

Presentasjon for FHIR Fagforum #10

FHIR og Sentral forskrivningsmodul

SFM er først og fremst modul for legemiddelbehandling i EPJ

Web EPJ emulator Show Allergies Galdhøpiggen testlegekontor (Fastlege) Christian Dag Holstad (23018555727)

Ingen legemiddelreaksjoner

Legemidler ⁴ Legemiddelreaksjoner Forbruksmateriell Næringsmidler Vaksiner Christian Dag Holstad (2.0.0-beta.8,2.0.0-beta.8)

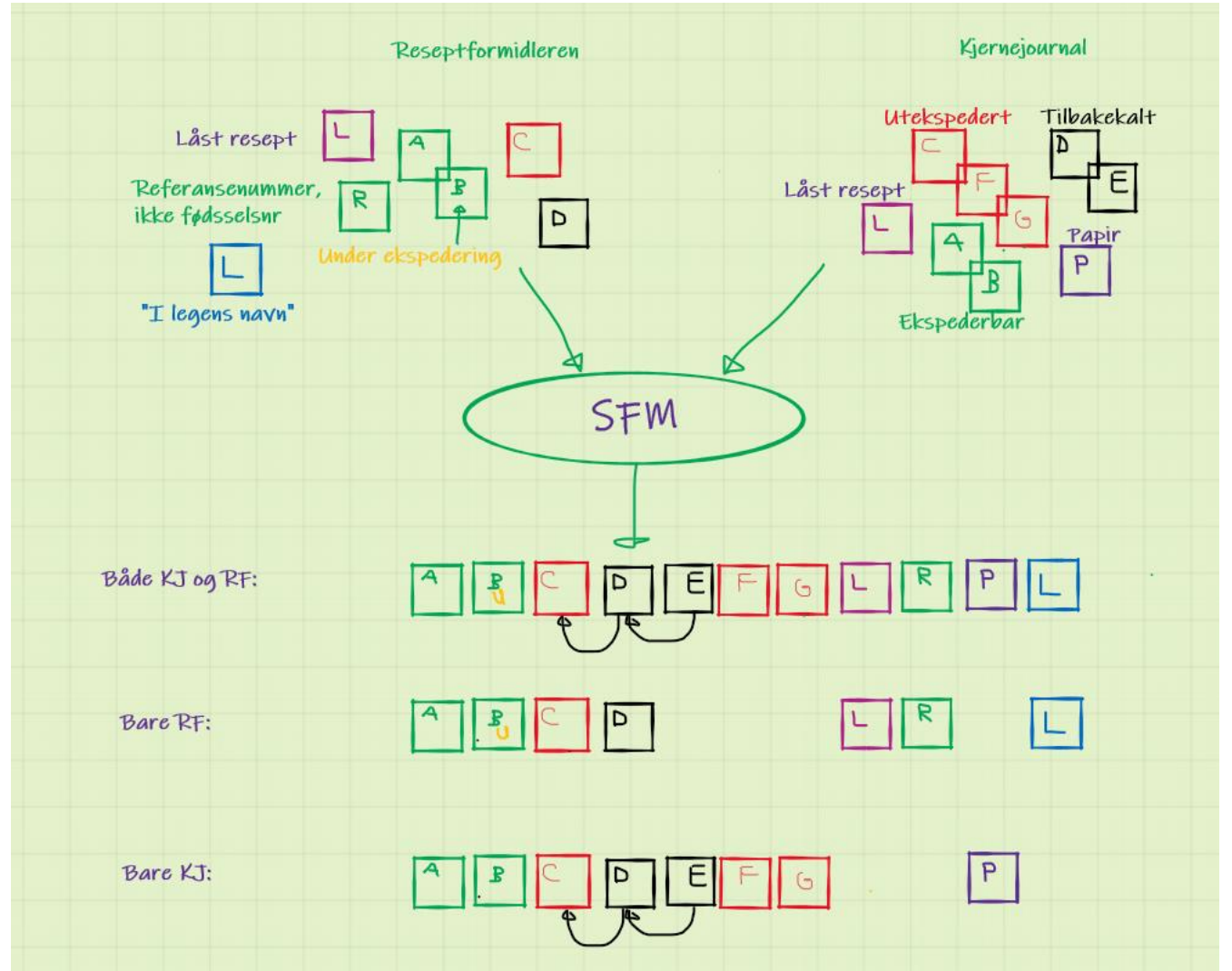
Vis nylig seponerte Vis inaktive oppføringer Listen har aldri blitt signert her Initier PLL

FAST	VIRKESTOFF	FORM	STYRKE	NAVN	BRUKSOMRÅDE	DOSERING	SEPONERES	RESEPT UTLEVERT	RESEPT GYLDIGHET	RESEPT REF.	SIGNERT
	Pantoprazol	enterotab	40 mg		MOT SPISERØRSSYKDOM	1+0+0+0				\$2 D84	BPV
	Semaglutid	tab	14 mg		MOT DIABETES	1 tablett morgen og 2 tabletter ...					BPV
	Levotyrosin	tab	50 mikrog	Euthyrox	FOR STOFFSKIFTET	1+0+0+0		0%	04.06.2022	\$2 E03	JPJ
	Diklofenak	tab	50 mg		MOT BETENNELSE	1 tablett morgen og 1 tablett k...		0%	09.06.2022	\$2 G43	JPJ
BEHOV											SIGNERT
	Levokabastin	øyedr	0,5 mg/1 ml		ØYEDRÅPER MOT ALLERGI	1+0+0+1 i hvert øye				\$2 F71	BPV
KUR											SIGNERT
	Mometason	krem	0,1%		MOT KLØE	1x1 Påføres i tynt lag			31.10.2021		BPV

