

4S

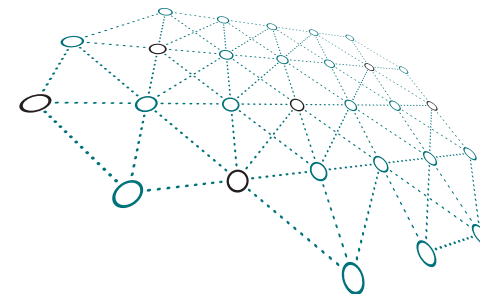
OpenTele3

Michael Christensen
Chef Softwarearkitekt, Alexandra Instituttet,
Koordinator for Softwaregruppen i 4S



STIFTELSEN FOR SOFTWAREBASEREDE SUNDHEDSSERVICES

Vision



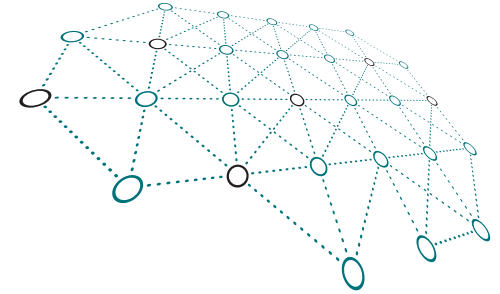
Muliggøre udvikling af
bedre og mere **effektive** løsninger
til **brugerne**

via

en **opsplitning** af OpenTele i
løstkoblede komponenter og services



Mål

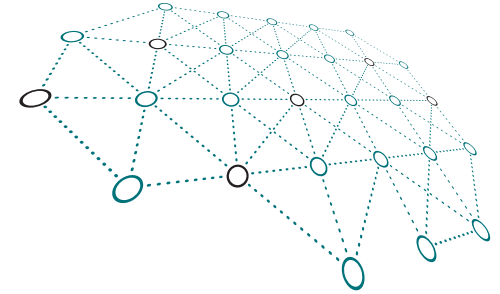


- **Uafhængighed**
 - flere samtidige leverandører og løbende udrulning
- **Individuel tilpasning**
 - skræddersy løsning efter behov
- **Genbrug**
 - modularisering
- **Veldefinerede snitflader**
 - fokus på internationale og anerkendte standarder
- **Indkapsling af kritisk funktionalitet**
 - certificering og kvalitetssikring

+ målrettet skalerbarhed

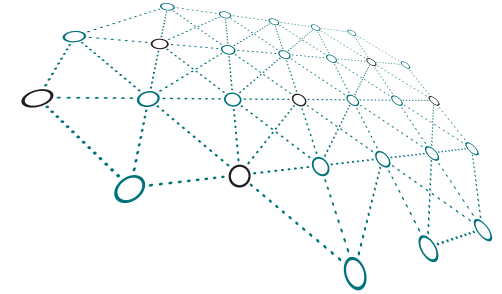


Udgangspunkter

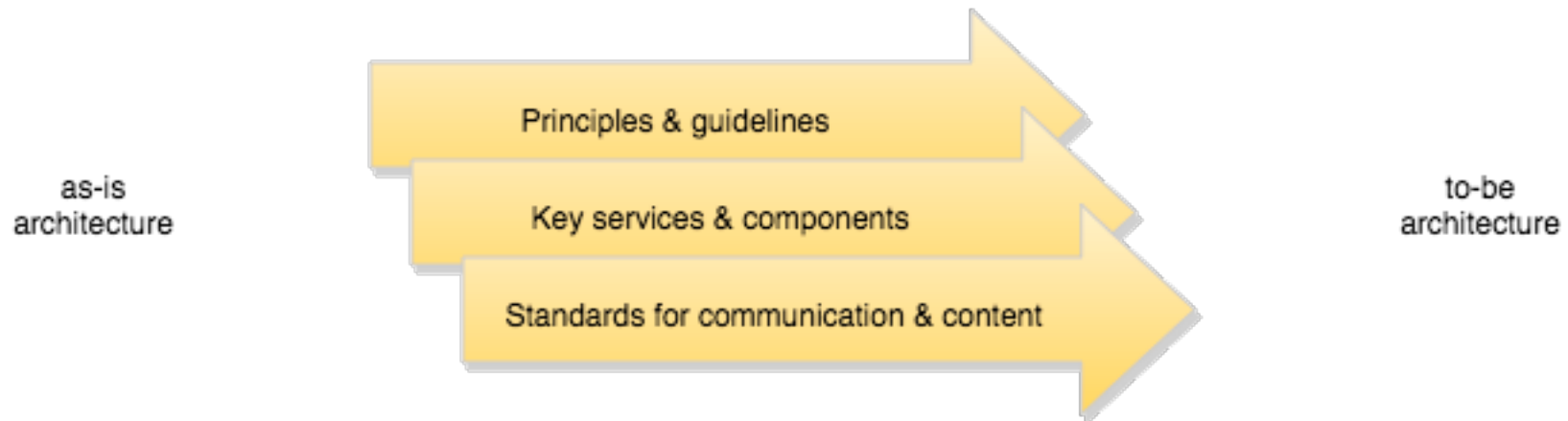


- Rodfæstet i involvering af interessenter
 - erfaringer, behov, planer, ...
- Referencearkitekturer og Continua
- Idéer om
 - arkitektur baseret på microservices
 - anvendelse af HL7 FHIR

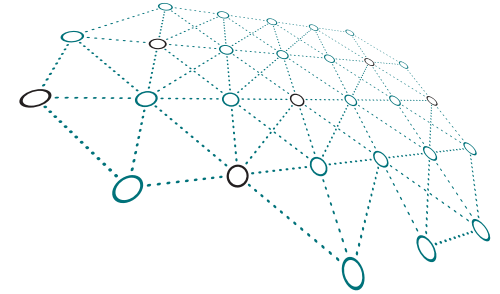
Spørgsmålene



- Hvad er kernekomponenterne?
- Hvad kan håndteres eksternt og hvad kan deles?
- Hvad er principper og retningslinjer for:
 - Serviceinfrastruktur?
 - Kommunikationsstandarder og indholdsformater?



Microservices



- **Small, and doing one thing well:** Microservices are independent services and its boundaries are aligned with boundaries of the business domain.
- **Autonomous:** A microservice is a separate entity and can be deployed in isolation without requiring data consumers to change.

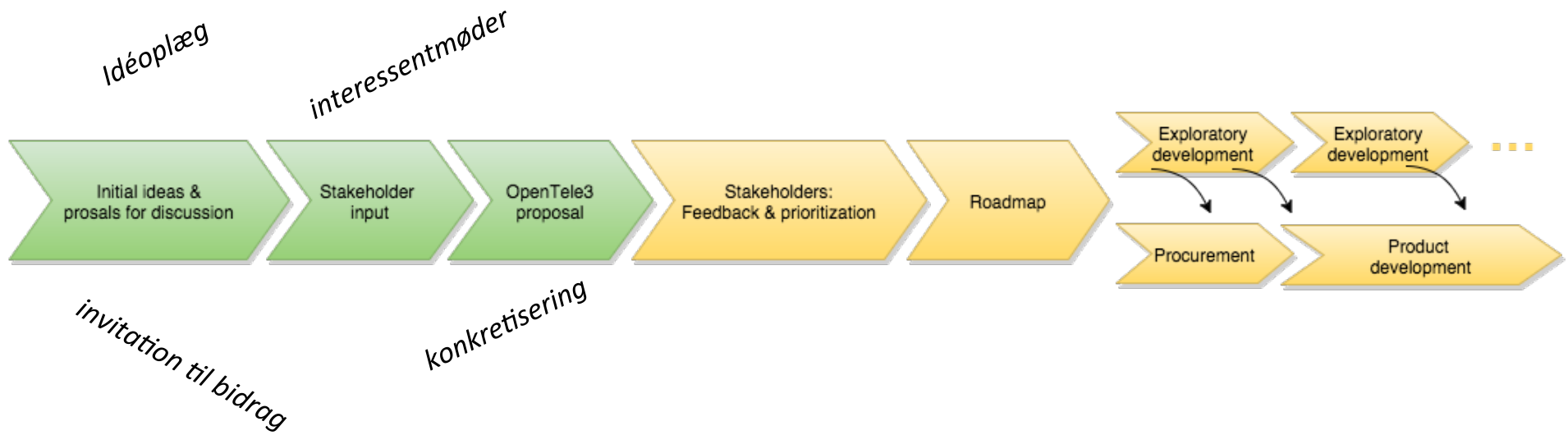
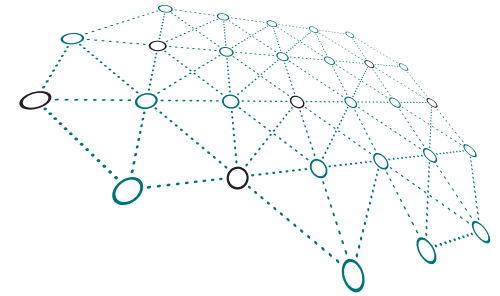
[Newman]

