Application Development for Archiving Data and Operating Status Analysis at KOMAC

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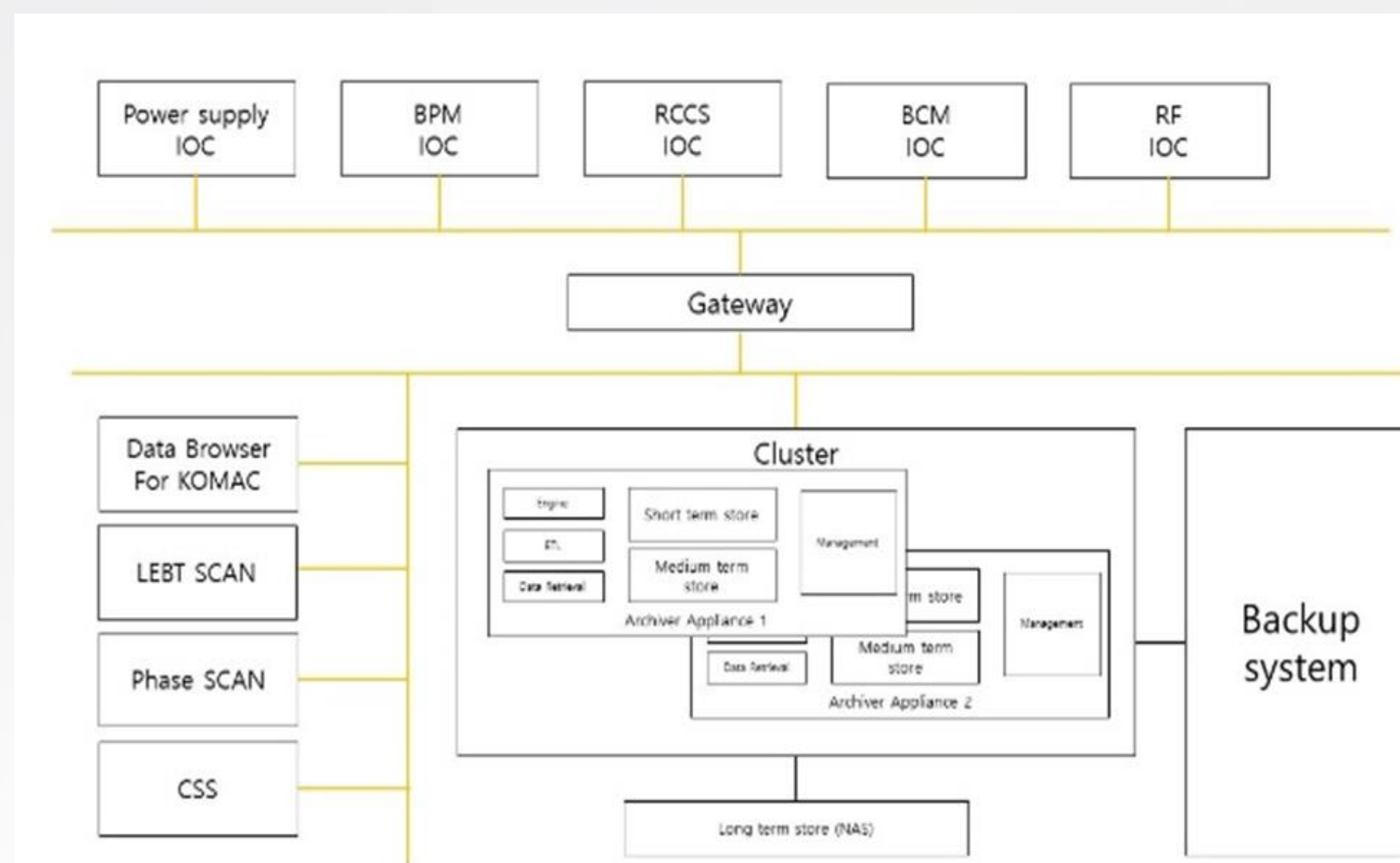
KOMAC and Archiver Appliance System

KOMAC Control System

- 100MeV, 20mA (Peak current) proton linac accelerator
- Based on Experimental Physics and Industrial Control System (EPICS)
- process variable : 18271 ea
- archiving variable : 1100 ea
- Timing system provides pulse until 60Hz repetition that's maximum repetition

