Théorie et Observatoire Virtuel

Etat de l'art 2011

Objectifs

- Faciliter la découverte de ressources dans le domaine de la modélisation et de la simulation numérique en astrophysique
  - Décrire les simulations à un niveau de détail suffisamment fin pour aider à trouver le « bon » service

SimDM

- Faciliter la recherche des jeux de données pertinents fournis par la ressources
  - Naviguer dans les jeux de données pour trouver celui qui présente un intérêt pour l'utilisateur

SimDAL ou SimDB

- Faciliter l'extraction de sous-ensembles de données
  - En particulier pour les volumes importants de données

SimDAL

- Faciliter le téléchargement des jeux de données sélectionnés, éventuellement de façon asynchrone
  - En s'adaptant aux formats de données très variés en simulations

SimDAL

Principaux évènements

- 2011 : une année très chargée pour le groupe Théorie
  - Standards (H. Wozniak, F. Le Petit, B. Ooghe, D. Languignon, et al.)
  - Vocabulaire pour la théorie (F. Le Petit et al.)
  - Développement de services (voir présentation de D. Languignon)
- IVOA Theory Interest Group
  - Franck Le Petit : vice-chair depuis printemps 2011
  - Hervé Wozniak : chair prolongé jusqu'au printemps 2012

Standards IVOA en cours d'élaboration

- Simulation Data Model (SimDM)
  - Vocabulaire et Sémantique
- Simulation (metadata) Data Base (SimDB)
- Simulation Data Access Layer (SimDAL)

SimDM

USERS

COMPUTERS

REC

InProgress

USER LAYER

Browser Based Apps | *Desktop Apps* | *Script Based Apps*

USING

REGISTRY

VO Query Languages

Utypes

Units

UCD

Semantics

Vocabularies

VO CORE

Data Models

DATA ACCESS

PROTOCOLS

Formats

VOTable

SimDM

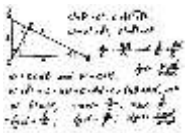
SimDAL

SHARING

Storage | *Data and Metadata Collection* | *Computation*

RESOURCE LAYER

PROVIDERS



20110515
IVOA Architecture

Simulation Data Model : PR

IVOA Proposed Recommendation

International Virtual Observatory Alliance

IVOA Documents

Recommandation :

http://www.ivoa.net/Documents/SimDM/index.html

- RFC du 4 mai au 12 octobre (clos)
- En cours de revue TCG depuis le 20 octobre

Simulation Data Model
Version 1.0

IVOA Proposed Recommendation 19 October 2011

Interest/Working Group:
http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDataModel

Author(s):
Gerard Lemson, Laurent Bourgès, Miguel Cerviño, Claudio Gheller, Norman Gray, Franck LePetit, Mireille Louys, Benjamin Ooghe, Rick Wagner, Hervé Wozniak

