Norwegian FHIR Hackathon 2025

Pre meeting 2

Welcome to Norwegian FHIR Hackathon 2025

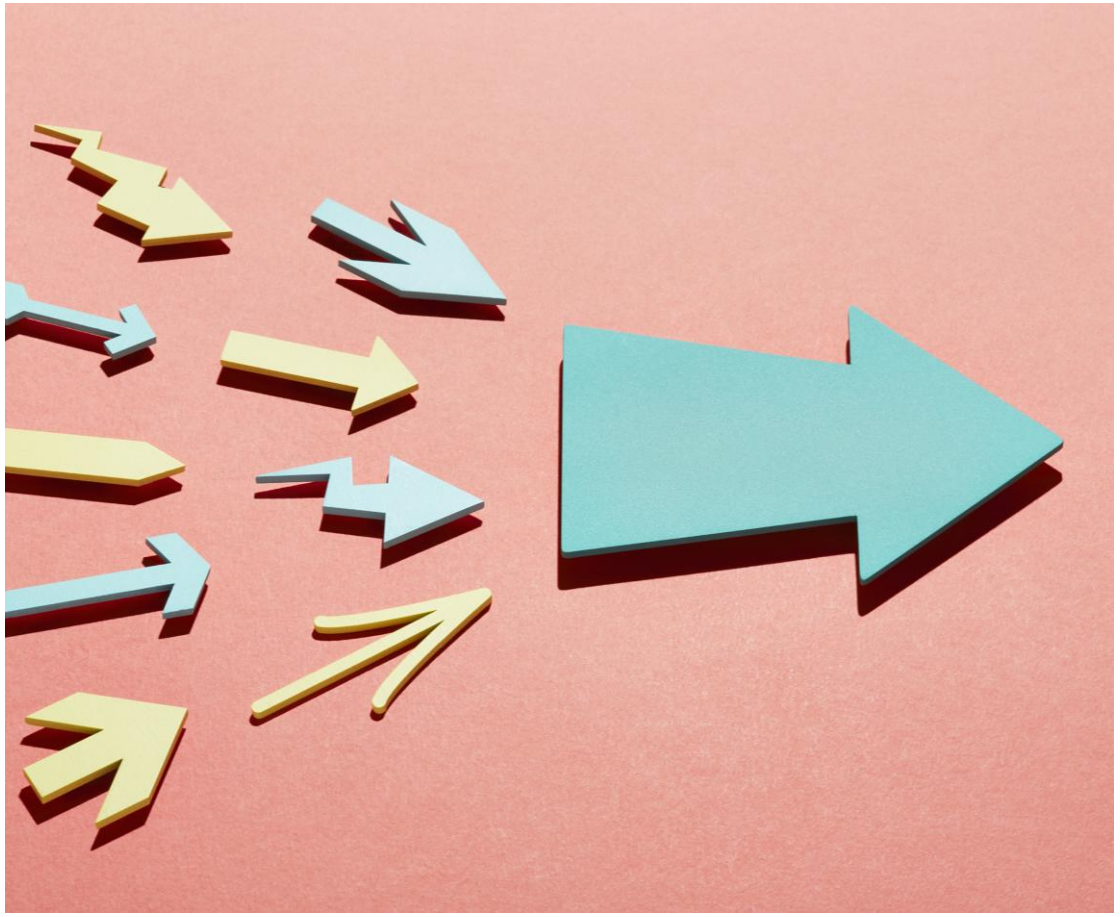
HL7 Affiliate | Norway

Agenda

1000	Welcome	Thomas T Rosenlund
1010	Presentation of the track leads	All
1015	Presentation of the participants	All
1020	Separate meetings for each track (breakout sessions)	All
1100	End of meeting	All

Practical info

- This is the second pre-meetings to prepare for the Hackathon.
- The Hackathon events takes place on November 10th from 0930-1700
- The Hackathon is a free event sponsored by HL7 Norway.



Practial info (continues)

- The Hackathon events takes place on November 10th from 0930-1700
  - If you can not attend the actual Hackathon please contact us, so we can fill up vacancies.
  - Lunch and snacks will be provided during the meeting (see agenda on the github page)
- The actual Hackathon event is physical attendance only on X meeting point outside Oslo as part of the EHiN pre-conference
- Information page about the Hackathon
- Registration page

Four tracks on the Hackathon

- You should probably choose one main track and i time permit also work on a second track during the Hackathon.
- Implement and test the FHIR API for Pasientens måledata (PMD-API)
- Implement and test FHIR interfaces for services with existing proprietary API's
- Implement and test use of FHIR terminology services
- Write and publish documentation of FHIR API's by authoring and publishing a FHIR Implementation Guide

Track leads and partners

Track	Name	Contact	Affiliate
PMD	Michal Jan Warecki	michal.jan.warecki@nhn.no	NHN
PMD	Tormod Haugene	tormod.haugene@nhn.no	NHN
PMD/OKT	Sigurd Ringbakken	sigurd.ringbakken@nhn.no	NHN
PMD	Bjørnar Selvén	bjornar.selven@nhn.no	NHN
OKT	Robert William Dall Frøseth	robert.william.dall.froseth@nhn.no	NHN
OKT	Adam Kover	adam.kover@felleskatalogen.no	Felleskatalogen
OKT	Nino Lo Cascio	nino.lo.cascio@tietoevry.com	Tietoevry
Terminology	Vadim Peretokin	vperetokin@hey.com	Consultant
Terminology	Mattias Colliander	mattias.colliander@collian.se	HL7 Sweden
IG authoring	Thomas Tveit Rosenlund	Thomas.Tveit.Rosenlund@helsedir.no	Helsedirektoratet
IG authoring	Espen Stranger Seland	ess@vali.no	Vali AS
Partner	Øyvind Aassve	oeyaas@sykehuspartner.no	Sykehuspartner
Partner	Gaute Nygreen	gaute.nygreen@nhn.no	NHN

Introduction participants

- Please present yourself:
  - Name
  - Affiliate
  - What track you want to attend

Separate meetings for each track

- We will split the group into four
  - You should connect to the meeting for your main track
  - Links are provided in the meeting invitation, and available on the pre meeting page on Github
  - https://hl7norway.github.io/FHIR-hackathon-2025/currentbuild/pre-agenda.html#november-3rd

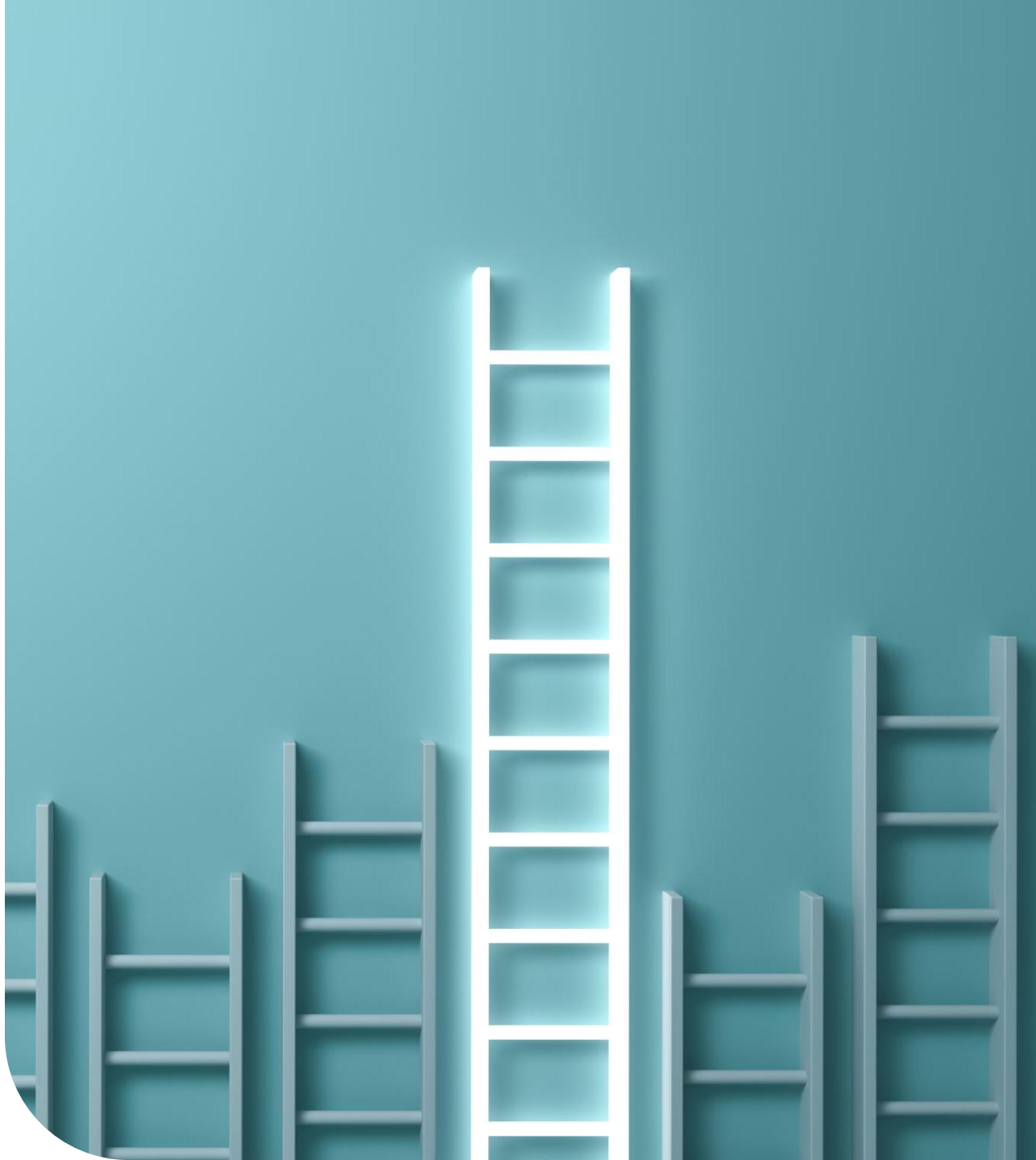
Title	Meeting link
PMD track	PMD track link
OKT Track	OKT track link
Terminology track	Terminology track link
IG track	IG Track link

