DevDays 10th Edition

HL7® FHIR® DevDays

NOV | 2020

Your Data in FHIR

How to create a scalable solution

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HL7 FHIR DevDays 2020, Virtual Edition, November 17–20, 2020 | @FirelyTeam | #fhirdevdays | www.devdays.com/november-2020

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Firely provides all the software, tools, and training you need to bring FHIR to life

https://fire.ly

Simplifier.net

Forge

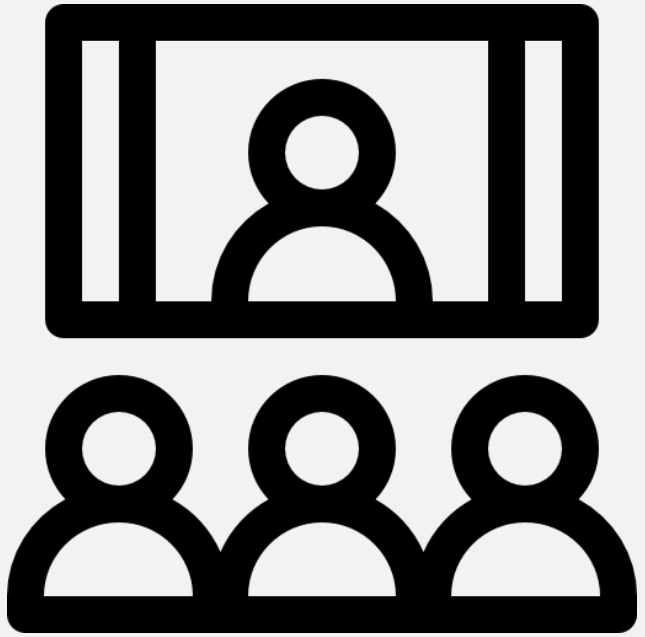
Vonk
(soon to be Firely Server)

FHIR Mapper

Firely .NET SDK

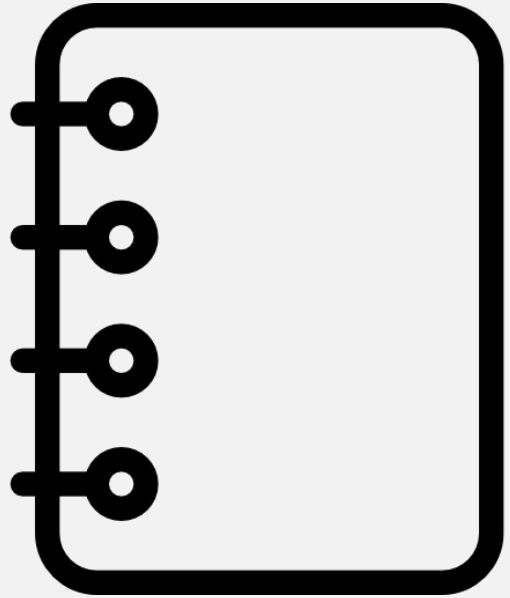
Audience

- High level
- Architects
- Integrators
- No code involved



Agenda

- Use case
- Scalable solutions
- Questions (and maybe answers)



The Question

You have data and want to expose it in FHIR

Data and usage will grow over time

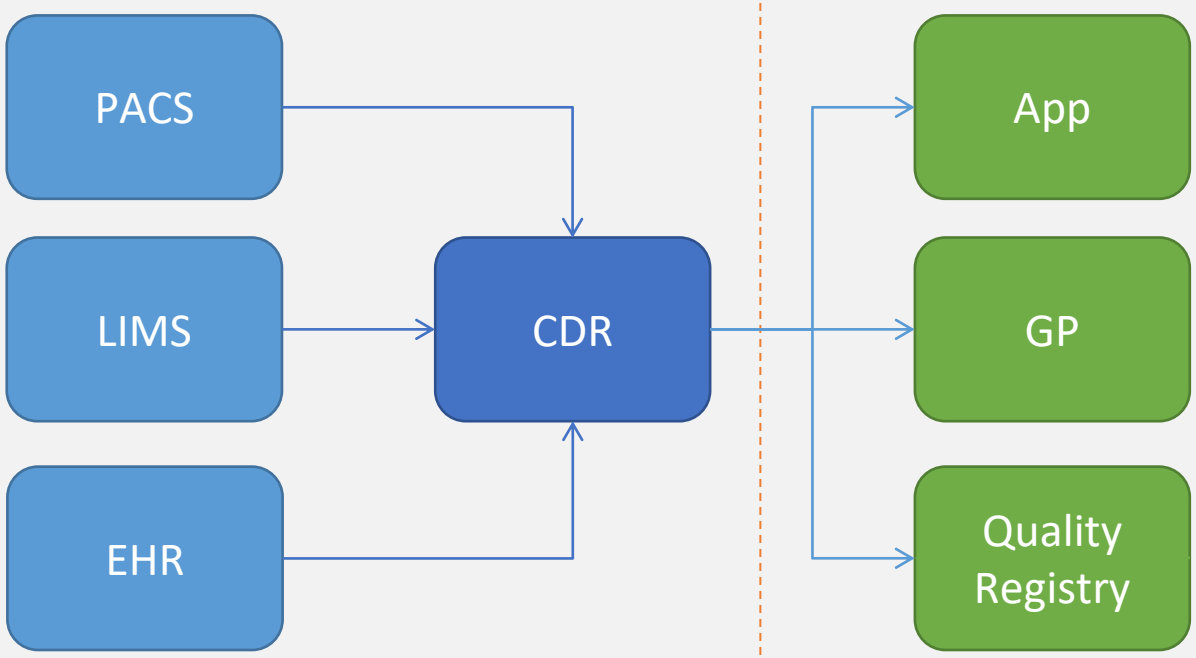
How to create a scalable solution?

