Modelos de Datos y VO

Juan de Dios Santander Vela, Emilio García (IAA-CSIC)

Primera Escuela de Observatorio Virtual de la
Red Temática Observatorio Virtual. Villafranca del Castillo, 26/11/2006

Esquema de la charla

- Modelos de datos
- Modelado de datos en IVOA
- Ejemplo modelo de datos: RADAMS
- Preguntas

Modelos de Datos

Definición

Descripción del conjunto de entidades (tablas y campos) necesarios para el almacenamiento de información dentro de un campo particular, y que especifica tanto los datos que se almacenan como las relaciones entre ellos.

Estructura de la información

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Becario I3P de Postgrado (01/2006-12/2006)
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Estructura de la información

- Elementos de modelos de datos
  - Campos (Atributos en POO)
  - Tipos de Datos
  - Semántica
  - Relaciones

Estructura de la información

Atributos y tipos de datos

Estructura de la información

Atributos y tipos de datos

Campo	Núm. Objeto	Nombre	RA	Dec	Época

Estructura de la información

Atributos y tipos de datos

Campo	Núm. Objeto	Nombre	RA	Dec	Época
Tipo	BigInt	String	Float	Float	String Code

Estructura de la información

Atributos y tipos de datos

Campo	Núm. Objeto	Nombre	RA	Dec	Época
Tipo	BigInt	String	Float	Float	String Code
Ejemplo	3123453445 ~~OBGGALAX_1~~	‘CIG 96’ ~~96~~	132.3478 ~~8h12º50’52’’~~	-05.3345 ~~-0h5º20’42’’~~	‘J2000’ ~~‘Epoch J2000’~~

Estructura de la información

Semántica y UCDs

Estructura de la información

Semántica y UCDs

Campo	Núm. Objeto	Nombre	RA	Dec	Época

Estructura de la información

Semántica y UCDs

Campo	Núm. Objeto	Nombre	RA	Dec	Época
Significado	Código de objeto	Nombre del objeto	Ascensión recta	Declinación	Código de Época

Estructura de la información

Semántica y UCDs

Campo	Núm. Objeto	Nombre	RA	Dec	Época
Significado	Código de objeto	Nombre del objeto	Ascensión recta	Declinación	Código de Época
UCD	meta.id; meta.code	meta.id; meta.name	pos.eq.ra; meta.main	pos.eq.dec; meta.main	time.epoch; meta.code

Modelado de datos en IVOA

Modelos de Datos en IVOA

Welcome to the IVOA TWiki!

This is the web-based collaboration area of the **International Virtual Observatory Alliance**

Main topics:

- Who is Who?
- Events
- Reports & Minutes
- Forums
- Technical Milestones

Working Groups:

- Resource Registry
- Semantics
- Data Modeling
- Data Access Layer
- VO Event
- VO Query Language
- Grid & Web Services
- Standards & Processes
- VOTable

Interest Groups:

- Applications
- Theory
- GGF Astro-RG
- Data Curation & Preservation

List of Initial working Draft documents (version < 1.0): InitialWorkingDrafts

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Modelos de Datos en IVOA

Technical Specifications

Title	Group	Most stable	In progress	Version history
IVOA Astronomical Data Query Language	VQL	1.01	RFC	1.01 1.00
Data Model for Astronomical DataSet Characterisation	DaM	1.00		1.00
IVOA Document Standards	SDP	**1.00**		**1.00** 1.00
IVOA Identifiers	ReR	1.11	RFC	1.11 1.10 1.10 1.10 1.00
Maintenance of the list of UCD words	semantics	**1.20**		**1.20** 1.20 1.10 1.00
IVOA Registry Interfaces	ReR	1.00		1.00
Resource Metadata for the Virtual Observatory	ReR	**1.01**	1.10 RFC	1.10 1.10 **1.01** 1.01 1.00 1.00
Simple Image Access	DAL	1.00		1.00
IVOA Single-Sign-On Profile: Authentication Mechanisms	GWS	1.00		1.00
IVOA SkyNode Interface	VQL	1.01	RFC	1.01 1.00
Space-Time Coordinate for the Virtual Observatory	DaM	1.21	RFC	1.21 1.20 1.10 1.00
An IVOA standard for Unified Content Descriptors	semantics	**1.10**		**1.10** 1.10 1.06 1.05 1.03
UCD1+ Controlled Vocabulary	semantics	**1.11**	1.21 RFC	1.21 1.20 1.20 **1.11** 1.11 1.10 1.02 1.00
Sky Event Reporting Metadata (VOEvent)	VOE	**1.11**		**1.11** 1.11 1.10 1.01
VOResource: an XML Encoding Schema for Resource Metadata	ReR	1.02		1.02 1.01 1.00
IVOA Spectral Data Model	DaM	1.00		1.00
VOTable Format Specification	VOT	**1.10**		**1.10** 1.00

