The Role of Master Data Management (MDM) for Data Centric Automation Strategies

Tracy J. McLane, Engineering Virtual Project Delivery (VPD) Lead
Bechtel Infrastructure
@tjmclane

Speaker Bio

Mclane, Tracy
Available - Video Capable
Engineering VPD Lead, G&HES ENG PROJECT TEC

Tracy McLane has been a Bechtel Distinguished Scientist since 2012, and served as the GIS Technical Discipline Lead for the company from March 2007 to February 2018. In this role, she was responsible for the development of the GIS Technical Center of Excellence, the Enterprise GIS database architecture and a centralized GIS Knowledge Bank for the Bechtel.

Ms. McLane served as the Engineering Virtual Project Delivery (VPD) Lead for the 4D, 5D Program for the past year and a half, with some of her personal focus being on 3D GIS and BIM integration and the development of Master Data.

Ms. McLane has worked with Oracle Spatial technology for over 16 years, and currently serves as the Chair of the Independent Oracle Users Group (IOUG) Oracle Spatial and Graph Special Interest Group (SIG) Board. Ms. McLane has worked in the GIS industry for more than 24 years, with past GIS experience at the Tennessee Valley Authority and the U. S. Department of Energy Savannah River Site Ms. McLane now works in Bechtels Headquarters in Reston, Virginia.

Ms. McLane holds a Master of Science degree in Geography from the University of Tennessee in Knoxville, Tennessee and a Bachelor of Arts degree in International Business from Eckerd College in Saint Petersburg, Florida.

Agenda – Oracle Spatial and Graph

1:30 pm "*The Role of Master Data Management for Data Centric Automation Strategies*" – Tracy McLane

1:55 pm "*Measuring Public Citation using Graph Modeling and Analysis*" – Keisuke Honda & Mio Takei

2:30 pm "*Spatial Analytics with Spark and Big Data*" – LJ Qian & Siva Ravada

3:40 pm "*Using GeoJSON in the Oracle Database*" -Albert Godfrind

Objectives - A Spatial Person's Journey to Graph

- Overview of Master Data Selection and Cataloging
- Classification of Master Data Types
- Development of MDM Data Dictionary
- Automation for MDM Structure Creation and Content Migration
- Comparison of RDF View vs. Native Semantic Model vs. Virtual Semantic Model
- Automation for Semantic Model Architecture Creation and Enrichment
- User Stories for Spatial: Comparison of Traditional RDBMS MDM Uses and Automation for Identification of Future Use Cases for Graph:
  - Data Normalization
  - BIM Classification and Other MDM Hierarchies for Spatial Data Classification
  - MDM Data Enrichment and Interoperability of Spatial Data

What Is Master Data Management?

- **Master Data Management (MDM)** : comprehensive methodology that raises the accuracy, quality and consistency of our information (data and systems).
- Essential for organizations transitioning to data centric execution and enterprise systems
- Effective enterprise MDM provides:
  - **Data Governance**
    - Policy and Rules
  - **Data Quality**
    - Constraints and Standards
  - **Integration**
    - Cross Functional Relationships

Oracle MDM RDBMS Decode Example:

```
DECODE
(<spatial table name>.<column name>,
<domain table>.<domain value column>,
<domain table>.<domain description column>,
<default value>)
<column alias>
```

Master Data Types

Bechtel VPD Master Data Management: Types and Organization

Source: Enterprise Database Design Developed by T. McLane in combination with original SDSFIE v. 2.6 design concepts, plus additional Bechtel-specific content, metadata, MDM architectural breakdowns/hierarchies, relational/RDF view concepts and functional requirements for Engineering VPD Jobs-to-be-Done (originated: August 11, 2017)

MDM Catalog
TBL_MDM_CONTENT
(+ MDSYS Metadata)

RDF Views
(RDF Content in Views with only metadata stored as RDF)

Structured Data

Constraint MDM
(Value List and Range Domains)
D_MDM_TYP:
MDM_COLMN

- Domains Types — D_DOMAIN_TYP
- List Domains — D_DOMAIN_LST
- Range Domains — D_DOMAIN_RANG

Rule-Based MDM
(Classification and Data Exchange Criteria)
D_MDM_TYP:
MDM_CLS

- Rules Types — D_RULE_TYP
- Classification Rules — D_RULES_CLASSIF
- Specification Rules — D_RULES_SPEC
- Rules of Credit — D_RULES_ROC
- BOM Quantity Rules — D_RULES_BOM

Software MDM
(Data Dependencies for API and Software Development)
D_MDM_TYP:
MDM_SFT

- Software Domains — D_BIM_3D
- Rule Groups by Software — D_RULE_OBJGRP
- Rule Group Membership by Software — D_RULE_OBJLST

Topology MDM
(Spatial Rules)
D_MDM_TYP:
MDM_TOPOL

- Topology Types — D_TOPOL_TYP
- Topology Subtypes — D_TOPOL_STYP

Structured Information

Relationship MDM
(Graph and RDB Types)
D_MDM_TYP:
MDM_RELAT

- RDF Views — D_RDF_VIEWS
- RDF Standard Properties — D_RDF_PROP
- ONTOLOGY TYPES — D_ONTOL_TYP
- GRAPH TYPES — D_GRAPH_TYP
- RDF Naming Conventions — D_RDF_NM
- RDF Rules Conventions — D_RDF_Rules

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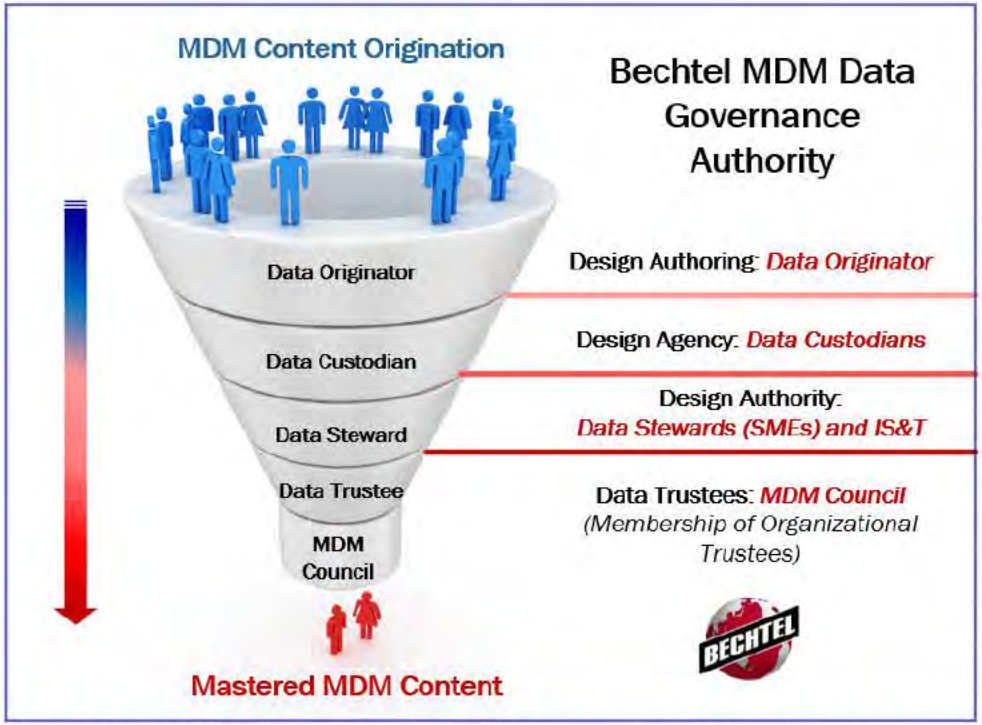
Spatial and MDM Data Governance



Data Governance Concept Diagram (*T. McLane, 2017*)

Spatial Data Governance:

- Process and governing roles were developed at Savannah River Site (SRS) for GIS Data with the involvement of many disciplines, stakeholders and data owners (Bechtel and Westinghouse)
- Bechtel Corporate now in the process of a data governance structures for Master Data

