TOWARDS A RISK-ORIENTED ONTOLOGICAL MODEL OF URBAN ENVIRONMENTS

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CHALLENGES

In the World Cities Report 2022, the United Nations states that the world will continue to urbanize over the next three decades - from 56% of the world's population in 2021 to 68% in 2050.

Urban areas are emerging as risk hotspots due to the human, social, economic, and technological capital they represent. The range of natural, environmental, and anthropogenic risks affecting cities is broad. They include direct, physical damage to hard infrastructure and indirect effects on services and the socio-economic fabric. Cities and metropolitan areas can be considered as adaptive complex systems, characterized by complex interactions between inhabitants and the surrounding infrastructure.

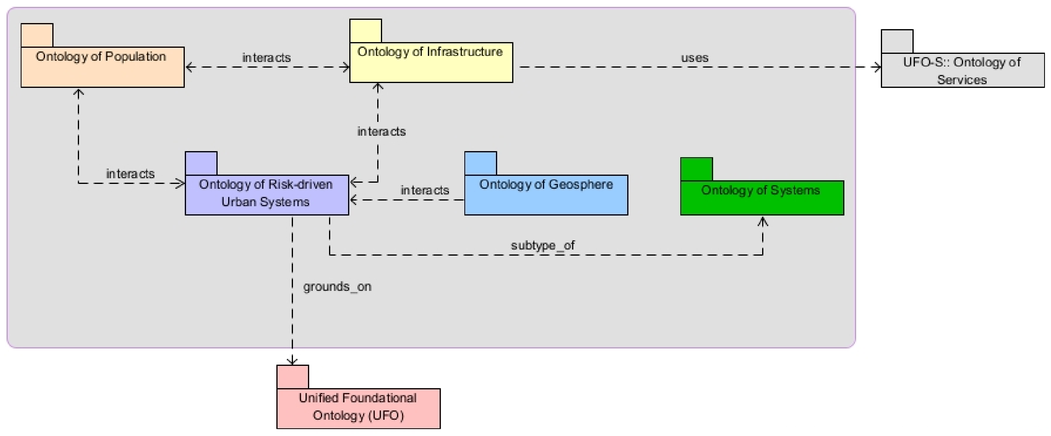
At the same time, the complexity of artificial systems has increased in recent years, making it more difficult to understand and share information. Issues such as FAIR (Findability, Accessibility, Interoperability, and Reuse of digital assets) have been at the forefront of applied computing research, contributing to new approaches and the emergence of new paradigms.

To address these challenges, some models referred to as "ontological models" employ semantic modeling languages that are capable of capturing the shared semantics of a specific portion of the world to be represented. This approach is designed to enhance comprehension and facilitate the sharing of distributed heterogeneous information.

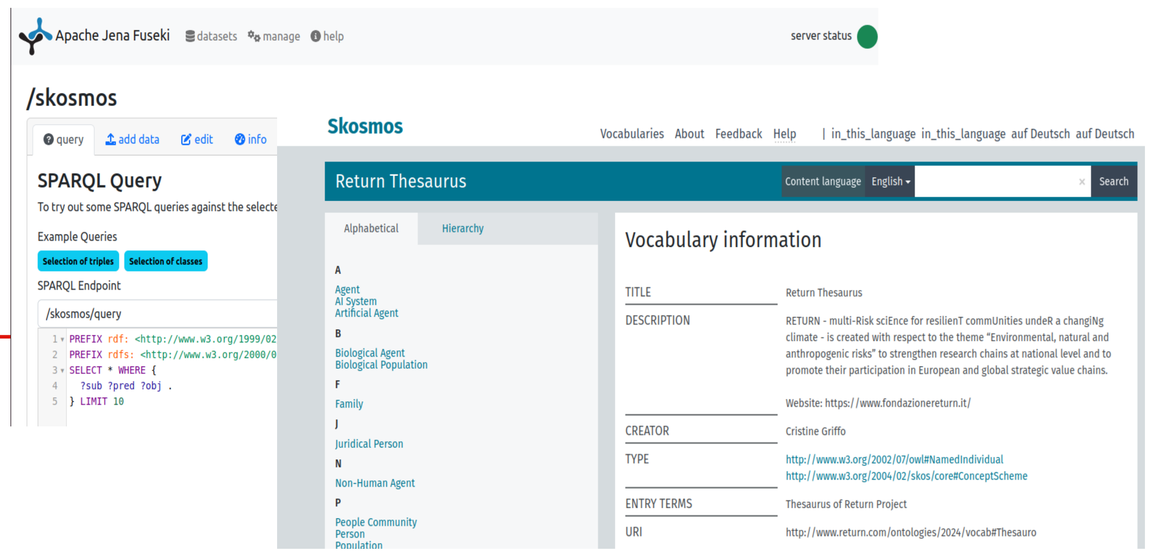
CONTRIBUTION

A framework to standardize and harmonize the description of the main components of risk related to multiple hazards and climate change in urban systems, consisting of:

