Using Snow Owl to Maintain Singapore’s SNOMED CT Extension and Drug Dictionary

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(10:45 – 11:30)
Agenda

• Introduction to Snow Owl
• Singapore SNOMED CT Extension
  – Background
  – Snow Owl Demonstration
• Singapore Drug Dictionary
  – Background
  – SDD Tooling Demonstration
• Project Timelines
Collaborative terminology authoring platform
  – Terminology
  – Subsets/Reference sets
  – Mapping
DL classification
Validation
Semantic (ESCG/TermInfo) query support
Concept model backed editing
  – MRCM support
Task management support (workflow)
Scripting support
Terminology server
Modular and extensible
Built on the seasoned Eclipse tooling platform with wide industry adoption
  – Composed of bundles running within an OSGi (Eclipse) container
  – Bundles can be deployed depending the product definition (possible for both client and server side)
  – Help and branding information are in separate bundles

SDD utilizes
  – the services provided by the Snow Owl terminology platform
  – quick search widget UI component
  – Snow Owl’s classification module for semantic equivalence checking
Modularity & extensibility

Platform Software Architecture

- Snow Owl
  - Exposed extension point
  - com.b2international
  - com.com.mohh

- SDD
  - sg.com.mohh.sdd

OSGi container

Exposed service

DB
Platform Standards Stack

Runtime API access
- REST, SOAP

Healthcare semantics
- SDD
- Ontologies
  - SNOMED CT, ICD-10

Healthcare standard agnostic modeling
- EMOF (EMF)

Runtime platform
- Scalability, modularity
- OSGi (Eclipse), JDBC
Snow Owl Project Timeline

- V0: 2010 April - project kick-off
- V2.0: 2012 September 28 – current release
- V3: mid 2013
  - The de-facto integrated tooling platform for BOTH terminology and information modelling authoring
  - Runtime platform for meaningful query
Singapore Terminology Development
MOHHoldings Standards Products

- **Diagnosis** - SNOMED CT*
- **Drugs** - Singapore Drug Dictionary (SDD)
- **Allergic Reactions** - SNOMED CT*
- **Allergens** - SNOMED CT* + SDD
- **Laboratory Results** - LOINC (TBD)
- **Data Dictionary** - MOHH Data Dictionary
- **Procedures** - TBD
- **Reason for visit** - SNOMED CT*
- **Symptoms and Problems** - SNOMED CT*
- **Laboratory Reports** - Smart SNOMED CT*
- **Laboratory Orders** - SNOMED CT*
- **Radiology Orders** - SNOMED CT*

SNOMED CT* includes Singapore Extension
Snow Owl Demonstration

- Browse reference sets
- Add new concepts, relationships and descriptions
- Revision history
- Publication process
A national standard to unambiguously identify, code, describe & interpret medicines.

Needs to meet the diverse requirements of different users and cater for new innovative products.
SDD Objectives

Improvements in clinical care activities, patient management and safety

- Semantic interoperability across use cases
- Semantic interoperability across care settings
- National / international decision support rules
- Medication safety initiatives including:
  - Medication management
  - Adverse drug event surveillance.
- Data mining, analysis and research
Interoperability Across Care Settings

Singapore Drug Dictionary

- General Practice
- Hospital
- Community Hospital/
- Community Pharmacy
- Aged Care
- Polyclinic
- Specialist Centre
Interoperability Across Use Cases

Registration

Prescribing

Inventory Management

Dispensing

Supply Chain

Administration

Medication Lists / Allergies / Research / Decision Support etc
The SDD model has been developed with the following principles in mind:

• **Extensibility**
  In both the drug content and data model to allow for innovations in pharmaceutical and device technology over time.

• **Ontology**
  Based on ontological principles to support Singapore’s growing need for Biomedical research.

• **Patient Safety, Semantic Interoperability and Decision Support**
  These must be facilitated by the SDD and be the focus of clinician review and initial EMR vendor uptake.

• **Hide Complexity**
  Complexity to be hidden from clinicians and most Electronic Medical Record (EMR) vendors.