HL7 FHIR

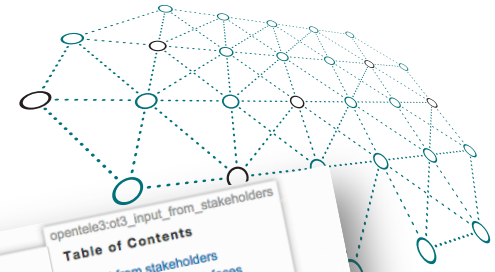


- FHIR® – Fast Healthcare Interoperability Resources
 - Næste generation standard framework fra HL7
 - Kombinerer bedste egenskaber fra HL7 v2, v3 og CDA
 - Benytter de nye web standarder
 - Fokus på implementerbarhed
- FHIR løsninger:
 - bygger på modulære enheder kaldet ressourcer (patient, CarePlan, Appointment, ...)
 - er anvendelige i mange forskellige kontekster (mobil apps, cloud kommunikation, EPJ-baseret datadeling, server kommunikation i store sundheds-it systemer, ...)

Processen



Input fra interessenter



- InTeleCare4U
- Silverbullet
- NNIT
- IBM
- NextStep Citizen
- Region Hovedstaden
- Region Midtjylland
- Region Nordjylland
- National Sundheds-IT
- MedCom

opentele3-013_input_from_stakeholders

Table of Contents

- Input from stakeholders
- Standards and interfaces
- Observations / measurements
- Devices
- Frontend / UI
- Questionnaires
- Communication
- Planning
- User, patient administration / information

Input from stakeholders

This page is part of the OpenTele 3 architectural design efforts. When we initiated these efforts 4S invited all interested parties to participate and contribute to the formation of an OpenTele 3.0 software architecture. Public as well as private parties have been included in this process and so far it has taken the form of a series of meetings where 4S representatives have conducted meetings with individual stakeholders. This page represents a condensed and loosely categorised summary of output from these meetings.

So far we have conducted meetings with representatives from:

- InTeleCare4U [I4U]
- Silverbullet [SB]
- NNIT [NNIT]
- IBM [IBM]
- NextStep Citizen [NSC]
- Region Hovedstaden [RH]
- Region Midtjylland [RM]
- Region Nordjylland [RN]
- National Sundheds-IT [NSI]
- MedCom [MedCom]

The sequence of the topics is not intended to suggest a prioritisation. In square brackets we have tried to capture which stakeholders explicitly made a point about which issues. This does not mean that other stakeholders may not also have touched on an issue or have the wish to prioritise it.

Standards and interfaces

- OpenTele should produce documents for XDS [RH]
- OpenTele WAN interface should conform with Continua Design Guidelines [RH]
- OpenTele client/server communication (WAN-IF) should conform with standards and guidelines specified by Continua Design Guidelines.
- Use HL7 FHIR outside Danish reference architectures [RH, NSC, MedCom, RM]
- Where Danish reference architectures and/or Continua doesn't say anything experiment with using FHIR where possible
- Integration with Danish National Service Platform [RN]
- Further integrate with services like Behandlingsrelation and Samtykke where and when appropriate

Observations / measurements

- Observations - searching and subscribing [RH]
- Need to continuously save incoming data in easily/fast searchable format
- Should have a standard for subscribing to incoming measurements
- Observation assessment - as a separate service/component [MedCom, RM, RN]
- Should isolate (safety) critical components
- Healthcare professionals should not need to look at normal data - i.e. data within set thresholds
- Support for patients seeing own measurements [RH]

Devices

- Asset management - managing measurement kits/devices [RH, RN]

Projects

- Net4Care
 - PHMR Builder
 - PHMR Viewer
 - XDS Connector
 - MHD Server
 - IUA Server
- OpenTele
 - Developing OpenTele2
 - Experimental Development
 - 4S Device Communication
 - 4SDC HTML/JS Demo
 - KIH Database
 - Sandbox

Working with 4S software

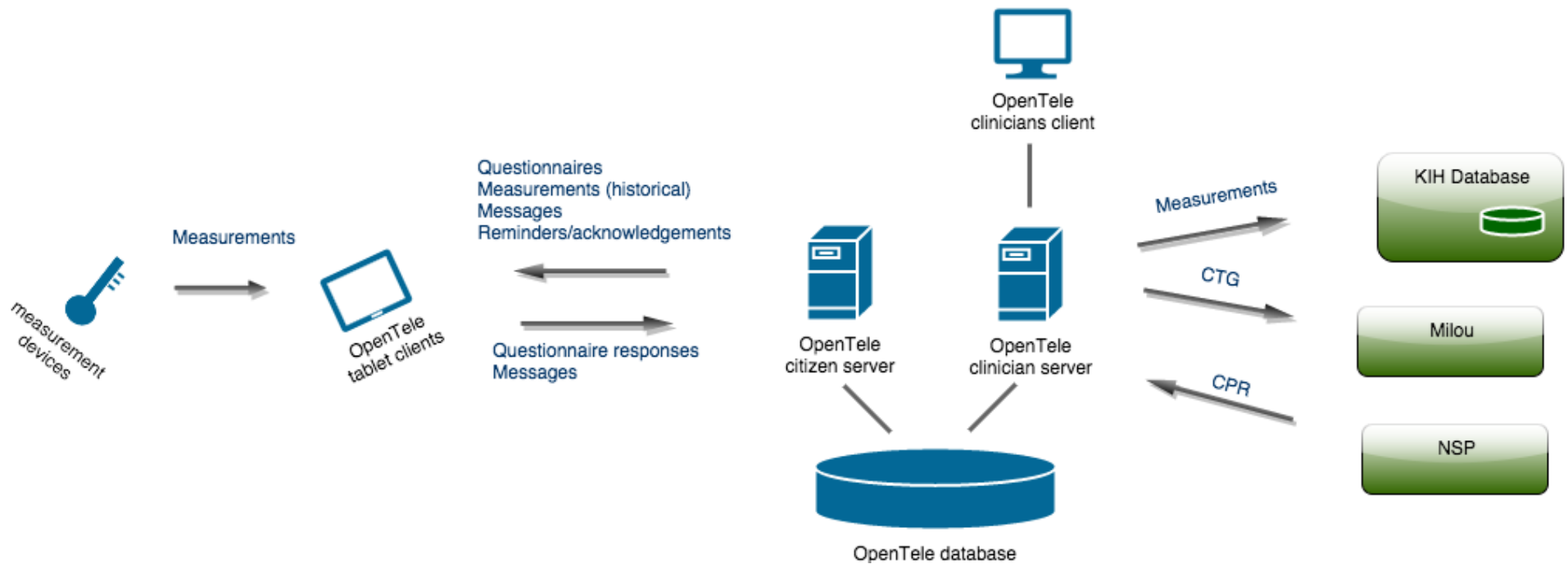
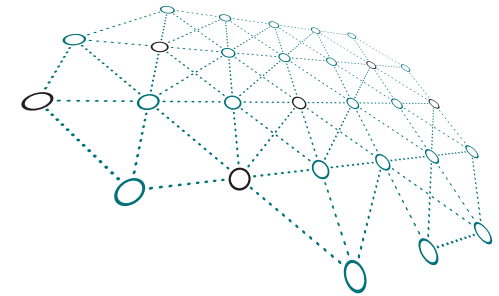
- Issue tracking
 - 4S Jira
 - Issue process
- Source code
 - 4S Bitbucket
 - Branching strategy
- Artifacts
 - 4S Artifacts
 - 4S wiki: Contributing
 - Work groups

