Development of Reference Terminology Model in Korean Healthcare Domain

MEDINFO 2007

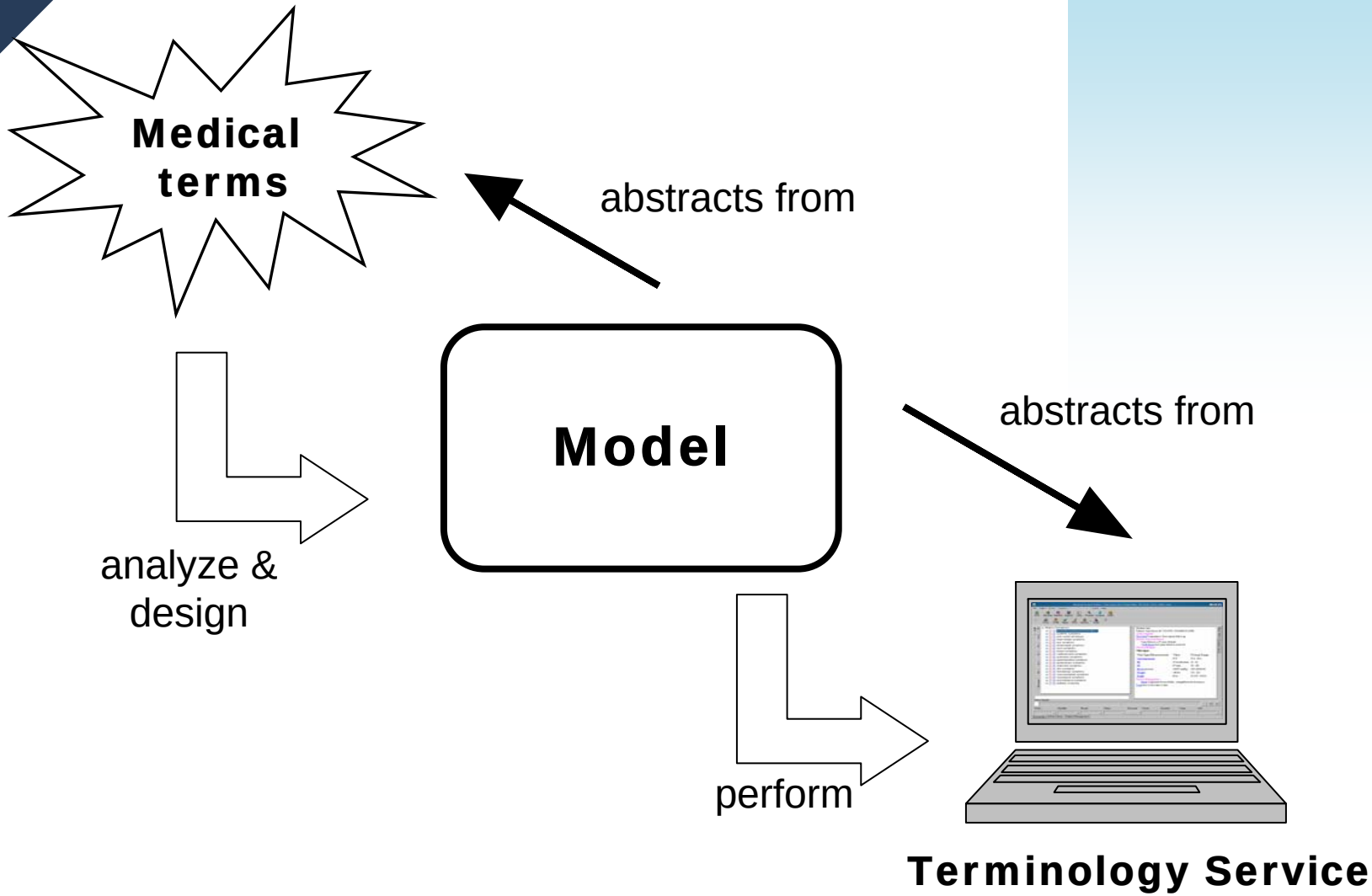
Seunghee Kim[a], Yookyung Boo[a], Dongkyu Kim[b], Soyong Yoon[a], Misook Kwak[a], Yoon Kim[a]