Source: *Role Names developed at Savannah River Site, with above definitions originally developed by T.McLane for publication in the 3DG-K04-00030: SPATIAL DATA MANAGEMENT IN BECHTEL'S ENTERPRISE GIS DATABASE, Rev. 000, 2010 December 9*

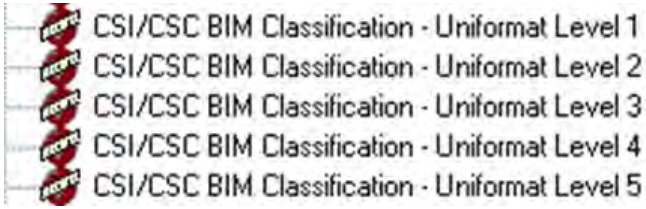
Mastering Engineering Data:
Content Authoring Process

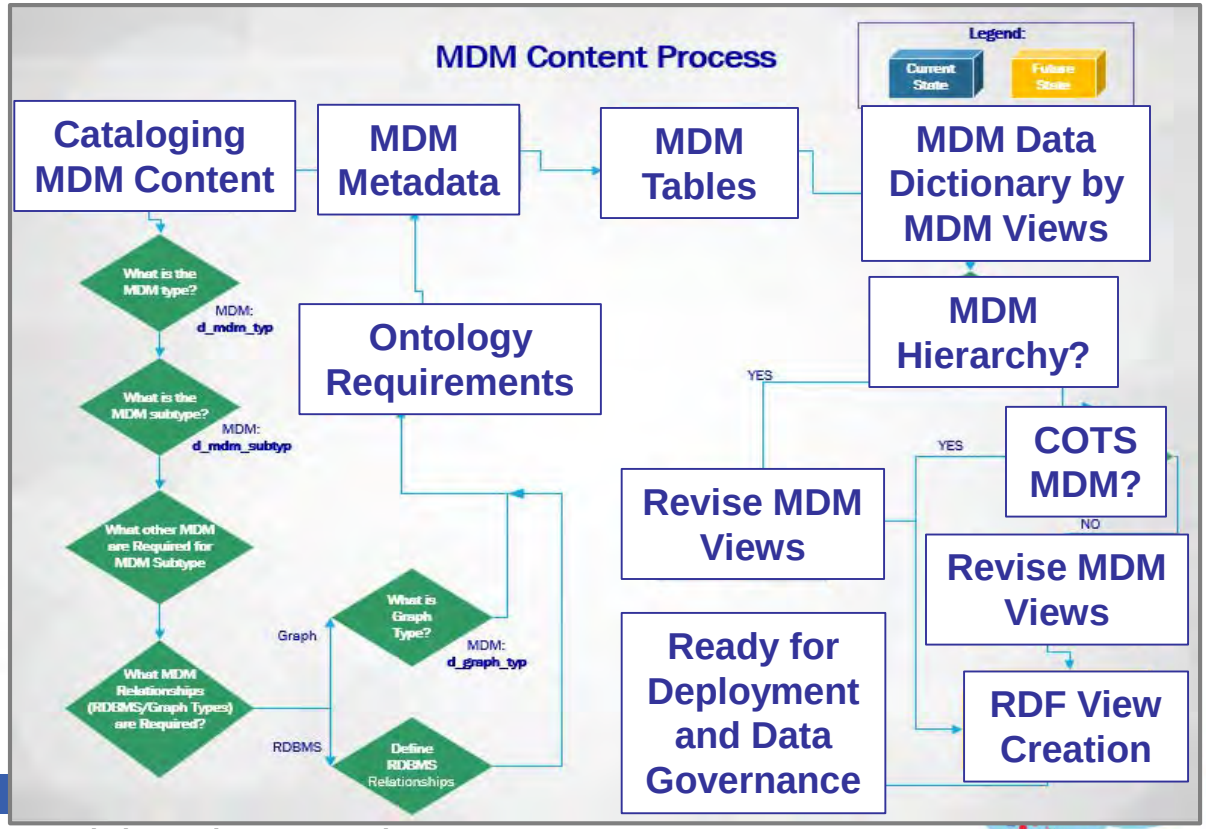
A	1	0	1	0	-	1	0

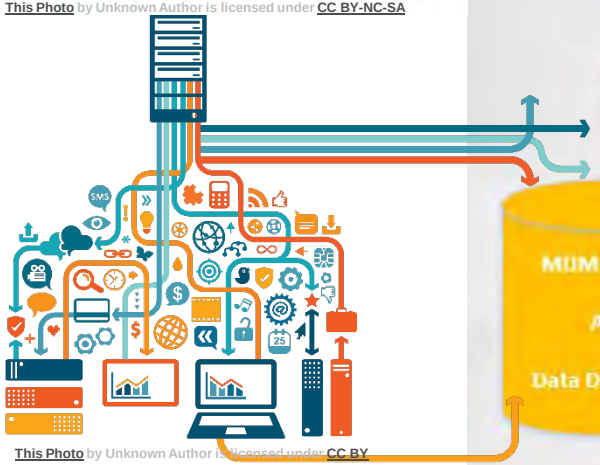
A = Substructure
A10 = Foundations
A1010 = Standard Foundations
A1010.10 = Wall Foundations

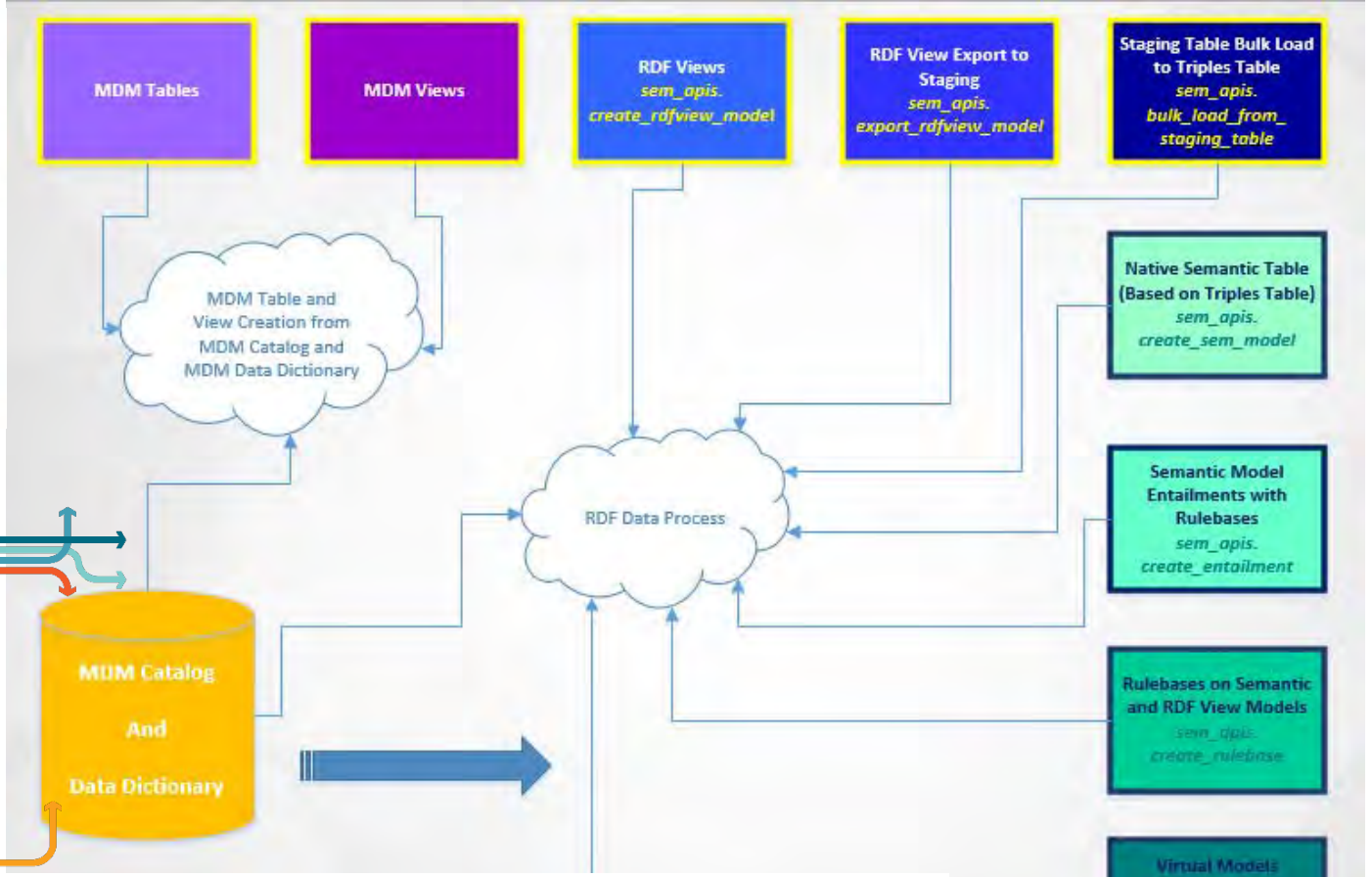
Figure 1: BIM Classification Hierarchy

Uniformat Level 4 Master Data









MDM Semantic Modeling with RDF Views:

