Summary report

Interim Workshop with Smart cities and communities
"What should a Local Digital Twin toolbox look like?", July 12th, 14:00 – 16:00 CET

1. Context

This workshop took place via ZOOM on July 12th, as part of the Digital Europe Program (DEP) project "**Co-design of the Local Digital Twins (LDT) toolbox technical specifications for Advancing the transformation of Smart Communities**".

The main objective was to **gather the feedback from the most relevant stakeholders in the Smart cities and communities (SCC) ecosystem on the composition of the LDT toolbox**, as well as its sustainability over time as an evolving toolbox. The **views collected will contribute to refining the approach toward the final delivery of the project** in August.

For this reason, while this workshop targeted mostly cities and communities, the wider LDT ecosystem was also welcome to join the discussion, namely LDT technology providers and developers; standardisation bodies; Smart city and communities' networks; and participants in relevant DEP projects (e.g., DS4SSCC).

The project is managed by unit CNECT.C.3 – Technologies for Smart Communities, and it is led by Deloitte, together with Capgemini, OASC, Intellera, Technopolis Group, IMEC, TNO and DTU.

2. Agenda of the workshop

Agenda	Time	Facilitator
Welcome		
Project positioning as part of the overall EU Local Digital Twins policy agenda	14:00-14:05	Jose Fernandez Villacañas (EC DG CNECT)
Introduction to the project - What's in it for Smart cities and communities?	14:05-14:15	Inês Ramos (Deloitte)
What should be in a LDT toolbox?		
Presentation of preliminary list of building blocks	14:15-15:00	Carlo Montino (Intellera) Philippe Michiels (IMEC)
Scenarios to deploy and maintain a sustainable toolbox		
Present and discuss different scenarios	15:00-15:30	Gert Hilgers (OASC)
Roadmap for deployment of the toolbox		
Present and discuss draft content of the roadmap for deployment	15:30-15:50	Lola García (Deloitte)

3. Introduction by DG CNECT

Jose Fernandez-Villacañas, Scientific Project Officer at DG CNECT's C.3 unit, introduced the project of the EU LDT toolbox as part of the wider EU policy context that includes data spaces at the local level, Local Digital Twins, and the CityVerse. The idea is to develop a set of tools that will help cities to increase the uptake of digital technologies, through procurement opportunities targeting cities and communities with different starting points in digital transformation.

The software toolbox to be developed will provide advanced tools for cities and communities that have already reached a considerable maturity in their solutions. This project in particular will provide the technical specifications of such tools for a later project to develop the LDT toolbox.

4. What should be in a Local Digital Twin toolbox?

Description of this session

During the session dedicated to the validation of the consultation, the project team explored the key components of the LDT toolbox and presented a preliminary component architecture, providing a framework for understanding and organising the key components within the context of the LDT toolbox.

The project team provided a comprehensive **overview of the three main components of an LDT toolbox, namely (i) technical building blocks, (ii) strategy tools, and (iii) legal and policy guidelines.** Technical building blocks refer to the foundational elements required for creating and operating a LDT system. Strategy tools were examined to aid in analysing and implementing effective strategies in utilising the LDT. Additionally, legal and policy guidelines were discussed to ensure compliance with regulations and ethical considerations.

Moreover, the four ambition levels of a LDT - awareness, experimental, predictive, and intelligent twin – were presented with the aim of gathering valuable insights regarding the key characteristics deemed most important for each specific level.

Key takeaways

Upon examining the perspective of stakeholders who responded to the Sli.do polls, several key takeaways emerge regarding the **significance of the four ambition levels** for a LDT.

- **The ambition level that applies most to their context is the *experimental* one** as reported by cities, in which what-if simulations become possible, followed by the *intelligent* level, which requires a high degree of maturity and an in-house team of technical, data, and subject matter experts.[1]
- Most respondents consider that ***data management & data governance*, including components like a data lake and asset registry, are the most crucial features for an awareness twin.** *2D/3D visualisation* ranks second in importance, and *sensing and measuring components*, such as IoT devices, IoT agents, context brokers, and asset management tools, follows but at a relatively lower level of significance. These insights emphasize the significance of robust data management and governance capabilities in the context of an awareness twin, with visualisation and sensing/measuring tools playing supporting roles in the overall functionality of the Digital Twin.
- Moving onto the **experimental twin**, the **most important features identified are *case and scenario management* to facilitate a structured approach for conducting experiments**. Following closely behind are *data and model management*, including an asset registry, and *model discoverability*, which involves finding models in model marketplaces or data spaces.

