



ASSISTANCE
PUBLIQUE



HÔPITAUX
DE PARIS

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i2b2 implemented over SMART-on-FHIR

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- ▶ i2b2 is a key leader with 200 implementations worldwide
- ▶ Analytic tools extend i2b2 (transmart, i2b2-transmart) to handle omics
- ▶ Federation tools federate multiple i2b2 instances (Shrine, Insite, TrinetX)

→ How to get a panoramic view of patients and hospitals in i2b2?



Panoramic View of Patients:

Data Variety Challenge

- ▶ RDBMs based i2b2 star schema cannot handle every types
- ▶ Specialized technology emmerges faster than i2b2 adopt them

Panoramic View of Hospitals:

Data Federation Challenge

- ▶ ETL processes need a dedicated engineer team
- ▶ Terminology Mapping tools in their infancy
- ▶ Security concerns



Data Variety Challenge

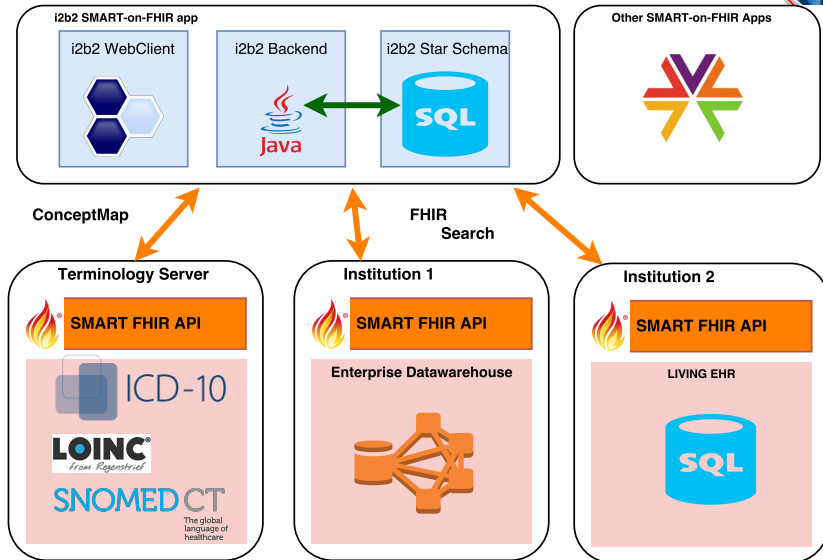
- ▶ FHIR is an Agile and RESTful Approach to Healthcare Information Exchange
- ▶ FHIR defines most Patients & hospital concepts (clinical, imaging, omics, providers. . .)

Data Federation Challenge

- ▶ FHIR specifies both a *Search* & a *Terminology Mapping* API
- ▶ EHR vendors massively adopt FHIR

→ Let's make i2b2 part of the 50 SMART-on-FHIR apps !

i2b2-FHIR Design



i2b2-FHIR Demo



Query Tool

Query Name: Glucose-Circula@11:28:27

Temporal Constraint: Treat all groups independently

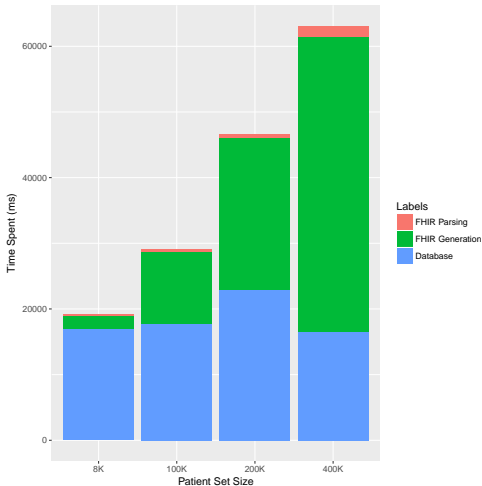
Group 1			Group 2			Group 3		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently ▾			Treat Independently ▾			Treat Independently ▾		
Glucose (Group:GLU) < 100 mg/dl [12/01/1979 to 9/27/2015] GLUCOSE (LOINC:6777-7) GLUCOSE @11AM, SERUM (LOINC:16166-1) GLUCOSE @4PM			Circulatory system Acute Rheumatic fever Arterial vascular disease Cerebrovascular disease					

Run Query Clear 2 Groups New Group

Show Query Status Graph Results Query Report

Finished Query: "Glucose-Circula@11:28:27" [2.8 secs]
Compute Time: 0.9 secs

Number of patients for "Glucose-Circula@11:28:27"
patient_count: 8±3



5B physiological table

- ▶ FHIR generation step bottleneck
 - ▶ under the minute
 - ▶ linear performances
- Bridging the gap (i2b2 / specialized tech)

Work done:

- ▶ Ontology Model
- ▶ Querying FHIR API
- ▶ Terminology Mapping
- ▶ Mixed star schema & FHIR API & No-SQL DBs

On the way:

- ▶ Oauth2 securisation
- ▶ Multiple FHIR endpoint
- ▶ Performance optimisations
- ▶ Release as a SMART-on-FHIR app

Conclusion



i2b2-FHIR opens new area:

- ▶ Data Federation
- ▶ Data Variety

→ Work in progress to release in future i2b2 version

Thank you

Core i2b2 www.i2b2.org/software

FHIR API <https://github.com/parisni/i2b2-fhir-search>

FHIR i2b2 <https://github.com/mikemendis/i2b2-fhir-search>