[a] R & D Center for Interoperable EHR, Korea, [b] CTO Prompt co., ltd., Korea

Introduction

- Controlled vocabulary
  - A terminology intended for clinical use
- Data sharing and re-use
- Common, centralized vocabulary
  - Communication among applications
  - Information processing standardization
  - The overall cost reduction
- Goal
  - Modeling a controlled vocabulary for standardization as core element for interoperable EHR

Role of model



Materials & Methods

Reference terminology model development to integrate various domain vocabularies

Structure Analysis → **Modeling** → **Schema Design**

Structure Analysis

- Korean health information vocabulary structure analysis
- Reference terminology structure analysis
  - UMLS
  - SNOMED CT

Modeling

- Meta model
- Conceptual model
  - Object oriented approach
- Instance model

Schema Design

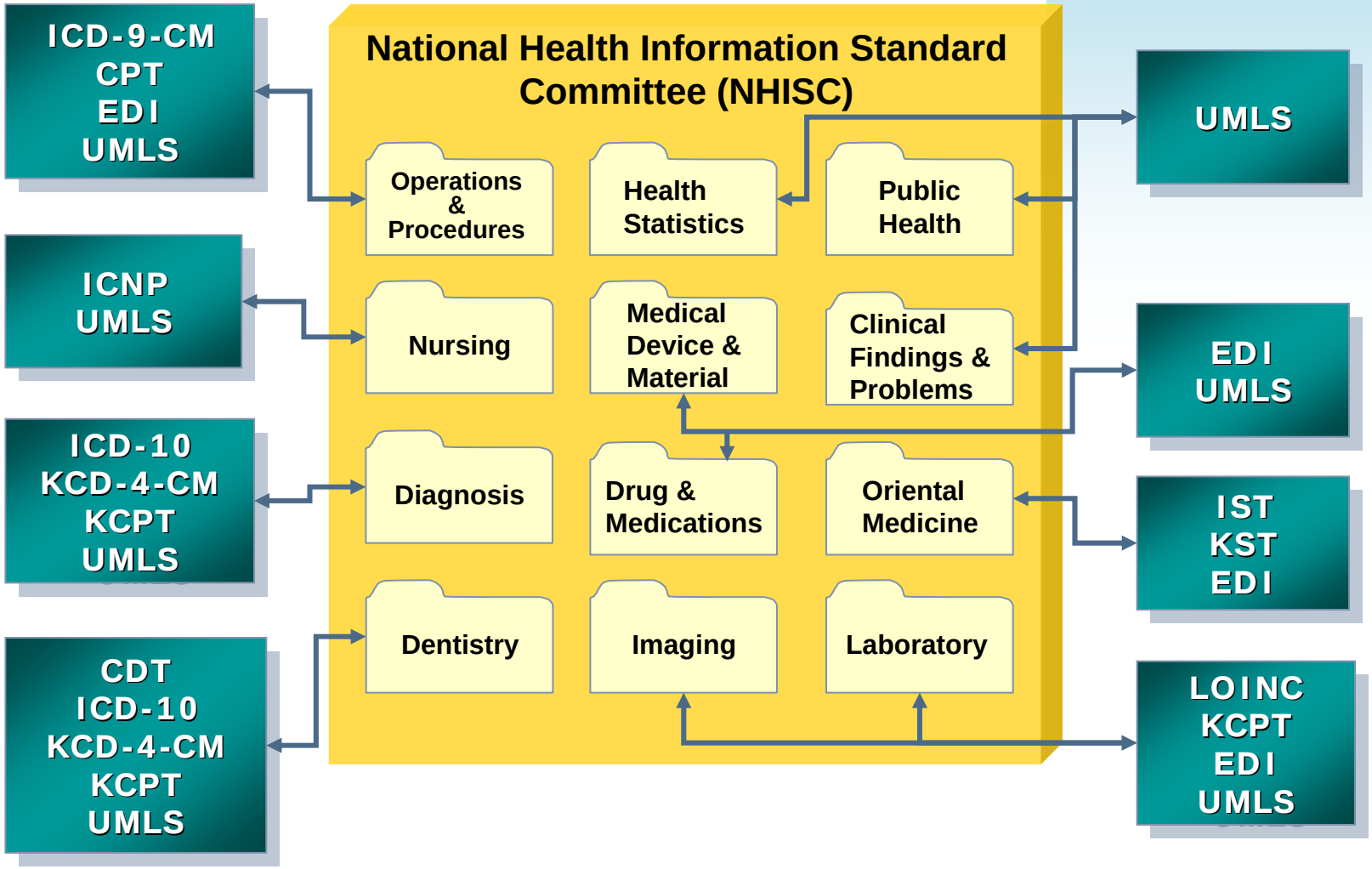
- Entity Relationship Diagram (ERD)
- Components
  - Concept table
  - Semantic table
  - Mapping table
  - Meta table