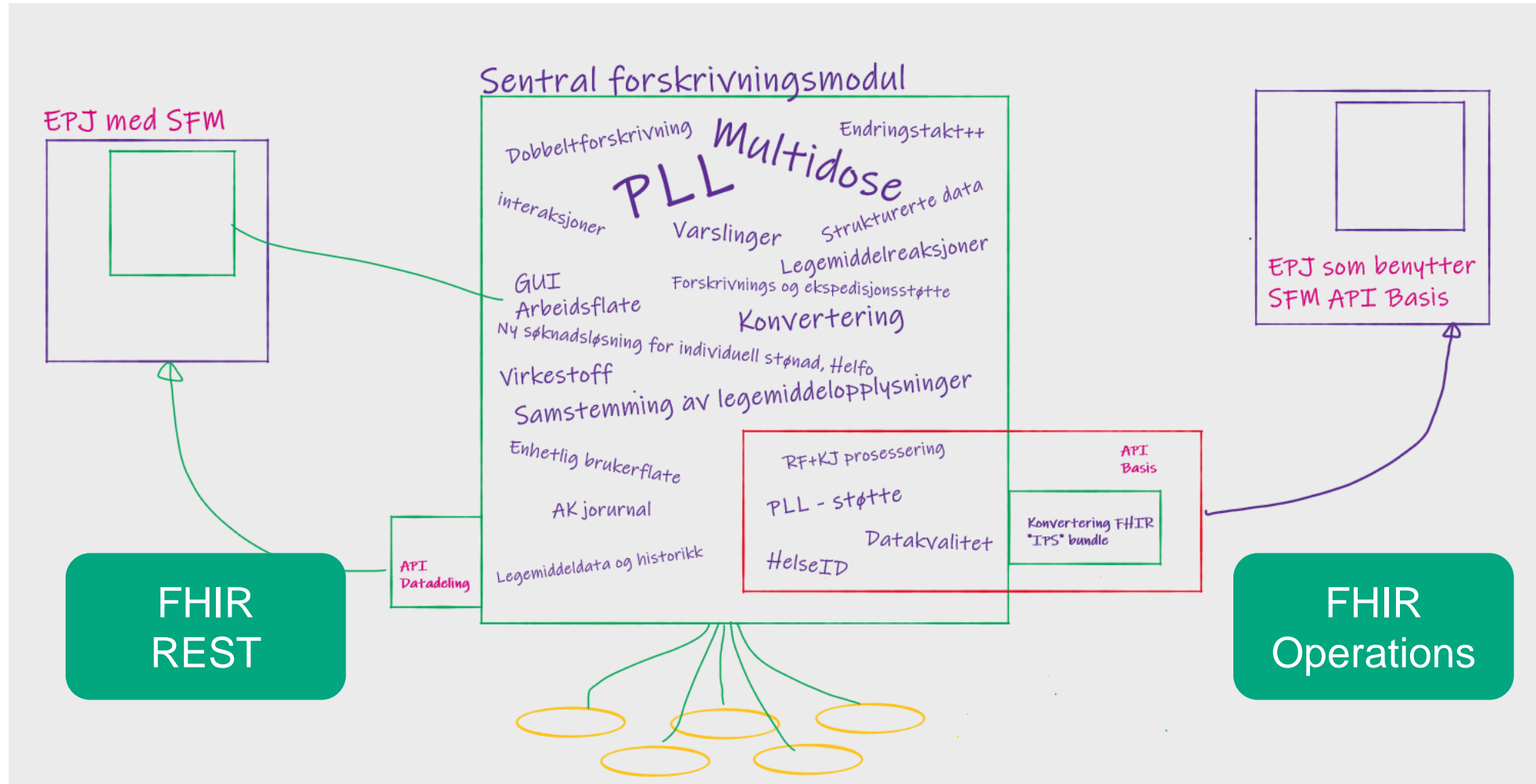
Samhandling med nasjonale systemer

Kompleksitet ligger i juss og tilgang
SFM samler informasjon og presenterer
konsistent

