Tecgraf/PUC-Rio

PCA Instrument SIG Workshop 2010

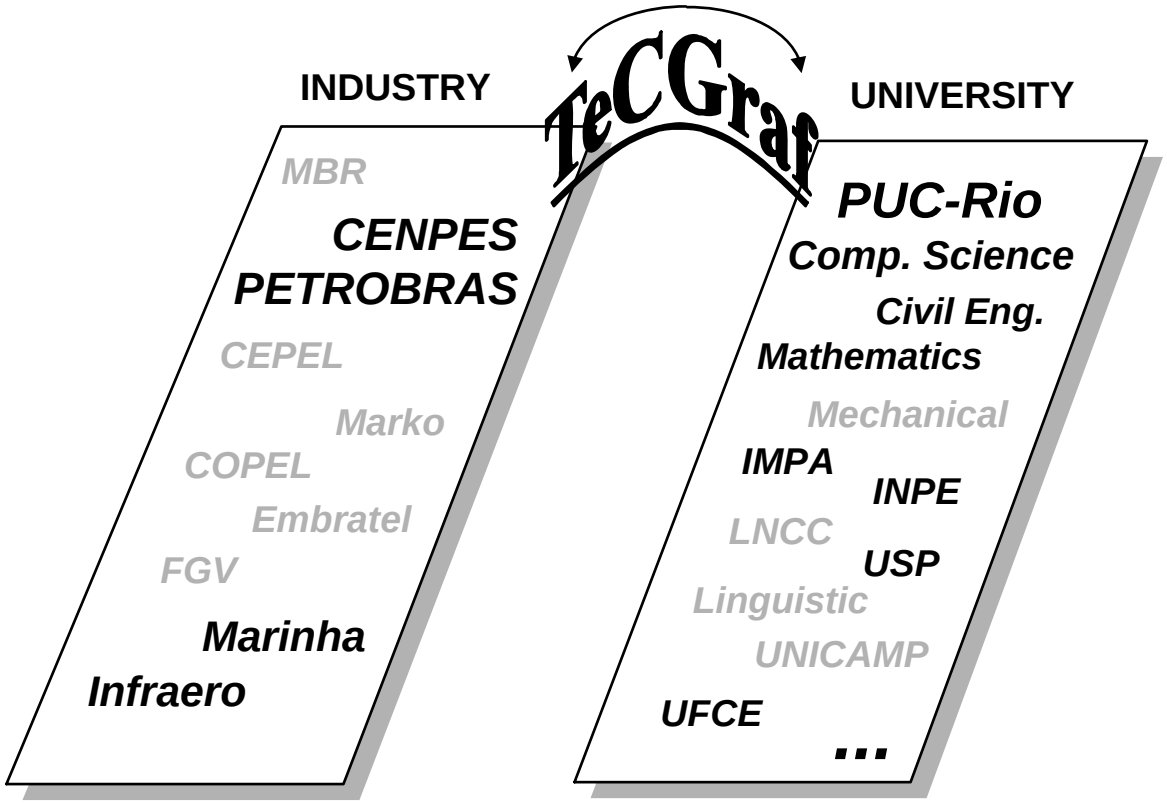
Célula de Automação de Engenharia

Agenda

- About Tecgraf
- Research opportunitìes in PETROBRAS
- How Tecgraf is learning ISO15926
- Modeling for ISO15926

