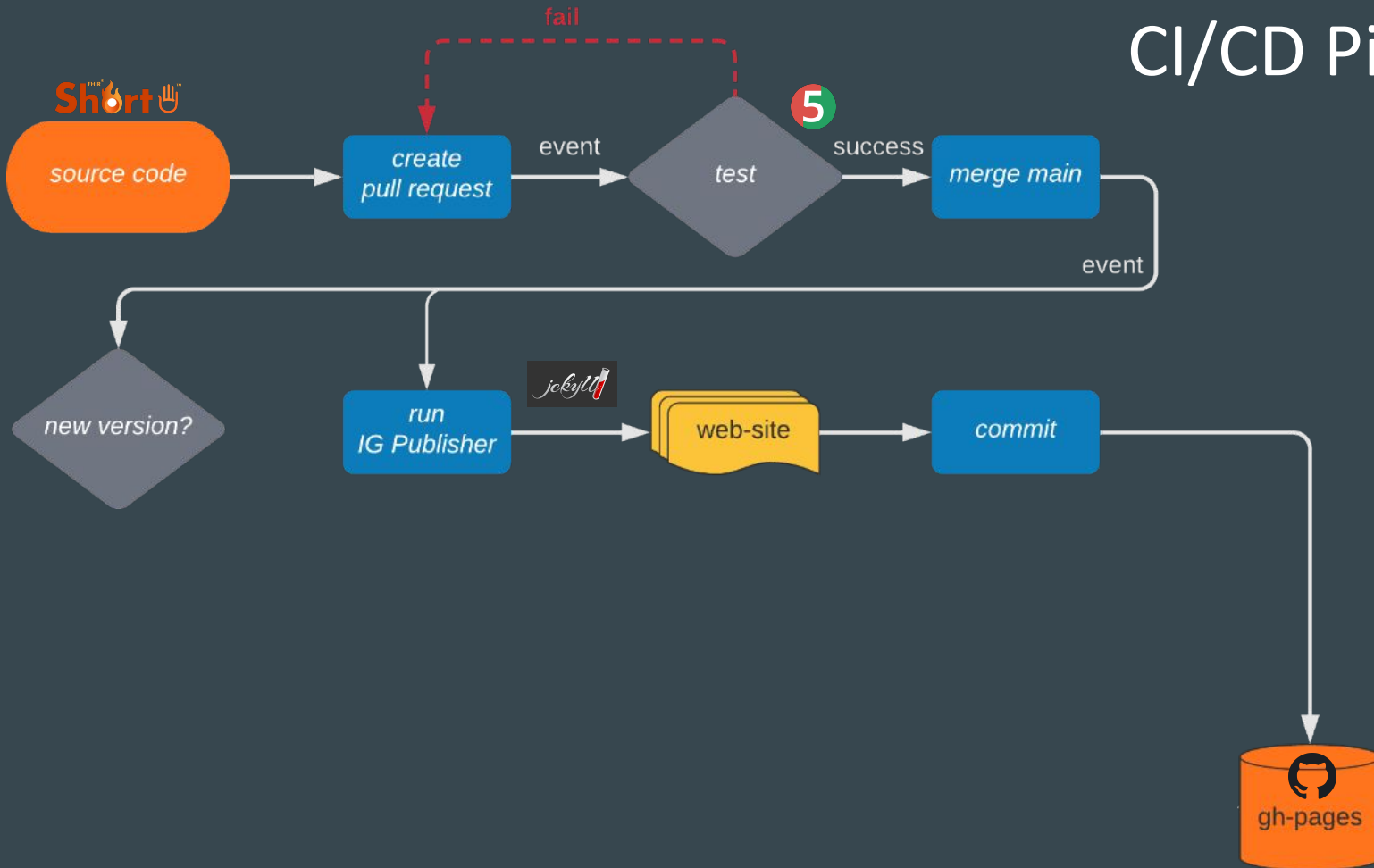


- Java CLI app + Jekyll (static site generator)
- **Input:** conformance-resources, markdown, assets og template
- **Output:** web-side og **NPM-pakke**
- Kan brukes med SUSHI