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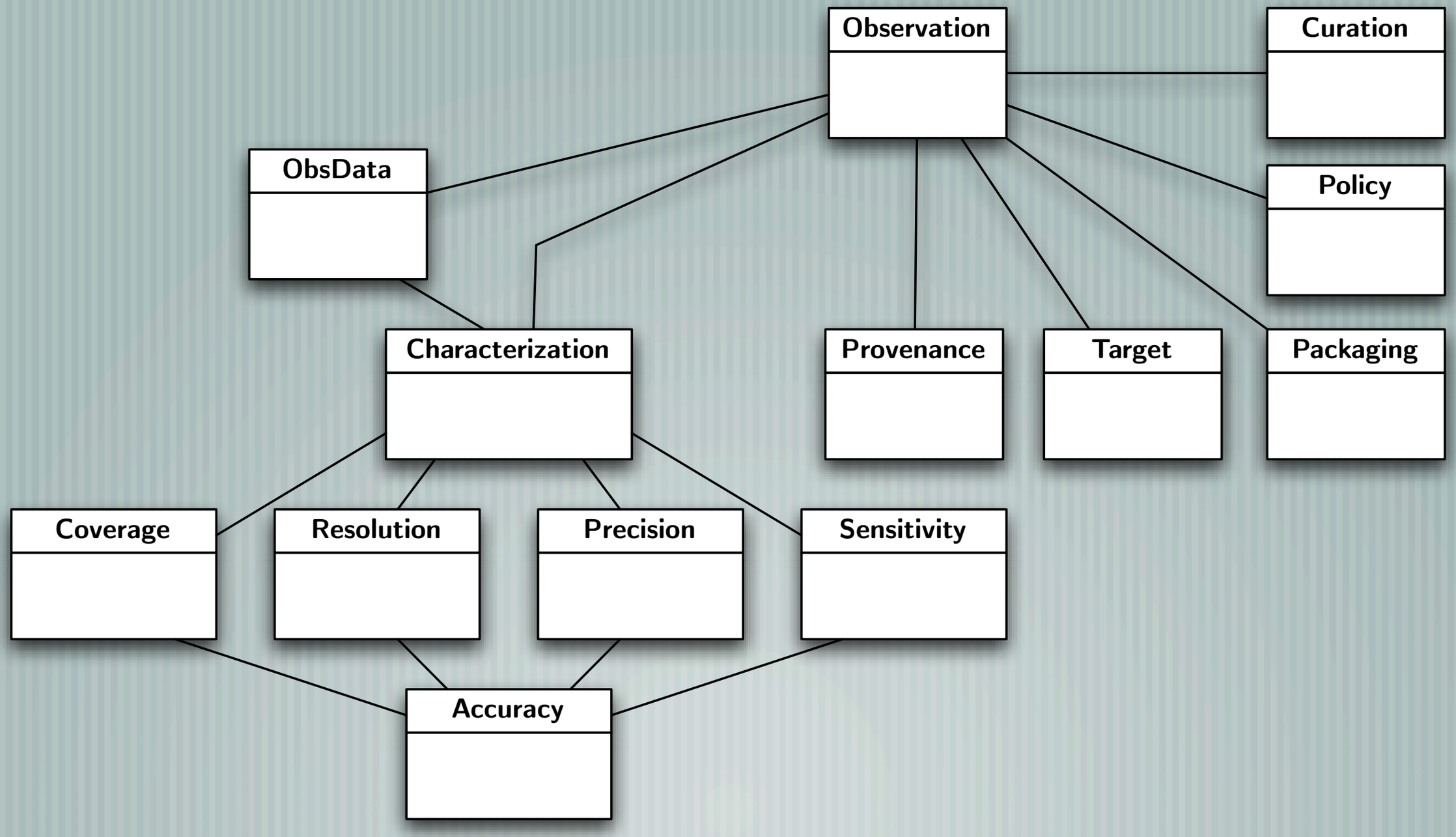
RADAMS: Radio Astronomy DAta-Model for Single-dish radio-telescopes