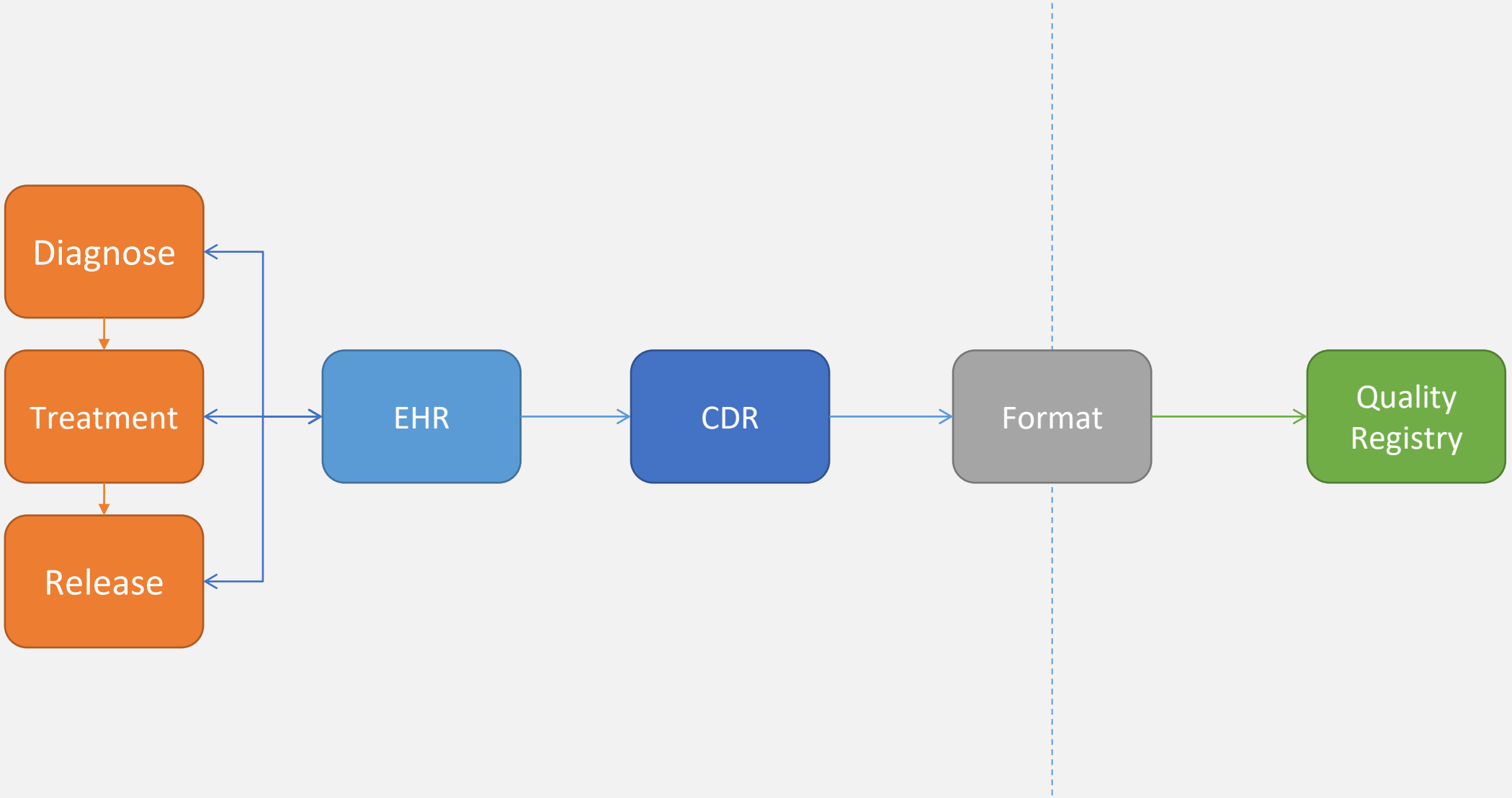
Expose existing data as FHIR

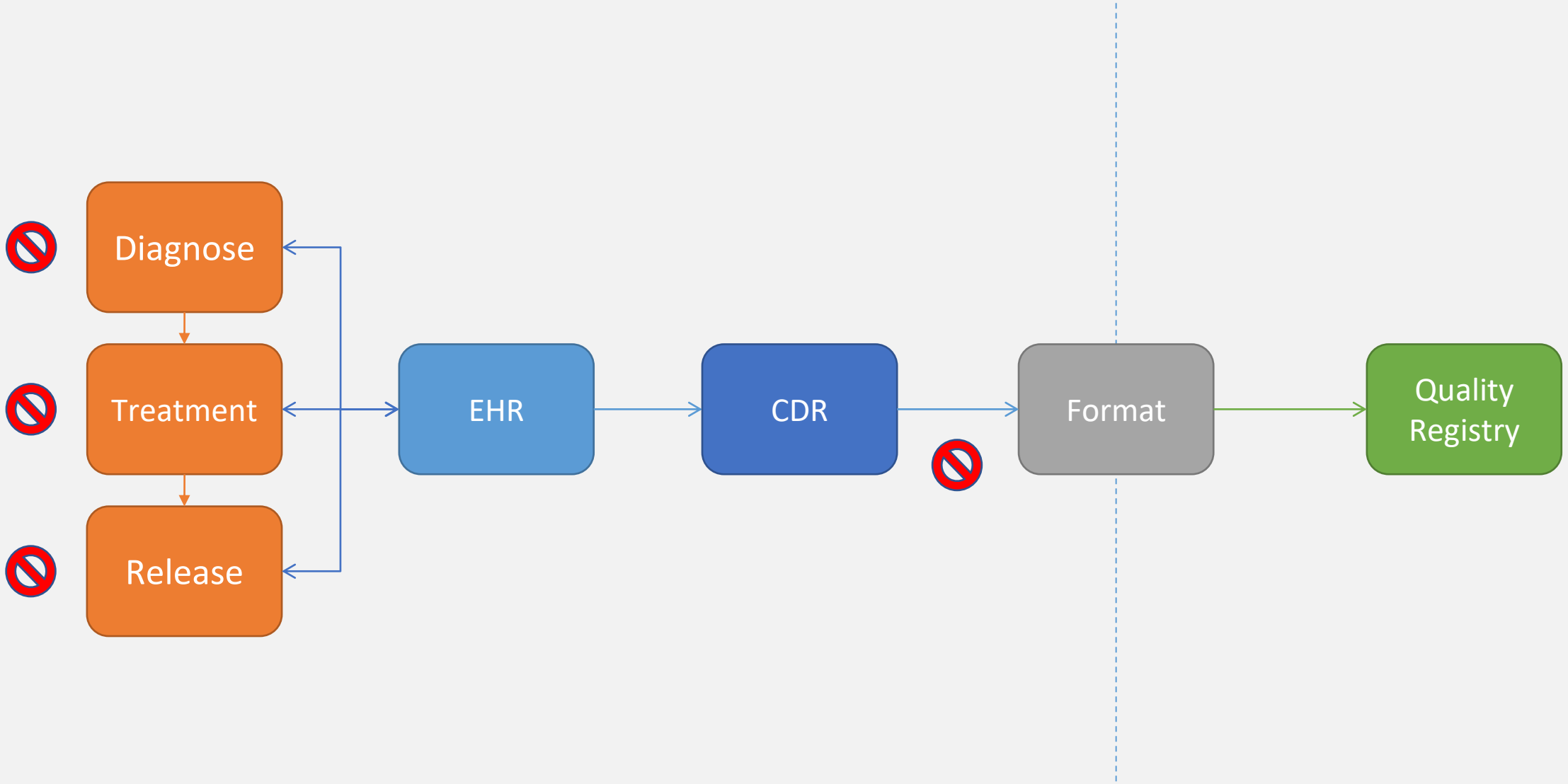
- Government regulations (ONC/CMS)
- Personal Health Environment
- Quality registries

Accept FHIR data

- Patient transfer (CMS, payer-to-payer DEX)
- Enable app developers
- Health information exchange
  - General practitioners
  - Dentists
  - Pharmacists