Outputs

- Health information vocabulary structure analysis result
- UMLS & SNOMED CT structure analysis result
- Meta Model
- Conceptual Model
- Instance Model
- Schema

Results

NHISC vocabulary → UMLS → SNOMED CT



Results

Component	UMLS tables (.RRF)	UMLS group
Metadata	MRFILES, MRCOLS, MRDOC, MRRANK	Data about the MT
Concept	MRCONSO	Concepts, Concept Names, and their sources
	MRSAT, MRDEF	Attributes
Semantic type	MRSTY	Attributes
History	MRHIST	Attributes
	CHANGE/MERGEDCUI, CHANGE/DELETEDCUI, CHANGE/DELETEDLUI, CHANGE/DELETEDSUI, MRCUI	Data about the MT
Relationship	MRREL, MRCOC, MRCXT, MRHIER	Relationships
Mapping	MRMAP, MRSMAP	Relationships
Source	MRSAB	Data about the MT
Ambiguity Concept	AMBIGLUI, AMBIGSUI	Data about the MT
Index	MRXW, MRXNW, MRXNS files	Indexes

Results

Component	SNOMED CT tables	SNOMED CT group
Concept	Concepts, Descriptions	Core Tables
Relationship	Relationships	Core Tables
Subset	Subsets, Subset Members	Subset Mechanism
Mapping	Cross Map Sets, Cross Maps, Cross Map Targets	Cross-Mapping Mechanism
History	Historical Relationships, Component History	History Mechanism
Developer Toolkit	Indexes, Canonical Table, navigation Hierarchies, Subsets, Word Equivalents, Duplicate Terms	Developer Toolkit

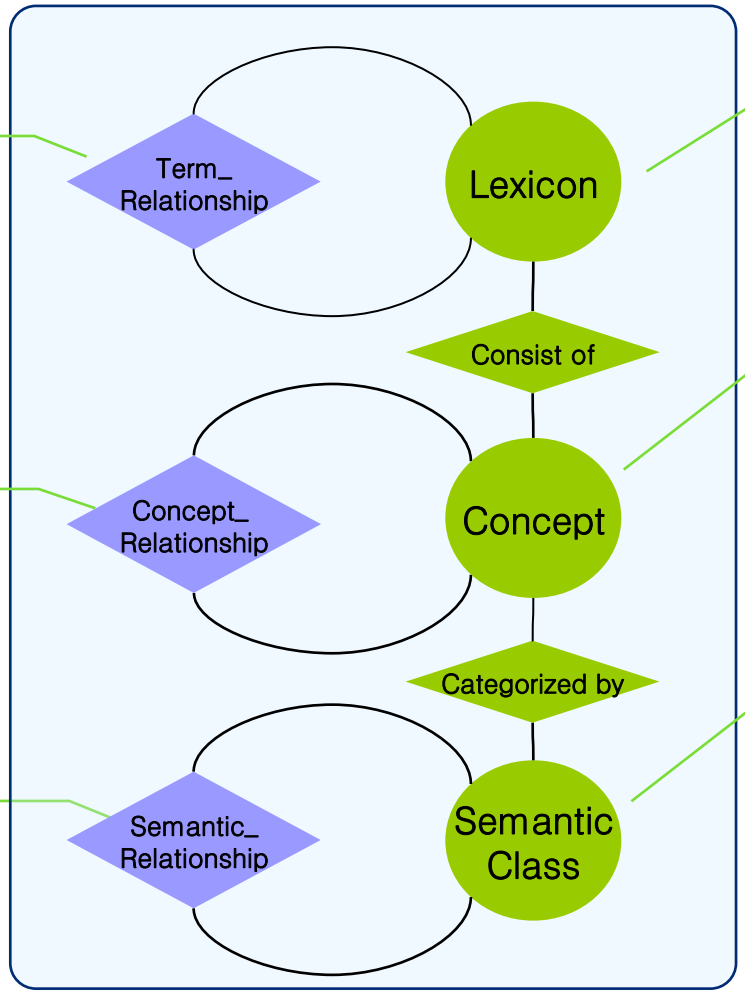
Meta Model → Conceptual Model → Instance Model

