HL7/OMG CTS2 Implementations

Phast and Mayo Clinic Approaches

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PHAST

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Phast – (1)

- Non-profit organization developing standards and services in the domain of Healthcare Information Technology in France since 1989.
- Interoperable Standards (messages, syntax, terminologies) in the following areas:
  - Pharmacy
  - Patient Care Medical Devices
  - Laboratory
  - Anatomic Pathology

Phast - 2

- Aside from national involvement, Phast is active in international Standards Development Organizations level:
  - Health Level Seven **(HL7)** International
  - Integrating the Healthcare Enterprise **(IHE)** International
  - International Organization for Standardization **(ISO)**
  - Object Management Group **(OMG)**
- The management of terminologies is one of the main areas of Phast's activities:
  - LOINC
  - HL7 Vocabularies
  - ICD-10 (French)
  - EDQM (French)
  - SNOMED 3.5 (French)
  - PathLex
  - IHE-based vocabularies
  - French national terminologies, including the extended terminologies CIOsp (Medication), CIOdm (Medical Devides) , CIObio (Laboratory)

Managing Terminologies

- Phast has been managing terminologies with proprietary means, needs were identified to extend the functionalities and align with international standards.

- Implementation of HL7 CTS2 SFM, creating a product named **Standard Terminology Service (STS)** or **Service de Terminologie Standard.**

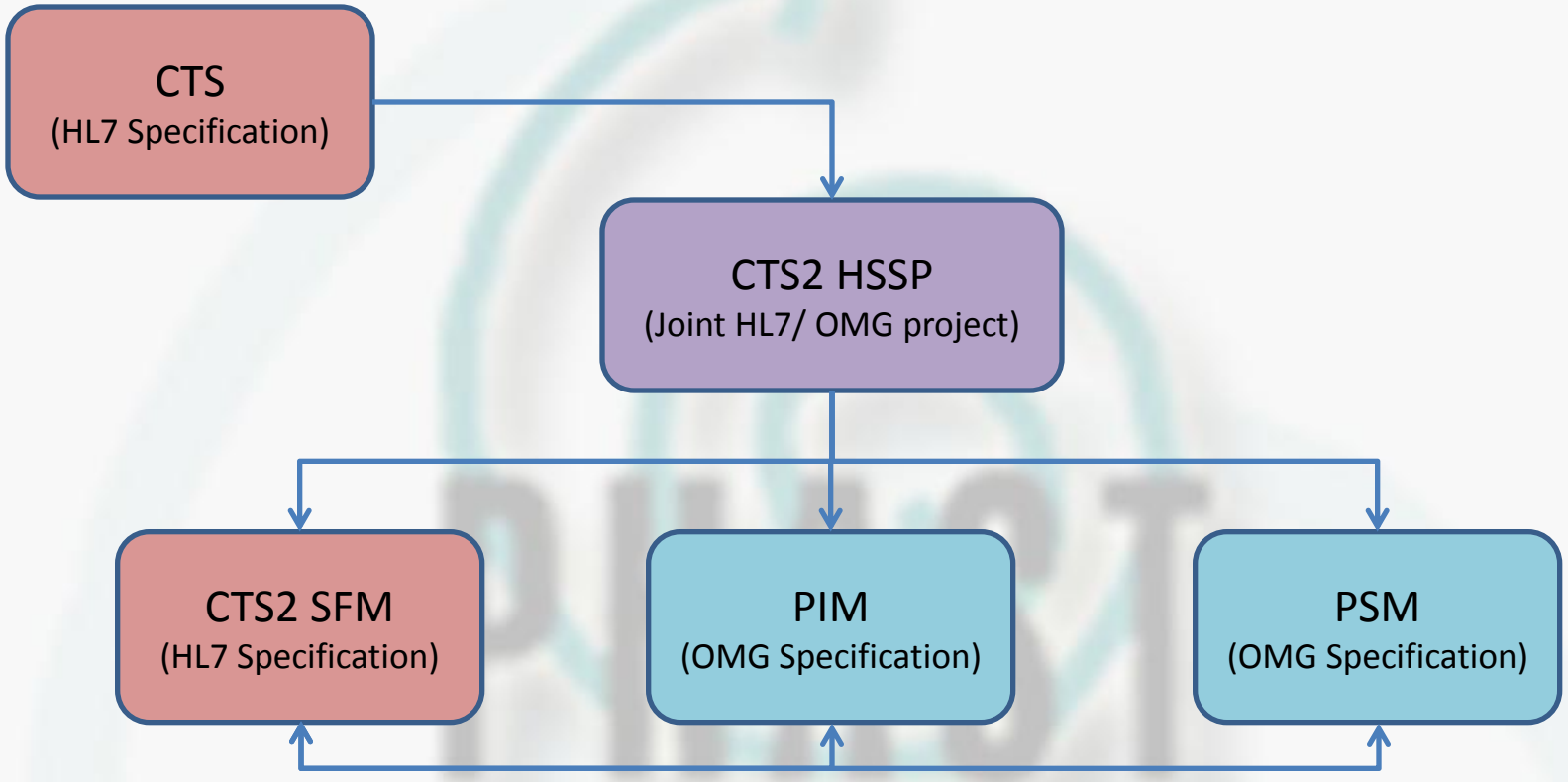
What is CTS2?