Oracle Spatial and Graph Process

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Oracle RDF Semantic Object Metadata

- All Semantic Models: *mdsys.sem_model$*
- Virtual Semantic Models: *mdsys.sem_vmodel_info*
- Unique Virtual Semantic Model View: *mdsys.semu_*
- Duplicate Virtual Semantic Model View: *mdsys.semv_*
- Rulebase View Columns Prefix: *mdsys.semr_*
- Rulebase Information: *mdsys.sem_rulebase_info*
- Rulebase View Prefix: *mdsys.rdfr_*
- Semantic Entailments (Indices): *mdsys.sem_rules_index_datasets*
- Semantic Entailment View Prefix: *mdsys.rdfi_*
- Semantic RDF Triples: *mdsys.rdf_value$_*

Oracle Graph RDF Views: Mapping Triples

Start Page | Bechtel Master Data | VRDF_MDM_MASTERFORMAT_01K

SPARQL Editor | Model Info | Mapping Triples | Schema Triples | Triples

Actions...

	SUBJECT	PREDICATE	OBJECT	GRAPH
1	_:m2511ma1833C0CA143A4167n36	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n37	<http://xmlns.oracle.com/orardf/r2rgraph>
2	_:m2511ma9788687AB2D0B054n20	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n21	<http://xmlns.oracle.com/orardf/r2rgraph>
3	_:m2511ma1833C0CA143A4167n76	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n77	<http://xmlns.oracle.com/orardf/r2rgraph>
4	_:m2511ma1833C0CA143A4167n112	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n113	<http://xmlns.oracle.com/orardf/r2rgraph>
5	_:m2511ma1833C0CA143A4167n60	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n61	<http://xmlns.oracle.com/orardf/r2rgraph>
6	:m2511ma9788687AB2D0B054n22	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n23	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n43	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n71	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n83	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n101	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n39	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n89	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n13	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n11	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n45	<http://xmlns.oracle.com/orardf/r2rgraph>
		<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n135	<http://xmlns.oracle.com/orardf/r2rgraph>
17	_:m2511ma1833C0CA143A4167n136	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n137	<http://xmlns.oracle.com/orardf/r2rgraph>
18	_:m2511ma1833C0CA143A4167n98	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n99	<http://xmlns.oracle.com/orardf/r2rgraph>
19	_:m2511ma9788687AB2D0B054n14	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n15	<http://xmlns.oracle.com/orardf/r2rgraph>
20	_:m2511ma1833C0CA143A4167n130	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n131	<http://xmlns.oracle.com/orardf/r2rgraph>
21	_:m2511ma9788687AB2D0B054n50	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma9788687AB2D0B054n51	<http://xmlns.oracle.com/orardf/r2rgraph>
22	_:m2511ma1833C0CA143A4167n54	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n55	<http://xmlns.oracle.com/orardf/r2rgraph>
23	_:m2511ma1833C0CA143A4167n66	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n67	<http://xmlns.oracle.com/orardf/r2rgraph>
24	_:m2511ma1833C0CA143A4167n138	<http://www.w3.org/ns/r2rml#objectMap>	_:m2511ma1833C0CA143A4167n139	<http://xmlns.oracle.com/orardf/r2rgraph>

- RDF Semantic Graph
  - Models
    - Regular Models
    - Virtual Models
    - RDF Views
  - Rulebases
  - Entailments
  - Network Indexes (RDF_LINK$)
  - Data Type Indexes (RDF_VALUE$)

Oracle Graph RDF Views: Schema Triples

Start Page | Bechtel Master Data | VRDF_MDM_MASTERFORMAT_01K

SPARQL Editor | Model Info | Mapping Triples | Schema Triples | Triples

Actions...

	SUBJECT	PREDICATE	OBJECT
1	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#LDOMAIN>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
2	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#DATE_CREAT>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
3	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#COLUMN_LV01A>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
4	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#DATE_SUBMT>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
5	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINCODE>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINVALU>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DATE_APPROVE>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#CREATOR>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINREV>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINREF>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINTBL>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINNAME>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#SUBMITPERS>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#CNTCTPERSN>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#COLUMN_LV01B>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
	/BMDM.VTBL_MDM_MASTERFORMAT_01A#CREATORORG>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
17	/BMDM.VTBL_MDM_MASTERFORMAT_01A#ISSUE_D>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
18	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINDESC>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
19	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#OPERATOR_LV01B>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
20	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#CONTACT_ORG>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
21	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#DOMAINPUB>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
22	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#COLUMN_LV01C>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
23	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#VALUE_LV01A>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/
24	<https://becweb.ibechtel.com/eMDM/BIM/BMDM.VTBL_MDM_MASTERFORMAT_01A#STATUS_D>	<http://www.w3.org/2000/01/rdf-schema#domain>	<https://becweb.ibechtel.com/

- RDF Semantic Graph
  - Models
    - Regular Models
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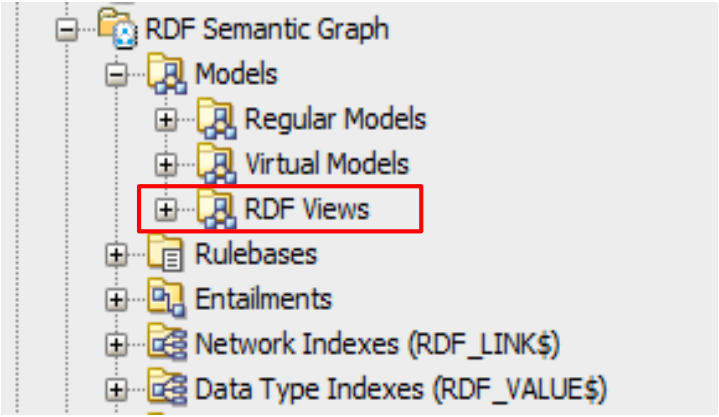
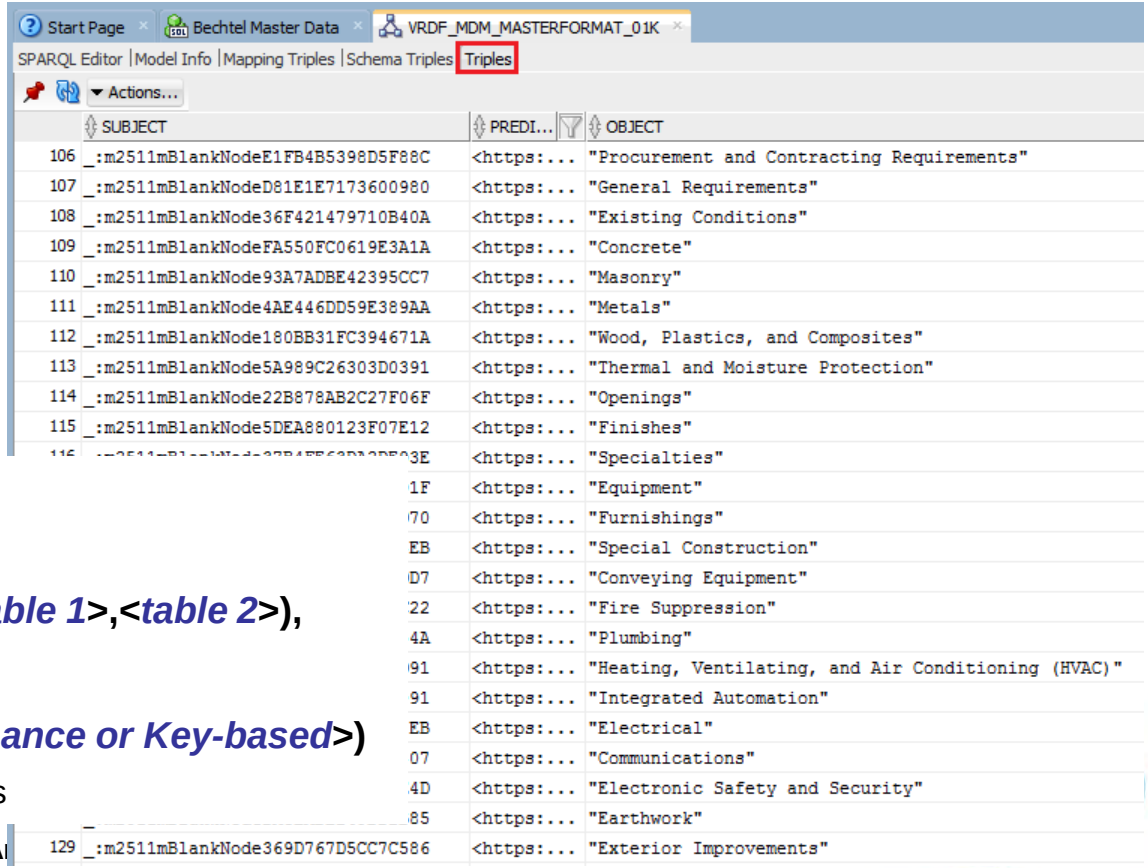
  - Network Indexes (RDF_LINK$)
  - Data Type Indexes (RDF_VALUE$)