FHIR IG building and authoring
Bygge IG med Shorthand og IG-Publisher

Thomas Tveit Rosenlund and
Espen Stranger Seland

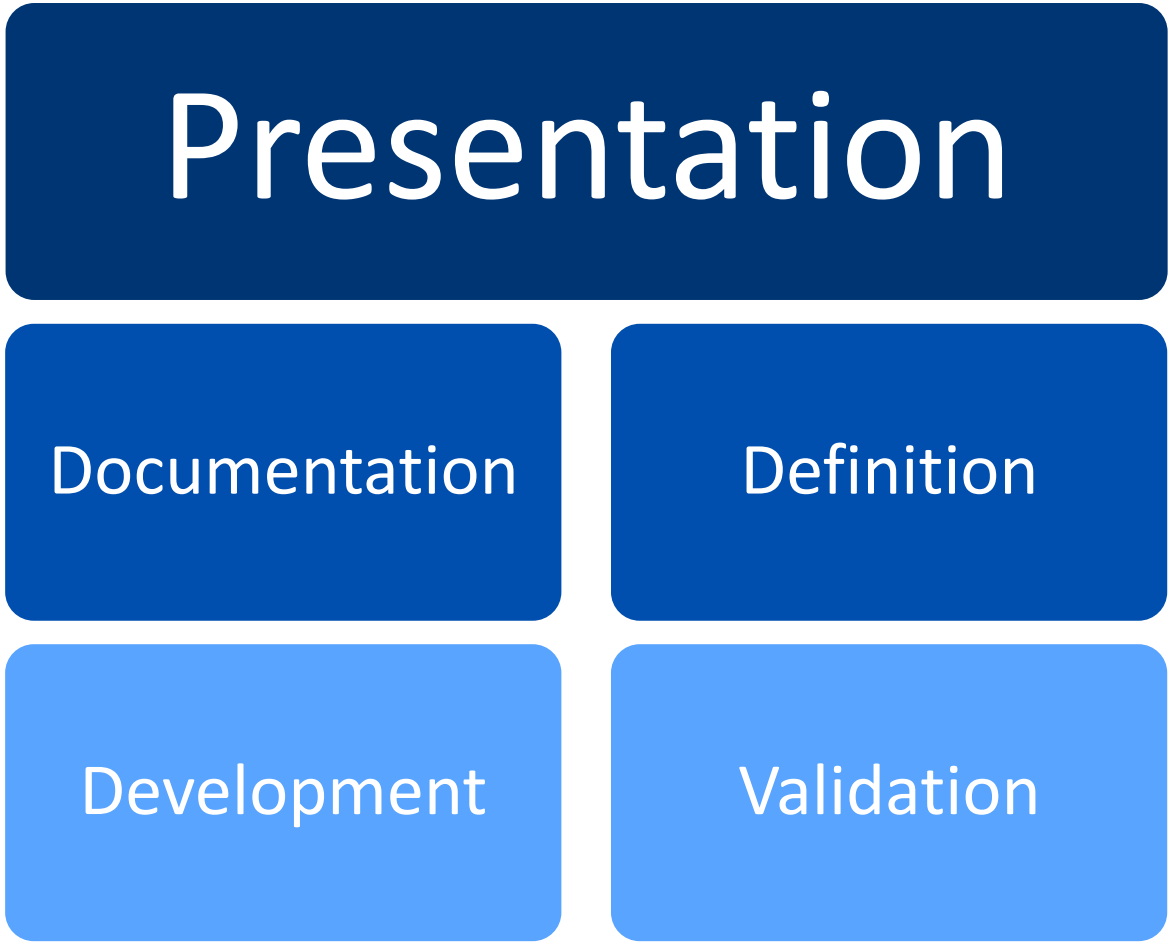
Learning goals for this track

- Basic understanding of the role of FHIR profiling
- Know the necessary tools for building FHIR IG's
  - IG publisher
  - SUSHI
  - Forge and Simplifer.net
- Learn how to write FHIR documentation using FSH or Forge
- Learn how to use the tools for FHIR IG authoring
- Learn how to present a draft IG using Github.io or Simplifier.net

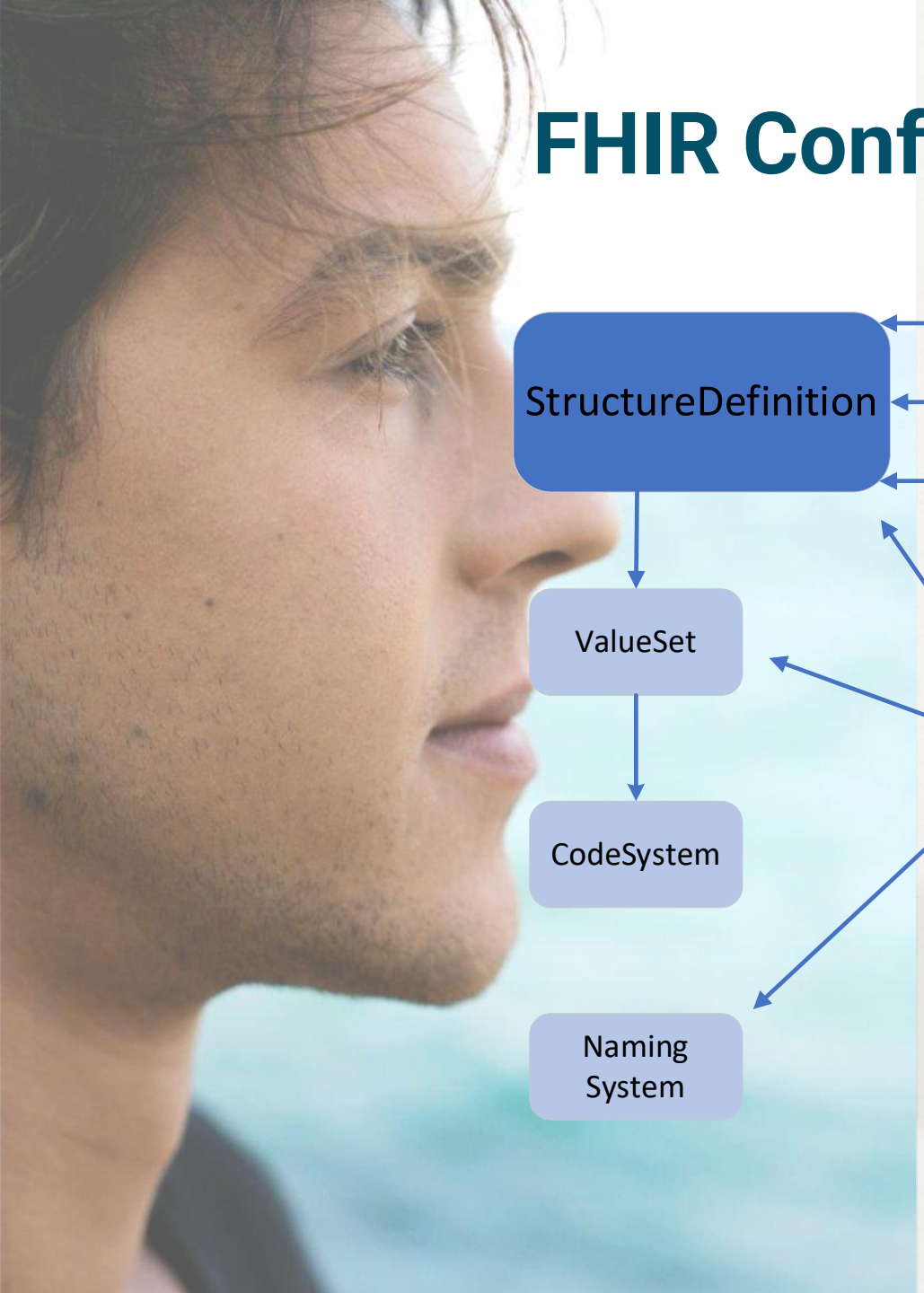


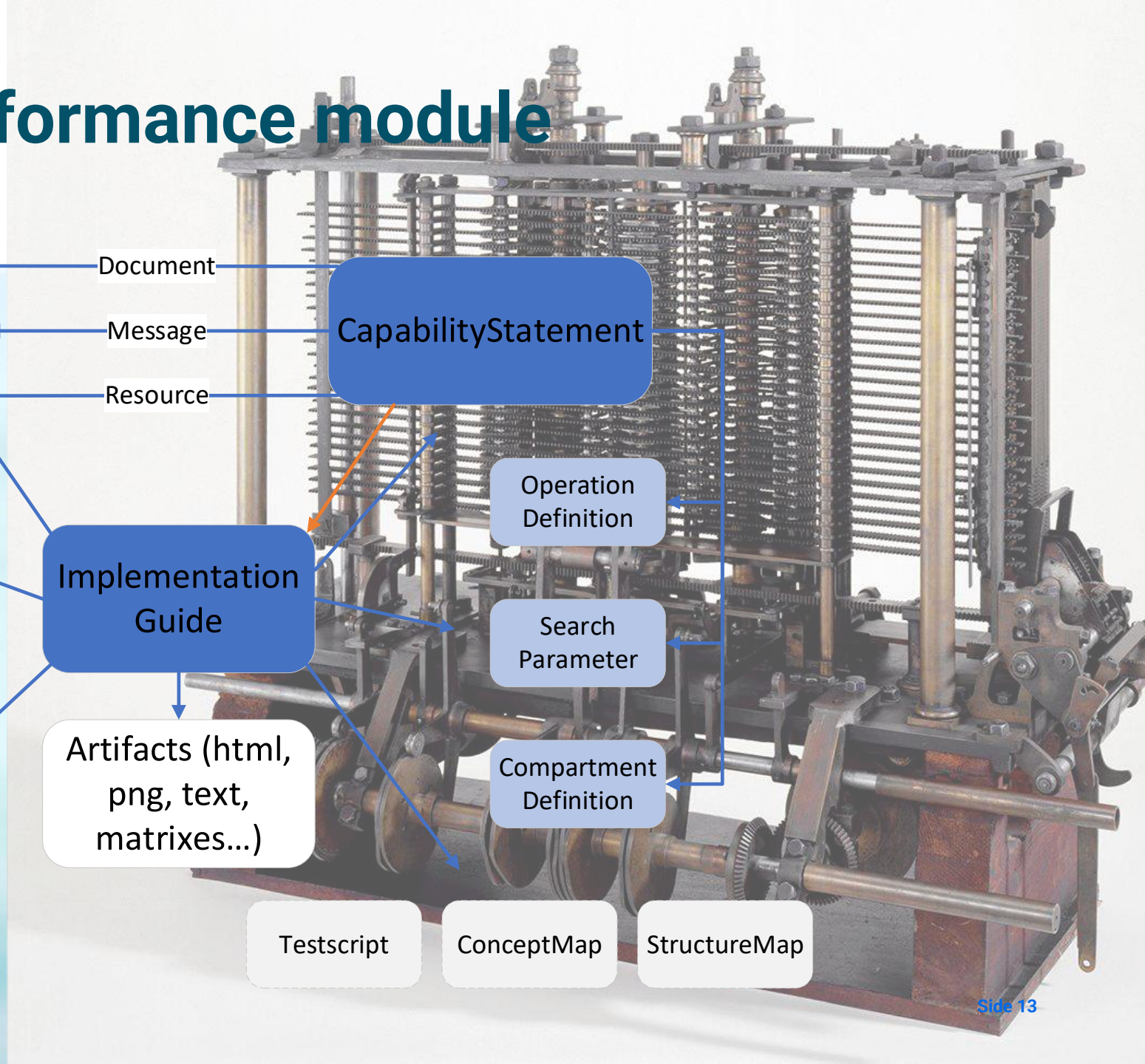
Why profile FHIR?

