



Norwegian FHIR Hackathon 2025

Pre meeting 1

Agenda

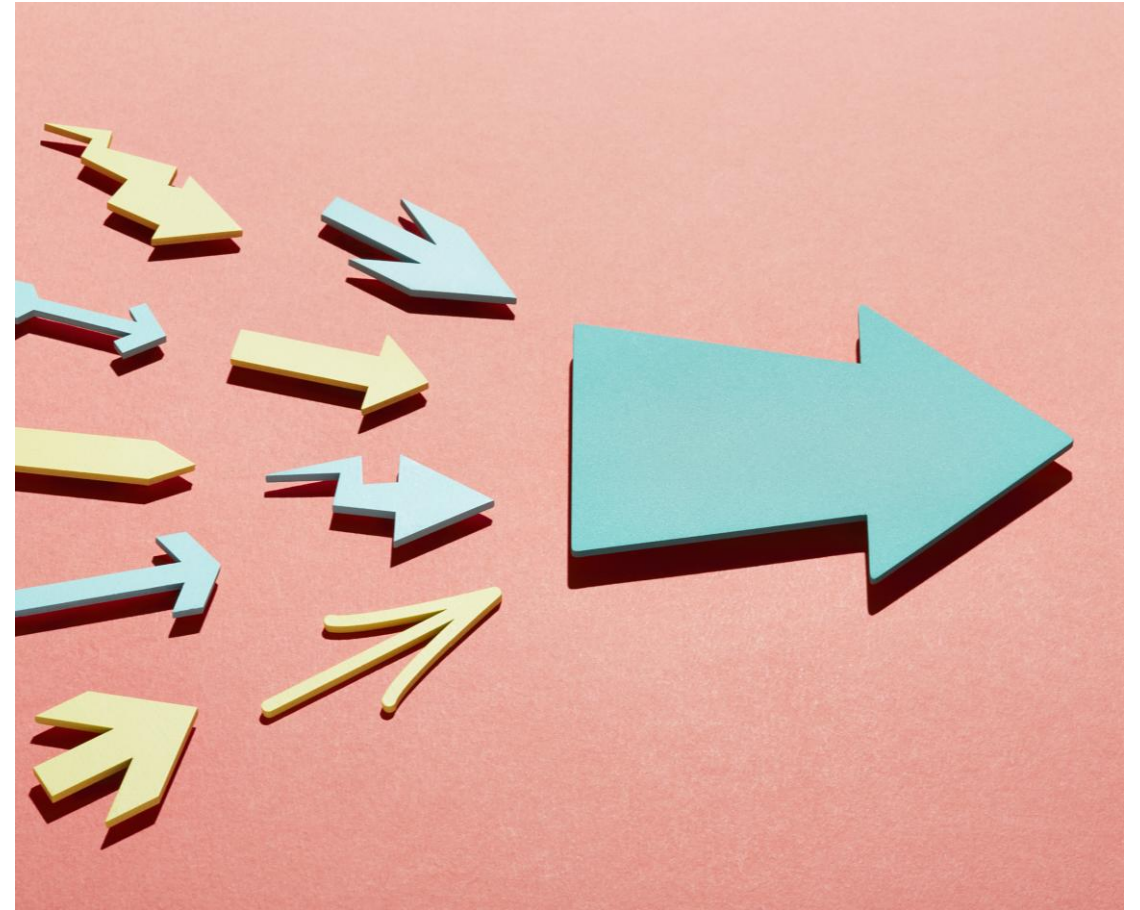
1000	Welcome	Thomas T Rosenlund
1010	PMD track intro	Michal Jan Warecki
1020	OKT track intro	Robert William Dall Frøseth
1030	Terminology track intro	Vadim Peretokin
1040	IG track intro	Espen/Thomas
1050	Q&A and Discussion	All
1100	End of meeting	All

Welcome to Norwegian FHIR Hackathon 2025



Practical info

- This is the first of two pre-meetings to prepare for the Hackathon
- The next pre-meeting takes place 10-11 on 3rd of November
- The Hackathon events takes place on November 10th from 0930-1700
- The Hackathon is a free event sponsored by HL7 Norway.



Practical 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 if time permit also work on a second track during the Hackathon.
- Implement and test the FHIR API for [Pasientens måldata](#) (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	Björnar 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@helse.dir.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

The next pre-meeting 03 november

- We will split the group into four, after a short intro.
 - You should choose one main track to follow because of this.
 - We can provide footage of the other intro meetings to anyone interested.
 - You should receive invite to the pre-meeting via e-mail. There is also a link to the teams meeting on the [github page](#)
 - You get a lot more out of the instructions and discussions if you do some preparations before the next meeting.
- Any last minute info regarding the actual Hackathon will also be provided next time.

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
- Learn how to write FHIR documentation using FSH
- Learn how to use the tools for FHIR IG authoring
- Learn how to present a draft IG on Github, using Github.io



Hvorfor profilerer vi FHIR?