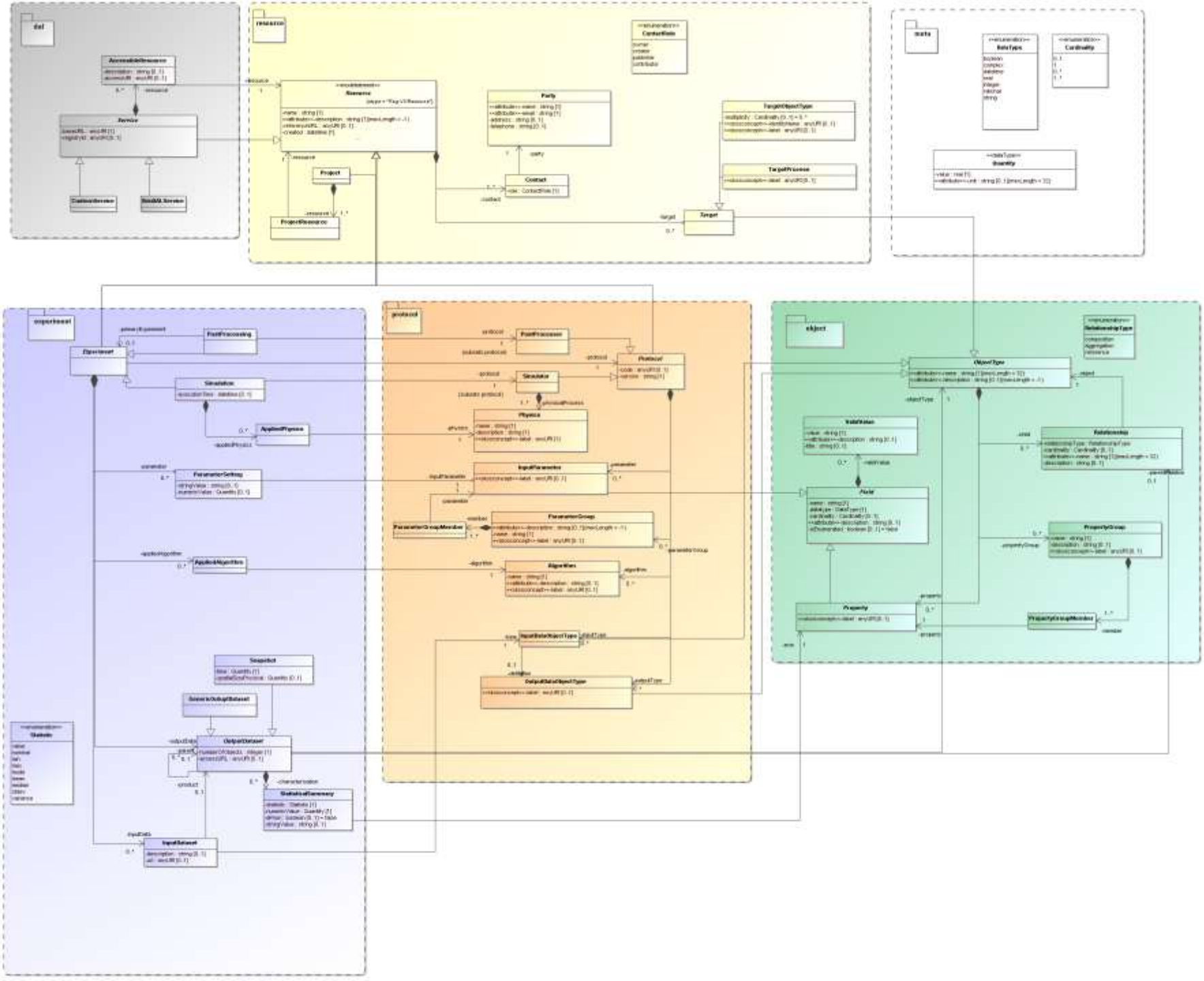
Editor(s):
Gerard Lemson, Hervé Wozniak

Abstract

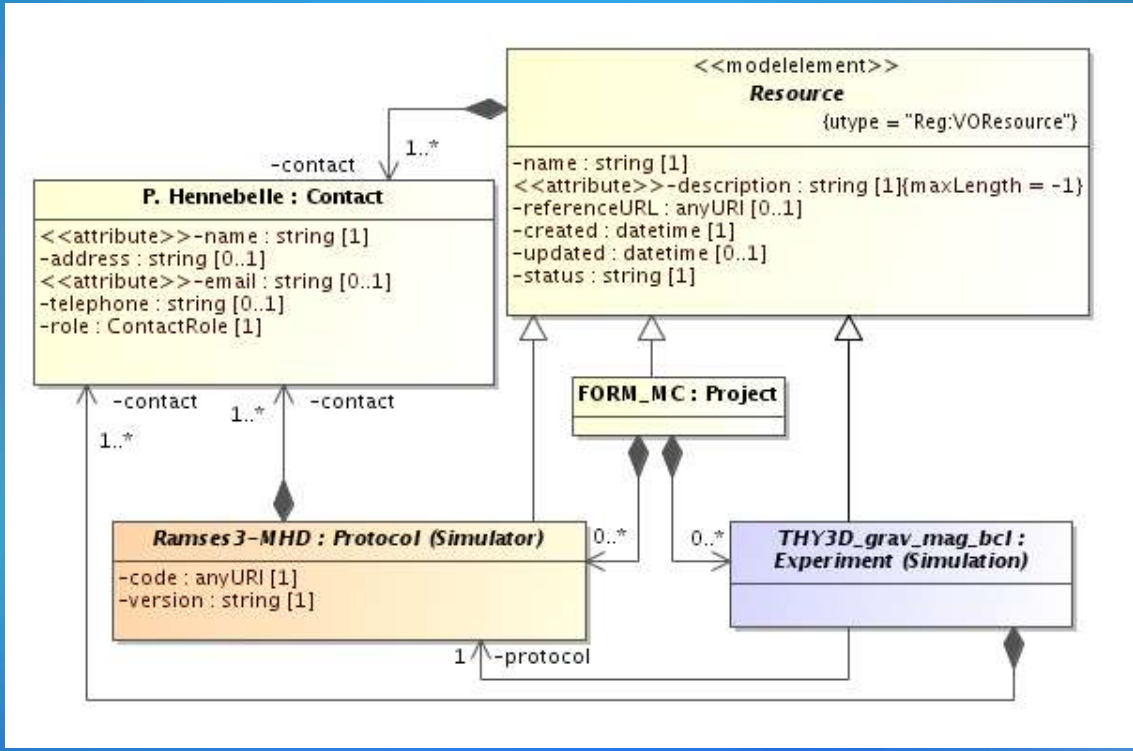
In this document and the accompanying documents we propose a data model(Simulation Data Model) describing numerical computer simulations of astrophysical systems. The primary goal of our proposal is to support discovery of simulations by describing those aspects of them that scientists might wish to query on, i.e. it is a model for meta-data describing simulations. This document does not propose a protocol for using this model. Two distinct IVOA protocols (SimDB and SimDAL) are in the make and both are supposed to use the model, either in its original form or in a form derived from the model proposed here, but more suited to the particular protocol. The SimDM has been developed in the IVOA Theory Interest Group with assistance of representatives of relevant working groups, in particular DM and Semantics.