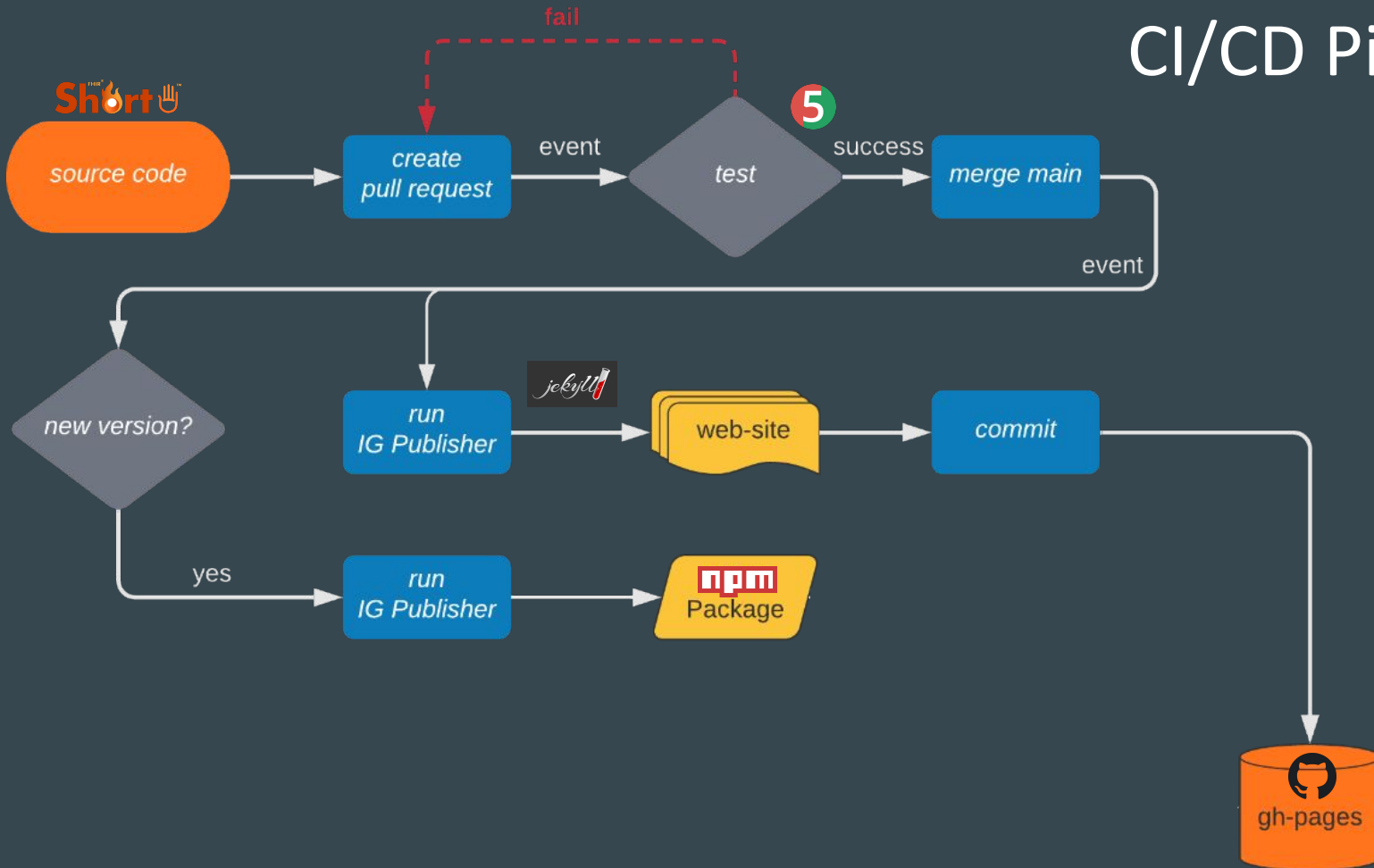
CI/CD Pipeline



CI/CD Pipeline



CI/CD Pipeline



Release - GitHub releases

- Versionert snapshot
- Dokumenter endringer
- Bundled assets
- Fåes også som maskinlesbar Json:

<https://api.github.com/repos/{owner}/{repo}/releases>

MessagingCore v0.1.0

Latest release

nav.no.messaging... 1ffc91b

Compare

github-actions released this on Sep 14

Added

- Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- Nam at dui sed ligula commodo mattis.
- Nulla cursus augue non egestas consectetur.

Changed





- Suspendisse placerat diam a mattis mattis.