PACS
LIMS
EHR
CDR
App
GP
Quality Registry


Diagnose
Treatment
Release
EHR
CDR
Format
Quality Registry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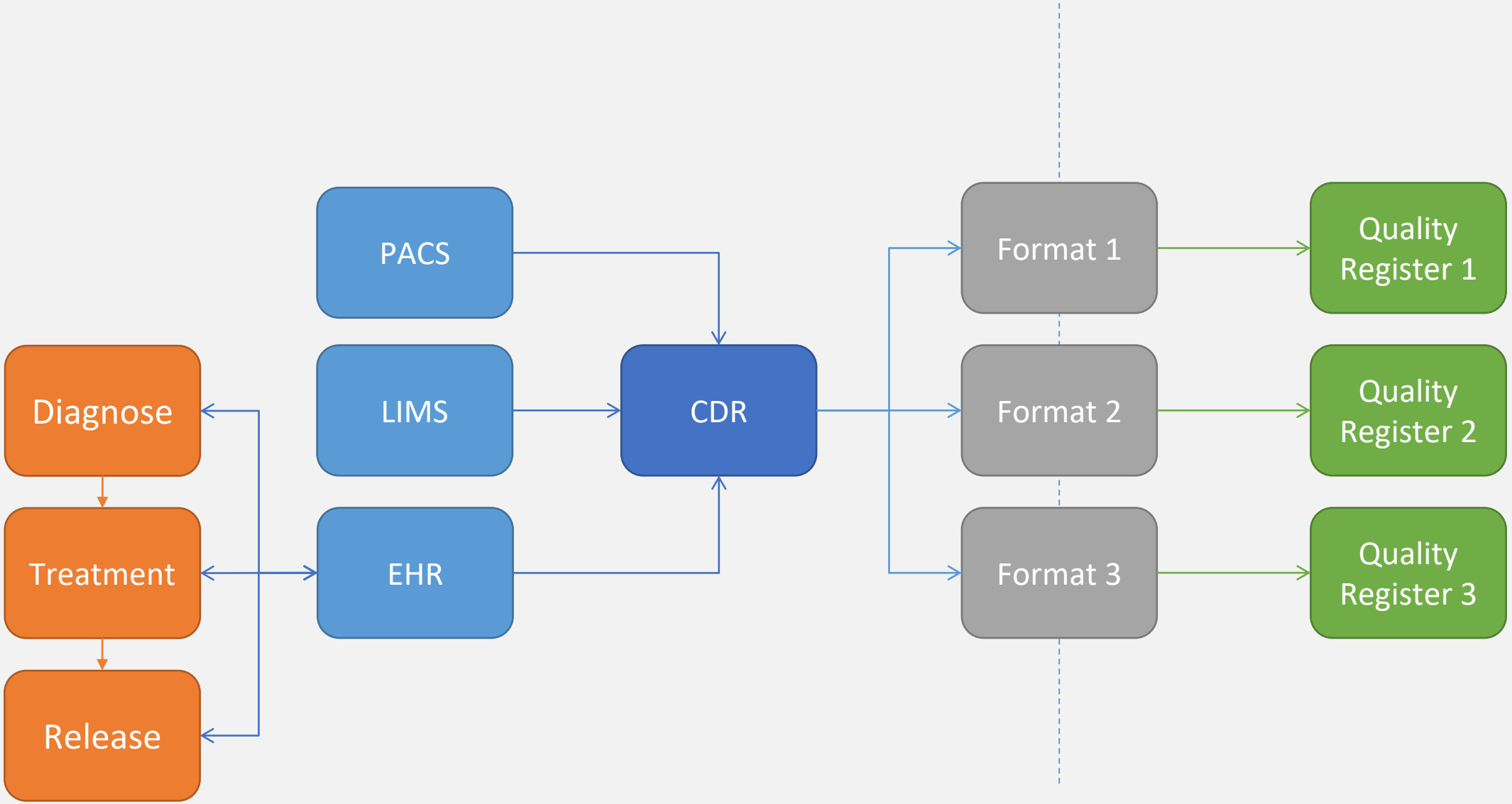
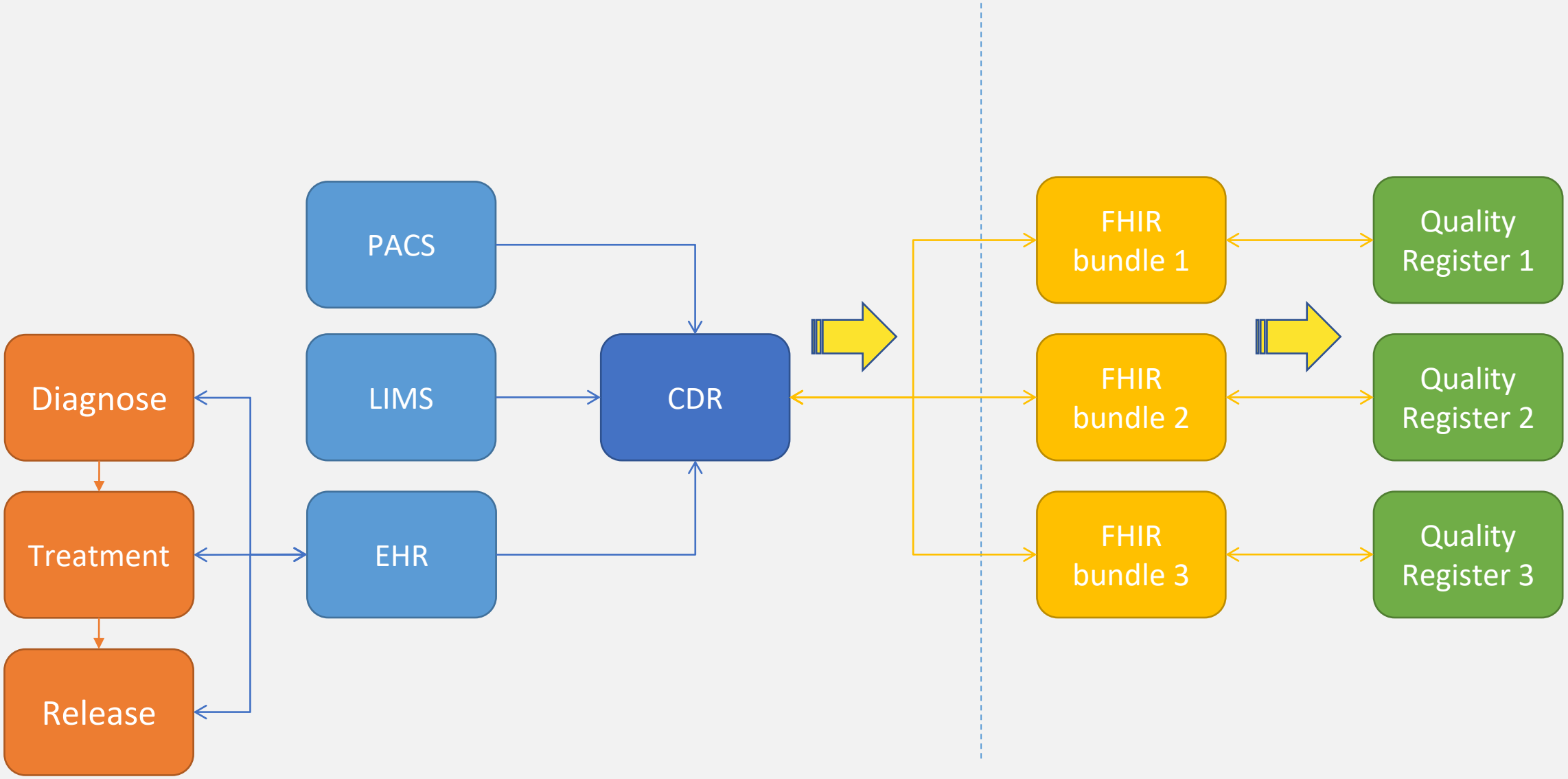
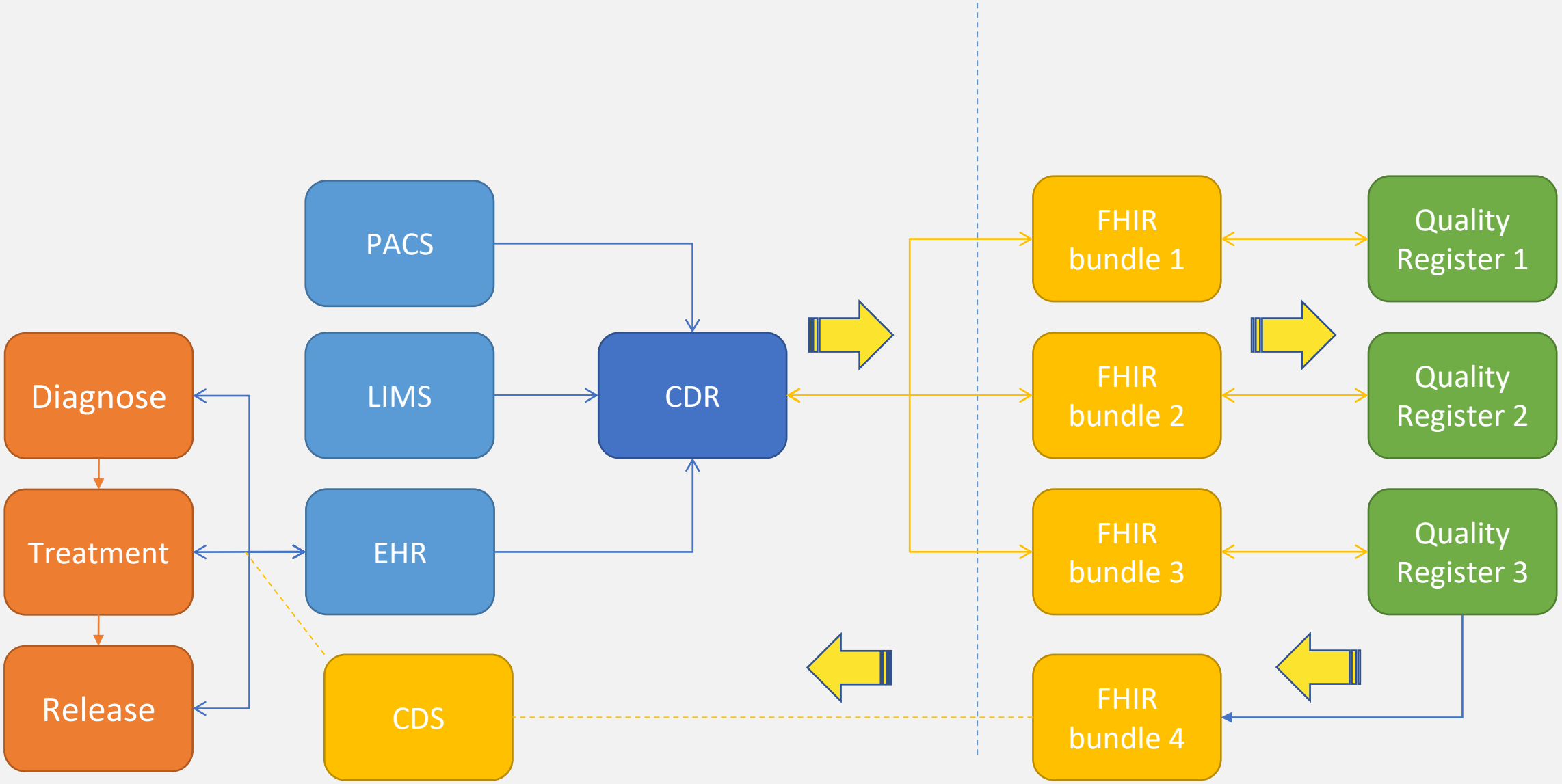

