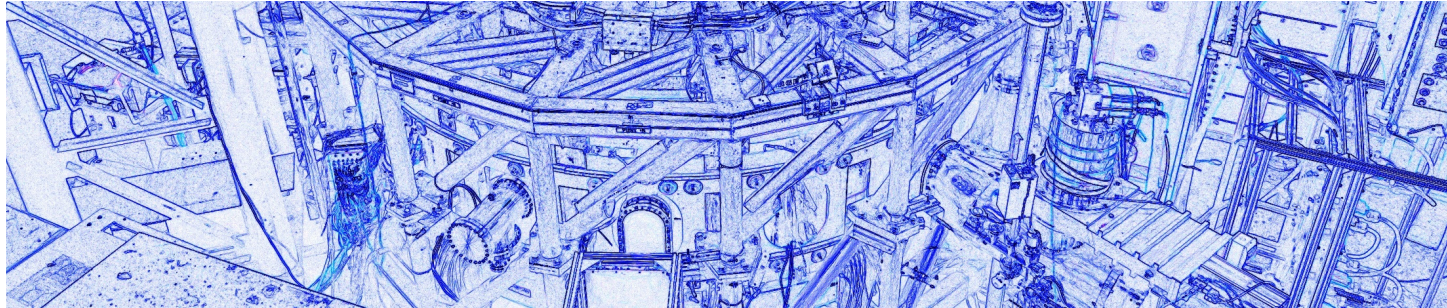


# A Major update of web based development toolkit for control system of largescale physics experiment device

XiaoHan Xie and J-TEXT Team



- Introduction
- Current status of CFET
- Update of CFET
- Application

# Introduction

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**SCADA** >>>> **supervisory control and data acquisition**

**SCADA** >>>> **supervisory control and data acquisition**

**EPICS** >>>> **The accelerator field** 

**SCADA**  **supervisory control and data acquisition**

**EPICS**  **The accelerator field**  **Fusion community** 

**SCADA** >>>> **supervisory control and data acquisition**

**EPICS** >>>>

**The accelerator field**



**Fusion community**

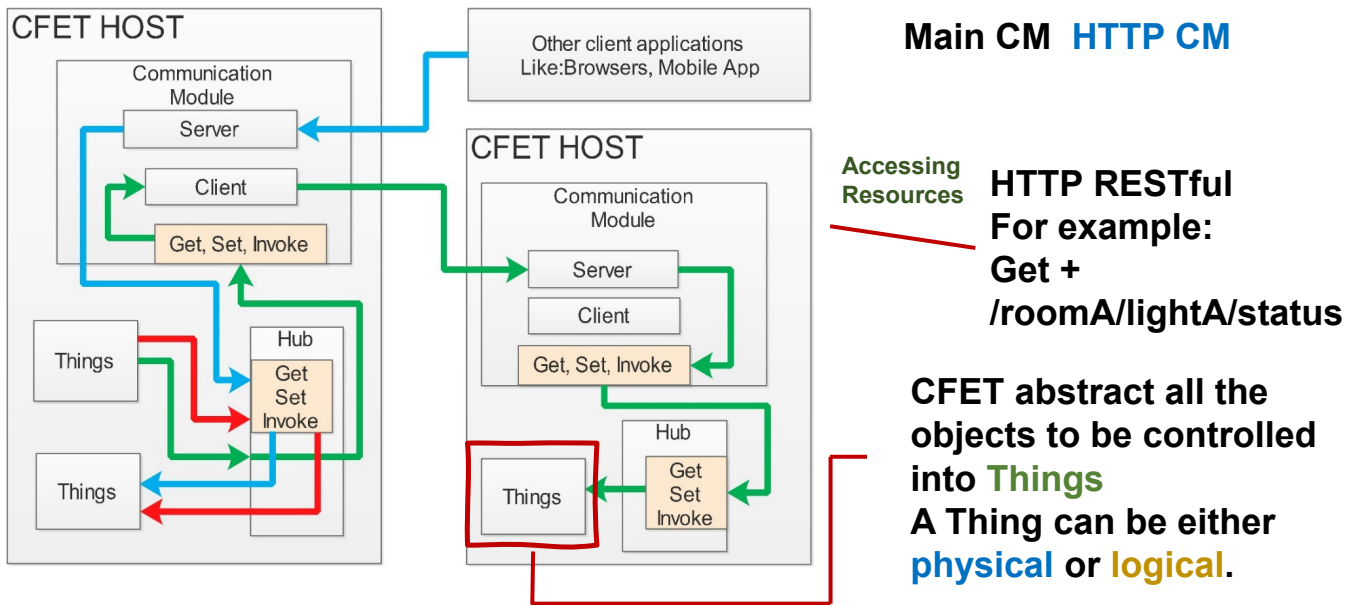


**CFET**

**Control system Framework for  
Experimental Devices Toolkit**



- **Control system Framework for Experimental Devices Toolkit**



- A CFET Host is a program which contains some CFET Thing.

