Trip Planning Ontology Documentation

1. Introduction

The purpose of the ontology in online trip planning services is to offer a more formal representation of knowledge about planning and organizing a travel itinerary, transportation options, and auxiliary services. The ontology presents a structured way to model critical concepts around online trip planning, including the modes of transport, itineraries, steps of a trip, and the platforms providing these services. With classes, properties, and relationships defined, this ontology will supplement the reasoning pathway assisting intelligent systems in inferring answers to reasonably important inquiries about trip planning: duration of trips, modal choice of transport, pricing, and these services' inter-connectivity with other transport services. The benefit of this ontology is to support autonomous systems in selecting which travel options to be preferred in a timely and effective fashion to ensure that a travel task's planning and execution are carried through optimally. This ontology aims to capture both user input elements (like departure and arrival data) and service output details (like transportation lines or providers).

2. Ontology Classes

1. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#Operation**

   o **Label:** Operation

   o **Comment:** Represents a function or action provided by a service, such as booking or cancelling.

2. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#Stop**

   o **Label:** Stop

   o **Comment:** A location along a transportation line where passengers may stop.

3. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#Ticket**

   o **Label:** Ticket

   o **Comment:** A document or token indicating that a traveler is allowed to a journey.

4. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#TransportationLine**

   o **Label:** TransportationLine

   o **Comment**: Represents a specific transportation route.

5. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#TripPlan**

   o **Label:** TripPlan

   o **Comment:** An organized route or schedule containing various steps of a journey.

6. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#TripStep**

- o **Label:** TripStep

- o **Comment:** A segment or part of a complete trip, representing an individual leg of the journey.

7. **IRI:**
   http://www.semanticweb.org/dell/ontologies/TripPlanning#TripPlanningService

   - o **Label:** TripPlanningService

   - o **Comment:** A system or application that assists users in organizing and scheduling travel plans.

3. **Ontology Object Properties**
   1. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#hasAffordance**

      - o **Label:** hasAffordance

      - o **Comment**: Indicates the actions or interactions supported by a particular service or stop.

      - o **Domain:** TripPlan

      - o **Range:** owl:Thing

   2. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#hasDestination**

      - o **Label:** hasDestination

      - o **Comment:** Relates a trip or leg of a journey to its final stop.

      - o **Domain:** TripPlan

      - o **Range:** Stop

   3. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#hasOperation**

      - o **Label:** hasOperation

      - o **Comment:** Connects a service to the operations it provides.

      - o **Domain:** TripPlan

      - o **Range:** Operation

   4. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#hasStop**

      - o **Label:** hasStop

      - o **Comment:** Specifies a stop that is part of a transportation line or trip.

      - o **Domain:** TripPlan

      - o **Range:** Stop

   5. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#hasTripForward**

      - o **Label:** hasTripForward

- o **Comment:** Indicates the next sequential step in a trip plan.

- o **Domain:** TripPlan

- o **Range:** TripStep

6. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#providedBy**

- o **Label:** providedBy

- o **Comment**: Indicates that a particular resource or entity is offered by a specific trip planning or transportation service.

- o **Domain:** TripStep

- o **Range:** TripPlanningService

7. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#requiresTicket**

- o **Label:** requiresTicket

- o **Comment:** Indicates that a particular service or transportation line requires a valid ticket.

- o **Domain:** TripPlan

- o **Range:** Ticket

8. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#usesLine**

- o **Label:** usesLine

- o **Comment:** Specifies the transportation line used by a trip.

- o **Domain:** TripPlan

- o **Range:** TransportationLine

4. **Ontology Data Properties**

1. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#arrivalInput**

- o **Label:** arrivalInput

- o **Comment:** The input field taking the arrival location or time.

- o **Domain:** TripPlan

- o **Range:** xsd:string

2. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#arrivalTime**

- o **Label:** arrivalTime

- o **Comment:** Specifies the desired or actual time of arrival.