- 80/20
  - The FHIR standard defines 20% of the needed definitions that covers 80% of the use-cases
  - The rest of the definitions has to be added using profiling
- Profiling covers five use-cases
  - Presentation (for humans)
  - Definition and documentation
  - Validation and development



FHIR Conformance module





StructureDefinition

Document

Message

Resource

CapabilityStatement

ValueSet

CodeSystem

Naming System

Implementation Guide

Artifacts (html, png, text, matrixes…)

Operation Definition

Search Parameter

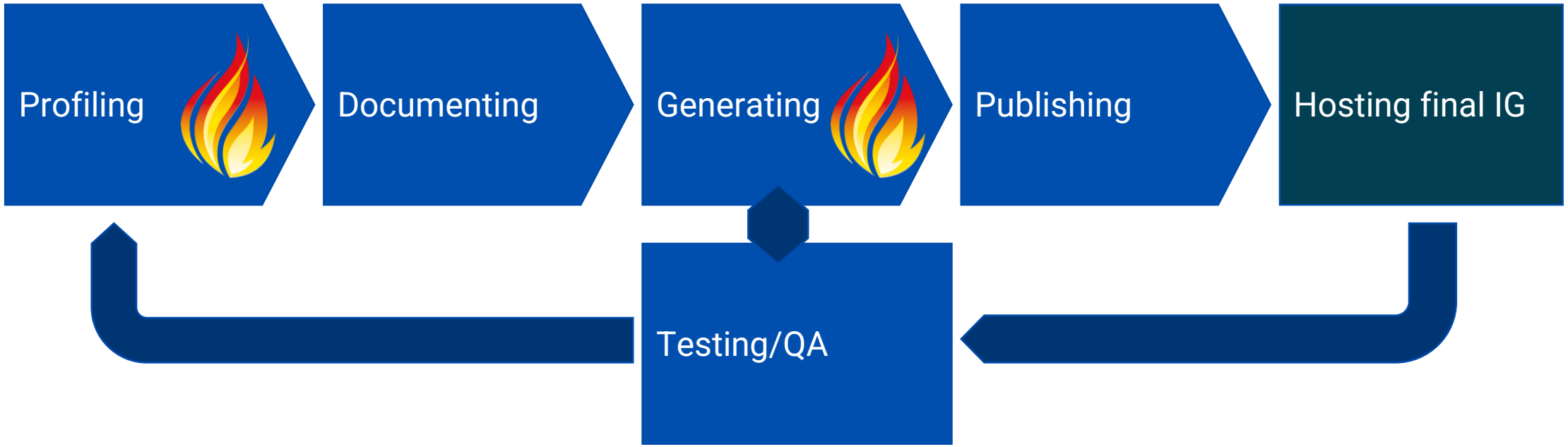
Compartment Definition

Testscript

ConceptMap

StructureMap

Profilering



Tools needed for profiling

- IG-publisher Getting Started with IG Publisher -
  - Publisher has several prerequisites:
    - Java
    - Ruby and Jekyll
    - Sushi
    - Git
  - You can get all this in a Docker image
  - Or use the ig-mal running on github entirely
    - Easier, but slower
  - As we are using FSH and SUSHI this can also be usefull
    - Project Structure | FSH School
    - Shorthand documentation

Assignments for the tracks

- Understand FHIR
- Install tools
- Make profiles using FSH, JSON or XML
- (Validation)
- Make a implementation guide web page
- Read and understand the QA page
- Add some documentation pages
- Add some images and plantuml/mermaid diagrams
- Versioning and publishing