PACS
LIMS
EHR
CDR
Diagnose
Treatment
Release
Format 1
Format 2
Format 3
Quality Register 1
Quality Register 2
Quality Register 3


PACS
LIMS
EHR
CDR
Diagnose
Treatment
Release
FHIR bundle 1
FHIR bundle 2
FHIR bundle 3
Quality Register 1
Quality Register 2
Quality Register 3


PACS
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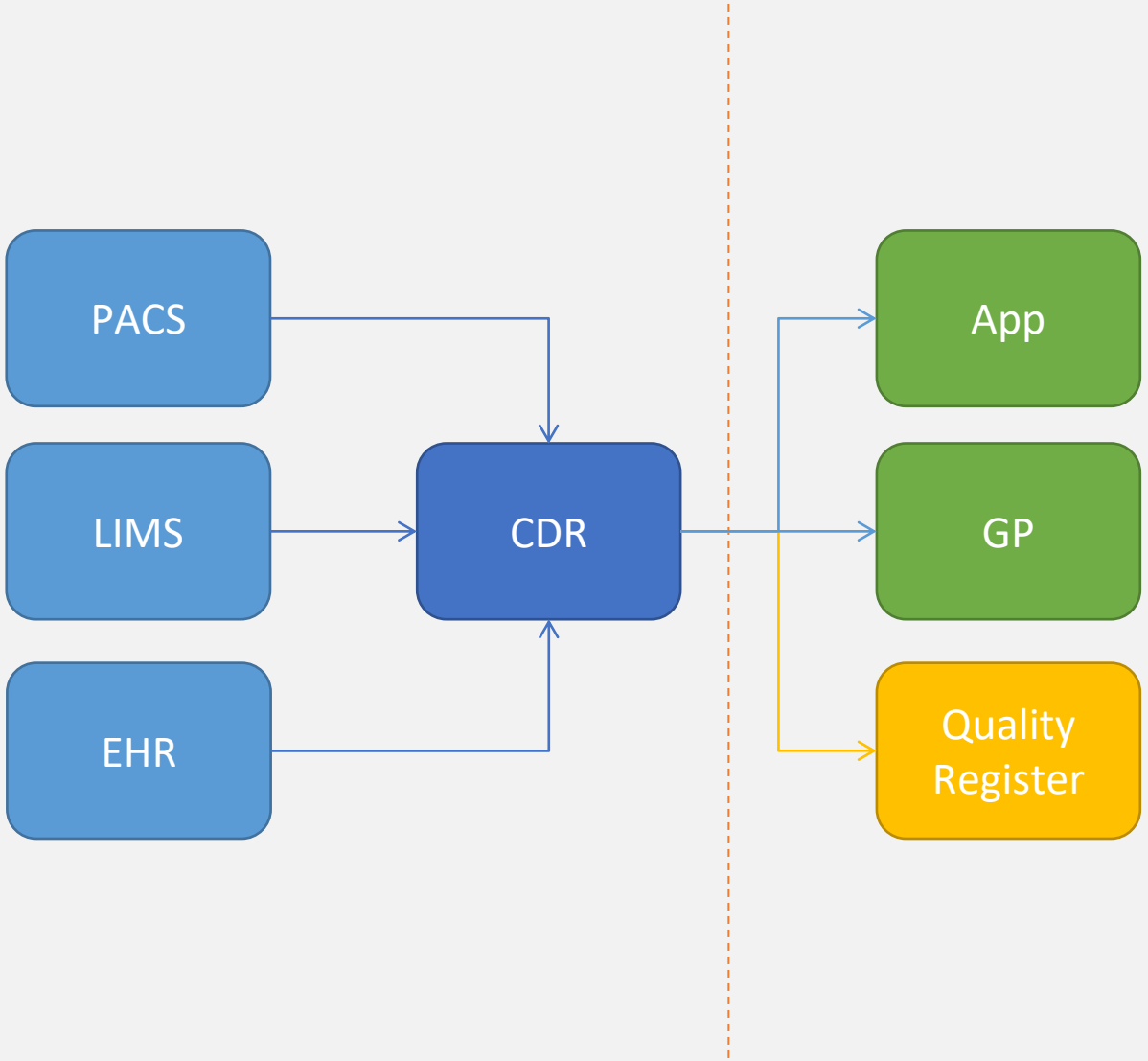
EHR
CDR
Diagnose
Treatment
Release
CDS
FHIR bundle 1
FHIR bundle 2
FHIR bundle 3
FHIR bundle 4
Quality Register 1
Quality Register 2
Quality Register 3


PACS
LIMS
EHR
CDR
App
GP
Quality Register

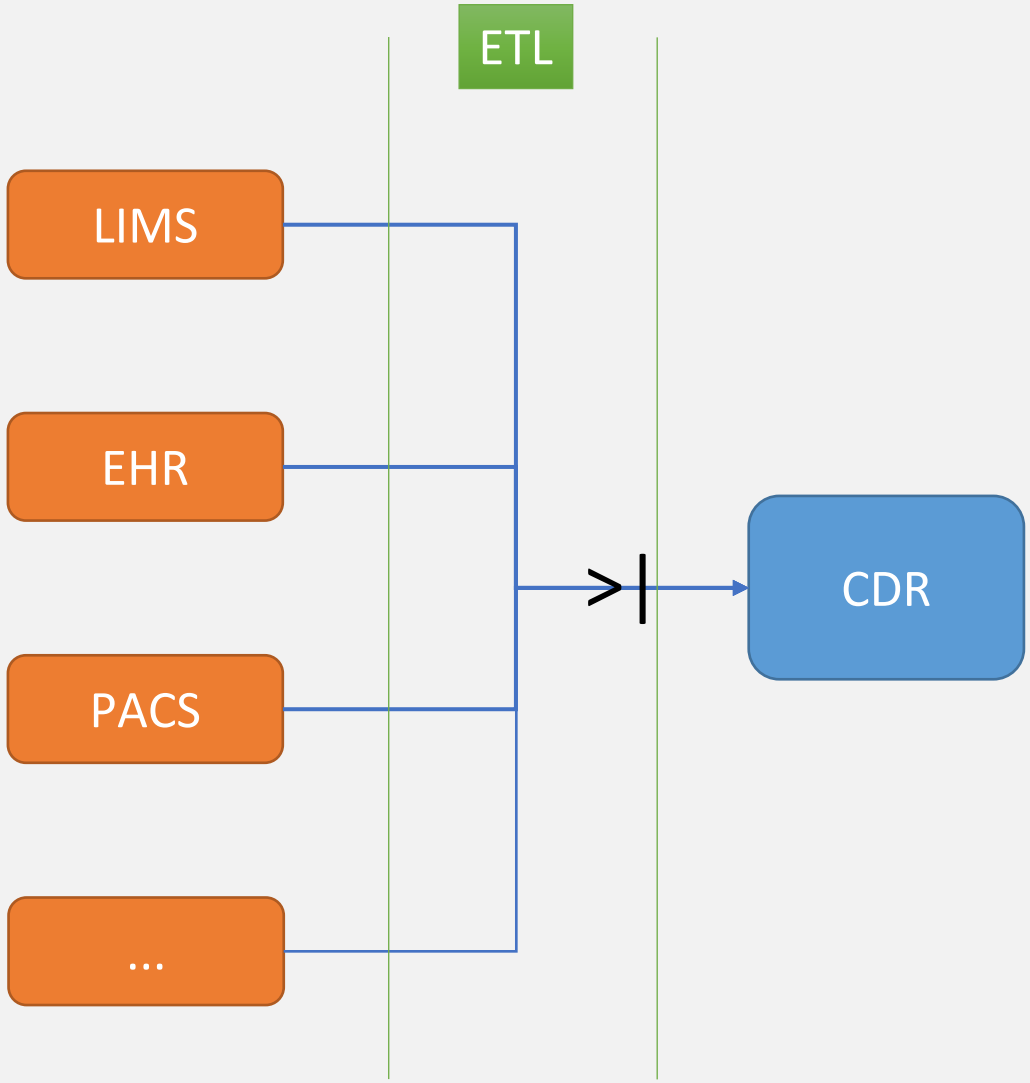
Requirements summary

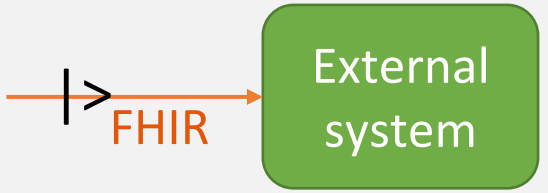
- Handle growth of data within a use case
- Handle increase in use cases
- Data transformation
- Data validation
- Data filtering

