



Project Profile



ITEA 4

IDT4GDC

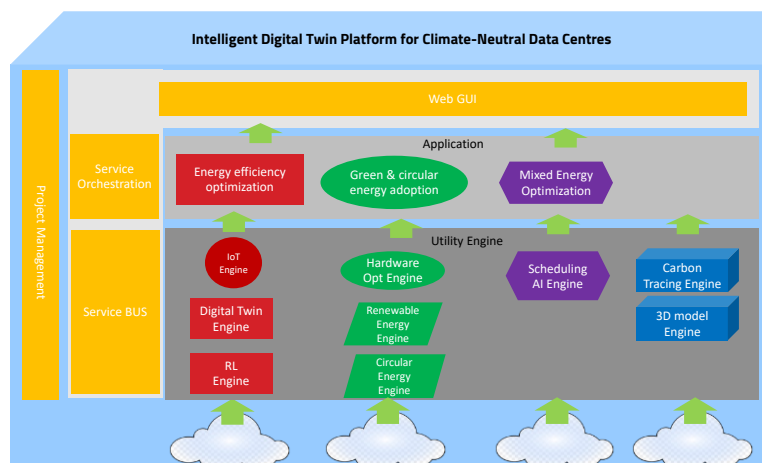
Intelligent Digital Twin Platform for Climate-Neutral Data Centers

Empowering sustainable data centers with AI and Digital Twin technology

With AI-driven Digital Twin solutions, iDT4GDC is **pioneering the transformation** of data centers into **energy-efficient, sustainable, and carbon-neutral** operations.

ADDRESSING THE CHALLENGE

Data centers are crucial for the digital economy but are also one of the largest consumers of electricity and significant contributors to carbon emissions. Traditional management approaches often lead to inefficiencies, excessive cooling, and resource wastage, making sustainability a pressing issue. While AI and automation offer potential solutions, their adoption in mission-critical infrastructure remains limited due to reliability concerns and lack of real-time optimization capabilities.



PROPOSED SOLUTIONS

The iDT4GDC project leverages cutting-edge **AI-driven Digital Twin** technology to optimize data center operations and sustainability performance. Through a collaborative consortium spanning four countries (Singapore, Turkey, United Kingdom, and Canada), this project aims to revolutionize data center management by:

- **Real-time Digital Twin Simulation:**
Creating a virtual representation of data centers to predict, monitor, and optimize energy consumption.
- **AI-Powered Sustainability Analytics:**
Utilizing machine learning to enhance efficiency, reduce cooling demands, and maximize renewable energy use.

- **Smart Resource Allocation:**
Implementing AI-driven scheduling to balance workloads and minimize environmental impact.
- **Carbon Footprint Reduction:**
Supporting compliance with international sustainability frameworks such as the EU Climate-Neutral Data Center Pact.
- **Open-Source, Scalable Platform:**
Providing a **Platform-as-a-Service (PaaS)** model to enable widespread industry adoption of real-time optimization capabilities

PROJECTED RESULTS AND IMPACT

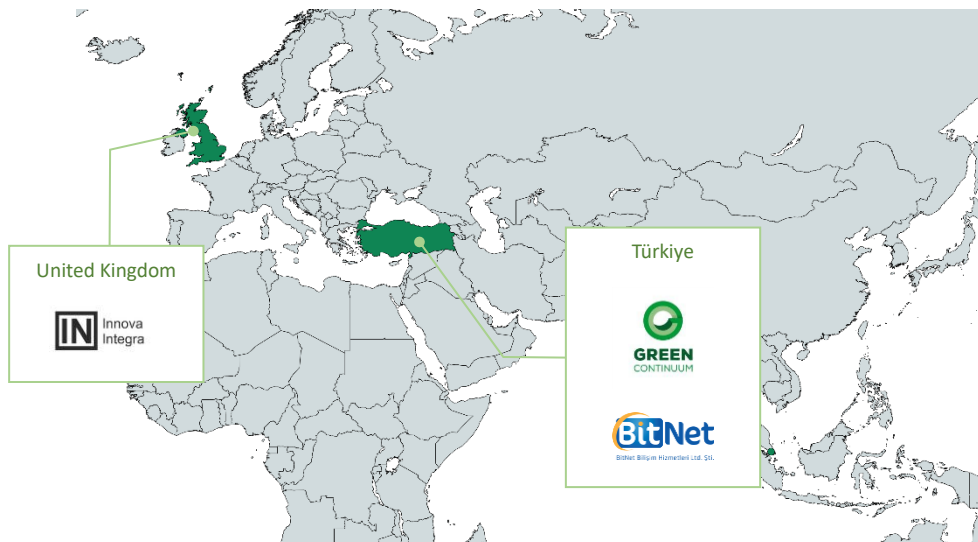
The goal of iDT4GDC is to develop an **intelligent, automated, and sustainable** approach to data center management, targeting:

- **Reduction in Power Usage Effectiveness (PUE) from 2.07 to 1.35** in tropical environments.
- **Energy cost savings of up to 67%** in cooling operations.
- **80% adoption of renewable energy** for data centers by 2030.
- **20% reduction in carbon emissions** through AI-optimized resource allocation.
- **Improved Overall Equipment Effectiveness (OEE)** through predictive maintenance and AI-driven fault detection.

SUS2022-042

IDT4GDC

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Project ID
SUS2022-042

Project Start
July 2023

Project Website
www.idt4gdc.com

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Project End
Dec 2026

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ITEA is a transnational and industry-driven R&D&I programme in the domain of software innovation. ITEA is a EUREKA Cluster programme, enabling a global and knowledgeable community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society.

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