Oracle Database Semantic Technologies provides support for native storage, querying and inference of semantic datasets. This infrastructure can be used to build applications, among others, for data integration, ontology usage and management, ontology enhanced search, and so on. In the upcoming release several features have been added to facilitate ontology management including: (1) native, forward-chaining based inference for an expressive subset of OWL DL (basic constructs, property characteristics, class comparisons, individual comparisons, and class expressions), (2) new SQL semantic operators to enhance the query of relational data using ontologies and (3) a bulk-load facility for loading large amounts of semantic data (RDF/RDFS/OWL) from N-Triple formatted files. All these features are SQL-based (with a SPARQL-like graph pattern-based query interface), providing a SQL based infrastructure for ontology management.

This has several advantages: (1) scalability of a database for large ontologies, (2) tight and seamless integration with relational data enabling combined queries, (3) ability to process the results of a semantic query with SQL constructs, and (4) database benefits of security, concurrency, transaction control, robustness, availability, etc. for ontologies.

In this presentation we will walk through the major steps of building an application using well-known ontologies in the Life Science domain, highlighting along the way the new and enhanced capabilities of Oracle Database semantic technologies, in terms of performance, scalability, and functionality. We will show how the ontology can be efficiently loaded into the database using the new, highly scalable bulk-load capability that also supports concurrent loading and appending to existing ontologies in the Oracle DB semantic data store. Next, we will explain how the native support for scalable and efficient inference, using the rich semantics of a highly expressive subset of OWL DL, can be used to discover knowledge from the explicitly specified relationships. We will then show how the ontology may be queried using SPARQL-like graph patterns embedded in a SQL query that automatically leverages the powerful capabilities of the Oracle DBMS optimizer. Finally, we will demonstrate how the ontology can be linked to a sample relational table containing data in traditional relational form, and illustrate how use of the newly introduced semantic operators for ontology-enhanced querying of traditional relational tables enhance the value of legacy as well as new data (for example, row containing “Elbow_Fracture” in the relational table can be retrieved via an ontology-enhanced query asking for “Upper_Extremity_Fracture”).