Set the scene

- Many organisations already aggregate their data in e.g. a CDR
  - Database level integration
- HL7 v2 messages exchange
  - Often a system's only information exchange mechanism
- (C)CDAs available
  - Potentially duplicate info

Context





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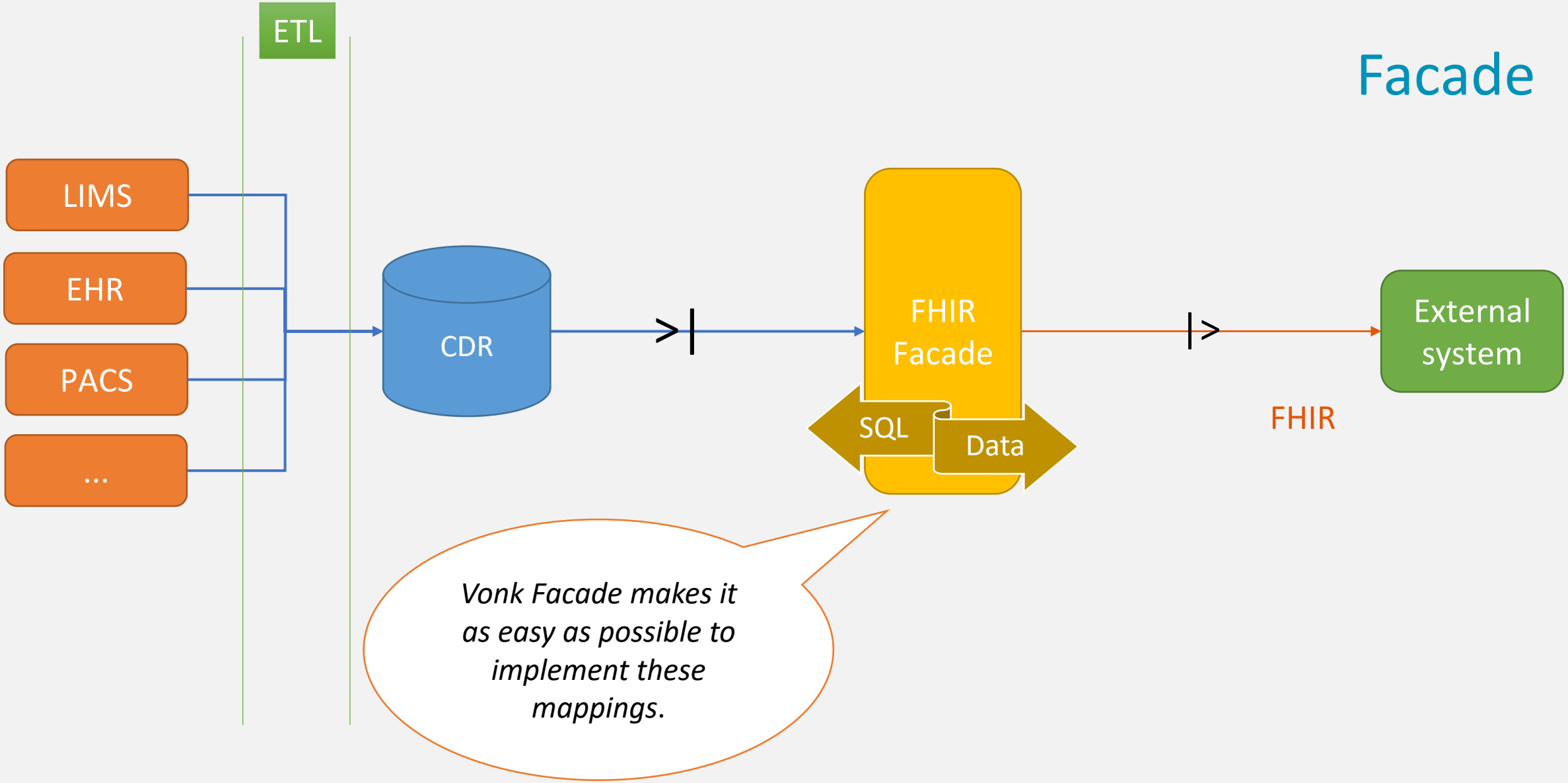
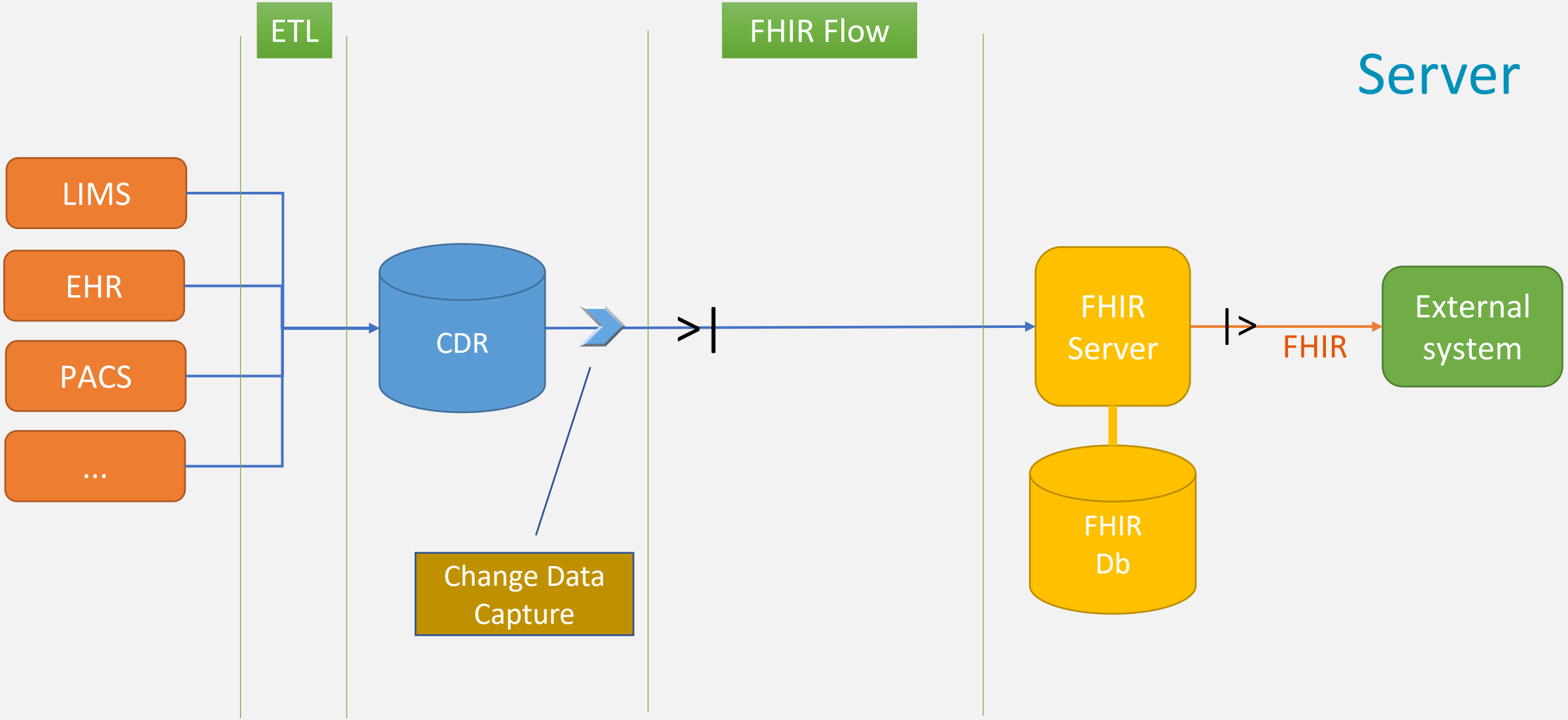
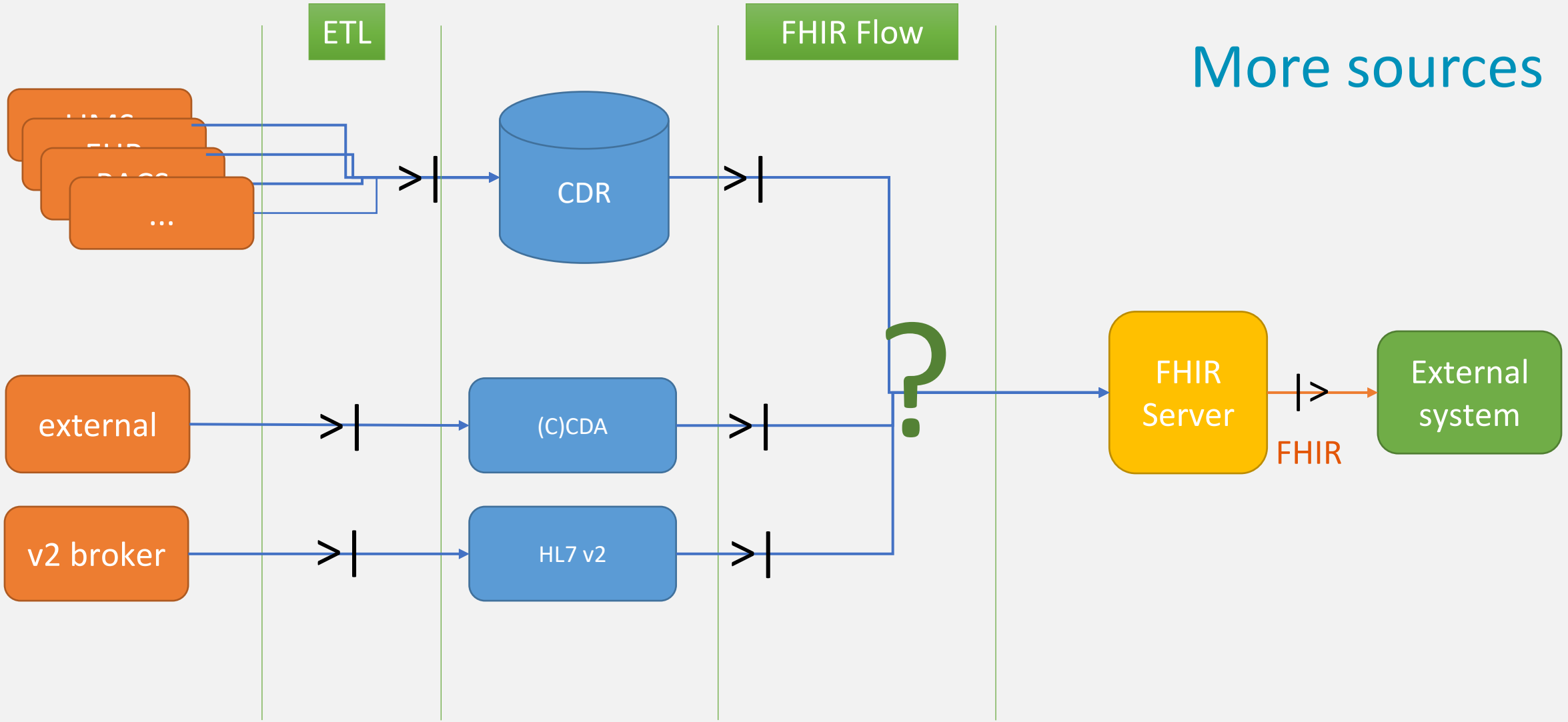
|> pull

