Eos and OMOCL

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OMOP

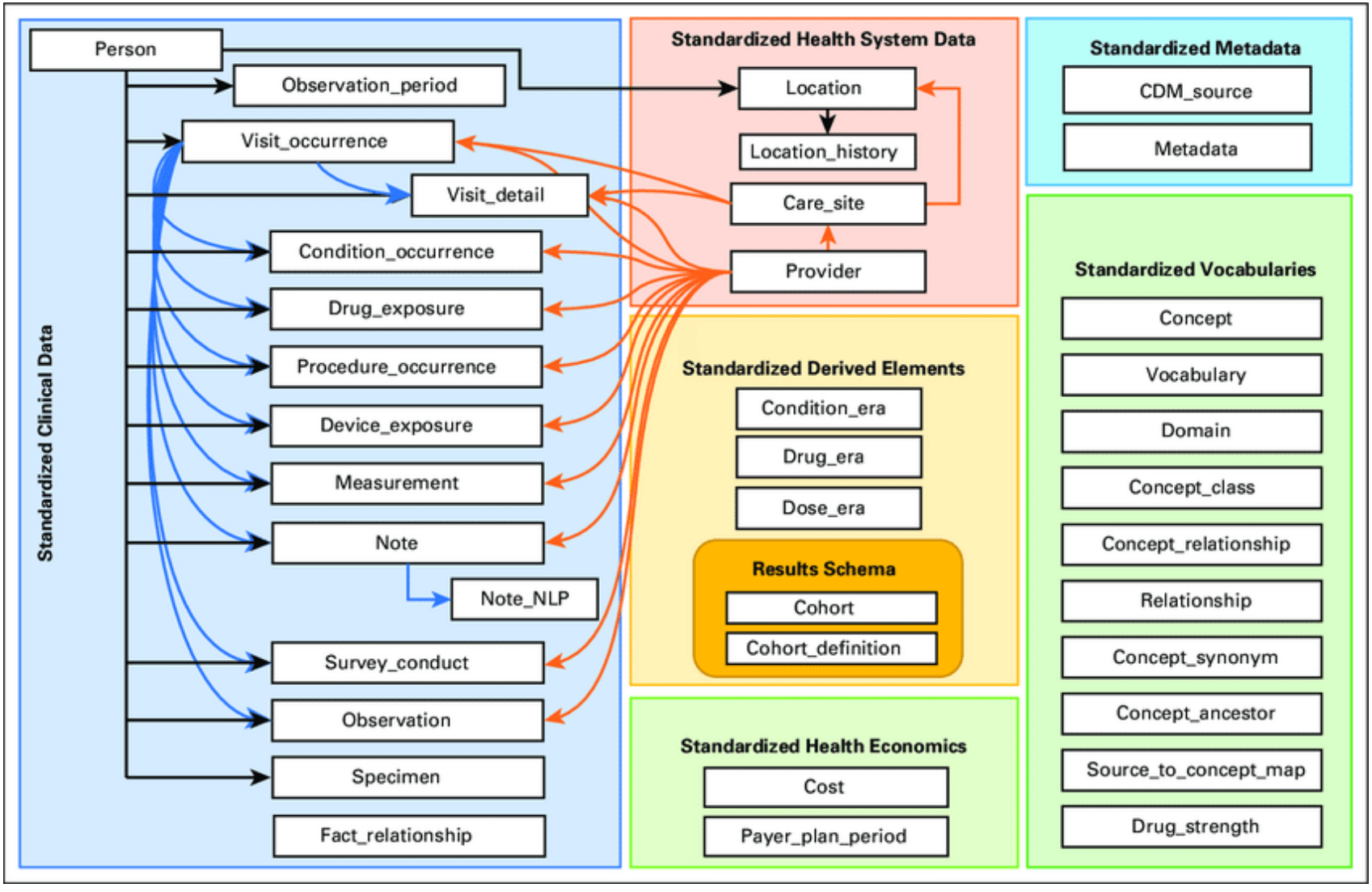
OHDSI OMOP

- **C**ommon **D**ata **M**odel (CDM)
- used to harmonize EHR data for **secondary use**
- aims to also **standardize terminologies** (vocabularies)
- originated from pharmacy (medicament side effects)