Oracle Graph RDF Views: RDF Value Triples

SEM_APIS.CREATE_RDFVIEW_MODEL





sem_apis.create_rdfview_model (

model_name => <*model name*>,

tables => SYS.ODCIVarchar2List (<*table 1*>,<*table 2*>),

prefix => <*URL prefix*>,

options => <*priority option: Conformance or Key-based*>)

***Note**: Input tables are RDBMS content, not triples

Triples Tables: Staging Tables

SEM_APIS.BULK_LOAD_FROM_STAGING

Oracle SQL Developer

File Edit View Navigate Run Team Tools Window Help

Connections

- TRPL_MDM_BECHTEL_COA_03K
- TRPL_MDM_BECHTEL_COA_04C
- TRPL_MDM_BECHTEL_COA_04K
- TRPL_MDM_BECHTEL_COA_05C
- TRPL_MDM_BECHTEL_COA_05K
- TRPL_MDM_BECHTEL_COA_06C
- TRPL_MDM_BECHTEL_COA_06K
- TRPL_MDM_BECHTEL_COA_07C
- TRPL_MDM_BECHTEL_COA_07K
- TRPL_MDM_MASTERFORMAT_01C
- TRPL_MDM_MASTERFORMAT_01K
- TRPL_MDM_MASTERFORMAT_02C
- TRPL_MDM_MASTERFORMAT_02K
- TRPL_MDM_MASTERFORMAT_03C
- TRPL_MDM_MASTERFORMAT_03K
- TRPL_MDM_MASTERFORMAT_04C
- TRPL_MDM_MASTERFORMAT_04K

Start Page | Bechtel Master Data | TRPL_MDM_MASTERFORMAT_01K

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	NULL...	DATA_TYPE	DATA_DEFAULT	COLUM...	COMME..
1	RDF$STC_GRAPH	Yes	VARCHAR2(4000 BYTE)	(null)	1	(null)
2	RDF$STC_SUB	Yes	VARCHAR2(4000 BYTE)	(null)	2	(null)
3	RDF$STC_PRED	Yes	VARCHAR2(4000 BYTE)	(null)	3	(null)
4	RDF$STC_OBJ	Yes	VARCHAR2(4000 BYTE)	(null)	4	(null)

```
sem_apis.bulk_load_from_staging_table (
        model_name => <model name>,
        table_owner => <table owner>,
        table_name => <staging table name>,
        flags => <optional flags>
        debug => NULL,
        start_comment => <comment>,
        end_comment => <comment>)
```

Triples Tables: Staging Tables for RDF Views

SEM_APIS.EXPORT_RDFVIEW_MODEL

Oracle SQL Developer

File Edit View Navigate Run Team Tools Window Help

Connections

- TBL_RDF_MDM_BECHTEL_COA_06K
- TBL_RDF_MDM_BECHTEL_COA_07C
- TBL_RDF_MDM_BECHTEL_COA_07K
- TBL_RDF_MDM_MASTERFORMAT_01C
- TBL_RDF_MDM_MASTERFORMAT_01K
- TBL_RDF_MDM_MASTERFORMAT_02C
- TBL_RDF_MDM_MASTERFORMAT_02K
- TBL_RDF_MDM_MASTERFORMAT_03C
- TBL_RDF_MDM_MASTERFORMAT_03K
- TBL_RDF_MDM_MASTERFORMAT_04C
- TBL_RDF_MDM_MASTERFORMAT_04K

Start Page | Bechtel Master Data | TBL_RDF_MDM_MASTERFORMAT_01K

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	NULL...	DATA_TYPE	DATA_DEFAULT	COLUM...	COMME...
1	SUBJECT	Yes	NVARCHAR2(500 CHAR)	(null)	1	(null)
2	PREDICATE	Yes	NVARCHAR2(2000 CHAR)	(null)	2	(null)
3	OBJECT	Yes	NVARCHAR2(2000 CHAR)	(null)	3	(null)

OR

	COLUMN_NAME	NULL...	DATA_TYPE	DATA_DEFAULT	COLUM...	COMME...
1	RDF$STC_GRAPH	Yes	VARCHAR2(4000 BYTE)	(null)	1	(null)
2	RDF$STC_SUB	Yes	VARCHAR2(4000 BYTE)	(null)	2	(null)
3	RDF$STC_PRED	Yes	VARCHAR2(4000 BYTE)	(null)	3	(null)
4	RDF$STC_OBJ	Yes	VARCHAR2(4000 BYTE)	(null)	4	(null)