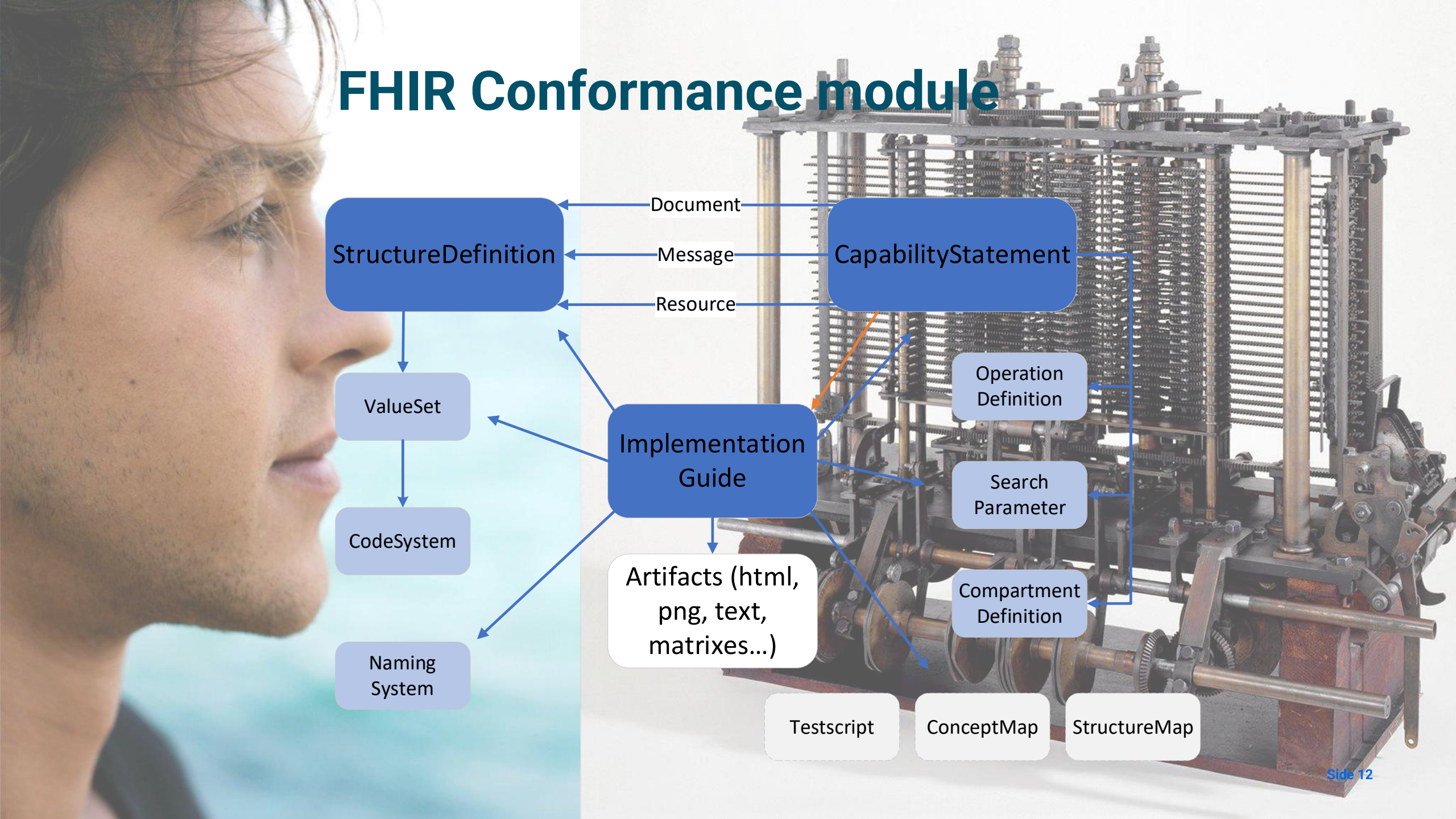
- 80/20
 - Standarden skal definere 20% av definisjonene som dekker 80% av use-casene
 - Resten må tilpasses ved hjelp av profilering
- Profiler fyller fem funksjoner
 - Presentasjon
 - Definisjon og Dokumentasjon
 - Validering og Utvikling



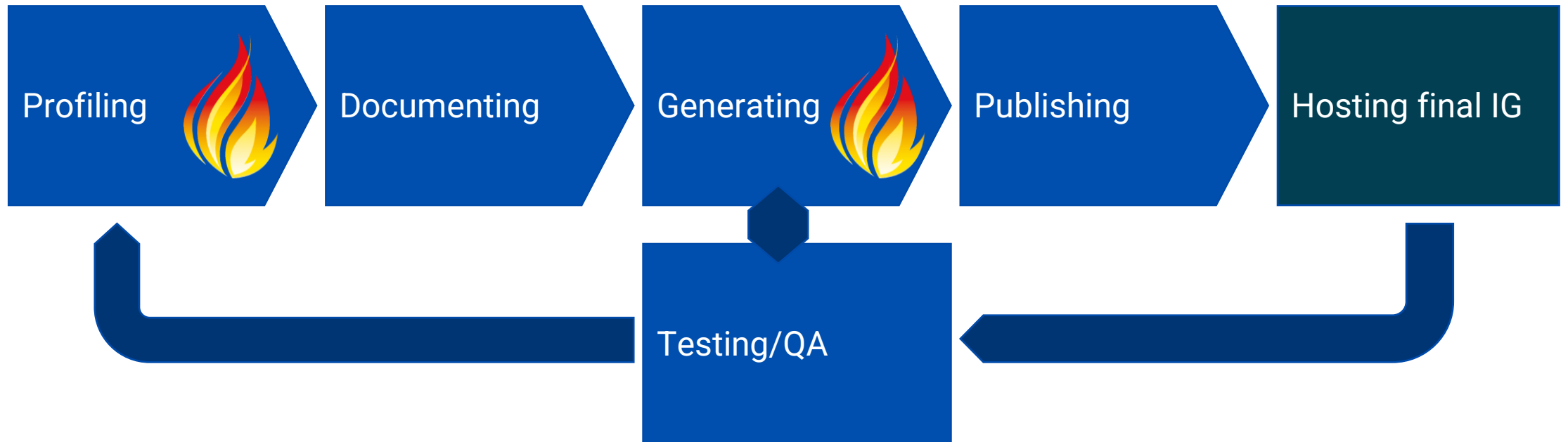
The diagram illustrates the FHIR Conformance module architecture, set against a background of a person's profile and a mechanical device. The central component is the **Implementation Guide**, which is connected to several other modules:

- StructureDefinition**: Receives input from **Document**, **Message**, and **Resource**. It is connected to **ValueSet**, which in turn connects to **CodeSystem**.
- CapabilityStatement**: Receives input from **Document**, **Message**, and **Resource**. It is connected to **Operation Definition**, **Search Parameter**, and **Compartment Definition**.
- Artifacts (html, png, text, matrixes...)**: Receives input from the **Implementation Guide**.
- Testsript**, **ConceptMap**, and **StructureMap**: These are output modules connected to the **Implementation Guide**.
- Naming System**: Receives input from the **Implementation Guide**.

The diagram uses blue rounded rectangles for the main modules and white rounded rectangles for the output modules. Arrows indicate the flow of data and dependencies between these components.