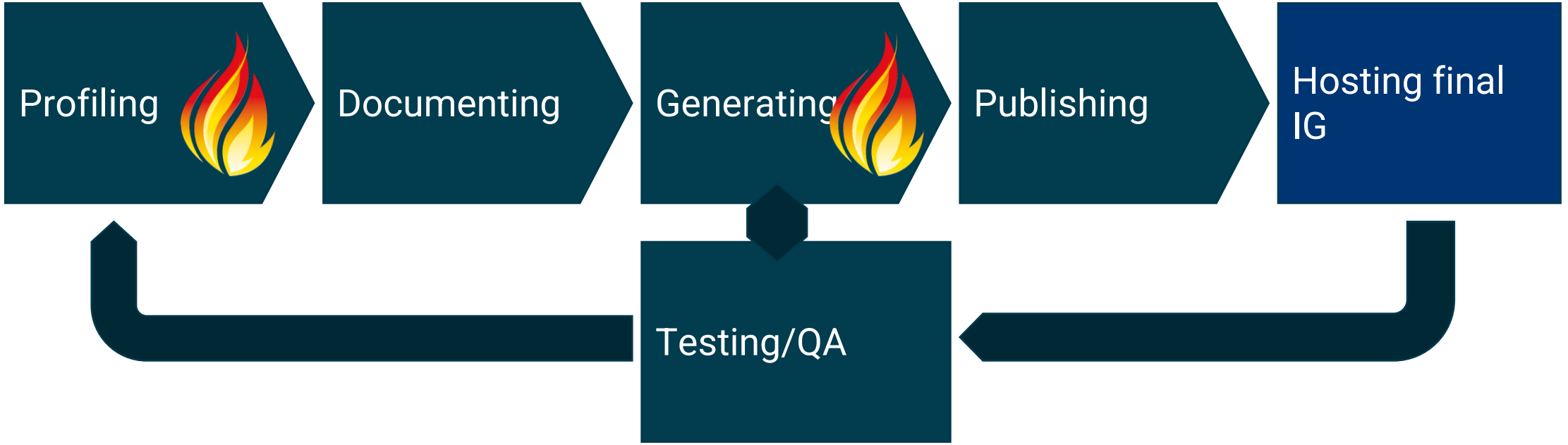
FHIR Hackathon

2025 Norwegian FHIR Hackathon

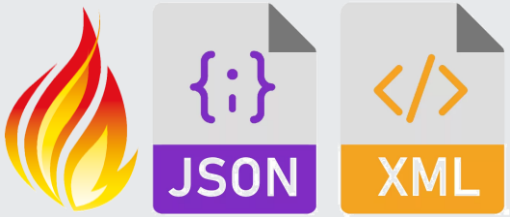
Agenda

1. Profilering generelt
2. Sammenligning profileringsverktøy
3. Shorthand/SUSHI

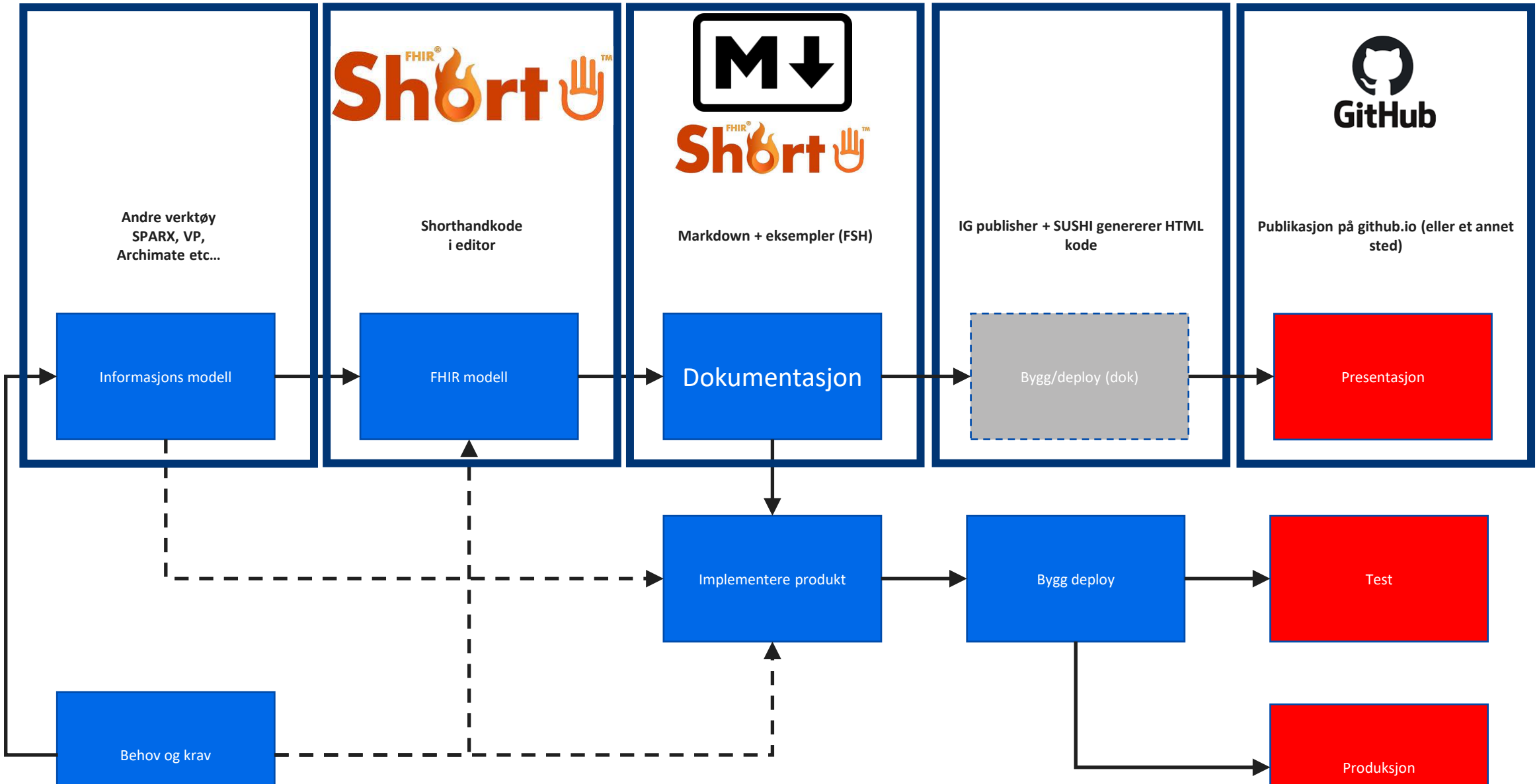
Profilering



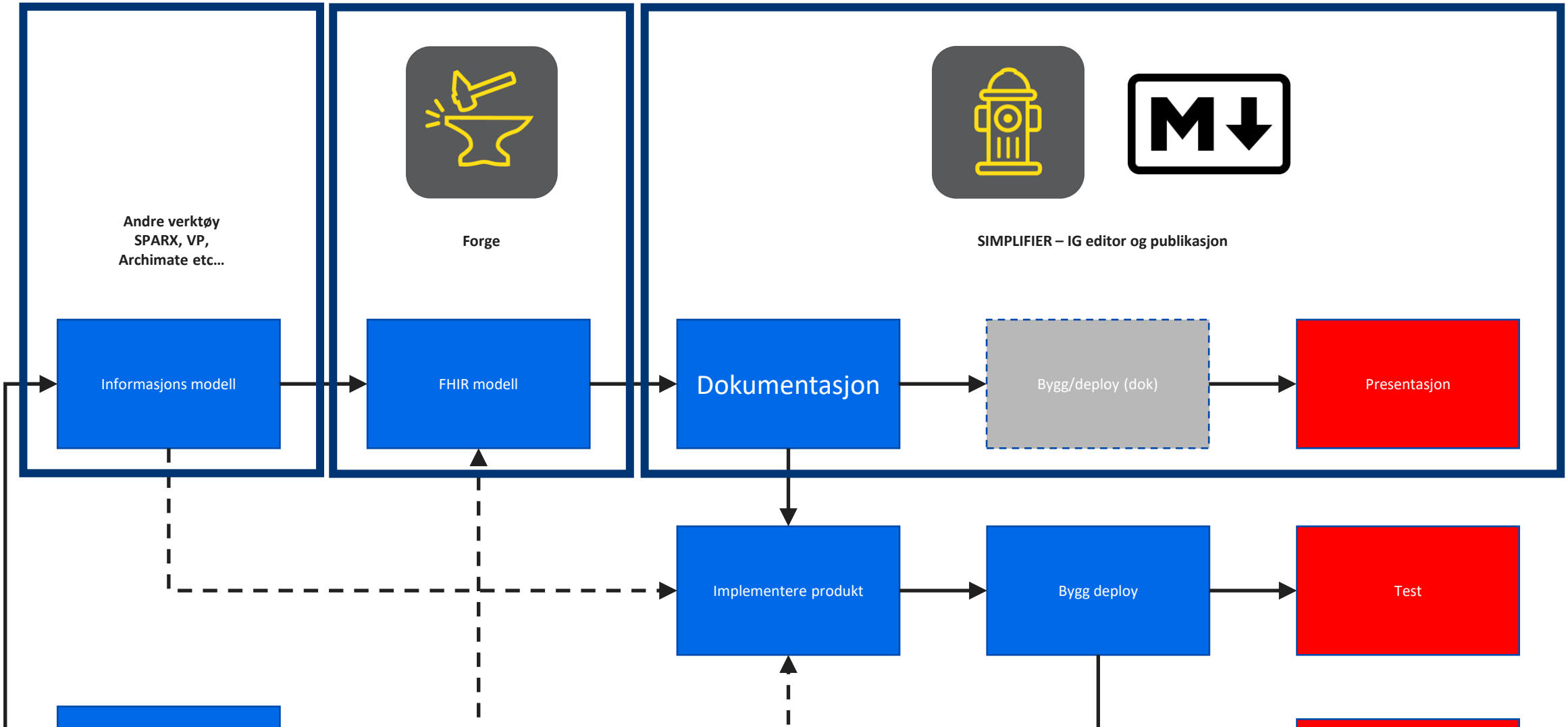
Build pipelines sammenligning

	Fordeler	Ulemper		
	Enkelt å komme i gang Raskt å publisere God rendring av profiler God support Publiseringsinfrastruktur inkludert	Versjonshåndtering er en utfordring Mange manuelle prosesser Kostbart Begrensninger på antall prosjekt	.NET	+1
	Forenklet språk Tett integrert i publisher Håndteres som annen kildekode (god versjonskontroll) Automatiserte prosesser Open source	Høyere terskel å lære Krever egen infrastruktur for publisering	Javascript + Java	+3
	Web grensesnitt som GUI Open source	Høyere terskel å lære	Java	+1
	Native FHIR Full kontroll Håndteres som annen kildekode God versjonskontroll Open source	Høy terskel å lære Omfattende arbeid å skrive Krever egen infrastruktur for publisering	Pure FHIR (+ Java)	+2

Arbeidsflyt Shorthand/ig-publisher/github-io



Arbeidsflyt Forge og SIMPLIFIER



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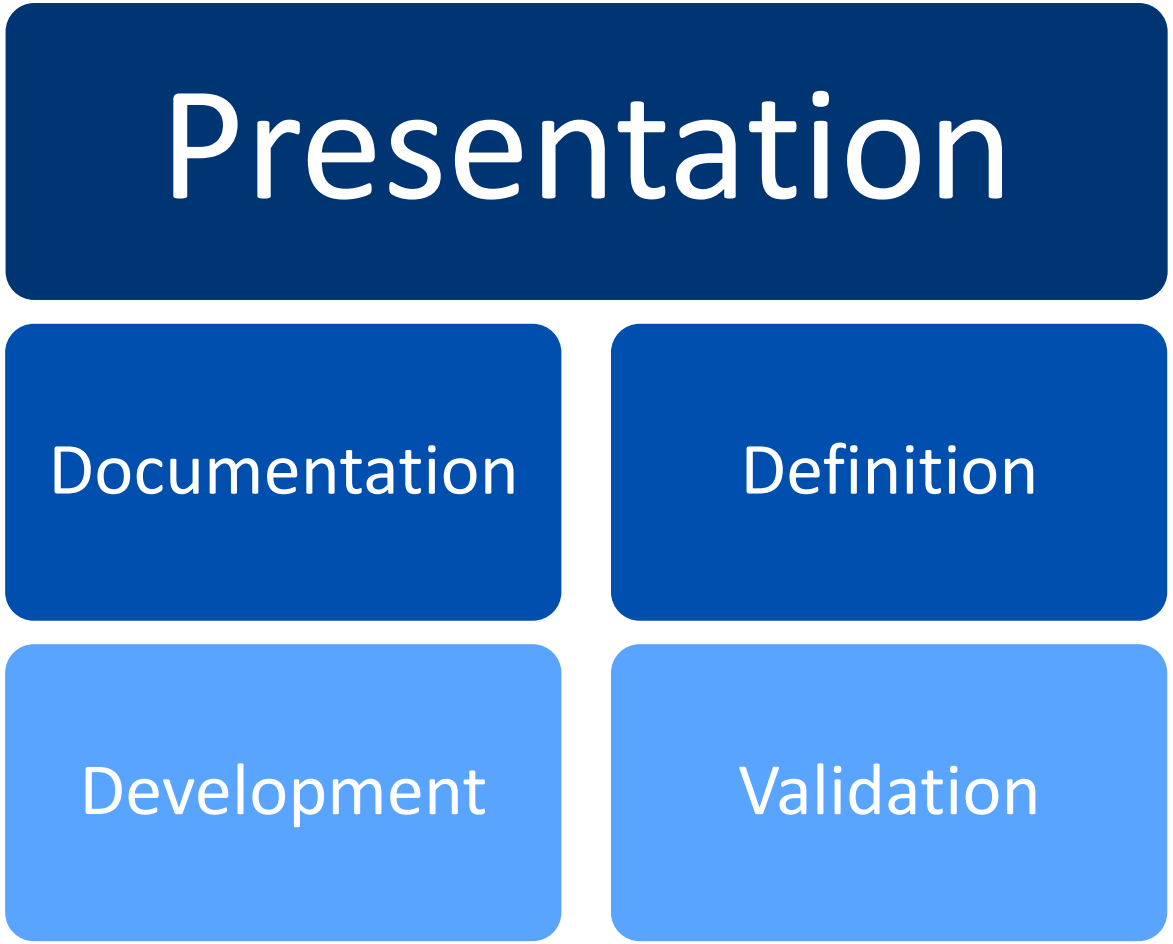
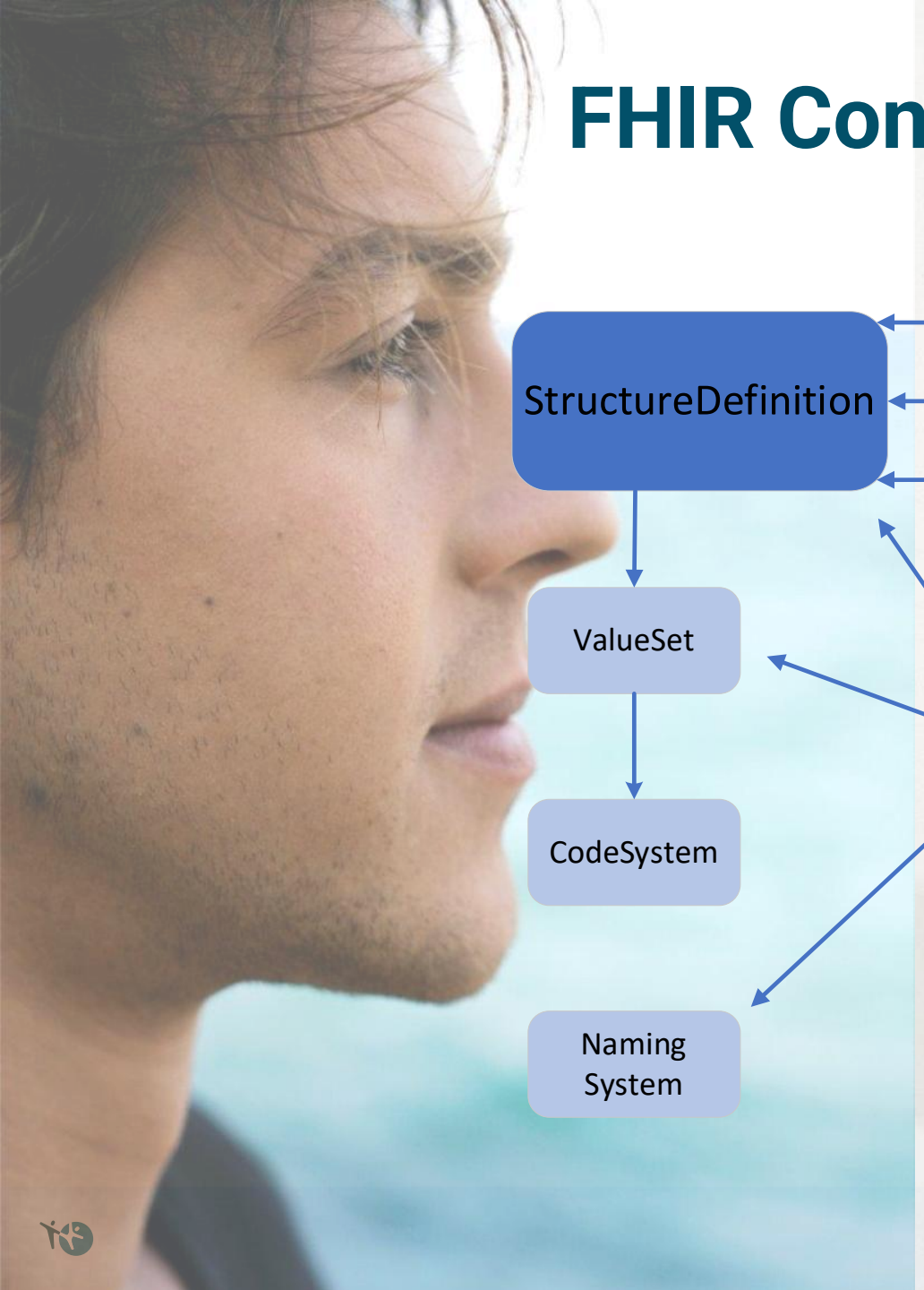
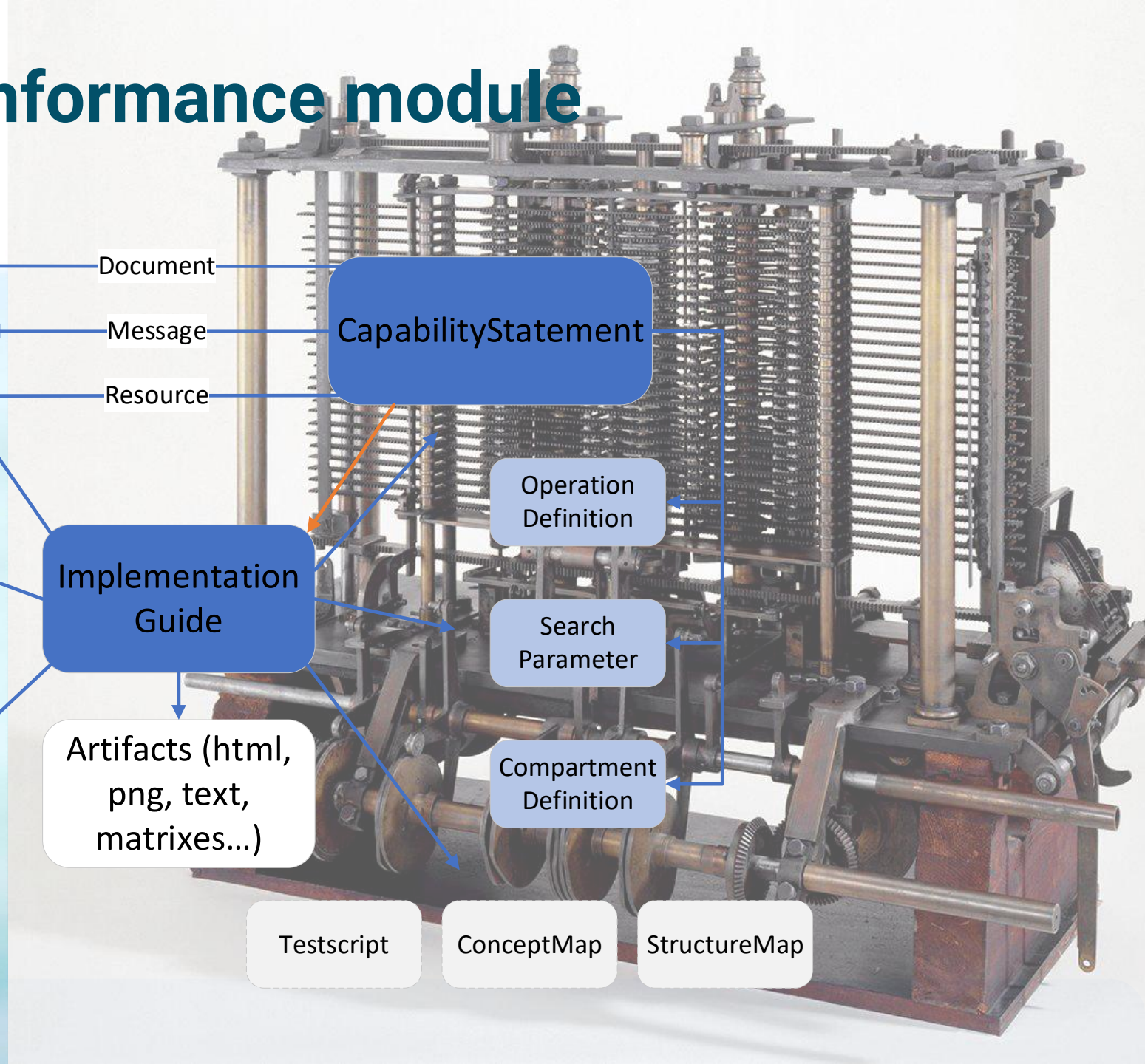


