



## **ORCHESTRA a Unified an Open Architecture for Risk Management Applications**

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Risk management activities involve a range of different organisations at various administrative levels with their own systems and services. However, the sharing of relevant information that is required for dealing with risks is often limited to a mere raw data exchange. Thus, true efficiency, in most cases, is hindered by administrative and legal boundaries as well as a lack of interoperability on the technical side. Furthermore, the application of numerous and different policies, procedures, data standards and systems, results in co-ordination problems with respect to data analysis, information delivery and resource management, all critical elements of risk management.

ORCHESTRA will is developing the following activities:

- The design and development of a reference model for an open architecture for risk management services, based on standards.
- The second goal is to develop the necessary services in order to demonstrate the usefulness of the ORCHESTRA approach in pilots that address the actual needs of end users and - in general - all the stakeholders involved in risk management activities in real-world scenarios.

As result of the second objective, the ORCHESTRA project is currently executing the pilots to implement and validate the architecture. These pilots are designed to involved risk management stakeholders that are facing common situations of lack of interoperability in their daily work.

The scenario described in this abstract is focused on the necessity to provide interoperability between the forest fire and flash flood domains, in order to concrete the level

of interaction between them and determine how the effect of one hazard could modify the level of risk foreseen for the other hazard.

The scenario presented is sited in Catalonia (Spain) where flash floods and forest fires are two of the most important risks that Regional Administrations have to face every year. Although specific Annual and Master Plans have been designed and developed for each risk by specific Regional Services, a new challenge, that of combined multi-risk planning, entails a demand for high level of collaboration and inter-operation among the involved actors and information entities.

In this context, the present scenario addresses the following main objectives:

- Improve the context of decision-making process in the prevention planning of various risks (floods and forest fires) in a basin by focusing on the efficiency of information management and assessment services, thus improving the interoperability among the involved actors and systems.
- Prove the adequacy of Orchestra Architecture as a solution for the mentioned challenges and, in turn, identify which parts need to be corrected or modified towards a fully operational implementation in other similar/larger cases

In the prevention planning of floods, and its link with the prevention planning of forest fires as a main factor affecting the response of the basin, a number of problems arise:

- Lack of information or ignorance of existing data and difficult search and access to this information.
- Lack of Comprehension. There is a misunderstanding and a lack of standardization in the concepts (lack of semantic coherence)
- Lack of coordination among authorities in multi-risk or trans-boundary emergencies.
- Model implicit hypothesis might be referred just to the local field when it was developed. To execute the models and obtain a valid result is mandatory to count with the most accuracy information. This does not happen in many occasions.

At catchment scale, several Administrations are involved in the planning and management of natural risks, which normally threaten and affect the natural areas and

ecosystems, the infrastructures, specifically the housing areas, and the people inhabiting such areas. This process becomes really complicate due to the disparate availability of information and the implication of a number of administrative entities, protection bodies and citizen representatives. Besides, each Administration, Department and even Service has set-up proprietary legacy systems and data which difficults a real, comprehensive and coherent interaction among the actors involved in each of the risk planning steps.

A common frame in which to connect the different data sources, models, querying and mapping in an interoperable, transparent way is required. In this sense **ORCHESTRA will prepare the way for a common, collaborative and efficient query and access to the most ap-proprate information sources to feed the risk prevention planning process (high level, risk ori-ented services) involving, floods, fires and pollution, hence to set-up (and co-ordinate) the data infrastructure, for multi-risk management in a basin.**

The pilot addresses potential chains of events within multi-risk scenarios, in particular:

- **Forest fires:** a great part of the basin surface is made of forests, which have often suffered fires
- **Hydrology** (link to erosion and landslides): after a fire, rain transformation into flow changes
- **Hydraulics** (link to floods): an extraordinary stormy event results in a flood
- **Sediment transport** due to erosion and floods
- **Pollution** (substances transport due to forest fire, due to industrial spill, due to flooding of industrial zone) may be triggered by flooding of industrial areas
- **Riverside and floodplain ecology** (link to environmental damage) may be affected by sediment transport, pollution and even only by flooding

**Public Heath:** may be affected by sediment transport, pollution and even only by flooding.

The interconnection of each event, currently disaggregated, is the challenge of the pilot presented in this abstract and also the challenge of ORCHESTRA as an Open Architecture for Risk Management.