sem_apis.export_rdfview_model
(<*model name*>,

<*project schema*>,

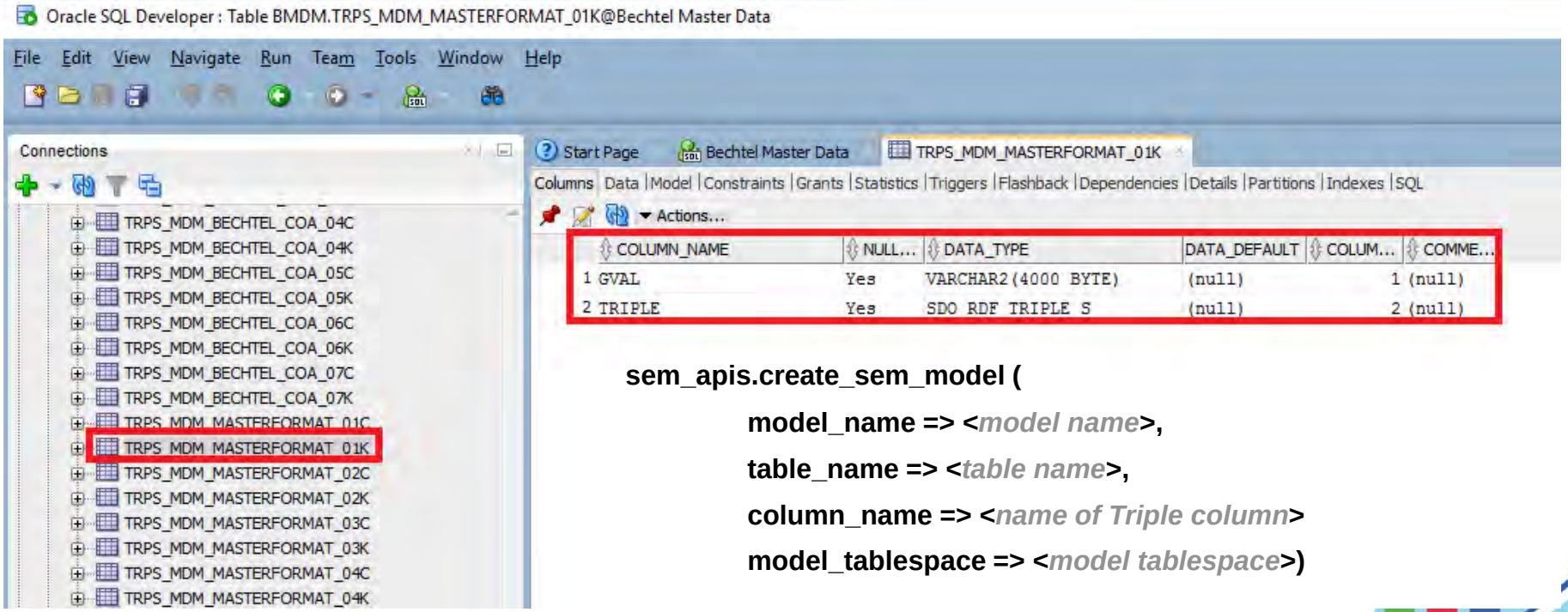
<*output staging table name*>,

NULL)

***Note**: The sem_apis.export_rdfview_model function supports both formats of staging tables

Oracle Triples Tables: Native Semantic Models

SEM_APIS.CREATE_SEM_MODEL




```
sem_apis.create_sem_model (
        model_name => <model name>,
        table_name => <table name>,
        column_name => <name of Triple column>
        model_tablespace => <model tablespace>)
```

Combining Content into a Virtual Semantic Model

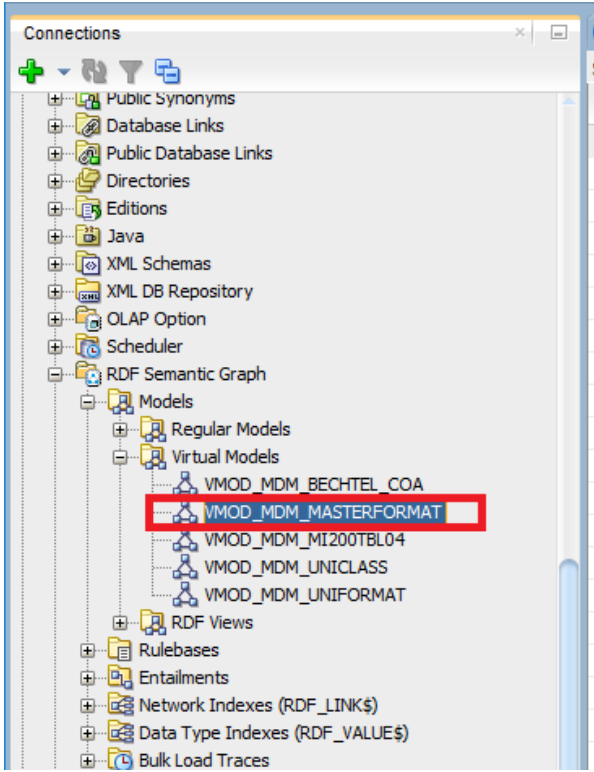
SEM_APIS.CREATE_VIRTUAL_MODEL

Data Type Input:

- **Models**
- **Rulebases**
- **Entailments (Indices)**

Advantages:

- **Single point for SEM_MATCH queries**
- **Can combine content of native semantic models and RDF view exported content**
- **Supports integration of RDBMS and services based content**



Start Page | Bechtel Master Data | VMOD_MDM_MASTERFORMAT

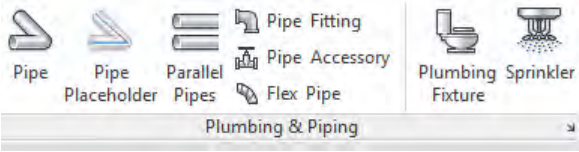
SPARQL Editor | Model Info | Virtual Model Info | Datasets

Actions...

	VIRTUAL_MODEL_NAME	DATA_TYPE	DATA_NAME
1	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_02K
2	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_02C
3	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_03K
4	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_03C
5	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_04K
6	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_04C
7	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_02K
8	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_02C
9	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_03K
10	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_03C
11	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_04K
12	VMOD_MDM_MASTERFORMAT	MODEL	TRDF_MDM_MASTERFORMAT_04C
13	VMOD_MDM_MASTERFORMAT	RULEBASE	RB_MDM_MASTERFORMAT_02
14	VMOD_MDM_MASTERFORMAT	RULEBASE	RB_MDM_MASTERFORMAT_03
15	VMOD_MDM_MASTERFORMAT	RULEBASE	RB_MDM_MASTERFORMAT_04
16	VMOD_MDM_MASTERFORMAT	RULEIDX	RBI_MDM_MASTERFORMAT_02
17	VMOD_MDM_MASTERFORMAT	RULEIDX	RBI_MDM_MASTERFORMAT_03
18	VMOD_MDM_MASTERFORMAT	RULEIDX	RBI_MDM_MASTERFORMAT_04

***Note**: RDF View content is not supported directly, but can be integrated from view content exported to staging tables and rewritten as SDO_RDF_TRIPLE_S triple content

MDM-Based Pattern Definition Exposure



MDM Data Dictionary Pattern Exposure for Automation &

Uniformat Classification Code	BL_UNIFORMAT_CD	1,3,5,8	VTBL_MDM_UNIFORMAT_04A
Masterformat BIM Classification Code	BL_MASTERFORMAT_CD	2,5,8,11	VTBL_MDM_MASTERFORMAT_04A
Omniformat Table 22 BIM Classification Code	BL_OMNIFORMAT22_CD	5,8,11,15	VTBL_MDM_OMNIFORMAT22_04A
Uniclass BIM Classification Code	BL_UNICLASS_CD	1,3,5,8	VTBL_MDM_UNICLASS_04A

Masterformat Hierarchy

Plumbing	22 13	Facility Sanitary Sewerage	22 13 19	Sanitary Waste Piping Specialties	22 13 19.13	Sani[illegible]rains
Plumbing	22 13	Facility Sanitary Sewerage	22 13 19	Sanitary Waste Piping Specialties	22 13 19.23	Fats[illegible], and Grease Disposal Systems
Plumbing	22 13	Facility Sanitary Sewerage	22 13 19	Sanitary Waste Piping Specialties	22 13 19.26	Grea[illegible]oval Devices
Plumbing	22 13	Facility Sanitary Sewerage	22 13 19	Sanitary Waste Piping Specialties	22 13 19.33	Back[illegible] Valves
Plumbing	22 13	Facility Sanitary Sewerage	22 13 19	Sanitary Waste Piping Specialties	22 13 19.36	Air-[illegible]ance Valves
Plumbing	22 13	Facility Sanitary Sewerage	22 13 29	Sanitary Sewerage Pumps	22 13 29.13	Wet-[illegible]unted, Vertical Sewerage Pumps
Plumbing	22 13	Facility Sanitary Sewerage	22 13 29	Sanitary Sewerage Pumps	22 13 29.16	Subm[illegible]e Sewerage Pumps
Plumbing	22 13	Facility Sanitary Sewerage	22 13 29	Sanitary Sewerage Pumps	22 13 29.23	Sewe[illegible]ump Reverse-Flow Assemblies
Plumbing	22 13	Facility Sanitary Sewerage	22 13 29	Sanitary Sewerage Pumps	22 13 29.33	Sew[illegible]p Basins and Pits