OHDSI OMOP

- **datamodel** manifested as e.g. **ddls** for postgres
- opensource including tooling for ETL and analysis
- very **pragmatic** and functional approach
- CDM is condensed to **important fields**

OMOP CDM


Standardized Clinical Data
Person
Observation_period
Visit_occurrence
Visit_detail
Condition_occurrence
Drug_exposure
Procedure_occurrence
Device_exposure
Measurement
Note
Note_NLP
Survey_conduct
Observation
Specimen
Fact_relationship
Standardized Health System Data
Location
Location_history
Care_site
Provider
Standardized Derived Elements
Condition_era
Drug_era
Dose_era
Results Schema
Cohort
Cohort_definition
Standardized Health Economics
Cost
Payer_plan_period
Standardized Metadata
CDM_source
Metadata
Standardized Vocabularies
Concept
Vocabulary
Domain
Concept_class
Concept_relationship
Relationship
Concept_synonym
Concept_ancestor
Source_to_concept_map
Drug_strength

Measurement example

- Measurement
- measurement_concept, value, unit, date time
- each data element is represented as a **row** in a **table**
- e.g. 4152194 for systolic bloodpressure

Golden Grail of OMOP

- OMOP vocabularies
- contains many **nomenclatures and classifications** (LOINC, SNOMED, RxNorm, ...)
- per domain a set of **concepts** is defined as **standard**
- non **standardized** concepts are **mapped** against these ones
- allowed concepts depend on target domain/table

openEHR

- popular in research
- simple use
- federated analytics
- **openEHR** has the data to **populate** it