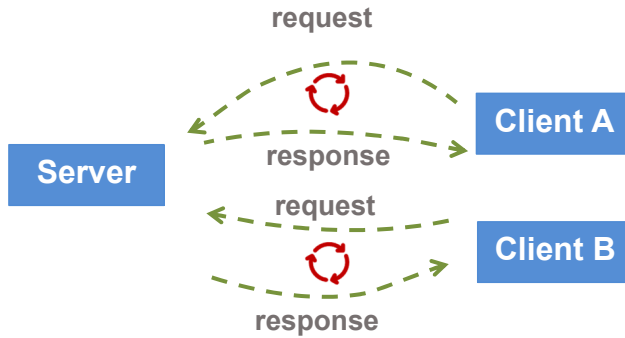
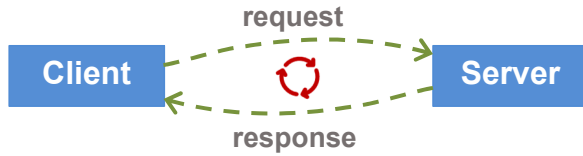


# New CFET communication module

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## HTTP CM



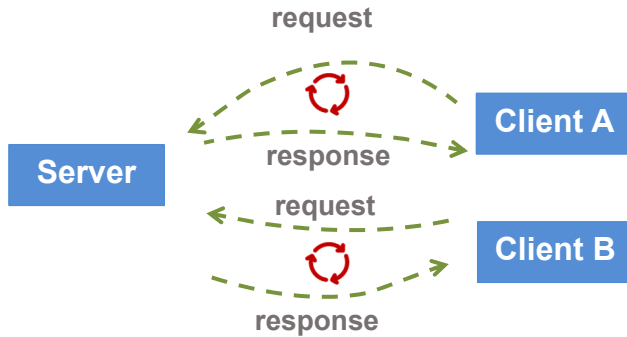
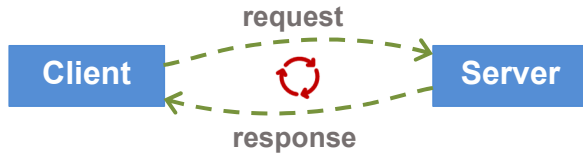
# New CFET communication module



HTTP CM



EVENT (WebSocket CM)



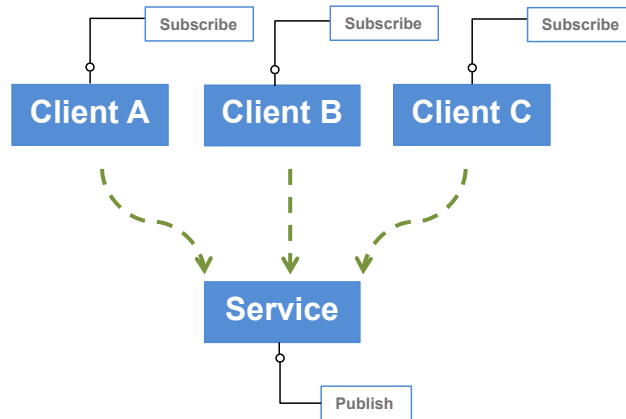
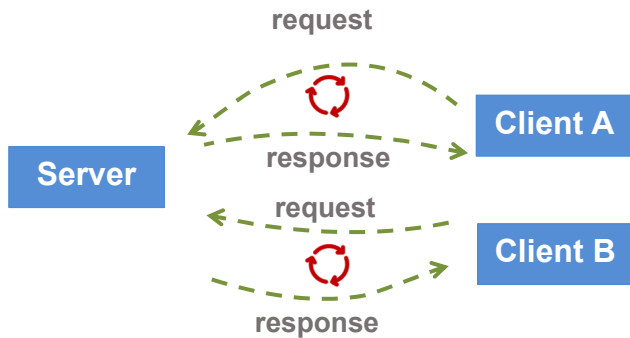
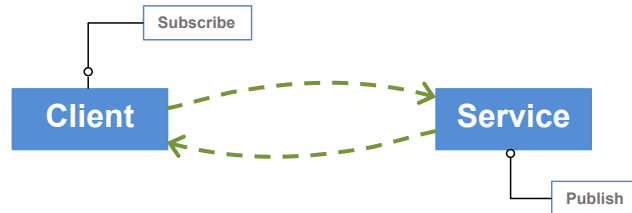
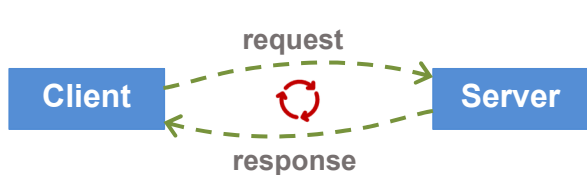
# New CFET communication module