Cytoscape Edge Definitions

EDGE_NAME01	EDGE_NAME02	EDGE_NAME03
[illegible]	[illegible]	[illegible]
22 (interacts with) 22	[illegible]eracts with) 22 13 19.13	
22 (interacts with) 22	[illegible]eracts with) 22 13 19.23	
22 (interacts with) 22	[illegible]eracts with) 22 13 19.26	
22 (interacts with) 22	[illegible]eracts with) 22 13 19.33	
22 (interacts with) 22	[illegible]eracts with) 22 13 19.36	
22 (interacts with) 22	[illegible]eracts with) 22 13 29.13	
22 (interacts with) 22	[illegible]eracts with) 22 13 29.16	
22 (interacts with) 22	[illegible]eracts with) 22 13 29.23	
22 (interacts with) 22 13	22 13 (interacts with) 22 13 29	22 13 29 (interacts with) 22 13 29.33

Primavera Unifier Parent-Child

UNIFIER_NAME01	UNIFIER_NAME02	UNIFIER_NAME03
[illegible]	[illegible]	[illegible]
22 ~~ 22 13	22 13 ~~ 22 13 19	22 13 19 ~~ 22 13 19.13
22 ~~ 22 13	22 13 ~~ 22 13 19	22 13 19 ~~ 22 13 19.23
22 ~~ 22 13		22 13 19.26
22 ~~ 22 13		22 13 19.33
22 ~~ 22 13		22 13 19.36
22 ~~ 22 13		22 13 29.13
22 ~~ 22 13		22 13 29.16
22 ~~ 22 13	22 13 ~~ 22 13 29	22 13 29 ~~ 22 13 29.23
22 ~~ 22 13	22 13 ~~ 22 13 29	22 13 29 ~~ 22 13 29.33

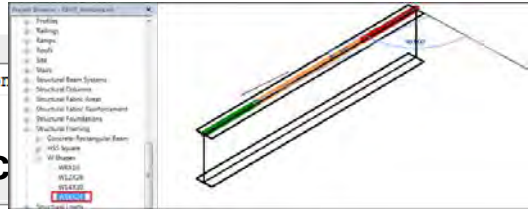
ORACLE
PRIMAVERA UNIFIER

Use Case 2: BIM Classification System Hierarchy Master Data for 3D Model Object Data

Uniformat BIM Classification Hierarchies for HVAC Objects

VTBL_MEP_FLEX_PIPES_QNT
VTBL_MEP_HVAC_ZONES
VTBL_MEP_HVAC_ZONES_QNT

...	BL_UNIFORMAT_CD	BL_UNIFORMAT_CD_DSC1	BL_UNIFORMAT_CD_DSC2
1	D30	Services	Heating, Ventilation, And Air Con



Uniformat BIM Classification Hierarchy

A	1	0	1	0	-	1	0

A = Substructure
A10 = Foundations
A1010 = Standard Foundations
A1010.10 = Wall Foundations

Masterformat BIM Clas

VTBL_MEP_COMMUNICAT_DEVICE_QNT
VTBL_MEP_CONDUIT_FITTINGS
VTBL_MEP_CONDUIT_FITTINGS_QNT
VTBL_MEP_CONDUITS
VTBL_MEP_CONDUITS_QNT

Columns | Data

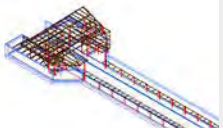
	MA...
1	
2	

DSC3	BL_MASTERFORMAT_CD_DSC4
or Electrical Systems	Conduit for Electrical Systems
or Electrical Systems	Conduit for Electrical Systems

Omniformat Tabl

VTBL_MDM_OMNIFORMAT22_02
VTBL_MDM_OMNIFORMAT22_02A
VTBL_MDM_OMNIFORMAT22_03
VTBL_MDM_OMNIFORMAT22_03A
VTBL_MDM_OMNIFORMAT22_04
VTBL_MDM_OMNIFORMAT22_04A
VTBL_MDM_PAYMENT_TERMS
VTBL_MDM_PERMIT_STATUS
VTBL_MDM_PIPE_COMMODITIES

Medium-Voltage Cables	22-26 05 13 16	Medium-Voltage, Single- and
Low-Voltage Electr...	22-26 05 19 13	Undercarpet Electrical Power
Low-Voltage Electr...	22-26 05 19 23	Manufactured Wiring Assembli
Raceway and Boxes ...	22-26 05 33 13	Conduit for Electrical Syste
Raceway and Boxes ...	22-26 05 33 16	Boxes for Electrical Systems
Raceway and Boxes ...	22-26 05 33 23	Surface raceways for Electri
Central Dimming Co...	22-26 09 33 13	Multichannel Remote-Controll
tral Dimming Co...	22-26 09 33 16	Remote-Controlled Dimming St



Rail Station Model:
8,612 objects,
141,593 parameters

Rail Station Model:
113,601 objects,
1,376,276 parameters

Uniclass Hier

VTBL_MDM_TMPL_STEEL
VTBL_MDM_TMPL_TERMIN
VTBL_MDM_TMPL_VALVE
VTBL_MDM_TMPL_WELD
VTBL_MDM_UNICLASS_01
VTBL_MDM_UNICLASS_01A
VTBL_MDM_UNICLASS_02
VTBL_MDM_UNICLASS_02A
VTBL_MDM_UNICLASS_03
VTBL_MDM_UNICLASS_03A
VTBL_MDM_UNICLASS_04
VTBL_MDM_UNICLASS_04A

Pr_20	Structure and genera...	Pr_20_85	Support and restraint products	Pr_20_85_11	Bridge suspension cables

CSI/CSC BIM Classification - Uniformat Level 1
CSI/CSC BIM Classification - Uniformat Level 2
CSI/CSC BIM Classification - Uniformat Level 3
CSI/CSC BIM Classification - Uniformat Level 4
CSI/CSC BIM Classification - Uniformat Level 5

DOMAINCODE4	DOMAINDESC4
Pr_20_85_10_27	Elastomeric bearings
Pr_20_85_10_35	Guide bearings
Pr_20_85_10_65	Pot bearings
Pr_20_85_10_70	Restraint bearings
Pr_20_85_10_72	Rocker bearings
Pr_20_85_10_73	Roller bearings
Pr_20_85_10_79	Sliding element
Pr_20_85_10_81	Spherical PTFE bearing
Pr_20_85_11_48	Locked coil strand

Master Data for Semantic Rulebase Creation

SEM_APIS.CREATE_RULEBASE

Rulebase Types

Start Page | Bechtel Master Data | VTBL_MDM_SEM_RULEBASE_TYP

Columns | Data | Grants | Dependencies | Details | Triggers | SQL | Errors

Sort.. | Filter: | Actions...

	LDOMAIN	DOMAINNAME	DOMAINTBL	DO...	DOMAINDESC	DOMAINREF
1	BMDM02-00005136-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_typ	CLS	Class	OWL 2 DL Rulebase Classifications OW
2	BMDM02-00005136-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_typ	CAX	Class Axioms	OWL 2 DL Rulebase Classifications OW

Rulebase Subtypes

VTBL_MDM_SEM_RULEBASE_STYP

Columns | Data | Grants | Dependencies | Details | Triggers | SQL | Errors

Sort.. | Filter: | Actions...