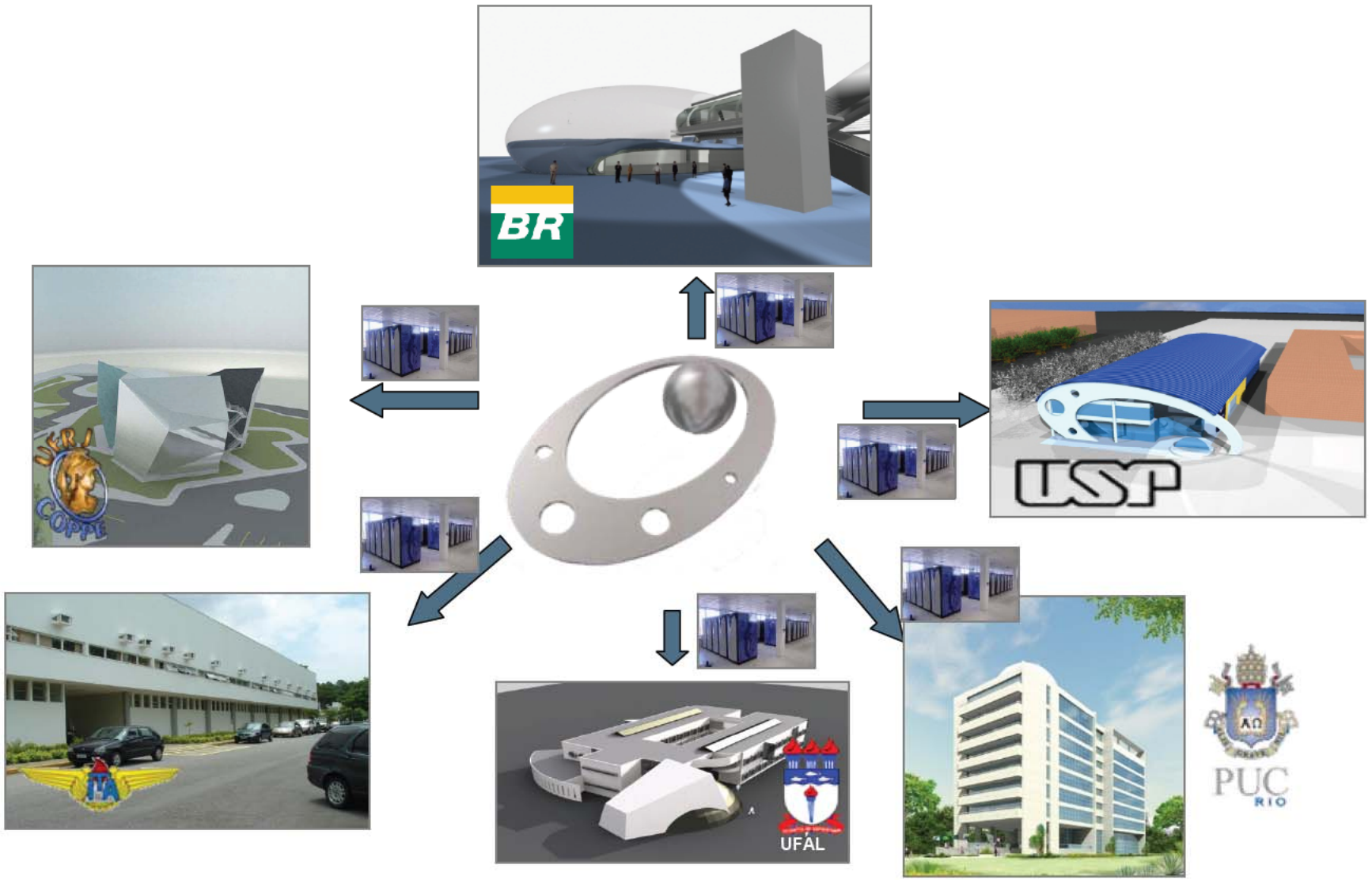
Tecgraf's Concept

PETROBRAS



Continuous support from Petrobras since May 1987
- 20 years of partnership -

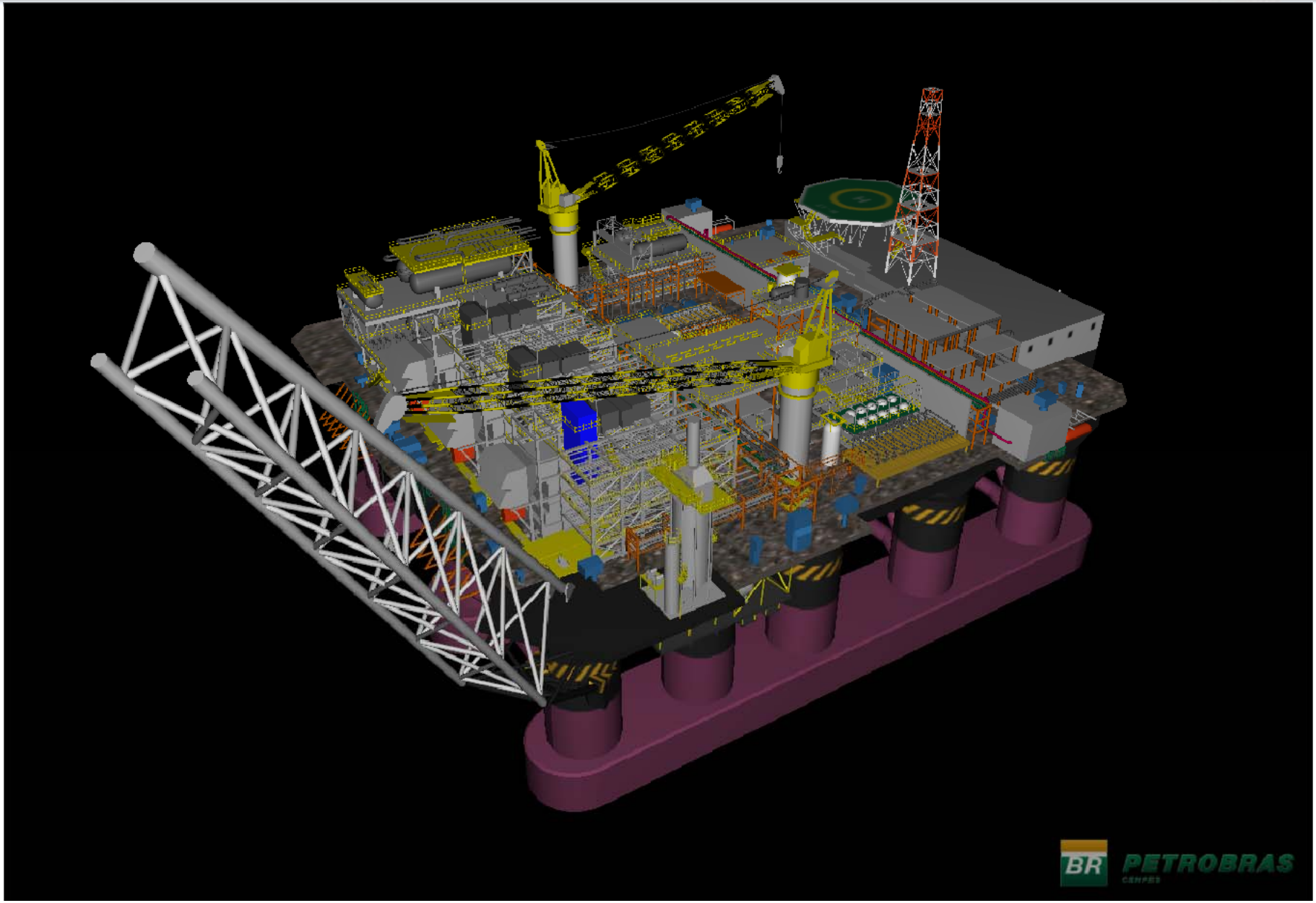
The Galileu Network



Intranet Portal for the PETROBRAS Campos Basin

- Integrated environment for finding project information accross applications
  - PDS
  - PDMS 3D
  - INTools
  - PTC ProductView, Division Reality
  - Walkinside
  - PETROBRAS SINDOTEC
- PETROBRAS Environ

PETROBRAS Environ



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PETROBRAS SIX – Research Plant

- SIX is made up of two separate shale process plants that are part of PETROBRAS downstream

- One plant solely dedicated to research

  - Hardware prototyping

  - Process development and benchmarking

  - **Study on Engineering Automation best practices**

- On-site Engineering Automation lab is a PETROBRAS-Tecgraf R&D partnership

- Engineering view for Tecgraf's ISO15926 team; we are in Computer Science

PETROBRAS SIX – Research Plant

- R&D Project Scope:
  - Analysis of SIX's Engineering Activity Model
  - Focus on Instrumentation – Potential colaboration
  - Mapping of subset of SIX's Engineering workflows relevant to instrumentation
  - Evaluation of data management related costs
  - Definition of scope for ISO15926 pilot project

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How Tecgraf is Learning ISO15926

- Support from the ISO15926 community;
  - PCA
  - Bechtel
  - Bentley
  - Fluor
- Review of the published and drafted parts of ISO15926
- Participation in the Geometry SIG
- PCA Trac documents
- Semantic Web Docs

Tecgraf ISO15926 Activities

- Rethinking ISO15926 in PETROBRAS
- Helping to develop template signatures for geometry
- Sample Part 8 OWL for geometry
- Study on full expansion of signatures
- Validation of the expanded model (Iterative colaboration process)
- Research on RDF, OWL, Jena API, triple stores and graph theory,
- iRING Tools study