FHIR Conformance module





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Lag en IG

In a separate folder under "igs", define your IG and the FHIR artifacts (profiles, extensions etc.). Artifacts goes in the input folder. FHIR artifacts can be converted from xml/json to FSH or written by hand using the FSH language.

You need three files to get started with IG build process:

- **ig.ini** - Defines the template for the IG and where the generated ImplementationGuide resouces is to be found.
- **sushi-config.yaml** - Defines configuration for your implementation guide to the SUSHI IG generation part of the IG-Publisher
  - sushi-config.yaml should contain references to any documentation pages you make in the input/pages folder
- **input/pages/index.md** - The starting page of your implementation guide, usually written i markdown
  - The input/pages folder can contain any number of markdown files to display as part of you implementation guide
- **package-list.json** - is recommended to keep track of published versions of your IG
- The actual FHIR definitions (FHIR Shorthand) goes into the fsh folder, full writeup of the catalog structure for IG-generation:
- **input/fsh/*** - All the fsh files defining your FHIR artifacts (profiles, search parameters, codesystems etc.)

IG.ini

- Navn og url
- Template for IG

```
[IG]

ig = fsh-generated/resources/ImplementationGuide-
hl7.fhir.no.domain.vitalsigns.json

template = https://github.com/HL7Norway/ig-template
```

sushi-config.yaml

- Hvordan bygge IG basert på SUSHI
- URL
- Canonical
- Pakkenavn/id
- Versjon
- Meny

```yaml
canonical: http://hl7.no/fhir
name: NoDomainVitalSigns
fhirVersion: 4.0.1
FSHOnly: false
applyExtensionMetadataToRoot: false
id: hl7.fhir.no.domain.vitalsigns
status: draft
version: 0.7.0
releaseLabel: ci-build
copyrightYear: 2021+
jurisdiction: urn:iso:std:iso:3166#NO "Norway"
dependencies:
    hl7.fhir.no.basis: 2.2.0

menu:
  Home: index.html
  Artifacts: artifacts.html
  TOC: toc.html
  Download: download.html
```

input/fsh

- Definisjoner
- Eksempler
- Kodeverk/verdisett
- Extensions

```
Profile: NoDomainVitalSignsObservationBodyHeight
Parent: $bodyheight
Id: NoDomainVitalSignsObservationBodyHeight
Title: "NO Domain VitalSigns Observation - Body Height"
Description: """Base profile for Norwegian Vital Signs Observation Body Height
information.
To be used for recording the measured height or body length of an individual at
any point in time."""
* ^url =
"http://hl7.no/fhir/StructureDefinition/NoDomainVitalSignsObservationBodyHeight"
* ^version = "0.9.0000"
* ^status = #draft
* ^date = "2021-05-01"
* ^purpose = "To record the length of the body from crown of head to sole of foot
of an individual - either measured or approximated, and either in a standing or
recumbent position."
* extension ^slicing.discriminator.type = #value
* extension ^slicing.discriminator.path = "url"
* extension ^slicing.rules = #open
* extension contains NoDomainVitalSignsObservationBodyHeightBodyPosition  named
bodyPosition 0..1
* extension[bodyPosition] ^short = "Position of individual when measured."
* extension[bodyPosition] ^definition = "Position of individual when measured."
```

input/pages

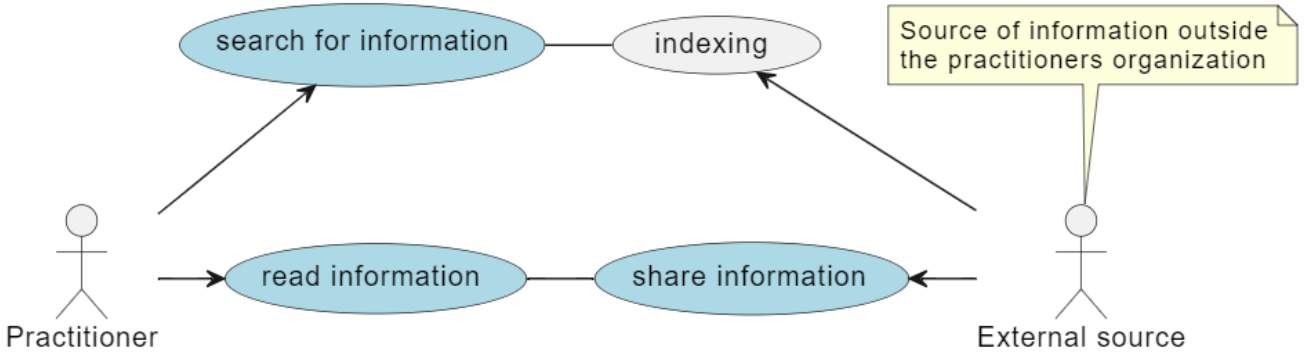
- Dokumentasjon i form av markdown

```
# About the Norwegian national vital signs profiles

The *Norwegian national vital signs profiles* have been designed for
exchange of the most important [vital
signs](https://en.wikipedia.org/wiki/Vital_signs) between systems,
devices, and healthcare organizations in the national Norwegian
healthcare system.

<div>{% include main-use-case.svg %}</div>

The initiative for the development of the profiles came from the
regional health authority for Northern Norway (Helse Nord RHF) for the
use case of exchanging the most commonly needed vital signs between an
electronic charting and medication system, and the core electronic
healthcare record (EHR) and patient management system. Additional
initial use cases included exchanging vital signs between the EHR and
the radiology system (RIS/PACS), neonatal and neonatal intensive care
(NICU) system, the pharmacy and medication production system, and entry
and lookup through multiple specialized mobile applications for bedside
use. In the subsequent development of the profiles uses cases for home
monitoring of patients, patient-provided data (e.g. from smartwatches
or other personal health devices), and exchange between healthcare
organizations (primary care, specialists, hospitals, and care homes,
etc.) have been considered. National quality and research registries
have been identified as a possible future use case.

<div>{% include verdikjede-vitalsigns.svg %}</div>
```

PlantUML

- Figurer kan legges inn som grafikkfiler eller som PlantUML kode

```
<div>{% include main-use-case.svg %}</div>
```




```
@startuml
note "Source of information outside\nthe practitioners
organization" as source
"Practitioner" as kliniker

"search for information" as (soke) #lightblue
"indexing" as (indeksere)
"read information" as (lese) #lightblue
"share information" as (dele) #lightblue

"External source" as applikasjon
applikasjon -left-> indeksere
applikasjon -left-> dele
dele -left- lese
indeksere -left- soke
source -down- applikasjon

soke -[hidden]down- lese

kliniker -up-> soke
kliniker -right-> (lese)
@enduml
```

Shorthand språket

- Består av enkle konstruksjoner.
- Er i utgangspunktet bare interessert det som er forskjellig fra «originalen».
- Kan skrive profiler, kodeverk, verdisett og eksempler med språket.
- FHIR Shorthand language definition
- FSH Online (fshschool.org)

Katalogstruktur

- Project Structure | FSH School

CI/CD action script

- Bygg og deploy en IG automatisk/semiautomatisk
- IG resultat Legges til en gh-pages branch
- Github tilgjengeliggjør på web

Referanser

- FSH School
- FHIR Shorthand language definition
- FSH Online (fshschool.org)
- IG-generation

