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PilotInnCities

Summary of Agile Pilot

Company name	**Hypertegrity AG**
Company location	**Büren, Germany**
Domain	**Digital services and communication, Energy efficiency**
Municipality	Marktleuthen, Germany
Project period	July 2025 – March 2026, 9 months
Solution	Within the framework of the INTERREG Danube Region project DRP0200367 "PilotInnCities", Hypertegrity AG implemented the agile pilot project "Intelligente Buchungserfassung Marktleuthen" between July 2025 and March 2026. The pilot connected the open-source room booking software "Kommunale Räume" (operated by Fraunhofer IESE on the deutschland.digital platform) with Hypertegrity's open-source Urban Data Space Platform (UDSP) and IoT sensor technology in the sports hall of Marktleuthen, for the first time bringing together actual room usage data and digital booking records in a real municipal environment. The solution tested combines three components into one integrated stack: (1) the "Kommunale Räume" booking front-end for citizens and administration, (2) the Urban Data Space Platform (UDSP) by Hypertegrity as the central data layer based on FIWARE / NGSI-LD, and (3) battery-powered LoRaWAN IoT sensors (Miromico Insight Lux for indoor air quality / CO_2, Milesight EM300-MCS door & window contact, ELSYS ERS Display Lite for temperature & humidity) installed in the sports hall. The combined system enables municipalities to digitalise room booking, monitor actual usage in real time, detect "ghost bookings" (rooms booked but not used) and unregistered usage, and lay the foundations for energy management and further smart-city use cases on the same infrastructure.
Stakeholders	Involved stakeholders / users: Town of Marktleuthen (municipal administration, sports hall caretaker), district of Wunsiedel i. Fichtelgebirge, Zentrum für Digitale Entwicklung GmbH (ZDE, contracting authority), Fraunhofer IESE (provider of "Kommunale Räume"), end users (sports clubs, individual citizens booking the hall), Hypertegrity AG (solution provider).
Lessons learned	• Participation in the agile pilot generated added value for the company: confirmation of the UDSP's horizontal scalability, validation of a partner-based open-source business model, and a reference deployment with a small municipality, complementing existing references in larger cities. • Changing framework conditions on deutschland.digital created uncertainty around the long-term availability of the booking front-end. The open-source / open-interface design mitigated this risk and remains the most important architectural decision of the pilot. • The project design (6 months development) did not sufficiently anticipate the operational handover phase. Future pilots should plan continuity ("Verstetigung") from day one, including roles, responsibilities and data stewardship after project end. • The selected booking system does not yet digitalise every administrative workflow around a sports hall (e.g. invoicing edge cases, key handover). Cooperation with MPSC reference cities such as Bamberg and Koblenz, who already operate similar booking front-ends (e.g. BamBoersla), is recommended to close functional gaps.
KPI 1 Availability of a FIWARE-based Urban Data Space Platform (UDSP by Hypertegrity) operated as "Sandbox as a Service" for 6 months, hosted in a data centre located in Europe.	Measurement: continuous uptime monitoring of the staging instance, evidence of European hosting location. Expected target value of the indicator: 6 months of continuous availability (July – December 2025), hosting in Europe. Achieved value of the indicator: 6 months of continuous availability achieved; UDSP accessible at https://staging.hypertegrity.eu/dashboard; hosting in a German data centre operated under ISO 27001-certified ISMS. Summary and analysis of the results achieved in relation to the indicator: The UDSP instance covered the entire pilot period without service-relevant downtime. All required platform components were available: connectors, standardised data storage, NGSI-LD interface management, data transformation, and the use-case enablement tools (IoT monitoring, geo / 3D twin, analytics, open data, customer-facing apps framework). ▫ Comments / arguments / explanation of factors influencing the indicators / results: Hosting in Germany combined with the ISO 27001 certified ISMS positions the solution