Status of this document

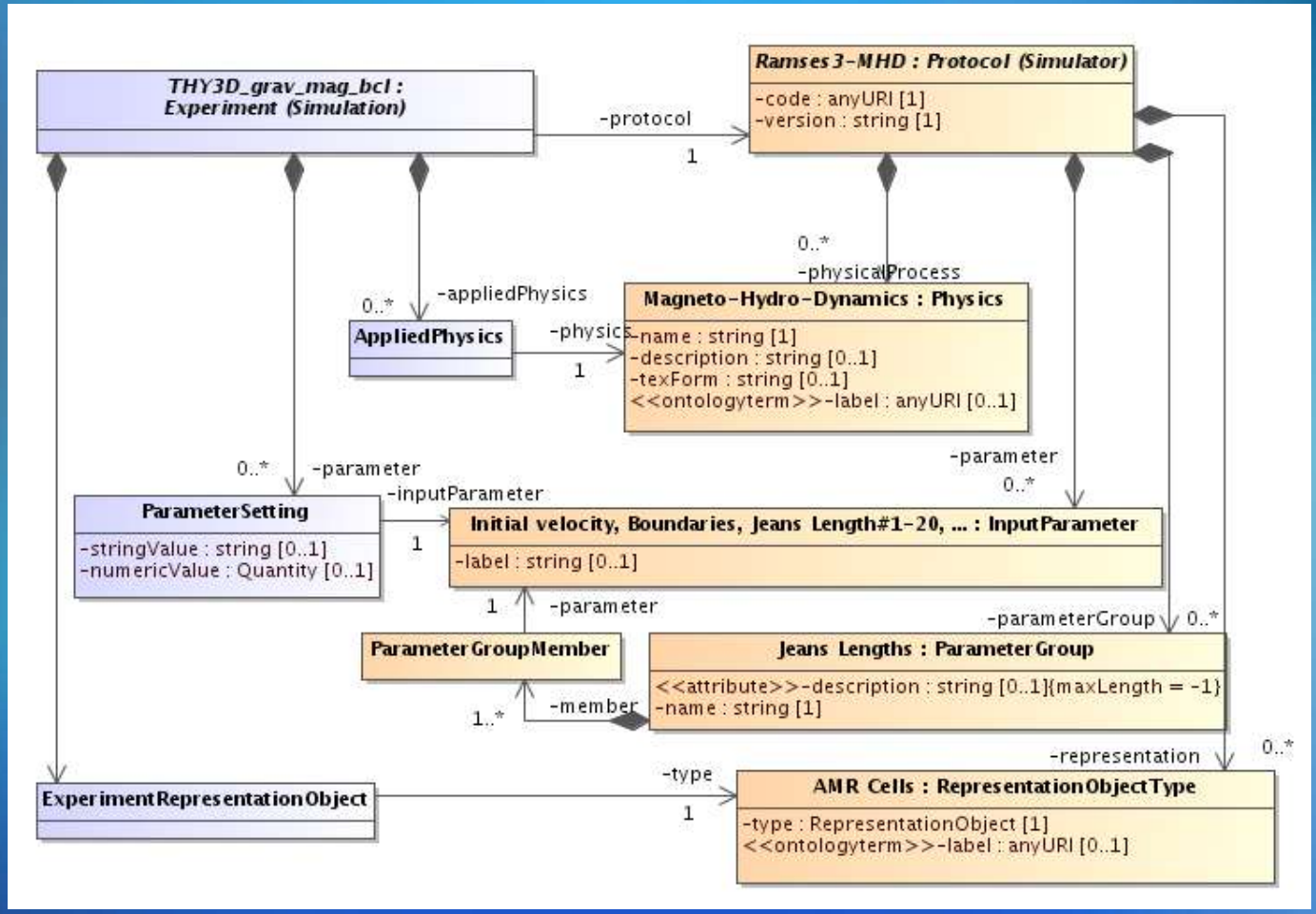
This is an IVOA Proposed Recommendation made available for public review.
It is appropriate to reference this document only as a recommended standard that is under review and which may be changed before it is accepted as a full recommendation.