Profiling



Tools needed

- [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

- 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

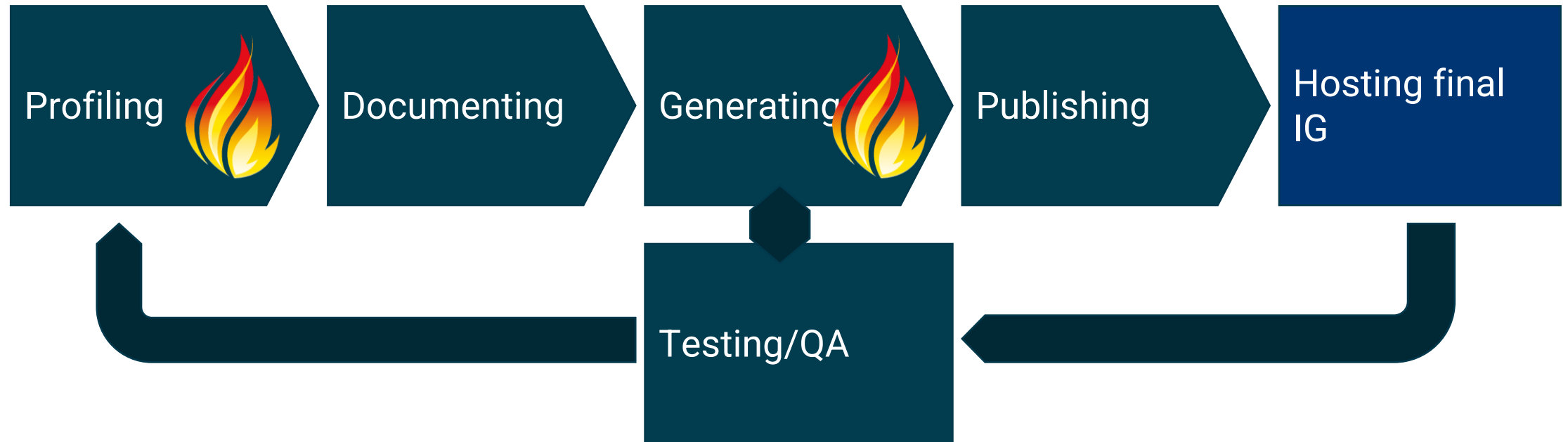
FHIR Hackathon

2025 Norwegian FHIR Hackathon

Agenda

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

Profiling



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

Presentasjon

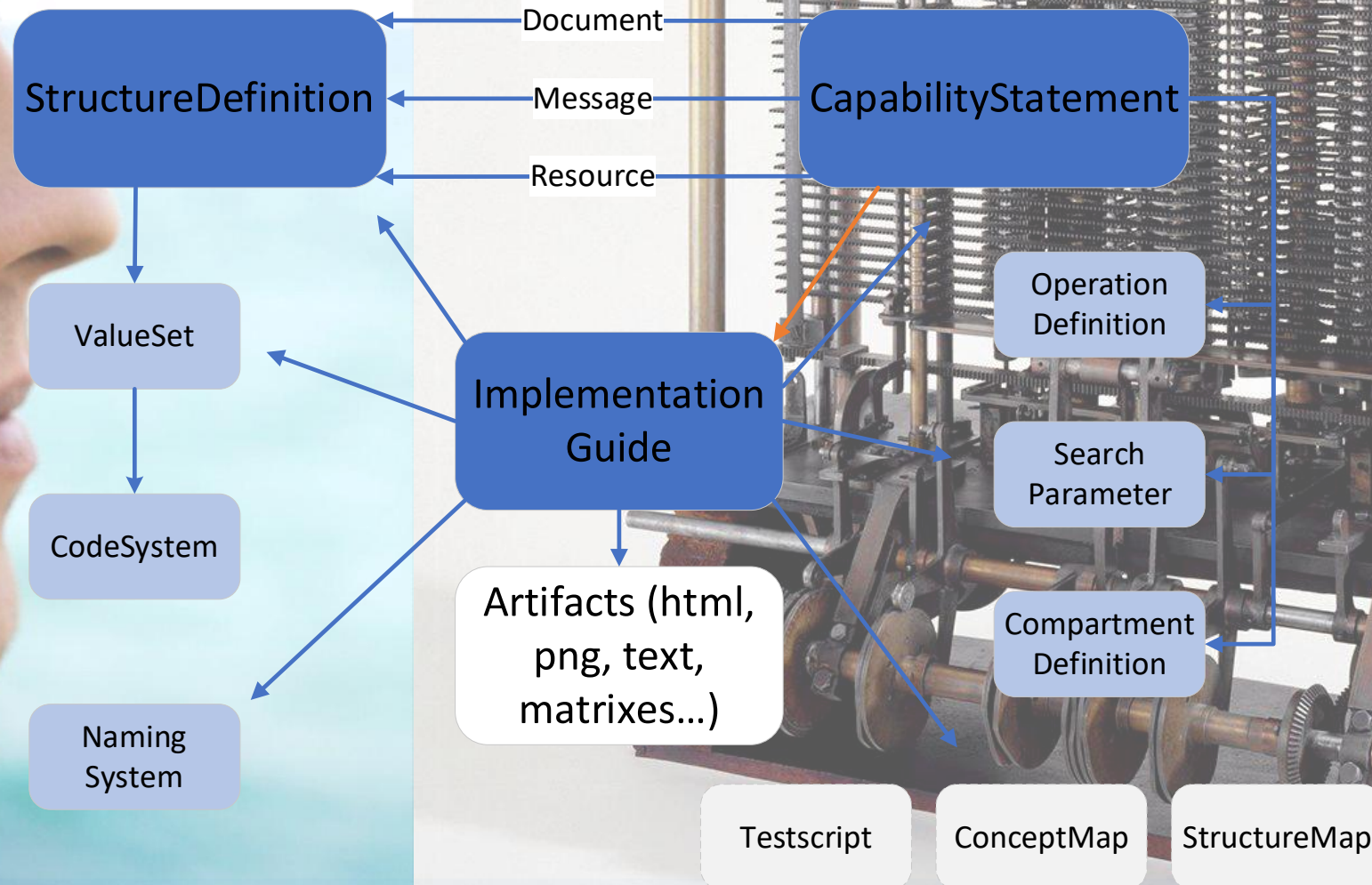
Dokumentasjon

Definisjon








Utvikling

Validering

FHIR Conformance module



Build pipelines sammenligning

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

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 resources 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 in markdown
 - The input/pages folder can contain any number of markdown files to display as part of your 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

```
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>
```