Basis API tilbyr sammenstilte data på «samme
måte» som SFM GUI viser dem fram

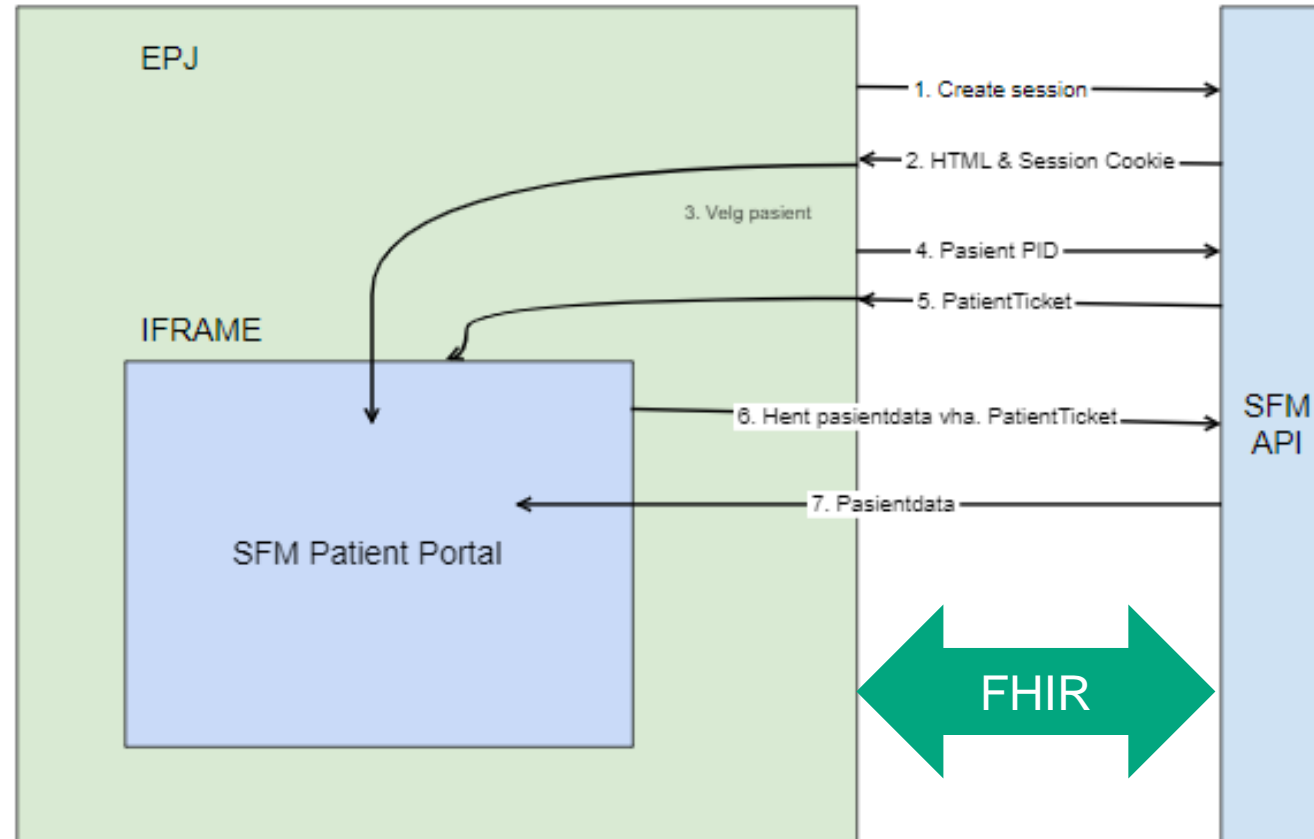


SFM har to publiserte API (i tillegg til noen støttefunksjoner)



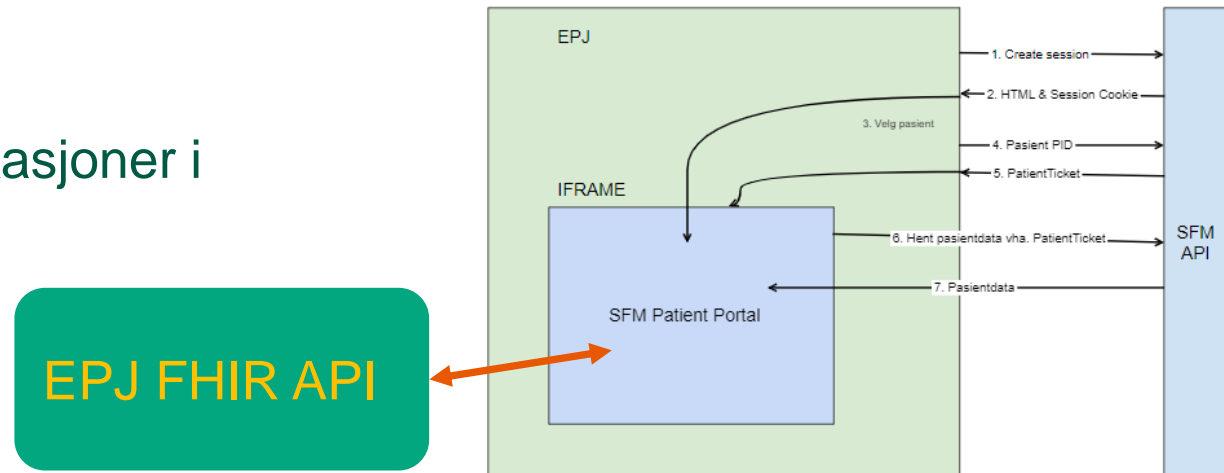
SFM

Application architecture



Hvorfor ikke «SMART»?

- En SMART applikasjon vil ha tilgang til data i EPJ
 - SFM har egen lagring av data, og kun minimalt behov for tilleggsdata.
 - Tilleggsdata (målinger/diagnose) skrives av EPJ til SFM i API
-
- SFM plattform kan kjøre andre applikasjoner i kontekst, - på ide-stadiet foreløpig



Dokumentasjon og verktøy

The screenshot shows the SIMPLIFIER.NET website. At the top, there is a search bar and navigation links for SNIPPETS, FEEDBACK, LOG IN, and SIGN UP. Below the header, it identifies the site as a PROJECT OF HL7 Norway and focuses on R4 Medication. A navigation menu includes Introduction, Resources, Guides, Team, Dependencies, and Packages. A status bar indicates it is a PUBLIC PROJECT, FHIR R4, with a National scope and 2 Subscriptions.

