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北京四方继保自动化股份有限公司
BEIJING SIFANG AUTOMATION CO.,LTD.

Practice in PMU Development for Smart Substation

Bonian Shi

BEIJING SIFANG AUTOMATION CO.,LTD

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Outline

- PMU Application in Wide Area Protection
- PMU Development for Smart Substation
- Future Application under Smart Substation



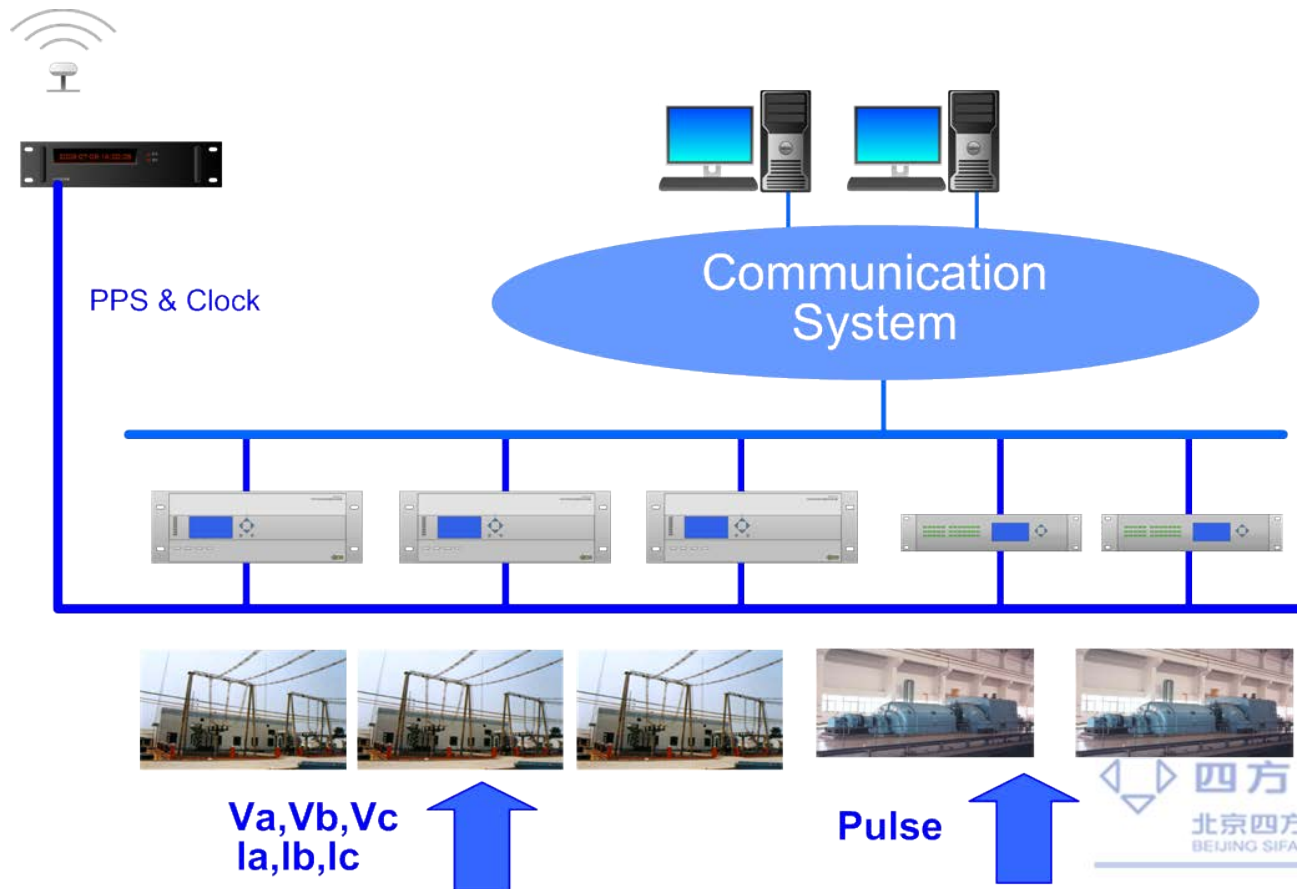
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Current Status of PMU Deployment in China