def
AccessibleResource
Service
OntologyService
WebAPI Service
resource
Resource
Project
ProjectResource
Party
Contact
TargetObjectType
TargetProcess
Target
CaptureMode
data
DataTypes
Cardinality
Quantity
experiment
ExperimentSetup
PostProcessing
Simulation
ApplicationProcess
ParameterSetting
ApplicationAlgorithm
SeqeuncSet
SimulationOutputDataset
Statistic
OutputDataset
StatisticalSummary
InputDataset
protocol
PostProcessor
Protocol
Simulator
Physics
InputParameter
ParameterGroup
ParameterGroupMember
Algorithm
InputDataObjectType
OutputDataObjectType
object
ObjectType
RelationshipType
ValidValue
Relationship
Role
PropertyGroup
Property
PropertyGroupMember

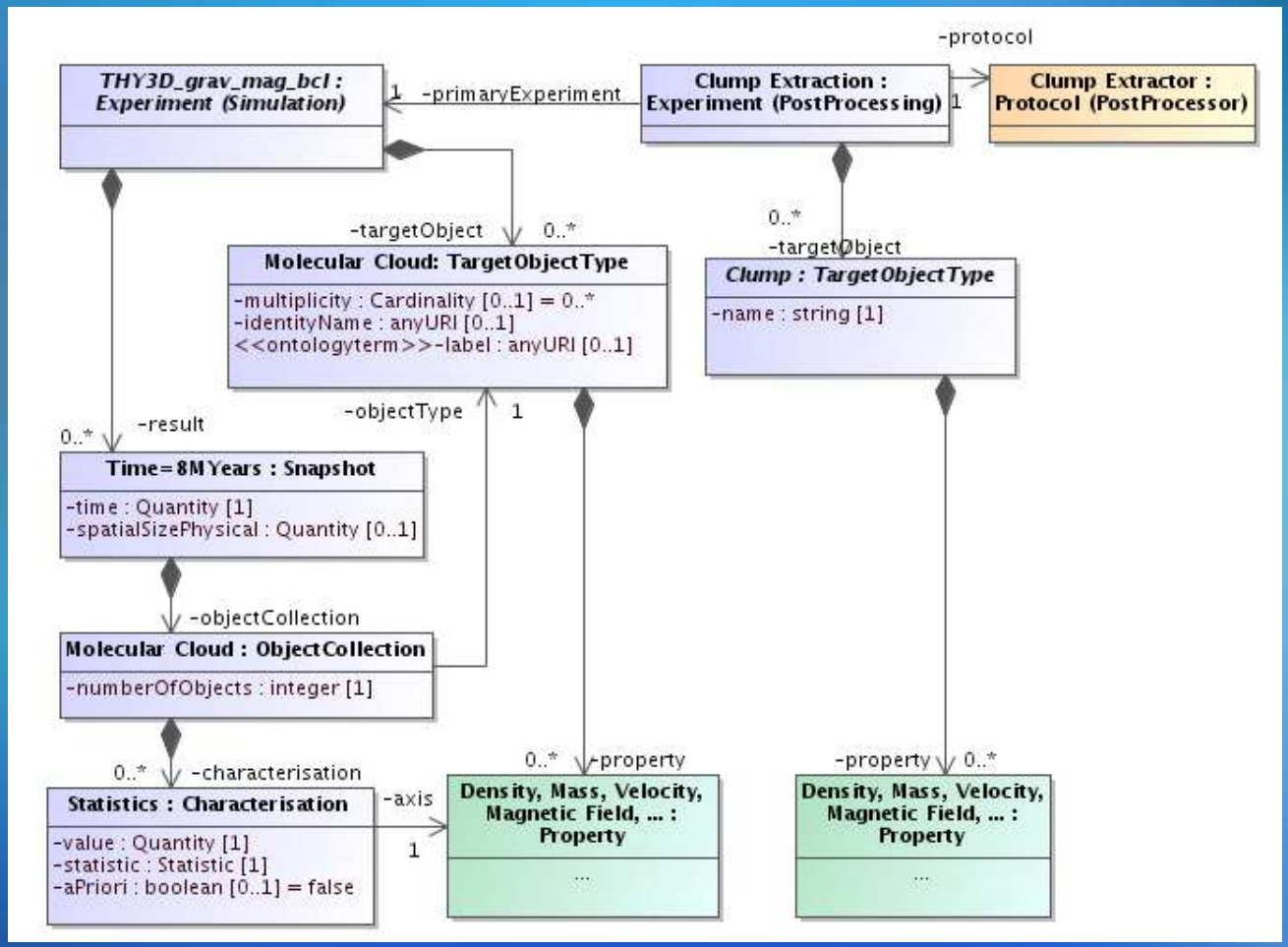
StarFormat examples of instantiation : Projects



StarFormat examples of instantiation : Simulations and Codes



StarFormat examples of instantiation : Snapshots, Results & Statistics



Simulation Data Model : les documents

- http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/IVOATheorySimDMspec

Simulation Data Model specification

The RFC has been opened from May 4th to June 4th. It has been prolonged until 12th of October to gather additional comments on the last 2011.09.06 version.

The TCG review is opened from Oct 20th to Nov 20th.