Fixed

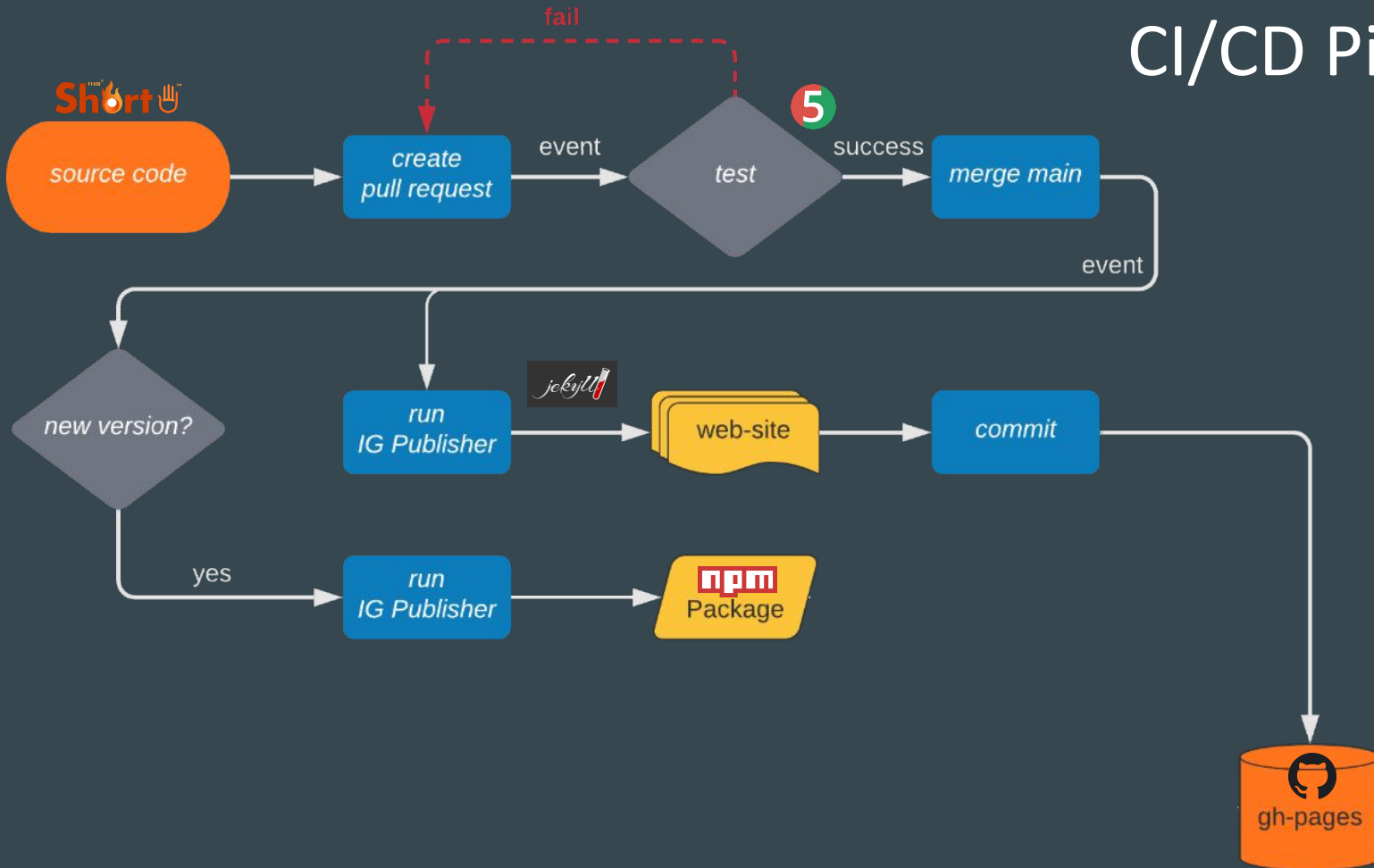
- Cras nec enim tincidunt lorem sagittis vehicula ac et leo.
- Nullam sagittis risus eu pharetra euismod.



