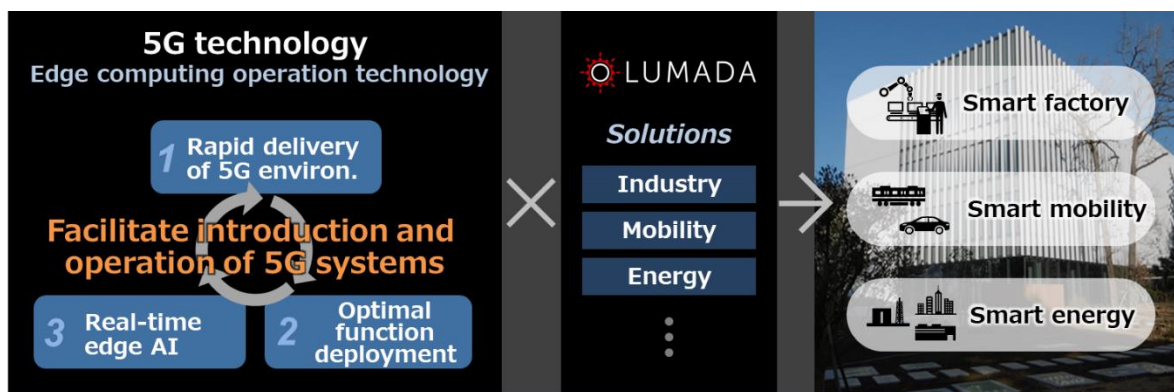


News Release

FOR IMMEDIATE RELEASE

Highly Reliable Edge-computing Operation Technology for Societal Infrastructure Demonstrated in Local 5G Demo Environment Established in the Open Co-creation Environment Kyōsō-no-Mori *Demo environment in Japan following on from the Silicon Valley Research Center to accelerate DX with customers*



Co-creation of solutions in the Kyōsō-no-Mori demo environment

Tokyo, October 23, 2020 --- Hitachi, Ltd. (TSE: 6501, Hitachi) today announced the demonstration of reliable 5G-based edge-computing operation technology (“the operation technology”) for the agile on-site introduction and stable operation of digital solutions leveraging 5G networks. The operation technology was demonstrated in a local 5G environment established with a commercial license in Kyōsō-no-Mori.⁽¹⁾ Operations in this 5G research environment follows that of Hitachi’s Silicon Valley Research Center in California, USA⁽²⁾ established last month. The operation technology will form the backbone to realize reliable 5G-enabled systems in a real-world environment, as it provides a communication environment that satisfies quality requirements for applications used in customers’ on-site systems and network environments, as well enabling the rapid deployment of real-time processing functions. Hitachi will enhance its Lumada solution by combining it with the benefits of 5G, and through co-creation with customers, will provide the solutions in societal infrastructure fields, such as industry, mobility, and energy to accelerate digital transformation (DX) in an era of “new normal”.

(1) April 11, 2019 News Release: A New Research Initiative to Accelerate Innovation through Open Collaborative Creation with Partners.
<https://www.hitachi.com/New/cnews/month/2019/04/190411.html>

(2) September 25, 2020 News Release: Hitachi Begins Testing of 5G Powered Industrial IoT Solutions at its Silicon Valley Research Center in California, USA

<https://www.hitachi.com/New/cnews/month/2020/09/200925a.html>

The use of IoT (Internet of Things) technology with 5G which is characterized by features such as large capacity, ultra-reliable and low latency, and massive connectivity is expected to accelerate DX in various industries.

While dramatic productivity improvements can be expected by the introduction of high-resolution video transmission and control technologies leveraging 5G characteristics, high reliability is also required for systems of societal infrastructures which ensuring safety and quality. The Kyōsō-no-Mori local 5G demo environment was prepared as a place to verify hypotheses for the promotion of DX in various fields of societal infrastructure. In addition, the operation technology which facilitates the introduction and operation of 5G-enabled solutions, was developed as a backbone for customers to utilize 5G.

Features of the operation technology are as followings.

1. Rapid delivery of a reliable 5G environment for application requirements

The communication quality required for equipment control and video transmission is different for each customer, and there is a mixture of such communications in the actual environment. The operation technology selects the best communication method to guarantee communication quality according to application requirements from on-site systems and the on-site network environment, enabling the rapid provision of a reliable communication environment according to applications.

2. Optimal deployment of applications for flexible system operations

To meet application requirements, it is necessary to optimize the combination of edge (on-site) processing for low-latency communication with cloud processing for large volume computation, however this design or deployment required much time and effort. In particular, the design layout has become complicated due to limitations on computer performance on edge devices and network resources due to restrictions of power, space and layout. The operation technology takes into account these constraints and enables functions to be easily added or allocated depending on the system environment on-site.

3. Real-time edge AI⁽³⁾ technology for real-time processing executed on restricted edge devices

On-site edge devices have limited computing power which has made it difficult to perform real-time execution of high-load AI processing. The operation technology

maintains the inference accuracy of reduced deep neural network (DNN) employed on edge devices, by automatically reducing the size of the DNN inference model by an effective algorithm to omit unnecessary parts of the model,⁽⁴⁾ thereby enabling real-time AI processing to be performed on constrained edge devices.

(3) AI: Artificial Intelligence

(4) Related research was presented at the 18th IEEE International Conference on Machine Learning and Applications

A high-mix low-volume production site where changes occur frequently in the production was simulated in this local 5G environment to verify video-based worker support. Results indicated that a high-quality communication environment required for real-world operation could be established with low latency (less than 50 milliseconds of delay) and high reliability (packet error rate⁽⁵⁾ 0.0001%) even in environments where multiple types of communication such as for equipment control and for video transmissions co-exist. Further, it was found that application deployment which traditionally took more than one hour, could be carried out in less than a minute without expert knowledge. The results confirmed systems using 5G could be easily introduced and operated, and that long periods of production line outage could be suppressed by using the operation technology. This operation technology is expected to be used not only in manufacturing sites but also to be applied to a range of digital solutions in societal infrastructure, such as railway and plant operations that use many edge devices and require advanced OT knowledge.

(5) An indicator that one packet cannot be received successfully. In digital communication, data is usually transmitted in packets, and processing is also performed in packets.

The Hitachi Group is promoting Lumada solutions combining OT know-how accumulated over many years together with cutting-edge digital technology such as AI, to accelerate customers' digital innovation. Through "Lumada × 5G," Hitachi will continue to develop the fusion of OT and IT for high value-added solutions, bringing together the combined effort of the Hitachi Group to contribute to the resolution of challenges in society.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, is focused on its Social Innovation Business that combines information technology (IT), operational technology (OT) and products. The company's consolidated revenues for fiscal year 2019 (ended March 31, 2020) totaled 8,767.2 billion yen (\$80.4 billion), and it employed approximately 301,000 people worldwide. Hitachi drives digital innovation across five sectors – Mobility, Smart Life, Industry, Energy and IT – through Lumada, Hitachi's advanced digital solutions, services, and technologies for turning data into insights to drive digital innovation. Its purpose is to deliver solutions that increase social, environmental and economic value for its customers. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

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