HTTP CM



EVENT (WebSocket CM)



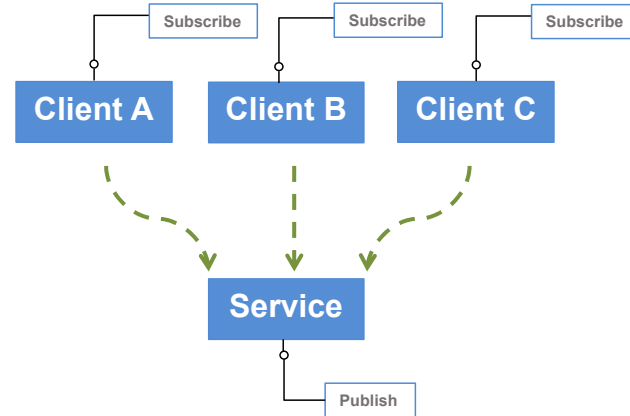
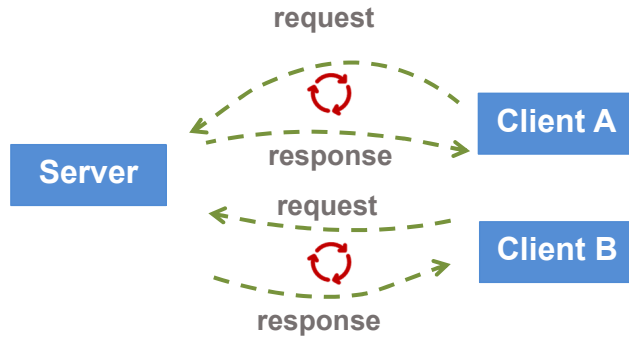
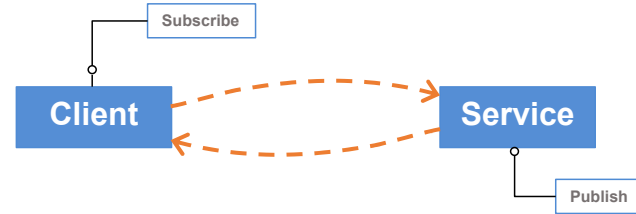
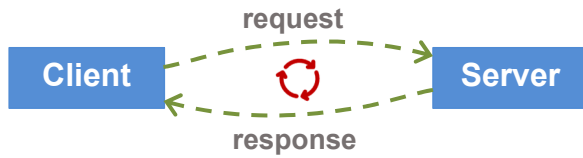
# New CFET communication module