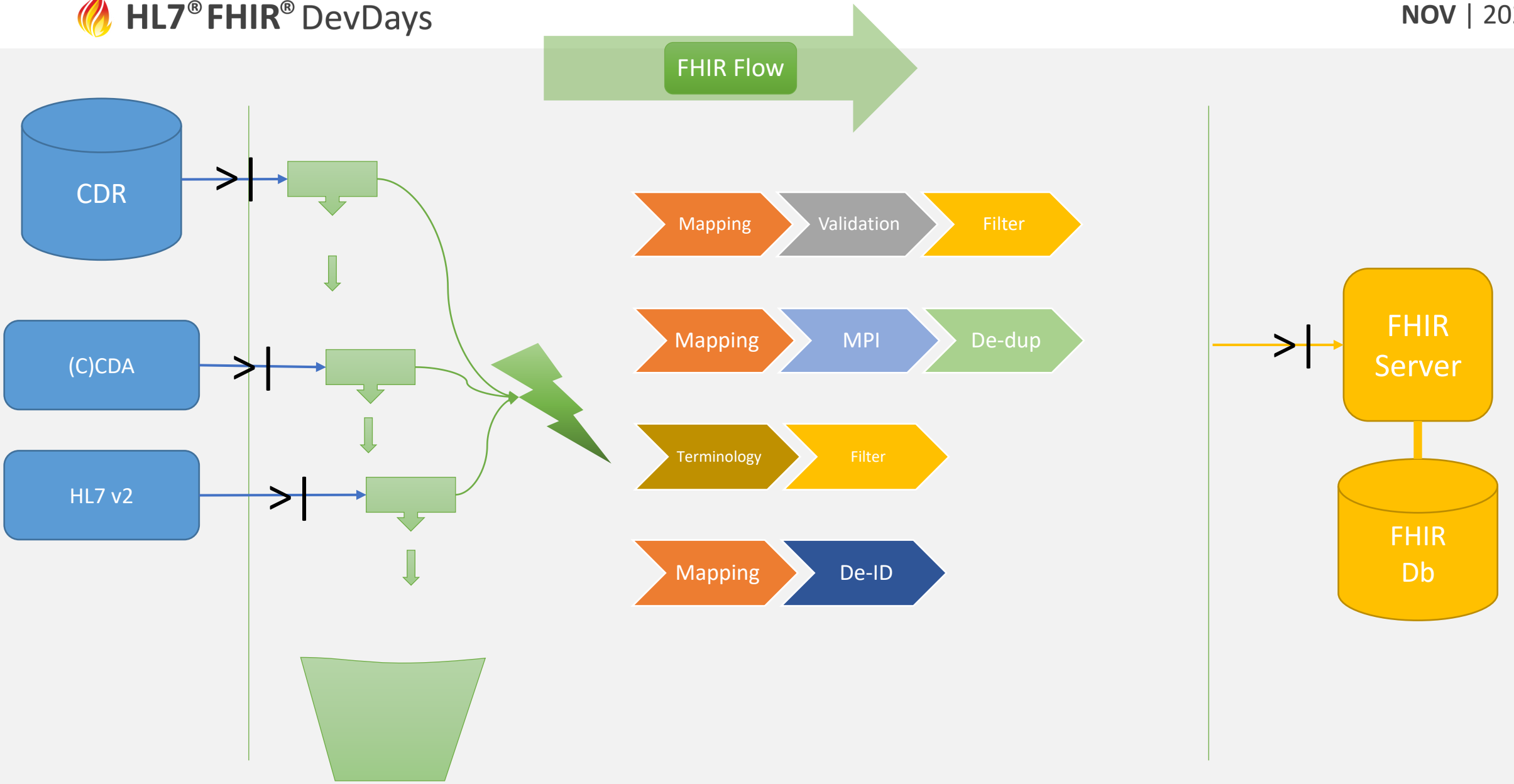
Facade


ETL
LIMS
EHR
PACS
...
CDR
FHIR
Facade
SQL
Data
External
system
FHIR
Vonk Facade makes it as easy as possible to implement these mappings.