The main content area displays a list of profiles, ordered by Rank Score (Descending). The profiles listed are:

- HSOMedication**: Profile on Medication Profile. Status: Draft. Last updated: 22.5.2019.
- sfm-BandaPrescription**: Profile on Basic. Banda prescription used in SFM, based on Basic. Status: Active. Last updated: 28.5.2021.
- sfm-Condition**: Profile on Condition. sfm-Condition is derived from Condition. Status: Active. Last updated: 3.5.2021.
- sfm-DetectedIssue**: Profile on DetectedIssue. Resource to communicate warnings and other issues that has been handled and communicated within PLL. Status: Active. Last updated: 3.5.2021.
- SfmExcipient**: Profile on Substance. Used to represent non active substances within a magistral drug. Status: Active. Last updated: 3.5.2021.
- sfm-GeneralDispense**: Status: Active.

The screenshot shows a GitHub repository for HL7Norway / Medications. The repository is public and has a search bar at the top. The main content area shows the file structure for the Medications / StructureDefinition / directory. A pull request is open, titled "Update sfm-seponering.StructureDefinition.xml" by olemartinwinnem. The pull request includes a list of files that have been updated:

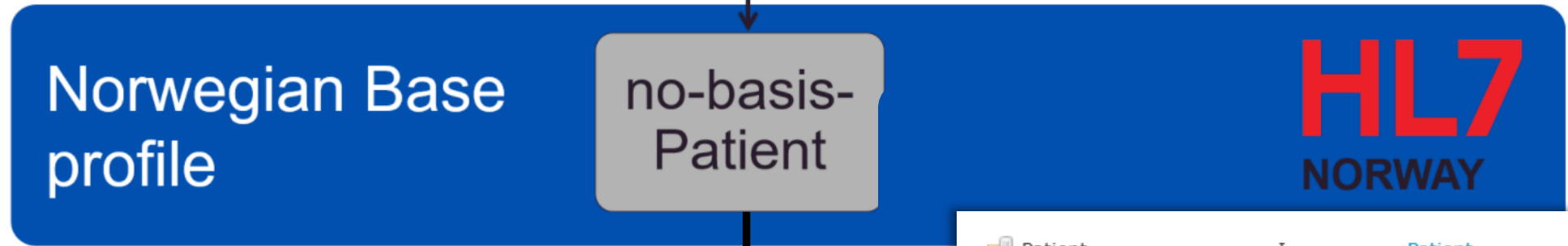
- SfmAmountText.StructureDefinition.xml: updated to same namespace and
- SfmMedicationBundle.StructureDefinition.xml: Common version and date
- sfm-BandaPrescription.StructureDefinition.xml: updated text
- sfm-Condition.StructureDefinition.xml: updated to same namespace and
- sfm-DetectedIssue.StructureDefinition.xml: updated to same namespace and
- sfm-Excipient.StructureDefinition.xml: updated to same namespace and








FORGE for profiling

The screenshot displays the Forge 27.3.1 for R4 interface. The main window title is "Profile on Composition⁽²⁾: SfmMedicationComposition". The interface is divided into several panes:

- Session Explorer:** Shows a session with several components: Medications-master, StructureDefinition, and SfmMedicationComposition (highlighted).
- File Properties:** Displays metadata for the selected file:
 - Title: SfmMedicationComposition
 - Type: Profile
 - Filename: sfm-MedicationComposition.StructureDefinition.xml
 - Location: C:\FHIR\Medication\Medications-master\Medications-master\StructureDefinition
 - Last modified: 9 months ago
- Element Tree:** Shows a hierarchical view of the profile elements:
 - Composition
 - identifier
 - status (1)
 - type (1)
 - category (*)
 - subject (1) [info, edit]
 - encounter
 - date (1)
 - author (1+) [edit]
 - title (1)
 - confidentiality
 - attester (0..2) [info, slice, edit]
 - attester:attesterPractitioner [info, edit]
 - attester:attesterOrganisation [info, edit]
 - custodian
 - relatesTo (*)
 - event (*)
 - section (1+) [info, slice, edit]
 - section:sectionPLInfo (1) [info, edit]
 - title (highlighted)
- Element Properties: title:** Shows configuration for the selected "title" element:
 - Element ID: Composition.section:sectionPLInfo.title
 - Cardinality: 0, 1, 0..0, 0..1, 0..*, 1..1, 1..* (1 is selected)
 - Type(s): string
 - Valueset binding
 - Fixed value: [empty field]
 - Short description: Label for section (e.g. for ToC)
 - Definition: The label for this particular section. This will be part of the rendered content for the document, and is often used to build a table of contents.
 - Label: [empty field]
 - Code: [plus icon]

