Overview of draft Interreg Proposal Internet of Smart Cities (IoSC)

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Introduction

- An overview of the proposal for Interreg V-A Österreich Tschechische Republik (2014-2020)

- **Pritoritätsachse** PA1: Stärkung von Forschung, technologischer Entwicklung und Innovation

- **Programmspezifisches Ziel** IP1a, Ausbau der Infrastruktur im Bereich Forschung und Innovation (F&I) und der Kapazitäten für die Entwicklung von F&I Spitzenleistungen; Förderungvon Kompetenzzentren, insbesondere solchen von europäischem Interesse

- **Projektakronym** IoSC

- **Projekttitel** Internet of Smart Cities

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Tentative Partners

- Lasaris Group, Masaryk University (MU), Brno
- Distributed Systems Group - Technische Universität (TU) Wien
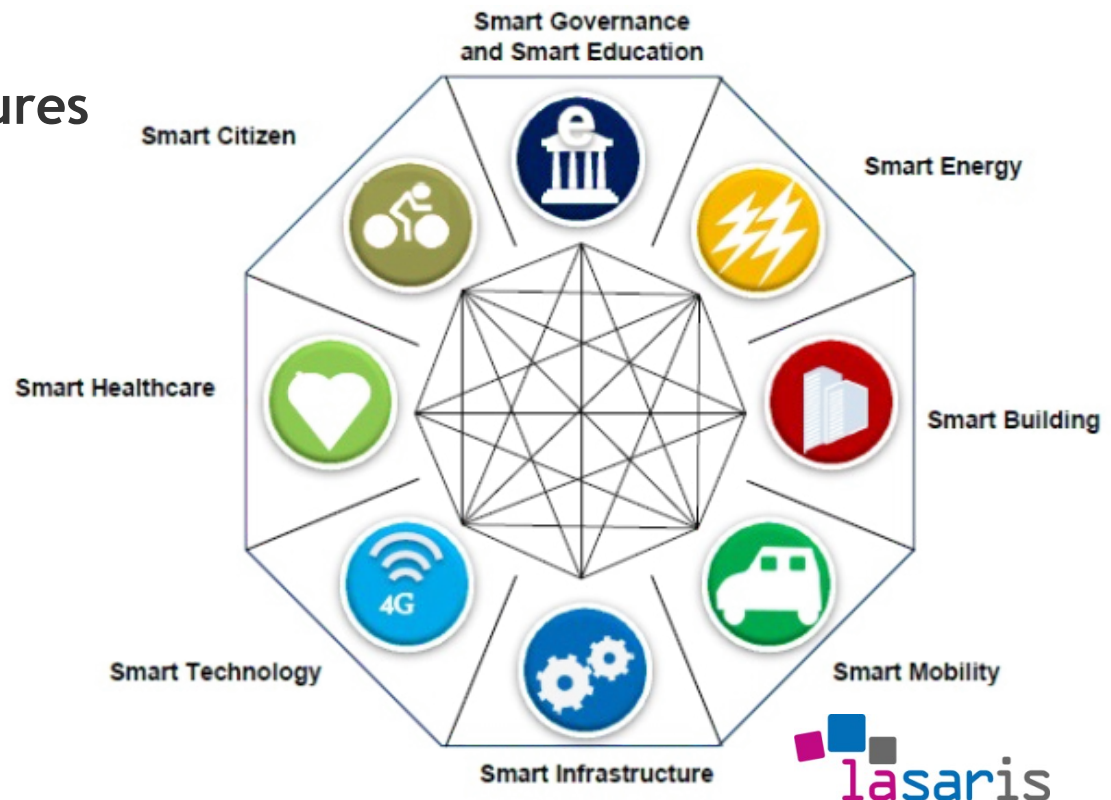- Software Competence Center Hagenberg (SCCH), Linz

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Introduction

- **Demographic** and **urbanization trends** push the current city infrastructures to their limits

- Availability of **ICT and IoT**

- Often **critical infrastructures**

- **Quality** is crucial

Smart Governance and Smart Education · Smart Citizen · Smart Energy · Smart Healthcare · Smart Building · Smart Technology · Smart Infrastructure · Smart Mobility

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Internet of Things in Smart Cities

Gubbi, Jayavardhana, et al. "Internet of Things (IoT): A vision, architectural elements, and future directions." Future Generation Computer Systems 29.7 (2013): 1645-1660.