Environment of KOMAC Archiver Appliance System

- Centos7 64bit
- Storage : 3.5 TB
- Apache-tomcat 7.0
- provide Archiver Appliance Application Programming Interface (API) for external program

Archiver Appliance API

- The data is requested by the URL which includes the information of server address, protocol, process variable name, time
- The received data show the information in JSON format (it is chosen between the CSV, MAT, TXT, JSON, etc)

The Development of Archiving Data Analysis Application

Development Environment

- Centos7 64bit
- Python3.6 (anaconda- environment), it includes the libraries that are pydm, pyepics, pyqt, numpy, etc
- qt 5.12.5 (it includes the qt-designer for UI development)

The Application based on PyDM

- The PyDM is based on the PyQT framework that's a python binding of the cross-platform GUI toolkit
- It have a function that's a data plugin such as channel access protocol and archiver appliance based on pyepics python library
- The qt-designer is a graphic design tool which provides the function included fast and convenient development

The method of the data requesting

- The data has a JSON format which received by Archiver Appliance API
- The python code is processed when the signal event break out
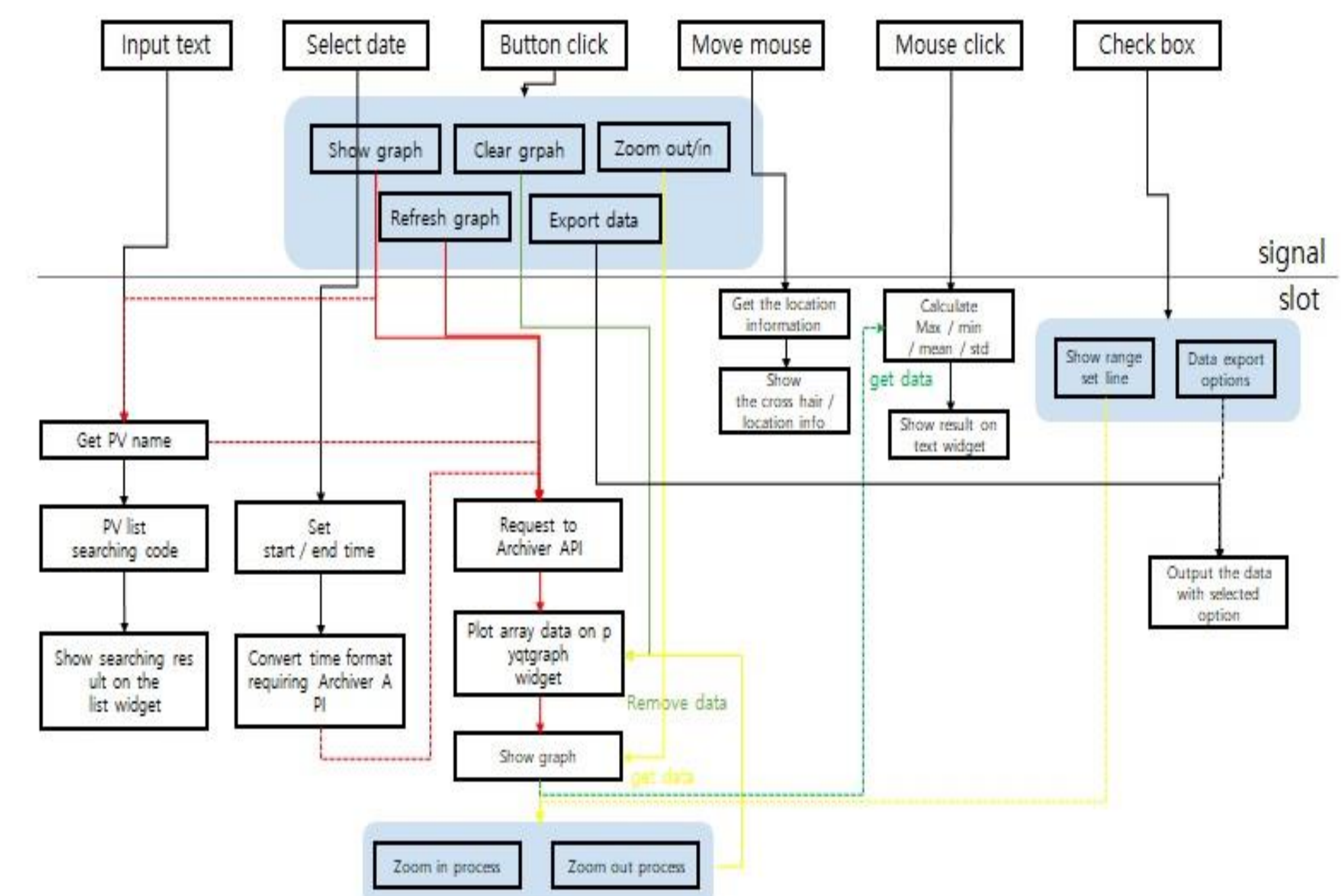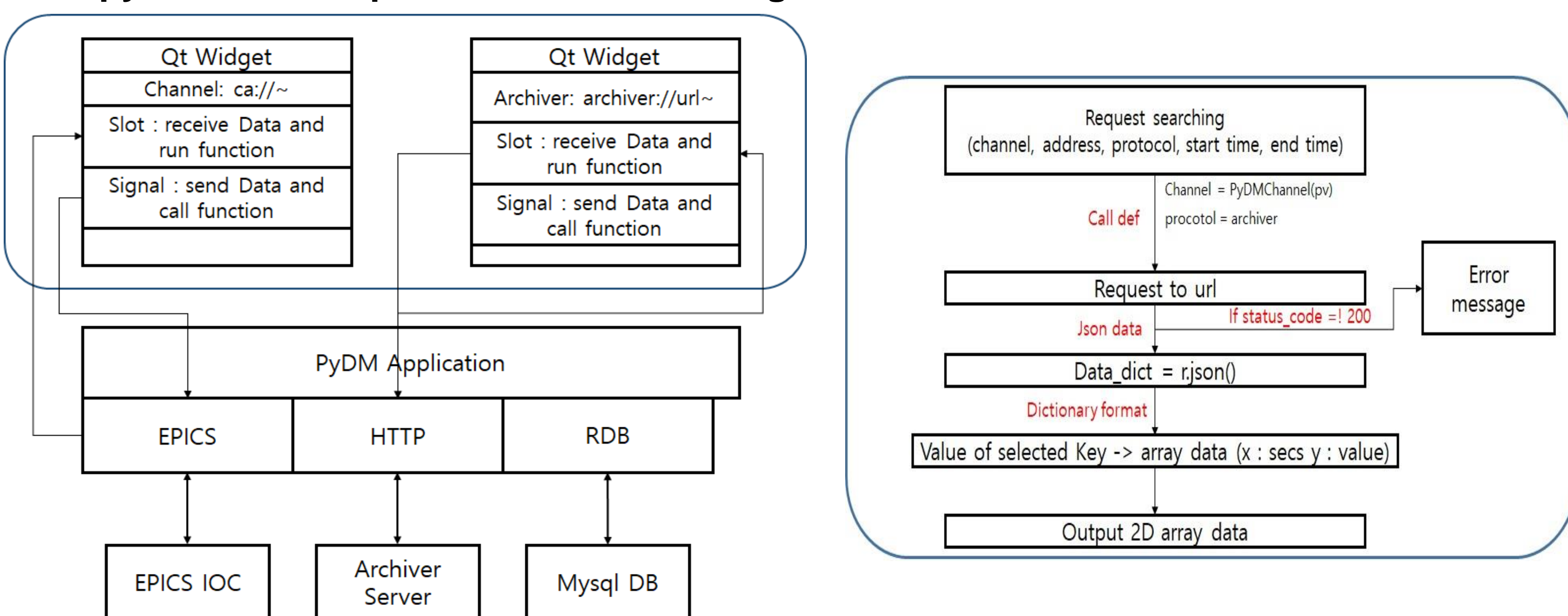
The major features of the graphical user interface

- Autocomplete search : when the user input the name, the code plots every variables related to the entered name in the list
- Select period : select start time, end time with a popup calendar
- Data browsing : auto scale, zoom in, zoom out, refresh, set range, noise filtering, plots the value on the cross-point
- Data export : linear interpolation, noise filtering, select file format