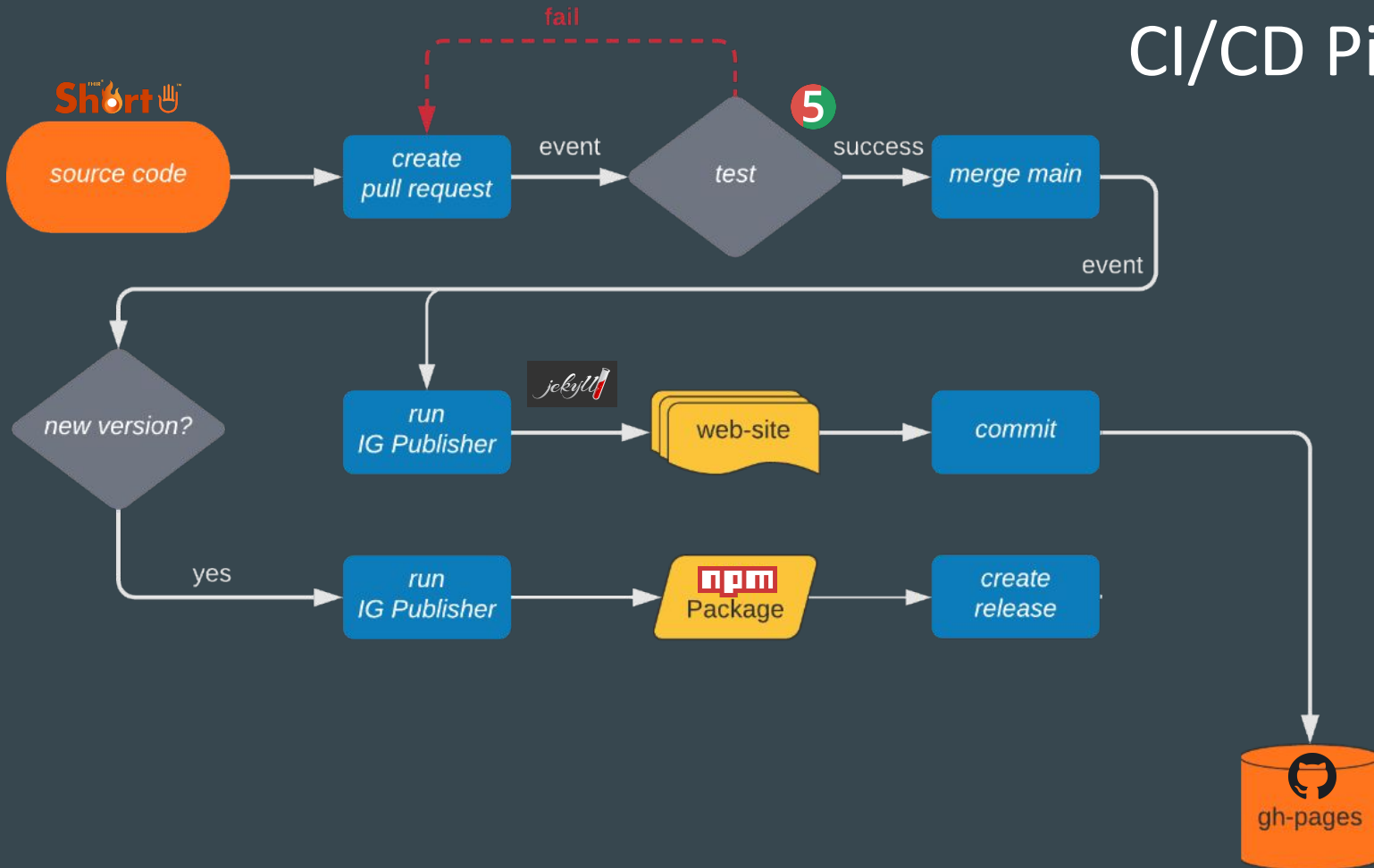
Assets 4

 full-ig.zip	2.14 MB
 package.tgz	36.4 KB
 Source code (zip)	
 Source code (tar.gz)	

CI/CD Pipeline



CI/CD Pipeline



Deploy - FHIR Package registry

- **npm** pakke med Conformance ressurser
- Egen NPM-feed bare for FHIR
- Orden på dependencies og versivering
- Publisering krever at du hoster en **RSS-feed**



FHIR PACKAGE REGISTRY [Home](#) [About FHIR](#) [FHIR Packages](#) [Publish a Package](#)

Package Filters

FHIR Versions:

- R4
- STU3
- DSTU2
- Latest releases only

Resource Filters

Filter FHIR resources within packages.

Resource Type:

Search

- Account
- ActivityDefinition
- Address
- AdverseEvent
- AllergyIntolerance
- Appointment
- AppointmentResp
- Attachment

Search: covid

10 results found in 46 ms POWERED BY SIMPLIFIER.NET

de.gecco October 2021
julliansass Version 1.0.5
R4

Nationales Forschungsnetzwerk der Universitätsmedizin zu Covid-19

Showing first 4 matches:

ComplicationsCovid19 ValueSet	Symptoms Covid-19 StructureDefinition for Condition
Diagnosis Covid-19 StructureDefinition for Condition	Complications of Covid-19 StructureDefinition for Condition

Eu.Dedalus.D4Solutions.C OVID-19 March 2020
pialbertogibellini Version 1.0.2
STU3

Project for self-assessment via App for COVID-19

● Match found at the package level

hitstdio.tw.fhir.dcc August 2021
Taiwan Digital COVID-19 Certificate Version 0.0.1
Canonical: <http://hitstdio.ntunhs.edu.tw/fhir>
Giorgio Canglioli - modified by HITSTD Lab R4

Taiwan Digital COVID-19 Certificate FHIR Implementation Guide (built Tue, Aug 17, 2021 11:13+0800+08:00)

Showing first 4 matches:

COVID-19 Observation	Covid19Vaccines ValueSet
Covid19Diseases ValueSet	Covid19VaccineNames ValueSet

d4l-data4life.covid-19.r4 April 2021
D4L_data4life GmbH Version 0.8.0

Deploy - FHIR Package registry

- DIY: Create your own package feed and add it to the list of package feeds:
 - Create an RSS feed (template at <http://hl7.org/fhir/package-feed.xml>)
 - Register the package feed in <https://github.com/FHIR/ig-registry/blob/master/fhir-ig-list.json> (by making a GitHub Pull-Request).
The package server will regularly check the RSS feed for new packages.

<https://api.github.com/repos/{org}/{repo}/releases>

```
1  [
2  {
3    "url": "https://api.github.com/repos/navikt/fhir/releases/49513113",
4    "assets_url": "https://api.github.com/repos/navikt/fhir/releases/49513113/assets",
5    "upload_url": "https://uploads.github.com/repos/navikt/fhir/releases/49513113/assets{?name,label}",
6    "html_url": "https://github.com/navikt/fhir/releases/tag/nav.no.messaging.core.r4-0.1.0",
7    "id": 49513113,
8    "author": { ...
9  },
10   "node_id": "RE_kwDOF5SUGs4C84KZ",
11   "tag_name": "nav.no.messaging.core.r4-0.1.0",
12   "target_commitish": "main",
13   "name": "MessagingCore v0.1.0",
14   "draft": false,
15   "prerelease": false,
16   "created_at": "2021-09-14T09:23:42Z",
17   "published_at": "2021-09-14T09:25:15Z",
18   "assets": [
19     { ...
20   },
21   {
22     "url": "https://api.github.com/repos/navikt/fhir/releases/assets/44725521",
23     "id": 44725521,
24     "node_id": "RA_kwDOF5SUGs4CqNUR",
25     "name": "package.tgz",
26     "label": "",
27     "uploader": { ...
28   },
29     "content_type": "application/octet-stream",
30     "state": "uploaded",
31     "size": 37267,
32     "download_count": 2,
33     "created_at": "2021-09-14T09:23:44Z",
34     "updated_at": "2021-09-14T09:23:44Z",
35     "browser_download_url": "https://github.com/navikt/fhir/releases/download/nav.no.messaging.core.r4-0.1.0/package.tgz"
36   }
37 ],
38 "tarball_url": "https://api.github.com/repos/navikt/fhir/tarball/nav.no.messaging.core.r4-0.1.0",
39 "zipball_url": "https://api.github.com/repos/navikt/fhir/zipball/nav.no.messaging.core.r4-0.1.0",
40 "body": "\r\n## Added\r\n- Lorem ipsum dolor sit amet, consectetur adipiscing elit.\r\n- Nam at dui sed ligula commodo m
41 ]
```