The cross-border Region

- As the majority of European cities, both cities of **Vienna** and **Brno** have ongoing Smart Cities programmes

- The city of Vienna is one of the **most advanced Smart Cities realities in Europe**. It is on top of international smart city indexes constantly throughout the years.

- The city of Brno has a **different state** in terms of Smart City programme. Taking into account an innovation theory, the city of Brno can be seen as laggard, bringing large efforts recently to catch up with more advanced realities in the Smart City areas.

- 2020 strategy's KPI will be defined Dec 2016 and strategy published afterwards
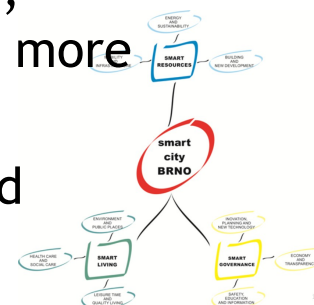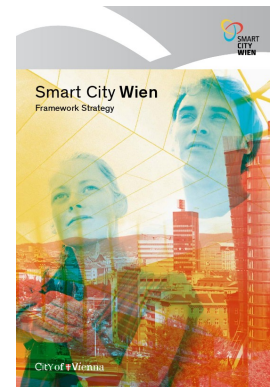
Triangle Vienna-Brno-Bratislava (Linz)

- One of the goals in the City of Vienna Smart City vision is to create a Smart triangle area among Vienna-Brno-Bratislava
- In this project proposal we are also interested in including Linz (as project partner)
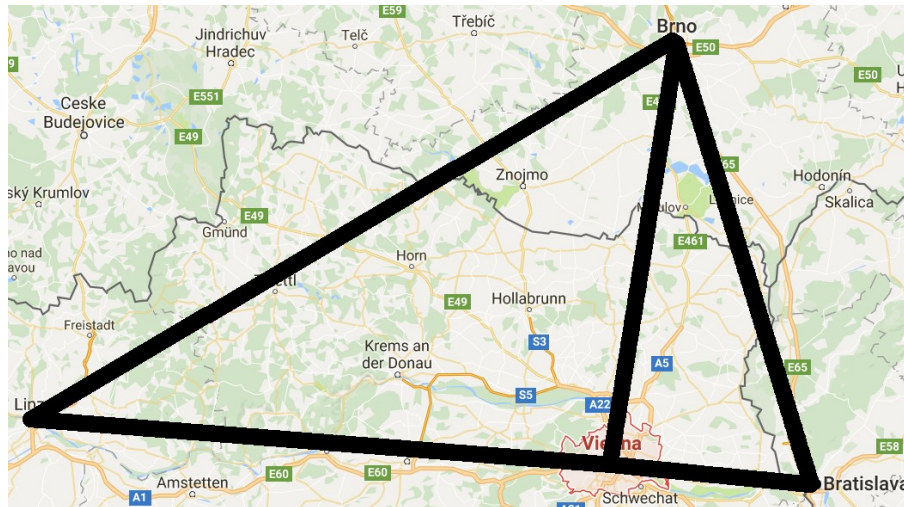
Three Main Addressed Problems

- **P1. Missing integration of different aspects of smart cities.**
- *Many currently implemented smart cities focus on one of such aspects. Without a clear understanding of the integration of the different components, it is difficult to reach the overall goal of improving services provided to citizen*
- **P2. interpretation and creation of knowledge** from the the vast amount of data that smart cities can collect. *The increase of IoT connected devices leads to the generation of large amounts of data that can be beneficial for the creation of fast feedback loops to improve services to citizen. However, to perform such task, we need first data effective data analytics*
- **P3. Sparsity of municipalities and their integration within the Smart City concept.** *One currently missing understanding is how such sparse municipalities can benefit from all the Smart Cities developments, and how smaller scale Smart Cities deployments can be integrated across the region*

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Main Goals

- G1. **Focus is on the holistic view of Smart Cities**, focusing on the provision of smart infrastructures that can bring benefits to all the components of a complete Smart City concept (government, economy, mobility, environment, living and people). *This can be seen as an "operating system" that can allow communication of different connected devices in a transparent way, allowing to decrease the overall complexity of management of the different examples*

- G2. **going beyond the concept of Smart Cities** and propose the concept of **Internet of Smart Cities (IoSC)**