- o **Domain:** TripStep

- o **Range:** xsd:dateTime

3. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#currency**

   o **Label:** currency

   o **Comment:** The currency used for ticket pricing or services.

   o **Domain:** Ticket

   o **Range:** xsd:string

4. **IRI:**
   http://www.semanticweb.org/dell/ontologies/TripPlanning#departureDateInput

   o **Label:** departureDateInput

   o **Comment:** Specifies the intended date of departure.

   o **Domain:** TripPlan

   o **Range:** xsd:dateTime

5. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#departureInput**

   o **Label:** departureInput

   o **Comment:** Refers to the information regarding the place and/or time from which a trip begins.

   o **Domain:** TripPlan

   o **Range:** xsd:string

6. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#departureTime**

   o **Label:** departureTime

   o **Comment:** The specific time at which the journey is scheduled to begin.

   o **Domain:** TripPlan

   o **Range**: xsd:dateTime

7. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#price**

   o **Label:** price

   o **Comment:** Specifies the cost of the ticket or transportation service.

   o **Domain:** Ticket

   o **Range:** xsd:decimal

8. **IRI: http://www.semanticweb.org/dell/ontologies/TripPlanning#schema**

   o **Label:** schema

   o **Comment:** Defines a reference to a structural description or standard used in the data.

o **Domain:** owl:Thing

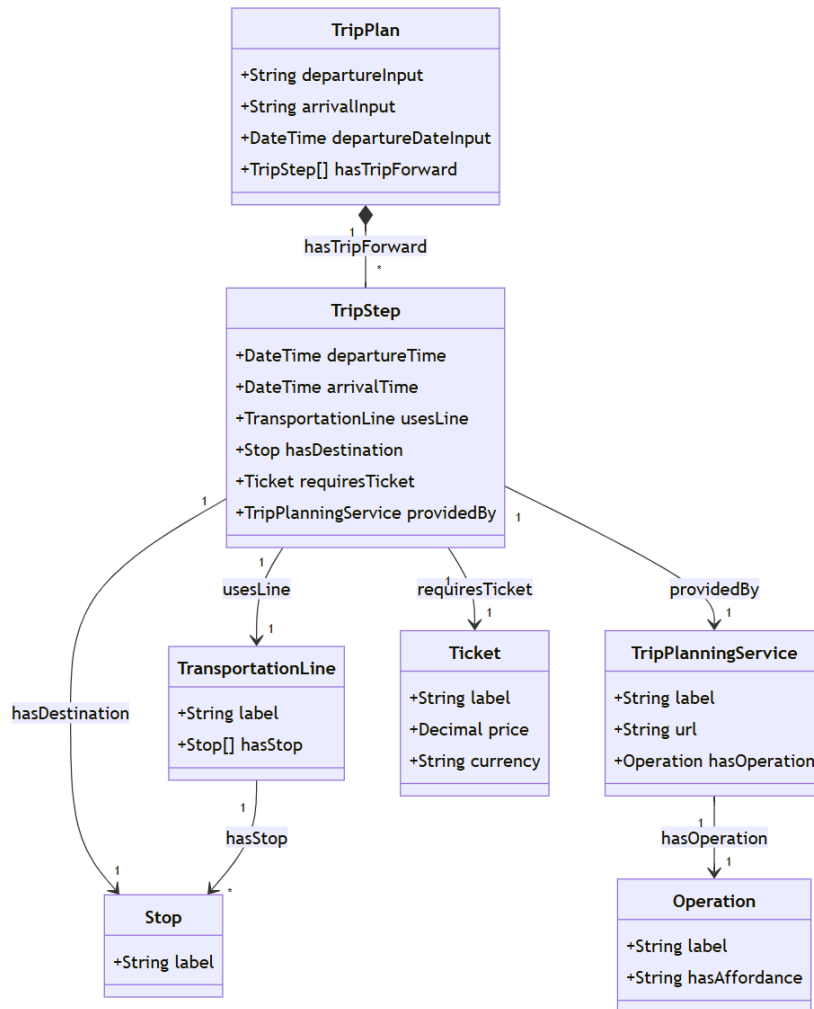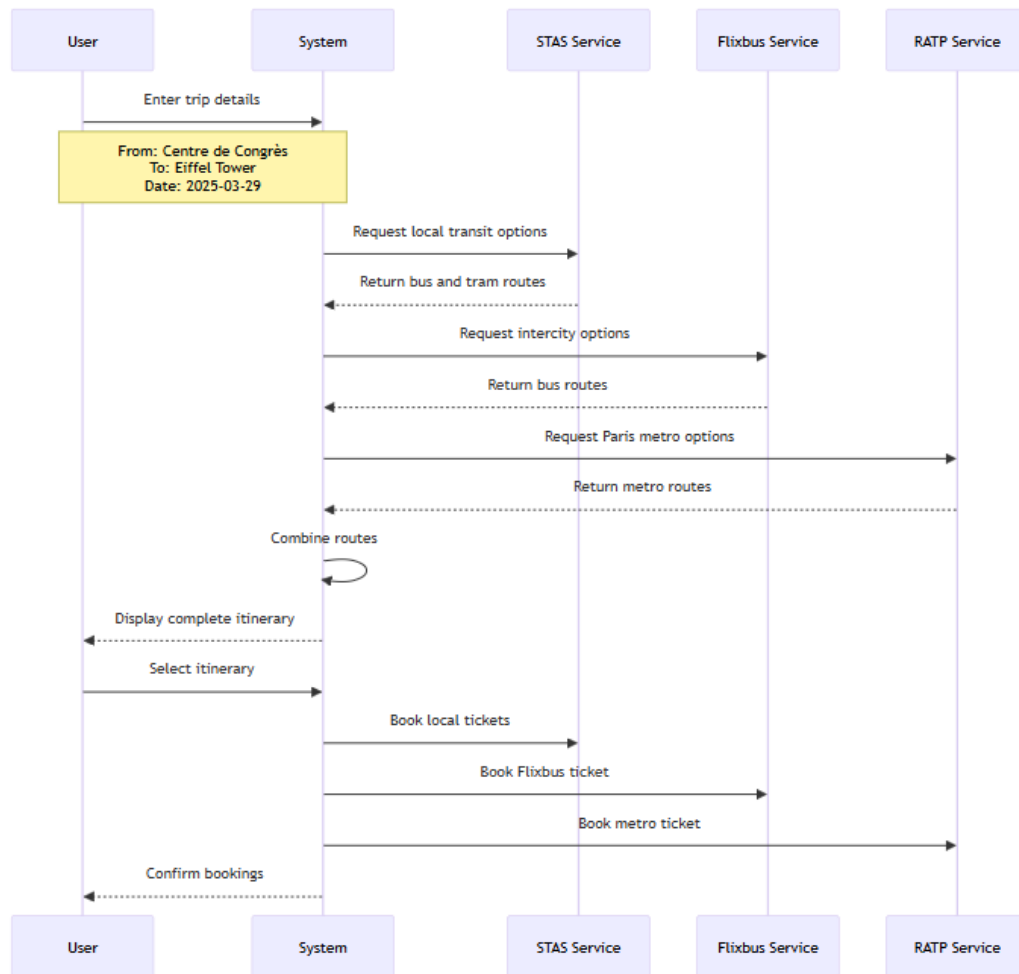o **Range:** xsd:anyURI