	above the minimum European hosting requirement and aligns it with BSI TR-03187 Level 2 expectations for urban data platforms.
KPI 2 Integration and visualisation of sensor-based building measurements (temperature, CO_2, humidity).	Measurement: number and type of sensors deployed, number of data points integrated, presence of live dashboards. Expected target value of the indicator: Operational sensor integration in the pilot location, with measurable values for temperature, CO_2 and humidity displayed in a dashboard. Achieved value of the indicator: Six LoRaWAN sensors deployed in the Marktleuthen sports hall (2× Miromico Insight Lux air-quality / CO_2, 2× Milesight EM300-MCS door / window contact, 2× ELSYS ERS Display Lite temperature / humidity). Sensor data integrated end-to-end via The Things Stack network server, three MQTT data streams, NGSI-LD entities in the UDSP, and three Grafana dashboards ("Raumstatus", "Raumbuchungs-Überwachung", "Raumbuchungen"). Approx. 1,294 data points per 24-hour window observed during the operational phase. Summary and analysis of the results achieved in relation to the indicator: The sensor stack delivers a complete picture of indoor conditions and door / window status. Visualisations combine indoor measurements with DWD external weather data, enabling first analyses for energy management. Comments / arguments / explanation of factors influencing the indicators / results: Reuse of the existing LoRaWAN infrastructure of the Wunsiedel district (cooperation with ZDE) significantly accelerated rollout and reduced cost; the development of payload decoders was a joint effort with ZDE and is reusable for future projects.
KPI 3 Hosting and Keycloak integration of the "biletato" booking solution (in the implemented variant: "Kommunale Räume" by Fraunhofer IESE, the booking solution selected jointly with the contracting authority).	Measurement: working integration, single sign-on through Keycloak, productive booking flow. Expected target value of the indicator: Productive booking solution accessible to administration and citizens, integrated via Keycloak, connected to the UDSP. Achieved value of the indicator: Partnership with Fraunhofer IESE established; account configured; room information set up; REST interface to UDSP developed and operational since October 2025. Bookings are processed end-to-end at https://kommunaleräume.de and synchronised into the UDSP via the documented REST API (bookings, invoices, media-items endpoints; OAuth via Keycloak). Summary and analysis of the results achieved in relation to the indicator: The integration enables full lifecycle management of bookings (pending → approved / rejected → invoiced) and exposes booking data for analytics. Citizens benefit from a simple, modern booking interface; administration from real-time data. Comments / arguments / explanation of factors influencing the indicators / results: The change of focus on the deutschland.digital platform during the project required active partner management and an architectural decoupling strategy. The open-source character of both components secured the integration's sustainability independently of the platform's future direction.
KPI 4 user feedback	Feedback was collected through structured interviews with administration staff and observation of usage patterns; results feed into the lessons learned in this report. Interviews were held to document administrative effort with and without the solution
Evaluation of the business model focusing on its viability and potential for growth	Hypertegrity AG is a GovTech start-up founded in 2020, headquartered in Büren (North Rhine-Westphalia), market leader in Germany for open-source urban data platforms on a FIWARE basis. Target markets are the public sector — municipalities, districts and city-owned utilities — and municipal IT service providers in the DACH region. The business model combines four revenue streams: development and consulting services, managed services / hosting (SaaS) for the UDSP, integration projects, and open-source-based community partnerships. The company is ISO 27001 certified for the scope "Operation and development of urban data platforms" — the only company in Germany with this specific certification scope — and is a member of Bitkom, the Open Source Business Alliance (OSBA) and part of the KTS Sounding Board of industry at the Federal Ministry of Housing, Urban Development and Building (BMWSB). Validated strengths of the business model: • Open-source plus managed-service combination is well received by small and medium municipalities: it removes vendor lock-in concerns while offering operational reliability backed by ISO 27001. • The horizontal platform approach (one UDSP, many use cases) is confirmed by the pilot: investments in the platform for one use case (room booking) directly enable additional use cases (energy management, waste, mobility) without redundant infrastructure.