	LDOMAIN	DOMAINNAME	DOMAINTBL	DOMAINVALU	DOMAINDESC	DOMAINF
1	BMDM02-00005140-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	REF	Reference Rule	OWL 2 DL
2	BMDM02-00005140-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	DIFF	Difference Rule	OWL 2 DL
3	BMDM02-00005140-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	FP	Functional Property Rule	OWL 2 DL
4	BMDM02-00005140-2016	list domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	AP	Annotation Rule	OWL 2 DL
		t domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	IRP	Irreflexive Functional Property Rule	OWL 2 DL
		t domain - Oracle Spatial and Graph Custom Rulebase Classification Codes	d_rulebase_styp	TRP	Transitive Property Rule	OWL 2 DL

Rulebase Syntax

Start Page | Bechtel Master Data | VTBL_MDM_SEM_RULEBASE_SYNTAX

Columns | Data | Grants | Dependencies | Details | Triggers | SQL | Errors

Sort.. | Filter: | Ac

	DOMAINTBL	DOMAINVALU	DOMAINDESC	VALUE_A	RULE_VALUE	DOMAINREF
1	d_rulebase_syntax	eq-ref	Equivalence: Reference Rule	T(?s,ÿ?p,ÿ?o)	T(?s, owl:sameAs,ÿ?s)	Table 4. The Semantics of Equality, OWL 2 Web
2	d_rulebase_syntax	eq-ref	Equivalence: Reference Rule	T(?s,ÿ?p,ÿ?o)	T(?p, owl:sameAs,ÿ?p)	Table 4. The Semantics of Equality, OWL 2 Web
3	d_rulebase_syntax	eq-ref	Equivalence: Reference Rule	T(?s,ÿ?p,ÿ?o)	T(?o, owl:sameAs,ÿ?o)	Table 4. The Semantics of Equality, OWL 2 Web
4	d_rulebase_syntax	eq-sym	Equivalence: Symmetric Rule	T(?x, owl:sameAs,ÿ?y)	T(?y, owl:sameAs,ÿ?x)	Table 4. The Semantics of Equality, OWL 2 Web
5	d_rulebase_syntax	eq-trans	Equivalence: Transitive Rule	T(?x, owl:sameAs,ÿ?y)	T(?x, owl:sameAs,ÿ?z)	Table 4. The Semantics of Equality, OWL 2 Web
6	d_rulebase_syntax	eq-trans	Equivalence: Transitive Rule	T(?y, owl:sameAs,ÿ?z)	T(?x, owl:sameAs,ÿ?z)	Table 4. The Semantics of Equality, OWL 2 Web

Use Case 1: Master Data (Relational and Graph) for 3D Spatial Object Data

Start Page | Bechtel Master Data | D_RULEBASE_CONSTR

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

Rulebase Constructs

	LDOMAIN	DOMAINNAME	DOMAINTBL	DOMAINVALU	DOMAINDESC
1	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:allValuesFrom	OWLSIF Vocabulary Constructs
2	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:allValuesFrom	OWLPrime Vocabulary Constructs
3	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:complementOf	OWLPrime Vocabulary Constructs
4	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:differentFrom	OWLPrime Vocabulary Constructs
5	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:disjointWith	OWLPrime Vocabulary Constructs
6	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	rdfs:domain	OWLPrime Vocabulary Constructs
7	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:equivalentClass	OWLSIF Vocabulary Constructs
8	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:equivalentProperty	OWLSIF Vocabulary Constructs
9	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:equivalentClass	OWLPrime Vocabulary Constructs
10	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:equivalentProperty	OWLPrime Vocabulary Constructs
11	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:FunctionalProperty	OWLSIF Vocabulary Constructs
12	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:FunctionalProperty	OWLPrime Vocabulary Constructs
13	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:hasValue	OWLSIF Vocabulary Constructs
14	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:hasValue	OWLPrime Vocabulary Constructs
15	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:InverseFunctionalProperty	RFDS++ Vocabulary Constructs
16	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:InverseFunctionalProperty	OWLSIF Vocabulary Constructs
17	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:inverseOf	OWLSIF Vocabulary Constructs
18	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:InverseFunctionalProperty	OWLPrime Vocabulary Constructs
19	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:inverseOf	OWLPrime Vocabulary Constructs
20	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	rdfs:range	OWLPrime Vocabulary Constructs
21	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:sameAs	RFDS++ Vocabulary Constructs
22	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:sameAs	OWLSIF Vocabulary Constructs
23	BMDM02-00005137-2016	list domain - Oracle Spatial and Graph Rulebase Constructs	d_rulebase_constr	owl:sameAs	OWLPrime Vocabulary Constructs

Master Data for Semantic Rulebase Creation

SEM_APIS.CREATE_RULEBASE

Ontology Types

Start Page | Bechtel Master Data | VTBL_MDM_SEM_ONTOLOG_TYP

Columns | Data | Grants | Dependencies | Details | Triggers | SQL | Errors

Sort... | Filter: | Actions...

	DOMAINTBL	DOMAIN...	DOMAINDESC	
1	d_ontolog_typ	rdf	PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>	DF) (source: https://www.w3.org/standards/techs/rdf#w3
2	d_ontolog_typ	rdfs	PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>	esource Description Framework (RDF) Schema (source: http://www.w3.org/TR/rdf-schema/)
3	d_ontolog_typ	owl	PREFIX owl: <http://www.w3.org/2002/07/owl#>	ntology Language (source: http://www.w3.org/2002/07/owl#)
4	d_ontolog_typ	xsd	PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>	xtensib arkup Language (XML) Schema (source: http://www.w3.org/2001/XMLSchema)
5	d_ontolog_typ	dc	PREFIX dc: <http://purl.org/dc/elements/1.1/>	ersistent S (PURL) Administration (source: https://archive.org/services/purl/domain
6	d_ontolog_typ	foaf	PREFIX foaf: <http://xmlns.com/foaf/0.1/>	riend of a Friend (FOAF) Project (source: http://www.foaf-project.org/)
7	d_ontolog_typ	skos	PREFIX skos: <https://www.w3.org/2008/05/skos>	SKOS Simple Knowledge Organization System RDF Schema (SKOS) Ontology (source: https://w

Ontologies Supported in Oracle Spatial and Graph (out-of-the-box)

sem_apis.create_rulebase(<Rulebase Name>);

INSERT INTO mdsys.rdfr_<*rulebase_name*> VALUES
('<*rule_name*>', '(?<*c1*> owl:sameAs ?<*c2*>)
(?<*c2*> owl:sameAs ?<*c3*>)', NULL,
'(?<*c1*> owl:sameAs ?<*c3*>)',
SEM_ALIASES(SEM_ALIAS('','<*alias url*>')));

Rules

Start Page | Bech l Master Data | RB_OWL_SCM_CLS_ACX

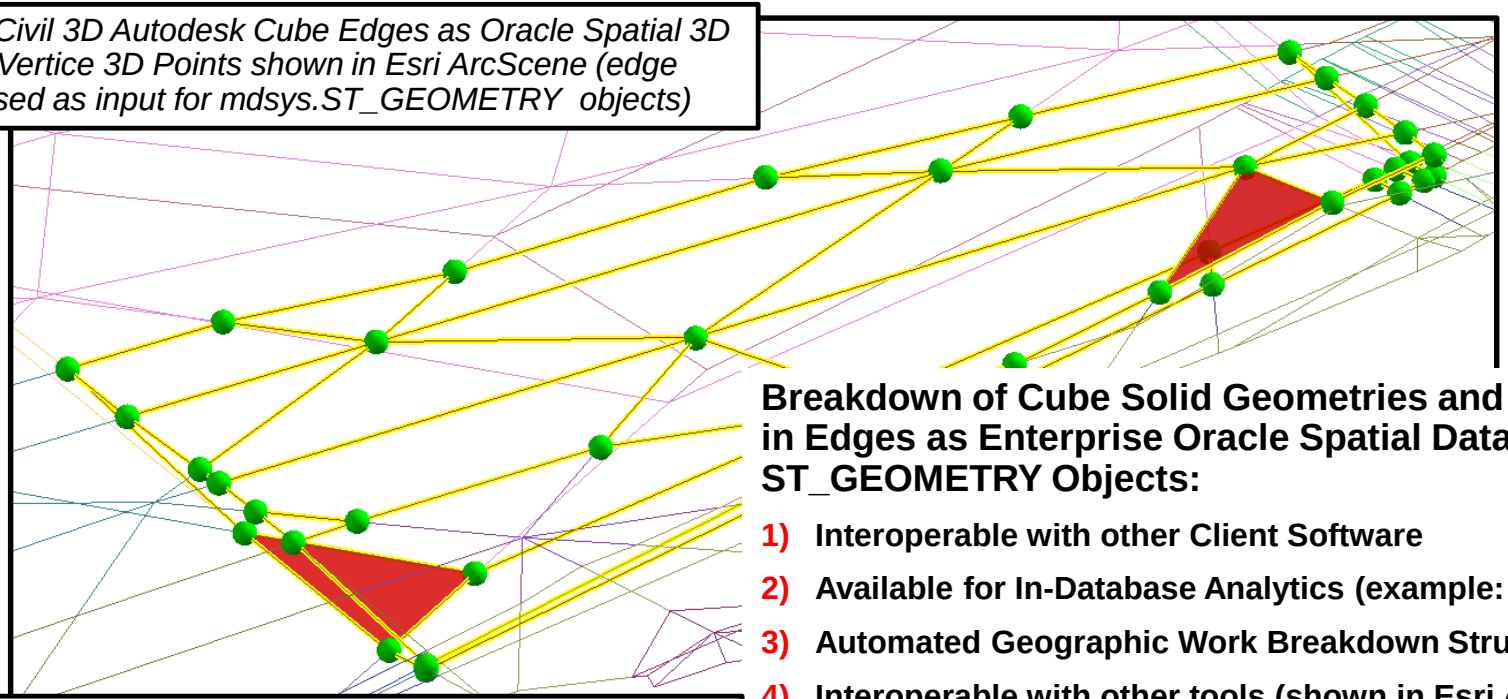
Rules | Information

Actions...