<https://api.github.com/repos/{org}/{repo}/releases>

Liquid template



```
1 [
2 {
3   "url": "https://api.github.com/repos/navikt/fhir/releases/49513113",
4   "assets_url": "https://api.github.com/repos/navikt/fhir/releases/49513113/assets",
5   "upload_url": "https://uploads.github.com/repos/navikt/fhir/releases/49513113/assets/{name,label}",
6   "html_url": "https://github.com/navikt/fhir/releases/tag/nav.no.messaging.core.r4-0.1.0",
7   "id": 49513113,
8   "author": { ...
9 },
10 },
11 },
12 },
13 },
14 },
15 },
16 },
17 },
18 },
19 },
20 },
21 },
22 },
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95 },
96 },
97 },
98 },
99 },
100 },
101 },
102 },
103 },
104 },
105 },
106 },
107 },
108 },
109 },
110 }]
```



```
1 {%- comment -%}
2 A Liquid Template used to transform json at https://api.github.com/repos/navikt/fhir/releases
3 into a FHIR Package RRS feed according to template http://hl7.org/fhir/package-feed.xml.
4 This is required to publish packages to the FHIR Package Registry: https://registry.fhir.org/submit
5 Bash command:
6 cat package-feed.liquid | npx liquidjs '{"releases":$(wget -q -O - https://api.github.com/repos/navikt/fhir/rele
7 {%- endcomment -%}
8 <rss xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:content="http://purl.org/rss/1.0/modules/content/" xmlns:f
9 <channel>
10 <title>NAV FHIR Packages</title>
11 <description>New Packages published by NAV</description>
12 <link>https://navikt.github.io/fhir/package-feed.xml</link>
13 <generator>HL7, Inc FHIR Publication Tooling</generator>
14 <lastBuildDate>{{ "now" | date: "%a, %d %b %Y %H:%M:%S GMT" }}</lastBuildDate>
15 <atom:link href="https://navikt.github.io/fhir/package-feed.xml" rel="self" type="application/rss+xml"/>
16 <pubDate>{{ "now" | date: "%a, %d %b %Y %H:%M:%S GMT" }}</pubDate>
17 <language>en</language>
18 <ttl>600</ttl>
19 {%- for release in releases -%}
20 {%- assign package = release.assets | where: "name", "package.tgz" | first %}
21 <item>
22 <title>{{ release.tag_name | replace: "-", "#" }}</title>
23 <description>
24 <link>{{ package.browser_download_url }}</link>
25 <guid isPermaLink="true">{{ package.browser_download_url }}</guid>
26 <dc:creator>NAV</dc:creator>
27 <fhir:version>4.0.1</fhir:version>
28 <fhir:kind>fhir.ig</fhir:kind>
29 <pubDate>{{ release.published_at | date: "%a, %d %b %Y %H:%M:%S GMT" }}</pubDate>
30 </item>
31 {%- endfor %}
32 </channel>
33 </rss>
```

<https://api.github.com/repos/{org}/{repo}/releases>

Liquid template



```
1 [
2 {
3   "url": "https://api.github.com/repos/navikt/fhir/releases/49513113",
4   "assets_url": "https://api.github.com/repos/navikt/fhir/releases/49513113/assets",
5   "upload_url": "https://uploads.github.com/repos/navikt/fhir/releases/49513113/assets{?name,label}",
6   "html_url": "https://github.com/navikt/fhir/releases/tag/nav.no.messaging.core.r4-0.1.0",
7   "id": 49513113,
8   "author": { ...
9 },
10 },
11 {
12   "node_id": "RE_kwDOF5SUGs4C84KZ",
13   "tag_name": "nav.no.messaging.core.r4-0.1.0",
14   "target_commitish": "main",
15   "name": "MessagingCore v0.1.0",
16   "draft": false,
17   "prerelease": false,
18   "created_at": "2021-09-14T09:23:42Z",
19   "published_at": "2021-09-14T09:25:15Z",
20   "assets": [
21     { ...
22     },
23     {
24       "url": "https://api.github.com/repos/navikt/fhir/releases/assets/44725521",
25       "id": 44725521,
26       "node_id": "RA_kwDOF5SUGs4C9nUR",
27       "name": "package.tgz",
28       "label": "",
29       "uploader": { ...
30     },
31     "content_type": "application/octet-stream",
32     "state": "uploaded",
33     "size": 37267,
34     "download_count": 2,
35     "created_at": "2021-09-14T09:23:44Z",
36     "updated_at": "2021-09-14T09:23:44Z",
37     "browser_download_url": "https://github.com/navikt/fhir/releases/download/nav.no.messaging.core.r4-0.1.0/package.tgz"
38   ],
39   "tarball_url": "https://api.github.com/repos/navikt/fhir/tarball/nav.no.messaging.core.r4-0.1.0",
40   "zipball_url": "https://api.github.com/repos/navikt/fhir/zipball/nav.no.messaging.core.r4-0.1.0",
41   "body": "\r\n#\r\n Added\r\n- Lorem ipsum dolor sit amet, consectetur adipiscing elit.\r\n- Nam at dui sed ligula commodo m
42 ]
43 }
```