	• Partner ecosystem strategy (e.g. Fraunhofer IESE, ZDE, MPSC cities Bamberg / Koblenz) validated as effective: the integration was delivered faster and with lower cost than a vertical, single-vendor approach. Identified barriers or potential weaknesses of the business model • Dependency on the long-term availability of third-party open-source components when these are operated by funded programmes (deutschland.digital): change of funding focus can disrupt availability and requires explicit decoupling strategies. • Small municipal pilot budgets (here: 9,900 € incl. VAT) do not cover the full lifecycle effort, in particular post-pilot operations; sustainable continuation requires either follow-up contracts, kit-based reusable assets, or co-investment from the platform operator. • Sales cycle in the municipal sector remains long; the agile pilot accelerates the trust-building phase but does not by itself shorten formal procurement timelines. Implemented / planned adjustments to the business model based on project results • Stronger productisation of the "smart room booking" use case as a reusable module of the UDSP, including pre-configured dashboards, payload decoders and a documented REST connector to "Kommunale Räume". • Active outreach to MPSC reference cities (Bamberg, Koblenz) to align on a joint roadmap for municipal room booking and to share functional gap analyses. • Refinement of the pilot offering to include an explicit "verstetigung" (continuation) package: clearly priced operations and second-level support after the funded pilot phase. Identified potential areas requiring external support • Business development for small and medium municipalities (sales channels, framework agreements with municipal IT service providers). • Marketing and storytelling for data-driven smart-city use cases: translating technical capability into political and administrative narratives. • Legal and contractual support around licensing terms and operational SLAs for open-source-based managed services. • Networking with European peer municipalities and platform providers along the Danube Region for further scaling. Priority needs for further scaling • Human resources: additional senior platform engineers and customer success / municipal account managers. • Business development support for the small municipality segment and for international markets (Danube Region). • Marketing capacity to translate technical capability into administrative and political narratives. • Co-investment instruments to bridge the gap between funded pilots and full commercial operations in small municipalities.
Impacts	A complete, end-to-end smart room booking solution was operational by mid-October 2025 in the Marktleuthen sports hall and ran in productive pilot mode until end of December 2025. Booking data from "Kommunale Räume" and live sensor data from the hall are now correlated automatically on three integrated dashboards (room status, booking-vs-sensor reconciliation, booking overview), making "regular", "alarm" (unbooked use) and "ghost" (booked but unused) situations visible in real time. The pilot validated the technical viability of the UDSP as a horizontal platform: the same infrastructure is reusable for further use cases (energy management, smart waste, mobility, environment). A reusable REST interface and payload decoders for the LoRaWAN network were jointly developed with ZDE and remain available for further municipalities. The open-source approach enables municipal continued operation independently of the deutschland.digital programme.

Suggestions for future actions, especially focusing on sustainability and replication	• Introduce a structured "continuation" phase (verstetigung) in the programme design, including co-investment options or framework contracts that follow on directly from the pilot. • Provide a moderated cross-pilot exchange format during implementation (e.g. monthly peer call between solution providers) to accelerate cross-learning between the participating SMEs. • Strengthen post-pilot dissemination: enable selected pilots to be presented at sector events in the Danube Region and beyond, and provide a shared communication kit.
Next steps	• Productise the "smart room booking" use case as a reusable UDSP module, with pre-configured dashboards, payload decoders and a documented REST connector — ready for deployment in further municipalities. • Use the pilot reference to actively engage other small and medium municipalities in the DACH region (target: 5+ follow-up engagements within 12 months). • Continue the architectural focus on horizontal platform scaling: every new use case (e.g. waste, energy, mobility) reuses the same UDSP installation.
Provider's Reflection	The pilot phase ran from 01 July 2025 to 31 March 2026. The agile pilot format combined the right balance of structure (three mandatory milestones: kick-off, mid-term in KW 39, wrap-up in mid-December) and flexibility (short-cycle alignment with ZDE, the municipality and ad-hoc local stakeholders). The cooperation with ZDE as contracting authority and with the Wunsiedel district was constructive throughout; access to existing LoRaWAN infrastructure was a significant accelerator. The change in focus on the deutschland.digital platform during the project caused some replanning but was successfully mitigated by the open-source / open-interface architecture. Overall the project was delivered on time and within budget; all four KPIs defined in Article 1 (7) of the Mandate Agreement were fully achieved. Perceived benefits and positive impacts of the company's participation in PilotInnCities • A validated reference deployment in a small municipality • Concrete product improvements (REST connector to "Kommunale Räume", reusable Grafana dashboards, payload decoders for LoRaWAN) that immediately benefit other Hypertegrity projects. • Strengthened local partner network in Bavaria (ZDE, district of Wunsiedel, Fraunhofer IESE).
Municipality's Reflection	For us as a city administration, it was a very new and interesting experience to work with a start-up and jointly develop a new tool for our needs. This collaboration provided valuable new perspectives on innovation processes, enabled a solution more closely tailored to our practical requirements, and strengthened our ability to approach future digitalization projects in a more agile and user-oriented way. Within the pilot, we implemented a new, custom-developed digital tool, which enables citizens to easily book the municipal sports hall while also allowing simpler facility management and monitoring for the administration. This system can be combined with additional sensor solutions and could potentially be scaled to other municipal properties as well.
Expert's Reflection	External independent experts did not participate in the pilot project.