Archetypes-to-CDM

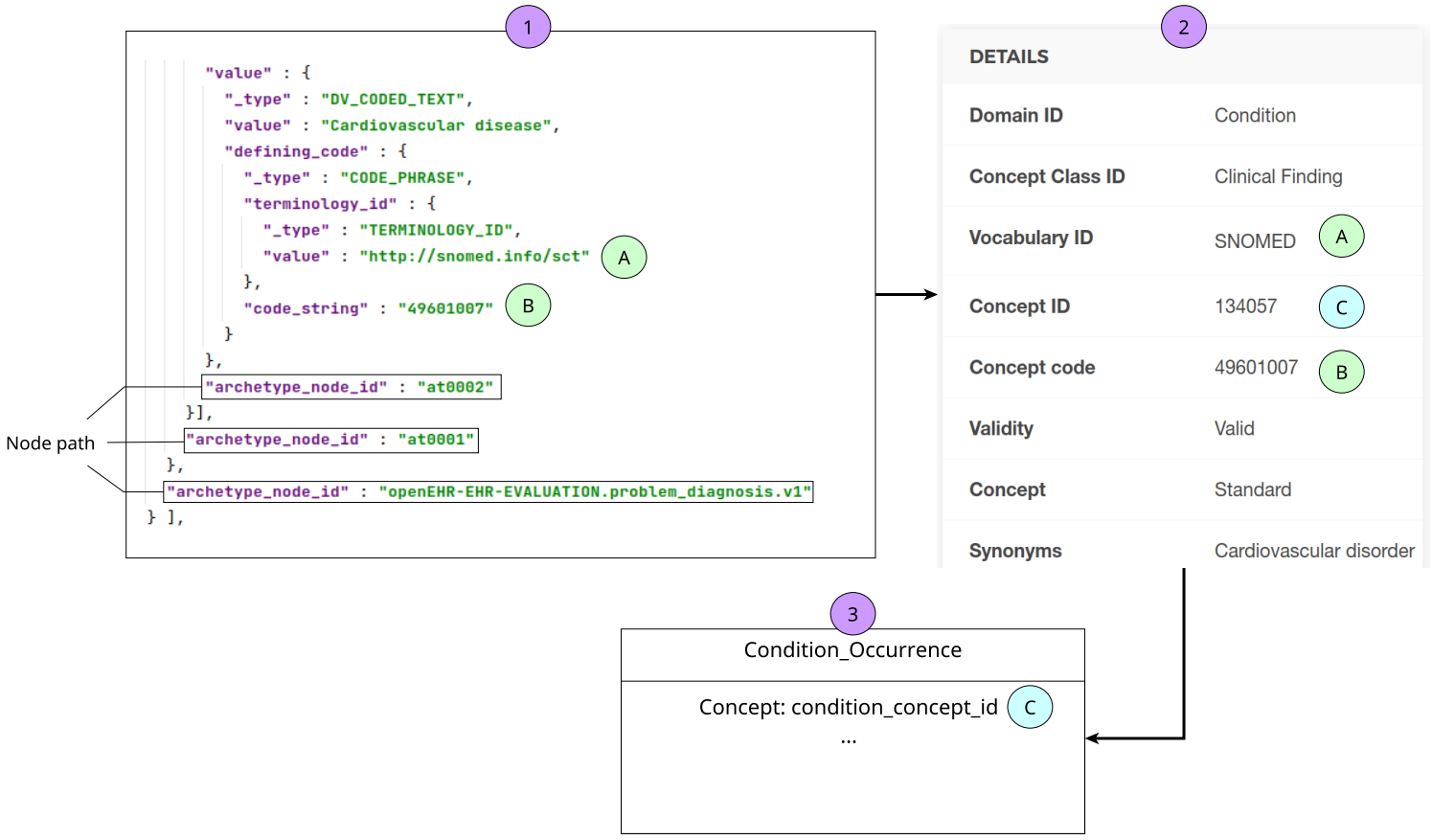
Transform

- **archetypes** are more viable then **templates**
- most of the data types are **easy to map** e.g. text to text etc.
- date times
- Coded Text to CDM Concept
- EHR to Person

Problems

- DateTimes
- limited linking of records
- less semantic rich model
- sometimes hard to **downgrade** data into **CDM**

Coded text transformation



EHR to Person

- link **EHR to Person**
- data **population** from **archetype** is easy
- otherwise can be **populated** as a **second step** to the person
- as long as link is existent

OMOP Conversion Language (OMOCL)

OMOCL

- simple DSL that takes a list of openEHR **paths** or direct **codes**
- archetype-to-CDM
- converts **paths** to **CDM fields**
- **declarative**
- no full bloom DSL

OMOCL

- **tailored to mission**
- has some basic features
- e.g. path manipulation terminal like via `.` `../`, fields can be set **optional** etc.