- CTS2 is a service specification, part of the Healthcare Services Specification Project (HSSP), a joint HL7 and OMG initiative
- The goal is to establish a common model for terminology, and how it is related to meta-data (models of data) and data (the information itself)
- The HL7 CTS Service Functional Model (SFM) was developed by the domain experts in HL7
- The Platform Independent Model (PIM) and the Platform Specific Model (PSM) are part of an OMG CTS2 specifications (in finalization)
- Phast and Mayo Clinic have joined efforts in order to contribute to the HL7 and OMG CTS2 normative implementation specifications by harmonizing technical feedback from the two different implementation viewpoints.

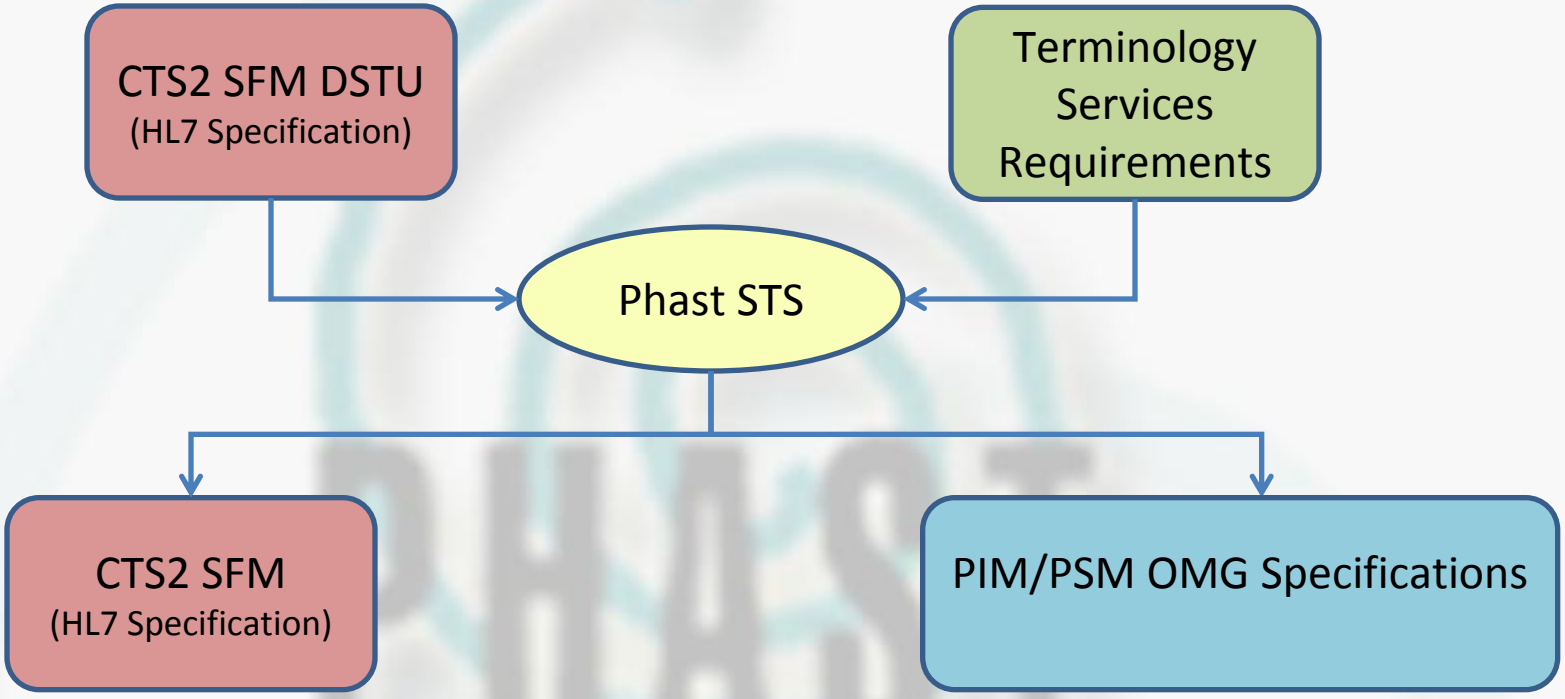
Structure of the CTS2 Service

- **CTS2 Query Profile** – search and query terminology content, representing terminology content in the appropriate HL7 Datatypes or structuring content appropriately when this is not available.
- **Terminology Administration Profile** – operations to access and make available terminology content obtained from a Terminology Provider. The terminology content thus obtained can be loaded on local Terminology Servers.
- **Terminology Authoring Profile** – analysis and editing the existing terminology content.

