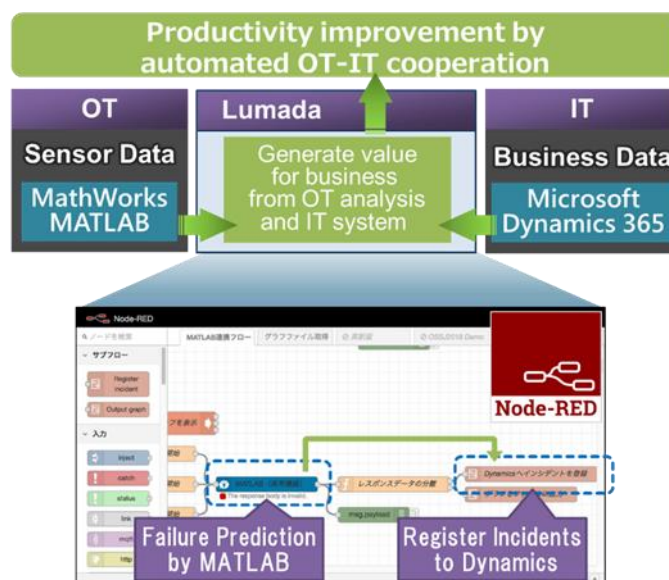


Integrating MathWorks MATLAB and Microsoft Dynamics 365 Using Hitachi's Lumada IoT platform

Simplifying business Kaizen based on advanced OT data analytics using Node-RED



Integration of MATLAB and Microsoft Dynamics 365 on Lumada

Tokyo, June 20, 2018 --- Hitachi, Ltd. (TSE: 6501, "Hitachi") today announced the development of technology enabling MATLAB[®] and Simulink[®],⁽¹⁾ a tool provided by The MathWorks, Inc. ("MathWorks") and widely used for modeling and simulation in industrial settings, and Microsoft Dynamics[®] 365,⁽²⁾ a cloud business application of Microsoft Corporation ("Microsoft"), to collaborate through Hitachi's Lumada IoT platform. The technology will facilitate the development of solutions using both advanced OT⁽³⁾ data analytics and enterprise IT system by automating the collaboration between OT systems and enterprise IT systems that in the past stood alone. This will realize the increased productivity and the prompt delivery of innovative digital solutions.

In recent years, there is an expectation that with progress in IoT technology, the digital data collected from various types of sensors can be analyzed and used to resolve a wide range of management issues such as improvement in productivity and reduction in failure rate. Amidst this growing need, Hitachi has developed its Lumada IoT platform to provide a wide range of digital solutions to resolve the challenges faced by our customers. A GUI⁽⁴⁾-based programming tool "Node-RED"⁽⁵⁾ was employed to facilitate the analytic operational flow from collecting data to analysis. Furthermore, in August

2017, Hitachi announced the development of Flow Connection Gateway,⁽⁶⁾ a technology that enables integrated management of connecting interfaces between systems on Node-RED to simplify the processing and data coordination between systems.

To accelerate the delivery of digital solutions using Lumada, Hitachi collaborated with MathWorks and Microsoft, to demonstrate that by linking MATLAB and Simulink with Microsoft Dynamics 365 using Node-RED, a collaborative solution integrating advanced data analytics with a work management system could be quickly and easily achieved. Specifically, a MATLAB data analytics algorithm, "wear condition estimation model" was controlled from Node-RED and combined with service and item data on Microsoft Dynamics 365 for Field Service, to realize the automatic registration of information related to maintenance items based on wear-related failure prediction.

Hitachi intends to expand the range of analytics algorithms and connectable work systems through open innovation, to promote the technology development of innovative digital solutions based on IoT technology. Further, Hitachi will continue to actively collaborate with and contribute to OSS⁽⁷⁾ communities.

A part of the technology described in this release will be presented at the Open Source Summit Japan to be held at the Tokyo Conference Center Ariake from 20th to 22nd June, in Tokyo, Japan.

Comment from Mr. Kris Borchers, executive director of the JS Foundation⁽⁸⁾

The JS Foundation is excited to see continued enterprise adoption of Node-RED in production environments. What started as a useful prototyping tool has grown to be adopted by many organizations as part of their product development tool chain and is shipped in their customer-facing products. This collaboration between Hitachi, Microsoft and MathWorks is a great example of that growing enterprise adoption trend for Node-RED and illustrates the importance of open source software in enabling these types of collaborations which provide major benefits to customers and partners. We look forward to continued collaboration with and contribution from Hitachi within the Node-RED project and the broader Node-RED and JavaScript ecosystems.

Comment from Mr. Satoru Abe, Industry marketing manager of MathWorks Japan

In collaboration with Hitachi, MATLAB and Simulink provide advanced algorithms and apps for data analytics and machine learning that can be used directly as the analytics engine for maintenance operation business systems. We expect this integrated platform to enable our customers to quickly implement wear and remaining useful life (RUL) estimation, failure prediction, predictive maintenance and other critical maintenance operations and deploy them across the enterprise.

Comment from Mr. Yoshinami Takahashi, Executive Managing Officer, One Commercial Partner, Microsoft Japan Co., Ltd

Microsoft Japan cordially welcomes Hitachi's development and global marketing of a new technology to interact with BSS⁽⁹⁾ powered by Microsoft Dynamics 365 as part of our partnership in Hitachi's Lumada Project. To help our customers accelerate digital transformation, a reliable cloud platform that leverages existing investments on open source and hosts them is required. Particularly, the industrial sector is in need of operational efficiency enhancement based on the IoT technology, and the technology developed by Hitachi, its innovativeness as well as fusion of existing applications and data is highly expected to drive forward digital transformation of our customers. Microsoft Japan will continue to contribute to further development of our customers' business through our collaboration with Hitachi in the global partnership framework.

- (1) MATLAB and Simulink are registered trademarks of The MathWorks, Inc. MATLAB and Simulink are data analytics and simulation platforms.
- (2) Microsoft Dynamics 365 is a trademark of Microsoft Corporation. Microsoft Dynamics 365 is a cloud business application that supports activities necessary for cooperative operations.
- (3) OT: Operational Technology
- (4) GUI: Graphical User Interface, the interface which utilizes visual images in displaying information from computers to users.
- (5) Node-RED is a "coding-less" programming tool developed by IBM which was donated to the JS Foundation, a project of the Linux Foundation, a non-commercial organization that provides support for a variety of open-source activities. The Node-RED website is <https://nodered.org>.
- (6) Hitachi News Release dated 9 August 2017, "Technology development to enhance the functionality of the Node-RED programming tool for easier system collaboration."
<http://www.hitachi.com/New/cnews/month/2017/08/170809a.html>
- (7) OSS: Open Source Software
- (8) JS Foundation: <https://js.foundation/>
- (9) BSS: Business Support System

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges, combining its operational technology, information technology, and products/systems. The company's consolidated revenues for fiscal 2017 (ended March 31, 2018) totaled 9,368.6 billion yen (\$88.4 billion). The Hitachi Group is an innovation partner for the IoT era, and it has approximately 307,000 employees worldwide. Through collaborative creation with customers, Hitachi is deploying Social Innovation Business using digital technologies in a broad range of sectors, including Power/Energy, Industry/Distribution/Water, Urban Development, and Finance/Social Infrastructure/Healthcare. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

Inquiry about this release

For more information regarding this release, please contact the Research & Development Group, Hitachi, Ltd.

<https://www8.hitachi.co.jp/inquiry/hqrd/news/en/form.jsp>

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