Spørsmål

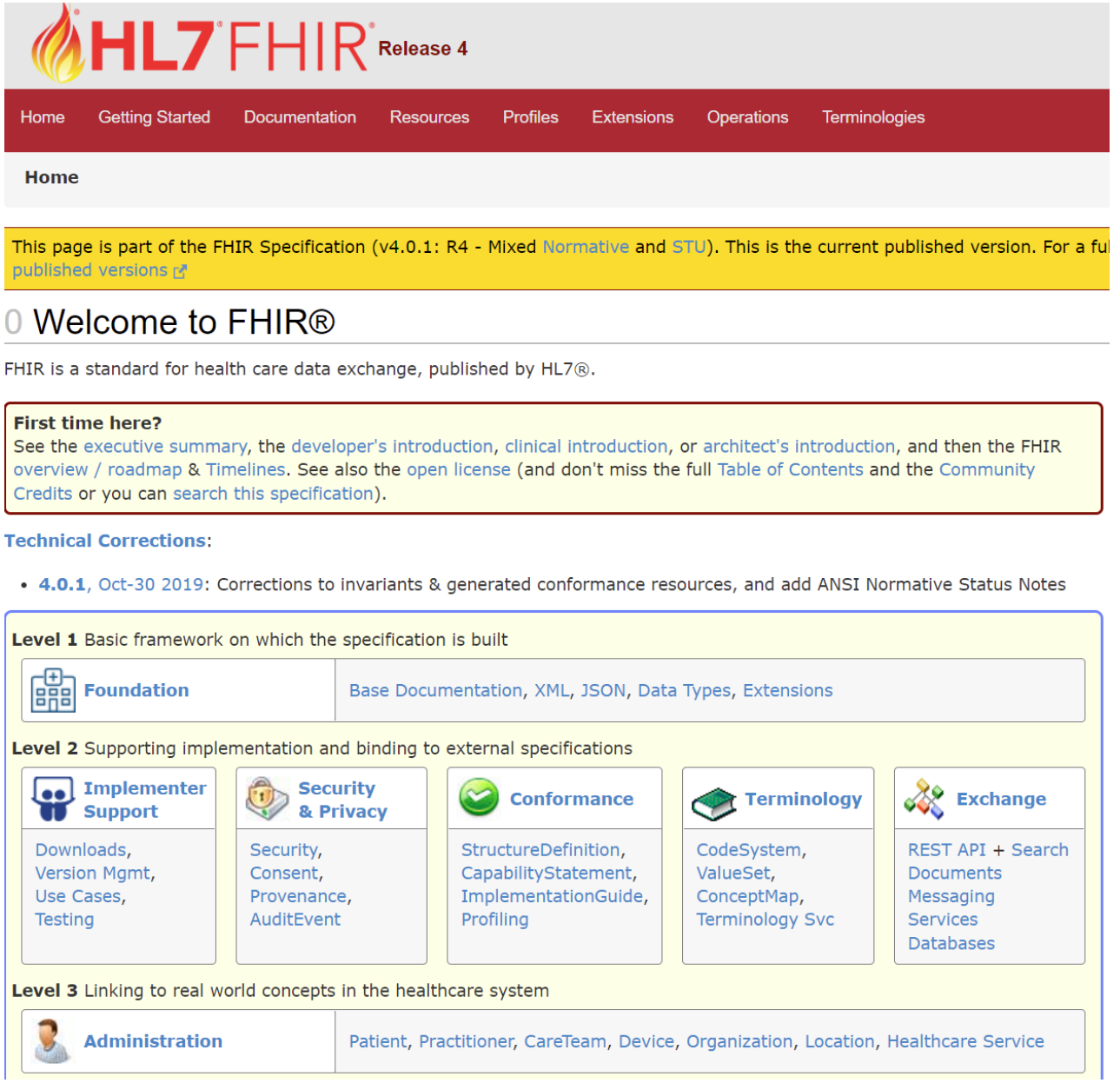
- Hva ønsker dere å gjøre?
- Har dere et use-case?
- Er dere involvert i prosjekter?
- Hvilke verktøy ønsker dere å bruke/har dere tilgjengelig?

FHIR IG building and authoring- bakgrunn

Thomas Tveit Rosenlund and
Espen Stranger Seland

FHIR dokumentasjon

- FHIR er en standard publisert av HL7
- Standarden er gratis å bruke og er fritt tilgjengelig på internett
  - https://www.hl7.org/fhir/
  - Standarden (R4) definerer 158 ressurser og inneholder flere hundre sider med spesifikasjon på hvordan disse skal benyttes



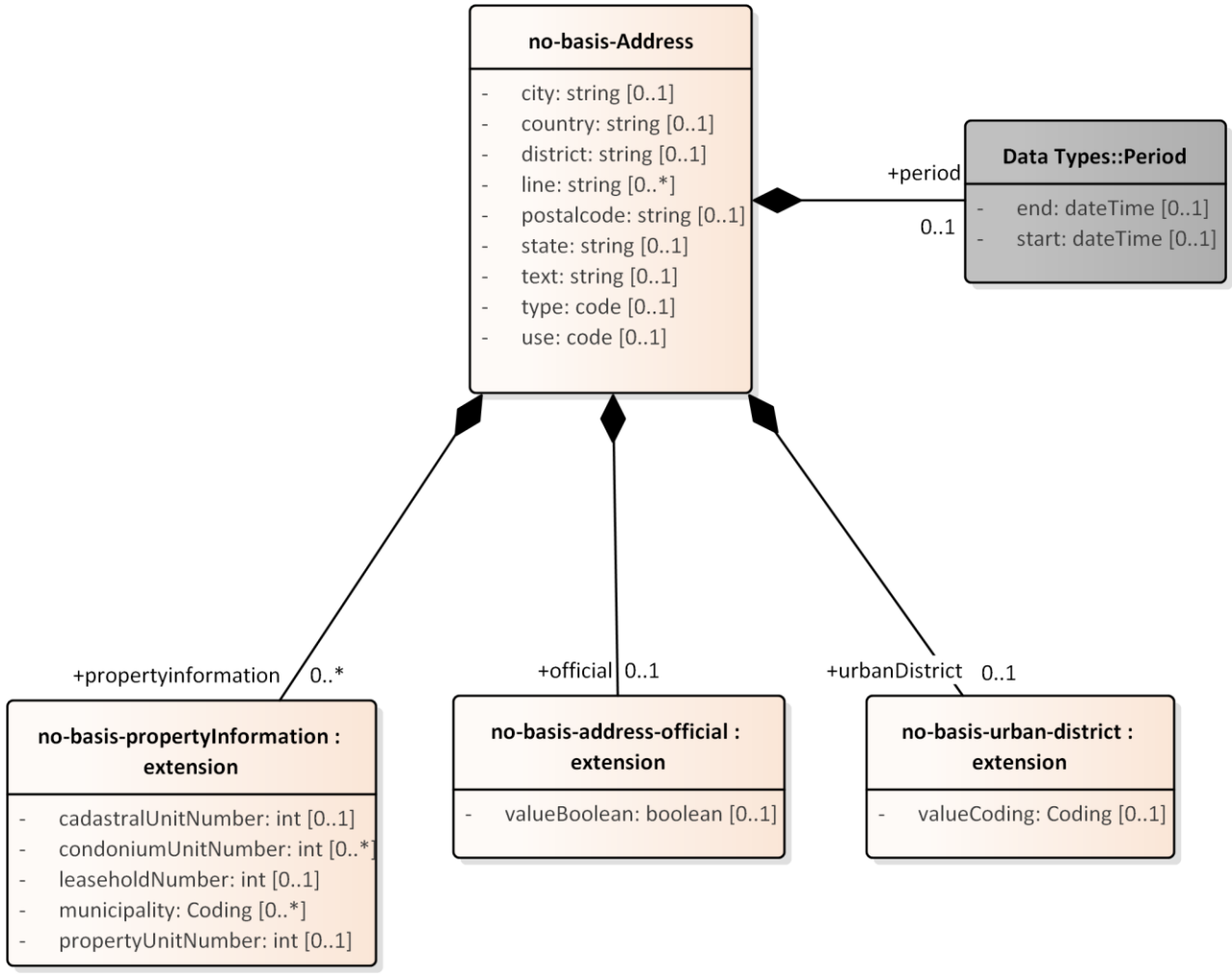
Innebygget fleksibilitet

- Enkelt valg:
  - Design en modell som favner alt og alle
    - eller
  - Design for 80% og tillate fleksibilitet

- Profilering
- Tilpasse informasjonsstrukturene (ressursene) til brukerhistorien

- Extension (i en profil)
- Utvide informasjonsstrukturene for å støtte informasjonselementer som ikke er spesifisert i HL7 spesifikasjonen

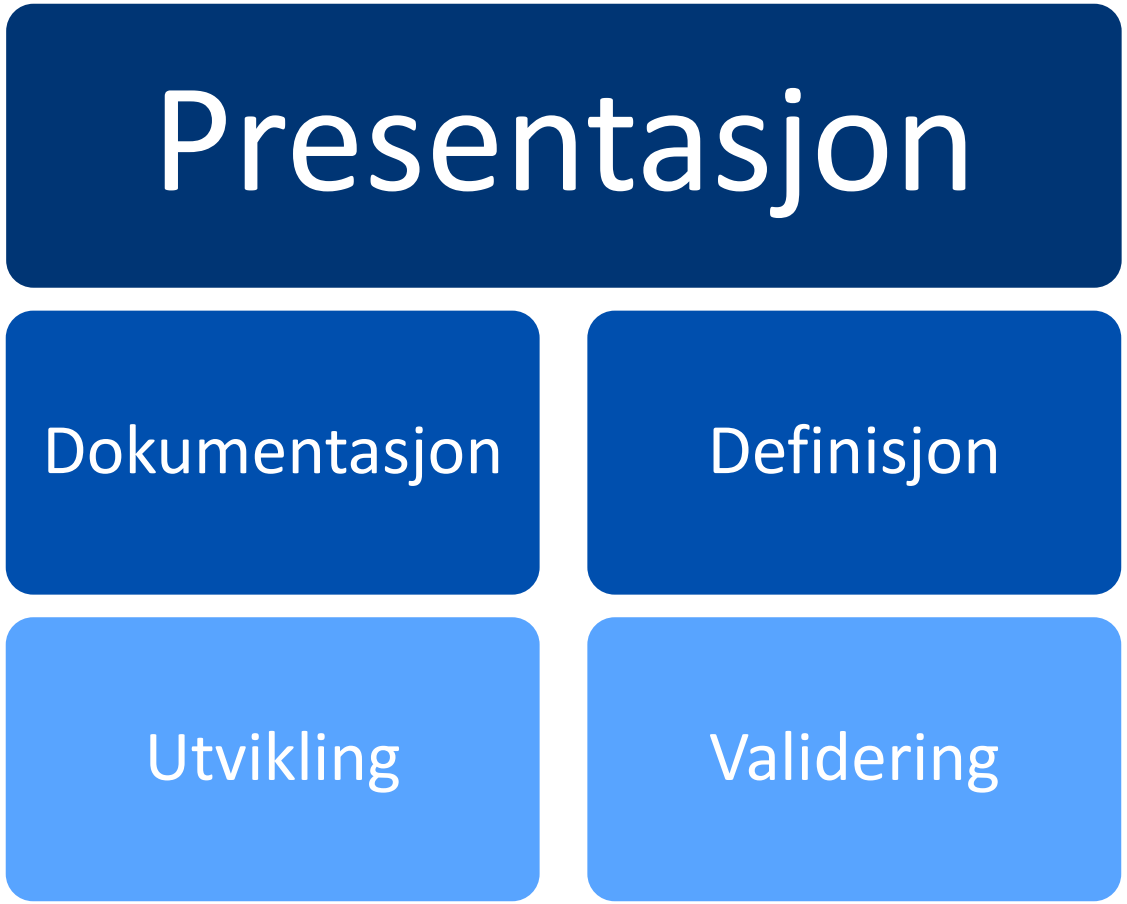
- Profiler og extensions kan valideres og leses av FHIR klienter/servere og er definerte ressurstyper i HL7 FHIR



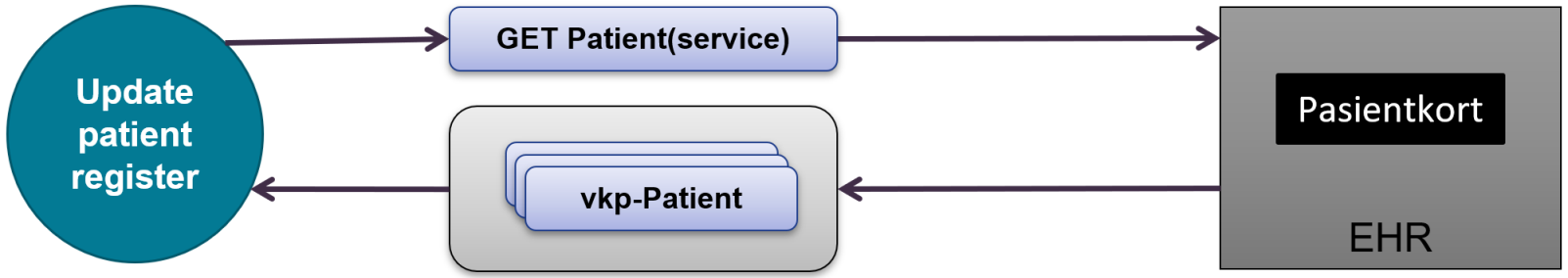
Hvorfor profilerer vi FHIR?