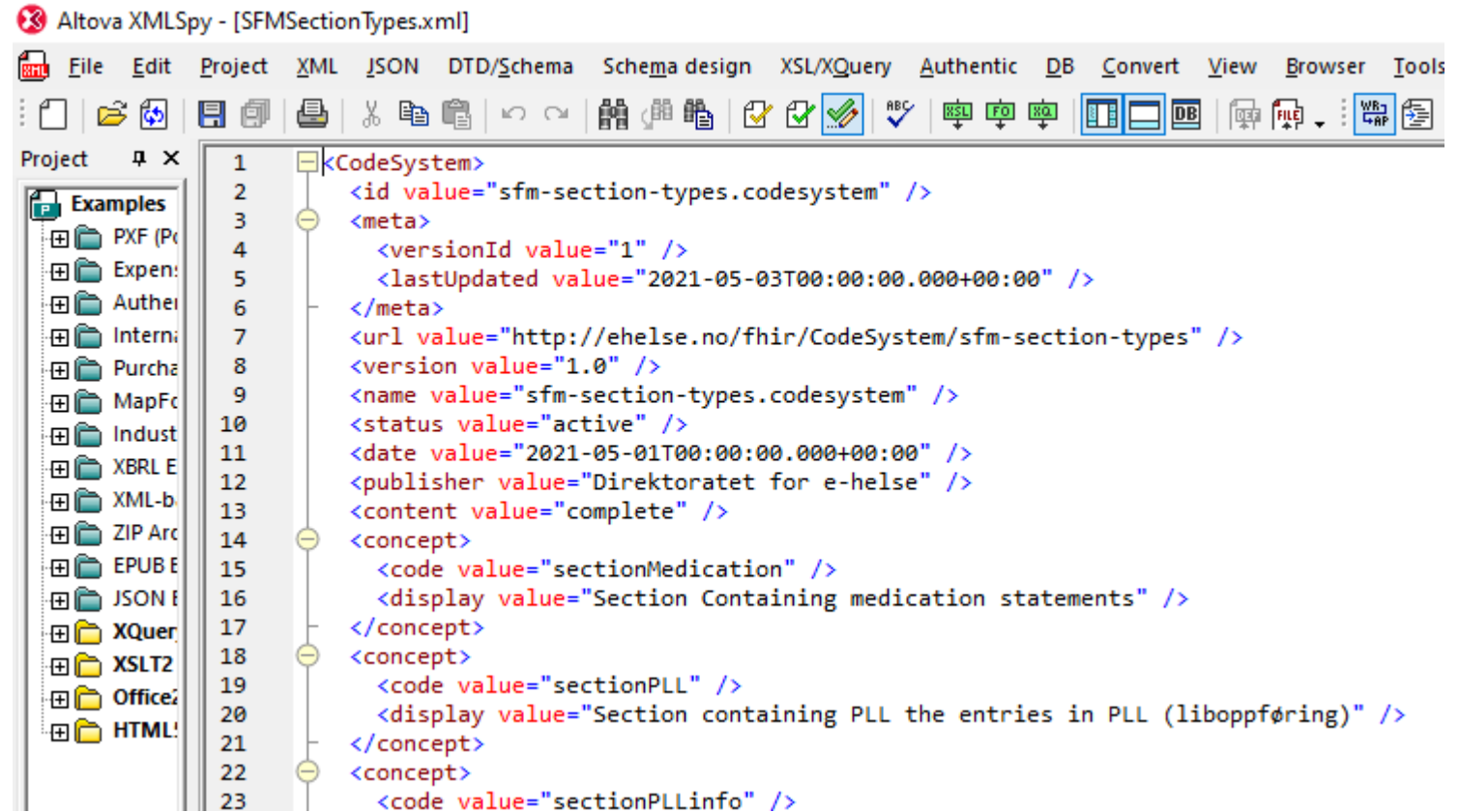
Norsk profileringsmodell



 Patient	I	Patient
 extension	I	0..* Extension
 identifier	S Σ	0..* Identifier
 FNR	Σ	0..* Identifier
 DNR	Σ	0..* Identifier
 xxxid	Σ	0..1 Identifier
 active	S Σ ?!	1..1 boolean
 name	S Σ	0..1 no-basis-HumanName
 telecom	S Σ I	0..* ContactPoint

XMLSpy for andre ressurser

CodeSystems
OperationDefinitions
SearchParamteters
ValueSet



The screenshot shows the Altova XMLSpy interface with the file SFMSectionTypes.xml open. The main editor displays the following XML code:

```
1 <CodeSystem>
2   <id value="sfm-section-types.codesystem" />
3   <meta>
4     <versionId value="1" />
5     <lastUpdated value="2021-05-03T00:00:00.000+00:00" />
6   </meta>
7   <url value="http://ehelse.no/fhir/CodeSystem/sfm-section-types" />
8   <version value="1.0" />
9   <name value="sfm-section-types.codesystem" />
10  <status value="active" />
11  <date value="2021-05-01T00:00:00.000+00:00" />
12  <publisher value="Direktoratet for e-helse" />
13  <content value="complete" />
14  <concept>
15    <code value="sectionMedication" />
16    <display value="Section Containing medication statements" />
17  </concept>
18  <concept>
19    <code value="sectionPLL" />
20    <display value="Section containing PLL the entries in PLL (liboppfølring)" />
21  </concept>
22  <concept>
23    <code value="sectionPLLinfo" />
```

PreferredReturn:

Login
HPR Token: 1010038
Organization: Rasletinden test2
Id: None

Patient Organization Person P

Patient
Patient:

Medication
Referansenummer:
 historyTimestamp:
SamtykkeKjemejournal:
SamtykkeSpesretLegemidler:
SamtykkeLasteResepter:
 Include reseptdok

Medication
Medication loaded: Jacub Undrum

Responsibility
 utleveringfastlege
 multidose

Medication

Patient: Patient Remove Allergies
PLL-info: Multidoseansvarlig lege: 1010038 (HPR), Ansvarlig farmasøyt: Testapotek Monier PLL New PLL
Composition Set CreatePLL

Medication:

P Zyrtec Mikst 1 mg/ml	Stopped, Ekspederbar	F PLL	New
P Enalapril Sandoz Tab 10 mg	Active, Ekspederbar	F PLL	
P Zyrtec Mikst 1 mg/ml	Active, Ekspederbar	F PLL	
P Zyrtec Mikst 1 mg/ml	Active, Ekspederbar	F PLL	
V Ibuprofen Kaps 400 mg	Active, Ekspederbar	B	
P Zyrtec Mikst 1 mg/ml	Active, Ekspederbar	F	
P Flagyl tab 400 mg	Active, Ekspederbar	K PLL	