Roadmaps & plans

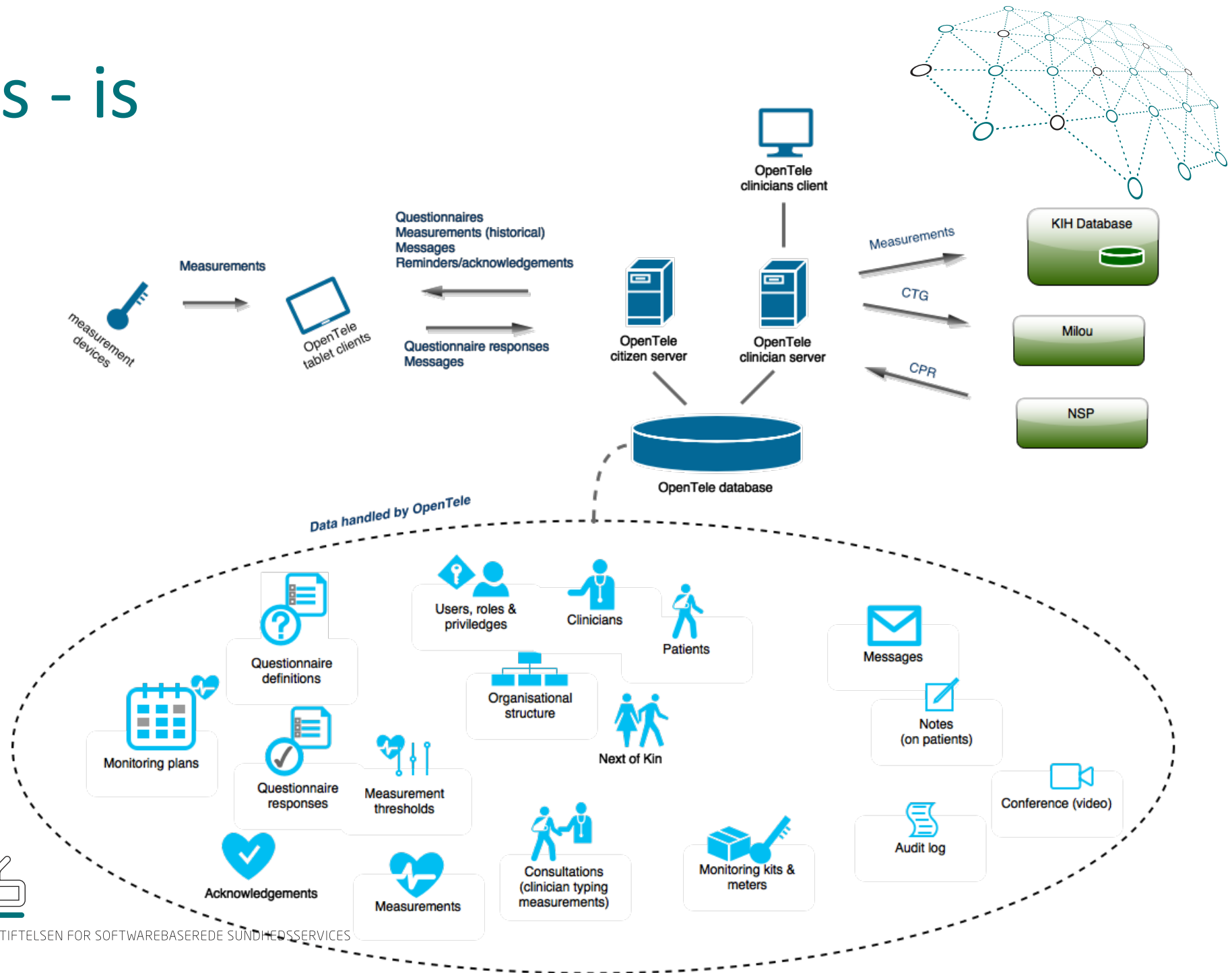
- Roadmaps & plans
- Analysis & reports
- Towards OpenTele3
 - Scope, goal and process
 - As is architecture
 - Input from stakeholders
 - To be architecture
 - How to get there



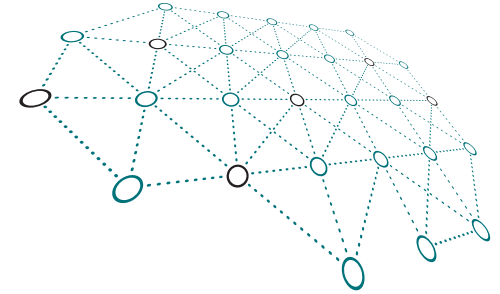
As - is



As - is



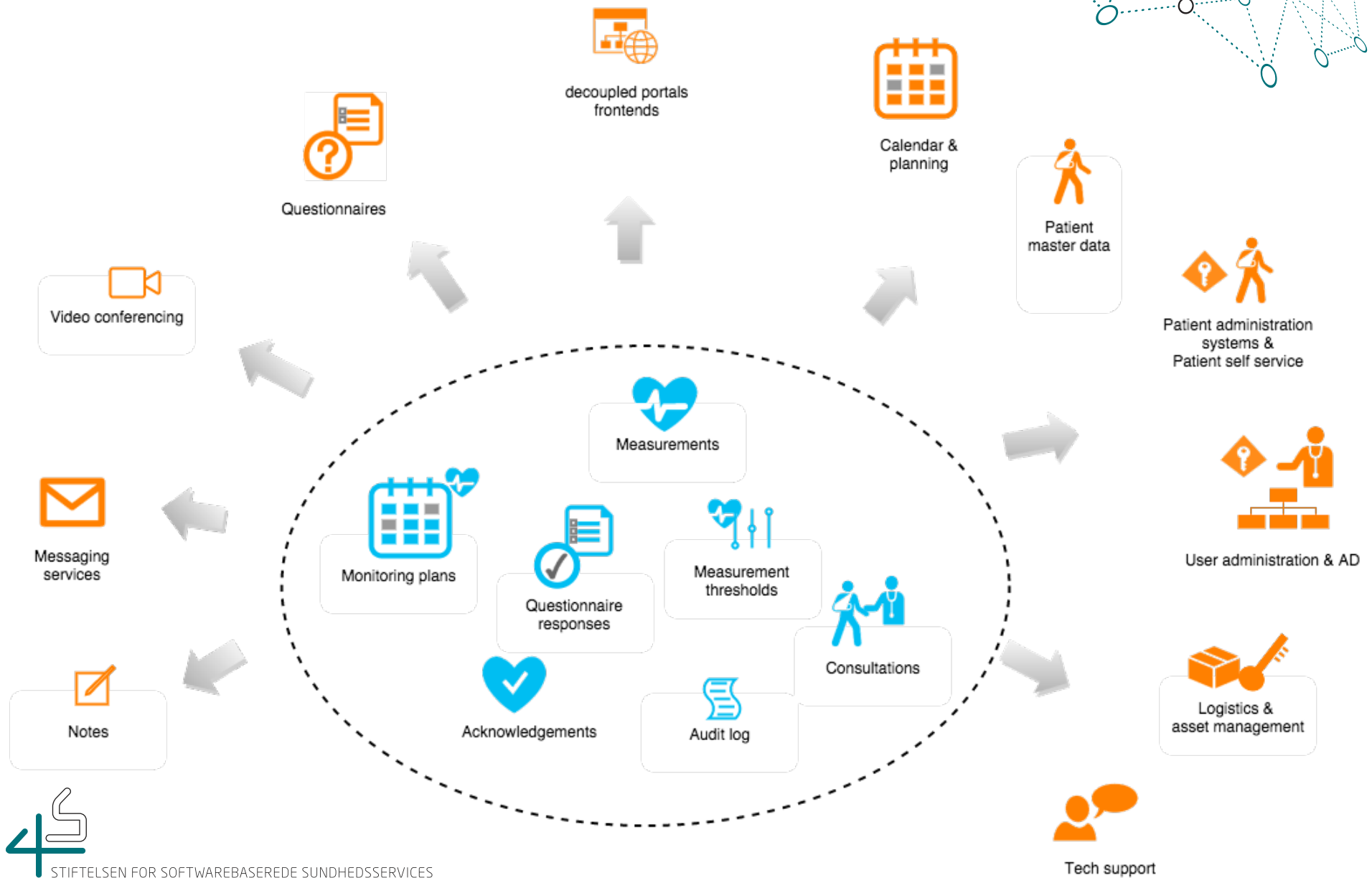
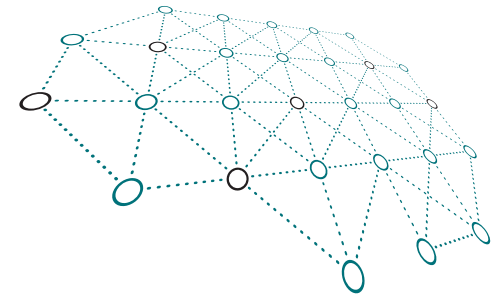
OpenTele3