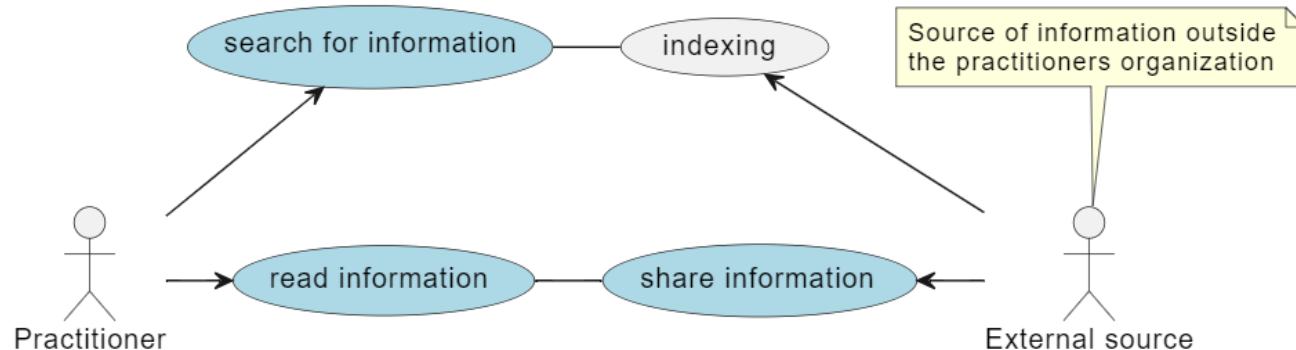
```
The initiative for the development of the profiles came from the regional health authority for Northern Norway (Helse Nord RHF) for the use case of exchanging the most commonly needed vital signs between an electronic charting and medication system, and the core electronic healthcare record (EHR) 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 use 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 \(fshschool.org\)](https://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](#)

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



HomeGetting StartedDocumentationResourcesProfilesExtensionsOperationsTerminologies

Home

This page is part of the FHIR Specification (v4.0.1: R4 - Mixed Normative and STU). This is the current published version. For a full list of published versions [click here](#).