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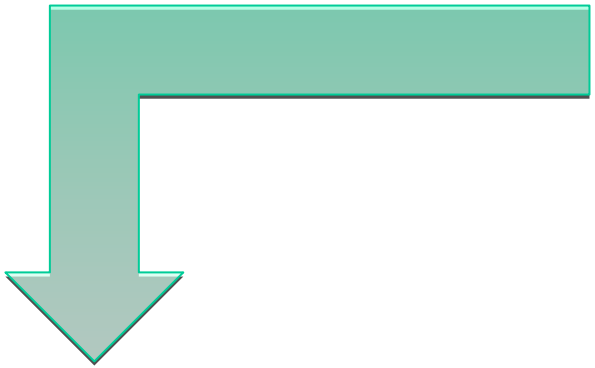
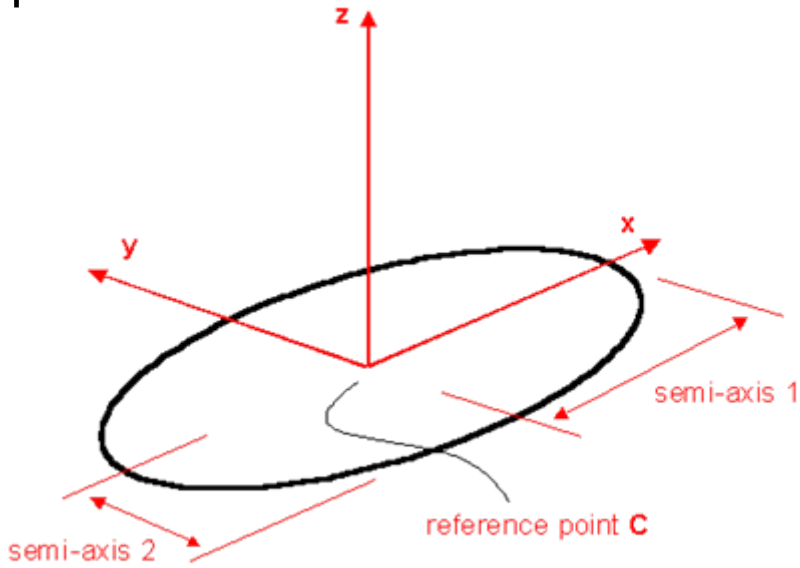
ISO15926 Modelling

- Analysis of the “real world” concept
- Identification relevant RDL classes (URI’s)
- Specification of template signature(s) in spreadsheet format