Page for comments during the RFC is there : http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/SimRFC.

New release of this specification in the DM WG and Theory IG : discussion at SimDMdiscussionPage

This page collects all the URLs of the documents forming the specification of SimDM, the so-called Simulation Data model. This specification being still in development, most URLs point to the Volute GoogleCode project at http://code.google.com/p/volute/source/browse/trunk/projects/theory/snapdm/specification/. But, as soon as SimDM is recommended, it will contain all the files.

SimDM current documents

File	Purpose	URLs
Simulation Data Model 1.0 Proposed Recommendation	The PR for the Simulation Data Model	http://www.ivoa.net/internal/IVOA/SimRFC/PR-SimulationDataModel-v.1.00-20111019.pdf
		http://www.ivoa.net/internal/IVOA/SimRFC/PR-SimulationDataModel-v.1.00-20111019.doc
NoteImplementationSimDB_1.0-20110910.pdf	Implementation Note (examples)	pdf file
SimDM.html	Specification of the model	http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/html/SimDM.html
SimDM_DM.png	Graphic view of the whole model (large image)	http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/uml/SimDM_DM.png
SimDM_DM.xml	MagicDraw UML diagram serialised to XMI	http://volute.googlecode.com/svn/trunk/projects/theory/snapdm/specification/uml/SimDM_DM.xml
SimDM_INTERMEDIATE.xml	Intermediate representation of the model: a (generated) XML document representing the complete model in more readable format than XMI	http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/uml/SimDM_INTERMEDIATE.xml
intermediateModel.xsd	XML schema document for intermediate representation's XML format	http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/uml/intermediateModel.xsd
xsd/	XML schema documents (generated) representing mapping of UML to XSD	http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/SimDM_root.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/base.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/resource.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/meta.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/object.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/resource/dal.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/resource/experiment.xsd http://volute.googlecode.com//svn/trunk/projects/theory/snapdm/specification/xsd/resource/protocol.xsd

Simulation Data Model : Note d'implémentation

Implementation of the Simulation Data Model

Version 1.0

IVOA Note 2011 September 9th

This version: 1.0
Version 1.0-20110909

Latest version:
http://www.ivoa.net/Documents/latest/latest-version-name

Previous version(s):
Version 1.0

Editors:
Franck Le Petit, Benjamin Ooghe-Tabanou

Author(s):
Franck Le Petit, Benjamin Ooghe-Tabanou, Nicolas Moreau, Laurent Bourgès, , Gerard Lemson, Jonathan Normand

Abstract

This document aims at providing examples of implementation of SimDM. Two VO-Theory databases are explained in details. First, the STARFORMAT database devoted to MHD simulations. Second, the PDR database devoted to 1D models of interstellar clouds. We present how the results of these simulations have been mapped on the Simulation Data Model. We also present in each case, the pipeline we used to simplify the updates of the databases each time the codes behind the simulation evolves or that new simulations have to be added in the databases. An overview of Millenium is also presented as well as a discussion presenting the relationships between S3 and a service based on SimDM.

Vocabulaire & Sémantique

- Consolidation des vocabulaires à utiliser avec SimDM
- http://votheory.obspm.fr/terms
- Accès via http://purl.org/astronomy/vocab/...
  - Algorithms used in class Algorithm
  - InputParameters → InputParameter
  - PhysicalProcesses → Physics and TargetProcess
  - PhysicalQuantities → Property
  - OutputDataObjects → OutputDataObjectType
  - AstronomicalObjects → TargetObjectType
- Exemple : http://purl.org/astronomy/vocab/algorithms/GaussSeidel

Simulation (metadata) DataBase (SimDB)

- Les *registries VO* ne disposent que d'une description limitée des services théoriques
- SimDB permet de collecter les metadata (SimDM) de tous les services
- SimDB permet de trouver tous les services et jeux de données intéressants en une seule (ou quelques) requêtes sans avoir à interroger tous les services un à un
  - Sorte de registre à grain fin
- Complexes à mettre en œuvre d'un point de vue technique
    - Centralisation sur quelques SimDB (e.g. Garching, Paris)
- Requêtes parfois complexes à gérer (nombreuses tables)

