

# Support technology for cloud systems that automatically presents appropriate operational procedures

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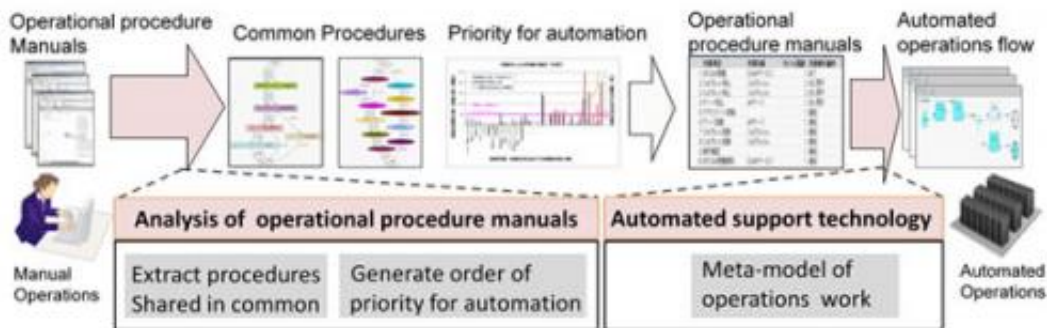


Figure 1: Technology for analysis of operational procedure manuals and automated support

Fujitsu Laboratories today announced that it has developed technology that supports the operations management of cloud systems by automatically generating the necessary procedure flows.

In recent years, as an increasing number of companies have moved systems from various on-premises customer sites to the cloud, improving operations management efficiency and [reliability](#) of cloud-based systems has become an issue.

Fujitsu Laboratories has now developed the world's first [technology](#) that analyzes and employs a variety of data relating to operations

management that are stored in the cloud, including system [logs](#), structural data, and operations procedure manuals. Fujitsu Laboratories has confirmed through in-house tests that approximately 30% of the operations work could be automated.

As a result, the various operations data that are generated in the course of using cloud-based systems can be re-used, and operations management can be expected to become more efficient and reliable.

In recent years, as storage and networks have become more sophisticated, an increasing number of companies have moved systems from various on-premises locations to the cloud. Operational data, including system logs, structural data, and operations procedure manuals, are increasingly being stored in the cloud. In conventional operations management, from operational policies such as periodic system maintenance, operations managers would specify each system's operations procedures based on their own experience and know-how while referencing manuals and past documents.

Operations management know-how is largely dependent on the operation manager's specialized skills and on-the-job experience, knowledge not detailed in written manuals. Previously, Fujitsu Laboratories had developed methods of predicting and detecting failures in cloud infrastructure as well as for automatically generating the parameters required to build systems. After operations had started, however, procedures were not automated. For this reason, executing different operations procedures for each business system, such as file backup, and launching or stopping services, led to conditions where problems were likely to occur, particularly with the management of multiple business systems.

Fujitsu Laboratories has developed technology that can analyze operation manuals, and then extract those parts that various manuals

have in common so as to infer what procedures can be standardized. It has also developed automated support technology that makes the development of automated execution flows for operational procedures more efficient (figure1).

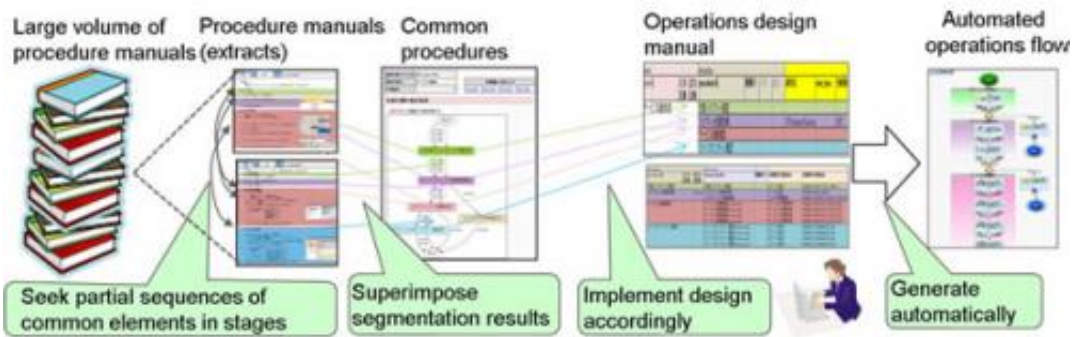


Figure 2: Automatically generated automated operations flow

The technologies developed have the following features (figure2).

## 1. Technology for analyzing operational procedure manuals

1. Using the following procedures, an analysis is performed on the operational procedure manuals that are read by operations managers.
2. Parts where the work is described are extracted and segmented so that the portioning of each procedure manual is minimized and re-use is maximized
3. Superimposing the segmentation results, the shared procedures are inferred
4. The common operational procedures are then further segmented by their complexity and the operations work involved

5. The time required to create automated operational flows and the current manual work times are then estimated to determine priority for automation

In calculating the segmentation, the computation diverges as the combination problems are solved. However, as this technology seeks partial sequences in stages, time required for computations is reduced.

As a result, analysis of operational procedure manuals, which requires over a month using conventional manual methods, could be performed in a matter of a few hours.

## **2. Automated support technology**

If the operations manager describes in the operations design manual the bare minimum components involved in operation work such as service launches and stoppages, an automated operations flow can automatically be generated. In the operations design manual, the conditions for execution processing can also be specified, but because conditional branching and other implementation steps are automated, operation designer skills are not required. By describing the operation design manual in accordance with common procedures obtained from the analysis of the operational procedures, maintenance administration becomes easy using an automated operations flow with a high degree of re-use. The time required to create an automatically generated automated operations flow can be reduced by up to 90%.

In testing the technology developed by applying it to the operations work of one of the [company](#)'s datacenters, Fujitsu Laboratories confirmed that approximately 30% of the operations work could be automated. By using this technology, customers can re-use the various operations data generated in the course of operating their cloud-based systems, and [operations](#) can expected to become more efficient and reliable.

Provided by Fujitsu

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