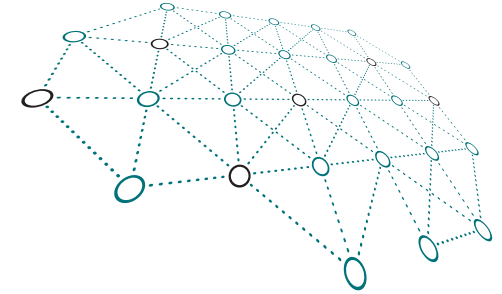
Kernekomponenter
&
strategiske fokusområder



Komponenter og fokusområder



Strategiske fokusområder

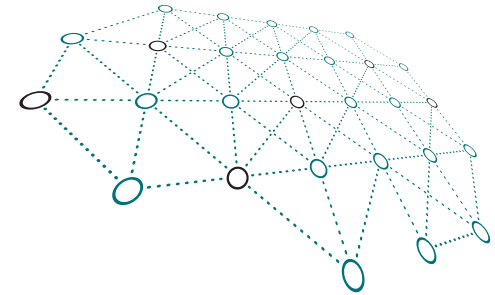


- *Klinikergrænseflader*
- *Spørgeskemaer*
- *Kommunikation*
 - *Messaging, videokonference, noter, patient fora, e-learning*
- *Kalendere og planlægning*
- *Administration, selfbetjening og master data*
- *Logistik, asset management og tech support*

+

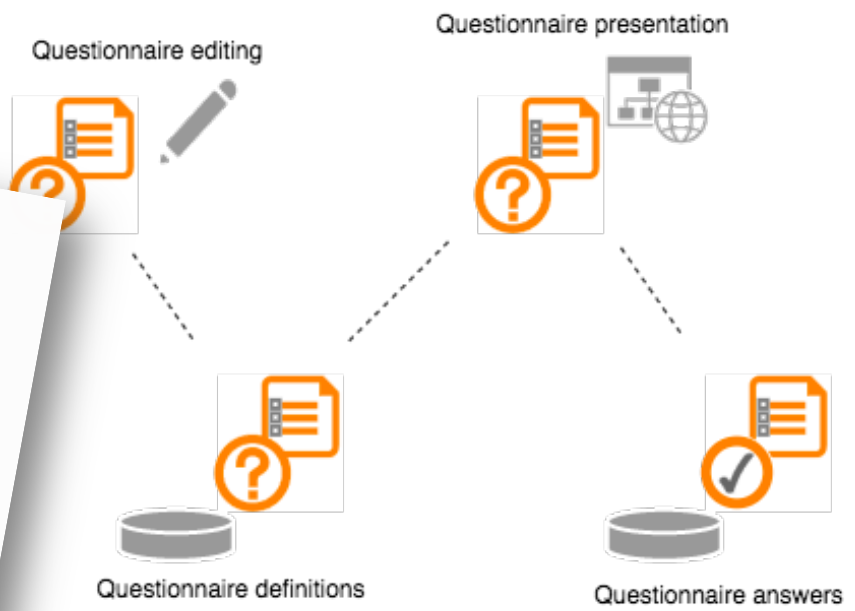
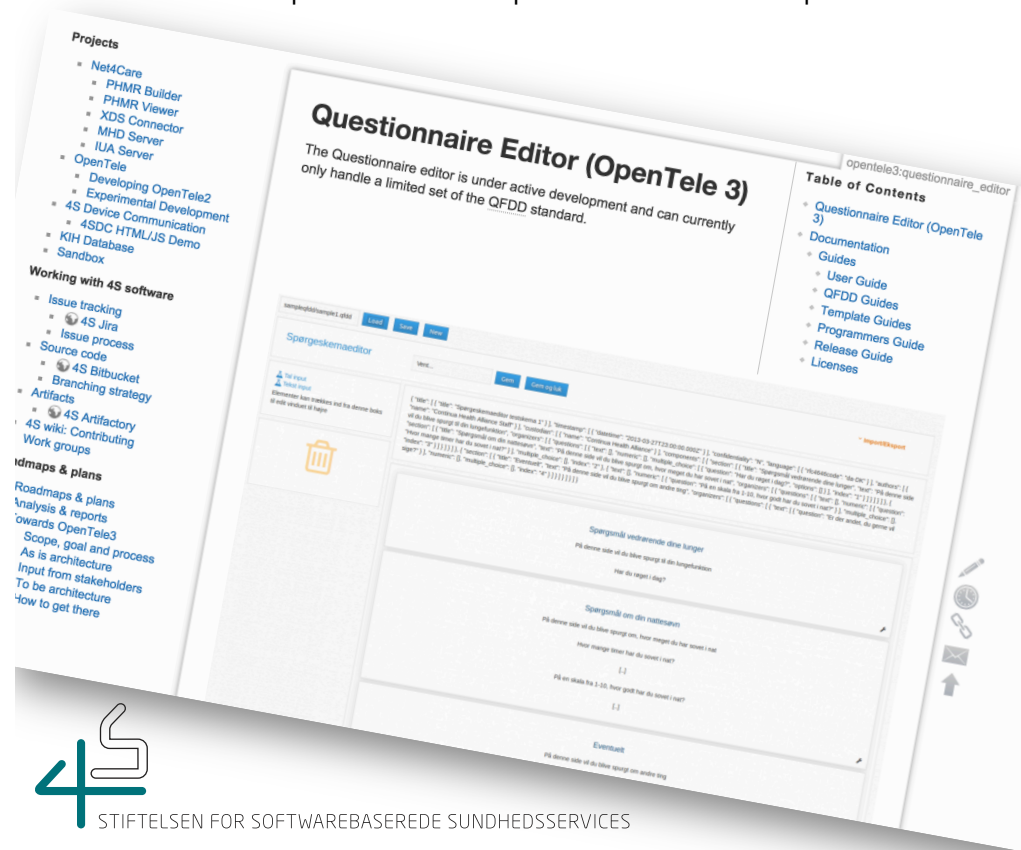
Standarder!

Ex: Spørgeskemaer

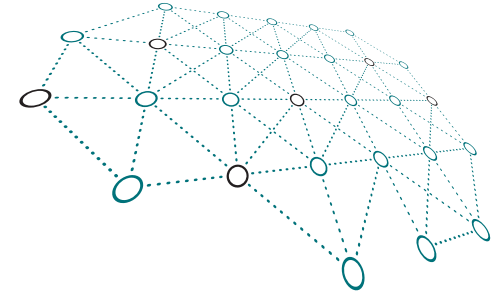


Input fra interessenterne:

- Questionnaire Editor as a separate component
- Support for HL7 questionnaire standards
- Generic questionnaire presentation component



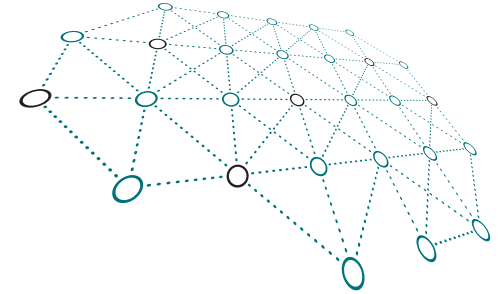
OpenTele3



Principper

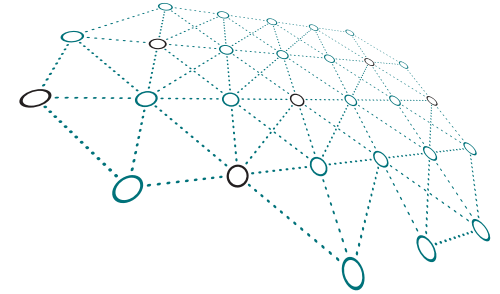


Generelle principper



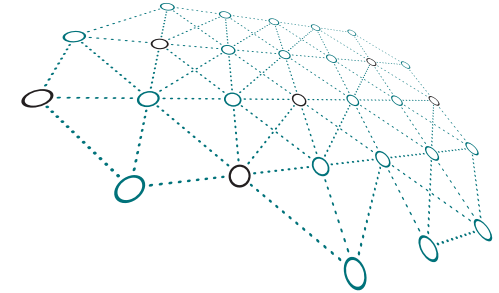
1. Work towards a **microservice architectural** style
2. Use **international standards** for communication and content formats
3. Aim for **cross-platform** support and low platform dependence

