Application Data Interface Method using MATLAB in Campus MG-EMS

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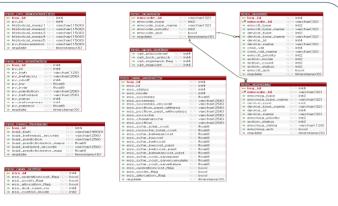
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■ Introduction

- · The micro grid needs to operate economically in connection with the existing power grid and operate steadily through independent operation in case of emergency.
- The application scope of the study is a program for estimating the load in the campus micro grid, a prediction program for solar power generation, and a program for establishing charge / discharge schedules for controllable power generation ESS.
- · In order to periodically run each of these applications, application program management functions for sequential operation of each program are described as functions of the platform.

Proposal



[Figure. 1] Application DB ERD

• In addition to the common table ERD used in MG-EMS. there are a table ERD for history and a weather interface table ERD for weather prediction

Classfication	Process	Description	
Server Process	SecAppManager	Application Process Manager	
	SecPGF	PGF Process	
	SecLDF	LDF Process	
	SecESC	ESC Process	
HMI Process	HmiSignalRHost	Server Interface Process	
	Web UI	HMI Process	
External Interface Service	Weather Manager	Weather Interface Service	

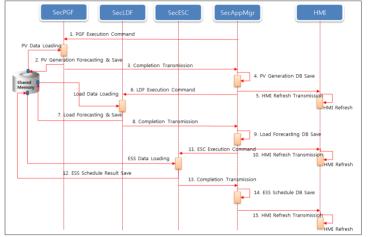
[Table. 1] Application List

- The Campus MG-EMS platform consists of a server process and an HMI process.
- · Among them, Table 1 shows only the processes directly linked to the application.

Message	Start Process	End Process	Transmit Service
Application Status Send	Realtime	HMI	Realtime
Application Status Request	НМІ	Realtime	Realtime
Application Execution	Application Manager	PGF, LDF, ESC	Message
Application Completion Reload	Application Manager	HMI	Message
PGF Completion	PGF		
LDF Completion	LDF	Application Manager	Message
ESC Completion	ESC	Managor	

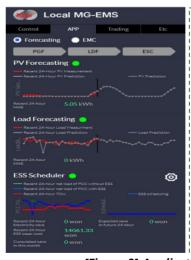
[Table. 2] Defining Inter-Process Messages

- Table 2 defines the message codes for each process and only the processes necessary for the application linkage process.
- In addition, the process of configuring the MG-EMS and the related messages are omitted because of their great contents.



[Figure.2] Application Schedule Sequence

· Figure 2 shows a sequential schedule execution sequence for each application and Application Manager.



- The following screen shows the execution result of the application program installed on Campus MG-EMS.
- Solar power output prediction. load prediction, and ESS scheduling can be sequentially performed as follows, and the latest 24-hour measurement data and the 24-hour prediction data can be confirmed on a screen-by-hour! basis based on the current time.

[Figure.3] Application Execution HMI

Conclusion

□ Proposed Method

- · In this study, the execution and interlocking of the linked applications were performed for stable operation of the Microgrid, and the corresponding platform was developed and presented.
- · We developed a scheduling process to run the Campus MG-EMS application programs and configured to run them in conjunction with MATLAB. Using the platform presented in this paper, we have laid the groundwork for stable operation of various applications to be installed in Microgrids in the future.