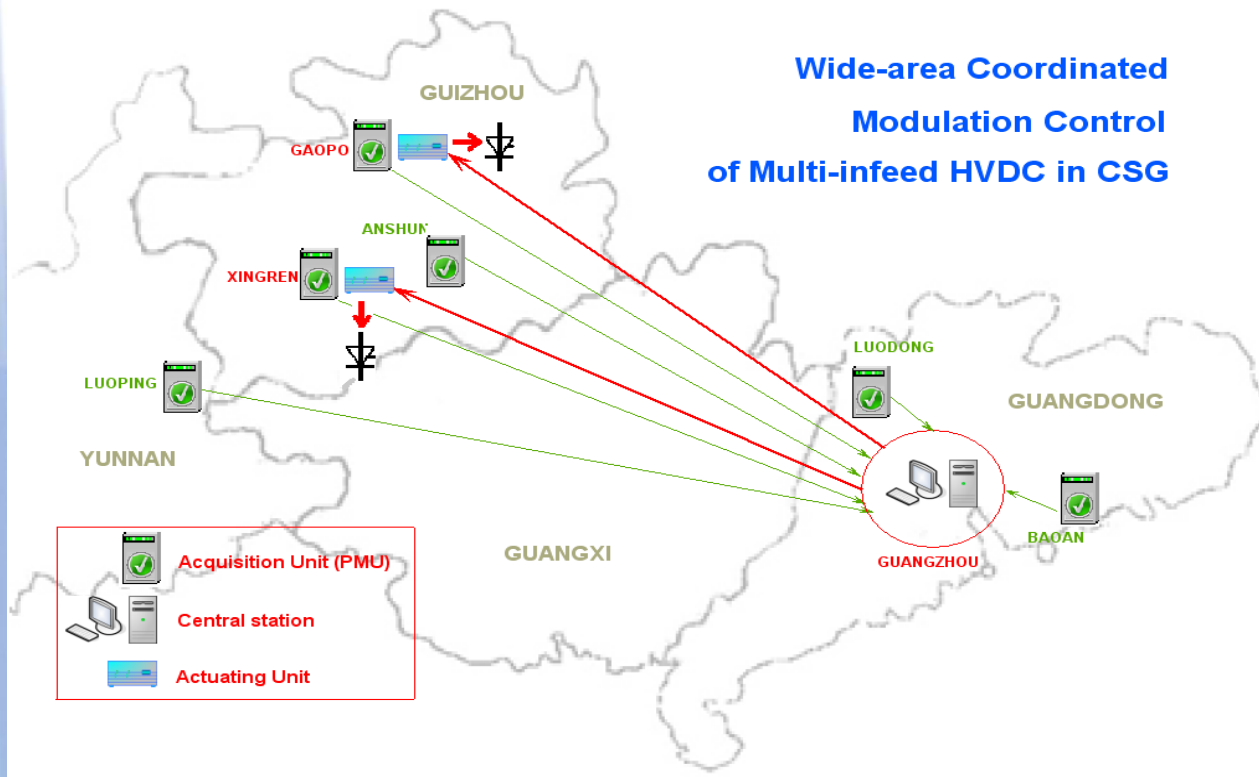
■ For monitoring use

- ◆ Have covered all 500kV and above substation
- ◆ Will be deployed in 220kV level with large scale
- ◆ Required installation for wind farm connected to main grid



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Wide area damping control system in CSG



- Closed loop operation of HVDC modulation damping control
- RTDS test completed for wide area PSS control