Specifikke principper

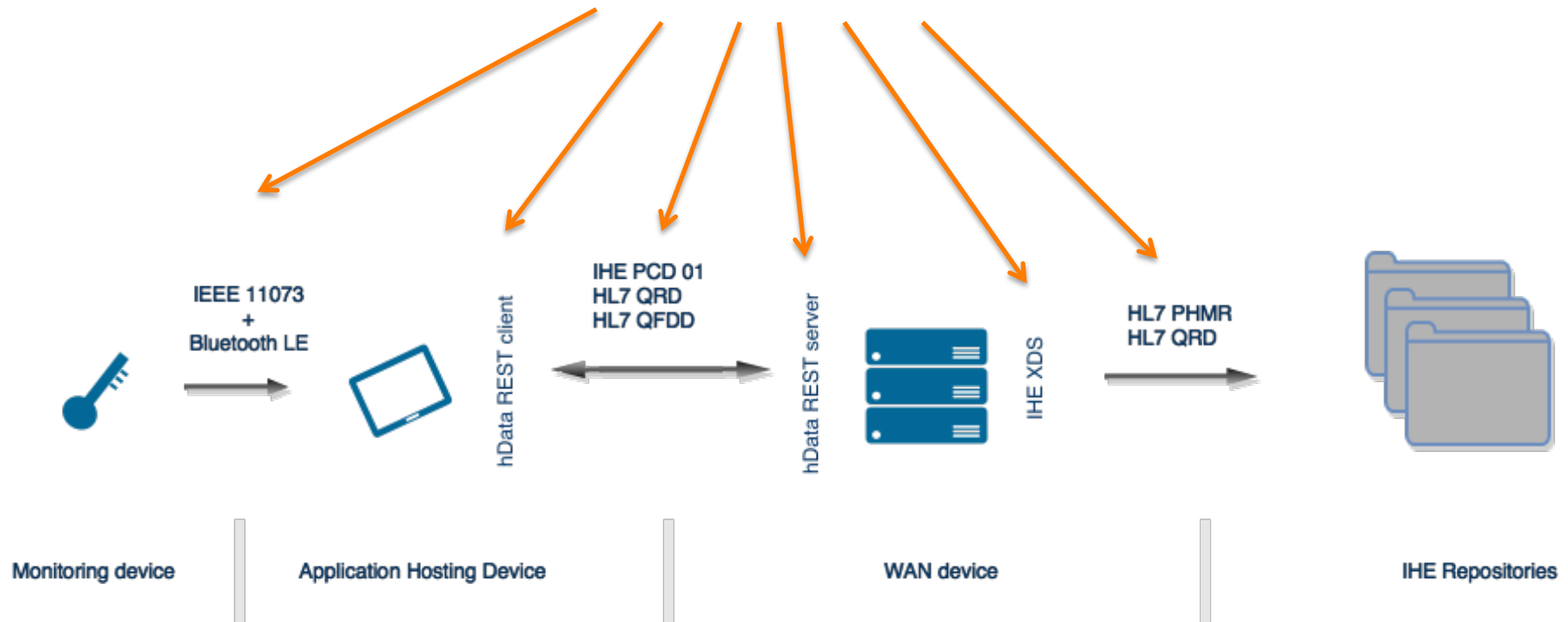


1. Does the national eHealth **reference architectures** say anything?
2. Does the **Continua Design Guidelines** say anything?
3. Does **HL7 FHIR** say anything?
4. If service handles any kind of resource, support a **RESTful interface** based on **hData**

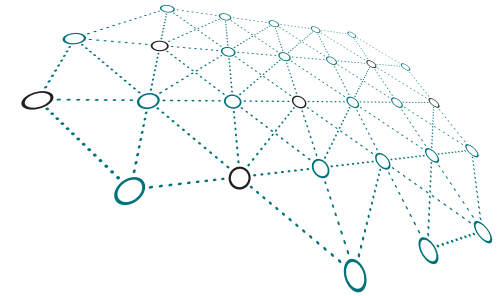
Standarder og principper



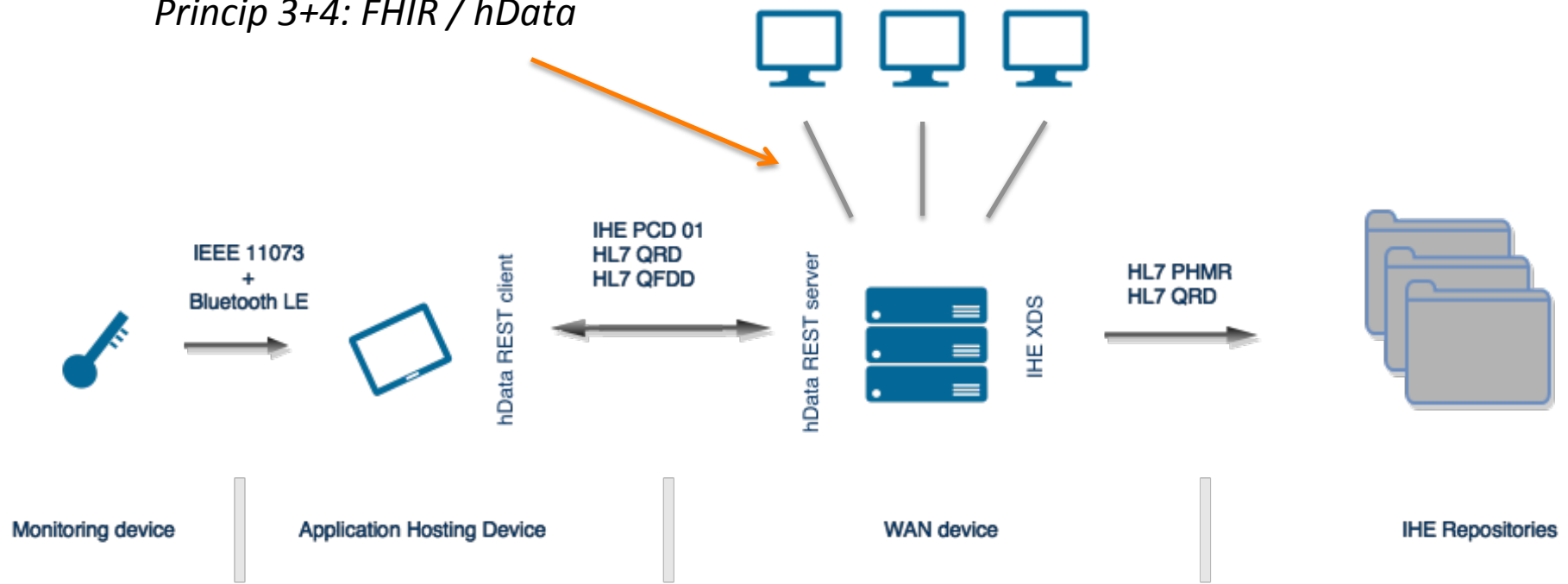
Princip 1+2: Referencearkitekturer + Continua