- 80/20
  - Standarden skal definere 20% av definisjonene som dekker 80% av use-casene
  - Resten må tilpasses ved hjelp av profilering

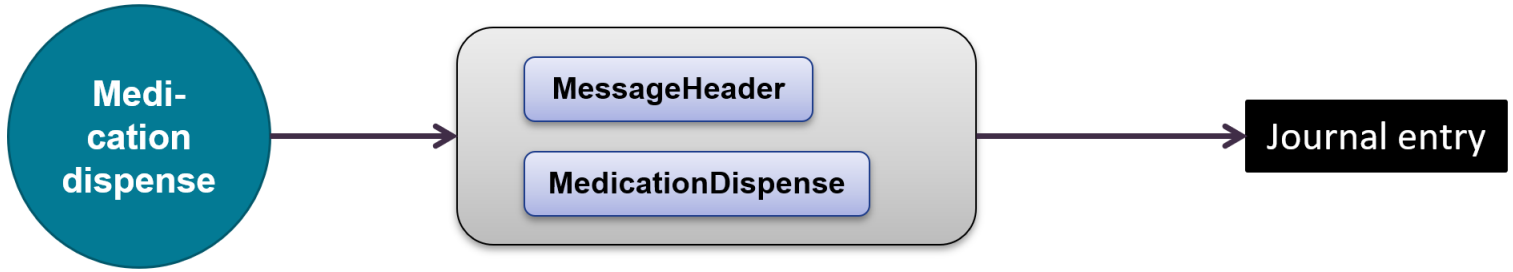
- Profiler fyller fem funksjoner
  - Presentasjon
  - Definisjon og Dokumentasjon
  - Validering og Utvikling



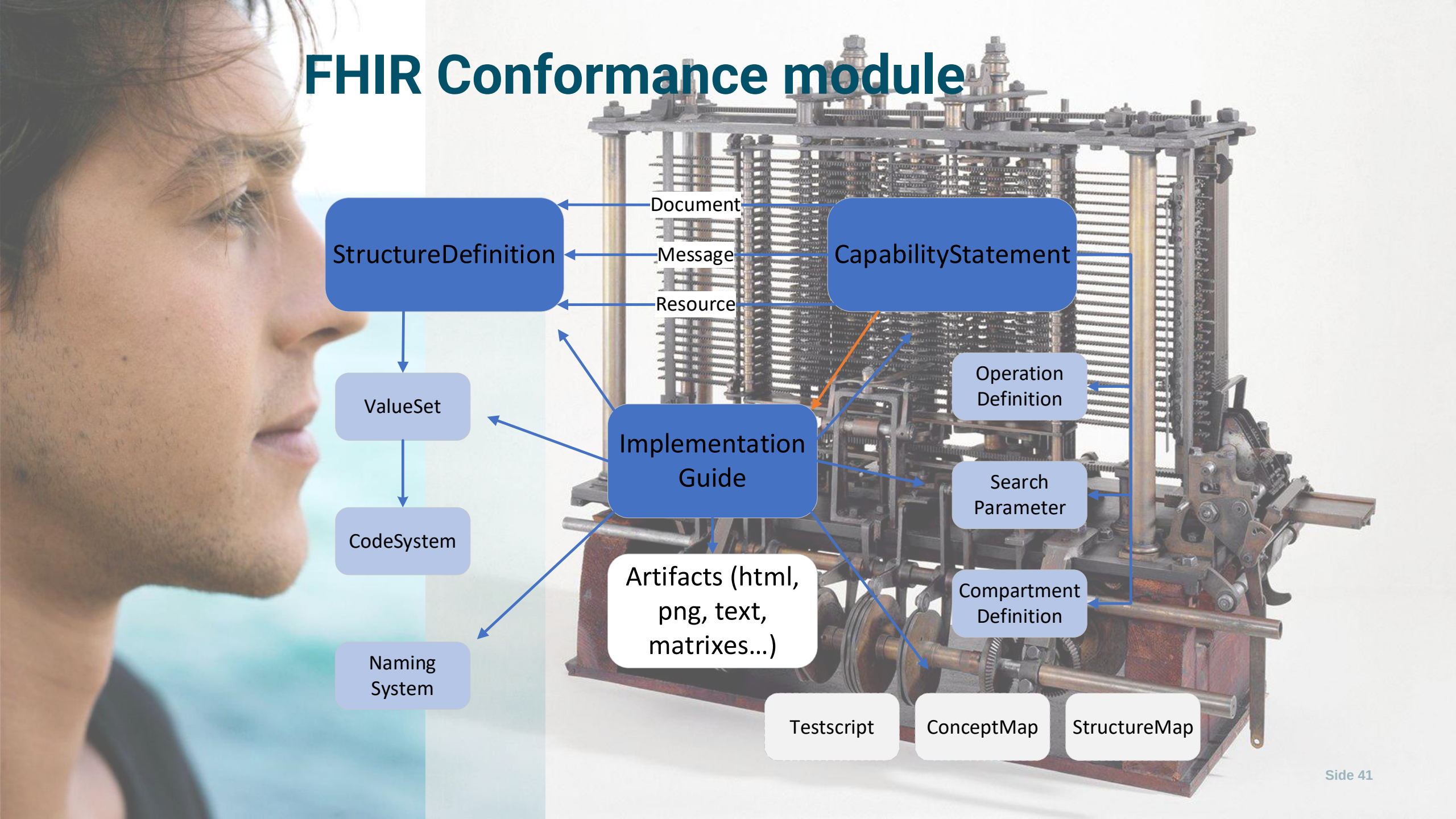
Profilering



- Profilere er å tilpasse en ressurs til en anvendelse
- Nasjonale anvendelser (no-basis) eller spesielle brukerhistorier (vkp)
- Detaljerte kliniske modeller
- Definere innhold og hva eventuelle REST transaksjoner, dokumenter og meldinger skal inneholde

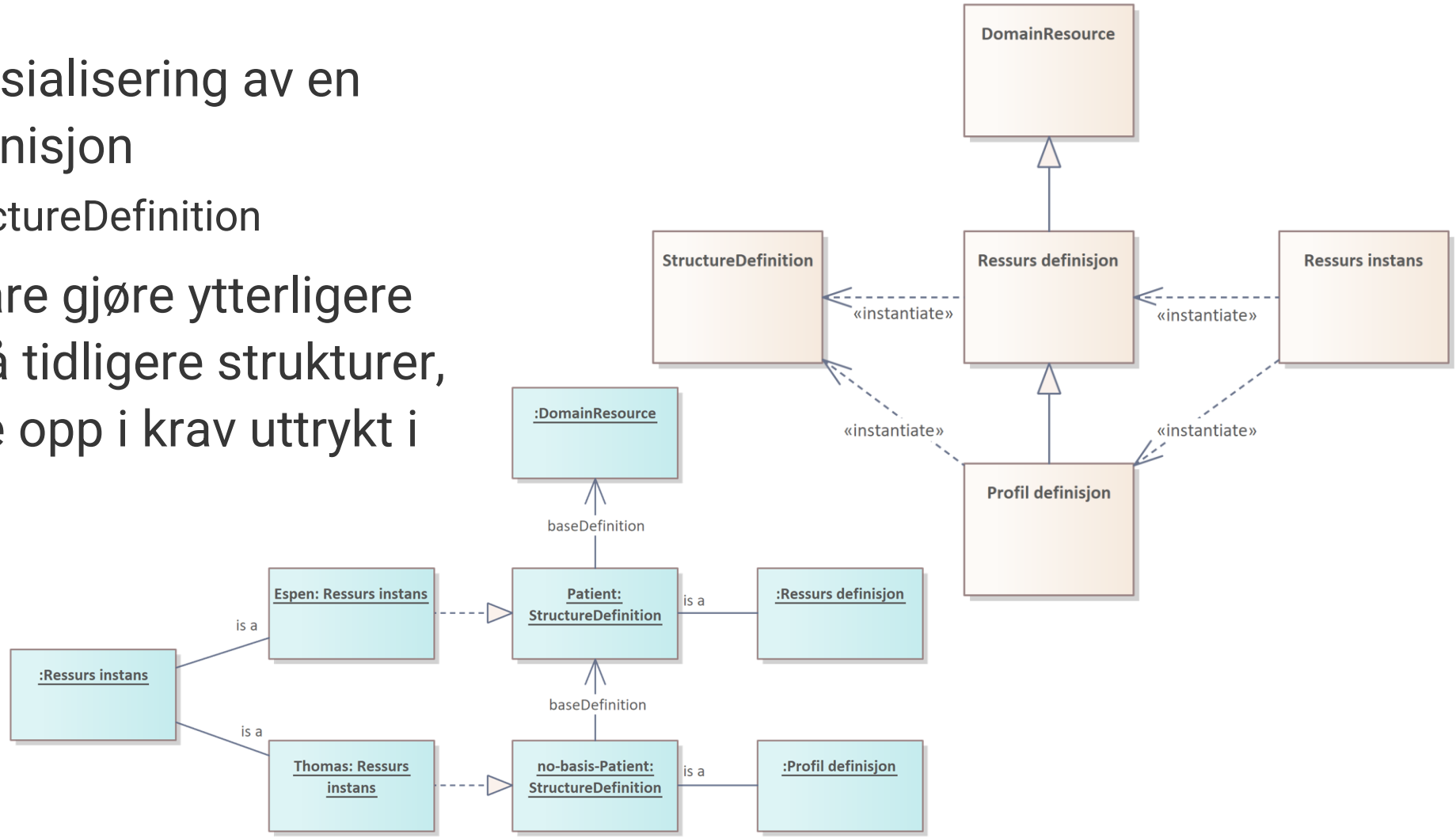


FHIR Conformance module



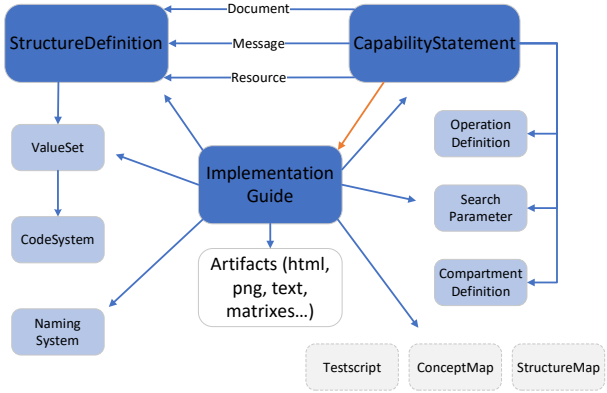
Hva er en profil? Hva er en ressurs? Hva er en instans?