Other prescriptions:
Hoftebeskyttere Ekspederbar New

Allergies:
Ibuprofen New

Dispense:
P Zyrtec Mikst 1 mg/ml Qty: 1.0 , Status: Completed

Save / Close

- Recall
- Renew
- Renew (w/change)
- Discontinue
- Add PLL-Id
- Add comment (spm)
- Add response (svar)

Add new element

Clear

Json:

```
{
  "resource": "Medication",
  "id": "d",
  "meta": {
    "lastUpdated": "2021-08-30T08:00:00",
    "source": "http://base-fhir.test2.forskrivning.no"
  },
  "profile": "http://hl7.org/fhir/StructureDefinition/medication",
  "type": "Medication",
  "timestamp": "2021-08-30T08:00:00",
  "total": 1,
  "link": {
    "rel": "self",
    "url": "https://base-fhir.test2.forskrivning.no/medication/d"
  },
  "entry": [
    {
      "full": true,
      "resource": "Medication",
      "status": "final",
      "type": {
        "coding": [
          {
            "system": "http://loinc.org",
            "code": "11503-0",
            "display": "Medical records"
          }
        ]
      }
    }
  ],
  "value": "ab475d0a-37ca-4a2f-830a-e9a580a981b9"
}
```

Ok Cancel

Save to file Load from file Cancel / Close

- [getMedication?](#)
- [Bundle"](#)
- [etMedication"](#)
- [icationComposition"](#)

Microsoft FHIR

<https://github.com/microsoft/fhir-server>

☰ README.md

FHIR Server for Azure

A .NET Core implementation of the FHIR standard.

CI Build & Deployment	Azure Government Deployment
	

FHIR Server for Azure is an open-source implementation of the emerging [HL7 Fast Healthcare Interoperability Resources \(FHIR\) specification](#) designed for the Microsoft cloud. The FHIR specification defines how clinical health data can be made interoperable across systems, and the FHIR Server for Azure helps facilitate that interoperability in the cloud. The goal of this Microsoft Healthcare project is to enable developers to rapidly deploy a FHIR service.

With data in the FHIR format, the FHIR Server for Azure enables developers to quickly ingest and manage FHIR datasets in the cloud, track and manage data access and normalize data for machine learning workloads. FHIR Server for Azure is optimized for the Azure ecosystem:

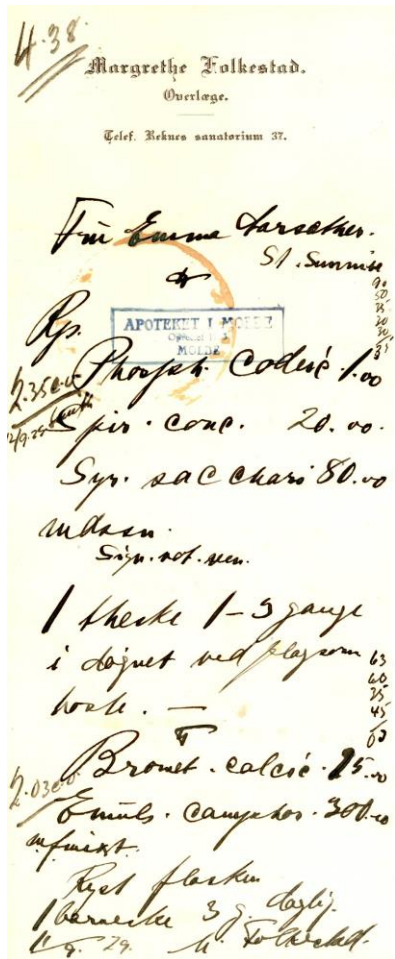
- Scripts and ARM templates are available for immediate provisioning in the Microsoft Cloud
- Scripts are available to map to Azure AAD and enable role-based access control (RBAC)

FHIR Server for Azure is built with logical separation, enabling developers with flexibility to modify how it is implemented, and extend its capabilities as needed. The logic layers of the FHIR server are:

- Hosting Layer – Supports hosting in different environments, with custom configuration of Inversion of Control (IoC) containers.
- RESTful API Layer – The implementation of the APIs defined by the HL7 FHIR specification.
- Core Logic Layer – The implementation of the core FHIR logic.
- Persistence Layer – A pluggable persistence provider enabling the FHIR server to connect to virtually any data persistence utility. FHIR Server for Azure includes a ready-to-use data persistence provider for Azure Cosmos DB (a globally replicated database service that offers rich querying over data).

Microsoft FHIR server

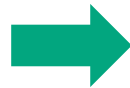
- Stort sett veldig bra
- Ikke et alternativ når vi startet, migrering fra egenutviklet FHIR server til MS
- Noen småbugs, og noen avvik fra standard (f.eks. i OperationOutcome)
- Taklet ikke alle UTF, kjent regex problem (non breaking space)
- Litt læring underveis.
- SFM har businesslogikk bak dataelementer: f.eks. henter tilleggs informasjon fra HPR for Practitioner
- Vi «mistet» Swagger på veien...