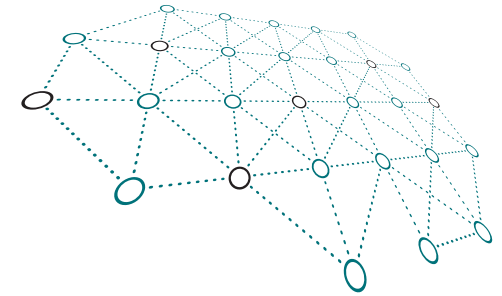
Standarder og principper



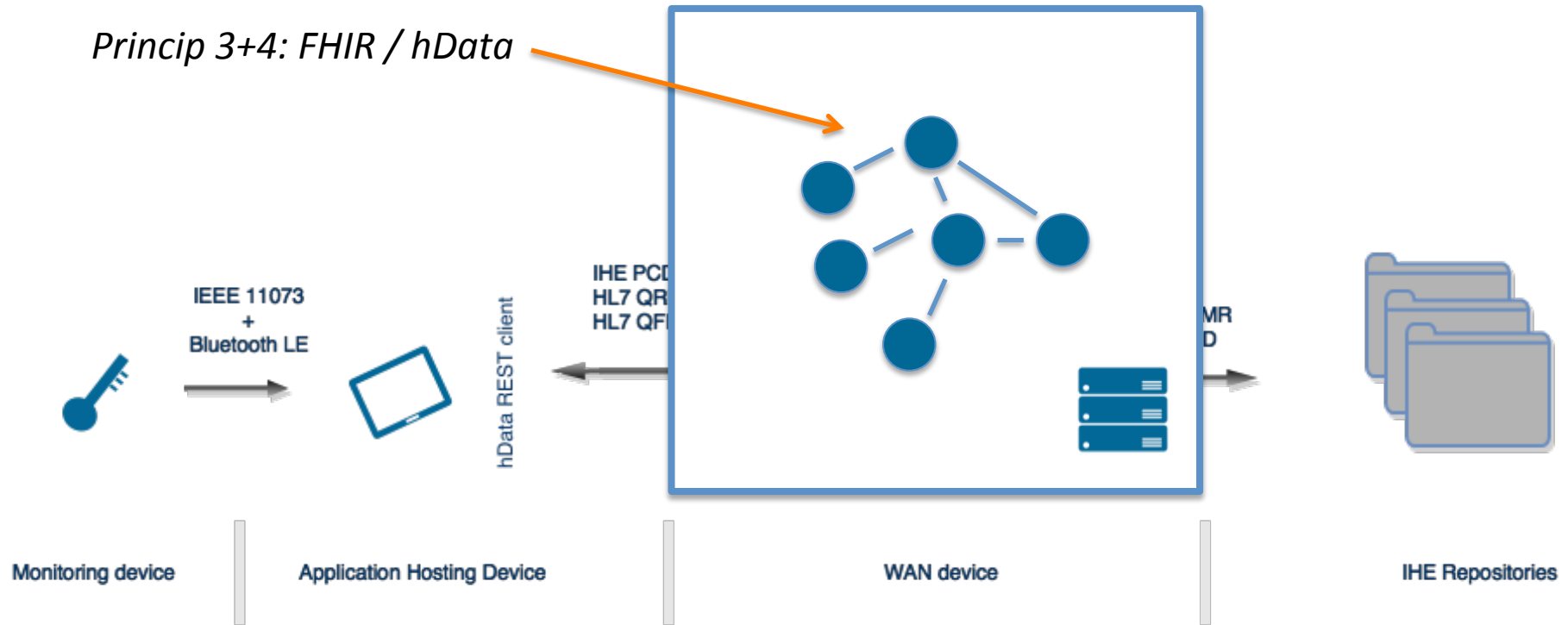
Princip 3+4: FHIR / hData



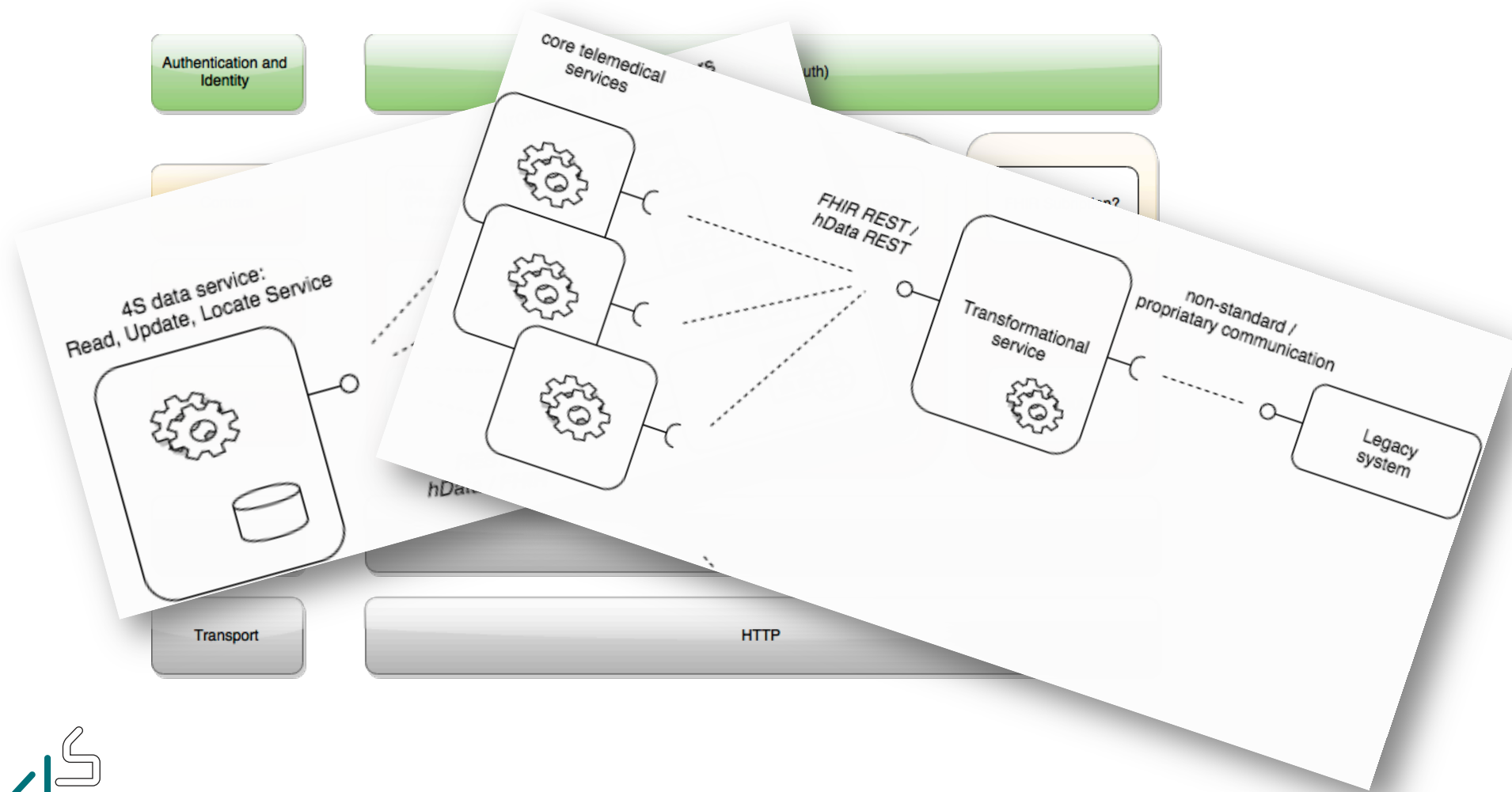
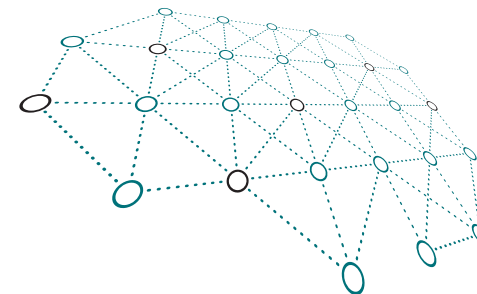
Standarder og principper