ETL
FHIR Flow
Server
LIMS
EHR
PACS
...
CDR
Change Data Capture
FHIR Server
FHIR Db
FHIR
External system

More sources

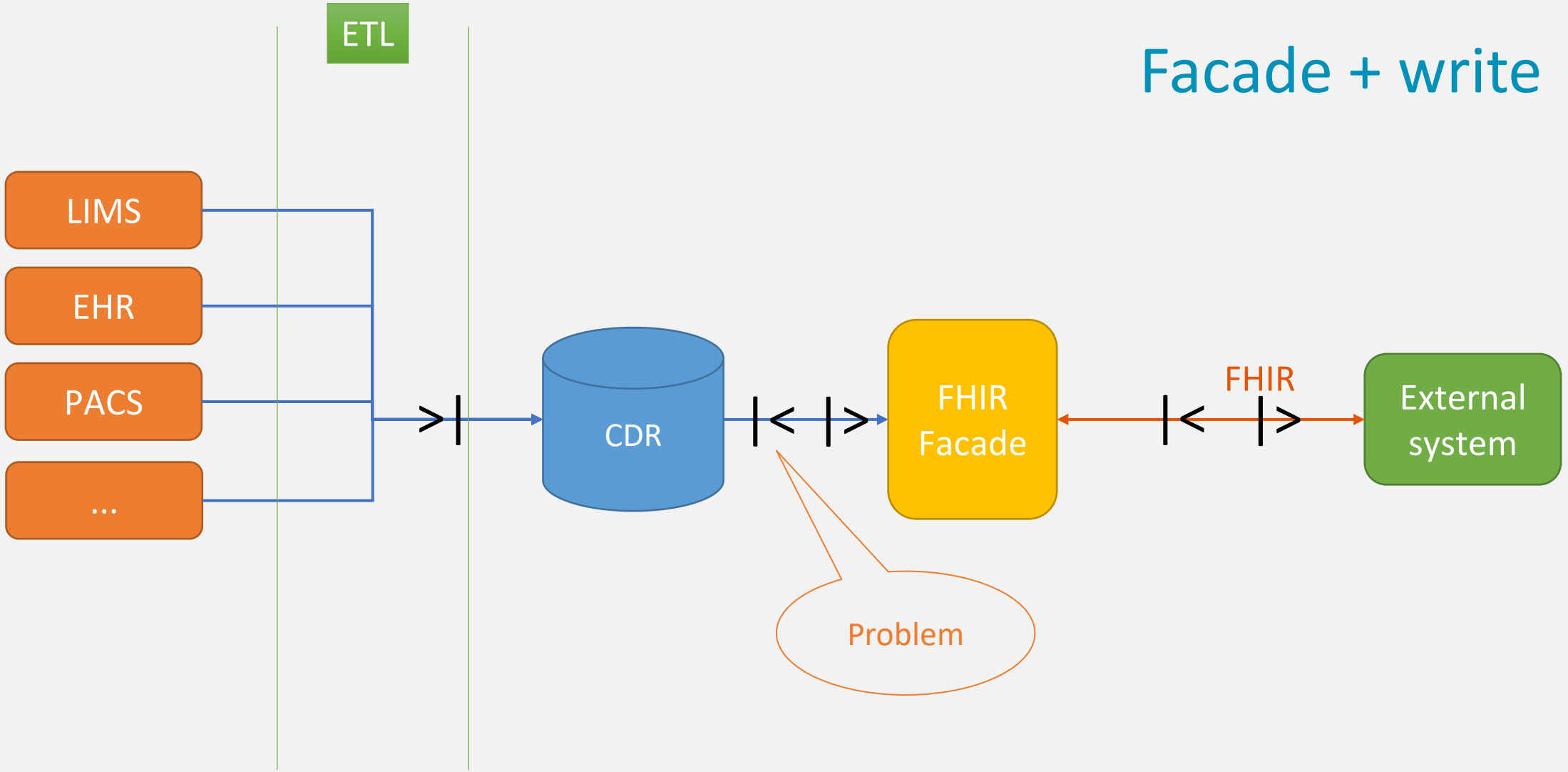



FHIR Flow
CDR
(C)CDA
HL7 v2
Mapping
Validation
Filter
Mapping
MPI
De-dup
Terminology
Filter
Mapping
De-ID
FHIR Server
FHIR Db