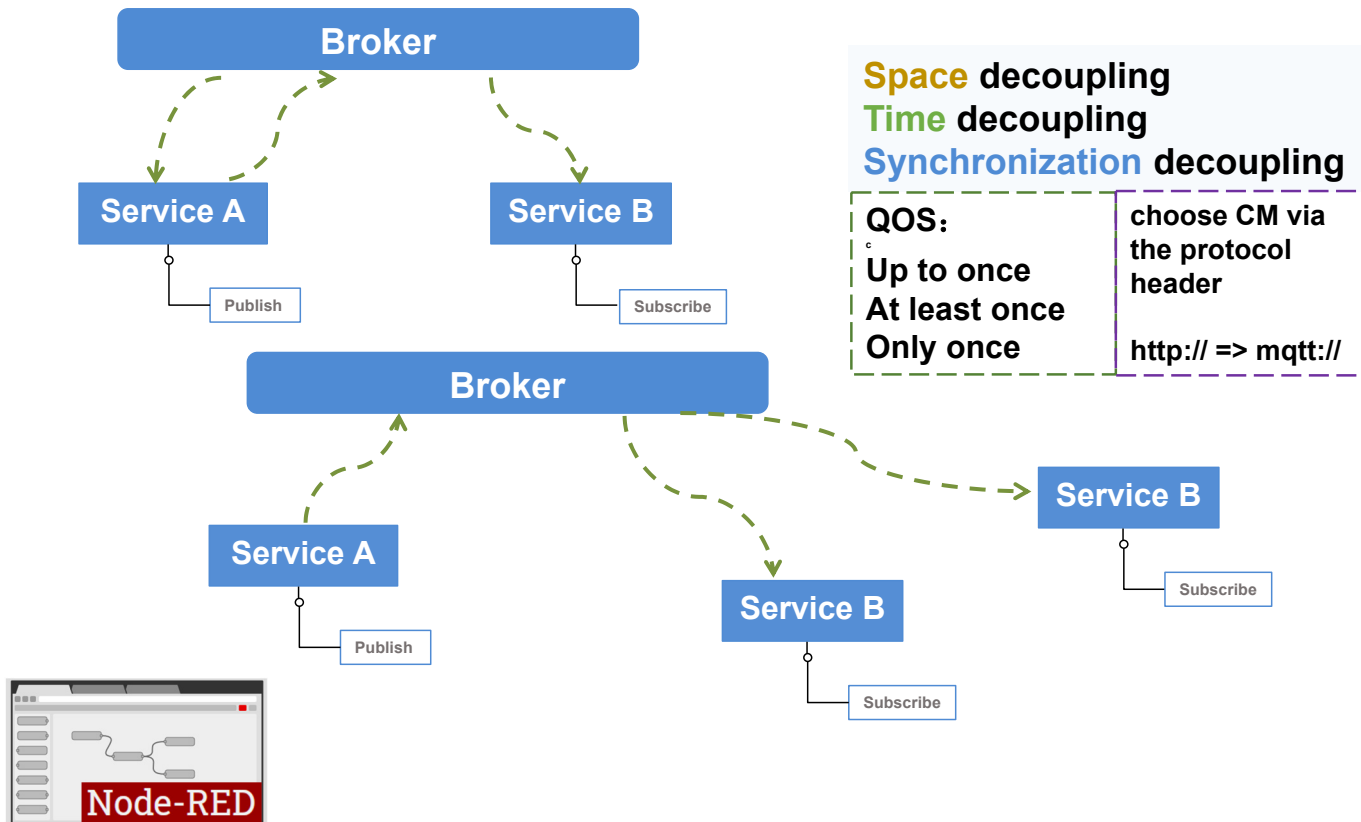


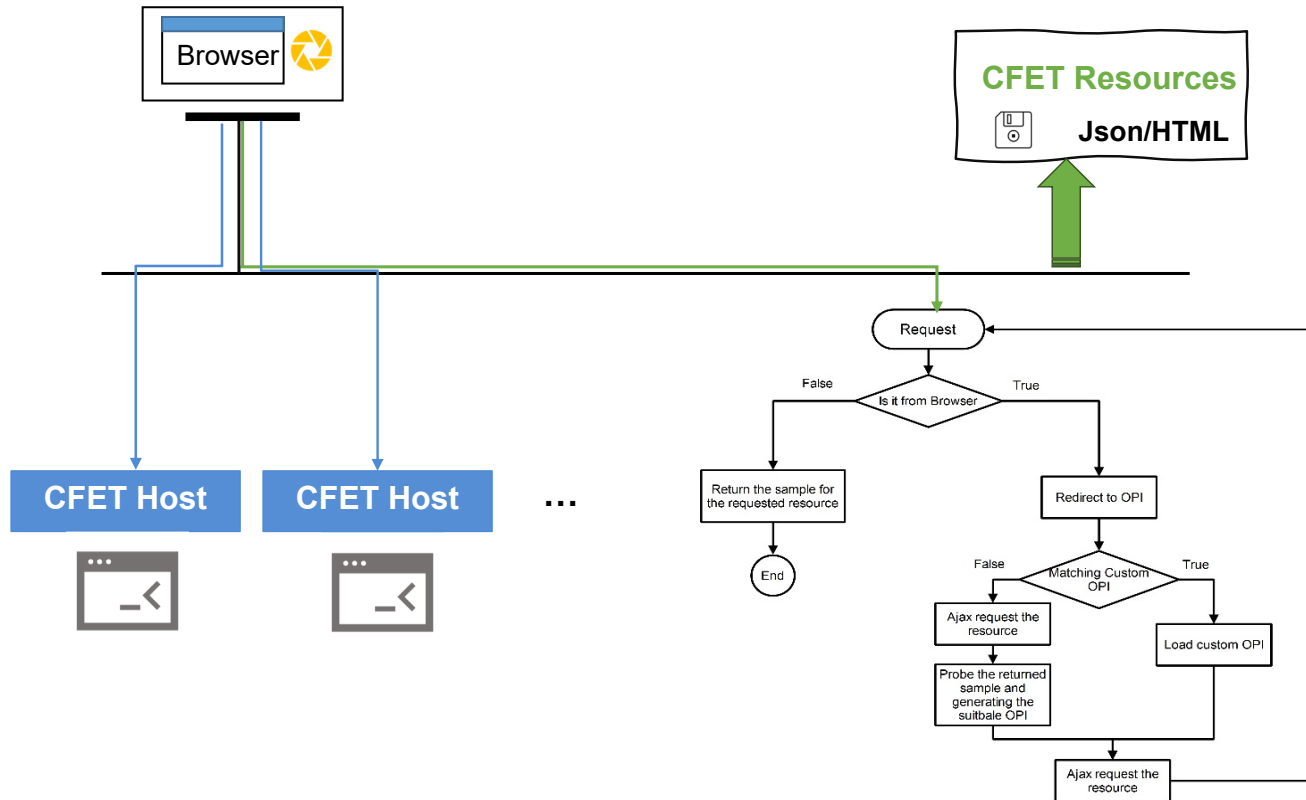
HTTP CM



EVENT (WebSocket CM)







# Human Machine Interface





# Human Machine Interface



The diagram illustrates three categories of DAQ card widgets: **DAQ card Status Time**, **DAQ card Method Arm**, and **DAQ card Config Rate**. Red arrows point from these categories to a screenshot of the HMI interface.

The HMI interface screenshot shows a control panel with the following elements:

- Header:** "Add Widget", "Save", "Widget layout", and a search bar "Choose a widget/template file to load".
- CurrentStateName:** A dropdown menu showing "Idle".
- CurrentSeconds:** A text input field with the value "276".
- Debug:** A toggle switch and a "DebugDS" input field with the value "0".
- Main ON/OFF:** A green indicator light, a "ON/OFF" toggle switch, and a "ControlSetting" toggle switch.
- PI ON/OFF:** A green indicator light, a "ON/OFF" toggle switch, and a "ControlSetting" toggle switch.
- Parameters:** Two sections for "Uout" (KV) and "Iset" (mA) with input fields and "set" buttons. The "Iset" section also includes "Iout" (mA) with a "set" button.
- Status Indicators:** Five circular indicators for "WorkStatus", "OverU", "OverI", "IsArcingError", and "ControlSetting Status".
- Actions:** "EDIT" and "DELETE" buttons with a purple arrow pointing to the "EDIT" button.

# Human Machine Interface



The image displays a Human Machine Interface (HMI) configuration environment. At the top, three boxes represent widget categories: "DAQ card Status Time", "DAQ card Method Arm", and "DAQ card Config Rate". Red arrows point from these boxes to a central screenshot of the HMI software. The screenshot shows a control panel with sections for "Main ON/OFF" and "PI ON/OFF", each containing various input fields (Uout, Iset, Iout) and status indicators (WorkStatus, OverU, Overt, IsArcingError, ControlSetting Status). A circular gauge is also visible. To the right, an "Edit Widget" panel is shown, listing various widget parameters such as status, uri, fontSize, title, titleSize, unit, hh, h, l, ll, max, min, and Finish. A purple arrow points from the "EDIT" button in the gauge area to the "Edit Widget" panel.