0 Welcome to FHIR®

FHIR is a standard for health care data exchange, published by HL7®.


First time here?

See the [executive summary](#), the [developer's introduction](#), [clinical introduction](#), or [architect's introduction](#), and then the [FHIR overview / roadmap & Timelines](#). See also the [open license](#) (and don't miss the full [Table of Contents](#) and the [Community Credits](#) or you can [search this specification](#)).

Technical Corrections:


- **4.0.1, Oct-30 2019:** Corrections to invariants & generated conformance resources, and add ANSI Normative Status Notes

Level 1 Basic framework on which the specification is built


**Foundation**

Base Documentation, XML, JSON, Data Types, Extensions


Level 2 Supporting implementation and binding to external specifications

**Implementer Support**


Downloads, Version Mgmt, Use Cases, Testing

**Security & Privacy**


Security, Consent, Provenance, AuditEvent

**Conformance**

StructureDefinition, CapabilityStatement, ImplementationGuide, Profiling


**Terminology**

CodeSystem, ValueSet, ConceptMap, Terminology Svc

**Exchange**

REST API + Search Documents Messaging Services Databases

Level 3 Linking to real world concepts in the healthcare system

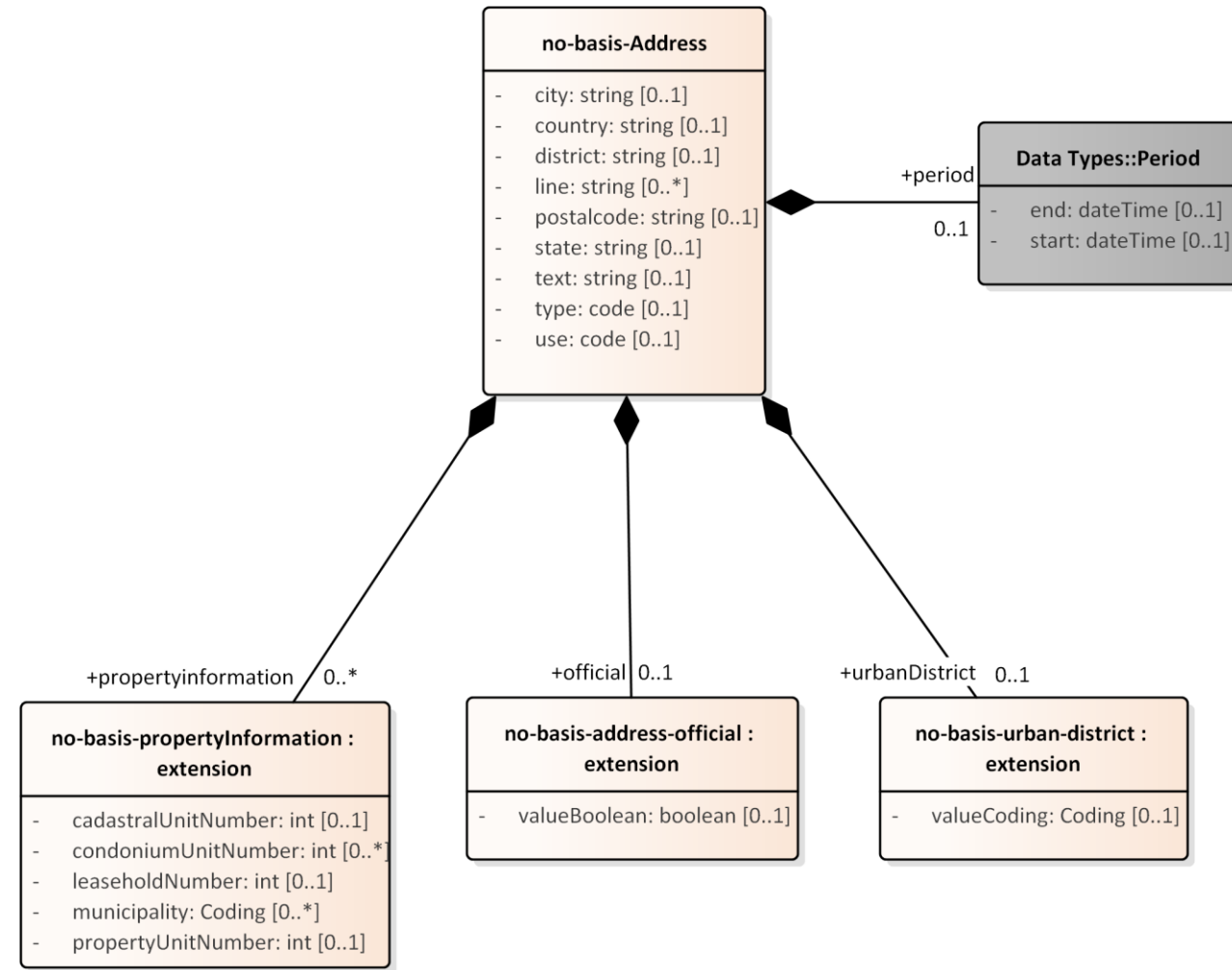
**Administration**

Patient, Practitioner, CareTeam, Device, Organization, Location, Healthcare Service

Side 33

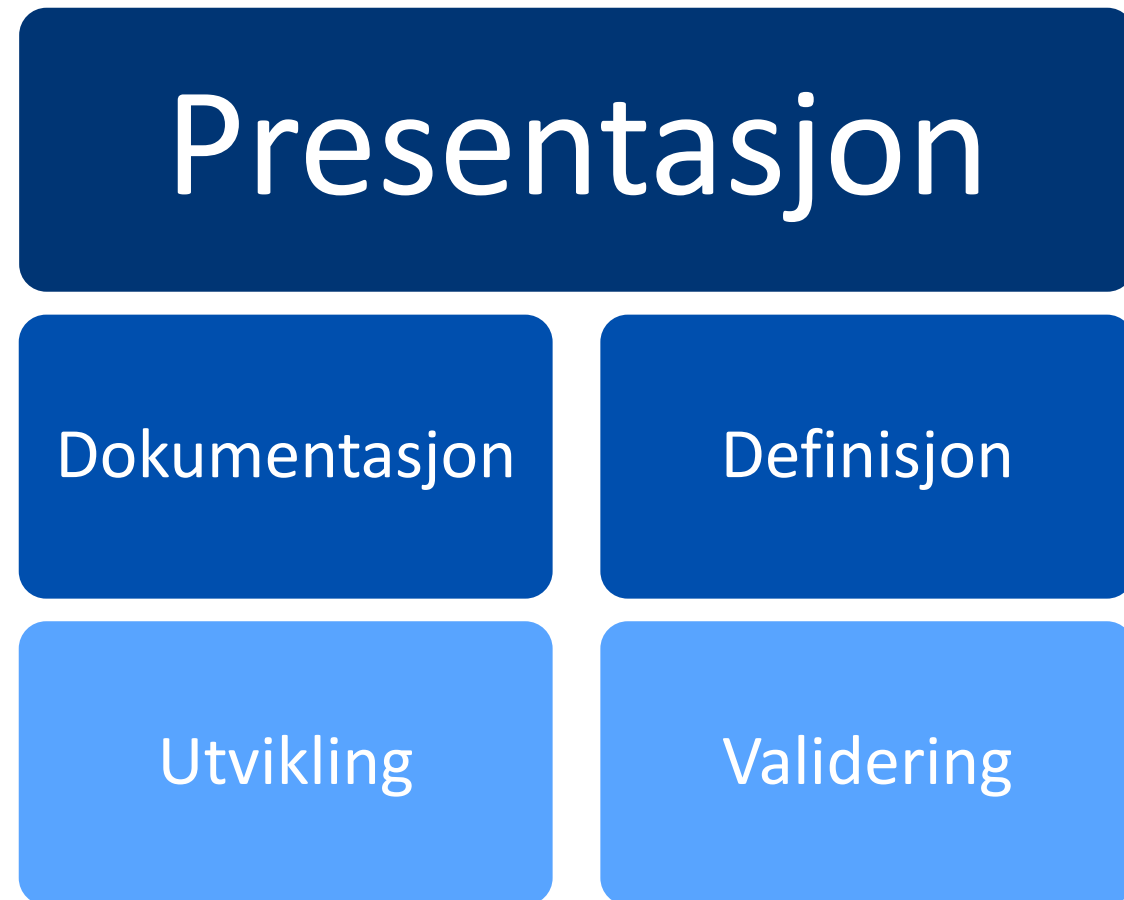
Innebygget fleksibilitet

- 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



