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# IOT APPLICATION IN THE CONTROL SYSTEM OF THE BEPCII POWER SUPPLIES*

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## INTRODUCTION

The paper introduces the idea how to apply Internet of things IoT to the accelerator control system and take the existing control system of the BEPCII power supplies as an example for IoT application. The purpose is to make the control system more intelligent and automatically identify what and where the problem is when the alarm of the control system of the power supplies occurs. That means that IoT can help to automatically identify which chassis and which module inserted in the chassis and the connection cables. It is great convenient for the maintainer to use a mobile phone to diagnose faults and create the electronic maintenance record.

## Power Supply Control System in the BEPCII

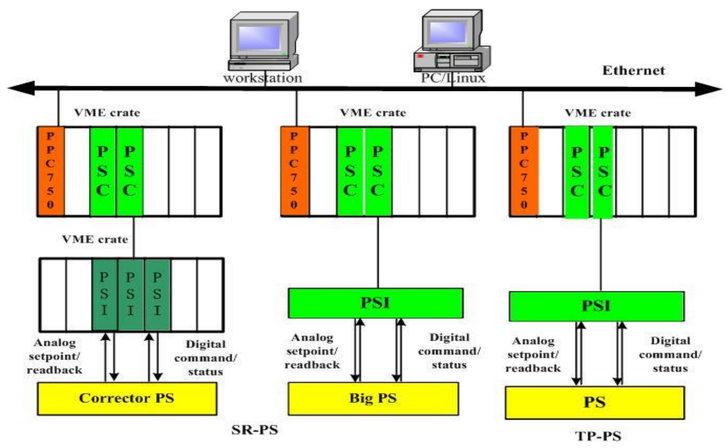
VME IOCs:18

EPICS PVs:~10000

PSC/PSI: ~60/200

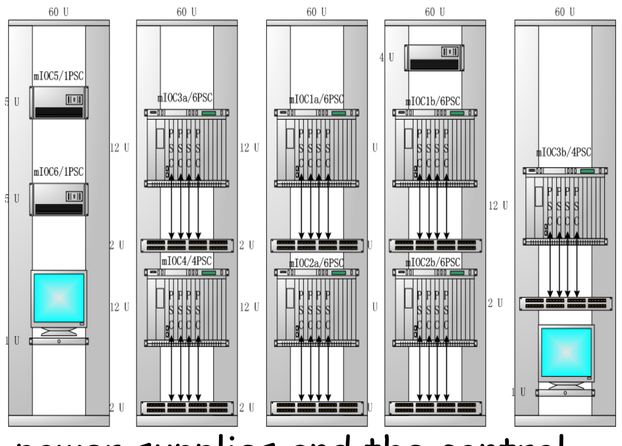
B/Q/S magnets power supplies: ~400

Optical fiber cables : ~400




## Layout of the Power Supply Control Station

Four local stations for the power supply control in the BEPCII. There are many cabinets, chassis, plug-ins, cables, etc. It's not so easy for engineers to maintain so many devices.




When a fault occurs with the power supplies and the control system, it will take many time to recognize what and where the problem happened. In order to improve the control system intelligent, we will use RFID to construct a sensing layer in each power supply control station. The goal:

- make the operation maintenance convenient
- easy to recognize the fault location
- automatically recording maintenance
- generate electronic maintenance log