Status

- **34 mappings done**
- `https://github.com/SevKohler/OMOCL/wiki`

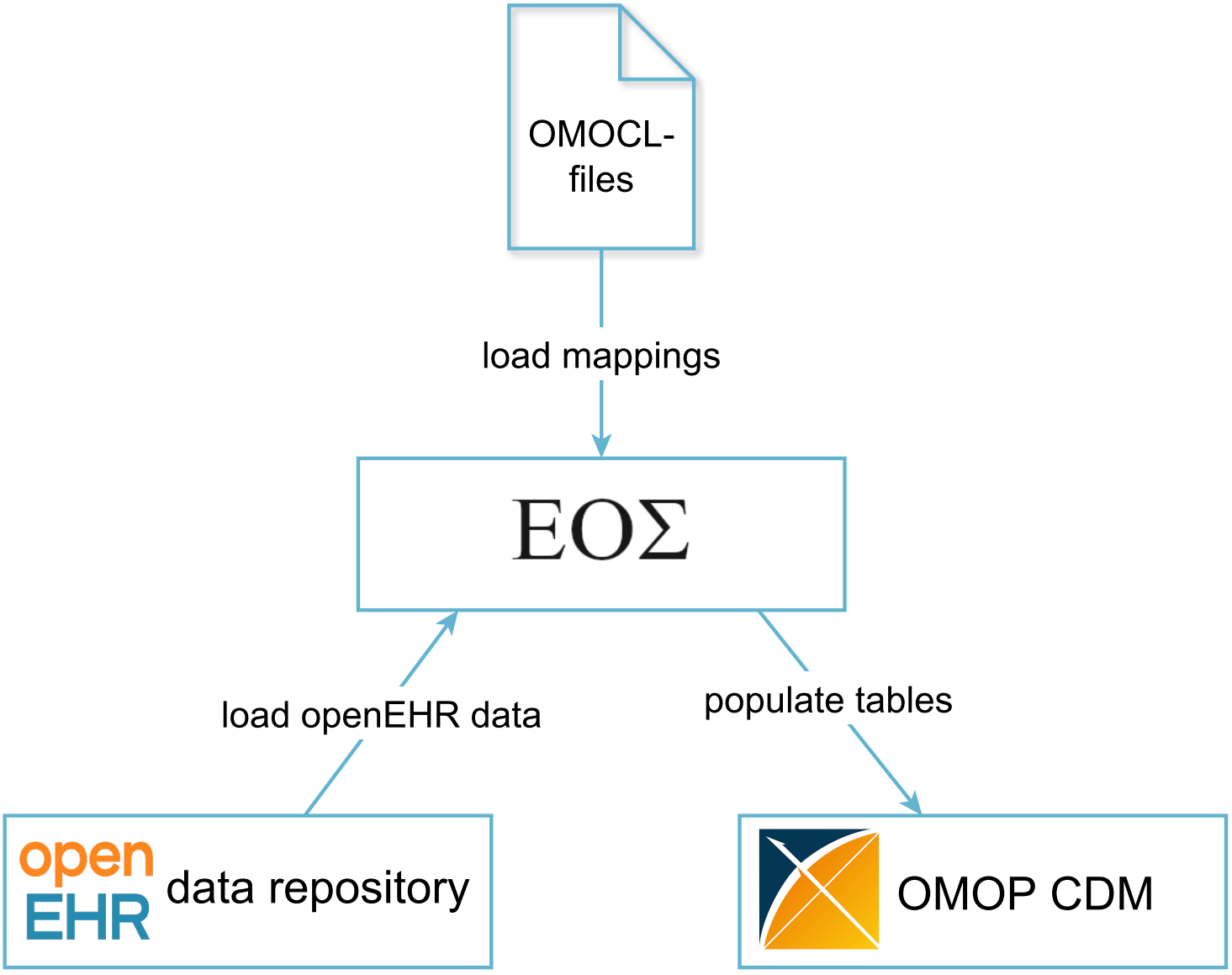
Example

Eos

Eos

- server that **loads** and **executes** OMOCL mappings
- REST API
- **connected** to an **openEHR** platform

Architecture



Transformation

- if **required** field is **missing**, transformation is **ignored** (log-file)
- CDM **optional** fields can be **set** required via config
- non-optional ones not
- tool **automatically** resolves **vocab mappings** for standard concepts
- one keyword to address multiple fields e.g. date and date_time etc.

Internal codings

- when openEHR **internal coding** added as vocab
- tool will then be able to **resolve those**
- **enabling openEHR** internal codings to CDM **concept transformation**

Problems

- test data only accessible because of FHIR-bridge
- openEHR community was **not able** to provide **sample data** even though several people were requested
- **semantic downgrade**

Future

- polish **documentation**
- add **more mappings** in cooperation with the community
- **polish** code and extend functionality
- add **guideline** to add **mappings**
- ...

Thank you for your attention!