5. UML Class Diagram

Diagram Description

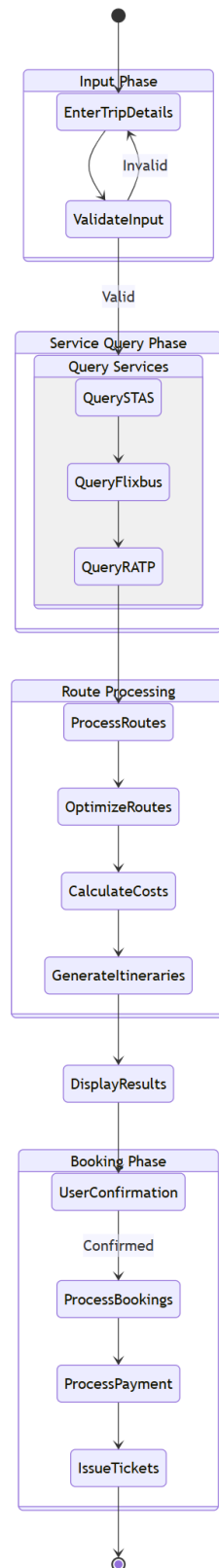This UML class diagram represents a trip planning system with the following key components:

- **TripPlan:** The main class representing a complete journey plan.

- **TripStep:** Individual segments of the journey, each with specific timing and transportation details.

- **TransportationLine:** Represents different transportation routes (bus, tram, metro lines).

- **TripPlanningService:** Services like Flixbus, STAS, or RATP that provide trip planning capabilities.

- **Operation:** Specific operations that can be performed by planning services.

- **Stop:** Physical locations where transportation services stop.

- **Ticket:** Represents the fare information for each trip segment

6. UML Sequence Diagram

7. UML Activity Diagram

8. Conclusion

This documentation serves as a foundational guide for understanding and utilizing the Trip Planning Ontology. Each term is defined with user-friendly labels and descriptions to promote clarity. Additional annotations and examples can be added to support future integration with linked data, semantic web services, and AI reasoning engines. The ontology is open to further extension based on domain-specific requirements.