

A brand-new flexible and scalable ENEA solution to handle data in smart city environment

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Abstract. In this work, the authors propose an approach and describe a methodology and show a modular and scalable multi-layered ICT platform called ENEA Smart City Platform (ENEA-SCP). The solution provided by ENEA SCP to exploit potentials in Smart City environments is based on four fundamental concepts: Open Data, Interoperability, Scalability and Replicability. The ENEA-SCP is implemented following the Software as a Service (SaaS) paradigm, exploiting cloud computing facilities to ensure flexibility and scalability. Interoperability and communication are addressed employing web services, and data format exchange is based on the JSON data format. By taking into account these guidelines as references, this talk provides a description of the SCP developed by ENEA and its potential use for smart and IoT city applications

Keywords. Smart City, Big Data, ICT Platform, Interoperability, IoT

Introduction

In a smart city environment, the explosive growth in the volume, speed, and variety of data being produced every day requires a continuous increase in the processing speeds of servers and entire network infrastructures, platforms as well as new resource management models. This poses significant challenges (and provides attractive development opportunities) for data-intensive and high-performance computing, i.e., how to turn enormous datasets into valuable information and meaningful knowledge efficiently. The variety of sources complicates the task of context data management such as data derives from, resulting in different data formats, with varying storage, transformation, delivery, and archiving requirements. At the same time, rapid responses are needed for real-time applications. With the emergence of cloud infrastructures and platforms, achieving highly scalable data management in such contexts is a critical problem, as the overall urban application performance is highly dependent on the properties of the data management service. This means, continuously developing and adopting ICT technologies to create and use platforms for government, business and citizens can communicate and work together and provide the necessary connections between the networks that are the base for the services of the smart city (Chinnici et al, 2018].

The main features of a generic Smart City Platform (SCP) are in the following (Brutti et al., 2018).

- Make data, information, people and organizations smarter;
- Redesign the relationships between government, private sector, non-profits, communities and citizens;

- Ensure synergies and interoperability within and across city policy domains and systems (e.g. transportation, energy, education, health & care, utilities, etc.);
- Drive innovation, for example, through so-called open data, living labs and tech-hub.

1. ENEA Smart City Platform

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The solution provided by ENEA SCP to exploit potentials in Smart City environments is based on four fundamental concepts:

- Open Data
- Interoperability
- Scalability
- Replicability

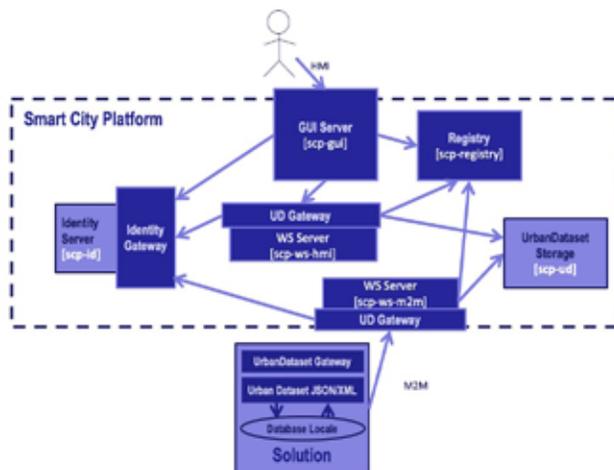
In this scenario, the ENEA SCP is going to tackle the issues concerning these two aspects providing a reference framework of modular (Brutti et al., 2018) specifications for stakeholders willing to implement ICT platforms to exploit the Smart City vision potentials and therefore offer new services for the citizen.

The ENEA Smart City Platform exploits computational resources of the ENEAGRID infrastructure (Iannone et al., 2019), as it is deployed in the cloud hosted in the Portici Research Center site. The creation of a customized environment ENEA cloud-based platform is possible thanks to the virtualization technologies of VMWARE platform, which allows hosting the management, the transportation and the processing of project data services, ensuring their availability and protection over time. More in detail, the SCP is composed by six Virtual Machines (VMs), and each of them hosts a component with a specific role (Fig. 1).

2. Conclusions

In this work, the authors presented the interoperability topic of Smart City platforms and attempted to provide their approach presented by the ICT ENEA Smart City Platform (SCP). This platform is able to interact with different stakeholders at the urban district level by a flexible and multipurpose data format. The ENEA-SCP milestones are the op-

Fig. 1
Scheme of
ENEASCP
architecture
based on VMs



portunity to scale the computational resources according to requests; interoperate with all the interesting parts; and replicate all the components in the different city context.

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