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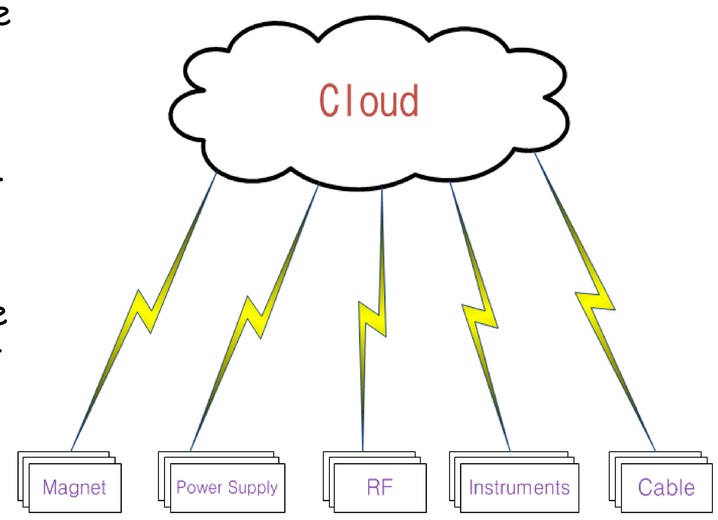
## IoT in the Accelerator

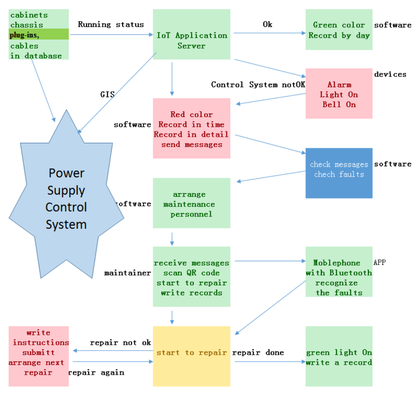
A modern accelerator is complex facility which consists of many systems and a large amount of equipment such as magnets, power supplies, RF and vacuum and so on. During the construction and the installation as well as running of the accelerator, a huge number of data and information related to these equipment are created. So, it's very important for a large accelerator to collect and save and manage such large data.

With the benefit of the Interne t of things, these problem can be solved nicely. The idea of IOT application in the accelerator is that every object is connected and people and objects are also linked together, there should be setup model of two-sided direct interconnecting and interworking networks. It's possible to use RFID in the accelerator to construct a sensing layer



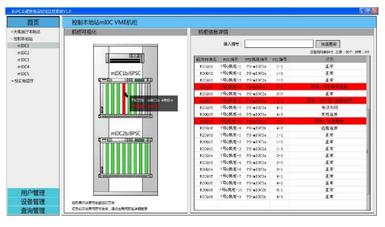

The goal is to automatically track the information of the accelerator equipment and devices as well as the cables with RFID.

## IoT Application in the control system of the power supplies



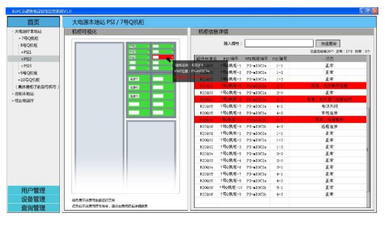

The engineers on-site scan the QR cord in the local station. The IoT APP functions as follows:

- get the permission to repair
- recognize what and where the problem happened according to the alarm colour
- writing a record and submitting the record
- monitor the status of the cabinets, the chassis, the plug-ins, the cables
- status of the control system of the PS



Visualization of the VME chassis, the PSC modules and the optic fibers between PSC/PSI. The right lists::(green:ok;red:fault)

- ✓ name of the power supply
- ✓ VME chassis number,
- ✓ PSC number
- ✓ PSI number
- ✓ status of the connection between the PSC and the PSI
- ✓ status of the power supply



Visualization of the cabinets of the power supplies and the PSI chassis sitting in the cabinets. The right lists:(green:ok;red:fault)

- ✓ name of the power supply
- ✓ VME chassis number
- ✓ PSC number
- ✓ PSI number
- ✓ status of the connection between the PSC and the PSI
- ✓ status of the power supply.

## CONCLUSION

The work of the IoT application is still in development. The APP of the IoT supports both IOS and Andriod. It may check the status of the cabinets, the chassis, the plug-ins, the cables and the status of the control system of the power supplies. It's easy for the engineers to recognize the fault location and to automatically record maintenance and to generate electronic maintenance log.