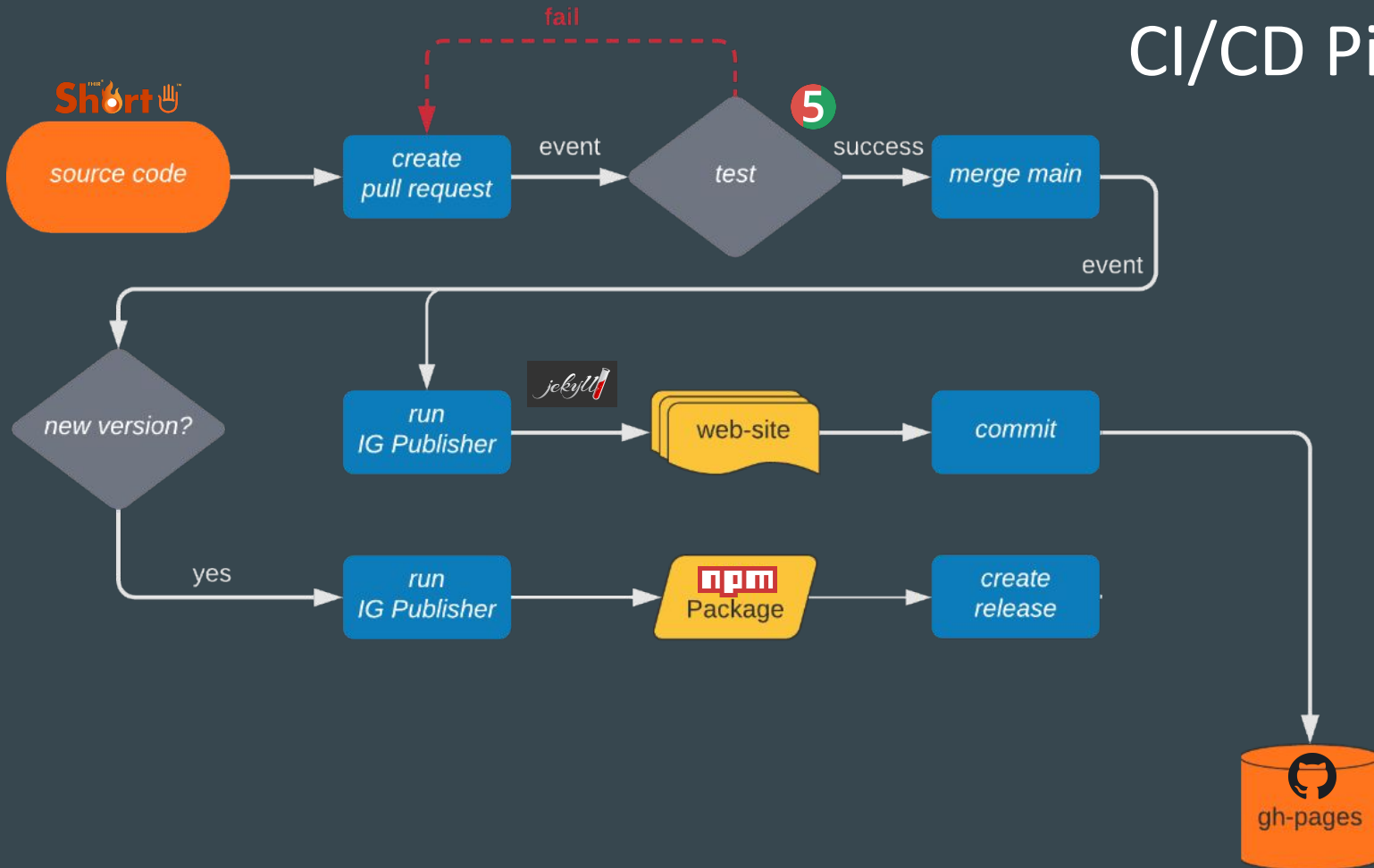


package-feed.xml

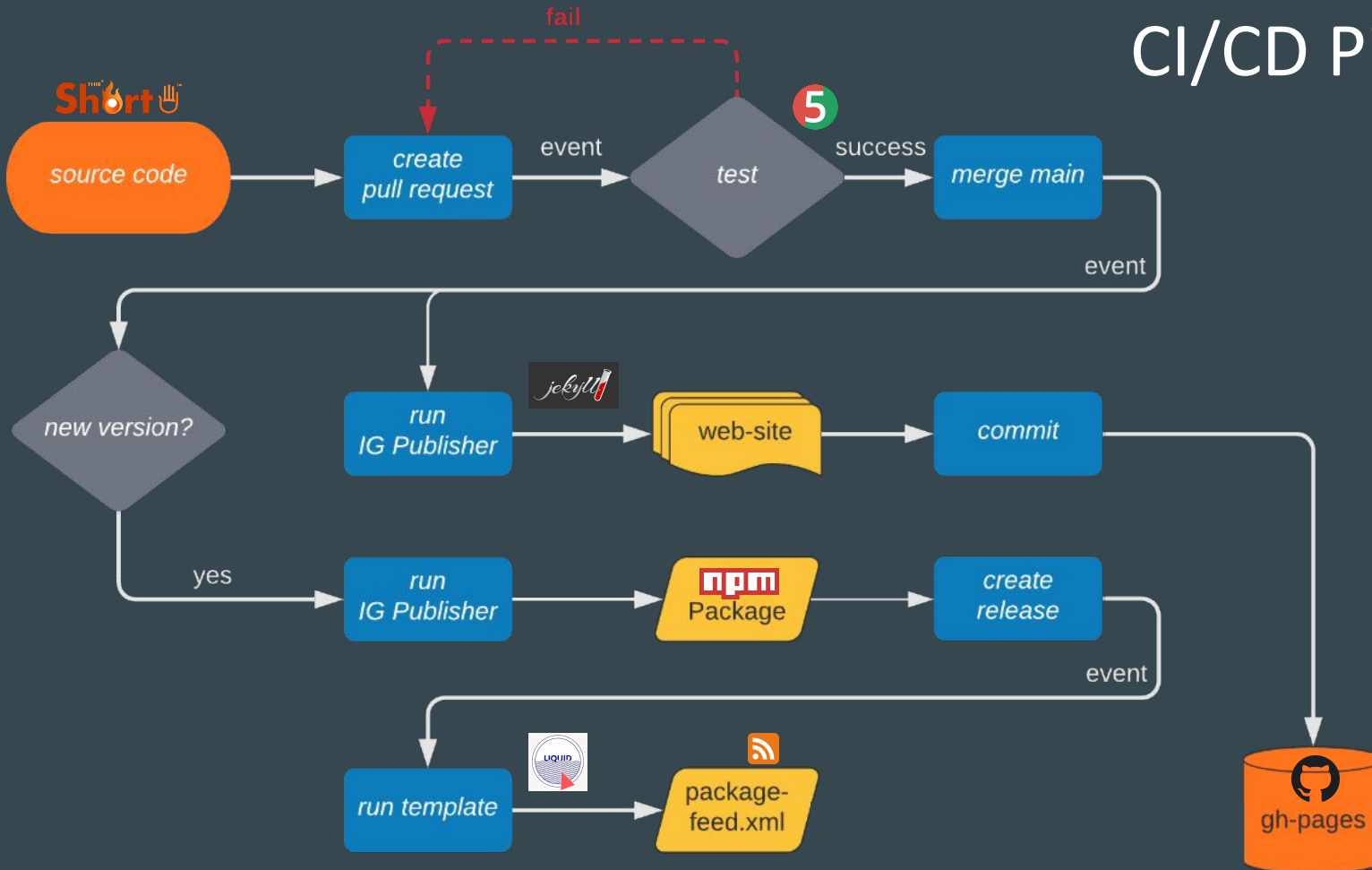
```
1 {% comment -%}
2 A Liquid Template used to transform json at https://api.github.com/repos/navikt/fhir/releases
3 into a FHIR Package RRS Feed according to template http://hl7.org/fhir/package-feed.xml.
4 This is required to publish packages to the FHIR Package Registry: https://registry.fhir.org/submit
5 Bash command:
6 cat package-feed.liquid | npx liquidjs '{"releases":$(wget -q -O - https://api.github.com/repos/navikt/fhir/rele
7 {% endcomment -%}
8 <rss xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:content="http://purl.org/rss/1.0/modules/content/" xmlns:f
9 <channel>
10 <title>NAV FHIR Packages</title>
11 <description>New Packages published by NAV</description>
12 <link>https://navikt.github.io/fhir/package-feed.xml</link>
13 <generator>HL7, Inc FHIR Publication Tooling</generator>
14 <lastBuildDate>{{ "now" | date: "%a, %d %b %Y %H:%M:%S GMT" }}</lastBuildDate>
15 <atom:link href="https://navikt.github.io/fhir/package-feed.xml" rel="self" type="application/rss+xml"/>
16 <pubDate>{{ "now" | date: "%a, %d %b %Y %H:%M:%S GMT" }}</pubDate>
17 <language>en</language>
18 <ttl>600</ttl>
19 {% for release in releases -%}
20 {% assign package = release.assets | where: "name", "package.tgz" | first %}
21 <item>
22 <title>{{ release.tag_name | replace: "-", "#" }}</title>
23 <description>
24 <link>{{ package.browser_download_url }}</link>