# Human Machine Interface



The image shows a screenshot of an HMI configuration tool. At the top, three boxes represent different widget types: 'DAQ card Status Time' (yellow), 'DAQ card Method Arm' (blue), and 'DAQ card Config Rate' (green). Red arrows point from these boxes to the main configuration area. A purple arrow points from a monitor icon to the 'Add Widget' button. The main configuration area displays a widget with various controls: 'CurrentStateName' (set to 'Idle'), 'CurrentSeconds' (set to '276'), 'Debug' (toggle), 'DebugGS' (set to '0'), 'Main ON/OFF' (toggle), 'Uout' (set to '0' KV), 'Uset' (set to '0'), 'ON/OFF' (toggle), 'Iset' (set to '0.0014648661020828565' mA), 'Iout' (set to '0.0014648661020828565'), 'ControlSetting' (toggle), 'WorkStatus' (OK), 'OverU' (OK), 'Overt' (OK), 'IsArcingError' (OK), and 'ControlSetting Status' (OFF). Below this is a 'PI ON/OFF' section with similar controls. To the right, an 'Edit Widget' panel is shown with a purple header. It contains a 'status' field with a description and a 'POKE' button. Below are fields for 'uri', 'fontSize' (22), 'title', 'titleSize', 'unit' (with a 'hide' toggle), 'hh' (80), 'h' (75), 'l' (40), 'll' (20), 'max' (100), 'min' (0), and 'Finish' (Apply). A 'DELETE' button is highlighted with a purple arrow, and a curved arrow points from the 'DELETE' button to the 'EDIT' button. A small gauge widget is also visible in the center, with a purple arrow pointing to its 'EDIT' button.

# Human Machine Interface



The image displays a screenshot of a Human Machine Interface (HMI) for a DAQ card. The main interface includes several widgets:

- DAQ card Status Time**: A yellow-bordered box.
- DAQ card Method Arm**: A blue-bordered box.
- DAQ card Config Rate**: A green-bordered box.