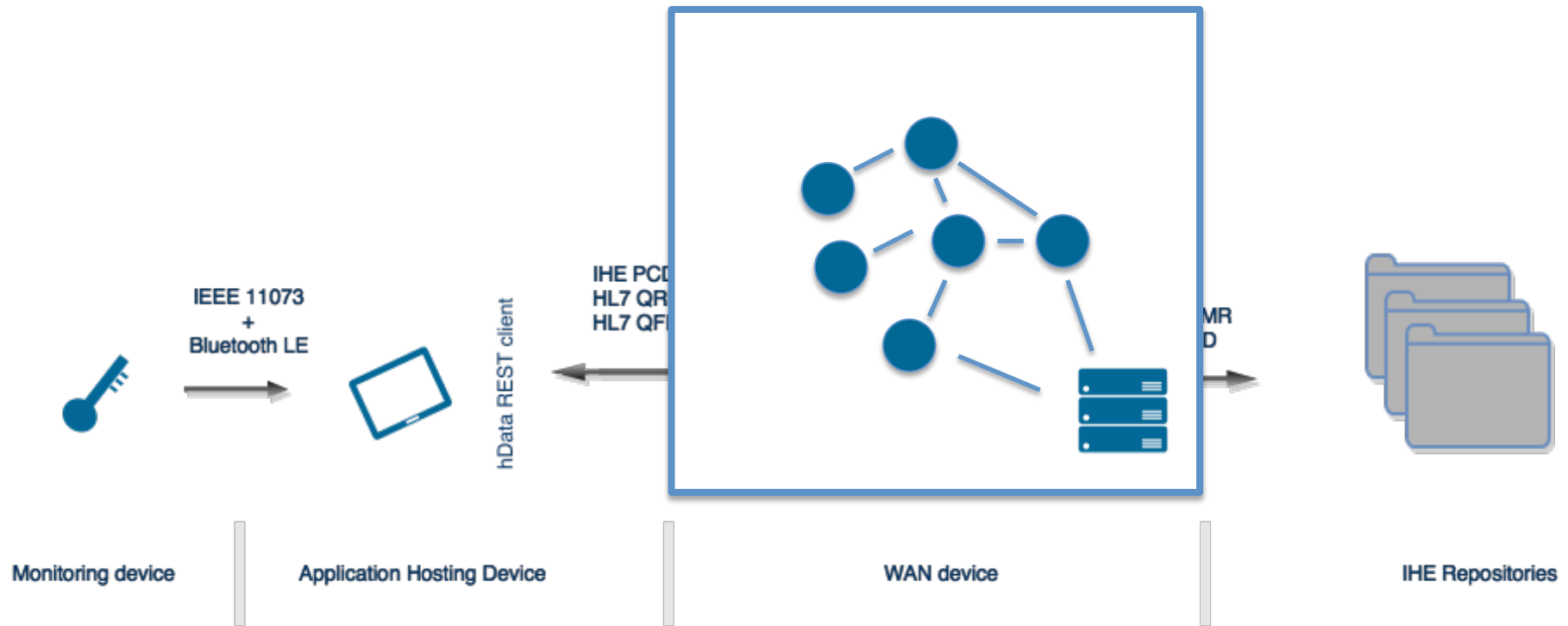
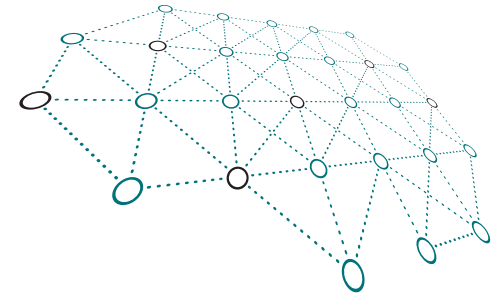
Princip 3+4: FHIR / hData

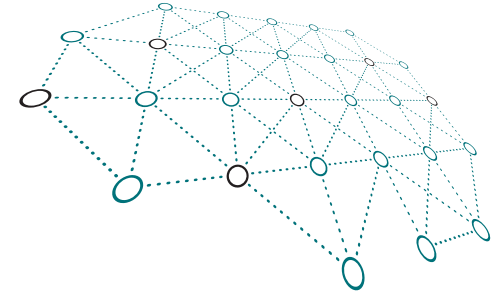


Services



Fra OpenTele2 til 3

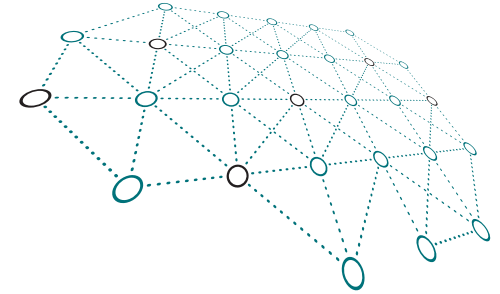




DIALOG OM GOVERNANCE

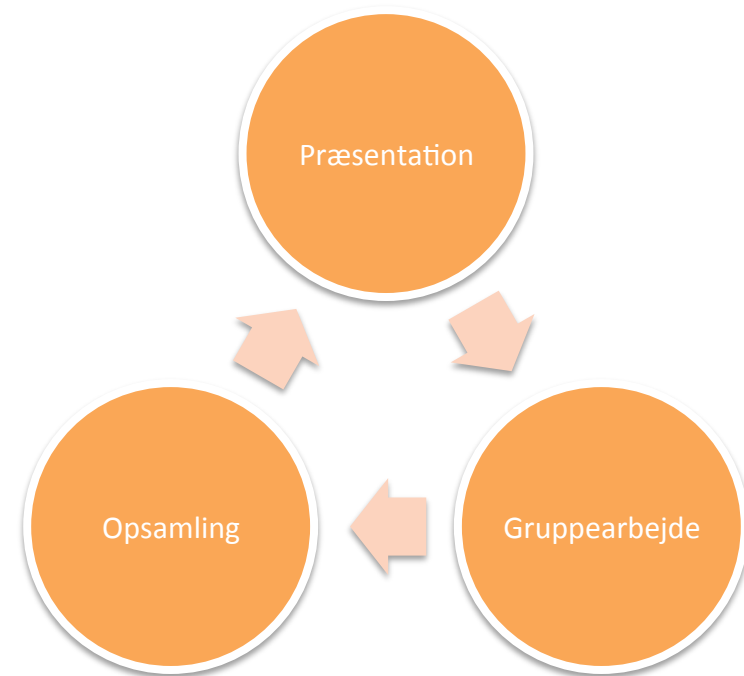


Dialog om governance

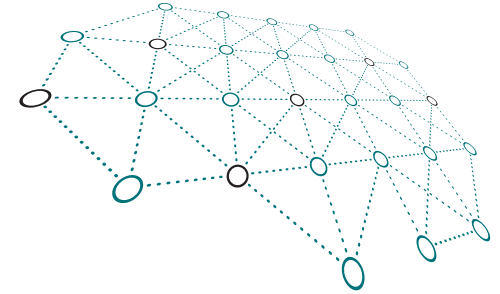


Tre runder:

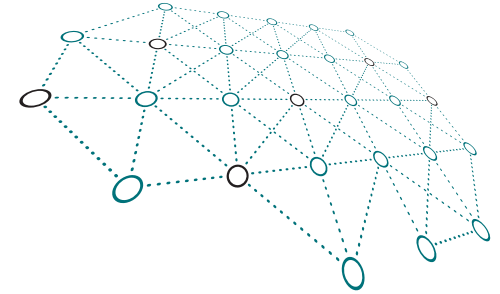
1. Styring af arkitektur og koordinering af udvikling
2. Kvalitetssikring
3. Kontrakter



Cases



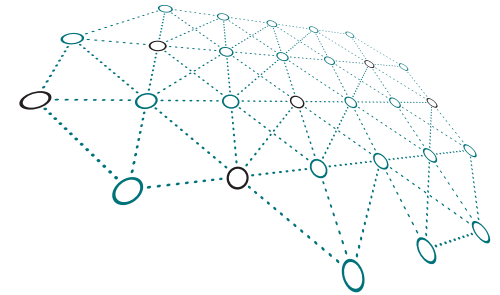
- **Ny klient:**
 - *Udvikling af en klient til iPad*
- **Spørgeskemaer:**
 - *Understøttelse af standarder*
 - *Spørgeskemaeditor som separat modul*
- **Bug:**
 - *Det rapporteres, at de blodtrykstal som klinikerne ser ikke stemmer overens med borgernes målinger*



STYRING AF ARKITEKTUR OG KOORDINERING AF UDVIKLING



OpenTele3 eksemplet



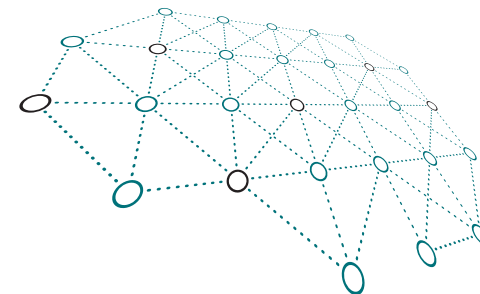
- Principles and guidelines
- Key services & components
- Standards for communication and content



1. Stakeholders **feedback** and proposals for **prioritisation**.
2. Feedback, prioritisation and concrete plans are consolidated into a **roadmap**.
3. Roadmap realisation broken into two parts:
 1. The most concrete parts can go directly to **procurement and product realisation**
 2. Less concrete parts benefit from cycles of **exploratory development** feeding into procurements and product development processes.