25 <guid isPermaLink="true">{{ package.browser_download_url }}</guid>
26 <dc:creator>NAV</dc:creator>
27 <fhir:version>4.0.1</fhir:version>
28 <fhir:kind>fhir.ig</fhir:kind>
29 <pubDate>{{ release.published_at | date: "%a, %d %b %Y %H:%M:%S GMT" }}</pubDate>
30 </item>
31 {% endfor %}
32 </channel>
33 </rss>
```

```
1 <rss xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:content="http://purl.org/rss/1.0/modules/content/" xmlns:fhir="http://hl7.
2 <channel>
3 <title>NAV FHIR Packages</title>
4 <description>New Packages published by NAV</description>
5 <link>https://navikt.github.io/fhir/package-feed.xml</link>
6 <generator>HL7, Inc FHIR Publication Tooling</generator>
7 <lastBuildDate>Sun, 17 Oct 2021 13:05:52 GMT</lastBuildDate>
8 <atom:link href="https://navikt.github.io/fhir/package-feed.xml" rel="self" type="application/rss+xml"/>
9 <pubDate>Sun, 17 Oct 2021 13:05:52 GMT</pubDate>
10 <language>en</language>
11 <ttl>600</ttl>
12 <item>
13 <title>nav.no.messaging.core.r4#0.1.0</title>
14 <description>
15 <link>https://github.com/navikt/fhir/releases/download/nav.no.messaging.core.r4-0.1.0/package.tgz</link>
16 <guid isPermaLink="true">https://github.com/navikt/fhir/releases/download/nav.no.messaging.core.r4-0.1.0/package.tgz</guid>
17 <dc:creator>NAV</dc:creator>
18 <fhir:version>4.0.1</fhir:version>
19 <fhir:kind>fhir.ig</fhir:kind>
20 <pubDate>Tue, 14 Sep 2021 11:25:15 GMT</pubDate>
21 </item>
22 </channel>
23 </rss>
```