SFM og FHIR

Hva skjedde på veien?

```
<import namespace="http://www.kith.no/xmlstds" schemaLocation="../../../felleskomponenter/k
<import namespace="http://www.kith.no/xmlstds/felleskomponent1" schemaLocation="../../../fe
<import namespace="http://www.kith.no/xmlstds/eresept/forskrivning/2013-10-08" schemaLoc
<element name="Resept">
  <complexType>
    <sequence>
      <element name="Forskrivningsdato" type="date"/>
      <element name="Utloper" type="date"/>
      <element name="Vernepliktig" type="boolean" minOccurs="0"/>
      <element name="SoktIndividRefusjon" type="boolean" minOccurs="0"/>
      <element name="Frikort" type="boolean" minOccurs="0"/>
      <element name="Vergeinnsynsreservasjon" type="boolean" minOccurs="0"/>
      <element name="TilEgenPraksis" type="boolean" minOccurs="0"/>
      <element name="RekvLegensNavn" type="boolean" minOccurs="0"/>
      <element name="RefNr" type="string" minOccurs="0"/>
      <element name="Spesialitet" type="kith:CV" minOccurs="0"/>
      <choice>
        <element ref="m1:ReseptDokLegemiddel"/>
        <element ref="m1:ReseptDokHandelsvare"/>
      </choice>
      <element ref="m1:Instituert" minOccurs="0"/>
      <element ref="m1:EkspAnm" minOccurs="0"/>
      <element ref="m1:Utlending" minOccurs="0"/>
      <element name="OppdatertFest" type="dateTime"/>
      <element name="TidligsteUtlevering" type="date" minOccurs="0"/>
      <element name="UtskrevetSykehus" type="boolean" minOccurs="0"/>
      <element name="LastResept" type="boolean" minOccurs="0"/>
    </sequence>
  </complexType>
</element>
```



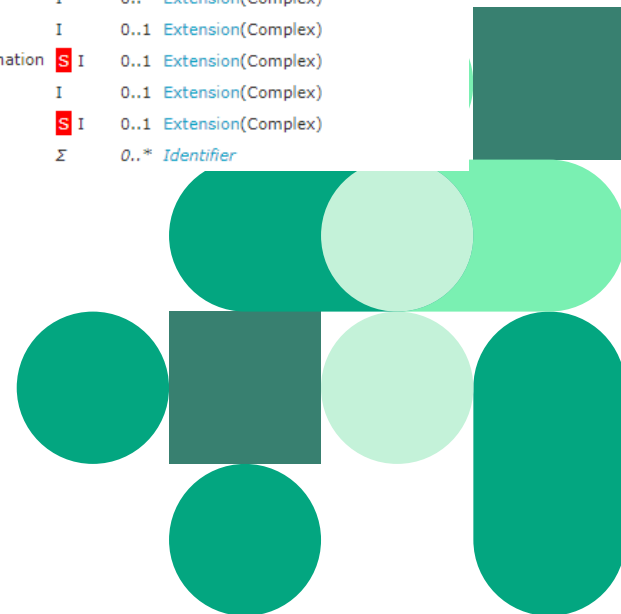
ORGANIZATION HL7 Norway / PROJECT R4 Medication

sfm-MedicationStatement

SFM MedicationStatement derived from no-basis-MedicationStatement

type Profile on MedicationStatement FHIR R4 status Active version 1.0

Overview Details Mappings Table XML JSON



IPS

[HL7.FHIR.UV.IPS\International Patient Summary Implementation Guide - FHIR v4.0.1](#)

[Trillium II | International Patient Summary - SIMPLIFIER.NET](#)

Composition	I		Composition
identifier	Σ	0..1	Identifier
status	Σ ?!	1..1	code Binding
type	Σ	1..1	CodeableConcept Binding
subject	S Σ I	1..1	Reference(Patient)
encounter	Σ I	0..1	Reference(Encounter)
date	Σ	1..1	dateTime
author	Σ I	1..*	Reference(Practitioner Device Pati
title	Σ	1..1	string
confidentiality	Σ ?!	0..1	code Binding
attester	Σ	0..*	BackboneElement
custodian	Σ I	0..1	Reference(Organization)
relatesTo	Σ	0..*	BackboneElement
event	Σ	0..*	BackboneElement
section	S I	1..*	BackboneElement
(All Slices)			
sectionMedications	S I	1..1	BackboneElement
sectionAllergies	S I	1..1	BackboneElement
sectionProblems	S I	1..1	BackboneElement
sectionProceduresHx	S I	0..1	BackboneElement
sectionImmunizations	S I	0..1	BackboneElement
sectionMedicalDevices	S I	0..1	BackboneElement
sectionResults	I	0..1	BackboneElement
sectionPastIllnessHx	I	0..1	BackboneElement
sectionFunctionalStatus	I	0..1	BackboneElement
sectionPlanOfCare	I	0..1	BackboneElement
sectionSocialHistory	I	0..1	BackboneElement
sectionPregnancyHx	I	0..1	BackboneElement
sectionAdvanceDirectives	I	0..1	BackboneElement
sectionEncounters	I	0..1	BackboneElement

SFM MedicationBundle (Basis API)

<https://simplifier.net/r4medication/sfmmedicationcomposition>

[HL7.FHIR.UV.IPS\International Patient Summary Implementation Guide - FHIR v4.0.1](#)

[Trillium II | International Patient Summary - SIMPLIFIER.NET](#)