- G3. Focus on **data analytics** and **simulations** to evolve the concept of **Smart Cities**

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The Smart City Ecosystem

- Heterogeneous sets of infrastructures managed by different providers to serve multiple stakeholders
- Need to have a Smart City Application Ecosystem:
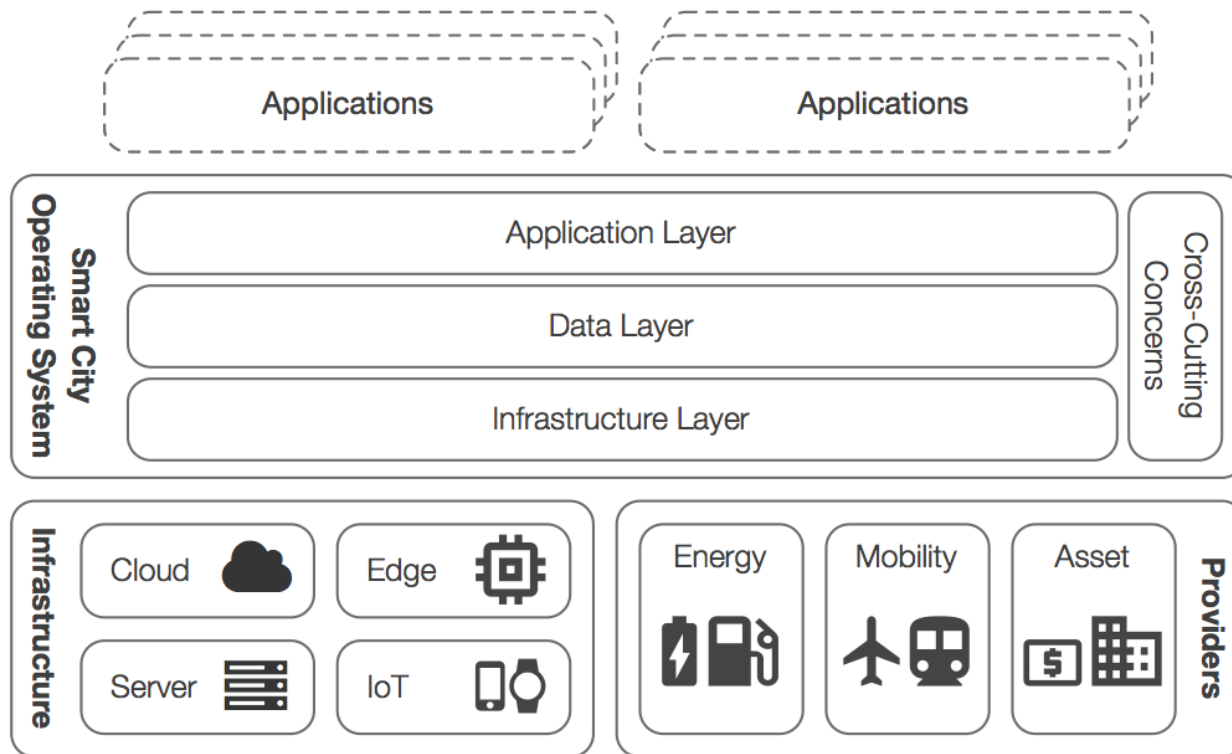
The Smart City Ecosystem

- Layers of abstraction are need to hide complexities that come with operating, analyzing, and managing applications in the smart city domain.

  Challenges:

- 1st: **incorporating and enabling the heterogeneous sets of available infrastructures in a Smart City**. The ecosystem needs the ability to manage and operate the large number of devices that emerge through the Internet of Things (IoT)

- 2nd: **massive amounts of data** that are emitted by the smart city in a magnitude of different forms and formats

- 3rd: **requirements that come with developing, managing, and operating applications** → calls for new methodologies and runtime environments

- 4th: **mechanisms to fully address the complex ownership and compliance requirements that arise in the smart city domain**