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[1] However, it is important to note that we cannot be sure of who were the respondents, so we cannot assure they were all City representatives and/or participants with sufficient awareness of the level of maturity of a digital twin. Moreover, the understanding of "ambition" may have not been fully aprehended, and could be understood as a political ambition to get in the future to an Intelligent twin, rather than that being the current situation.

- Many respondents identify ***near-real-time sensing and data streaming* as the key features for a predictive twin.** This is followed closely by *advanced analytical dashboarding with business intelligence (BI) capabilities* and *advanced data/model governance*.
- A significant number of participants view a ***real-time Digital Twin with live data streams as the most crucial feature for an intelligent twin.*** Following closely behind are *algorithm/model and data transparency* and *explainability in the twin's operations*. Additionally, a *higher level of situational awareness, encompassing oversight and control*, is also regarded as an important aspect of an intelligent twin. These insights underscore the importance of real-time data, transparency, and situational awareness in achieving an effective and impactful intelligent twin implementation.

When considering the **strategic and legal tools** deemed important for a LDT, several key takeaways emerge from the perspectives of stakeholders who responded to the polls and who provided contributions through the Zoom chat.

- In terms of **strategic tools**, a significant number of respondents prioritise the need of a **Reference Architecture.** *Tools for ambition assessment and roadmap management* are also relevant although they hold a slightly lesser degree of importance. *Catalogues of tech solutions* and *use cases* hold minor importance.
- Turning to the **legal tools**, participants to the poll emphasise the need *guidelines for data management* to improve collaboration and foster a data-driven culture. *Guidelines for LDT procurement*, ensuring fair and standardised terms, are also crucial. *Guidelines for privacy-preserving synthetic data generation* follow, albeit with slightly lesser importance.

5. Scenarios for deployment of the toolbox

Description of this session

During this session, the project team shared the core criteria for developing deployment scenarios for the toolbox and engaged with the audience to validate the approaches and receive valuable feedback on key aspects.

Scenario challenges presented included the importance of the toolbox' organisational structure to support co-creation by cities, industry, and academia/research; the necessity to build an active community across multiple layers to steer, maintain, and develop the toolbox, and options to ensure the sustainability of the toolbox. For its self-sustainability, in particular a successful, active, and broad open-source community is key. Funding/Revenue options present a challenge due to the open and free nature of the core toolbox tools to be deployed, and reasonable revenue streams which are not hindering adoption of the toolbox are explored.

Two scenarios were presented:

- A *Network of Networks* scenario, loosely based on Living-in.EU, which links city, industry, and innovation networks. These would be managing cross-sector working groups with cities to develop and test tools, and to govern the relevant intellectual property. The benefit of this approach is to gain the support by credible networks to increase adoption rates and to make use of their wide expertise.
- A *Community-led* scenario, loosely based on the City Protocol Society, which is an organisation led by cities. It brings in industry and academia/research to work with cities to develop and

maintain solutions to 'city challenges' in so-called Task and Finish Teams. The benefit of this approach is to focus on the needs of cities by have a majorly city-run organisation that is focused in following through in developing solutions to challenges.

Key takeaways

Amid receiving significant valuable qualitative feedback via the sli.do tool and workshop chat, two main points were emphasised:

- The importance of community engagement, and being open, transparent, and supportive, when governing the toolbox. Citizen engagement is key, and their needs, and their operating realities, need to be considered.
- The commitment that is required by partners and collaborators to drive the toolbox, and tools therein, forward. Having a goal- and solution-oriented governance model is key to promote the toolbox and gain city, developer, and wider stakeholder support.

Further feedback touched on additional important aspects such as funding options, to provide a level-playing field that also offers smaller companies a chance to participate (and offer paid services on top), and to champion interoperability for all related tools and services to be developed.