Path	Cardinality	Binding	Type
Composition	I		Composition
identifier	Σ 0..1	Identifier	Identifier
status	Σ ?!	code	code Binding
type	Σ	1..1	CodeableConcept Binding
category	Σ	0..*	CodeableConcept
subject	S Σ I	1..1	Reference(sfm-Patient)
encounter	Σ I	0..1	Reference(Encounter)
date	Σ	1..1	dateTime
author	Σ I	1..*	Reference(Device Organization sfm-Practition...
title	Σ	1..1	string
confidentiality	Σ	0..1	code Binding
attester	S	0..2	BackboneElement
custodian	Σ I	0..1	Reference(Organization)
relatesTo		0..*	BackboneElement
event	Σ	0..*	BackboneElement
section	S I	1..*	BackboneElement
(All Slices)			
sectionPLInfo	S I	1..1	BackboneElement
sectionMedication	S I	1..1	BackboneElement
sectionOtherPrescriptions	S I	1..1	BackboneElement
sectionAllergies	S I	1..1	BackboneElement
sectionDispense	S I	0..1	BackboneElement
sectionPregnancyHx	I	0..1	BackboneElement
sectionAdvanceDirectives	I	0..1	BackboneElement
sectionEncounters	I	0..1	BackboneElement

Datadeling (API for SFM Fullversjon)

SFM Datadeling API Implementation Guide

- Home
 - Introduction
 - Change log
 - Principles
 - Missings identifier
 - Getting started
 - Use of HTTP URL, verbs and search par...
 - Using HelseID and accesstoken
 - Using SFM patientticket
 - Create SFM database
 - Flow description
 - Person information
 - Practitioner information**
 - Patient information
 - Open a patient
 - Patient conditions
 - Patient lab results
 - Patient LIB list
 - Patient KI list
 - Managing tasks
 - Medical information
 - Statistics
 - Resources
 - SFM profiles
 - sfm-Person
 - sfm-Practitioner
 - sfm-Organization
 - sfm-Patient
 - sfm-Task

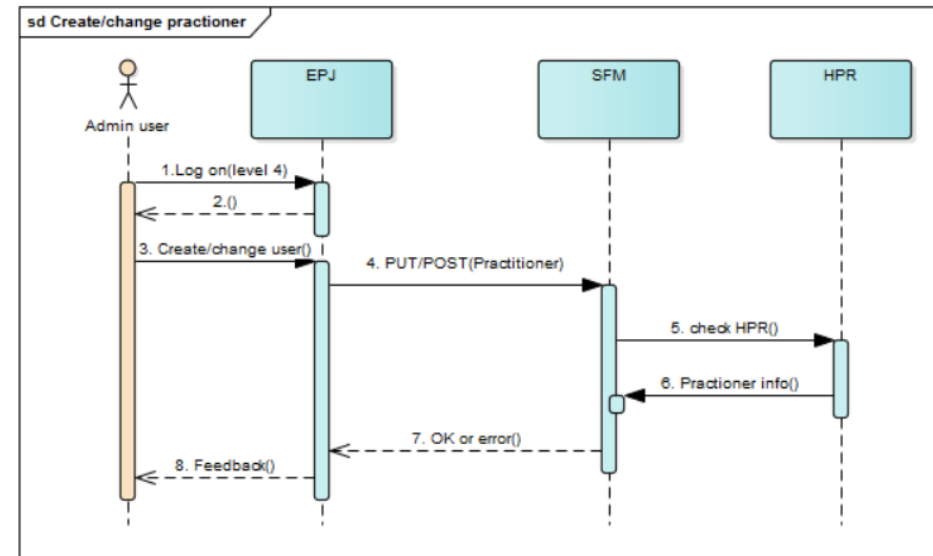
Practitioner

Introduction

Using the Practitioner resource in SFM is restricted to using the [sfm-Practitioner](#) resource

The resource is available to make it possible for EPJ systems to write and update information about the users. SFM is checking practitioner information against **HPR** (*Helsepersonellregisteret* - the norwegian official registry for healthcare professionals) in order make sure that the information provided from the EPJ is correct.

Write practitioner information



Datadeling (API for SFM Fullversjon)

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 - Medical information
 - Statistics
 - Resources

Patient LIB list

Introduction

The [sfm-lib-List](#) resource in SFM is used to represent the patients current medication (*bruk* or *medication in use*), a snapshot for a given time or aggregated list for a patient.

The resource is available to make it possible for EPJ systems to retrieve current, prescriptions from SFM.

Only the commands GET is made available for practitioners. The resource can be accessed for different purposes and different input parameters is specified.

The LIB list could be requested based on different purposes:

- Using it in correspondance
- Presenting it in patient overview
- Using it for medication administration
- Input to a curve system

Each purpose requires different type of data as input and feedback.

Correspondance

LIB in correspondance requires only the patient ticket as input parameter. It returns statements with short dosage and/or textual dosage is returned. No structured data is returned.

Leverandøroppfølging

Leverandørene får tips og tilgang til eksempelkode

Vi har benyttet .NET FHIR API (FireLy), men noen ser på Graham Grieve sin Delphi implementasjon

Testsystemer tilgjengelig på internet

Integrasjon med HelseID i test.

Ukentlige statusmøter når det trengs

SFM på lufta!

Dag Hammer la ut på okt 27, 2021

Onsdag 27.10.2021 ble hurradagen for SFM.



Første SFM resept

Lars Ødegaard fra Åros legekantor ble den første som sendte resept med SFM

BasisAPI



HELSEPLATTFORMEN

felles pasientjournal i Midt-Norge



Helse Vest

Hvor går vi nå?

- FHIR 5?
- Nasjonale profiler medication og PLL/IPS
- Versjonering av profiler
- Versjonering av API

 Norsk helsenett