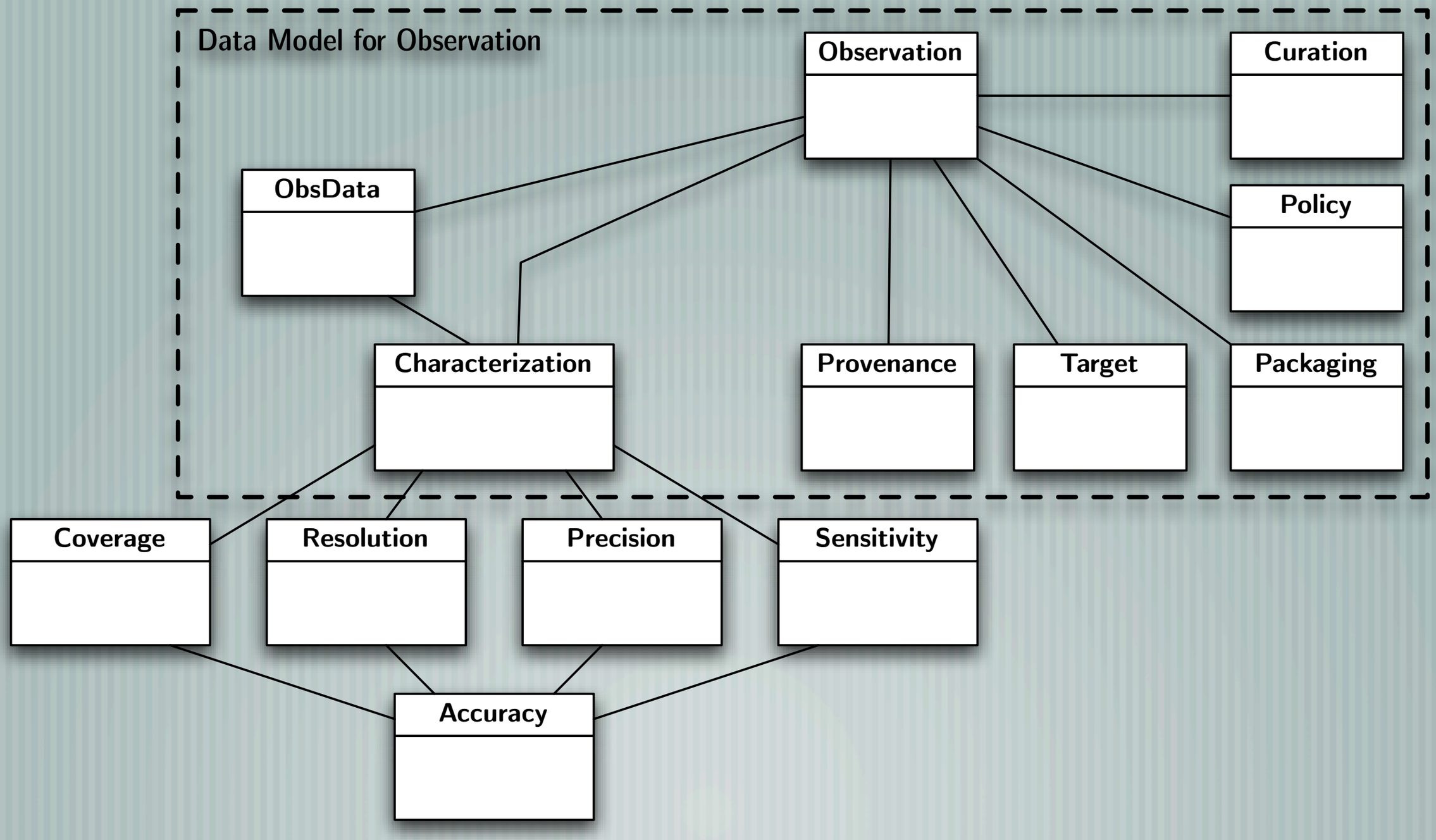
Fuentes RADAMS

- Data Model for Observation
  - McDowell, Bonnarel et al., IVOA Data Model WG Internal Draft
- Data Model for Astronomical Dataset Characterisation
  - McDowell, Bonnarel et al., IVOA Data Model WG Note
- IVOA Spectral Data Model
  - McDowell, Tody et al., IVOA Data Model WG Working Draft
- IVOA Data Model for Raw Radio Telescope Data
  - Lamb and Power, IVOA Radio IG Note