The main control panel features two sections: **Main ON/OFF** and **PI ON/OFF**. Each section includes a green indicator light, a 'ControlSetting' toggle, and various input fields for 'Uout', 'Iset', and 'Iout'. Status indicators for 'WorkStatus', 'OverU', 'OverI', 'IsArcingError', and 'ControlSetting Status' are also present.


An **Edit Widget** configuration window is open on the right, showing the following parameters:

- status**: Enter the Thing in the input box below, click 'POKE' to get the parameters
- uri**:  POKE ParseUrl
- fontSize**: 22
- title**:
- titleSize**:
- unit**:  Hide
- hh**: 80
- h**: 75
- l**: 40
- ll**: 20
- max**: 100
- min**: 0
- Finish**: Apply


A purple arrow points from the 'uri' field in the 'Edit Widget' window to the URL <http://ip+port/lab/lightA/status> shown below. Another purple arrow points from the 'EDIT' button in the widget configuration to the 'Edit Widget' window.

<http://ip+port/lab/lightA/status>

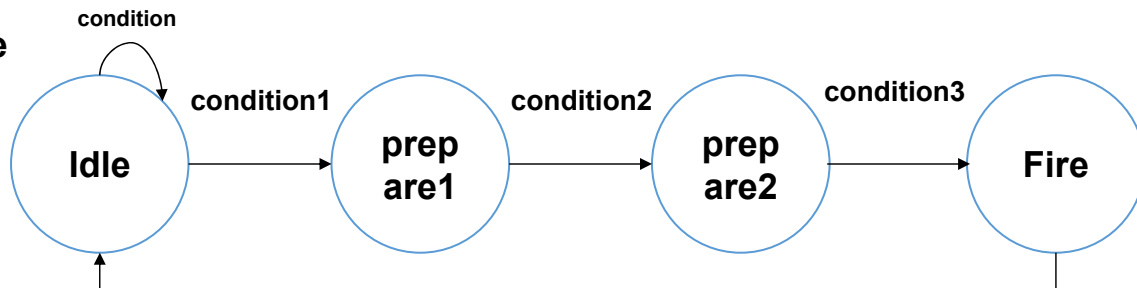
```
{  
  "StateNo": 1,  
  "StateName": "Idle",  
  "DefaultNs": 1,  
  "Transitions": [  
    {  
      "TransitionName": "IdleToArming",  
      "ConditonExpr": "(Debug == 1 ? VirtualGCState : RealGCState) == 4",  
      "NextState": 2  
    }  
  ]  
},
```