Endpoints

- */composition*
- */person*
- */ehr*
- */generate-eras-period*

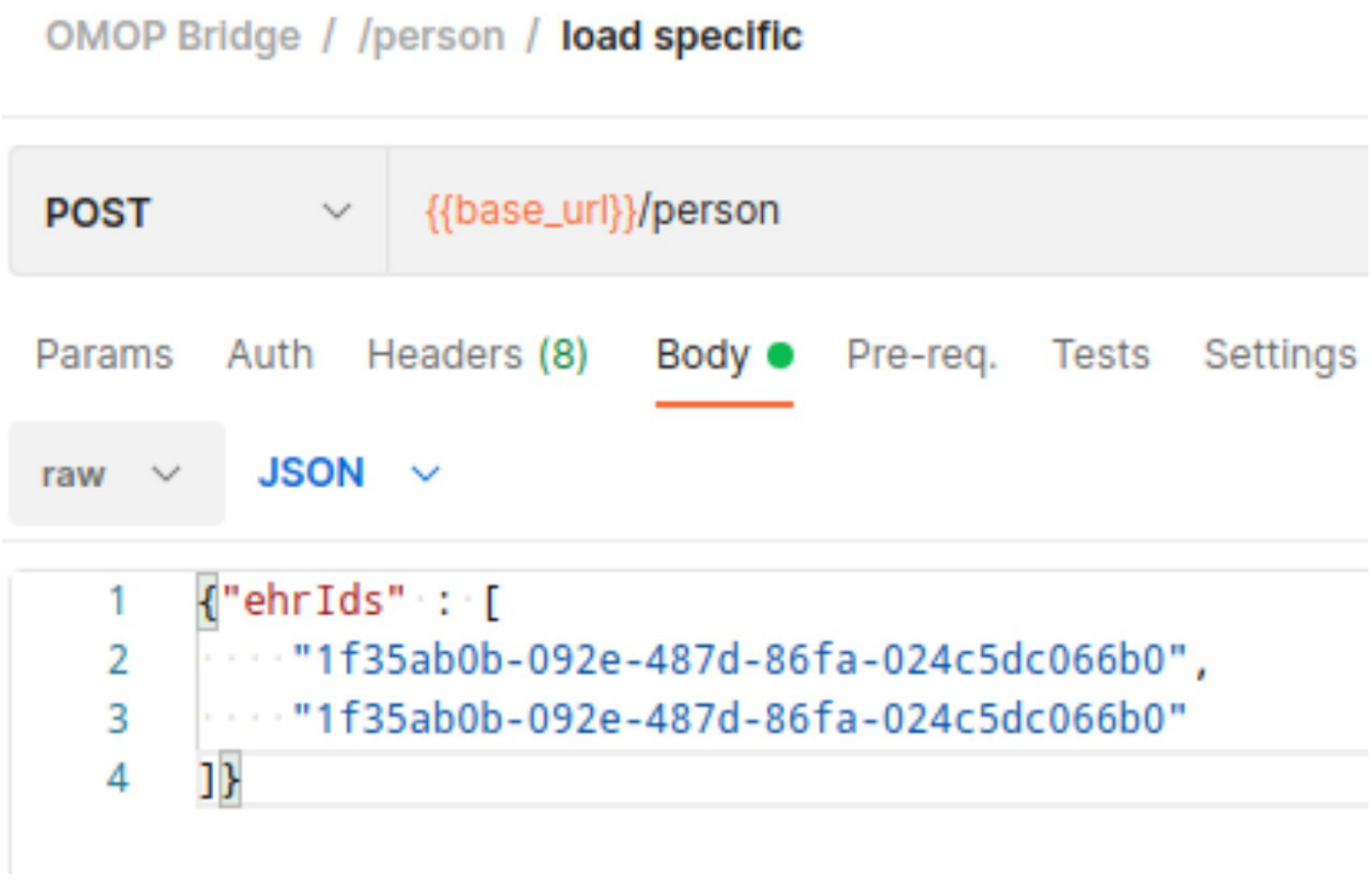
/person

- used to create alias
- creates for each EHR id one Person
- or for a specific list
- EHR id has to exist in the platform
- **required** to use the other endpoints

/person

- person table is either populated blank
- or using compositions loading person_data mappings
- for each EHR a person is generated and linked