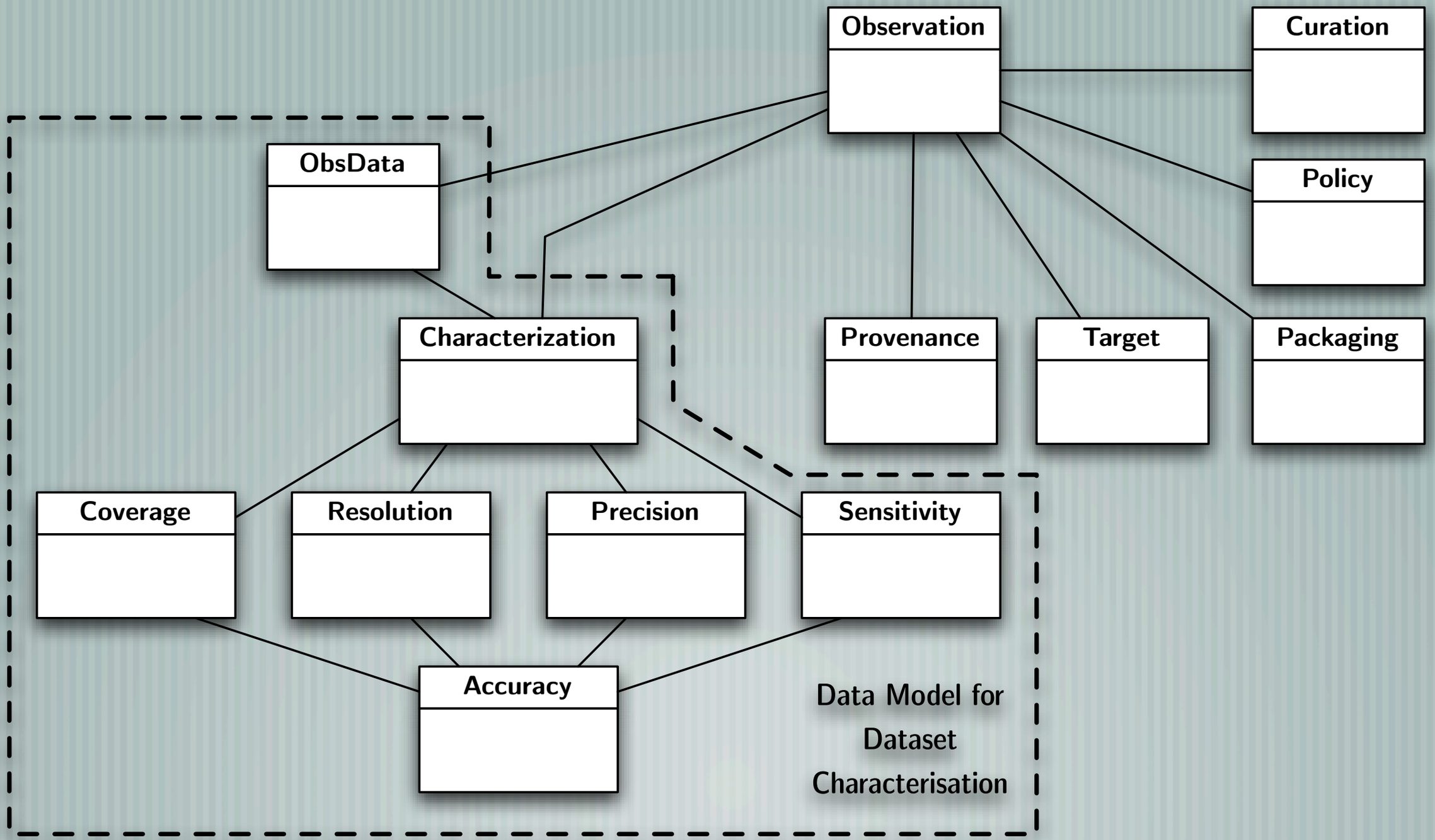
Estructura RADAMS



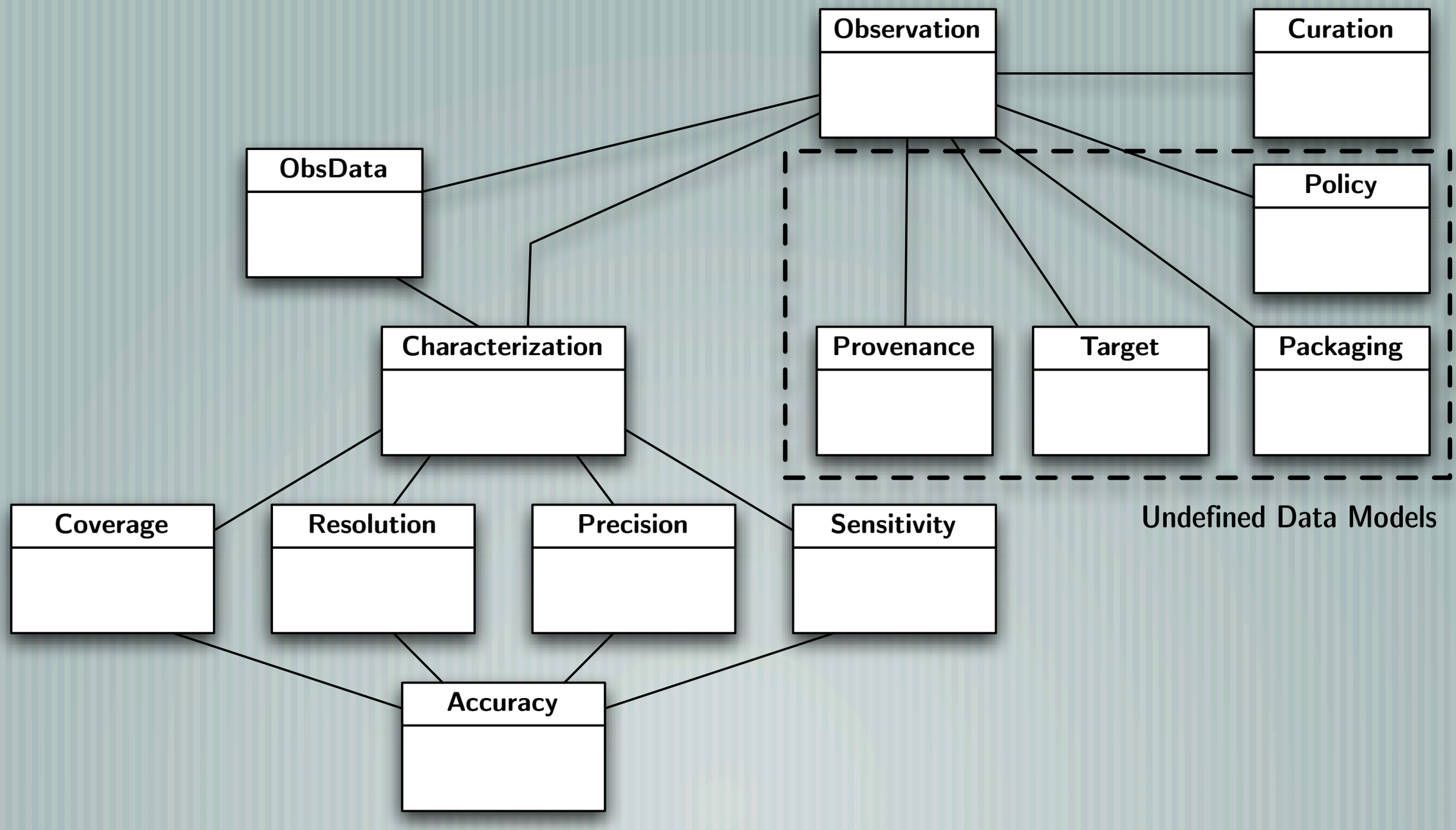
Estructura RADAMS



Estructura RADAMS



Estructura RADAMS



Detalles RADAMS

Table 7.1: AxisFrame.Spatial metadata.