SimDB

USERS

COMPUTERS

REC

InProgress

USER LAYER

Browser Based Apps

Desktop Apps

Script Based Apps

USING

SimDB

Resource Metadata

VOResource

VODataService

REGISTRY

ADQL

VO Query Languages

UCD

Semantics

VO CORE

Utypes

Units

Data Models

DATA ACCESS

PROTOCOL

TAP

Formats

Resource Identifier

VOTable

SimDM

SimDAL

VOSI

SHARING

UWS

Storage

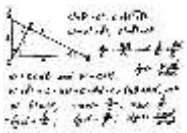
Data and Metadata Collection

RESOURCE LAYER

Computation

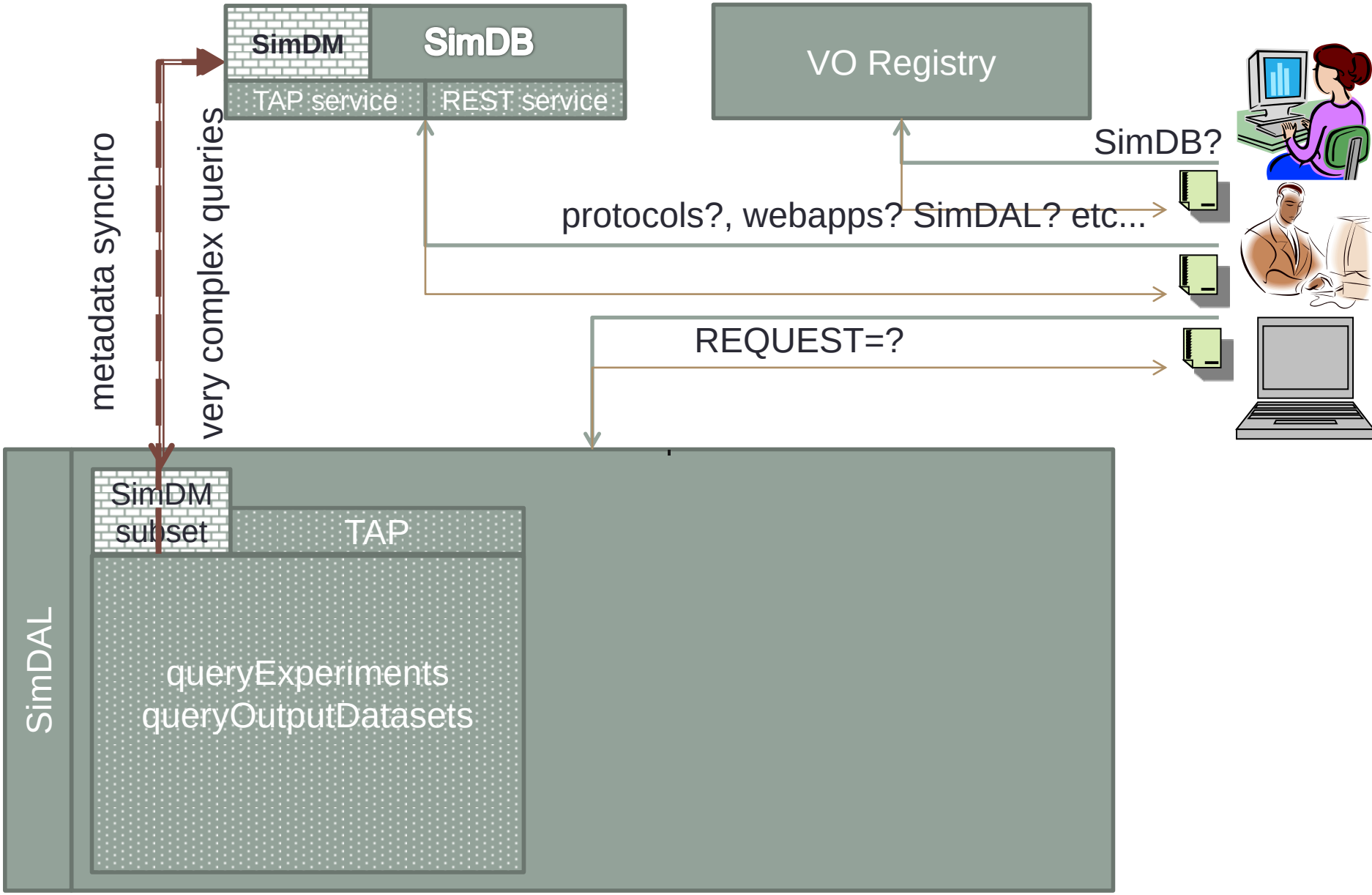
DRAFT

PROVIDERS



20110515
IVOA Architecture

Strasbourg Sep 2010 slightly updated after Nara INTEROP Dec2010