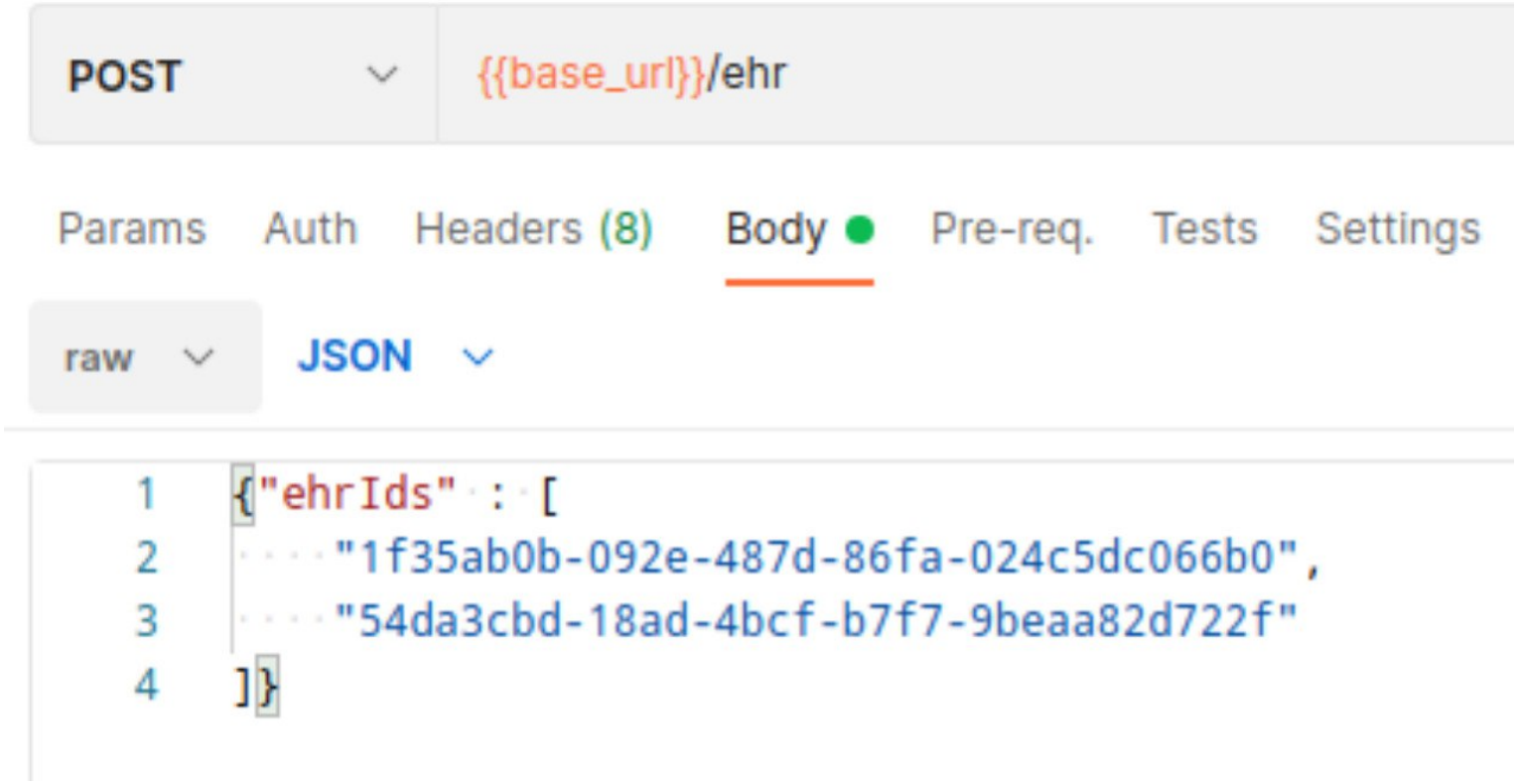
/person example



/ehr

- used to convert compositions from EHR
- either all
- or specific ones
- EHR id has to exist in the platform
- requires that EHR id is mapped using /person before