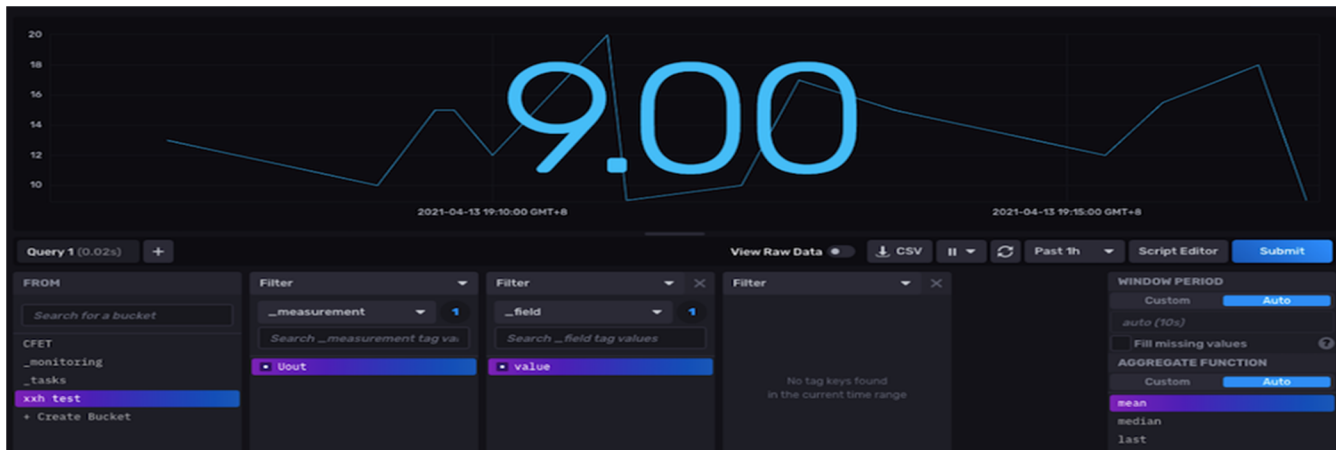
 AliasTableConfig.json

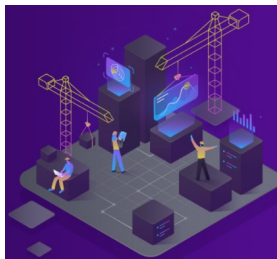
 StateConfig.json

 TransExcute.json

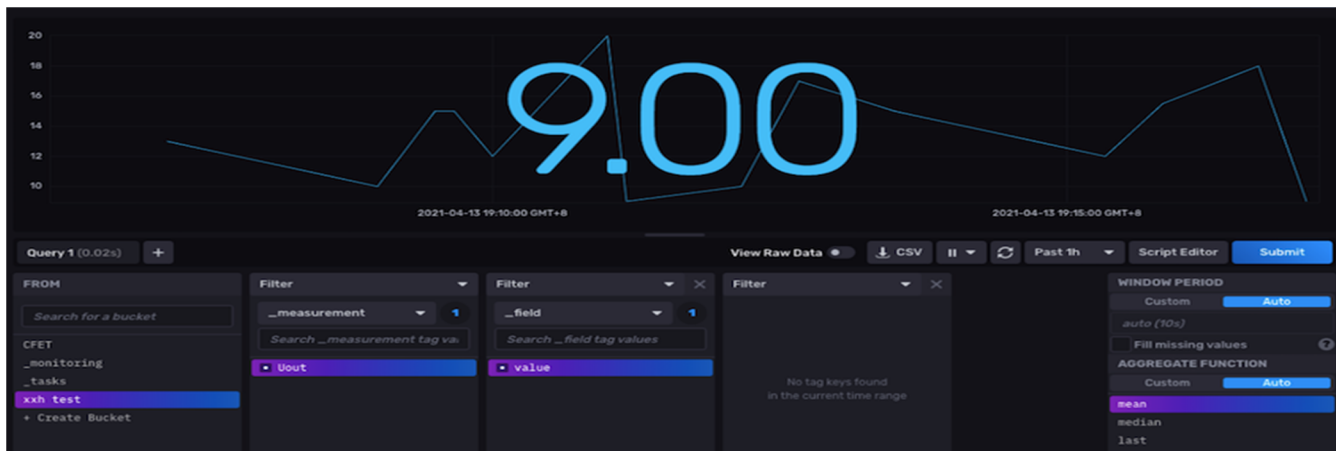
example





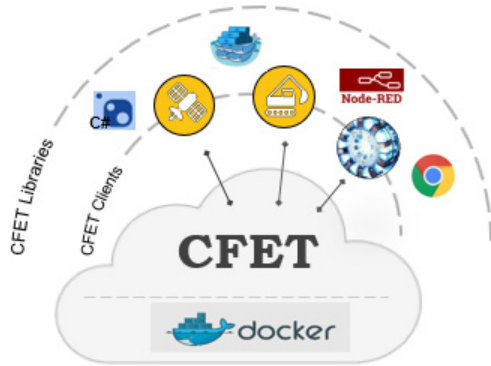


Engineering data refers to the non-experimental data generated during the experiment, such as sensor data, the voltage of the power and the temperature of the instrument, etc.





1. supports major Linux distros, Mac OS and Windows.
2. eliminate the "it works on my machine" problem
3. Build safer, share wider, run faster



**CFET CLIENTS**

**CFET Host**

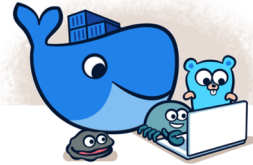
**Docker-based policy deployment to run simple CFET Application quickly**



