Semantic Web Report

# Ontology :

The PICE Ontology is designed to provide a user-friendly platform where individuals can search for event   
organizers and event locations within a city, while also displaying weather information for that city. This makes the event planning process more integrated and convenient by combining essential elements like location, organization, and weather forecasts in one easy-to-use system.

## Classes and Properties:

* + - **Classes in the PICE Ontology:**
    - Event (dbo:Event): Central to the ontology, it captures the essence of any event.
    - Venue (pice:Venue): Represents the physical location of events.
    - Weather Forecast (pice:WeatherForecast): Offers detailed meteorological data pertinent to event planning.
    - Organisation (dbo:Organisation): Encompasses companies providing event services.
    - Place (pice:Place): General category for locations like hotels, restaurants, etc.
    - Equipment (pice:Equipment): Details about equipment used in events.
    - **Properties inside the schema :**
* Location (dbo:location): Connects events to their venues.
* Provided By (dbo:providedBy): Links service providers to events.
* Knows (foaf:knows): Describes personal connections between individuals.
* Has Equipment (pice:hasEquipment): Associates events with required equipment.
* Venue Category (pice:venueCategory): Classifies venues into different categories.
* Start and End Dates (dbo:startDate, dbo:endDate): Specifies the duration of events.
* Theme (dbo:theme): Defines the theme of an event.
* Weather-Related Properties (pice:hasTemperature, pice:hasMinTemperature, etc.): Provide comprehensive weather forecasts.
* Has Weather Forecast (pice:hasWeatherForecast): Connects weather forecasts to events.
* Place Attributes (pice:address, pice:category, etc.): Offer detailed information about locations.
* Organisation Attributes (pice:providerName, pice:price, etc.): Detail aspects of service providers.
  + - **Benefits of the PICE ontology :**
    - Enhanced Coordination: By integrating various components of event planning such as venues, service providers, and weather forecasts, the PICE Ontology ensures seamless coordination, leading to more efficient event management.
    - Comprehensive Data Access: With its extensive properties and classes, the ontology allows for a detailed understanding and representation of all aspects of an event, from logistical details to participant interactions.
    - Improved Decision Making: The ability to link weather forecasts with event dates and locations aids in making informed decisions, ensuring better preparedness for environmental factors.
    - Service Provider Optimization: The detailed classification of organisations and their services allows for a tailored selection of service providers, ensuring that the best possible options are chosen for each event.

## Utilization of SHACL:

## In this section of the report, we examine the implementation of SHACL (Shapes Constraint Language) constraints within the PICE Ontology framework. These constraints are instrumental in validating the accuracy and consistency of the data encompassed by the ontology. Such a validation mechanism is integral to upholding the dependability and integrity of the event planning process managed through the ontology. The incorporation of these SHACL constraints is a critical step towards ensuring an effective, error-free, and streamlined event management system, highlighting the ontology's commitment to high standards in data quality and process efficiency.

## **Event Shape Constraints (pice:EventShape):**

## Start and End Dates: Each event (dbo:Event) must have exactly one start date (dbo:startDate) and one end date (dbo:endDate), both in dateTime format.

## Location: An event can have at most one location (dbo:location), which must be an instance of pice:Venue.

## Theme: Events can have a theme (dbo:theme) represented as a string, with a length between 3 and 100 characters.

## Service Provider (providedBy): Validates that the service provider is an instance of dbo:Organisation.

## **Venue Shape Constraints (pice:VenueShape):**

## Address Validation: Each venue (pice:Venue) must have an address (vcard:address), which is a non-empty string.

## Venue Category: Venues must belong to predefined categories like "Hotel", "Restaurant", etc.

## **Weather Forecast Shape Constraints (pice:WeatherForecastShape):**

## Weather Data Types: Validates data types for temperature, humidity, weather description, weather icon, and forecast time.

## Temperature Consistency: Ensures the minimum temperature is less than or equal to the maximum temperature.

## These constraints play a vital role in maintaining the accuracy and reliability of the data within the PICE Ontology. They help ensure that the information entered for events, venues, organizations, and weather forecasts adheres to specified standards, which is critical for the successful planning and execution of events.