SimDAL

USERS

COMPUTERS

REC

InProgress

USER LAYER

Browser Based Apps | *Desktop Apps* | *Script Based Apps*

USING

SimDB

Resource Metadata

VOResource

REGISTRY

ADQL

PQL

VO Query Languages

STC

Utypes

Units

UCD

Semantics

Vocabularies

VO CORE

Data Models

DATA ACCESS

PROTOCOLS

TAP

SimpleDALRegExt

VOSI

Formats

Resource Identifier

VOTable

SimDM

SimDAL

SHARING

UWS

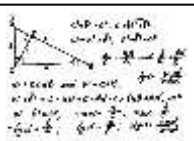
Storage

Data and Metadata Collection

RESOURCE LAYER

Computation

PROVIDERS

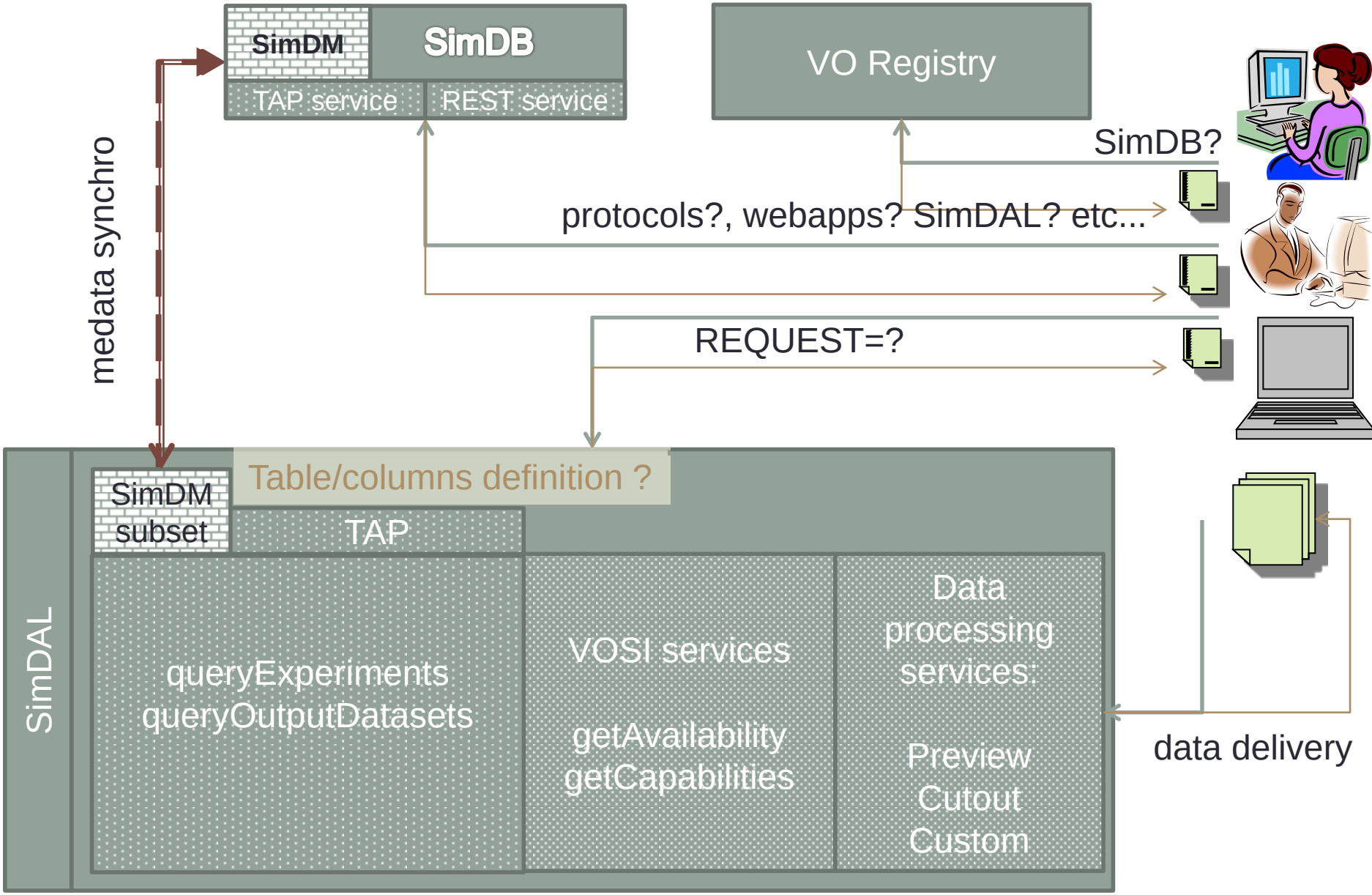


20110515
IVOA Architecture

Simulation Data Access Layer (SimDAL)