6. Roadmap for the deployment of the toolbox

Description of this session

During this session, the project team presented the main approach to develop the work in progress roadmap. The roadmap will contain a set of actions with responsible stakeholder(s), prioritised and presented in a timeline, including the status.

In addition, the main phases for the deployment of the LDT toolbox were described and feedback was requested. These main phases are:

- **Preparation** to set-up the development (and scale-up) of the toolbox;
- **Design** the development & deployment phases of the LDT Toolbox, both from a governance and a technical point of view;
- **Implementation** to develop &test the toolbox as well as to implement the governance model;
- **Deployment** to release the toolbox across EU communities, to gather feedback and start with the training activities; and
- **Operation** to run, maintain and update/scale-up the toolbox across EU communities, by continuous monitoring (fit-for-purpose).

The project team also provided an overview and asked for feedback on the five main streams for the deployment of the LDT toolbox, being:

- **Toolbox development** to ensure the technical functioning of the toolbox;
- **Raise awareness** about LDT across EU communities;
- **Community engagement** to engage EU communities in the toolbox development, governance and evolution of the engagement over time;
- **Governance activities** to ensure the day-to-day running of the toolbox, and the right knowledge transfer between stakeholders; and
- **Constant update** to keep the LDT toolbox fit-for-purpose and at the highest technical and functional level over time.

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Finally, a set of examples to discuss the possible actions was presented and feedback was shared.

Key takeaways

The perspective of stakeholders who responded to the Sli.do polls, revealed several takeaways:

70% of participants expressed their agreement with the **identified phases** of the deployment roadmap. This consensus suggests a shared understanding and acceptance of the proposed approach.

In terms of feedback received regarding the phases, several important points were raised:
- Participants emphasised the importance of **incorporating iterative and agile-like processes** into the deployment roadmap. This iterative approach allows for continuous improvement and flexibility throughout the implementation stages. Additionally, there was a call for clarity in delineating the phase in which architectural design takes place, ensuring that stakeholders understand its role and significance.
- The feedback also stressed **the need to specify interactions with municipalities**, recognizing their crucial involvement in the deployment process. It was suggested that workshops be conducted at each stage to foster engagement and collaboration among stakeholders. Furthermore, community engagement emerged as a priority, with an emphasis on raising awareness, providing education, and training opportunities, and linking with EU skilling programs, projects, and certifications.
- The importance of **defining KPIs in collaboration with the community** was highlighted, acknowledging the significance of aligning goals and measuring success collectively. Additionally, participants recommended considering a Hypercare period after deployment.

80% of respondents indicated their agreement with the identified streams within the deployment roadmap. This broad consensus reinforces the significance of these streams in the successful implementation of the LDT toolbox.

In terms of feedback received regarding the phases, several important points were raised:
- Participants emphasised the need to **improve interoperability** within the LDT, both at the local and external levels. This highlights the importance of seamless data exchange and integration across various Digital Twin instances. Building reward-driven engagement mechanisms was also suggested to incentivise active participation and contribution from stakeholders.
- Participants recognized the significance of addressing risks and concerns related **to ethics, inclusion, equity,** and other pertinent areas. The deployment roadmap should account for these considerations to ensure responsible and equitable Digital Twin implementations. It was proposed to start with a single Digital Twin as the core intelligent software entity and gradually expand to connected twins, enabling the tool and other software to discover and act upon insights collectively.
- The **creation of necessary standards surrounding the LDT toolbox** was highlighted as a crucial aspect. Standardisation ensures interoperability, consistency, and compatibility, which are vital for the successful adoption and integration of the toolbox.
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Finally, feedback on example actions focused on practical considerations. Participants suggested the inclusion of versioning mechanisms to manage updates and changes effectively. Engaging with innovation ecosystems and applying the LDT toolbox to specific use cases were seen as valuable approaches to support users effectively. Ecosystem mapping was recommended to identify and leverage existing resources and expertise. The importance of documentation and knowledge

management was emphasised to ensure transparency and facilitate knowledge sharing. Lastly, participants requested further clarification and detailing of awareness tools and actions specific to each stage of the deployment roadmap.