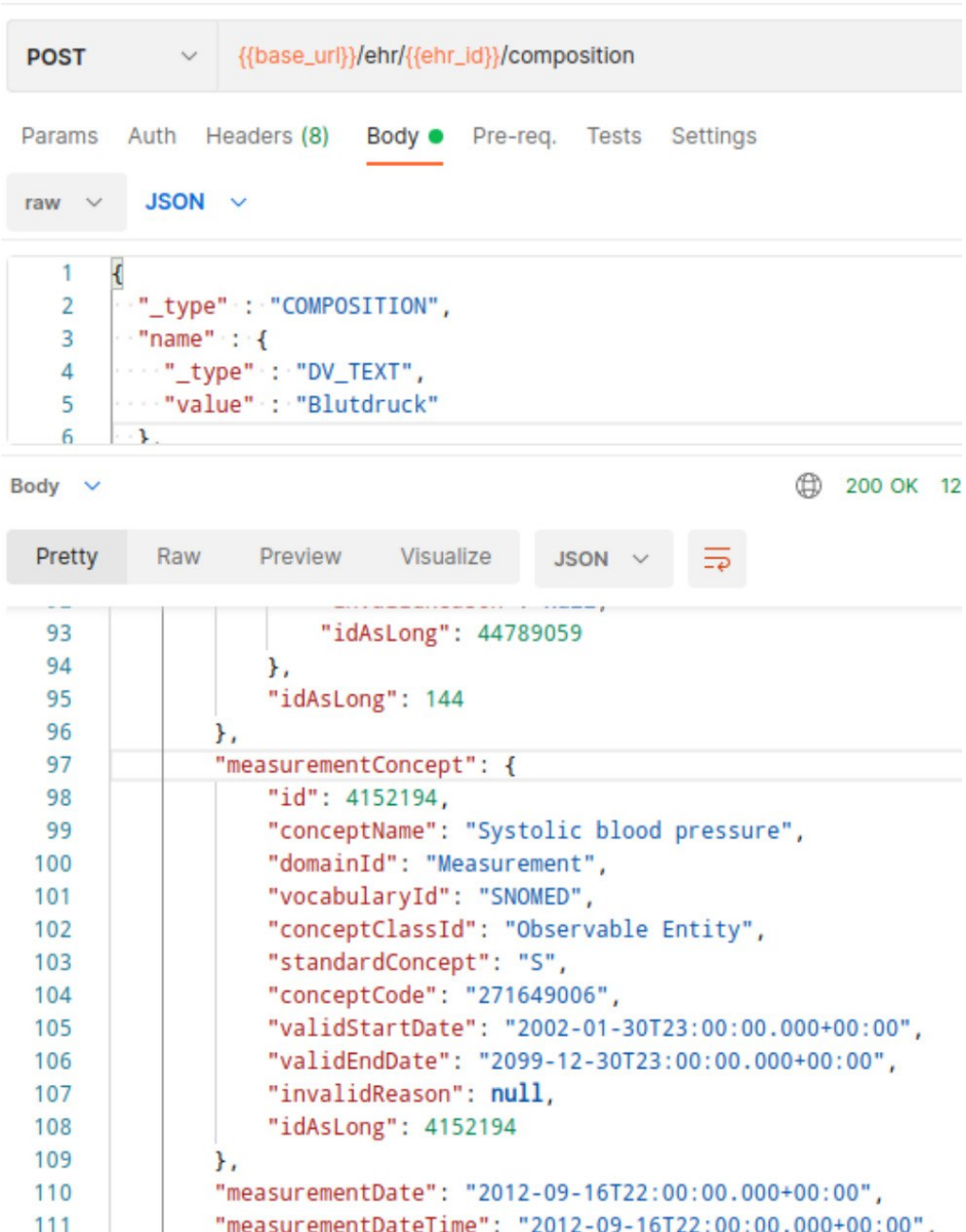
/ehr example


POST
{{base_url}}/ehr
Params
Auth
Headers (8)
Body
Pre-req.
Tests
Settings
raw
JSON
{"ehrIds" : [
"1f35ab0b-092e-487d-86fa-024c5dc066b0",
"54da3cbd-18ad-4bcf-b7f7-9beaa82d722f"
]}

/composition

- on-demand mapping of single composition for an ehr
- url path same as in openEHR
- mapping to person is automatic
- takes xml or json composition

/composition example



/generate-eras-period

- generates the Standard Derived Elements
- thinks like a DRUG_ERA, CONDITION_ERA.
- standardized scripts are provided by the OHDSI community
- these are executed either manually via the endpoint or with a cron job.