	RULE_NAME	ANTECEDENTS	FILTER	CONSEQUENTS
1	OWL_SCM_CLS_ACX_EGEN_1	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ALIAS) (?ALIAS <http:...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
2	OWL_SCM_CLS_ACX_EGEN_2	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ALIAS2) (?ALIAS2 <htt...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
3	OWL_SCM_CLS_ACX_EGEN_3	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?LABEL) (?LABEL <http:...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
4	OWL_SCM_CLS_ACX_EGEN_4	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?COLUMN_NAME) (?COLUMN...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
5	OWL_SCM_CLS_ACX_EGEN_5	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?COLUMN_NAME01) (?COLU...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
6	OWL_SCM_CLS_ACX_EGEN_6	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?COLUMN_NAME02) (?COLU...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)
7	OWL_SCM_CLS_ACX_EGEN_7	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?SPECIALIZATION_NAME)...	(null)	(?ELEMENT_NAME <http://www.w3.org/2002/07/owl#sameAs> ?ATTRIBUTE)

Use Case 3: Spatial Data Interoperability & MDM Enrichment: Autodesk Civil 3D Cube Solids

Figure 1: *Civil 3D Autodesk Cube Edges as Oracle Spatial 3D Lines and Vertice 3D Points shown in Esri ArcScene (edge linework used as input for mdsys.ST_GEOMETRY objects)*

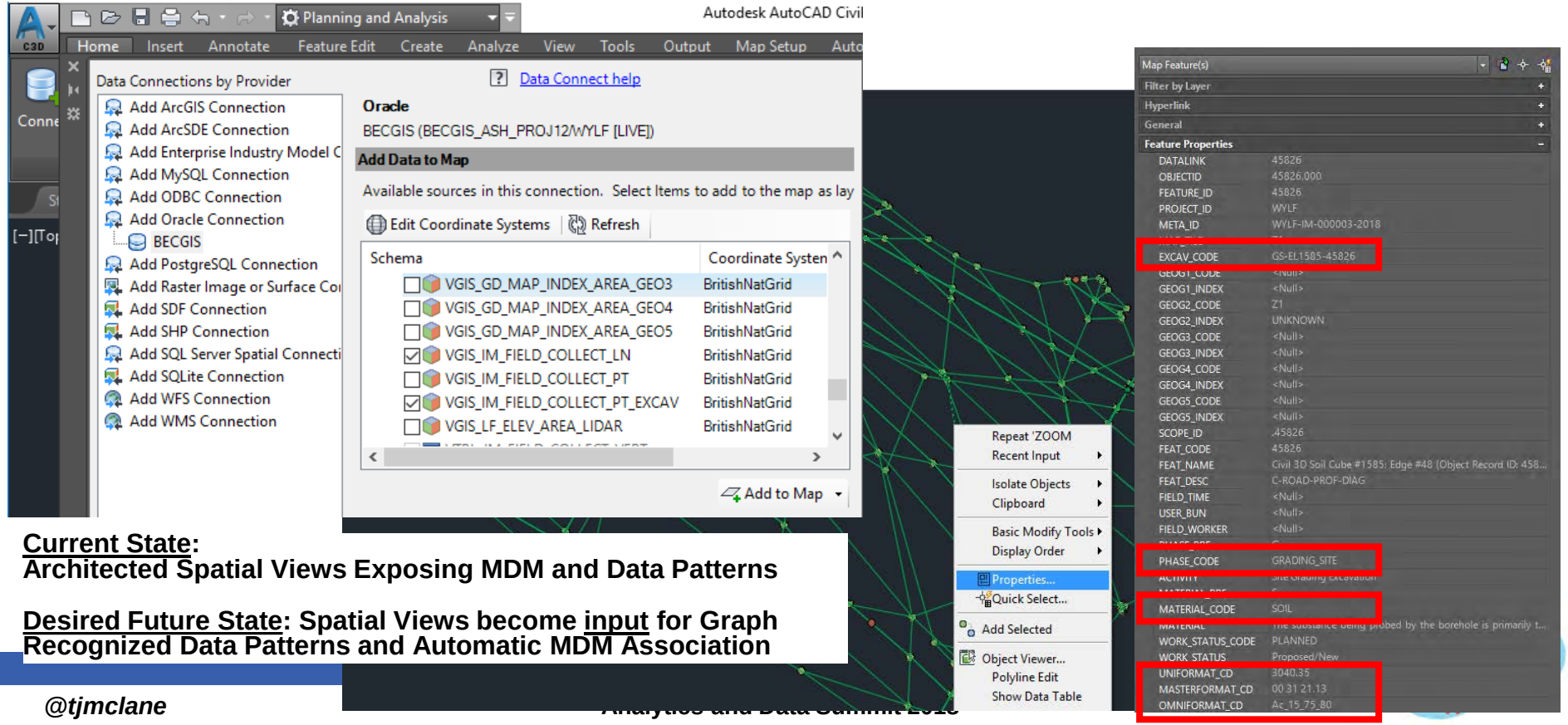


Breakdown of Cube Solid Geometries and Regenerate in Edges as Enterprise Oracle Spatial Database ST_GEOMETRY Objects:

1) **Interoperable with other Client Software**
2) **Available for In-Database Analytics (example: Centroid)**
3) **Automated Geographic Work Breakdown Structure**
4) **Interoperable with other tools (shown in Esri ArcScene)**
5) **Exposure of MDM-Enriched Data back in original authoring software**

Note: *Oracle Spatial 3D Polygon Faces examples in* ***red*** *also displayed, but these objects do not directly interoperate back to Civil 3D (but export to Esri Shapefile from Oracle Spatial does interoperate 3D polygon cube faces)*

Use Case 3: Master Data Enrichment and Automated Tag Generation: Civil 3D Solid Cube Edges as ST_GEOMETRY



Current State:
Architected Spatial Views Exposing MDM and Data Patterns

Desired Future State: Spatial Views become input for Graph Recognized Data Patterns and Automatic MDM Association

Key Takeaways: Spatial Master Data

- Primary priority should be on identification of important master datasets needed for spatial content
- Second priority should be on the revision process to update content to keep current with the industry publication and to normalize content between MDM datasets (i.e. – data governance process)
- Final priority should be on deployment strategies (both relational and graph) needed to support end user experience
- Master data architecture should have both data dictionary and metadata components to facilitate automation
- Definitions for data quality should include a MDM basis for data completeness, content standards and data transformation

Key Takeaways: Use of RDF Views

- **RDF Views** are a way to expose semantic triples data from traditional relation database content
- **RDF Views** create: mapping triples, schema triples, rdf object triples
- **RDF View** triples content can be ported to staging and triplestore tables for the creation of **Native Semantic Models**
- Rulebases and entailments can be created on the native semantic models exported from RDF Views
- Semantic matching (SEM_MATCH) queries work against both **RDF Views** and traditional **Native Semantic Models**, BUT…
- Perhaps a hybrid of both RDF Views and native semantic models content combined in a **Virtual Semantic Model** will produce the best results…my comparisons of the three are now in progress

Questions & Answers


ANALYTICS AND DATA SUMMIT
2018
All Analytics. All Data. No Nonsense.
March 20–22, 2018