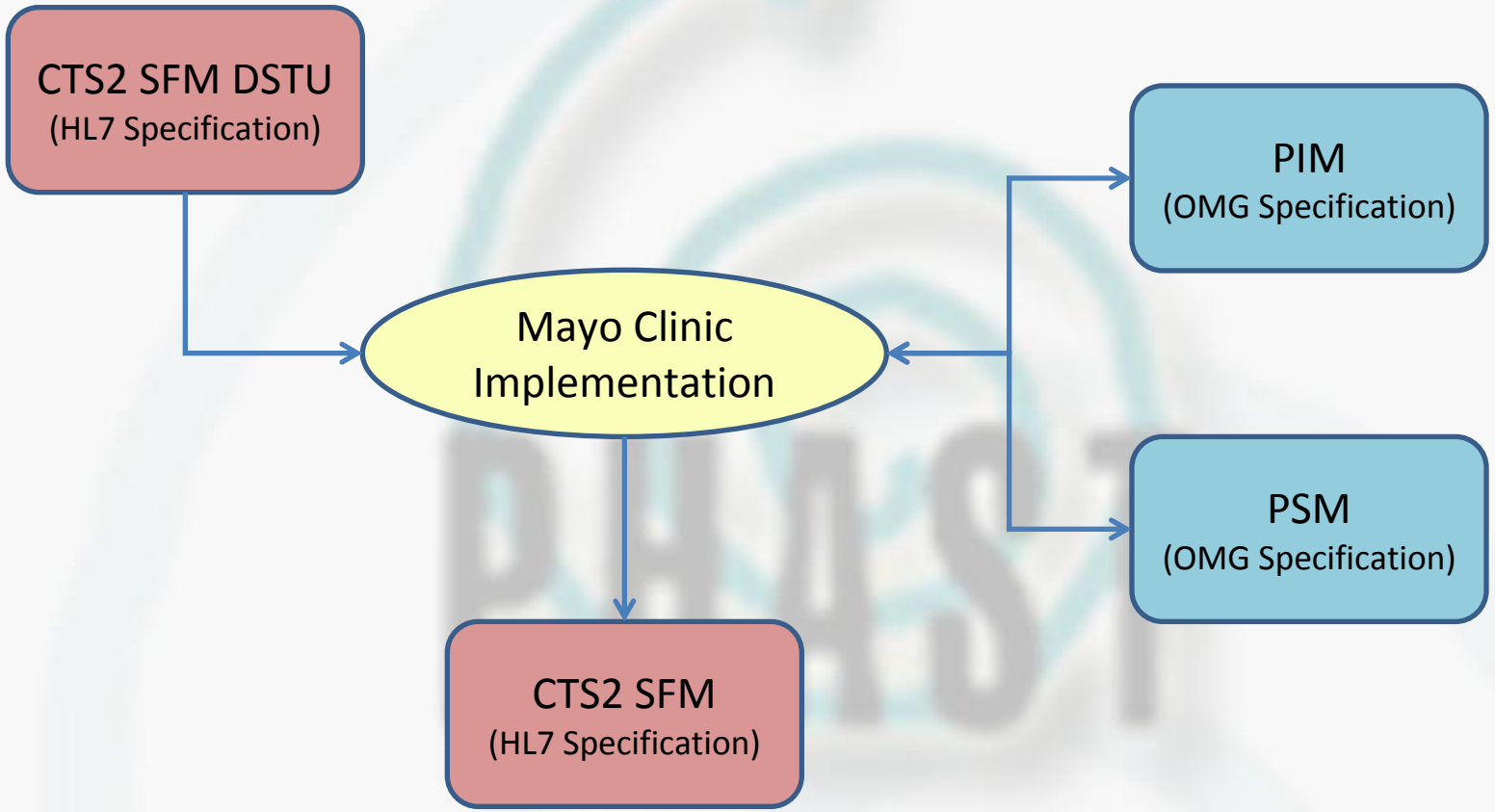
Evolution of CTS2



Approaches to CTS2 implementation: Phast



Approaches to CTS2 implementation: Mayo Clinic



Harmonization efforts

- Phast and Mayo clinic have joined efforts in order to contribute from two different standpoints to the HL7 and OMG CTS2 normative implementation specifications by harmonizing technical feedback from the two different implementation viewpoints.