Roadmap



- Et værktøj til planlægning og koordinering
- Hvad sker på kort og lang sigt og hvad er rammerne?

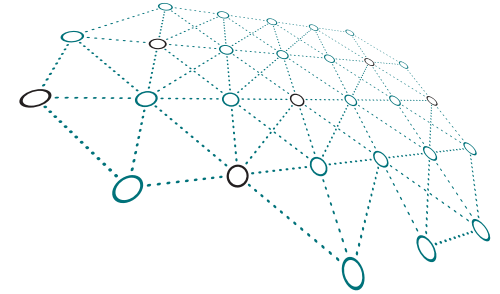
Bør være

- Flexibelt og åbent nok til at rumme exploratorive og agile udviklingsprocesser
- Konkret og afgrænsende nok til at fungere som en ramme for planlægning

Kan f.eks. indeholde

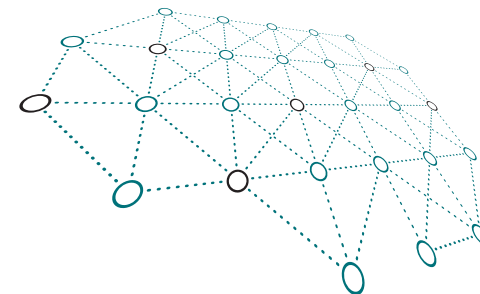
- Use cases, scenarer og overordnede krav
- Strategiske og kritiske fokusområder
- Konteksten for fokusområderne (legacy, standarder, tech.drivers,...).
- Overordnede muligheder og alternativer indenfor fokusområderne
- anbefalinger med overordnet timing / tidsramme

4S Softwaregruppen

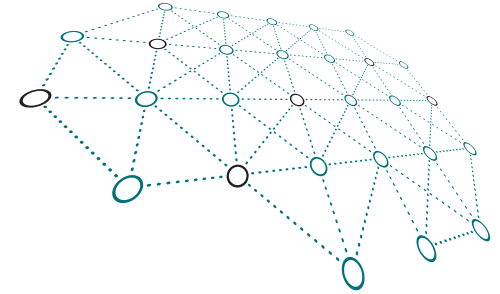


- Ønsker oversigt over:
 - Hvad *er* lavet
 - Hvad er *på vej*
 - Hvad er “*boblerne*”
 - og hvem er interesserede?
- Beskrivelse af idé/komponent:
 - hvad er det?
 - hvorfor er det en god idé?
 - hvilke afhængigheder er der?

Styring af arkitektur og koordinering af udvikling



- Dit firma er ved at sælge udviklingen af ny komponent til en region. Regionen siger du bør inddrage 4S fra starten. Hvordan kommunikerer i om løsningsdesign?
- En kommune kontakter 4S og vil gerne have udviklet en iPad klient. 4S vil gerne diskutere designidéer. Hvordan deltager dit firma i diskussionen.



4S VÆRKTØJER OG HJEMMESIDE



Værktøjer

Online fora

STIFTELSEN FOR SOFTWAREBASEREDE SUNDHEDSSERVICES

Developer discussions

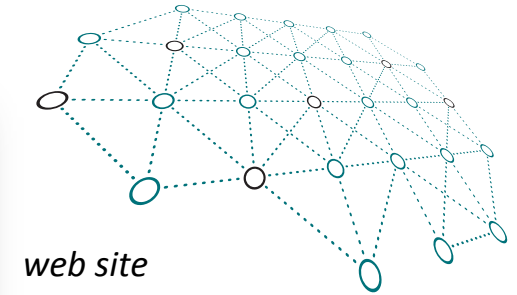
This forum contains 16 topics and 66 replies, and was last updated by Ayat 4 days, 4 hours ago.

Viewing 15 topics - 1 through 15 (of 16 total)

Topic	Voices	Posts	Freshness
Server specifications	1	1	4 days, 4 hours ago
OpenTele deployment diagram	2	4	3 weeks, 2 days ago
Communication between HTML5 static webpage and OpenTele citizen server	2	2	1 month ago
Deployment of opentele-server	3	17	1 month ago
OpenTele communication type and accu-check	4	5	1 month ago
Problem with opentele-server and opentele-citizen-server	2	4	2 months, 3 weeks ago
Devhush with android.html client			9 months ago

Jenkins

S	W	Name	Last Success	Last Failure
		4SDC Documentation	2 mo 26 days - #51	2 mo 26 days - #51
		master-kih-auditlog	1 yr 0 mo - #9	N/A
		master-opentele-android-client	1 yr 0 mo - #50	N/A
		master-opentele-server	11 mo - #18	1 yr 0 mo - #12
		Net4Care PHMR Builder	3 mo 16 days - #55	N/A
		OpenTele2-Client-Android.html	1 mo 11 days - #31	8 days 4 hr - #32
		OpenTele2_citizen_server	1 mo 11 days - #10	6 days 6 hr - #12
		OpenTele2_Client_Android_native	1 mo 11 days - #12	3 mo 16 days - #1
		OpenTele2_clinician_server	1 mo 11 days - #18	8 days 3 hr - #19
		OpenTele2_Server_Builder_kih_auditlog	1 mo 11 days - #22	8 days 3 hr - #23
		OpenTele2_Server_Builder_server_core_plugin	1 mo 11 days - #6	6 days 6 hr - #2
		opentele3_questionnaire_test	2 mo 11 days - #142	2 mo 17 days - #139



web site

4S - Organisationen
Hvad vil 4S?
4S vil gøre det lettere at arbejde med sundhedsdata på tværs af sektorer og leverandere. 4S fokuserer på at lette arbejdet med at skabe og afprøve telemedicinske løsninger som baseret på internationale standarder som HL7/FHIR og IHE/XDS.

4S - Net4Care
Net4Care er en udviklingsplatform, der gør det nemmere at skabe sundhedsdata sammen på tværs af sektorer og leverandere. Net4Care har især fokus på at lette arbejdet med at skabe og afprøve telemedicinske løsninger som baseret på internationale standarder som HL7/FHIR og IHE/XDS.

4S - OpenTele
OpenTele er en telemedicinsk platform til opsætning af sundhedsdata. OpenTele består af en server og en klient på en Android tablet. Klienten betjenes typisk af en borger, og bruges til kommunikation og opsætning af sundhedsdata fra medicinsk rådgivning, som biotrykplastre o.l. Måltid data registreres og sendes via klienten til en OpenTele server. Data på OpenTele serveren kan ses via en webportal ligesom af alle relevante sundhedsfagligt personale på sygehuse.

Jira

wiki

Welcome to the OpenTele Wiki

- Welcome to the OpenTele Wiki
 - User manual
 - Where to start
 - Working with the software as a developer
 - Prerequisites
 - Building
 - Configuration
 - Debugging
 - Tomcat
 - Useful links
 - Defects and features

IMPORTANT: The OpenTele project is NOT a medical product and should not be used as a source of inspiration for developers that wants to use the tech

The OpenTele project is made to promote the use of Tele medicine, by illustrating

git + Bitbucket

OpenTele

Component	Lead	Description
Android application		The Android application
Documentation		Homepage/wiki
KIH Auditlog		The KIH Auditlog plugin
Server		The server
Testing		The tests them self, not failures in code when tests are performed

4S Team since January 2014

- www: Source for our website at 4s-online.dk
- opentele-server: Updated 4 days ago
- opentele-client-android: Updated 2014-02-13
- kih_auditlog: Updated 2014-02-17
- 4s.bitbucket.org: The 4S technical website
- wiki: Placeholder for the shared wiki

+ LinkedIn grupper ("4S" og "OpenTele")