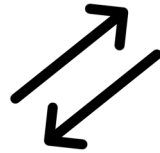
Config File



EPICS IOC

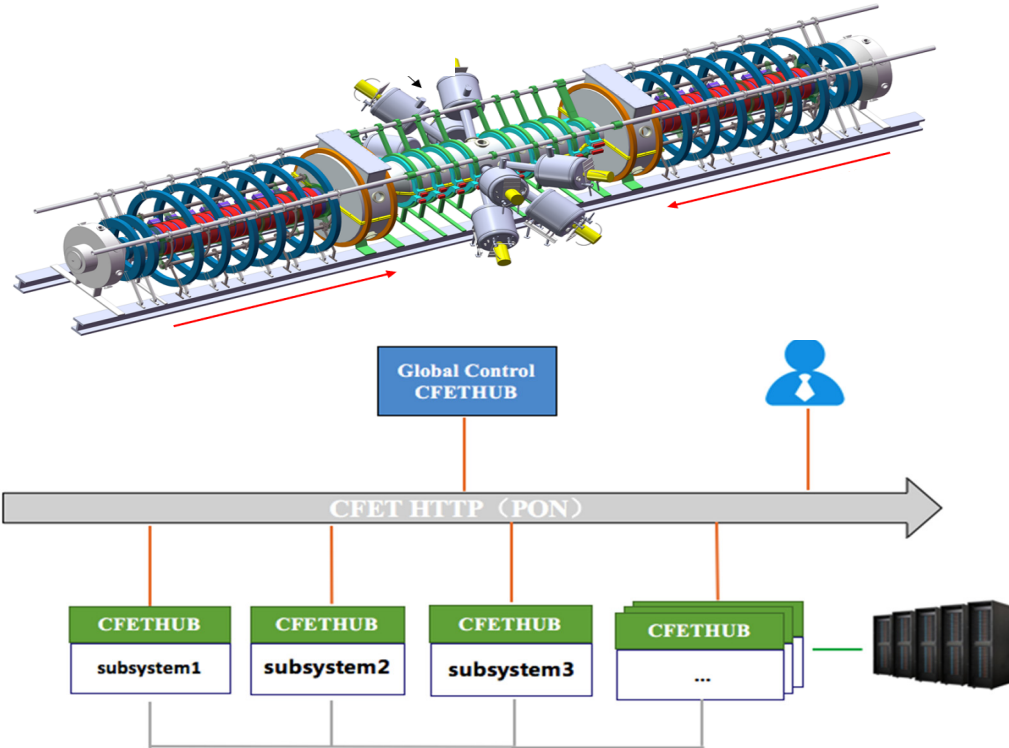


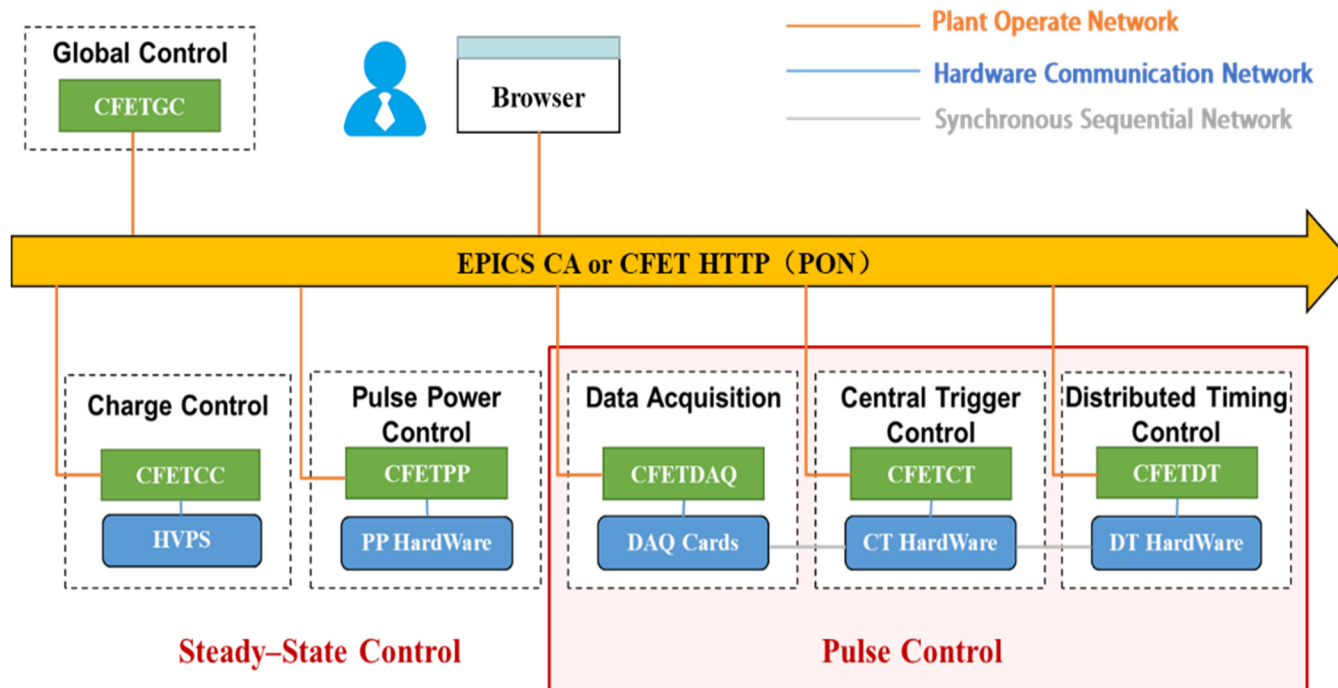
EPICS network



EPICS CLIENT (is a THING)

## HFRC





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# Thanks