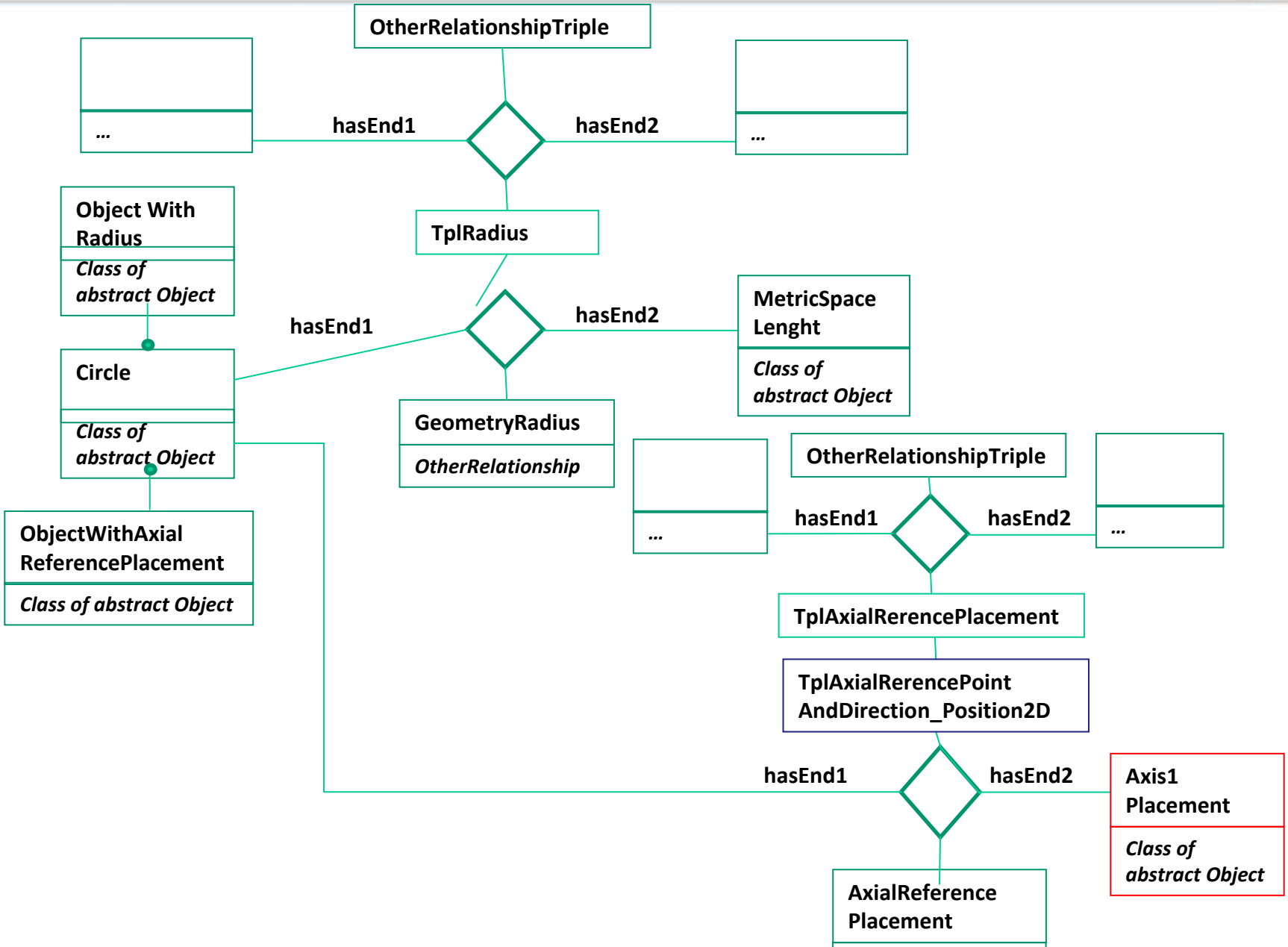


Template Name	Unique Numbers	Template Superclass	Role1 Name	Role1 Type
object_with_radius				
geometry_radius	428	class_of_relationship	object	object_with_radi
object_with_reference_direction				
reference_direction	430	class_of_relationship	object	object_with_refe
object_with_reference_point				
reference_point	436	class_of_relationship	object	object_with_refe
object_with_axial_reference_placement				
axial_reference_placement	332	class_of_relationship	object	object_with_axia

ISO15926 Modelling

- From spreadsheet signature role types, browse RDL hierarchy to find types compatible with proto-template operands
- Genaration of diagram according to Part 7 symbology
- Generation of OWL through Protegé's UI
- **Use of stub URI's for templates**

ISO15926 Modelling



ISO15926 Modelling

- According to the RDLFacade.org, Radius is a SinglePropertyDimension. In the expansion of the signature proposed by GSIG for Radius

RDS/WIP: Home Page • Project Page • IDS-ADI Project • POSC

RDS/WIP: RADIUS

General

RDS/WIP URI	http://rdl.rdlfacade.org/data#R72786921793
Label	RADIUS
Description	The separation between a circular arc and its centre
Entity Type	http://dm.rdlfacade.org/data#SinglePropertyDimension

PCA Attributes

Identifier	RDS358289
Designation	RADIUS
Creation Date	2001.09.10

ISO15926 Modelling

- Yet in the ISO15926 Part3, radius is a relationship

4.4.10.14 radius

An object is a **radius** if and only if:

- it is a **function** between geometric objects with a unique radius and **metric_space_length**;
- it specifies the radius.

NOTE 1 For a **cylindrical_surface** or **spherical_surface** the **radius** has exactly one value.

For a **conical_surface**, the **radius** is arbitrary. However, for a **canonically_parameterized_conical_surface**, the **radius** is evaluated at the

NOTE 2 EXPRESS specification:

```
*)
TYPE object_with_radius = SELECT
 (circle,
  spherical_surface,
  cylindrical_surface,
  canonically_parameterized_conical_surface,
  solid_sphere);
END_TYPE;

ENTITY radius
  SUBTYPE OF (function_instance);
  SELF\other_relationship.end_1 : object_with_radius;
  SELF\other_relationship.end_2 : metric_space_length;
END_ENTITY;
(*
```

ISO15926 Modelling Issues

- **Use of stub URI's for templates**
- **How explicit do template signatures need to be in order to garantee consistent expansion**
- **Template hierarchy is dificult to understand without examples going from template signature to OWL**
- **Inconsistencies in RDL make the modeler walk around in circles**
- **Which tool(s) should be used to validate OWL syntax**

Thank You