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Current State
CTS2 Specification

- **CTS2 PIM / HTTP REST PSM and SOAP PSM voted in as standard**
- **OMG FTF - Finalization Task Force Pending**
  - **Waiting on OMG Technical Issues**
  - **Focus will be on errors and *clarification* (finish Z, much more documentation)**

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Current State
CTS2 Development Framework

First version of CTS2 Development Framework is written and running

- **Doesn't cover all of the spec**
- **Sections prototyped against BioPortal, eXist and (pending) LexEVS**

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Current State
CTS2 Implementation Guides

- **IHTSDO (SNOMED-CT) has formed a group to develop the SNOMED-CT CTS2 Implementation Guide**
  - **Target draft document Mar 2012**
- **HL7 is considering an HL7 CTS2 Implementation Guide (proposed)**
- **Targeting RDF/OWL implementation guide middle of 2012**

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Current State
CTS2 HL7 SFM DSTU

- **HL7 SFM DSTU will soon expire. A project to take the DSTU to Normative is planned. Mayo will collaborate with PHAST to contribute technical feedback based on implementations to this HL7 project.**

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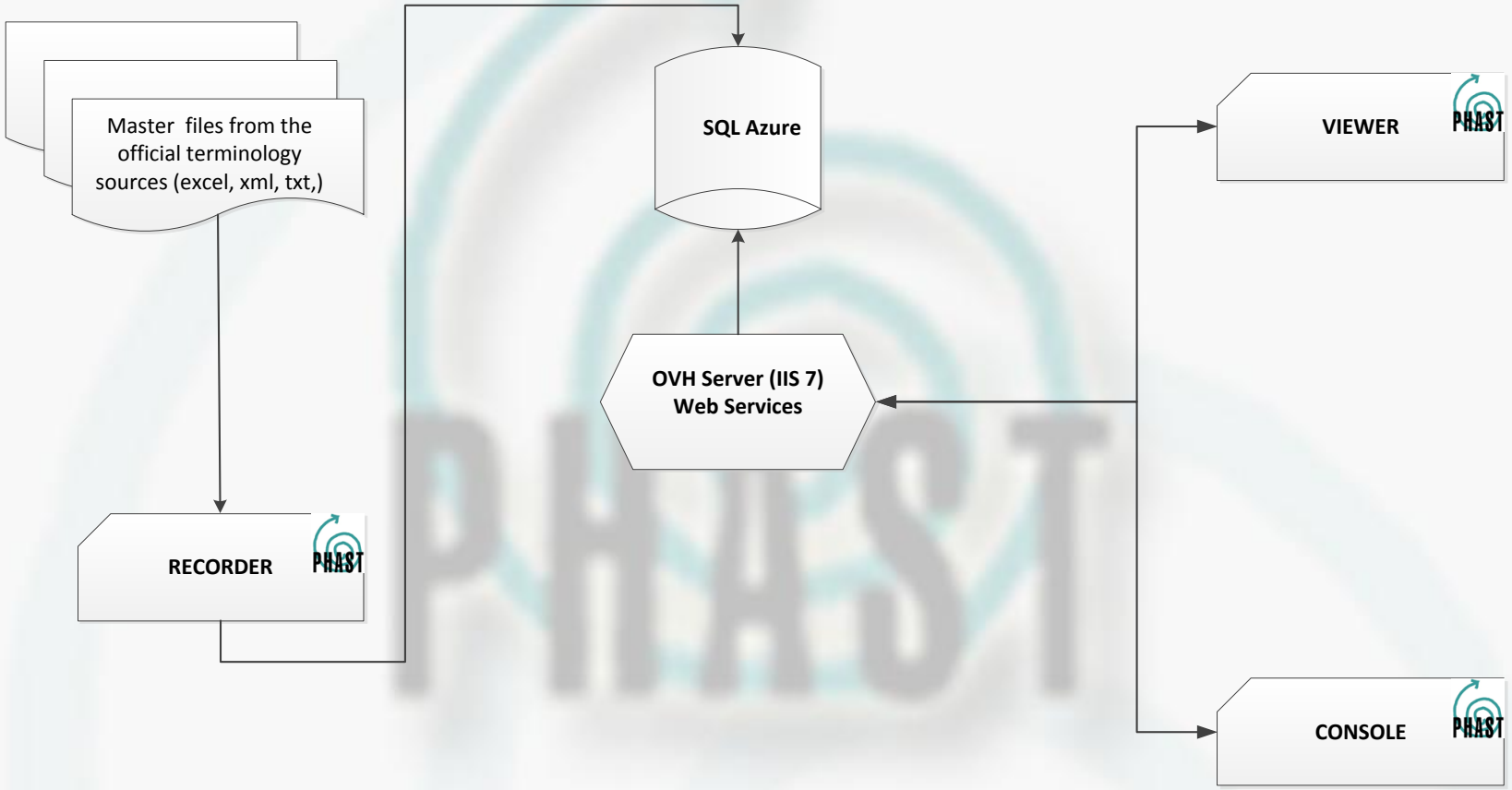
Current State Resources