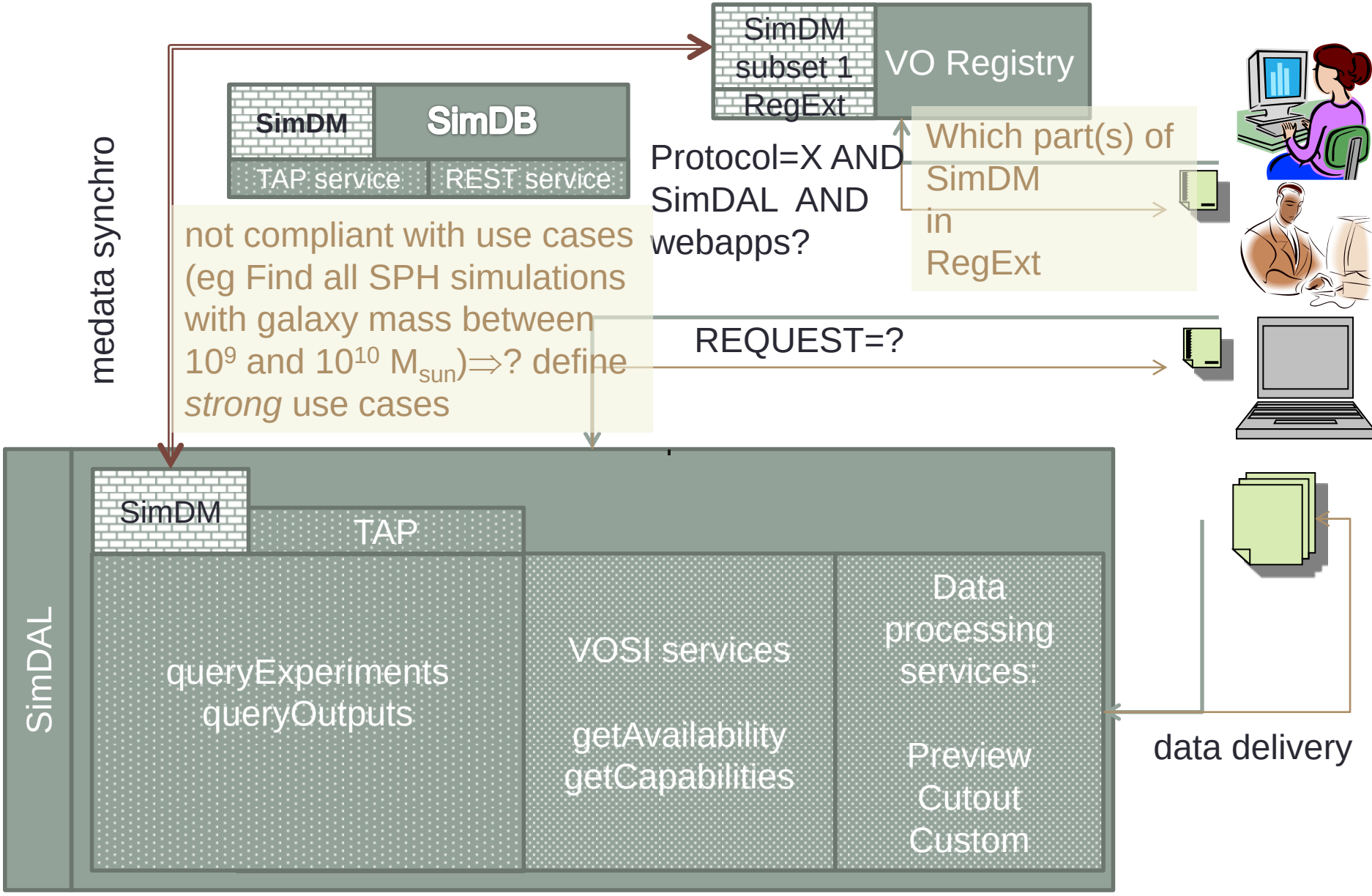
- Du côté du « provider » des modèles ou des simulations
- Couche permettant
  - De naviguer dans les différents jeux de données (si besoin)
  - De prévisualiser
  - De sélectionner les jeux de données à télécharger ou d'extraire des sous-ensembles (cutout)

Strasbourg Sep 2010 slightly updated after Nara INTEROP Dec2010



Les défis 2012

- Simulation Access Layer (SimDAL)
  - Manque de forces pour :
    - Développer le standard
    - Tester sur des implémentations « test » (cf. D. Languignon)
  - Risques de dispersion :
    - « Quick and dirty » (rapide mais plutôt web-service que VO)
    - Exhaustif (plus long mais totalement interopérable)
  - Deux grands cas scientifiques extrêmes à considérer :
    - De « quelques » à « de nombreux » fichiers ascii ou autres, téléchargeables
    - Simulations de gros volumes dont il faut extraire un sous-ensemble (spatialement ou via des paramètres)
  - Décision prise de ne faire qu'un seul standard (Victoria INTEROP 2010)
    - SimDAL = S3 (proposé par SVO) + SimDAP (tous sauf SVO)
    - Des avancées depuis:
      - Table Access Protocol (TAP) via PQL
      - Queries par SKOS Concept ? Etc.


SimDM subset 1 RegExt
VO Registry
SimDM
SimDB
TAP service
REST service
medata synchro
Protocol=X AND SimDAL AND webapps?
Which part(s) of SimDM in RegExt
not compliant with use cases (eg Find all SPH simulations with galaxy mass between 10^9 and 10^{10} M_{sun})⇒? define *strong* use cases
REQUEST=?
SimDM
TAP
SimDAL
queryExperiments
queryOutputs
VOSI services
getAvailability
getCapabilities
Data processing services:
Preview
Cutout
Custom
data delivery