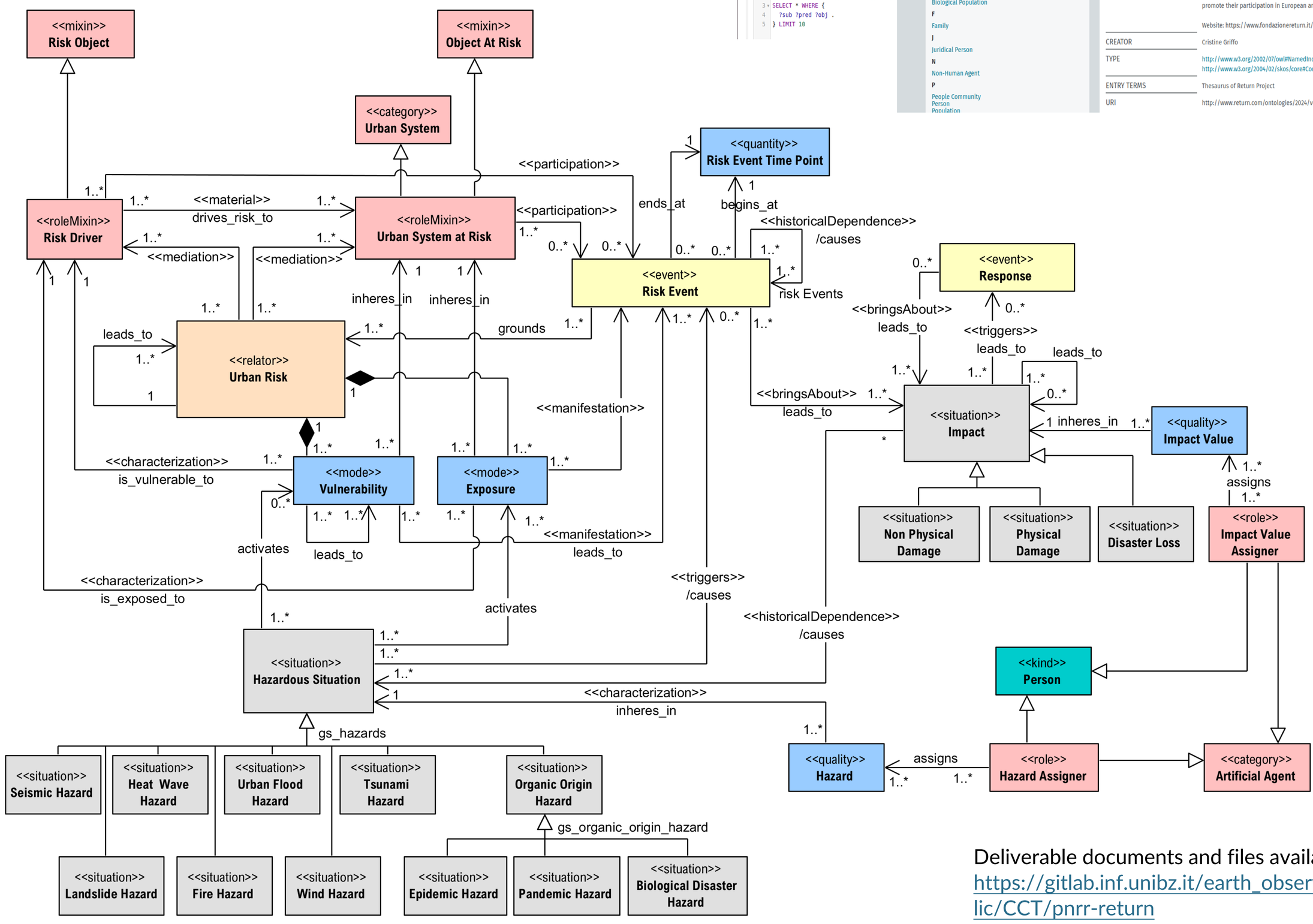
- A set of ontological models based on the Unified Foundational Ontology (UFO) using OntoUML plugin + Visual Paradigm



- Operational ontologies (Turtle and JSON files) available at Protegè
- A methodology proposed for ontology engineering
- A controlled vocabulary visualized on Skosmos + Apache Jena Fuseki



RISK-DRIVEN ONTOLOGY OF URBAN SYSTEMS



Deliverable documents and files available at https://gitlab.inf.unibz.it/earth_observation_public/CCT/pnrr-return