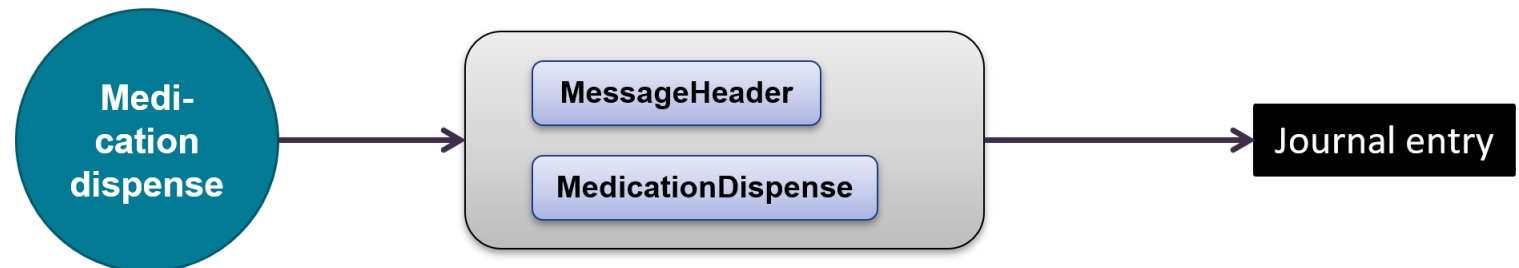
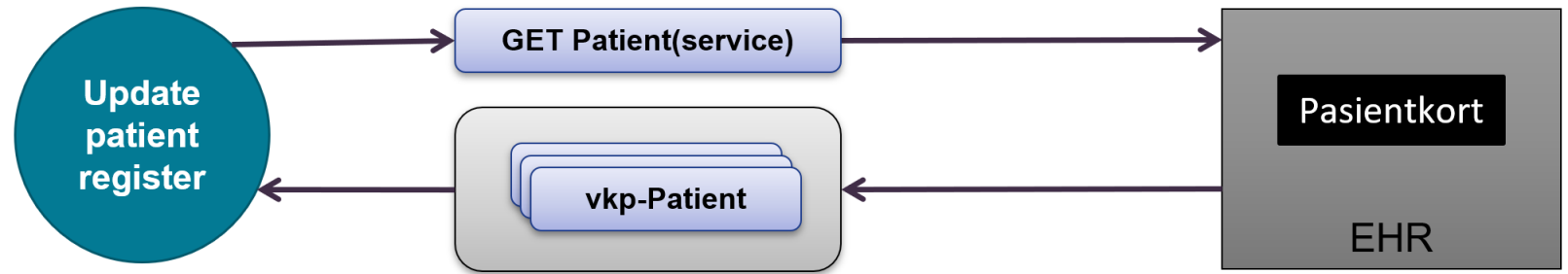
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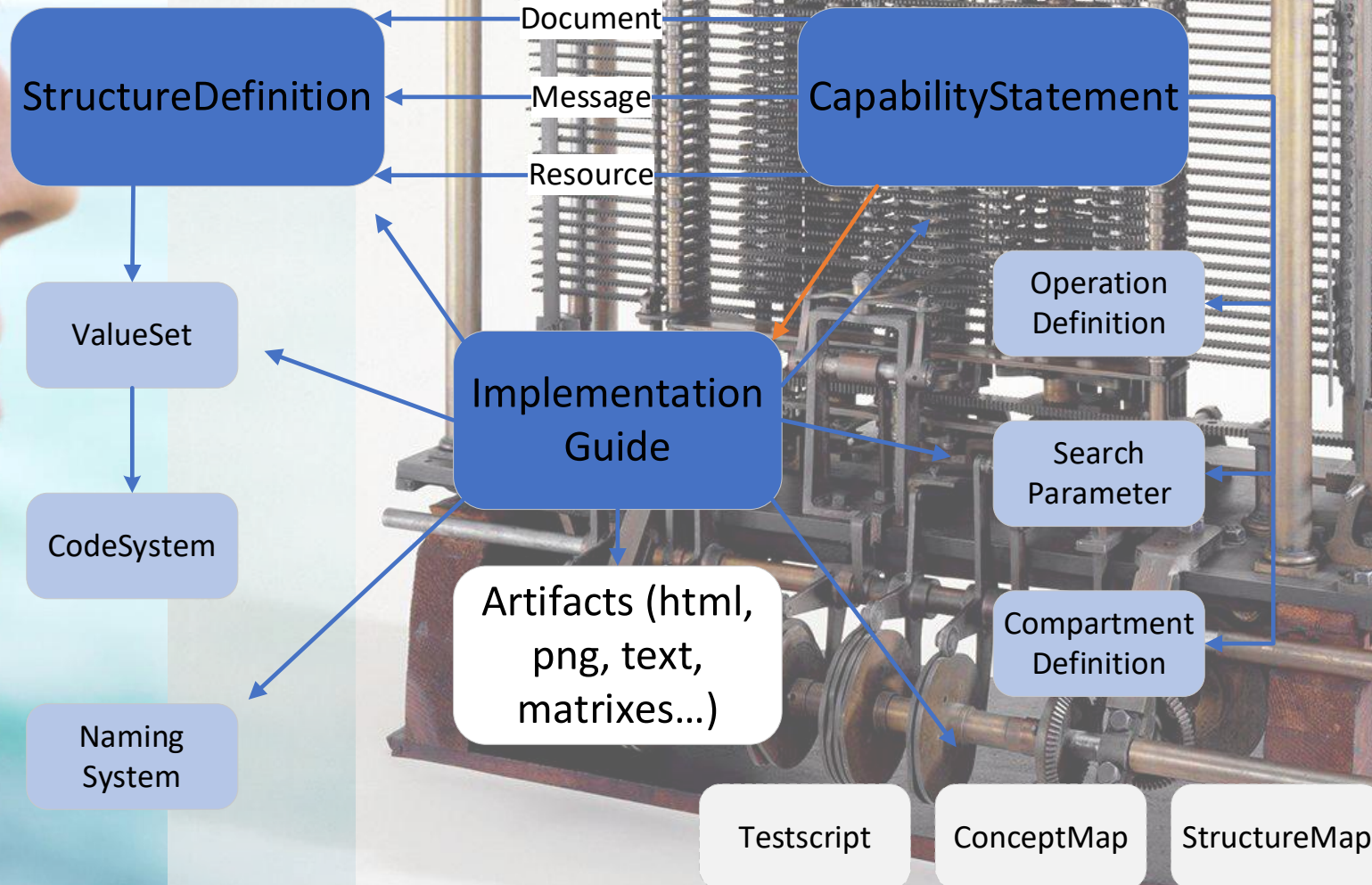


Profilering

- 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

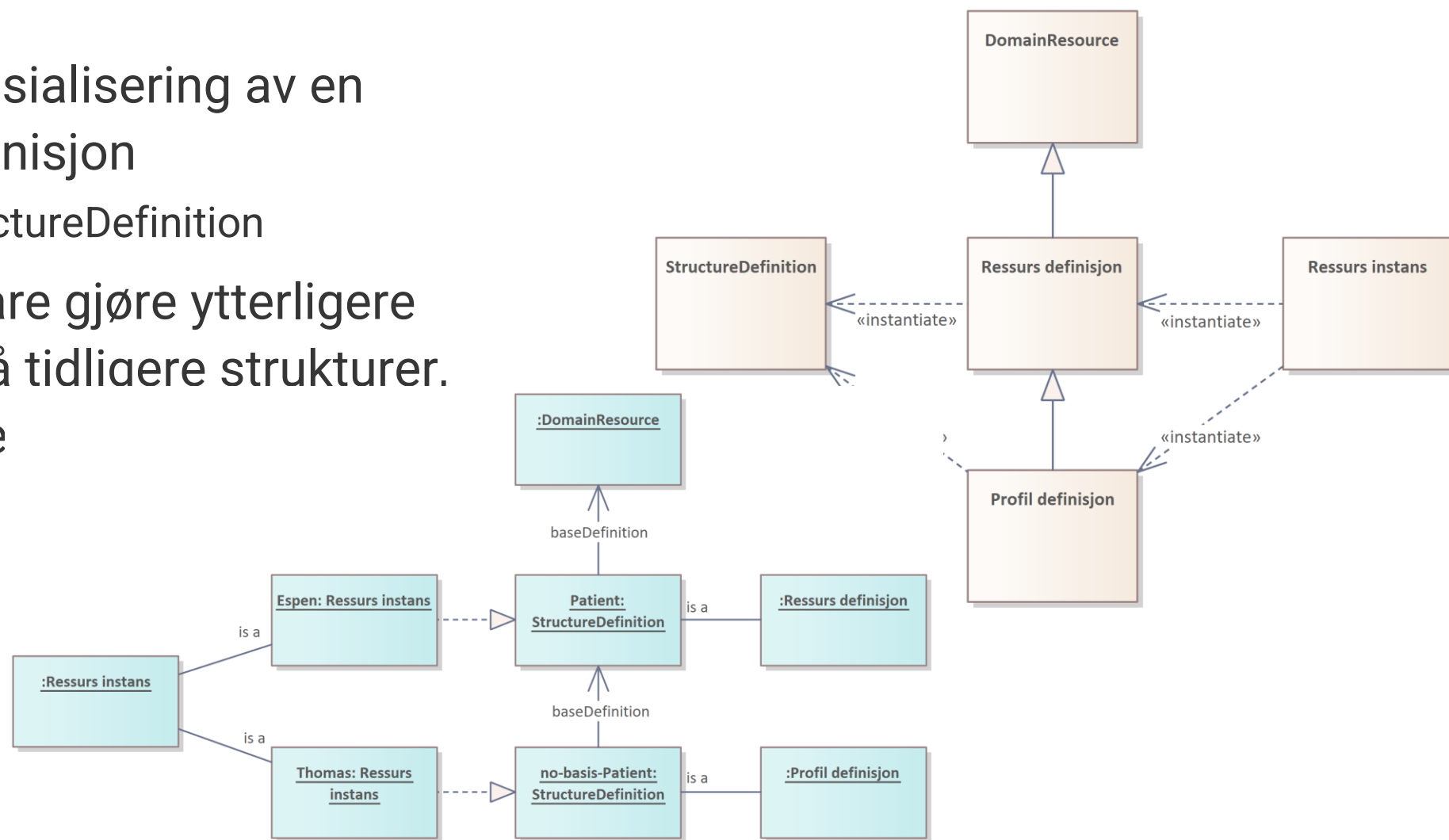


FHIR Conformance module



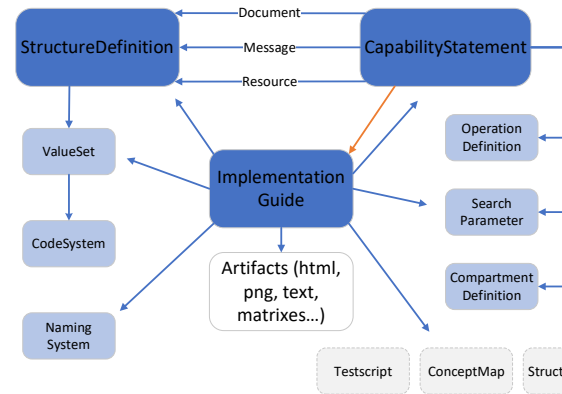
Hva er en profil? Hva er en ressurs? Hva er en instans?

- 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 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



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

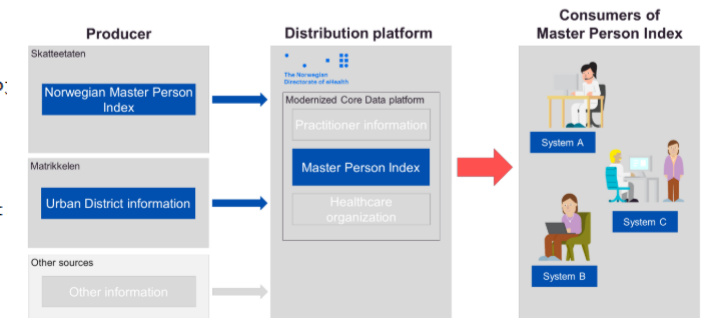


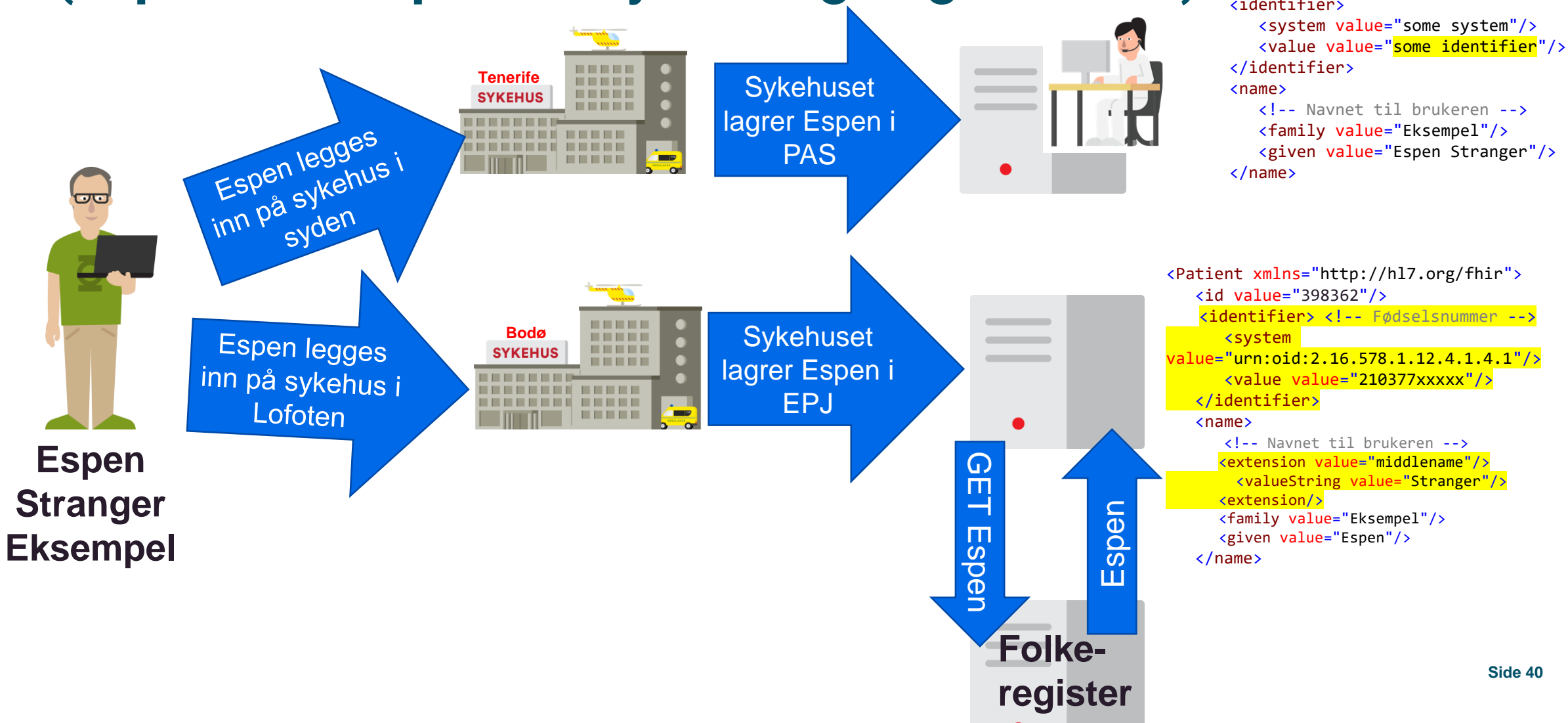
Figure 1: Distribution platform for Core Data, the grey boxes signifies components that can be included in future development of the platform