Results

Relation between two terms

Relation between two concepts

Relation between two semantic classes

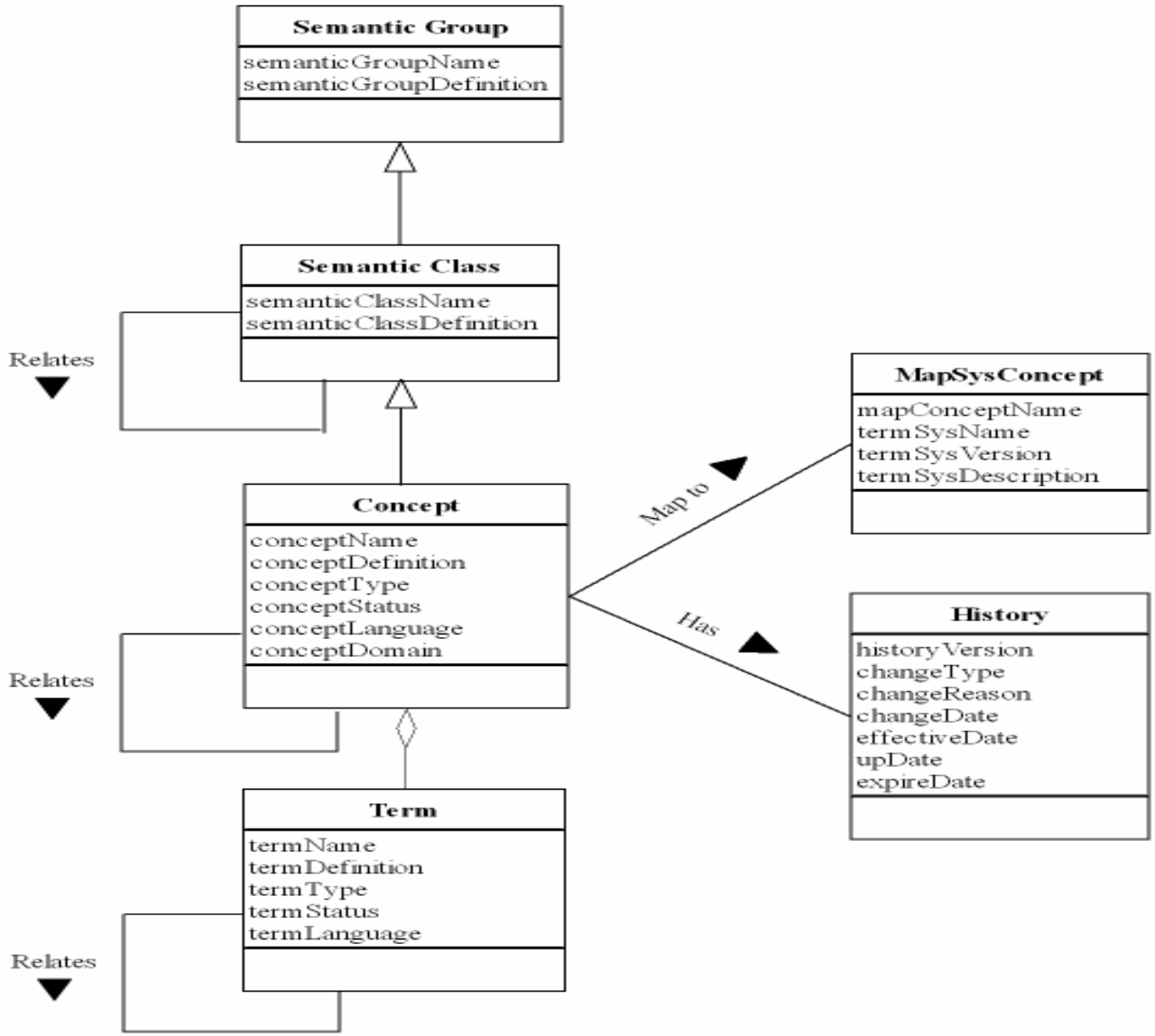


A set of lexical for each spelling or set of spelling variants in a particular part of speech

Unit of knowledge created by a unique combination of characteristics

Generic concept which corresponds to two or more concepts which form a group by reason of common properties

Results


Semantic Group
semanticGroupName
semanticGroupDefinition
Semantic Class
semanticClassName
semanticClassDefinition
Relates
Concept
conceptName
conceptDefinition
conceptType
conceptStatus
conceptLanguage
conceptDomain
Relates
Term
termName
termDefinition
termType
termStatus
termLanguage
Relates
Map to
MapSysConcept
mapConceptName
termSysName
termSysVersion
termSysDescription
Has
History
historyVersion
changeType
changeReason
changeDate
effectiveDate
upDate
expireDate