- En profil er en spesialisering av en annen ressursdefinisjon
  - Uttrykt ved en StructureDefinition
- I FHIR kan man bare gjøre ytterligere beskrankninger på tidligere strukturer, man kan aldri løse opp i krav uttrykt i base definisjonen



Implementasjonsguide

- Implementasjonsguide forklarer sammenhengen mellom Conformance ressursene som er definert og hvordan disse anvendes i brukerhistorien
- ImplementationGuide ressursen:
  - Spesifikasjon på hvordan en Implementasjonsguide skal rendres fra kode (for IG-publisher verktøyet)
  - Beskrivelse på alle andre Conformance ressurser som brukes i use-caset




```
<ImplementationGuide xmlns="http://hl7.
  <id value="example"/>
  <version value="0"/>
  <name value="Data Access Framework (D
  <status value="draft"/>
  <experimental value="false"/>
  <date value="2015-01-01"/>
  <publisher value="ONC / HL7 Joint pro
  <contact>
    <name value="ONC"/>
    <telecom>
      <system value="url"/>
      <value value="http://www.healthit
    </telecom>
  </contact>
  <contact>
    <name value="HL7"/>
    <telecom>
      <system value="url"/>
      <value value="http://hl7.org/fhir
    </telecom>
  </contact>
  <description value="The Data Access Framework (DAF) Initiative leverages the
  <jurisdiction>
    <coding>
      <system value="urn:iso:std:iso:3166"/>
      <code value="US"/>
    </coding>
  </jurisdiction>
  <copyright value="Published by ONC under the standard FHIR license (CC0)"/>
  <packageId value="hl7.fhir.us.daf"/>
  <license value="CC0-1.0"/>
  <fhirVersion value="4.0.1"/>
  <dependsOn>
```

Direktoratet for e-helse

Version	2.1.0
Publish date	2019-12-19
Last bugfix	2019-12-19
IG namespace (not resolvable)	http://ehelse.no/fhir/ImplementationGuide/gd-Person-v210

Summary

The services for Person information distributes information from the modernized version of Norway's Master Person Index, produced by Skatteetaten, to Healthcare providers in Norway. The Master Person Index contains demographic information describing citizens of Norway and persons with a legal right to stay in Norway for a limited time including immigrants and asylum seekers. This implementation guide describes how consumers of person information (aka client systems) can integrate their systems to consume information from the Master Person Index.

Introduction

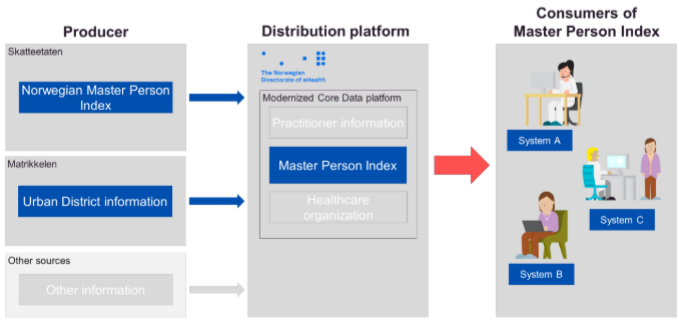
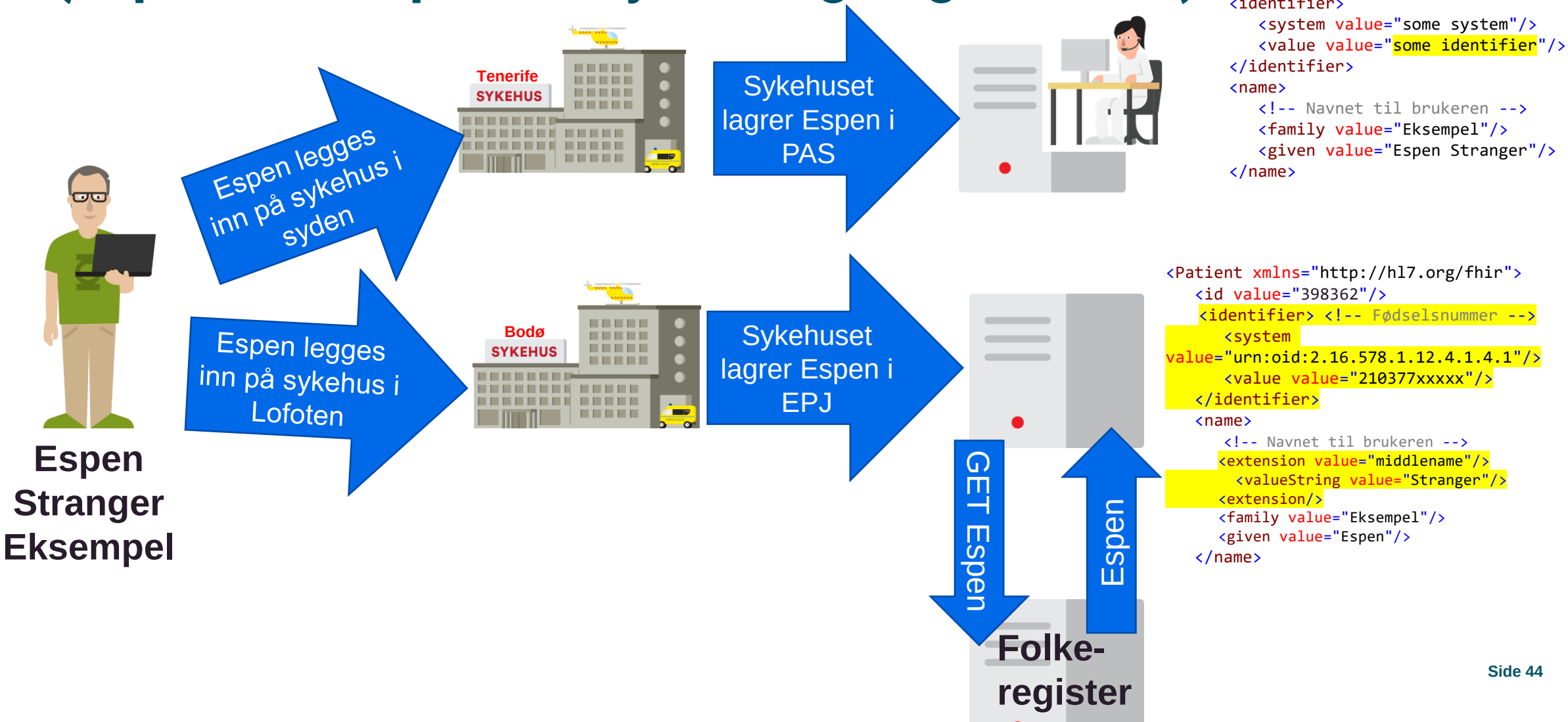


Figure 1: Distribution platform for Core Data, the grey boxes signifies components that can be included in future development of the platform

Eksempel på bruk av tilpasninger (Espen Eksempel blir syk i Norge og utlandet)

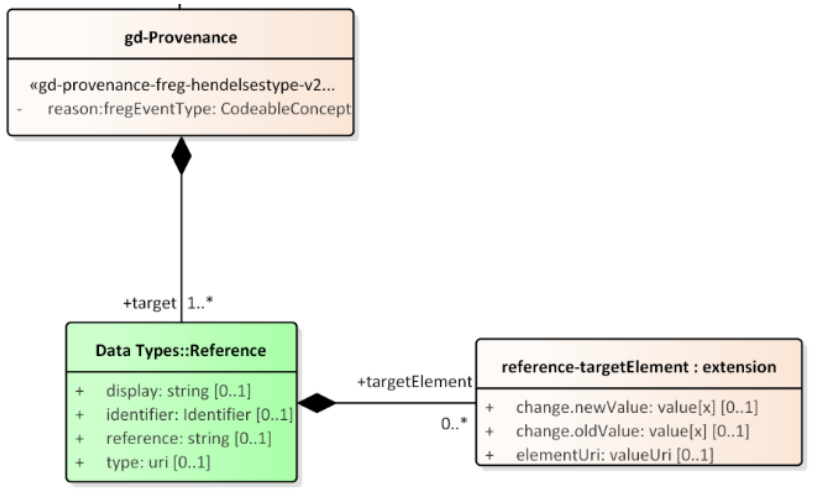



```
<Patient xmlns="http://hl7.org/fhir">
  <id value="592410"/>
  <identifier>
     <system value="some system"/>
     <value value="some identifier"/>
  </identifier>
  <name>
     <!-- Navnet til brukeren -->
     <family value="Eksempel"/>
     <given value="Espen Stranger"/>
  </name>
```

```
<Patient xmlns="http://hl7.org/fhir">
   <id value="398362"/>
    <identifier> <!-- Fødselsnummer -->
      <system
value="urn:oid:2.16.578.1.12.4.1.4.1"/>
      <value value="210377xxxxx"/>
   </identifier>
   <name>
      <!-- Navnet til brukeren -->
      <extension value="middlename"/>
        <valueString value="Stranger"/>
      <extension/>
      <family value="Eksempel"/>
      <given value="Espen"/>
   </name>
```

Teknikker for tilpasning av FHIR (terminologi)

- Definere informasjonsinnholdet og meningen med informasjonselementene (StructureDefinition)
- Innskrenkninger (constraints i StructureDefinition)
  - Must support/not support
  - Kardinalitet
  - Slicing
  - Angi bruk av kodeverk
  - Definere invariants (Proprietære regler/kontroller FHIRPath)
- Angi bruk av navnerom og NamingSystem (fødselsnummer/d-nummer)
- Angi bruk av utvidelser (extensions)
- Angi hvilke søkeparametere og operations som kan brukes
- Definere innholdet i dokumenter og meldinger (vkp-MessageHeader)
- Definere CapabilityStatement for hva systemet støtter av FHIR funksjonalitet

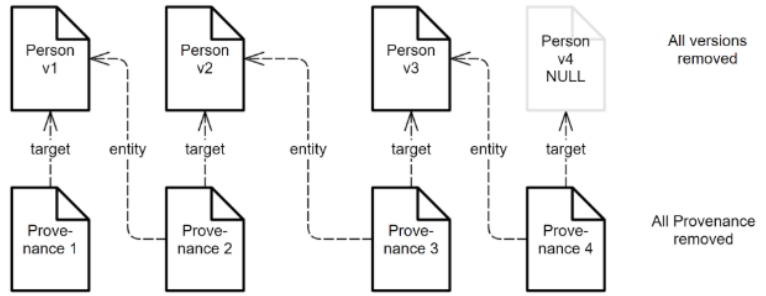


There is only two noteable changes to the Provenance resource in the gd-Provenance profile:

- The inclusion of a reference-targetElement extension that allows any target reference to also include the possibility to document the actual elements that are changed in the target resource
- The slicing of reason with a required binding to document FREG event types from the valueset GdProvenanceFregHendelsestypeValueSet

The provenance process

When the information regarding a person is updated in the register a provenance instance is created to document the change to the person-document:



Verktøy og implementasjoner

- Firely Forge og SIMPLIFIER
- HL7 IG-publisher
- HL7 FHIR validator
- HAPI FHIR JAVA implementation
- Firely Torrinox
- .NET FHIR core
- FHIR plugin for Notepad++
- Trifolia FHIR web profiling tool
- Synthea
- Microsoft FHIR server
- Shorthand – SUSHI, GOFSH

FHIR Hackathon

2025 Norwegian FHIR Hackathon