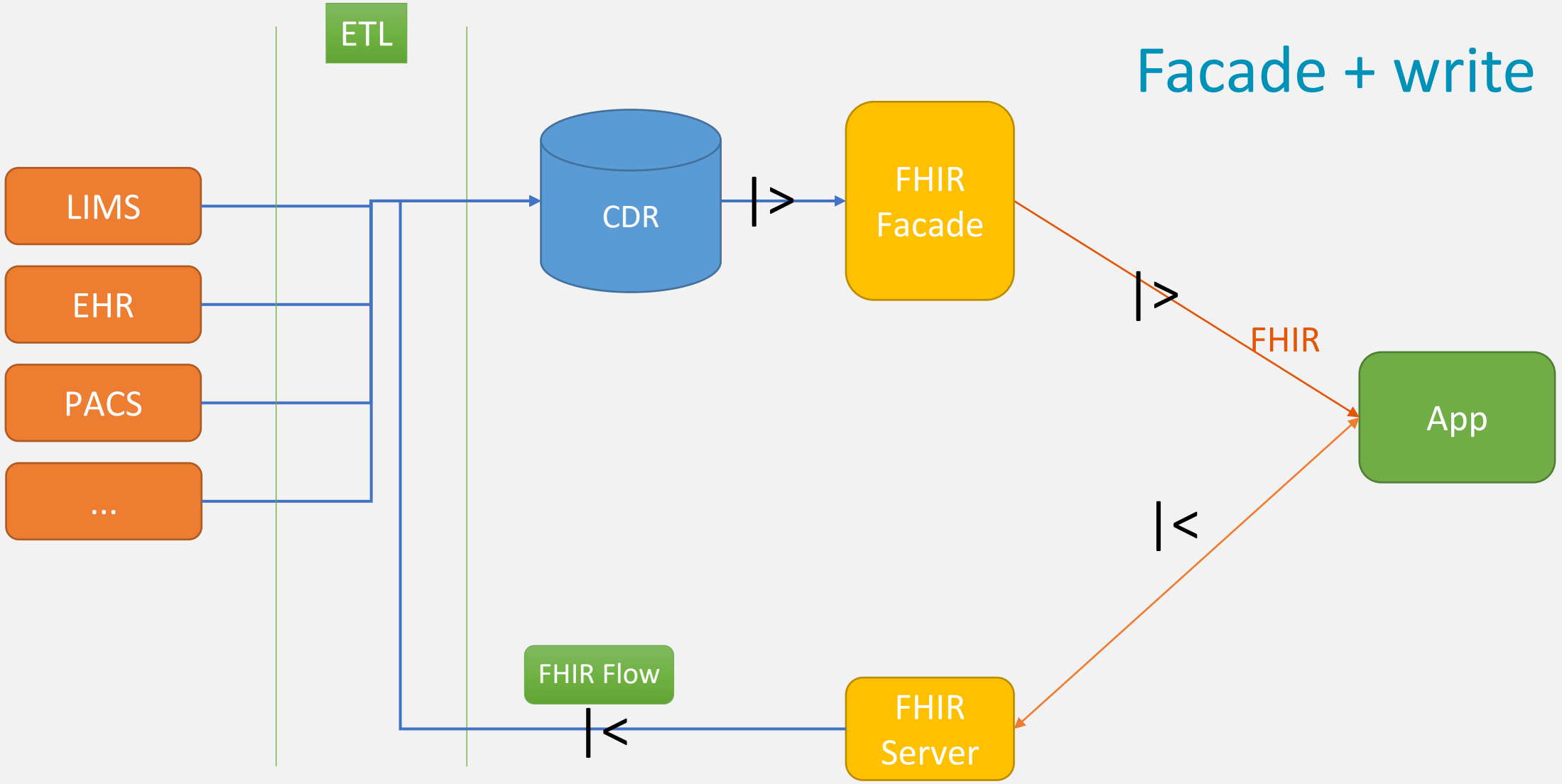
Set the scene

- An app needs to *write* data in FHIR
- And read existing data

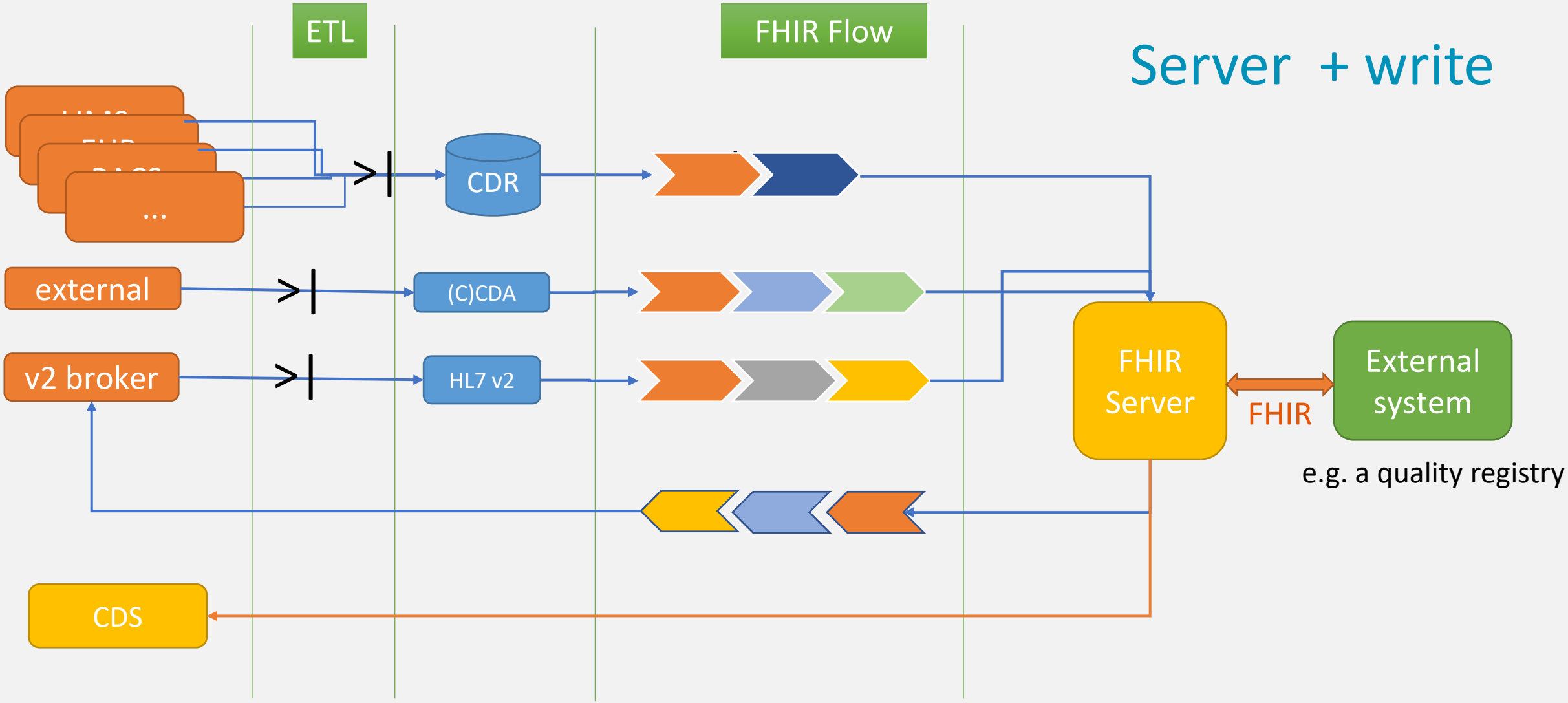
Facade + write



Facade + write

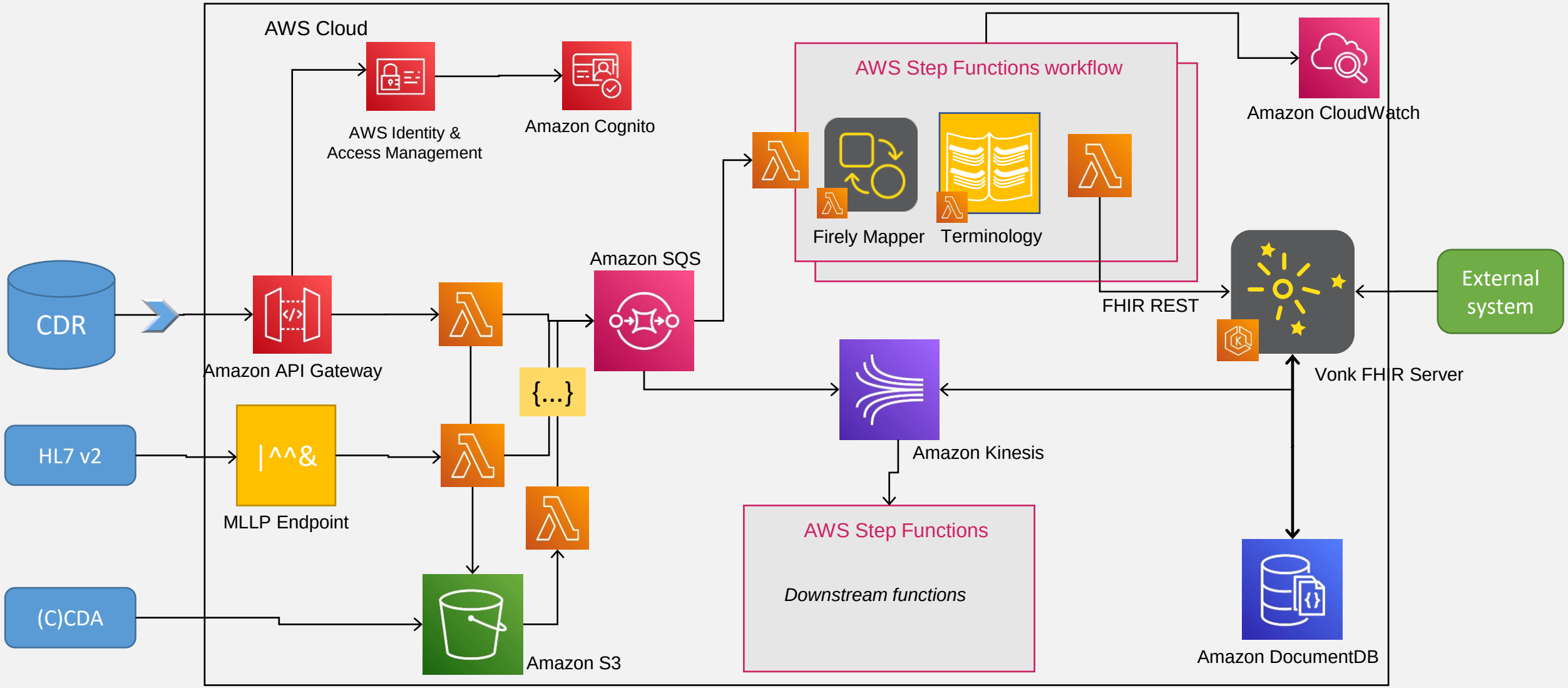


Server + write



A Cloud picture

- How would this translate to a cloud environment?
- AWS as an example


AWS Cloud
AWS Identity & Access Management
Amazon Cognito
AWS Step Functions workflow
Firely Mapper
Terminology
Amazon CloudWatch
CDR
Amazon API Gateway
Amazon SQS
FHIR REST
Vonk FHIR Server
External system
{...}
HL7 v2
|^^&
MLLP Endpoint
Amazon Kinesis
AWS Step Functions
Downstream functions
(C)CDA
Amazon S3
Amazon DocumentDB

Scale

Functional

- Reuse blocks
- Reuse logic (mappings, profiles, potentially from other parties)

Technical

- Serverless, autoscaling components (Lambda, Step Functions)
- Elastic storage
- Specialized Vonk servers in Kubernetes or even a Lambda

Start small, allow for growth

Downstream

- Use queue messages or stream notifications
- FHIR Flow to go from FHIR to other formats
- Pub/sub
- Real time analytics
- AI
- Benefit from existing cloud offerings

Summary of solutions

- FHIR Server
- FHIR Facade
- FHIR Flow
  - Mapper
  - Validator
  - Terminology
  - etc.

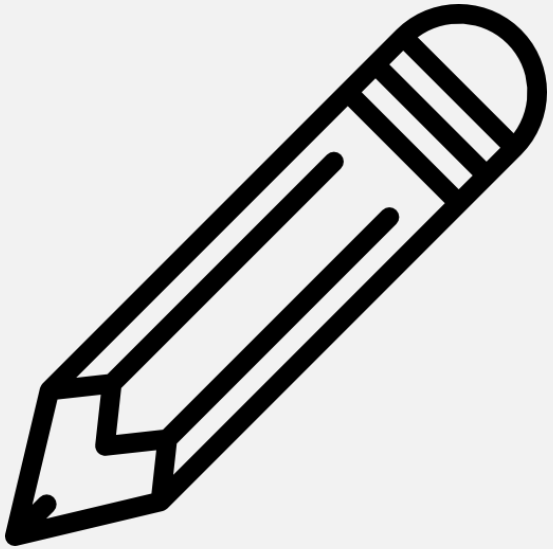
Facade	Server
map data -> FHIR (in C#)	map data -> FHIR (any tech stack)
map search -> sql / api (in C#)	full search built-in
realtime	track changes
pressure on source system	extra server needed
reuse source data	duplicate data
single source	multiple sources
filter/authz in query	filter/authz in transform
most plugins available	all plugins available
all deployment options	all deployment options

Example: US Core

- Basis for ONC/CMS rules
- Read only
- 18 resources
- 76 search parameters
- Depends on how many of these you provide

The answer

It depends ☺



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