Results

Concept	CID	SYID	CNAME

Semantic_Class	SID	STYPE	SDEF	SGID	SGNAME

Concept_Semantic	CID	SID

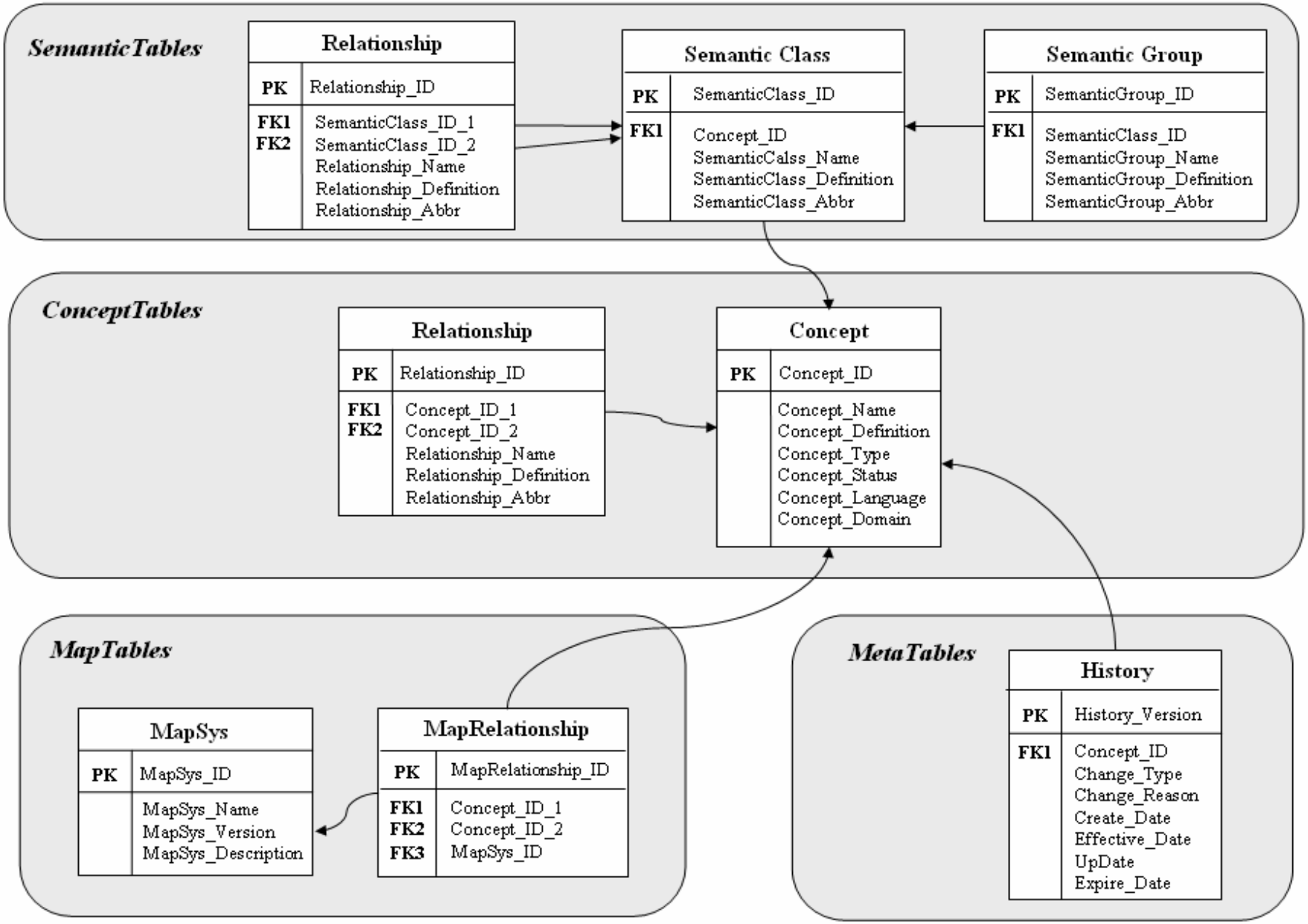
Lexicon	TID	Tense	BAS	SCA	TYP	MOD	SPV

Concept_Lexicon	CID	TID

Concept_Relationship	CRID	CID1	CID2	CREL	CCHRTYPE

⋮

Results


SemanticTables
Relationship
PK Relationship_ID
FK1 SemanticClass_ID_1
FK2 SemanticClass_ID_2
Relationship_Name
Relationship_Definition
Relationship_Abbr
Semantic Class
PK SemanticClass_ID
FK1 Concept_ID
SemanticCalss_Name
SemanticClass_Definition
SemanticClass_Abbr
Semantic Group
PK SemanticGroup_ID
FK1 SemanticClass_ID
SemanticGroup_Name
SemanticGroup_Definition
SemanticGroup_Abbr
ConceptTables
Relationship
PK Relationship_ID
FK1 Concept_ID_1
FK2 Concept_ID_2
Relationship_Name
Relationship_Definition
Relationship_Abbr
Concept
PK Concept_ID
Concept_Name
Concept_Definition
Concept_Type
Concept_Status
Concept_Language
Concept_Domain
MapTables
MapSys
PK MapSys_ID
MapSys_Name
MapSys_Version
MapSys_Description
MapRelationship
PK MapRelationship_ID
FK1 Concept_ID_1
FK2 Concept_ID_2
FK3 MapSys_ID
MetaTables
History
PK History_Version
FK1 Concept_ID
Change_Type
Change_Reason
Create_Date
Effective_Date
UpDate
Expire_Date

Conclusion

- References
  - Cimino JJ, Clayton PD, Hripcsak G, Johnson SB. Knowledge-based approaches to the maintenance of a large controlled medical terminology. *Journal of the American Medical Informatics Association* 1994;1(1):35-50.
  - Lau LM, Johnson K, Monson K, Lam SH, Huff SM. A method for the automated mapping of laboratory results to LOINC. *Proc AMIA Symp* 2000:472-6.
- Acknowledgments
  - This work was supported by a research grant of the Korea Health 21 R&D project, Ministry of Health and Welfare of Korea (A050909).
- Contact details
  - ss0202@snu.ac.kr