Attribute	FITS Keyword	UCD	Description
axisName	assign	meta.id; meta.main	Axis name.
calibrationStatus	assign	obs.calib; meta.code	Calibration status from a controlled vocabulary: `uncalibrated`, `calibrated`, `relative`[a], `normalized`[b].
ucd	assign	meta.ucd; meta.main	Main UCD
unit	assign	meta.unit; meta.main	Main uni
refPos	assign	meta.ref; meta.id	Identifi sition Frame ulary nate
spaceRefFrame	`WCSNAME` or `RADESYS`	pos.frame; meta.id	Iden syst cal or F
coordEquinox	assign	pos; time.equinox	
epoch	assign	pos; time.epoch	
independentAxis	assign	pos; obs.param; meta.code	
undersamplingStatus	assign	pos; obs.param; meta.code	
regularStatus	assign	pos; obs.param; meta.code	

[a] `relative` refers to calibrated data, except f
[b] `normalized` refers to dimensionless quantit
between two commensurable datasets.

Table 7.40: Calibration metadata[a].

Attribute	FITS Keyword	UCD	Description
timestamp	`DATE-RED`	obs.param; time.epoch	Timestamp for the calibration step being performed.
parameter.name	assign	obs.calib; obs.param; meta.id	Keyword defining the parameter that we will characterise with the remaining attributes.
parameter.type	assign	obs.calib; obs.param; meta.code	Type of calibration parameter used, from a controlled vocabulary: `additive`, `factor`, `polynomial`, `exponential`, `logarithmic`.
parameter.value	assign	obs.calib; obs.param; meta.number	Value for the main calibration parameter, where parameter.type is not `polynomial`.
parameter.sigma	assign	obs.calib; obs.param; meta.number	Value of sigma, for `exponentia` calibrations.
parameter.calCoeff.[n]	assign	obs.calib; obs.param; meta.number	n^{th} degree coefficient fo `polynomial` calibration pa ter; polynomial degree is d from the maximum n.

[a] It is mandatory that at least one `[parameter.name, parame parameter.value]` triplet appears, with `fluxScale` as parameter.name, `antennaTemperature`, `mbBrightnessTemperature`, or `S_nu` as the parameter. parameter.type of `string`.

Table 7.39: Processing Step metadata.

Attribute	FITS Keyword	UCD	Description
timestamp	`DATE-RED`	obs.param; time.epoch	Timestamp for the p step being performed.
type	assign	obs.param; meta.code	Type of processing to source data; comes controlled vocabulary: `essed`, `noiseWeightedAv nonWeightedAverage`.
softwarePackage	assign	meta.software; meta.id	Software package used for processing; should come a controlled vocabulary: `CL GILDAS`, `MIRA`, `MIR`, `other`. In case of `other`, the actual packa that was used should be add as a parameter, with param eter.name as `softwarePackag` and the parameter.value as the package name.
parameter[n].name	assign	obs.param; meta.code	Additional processing parameter name, whose value will be in pa rameter.value; eventually, we will have a controlled list of possible parameter.name values.
parameter[n].type	assign	obs.param; meta.code	From a controlled vocabulary: `integer`, `float`, `string`... At least all of FITS data types should be present.
parameter[n].value	assign	obs.param[a]	Value for the parameter indicated by parameter.name.

[a] The final UCD to mark parameter[n].value will be calculated when writing the VOTable, as it depends on parameter.type; it will be `obs.param; meta.number` most of the time, but it could be `obs.param; meta.name` or `obs.param; meta.code`, depending on the context.

Detalles RADAMS

Table 7.39: Processing Step metadata.

Attribute	FITS Keyword	UCD	Description
timestamp	`DATE-RED`	`obs.param; time.epoch`	Timestamp for the processing step being performed.
type	`assign`	`obs.param; meta.code`	Type of processing applied to source data; comes from a controlled vocabulary: `unprocessed`, `noiseWeightedAverage`, `nonWeightedAverage`.
softwarePackage	`assign`	`meta.software; meta.id`	Software package used for data processing; should come from a controlled vocabulary: `CLASS`, `AIPS`, `AIPS++`, `CASA`, `MOPSIC`, `GILDAS`, `MIRA`, `MIR`, `other`. In the case of `other`, the actual package that was used should be added as a parameter, with param-

¡Gracias!

¿Preguntas?