• **Informed by Existing Clinical Practice**
  Models tested against several thousand existing medication terms from hospital and GP prescribing/dispensing systems, PRIOR to finalisation of model.
Core Medication Classes

Medicinal Product (MP)

is a

Medicinal Product Form (MPF)

is a

Medicinal Product Preparation (MPR)

Medicinal Product Quantity (MPQ)

Medicinal Product Pack (MPP)

Medicinal Product Pack in Container (MPPC)

Medicinal Trade Product (MTP)

Medicinal Trade Product Form (MTPF)

Medicinal Trade Product Preparation (MTPR)

Medicinal Trade Product Quantity (MTPQ)

Medicinal Trade Product Pack (MTPP)

Medicinal Trade Product Pack in Container (MTPPC)

Singapore Medicinal Product (SG product)

Brand

20 tablets

2 x 10 tablets

2 x 10 tablets per blister strip
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<thead>
<tr>
<th>Allergies DSS</th>
<th>Interaction checking</th>
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<tr>
<td><strong>Allergies</strong></td>
<td>Amoxicillin</td>
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<tr>
<td><strong>DSS</strong></td>
<td>STRIMOX [Amoxicillin]</td>
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<td><strong>ATC</strong></td>
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<td><strong>STRIMOX [Amoxicillin] Capsule</strong></td>
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<td><strong>STRIMOX [Amoxicillin] 250 mg Capsule (1,000 capsules)</strong></td>
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<tr>
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<td><strong>STRIMOX [Amoxicillin] 250 mg Capsule (100 x 10 capsules per blister strip)</strong></td>
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Amoxicillin Capsule

STRIMOX [Amoxicillin] Capsule

STRIMOX [Amoxicillin] 250 mg Capsule

STRIMOX [Amoxicillin] 250 mg Capsule (1,000 capsules)

STRIMOX [Amoxicillin] 250 mg Capsule (100 x 10 capsules)

STRIMOX [Amoxicillin] 250 mg Capsule (100 x 10 capsules per blister strip)
PRESCRIBE

MP
Amoxicillin

MTP
STRIMOX [Amoxicillin]

MPF
Amoxicillin Capsule

MTPF
STRIMOX [Amoxicillin] Capsule

MPR
Amoxicillin 250 mg Capsule

MTPR
STRIMOX [Amoxicillin] 250 mg Capsule

MPQ
Amoxicillin 250 mg Capsule (1,000 capsules)

MTPQ
STRIMOX [Amoxicillin] 250 mg Capsule (1,000 capsules)

MPP
Amoxicillin 250 mg Capsule (100 x 10 capsules)

MTPP
STRIMOX [Amoxicillin] 250 mg Capsule (100 x 10 capsules)

MPPC
Amoxicillin 250 mg Capsule (100 x 10 capsules per blister strip)

MTPPC
STRIMOX [Amoxicillin] 250 mg Capsule (100 x 10 capsules per blister strip)

ADMINISTER

DISPENSE
The Structure of an SDD Drug

Multi Pack (e.g. 2 packs)

(Super) Pack

Subpack in Container (e.g. blister strip)

Component

Ingredient

&

Ingredient

Component

Ingredient

Subpack in Container (e.g. bottle)

Component

Ingredient
Tooling Demonstration

- **Create Simple Drug Definition**
  - e.g. PANADOL [Paracetamol] 500 mg Tablet
    - 3 x 10 tablets per blister strip
    - 1 x 30 tablets per bottle

- **Generate Drug Ontology**
  - View hierarchy and open concepts to see relationships created

- **Multi-ingredient, Multi-component, Multi-subpack Drugs**
  - Browse the drug definitions for these and resulting hierarchies
SDD Project Timeline

- 2012 February– SDD Project kick-off

- V0.7: 2012 November 3 – current release
  - Existing MOHH extension concepts and refsets imported
  - Source drug editor with revisions
  - Drug ontology generation for core medication classes
  - Drug description generation for core medication classes
  - Task management

- V1.3: 2013 June 3 - Final release
  - Drug ontology generation completed
  - Description generation completed
  - Drug ontology visualization