Operating Status Analysis and Vision which includes the WEB development
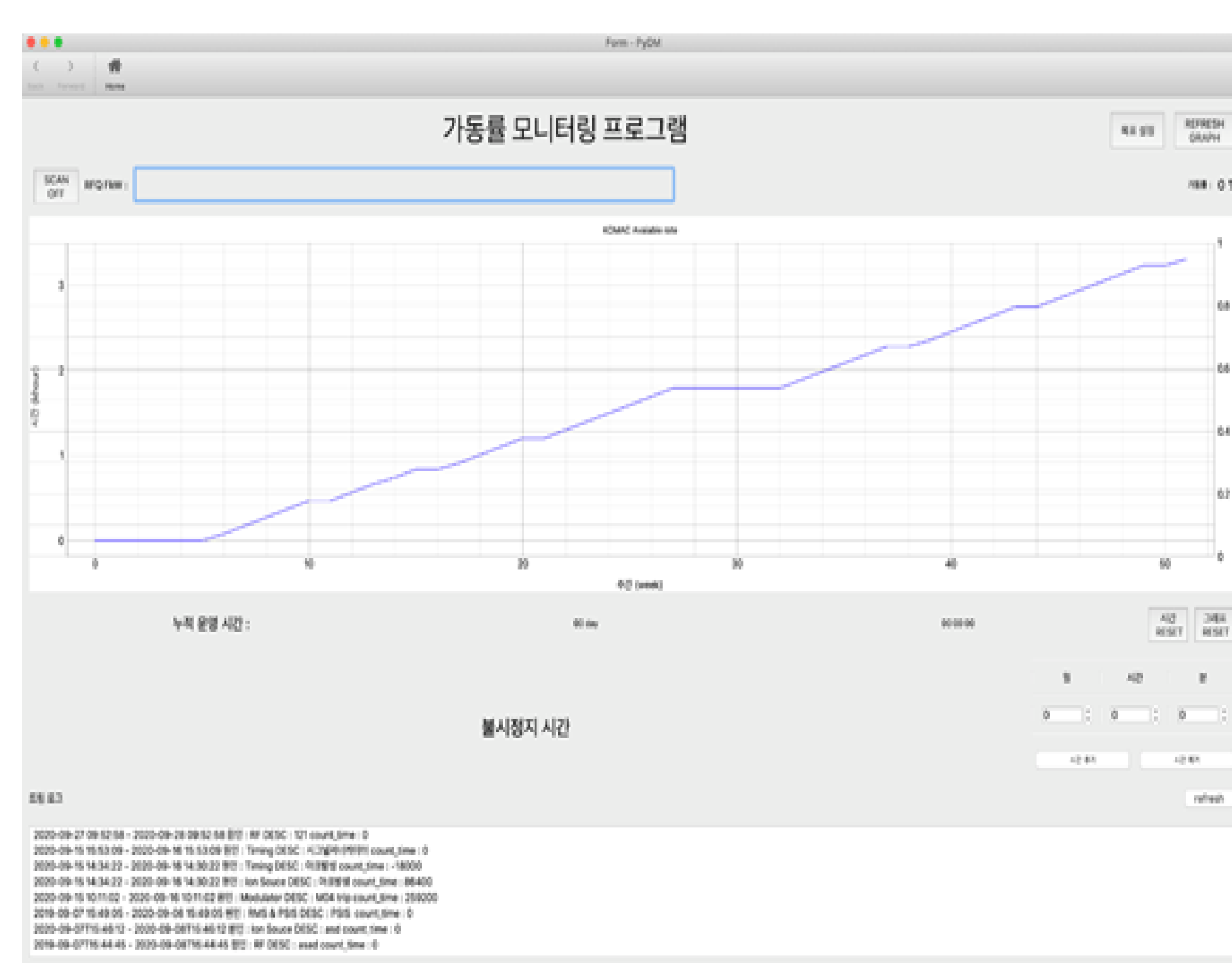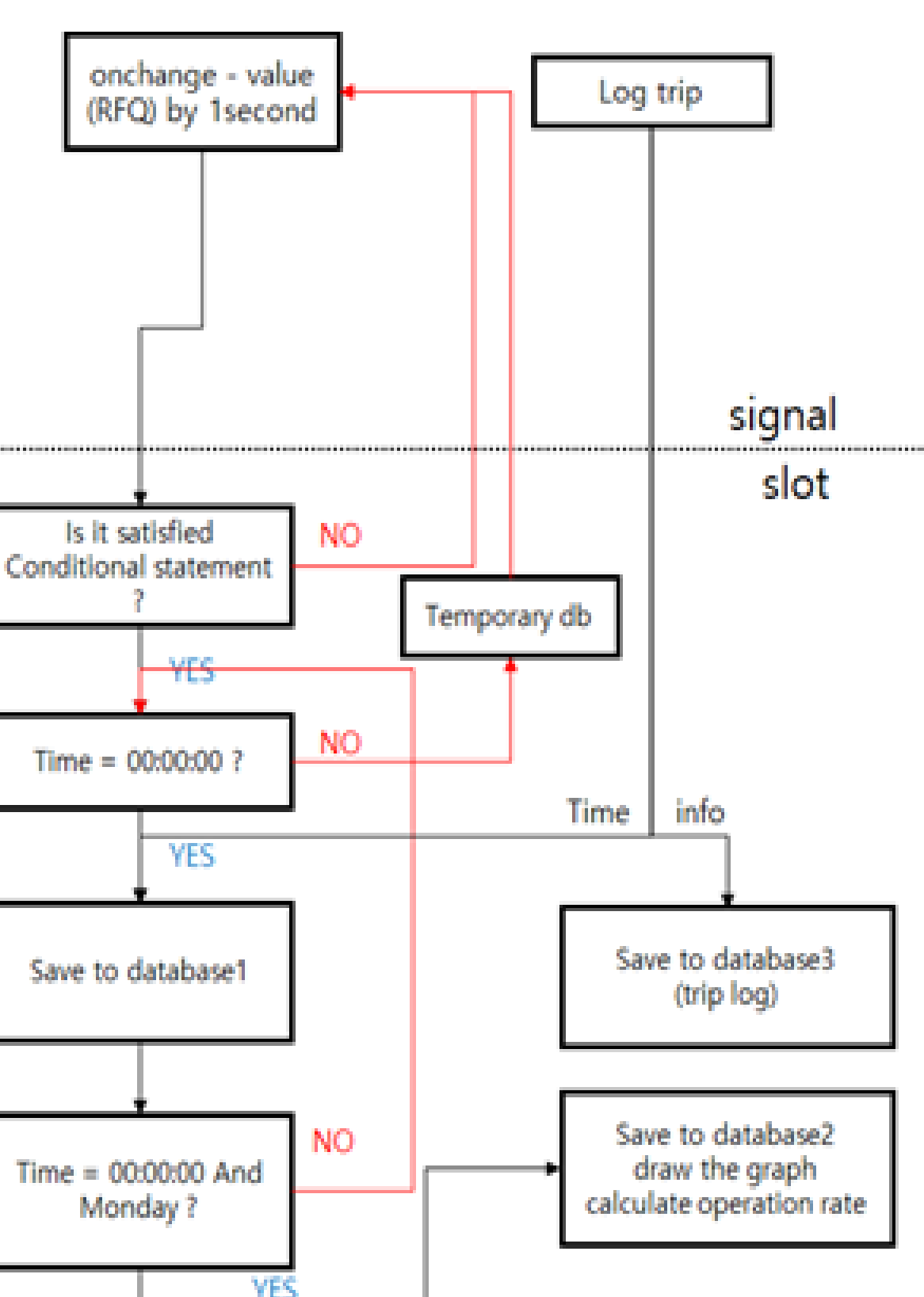
Operating Status Analysis Application

- The integrated time is calculated if the conditional statement is satisfied which includes Radio Frequency Quadrupole (RFQ) forward power value and user-defined trip source
- The integrated time is reflected on the database at midnight automatically
- From now on, In order to the improvement of the application, the alarm log db will be used and it annunciated the trip source from analysis alarm log

WEB Development

- The WEB interface will provide convenient access and the effective user-management
- The WEB service will be developed based on Django framework with python, html, css, javascript, ajax, etc
- Now, The static interface has been being developed based on HTML, CSS markup language