Graphical user interface, calendar

Description automatically generated

# Resource Description Framework (RDF)

* Is a World Wide Web Consortium (W3C) standard originally designed as a data model for metadata.
* RDF is a directed graph composed of triple statements.
* An RDF graph statement is represented by:
  + a node for the *subject*,
  + an arc that goes from a subject to an object for the *predicate*, and
  + a node for the *object*.

Graphical user interface

Description automatically generated with medium confidence

* Each of the three parts of the statement can be identified by a Uniform Resource Identifier (URI).
* The object can also be a literal value.
* The subject denotes the resource, and is expressed as either a uniform resource identifier (URI) or a blank node.
* The predicate denotes traits or aspects of the resource and expresses a relationship between the subject and the object.
* RDF triples may be stored in a type of database called a triplestore.
* This simple, flexible data model has a lot of expressive power to represent complex situations, relationships, and other things of interest, while also being appropriately abstract.
* TTL is the most widely used notation.
* SPARQL is a standard query language for RDF graphs.
* Example

“The sky has the color blue”

* + subject is “sky”
  + predicate denotes “has the color”
  + object denotes “blue”

# TTL

* TTL (pronounced “turtle”) stands for *Terse RDF Triple Language*
* Is a file format used to express data in the RDF data model
* Other alternatives are
  + N-Triples: a very simple, easy-to-parse, line-based format that is not as compact as Turtle
  + JSON-LD: JavaScript Object Notation for Linked Data
  + XML: an XML-based syntax that was the first standard format for serializing RDF
* Is a W3C standard that is described as a “general-purpose language for representing information in the web.”
* Each item in the triple is expressed as a Web URI.
* Semi-colons allow triples to share a subject
* Periods mark a full-stop
* Prefixes are used to shorten entities, for readability

Examples

Internationalized Resource Identifier (IRI)

Reference (to parent)

Name/ID

Connection Information

\_:b2

dwec:jdbcUrl <jdbc:sqlserver://APDWVDSQL01.apd.fl.local;databaseName=DWCCProvider> ;

dwec:databaseName "DB 1" ;

dwec:databasePort "1433"^^xsd:int ;

dwec:databaseSchema "Schema 1" ;

dwec:databaseServer "APDWVDSQL01.apd.fl.local" ;

rdf:type dwec:DatabaseConnectionInfo .

Database Information

<https://fl-apd.data.world/db.f6ca35310d9676db6295d9c3952f46bf>

dct:identifier "DB 1" ;

dwec:databaseType <https://dwec.data.world/v0/database-types/sqlserver> ;

dwec:databaseConnection \_:b2 ;

rdf:type dwec:Database .

Schema Information

<https://fl-apd.data.world/sch.9d619776b73e0b9bc0144691156de829>

dct:isPartOf <https://fl-apd.data.world/db.f6ca35310d9676db6295d9c3952f46bf> ;

dct:identifier "Schema 1" ;

rdf:type dwec:DatabaseSchema .

Table Information

<https://fl-apd.data.world/tbl.3e9a87efefc8b916b8760ba32407291c>

dct:isPartOf <https://fl-apd.data.world/db.f6ca35310d9676db6295d9c3952f46bf> ;

dct:isPartOf <https://fl-apd.data.world/sch.9d619776b73e0b9bc0144691156de829> ;

dct:identifier "Table 1" ;

dct:description "Contains information about APD users" ;

dwec:hasAssetStatus <https://fl-apd.data.world/ApprovalStatusApproved> ;

rdf:type dwec:DatabaseTable ;

<https://fl-apd.data.world/business\_summary> "Group Homes" ;

<https://fl-apd.data.world/contains\_sensitive\_data>

<https://entities.data.world/contains\_sensitive\_data\_no> ;

<https://fl-apd.data.world/restricted\_to\_public\_disclosure>

<https://entities.data.world/restricted\_to\_public\_disclosure\_no> .

Column Information

<https://fl-apd.linked.data.world/col.24492a55543a56ec3e4e3e406fe40df6>

dct:isPartOf <https://fl-apd.linked.data.world/tbl.3e9a87efefc8b916b8760ba32407291c> ;

dct:identifier "Column 1" ;

<http://www.w3.org/ns/csvw#name> "Column 1" ;

dwec:jdbcType <https://dwec.data.world/v0/jdbc-types/VARCHAR> ;

dct:description "Column 1 description..." ;

dwec:columnSize "500"^^xsd:int ;

dwec:columnIndex "11"^^xsd:int ;

dwec:columnTypeName "varchar" ;

dwec:columnIsNullable true ;

rdf:type dwec:DatabaseColumn ;

<https://fl-apd.linked.data.world/business\_summary> "Column 1 business summary... " .

# SPARQL

* SPARQL is a query language for accessing RDF
* Converts RDF triplestore to Cartesian result sets
* The following basic query returns every triple in the triplestore

SELECT ?subject ?predicate ?object

WHERE {

?subject ?predicate ?object .

}

* Example

SELECT DISTINCT

?databaseiri

?databaseName

?jdbcURL

?databaseServer

?databasePort

(GROUP\_CONCAT(?databaseSchema;SEPARATOR=", ") as ?schemas)

WHERE

{

?databaseiri dct:identifier ?databaseName ;

rdf:type dwec:Database .

OPTIONAL{

?databaseiri dwec:databaseConnection ?bnode .

OPTIONAL{

?bnode dwec:databasePort ?databasePort .

}

OPTIONAL{

?bnode dwec:databaseServer ?databaseServer .

}

OPTIONAL{

?bnode dwec:jdbcUrl ?jdbcURL .

}

OPTIONAL{

?bnode dwec:databaseSchema ?databaseSchema .

}

?dataSourceCatalogRecord foaf:primaryTopic ?databaseiri .

?collectionIRI dcat:record ?dataSourceCatalogRecord ;

dct:identifier ?collection\_name .

}

}

* + *rdf:type* is used to state that the query should return only resources that are instances of class *dwec:Database.*
  + *bnode* is a variable for the database connection node associated with the database.

# Output (Java + Snowflake + Excel + SQL)

* Java can leverage Apache Jena (<https://jena.apache.org>)  
    
    
    
    
    
  TODO: show Java code and data structures  
    
  TODO: show pictures of setting up ODBC connection on PC
* Queries RDF graphs

use role INFORMATICA\_METRICS\_ANALYST;

use database INFA\_METRICS;

use schema INFA\_METRICS.PUBLIC;

TODO: show how/why columns are named with dot notation

create or replace table DATABASE\_METADATA

(

"orgId" text,

"core.externalId" text,

"core.name" text,

"custom.data.world.import.jdbcURL" text,

"custom.data.world.import.databaseServer" text,

"custom.data.world.import.databasePort" text

);

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **orgId** | **core.externalId** | **core.**  **name** | **core.**  **description** | **com.infa.odin.models.relational.**  **Comment** | **com.infa.odin.models.relational.**  **Owner** |
| APD | db.f6ca…db6295d9c3952f46bf | DB 1 | DB 1 Description | DB 1 Comment | DB 1 Owner |

# INFA Model

TODO: show how CSV file names need to match packageName

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"packageLabel": "Data Dot World Objects",

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"core"

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