Tutorial-2: Interoperability Types

Case Study-1 Solution

S1:

ID	Name	Tel	Date of Birth	Values	Report	Type

S2:

ID	Name	DoB	Tel	Action	Finding	Values

1. Structural interoperability

To achieve structural interoperability, S1 to S2, i.e. to send data from S1 to S2, we create a Data Structure mapping template, at S2, as follows:

S1.ID=S2.ID	S1.Name=S2.Name	S1.Tel=S2.Tel	S1.DateOfBirth=S2.DoB	S1.Values=S2.Values	S1.Report=S2.Finding	S1.Type=S2.Action

To achieve structural interoperability, S2 to S1, to send data from S2 to S1, we create a Data Structure mapping template, at S1, to show mapping from S1 to S2 (opposite of the above):

2. Syntactic interoperability

To achieve syntactic interoperability, we need to ensure that the syntax of each data type is consistently stored, i.e. the stored values for each type, in each column are consistent. Example, as follows:

ID	Name	Tel	Date of Birth	Values	Report	Type
0011-1	A Dawood	0097222334444	1 Apr 78		Hypertension	Diagnosis
0011-1	A Dawood	0097222334444	1 Apr 78	5000 mcL	WBC	Labtest
0011-1	1N Dawood	00972593306070	1 Apr 78	90 mg	Nadolol	Drug

3. Semantic interoperability

   To achieve semantic interoperability, we need to

   1. identify the types of semantic (terminology) dictionaries need to define the meaning/semantic of each term (i.e. for each data type/column and its values) used.
   2. construct a message, that includes defines the semantic terminology for each record/raw of data.

   A Possible solution, is as follows:

   1- Potential Terminologies:

Unit
Diagnosis: Disease = ICD 10 Or SNOMED-CT
Labtest: LIONC
Drug: RxNorm

2. Construct message for each raw, between source and destination systems.
To send first two records/raw data, between two systems, we send each record/raw as a message as follows:

⇨ Data, from 1ˢᵗ Record/Raw to send from S1 to S2 as a semantically interoperable message:
   Message1=(
   ID="0011-1", semantictype=none;
   Name= "A Dawood", semantictype=none;
   Tel=0097222334444, semantictype=none;
   DateOfBirth=1 Apr 78, semantictype=none;
   Values="", unit="", semantictype=Unit, code=;
   Report="Hypertension", semantictype=ICD10, code=000.00;
)

⇨ Data, from 2ⁿᵈ Record/Raw to send from S1 to S2 as a semantically interoperable message:
   Message2=(
   ID="0011-1", semantictype=none;
   Name= "A Dawood", semantictype=none;
   Tel=0097222334444, semantictype=none;
   DateOfBirth=1 Apr 78, semantictype=none;
   Values="000, unit="mcl", semantictype= Unit, code=00000;
   Report="WBC", semantictype= LOINC, code=0000-0;
)

⇨ Data, from 3ʳᵈ Record/Raw to send from S1 to S2 as a semantically interoperable message:
   Message3=(
   ID="0011-1", semantictype=none;
   Name= "1N Dawood", semantictype=none;
   Tel=0097222334444, semantictype=none;
   DateOfBirth=1 Apr 78, semantictype=none;
   Values=90, unit="mg", semantictype= Unit, code=00000;
   Report="Nadolol", semantictype= RxNorm, code= 000000;
)