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Suggested Architecture
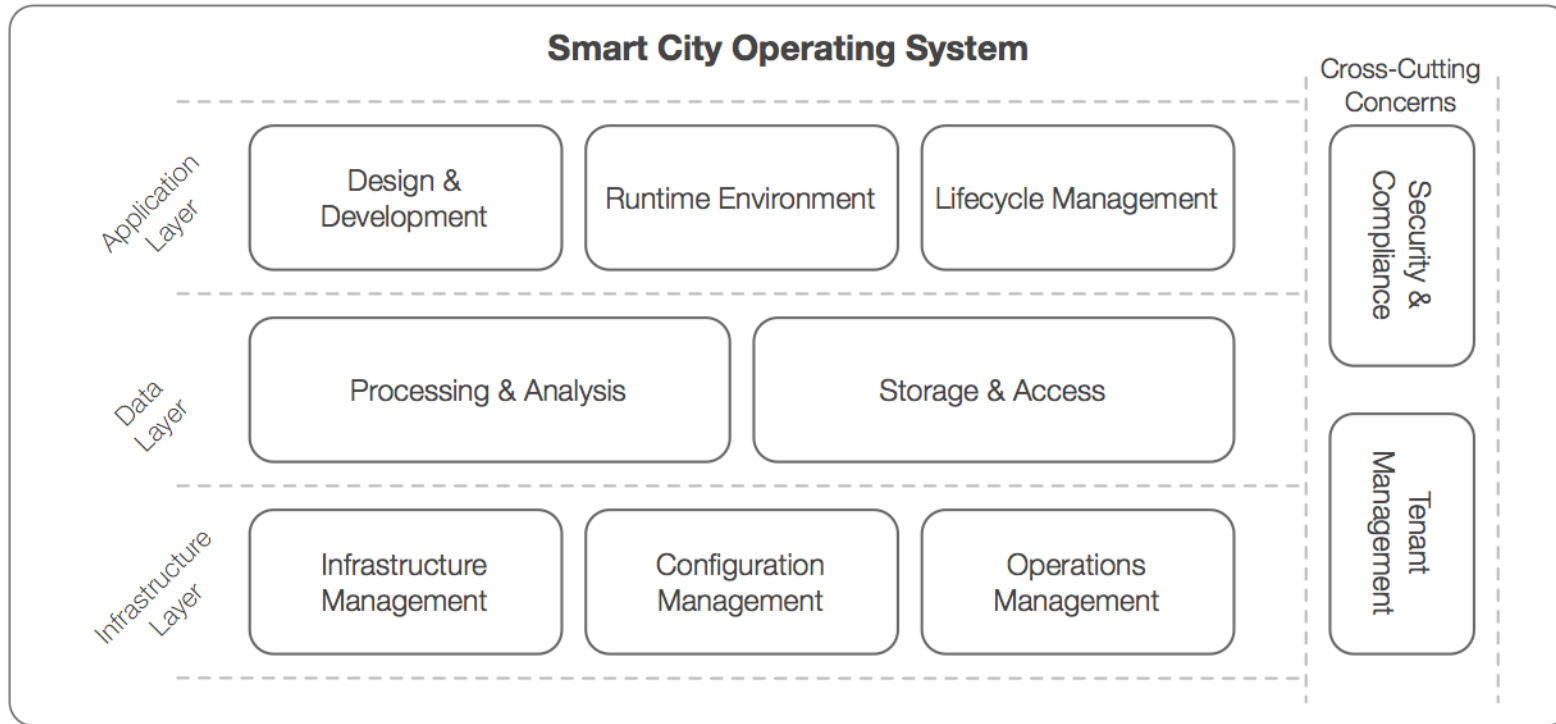
Initial List of Outcomes

- **Definition and dissemination** of the Internet of Cities concept and the impact in the context of crossborder collaborations;
- **Requirements specification** for crossborder Smart Cities and Internet of Cities specific needs of Vienna and Brno area;
- **Systematic literature reviews** about Smart City and sub-domains, providing useful insights about categorizations, classifications, characteristics leading towards an holistic view;
- A **review of existing technologies and standards** to support Internet of Cities, according to the collected requirements;
- The **conceptual design** of the Smart City Operating System to support the Internet of Cities;
- **Architectural representations** for the Smart City Operating System, based on the collected requirements from Vienna and Brno districts;
- A **prototype system** that integrates the Smart City Operating System with a simulation environment;
- **Experimental design** for testing the implemented prototype system in the Internet of Cities context, taking into account the characteristics of the Vienna and Brno districts;
- **Experimental packages** to enhance replicability of the deployments performed;
- **Summary of the main lessons learnt** from the experimental deployments for further knowledge transfer;

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- Feedback, Suggestions & Questions

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