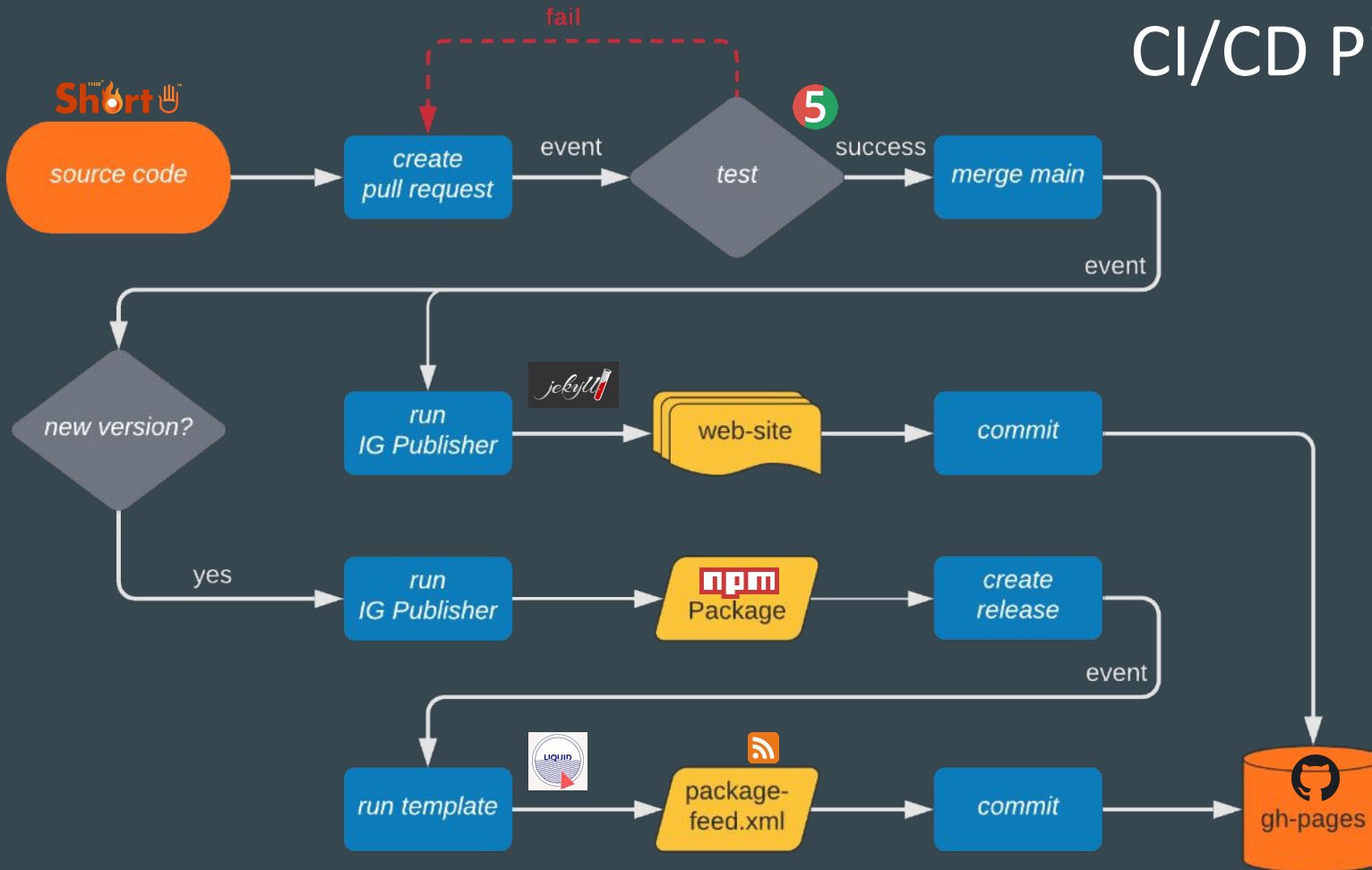

CI/CD Pipeline



CI/CD Pipeline



CI/CD Pipeline



Spørsmål?

<https://github.com/navikt/fhir>