```

<ImplementationGuide xmlns="http://hl7.org/fhir/ImplementationGuide"
  <id value="example"/>
  <version value="0"/>
  <name value="Data Access Framework (DAF) Initiative"/>
  <status value="draft"/>
  <experimental value="false"/>
  <date value="2015-01-01"/>
  <publisher value="ONC / HL7 Joint project"/>
  <contact>
    <name value="ONC"/>
    <telecom>
      <system value="url"/>
      <value value="http://www.healthit.gov/dafevents"/>
    </telecom>
  </contact>
  <contact>
    <name value="HL7"/>
    <telecom>
      <system value="url"/>
      <value value="http://hl7.org/fhir/ImplementationGuide/ig-daf-1.0"/>
    </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>

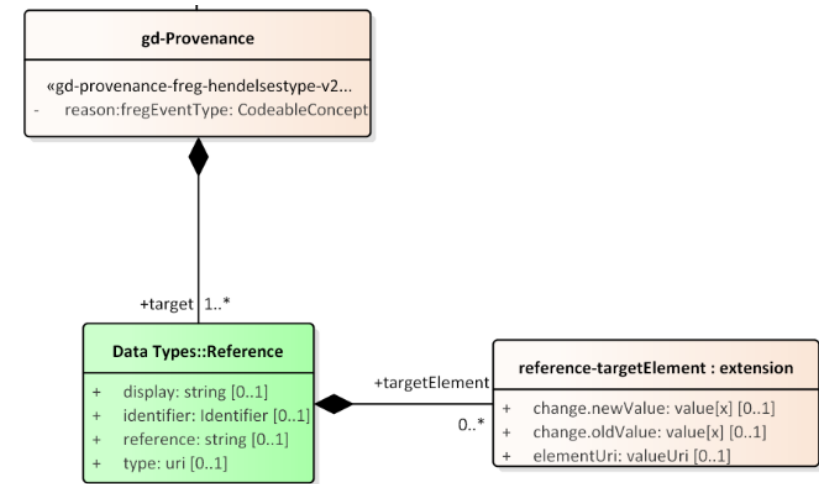
```

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



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 (vcp-MessageHeader)
- Definere CapabilityStatement for hva systemet støtter av FHIR funksjonalitet

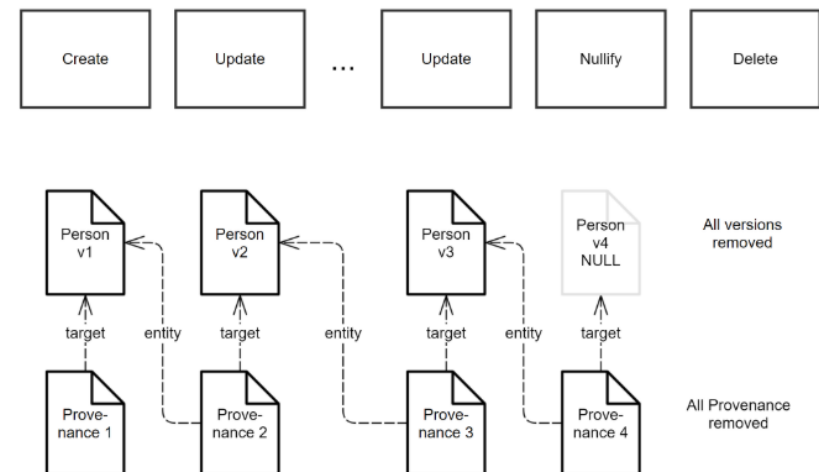


There is only two notable changes to the Provenance resource in the gd-Provenance profile:

- 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:

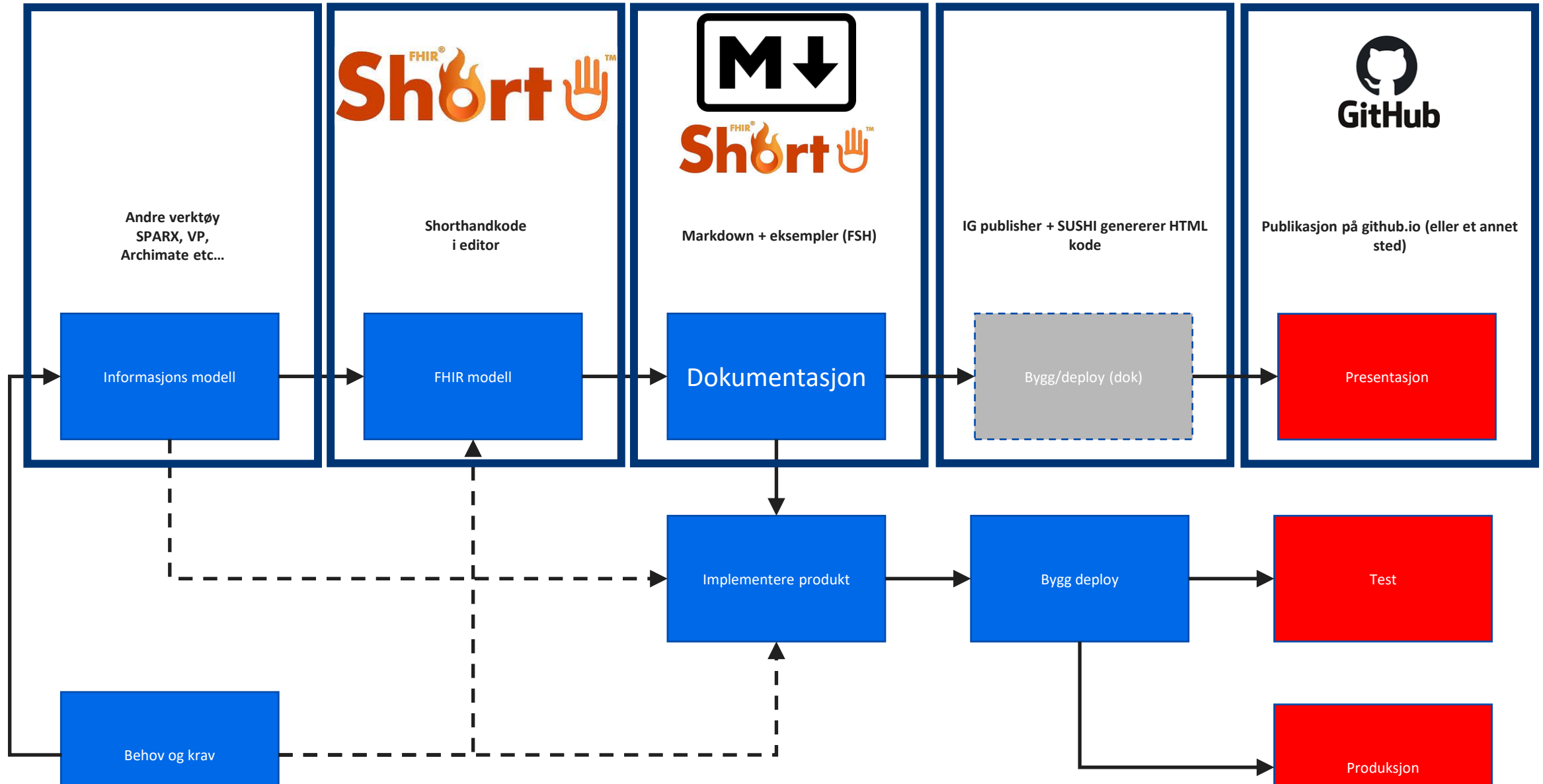


Verktøy og implementasjoner



- 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

Arbeidsflyt Shorthand/ig-publisher/github-io



FHIR Hackathon

2025 Norwegian FHIR Hackathon