Università degli Studi di Trento
Dipartimento di Ingegneria e Scienza dell'Informazione

Scholarships References	L-ENYR
Company (name and address)	Enyr Srl - Piazza Manifattura 1 - 38068 Rovereto (TN)
Type of Scholarship	● **Professional Training**
Title of Scholarship	Data Integration in the Energy Sector: Implementation of an Asset Registry based on a Non-Relational Database for Linked Data Interoperability
Industrial Tutor (full name + email address)	Giuseppe Rigadello – giuseppe.rigadello@enyr.eu
Academic Supervisor (full name + email address)	To be defined

Short Description of Internship and Thesis Activities, and Expected Outcome:

This thesis focuses on data integration in the energy sector, specifically on implementing an Asset Registry based on a non-relational database to enhance the interoperability of linked data. The main goal is to create an efficient and reliable system for managing data related to energy assets, allowing their representation and modification through dedicated frontend components.
Data integration in the energy sector poses significant challenges, particularly in interconnecting information from various sources and structuring it effectively. The Asset Registry serves as a centralized record containing details on energy resources, such as production facilities, transmission networks, and energy storage systems. Its implementation aims to facilitate more effective asset management and monitoring, optimizing resource use and contributing to greater overall energy efficiency.
Adopting a non-relational database is particularly well-suited for representing linked data, providing the scalability, flexibility, and high performance necessary for data interoperability in the energy sector.
In this thesis, the proposal is to implement an Asset Registry using a non-relational database specifically suited for managing linked data. It will consider aspects like data modeling, managing RDF triples (Resource Description Framework), efficient information retrieval, and optimizing queries to facilitate linked data interoperability.
Furthermore, an intuitive and user-friendly frontend will be developed for viewing and editing data in the Asset Registry. This user interface will allow energy sector operators to access asset information, visualize relationships between linked data, and make necessary modifications. Usability aspects, interaction with the non-relational database, and integration with other existing systems in the energy ecosystem will be considered.
Through this project, the aim is to enhance data integration in the energy sector, promoting the interoperability of linked data and improving information sharing among various energy sector

stakeholders. This could lead to greater transparency, better planning of energy resources, and reduced operational costs in the energy sector.

Expected Outcome
The expected outcome of this project is the establishment of a comprehensive and robust Asset Registry that significantly enhances the efficiency and effectiveness of data management in the energy sector. This system is anticipated to provide a unified platform that streamlines the access and manipulation of energy asset data, ensuring that stakeholders can make informed decisions based on accurate, up-to-date information. The improved data interoperability and connectivity are expected to result in better coordination among various energy sector entities, leading to optimized resource allocation, reduced operational costs, and an overall increase in energy efficiency. Additionally, the project aims to contribute to the advancement of data integration technologies within the energy sector, setting a benchmark for future developments in this field.

Required Candidate Skills and Prerequisites:

1. Database Management: Knowledge of non-relational (NoSQL) databases, understanding of database architecture, and basic experience in database design and maintenance.
2. Knowledge of Data Integration Techniques: Familiarity with data integration concepts, particularly in handling and integrating linked data from various sources.
3. Programming Skills: Competence in programming languages such as Python, JavaScript, or other relevant languages, especially in the context of database manipulation and frontend development.
4. Understanding of RDF and Semantic Web Technologies: Basic knowledge of RDF (Resource Description Framework), SPARQL, and other semantic web technologies to manage linked data effectively.
5. Frontend Development Experience: Skills in developing user interfaces, preferably with experience in creating intuitive and user-friendly web applications.
6. Analytical and Problem-Solving Skills: Ability to analyze complex data sets, identify issues, and develop practical solutions.
7. Knowledge of the Energy Sector: An understanding of the energy industry, including knowledge of energy assets, would be beneficial.
8. Strong Communication Skills: Ability to communicate technical concepts to non-technical stakeholders and work collaboratively in a team.
9. Research and Development Orientation: A proactive approach to research, with the ability to keep abreast of the latest trends and developments in data management and energy sector technologies.