## Utilization of SKOS in the Ontology Schema:

In this section of the report, we present the application of the Simple Knowledge Organization System (SKOS) within the PICE Ontology. SKOS is utilized to define and organize key concepts related to event planning, making information more accessible and understandable.

**Basic Concepts:**

* Event Space: Defined as a location where various events occur.
* City: Represents a large town or populated area suitable for hosting events.

**Event Types:**

* Party, Conference, Wedding: These are categorized as broader concepts under Event Space, each with its own specific definition.

**Event Services:**

* Catering, Entertainment, Audio Visual Equipment: Listed under Event Space, these services are essential for events.

**Specific Cities:**

* London and Tokyo: These cities are described with their unique characteristics and are related to various event types and services.

**SKOS Collections:**

* EventTypes and EventServices: These collections group related concepts like Party, Conference, Wedding, and services like Catering.
* ParticipantTypes and Cities: Collections for different participant roles and major cities like Paris, New York, London, and Tokyo.

**Meteorology Concepts:**

* Meteorology, Temperature, Humidity, Weather Condition: These concepts are crucial for understanding weather-related aspects of event planning.

**Venue Concepts:**

* Venue and Specific Venue Categories: Defines various types of venues, each with its own unique characteristics, grouped under a collection for easy reference.

# **Data Lifting :**

## APIs :

## In our report, the data lifting process is a critical component, enriched by the integration of twoAPIs: TomTom and OpenWeatherMap, which significantly enhance the functionality of the PICE Ontology.

## **TomTom API Integration:**

## We employ the TomTom API to gather comprehensive information about event-related venues in various cities. This API, with its extensive category range, allows us to focus specifically on locations pertinent to event planning. The integration of this data into the PICE Ontology means users have access to an updated and diverse array of venue options in their chosen city, tailored to the specific needs of their event.

## **OpenWeatherMap API Usage:**

## For real-time weather data, we rely on the OpenWeatherMap API. This tool provides vital weather forecasts and current conditions for different cities, a crucial aspect of event planning. Integrating this weather data into the ontology equips users with the necessary information to make informed decisions about event scheduling and preparation, adapting to weather conditions as needed.

## CSV :

## For real-time weather data, we rely on the OpenWeatherMap API. This tool provides vital weather forecasts and current conditions for different cities, a crucial aspect of event planning. Integrating this weather data into the ontology equips users with the necessary information to make informed decisions about event scheduling and preparation, adapting to weather conditions as needed.

## For the second aspect of our data lifting process, we utilized a CSV file generated from data scraping of the website 'https://www.lemagdelevenementiel.com/prestations-region-11.html'. This website is a comprehensive resource for event service providers across all regions of France. The website 'Le Mag de l'Événementiel' serves as a rich repository of event service providers in France, offering detailed listings across various categories. We employed web scraping techniques to extract relevant data from this website. This process involved programmatically navigating the site and collecting information on event service providers, such as names, services offered, and regional locations. The CSV file serves as a static dataset that complements the dynamic data obtained from the APIs. It provides a broad base of information about various event service providers in France, enriching the PICE Ontology with more localized and specific data.

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# Information extraction : Challenges and strategic shift :

# In the information extraction phase of our project, our initial approach involved processing natural language texts to extract details about event service providers and their related information. This task was undertaken with the intention of leveraging both the REBEL and SpaCy Matcher tools. However, the outcomes of this approach did not meet our expectations due to several challenges.

# **Challenges Encountered:**

# Accuracy Issues: We observed that the precision of information extraction from natural language texts using REBEL and SpaCy Matcher was not sufficiently high. This led to a significant amount of erroneous or incomplete data, impacting the overall quality of our dataset.

# Complexity of Natural Language: The inherent complexities in understanding and interpreting natural language, especially when extracting specific data points like names, services, and locations of service providers, posed considerable difficulties.

# Given these challenges, we made a strategic decision to pivot our approach. Instead of relying on text extraction from natural language sources, we chose to utilize data directly from our integrated APIs and a specially curated CSV file.