- http://informatics.mayo.edu/cts2
- http://www.omg.org/spec/CTS2/1.0/Beta1/
- http://informatics.mayo.edu/cts2/framework/

Phast implementation (STS) – use cases in France

- Providing up-to-date specific value sets for the implementation of the national EHR (Dossier Médical Personnel).
- Used in the entries, CD data type and using specific defined value sets mandated by the government)
- IHE-based content profiles in different clinical areas:
  - Cardiology
  - Discharge Summary
  - Anatomic Pathology
  - The Mother and Child Health Certificates
  - Laboratory Reports
  - Multidisciplinary Assessment of Care in Oncology
- Providing updated versions of a localized terminology (LOINC) and the information associated with it – for example if a new code is present, STS will allow for:
  - it being recognized by the software application receiving it within the right context.
  - the user can obtain all the information associated with that particular code from other terminologies (such as units from UCUM or billing information from NABM which is a French billing code system).

STS Architecture



The Database

- The STS database is based on HL7 CTS2 SFM and the HL7 RIM layered on top of the ISO data types

- Advantages to this approach
  - The concepts corresponding to real world objects such as medication or a medical device can have a structured description, allowing for links to additional data saved under the Common Product Model format whenever the need arises. (a medication has attributes such as active ingredient, packaging, pharmaceutical form, etc. and each attribute has different code systems)
  - The CTS2 functional specifications allow for bindings and relationships between
    - value set
    - the concept domains
    - templates
  - The templates are implemented using their usage context; however one may need additional information that is obtained via the link between a template and a particular RIM class.

- Azure SQL database

Recorder

- Executable program proprietary to Phast.
- Can write directly into the database since the "**write**" functions of STS (the CTS2 Terminology Administration Profile and the CTS2 Terminology Authoring Profile are not active yet).
- Can receive information either manually or provided by the Feeder, will be able to receive information when the "write" functions will be activated as well.
- Works by periodically checking its working directory for new files to be integrated in the database.
  - Each file may represent either a whole terminology or simply a value set
  - Each type of file can have a different method for integrating in the database
- The Recorder also archives all the processed material, depending on its source (if the material is created by a user such as translation of display names vs. material produced by official terminology providers).

Web Services

- The CTS2 operations are implemented as functions of the STS Web service.
- All the functions are defined, and for each, the corresponding Web service operation can be invoked with the appropriate input data.
- All the CTS2 operations are present in the list of functions on the web site and on the Forms in the Console (56 operations).
- The website where the Web service is available is: http://extension.phast.fr/RLIO_WS/RLIO.asmx
- Only the active functions that have been implemented will be able to return data. There are only 22 active functions.
- The purpose of having both active and inactive Web service functions listed is so that the programmers needing them can see them and can obtain the WSDL
- The Console will demonstrate if a function is active or not.

Console

- The Console is a program used as a test tool.
- Each **console form** is a function described in the Web service allowing the capturing input data for the Web service, and returning data so that the tester can verify that the functions supported by the Web service are working properly.
- The Console is a program which is a testing tool for the Web services and giving access to the the data present in the Azure database.
- You can install the Console on any PC following the instructions on the Phast wiki:

  http://wiki.phast.fr/index.php?title=Standard_Terminology_Service_-_STS#How_to_install_the_Console_on_your_machine.

Viewer

- Lets a user see the contents of STS database.
- The Viewer is the only part of the STS architecture which is intended for the end user in order to establish trust.
- An advanced user of STS will probably only use it when some manual verification may be needed, for example if a user of an STS client comes across an unexpected code s/he can use the Viewer to check the actual content of the data base.
- http://extension.phast.fr/CTS2/RLIO_CTS2_Main.aspx

Conclusions

- Exchange on the implementation efforts between the Mayo Clinic and Phast.
- Products in beta versions, contributing to standardization efforts (OMG and HL7).
- Improving terminology servers, improving standards.

Any questions?

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