Data centres that can operate for years without human involvement. This is the aim of the ITEA project AutoDC, which foresees a massive reduction in maintenance and operational costs and an expansion into new domains and markets. Through automated management and self-healing, data centre technicians can concentrate on more difficult tasks and be more efficient.

ADDRESSING THE CHALLENGE
The data centre market is growing rapidly, allowing for greater performance and efficiency – at a cost. In large and mega-scale data centres, administration and maintenance account for one third of OPEX due to the large amounts of personnel and equipment required. The rise of edge computing is already leading to a new level of operational complexity that translates into rising costs and the need for more technician work hours. The edge computing solutions have to mimic radio base station self-sustainable operation. The market is also limited by the lack of knowledge and personnel in developing countries and the difficulties in managing remote centres. Autonomous data centres are the way forward.

PROPOSED SOLUTIONS
AutoDC (Autonomous Datacenters for Long Term Deployment) will create an innovative design framework for data centres to operate and self-heal independently of human intervention or contextual interference. This will be focused around five innovation themes: Measurements, KPIs & Performance, Smart DC & Data Collection for Automation, Decision Support Systems, Automated Management & Self-Healing and Equipment Control. To enable automation, data must be collected from various monitoring systems, combined with external sources and recorded for analysis; AutoDC will therefore design a scalable engine to support large volumes of high frequency data. Sensors will measure the physical properties of components and their environments with tools such as heat or energy mesh maps. These allow a Prescriptive Decision Support System (PDSS) to guide a centre’s complete operations. For self-healing, innovations must overcome hardware failures through robust failover software. Cloud-based machine learning tools will offer real-time analysis of statistics and immediate decision-making. These will be highly distributed between heterogeneous underlying infrastructure, small telecom data centres and large provider centres, allowing them to remain self-regulating in the event of interference. Analytic algorithms will detect and identify hardware faults, propose actions and correlate these faults with cloud operations. Throughout these procedures, power usage, network or server equipment efficiency, cooling efficiency and space utilisation efficiency will be measured against a new set of KPIs.

PROJECTED RESULTS AND IMPACT
AutoDC aims to offer significant cost reductions on data centre maintenance and operations. For instance, a mere 1% CAPEX reduction is predicted to create EUR 540 million in market savings in 2022. Increased speed and reliability of 5G will allow for an expansion into new domains, such as autonomous vehicles, factory equipment and IoT devices supported by edge computing; meanwhile, markets will open up in developing countries or remote areas for data centre processing as a lack of qualified personnel will no longer stand in the way of digitalisation. Finally, from an environmental perspective, AutoDC aims to minimise site travel and construction, which can result in a 50% CO2e reduction.
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Project start
October 2018

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Project end
October 2021

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