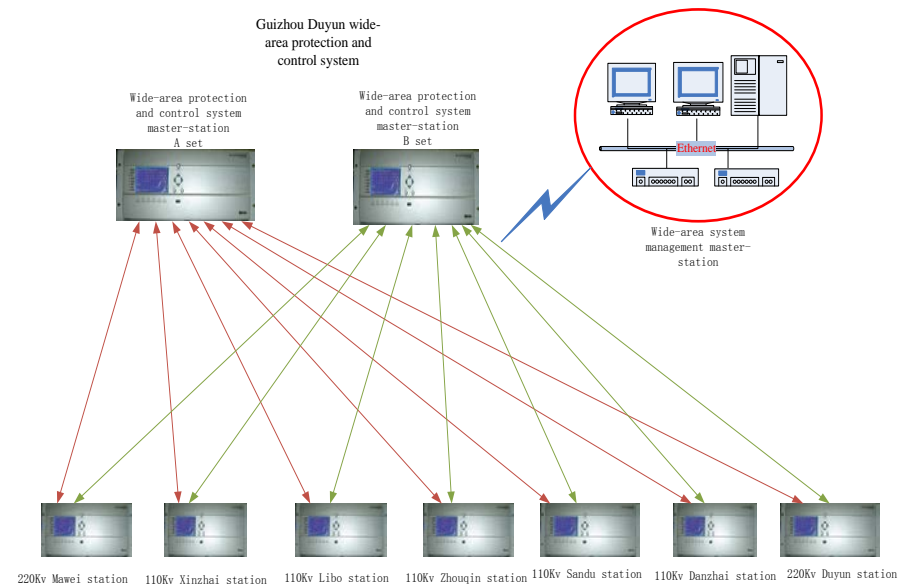
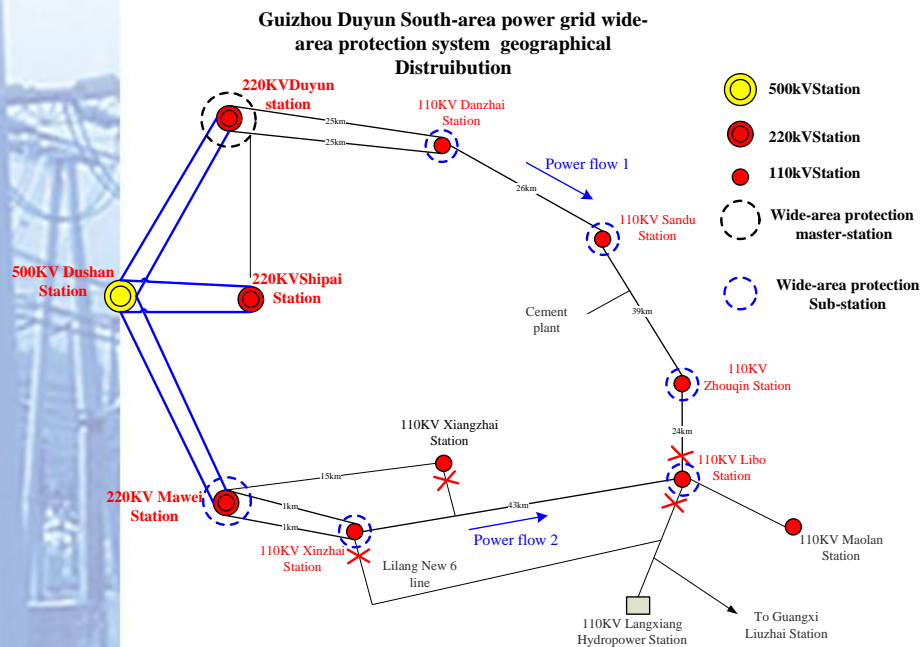


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Guizhou Duyun Wide Area Protection System

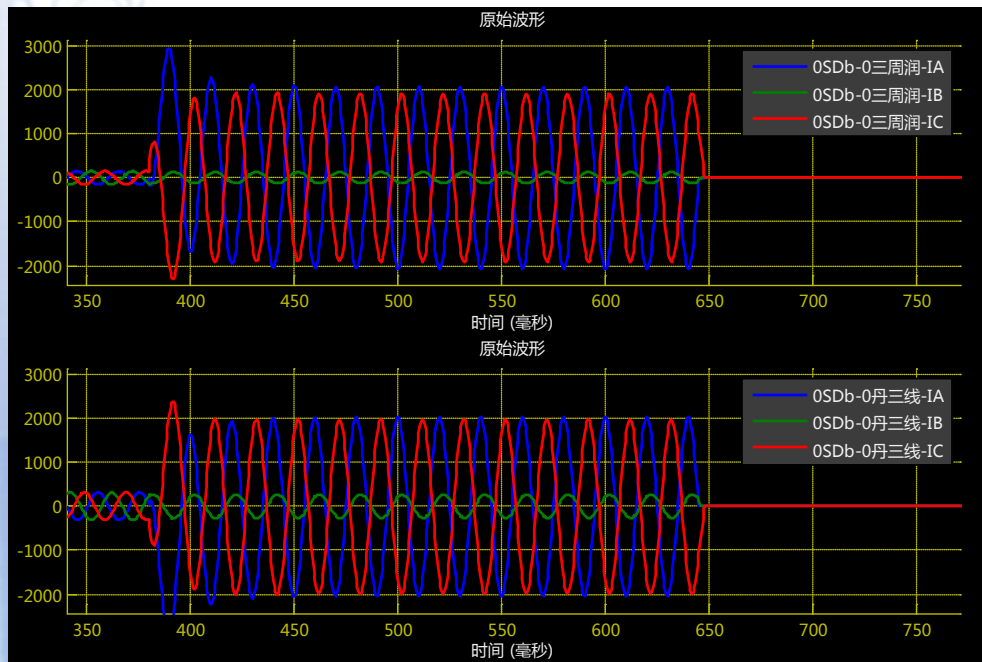
■ **Duplicated Master Station**, located at 220kV Duyun substation

■ **Sub Control Stations** at **two** 220kV and **five** 110kV substations



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RTDS Test for Guizhou Duyun WAP System

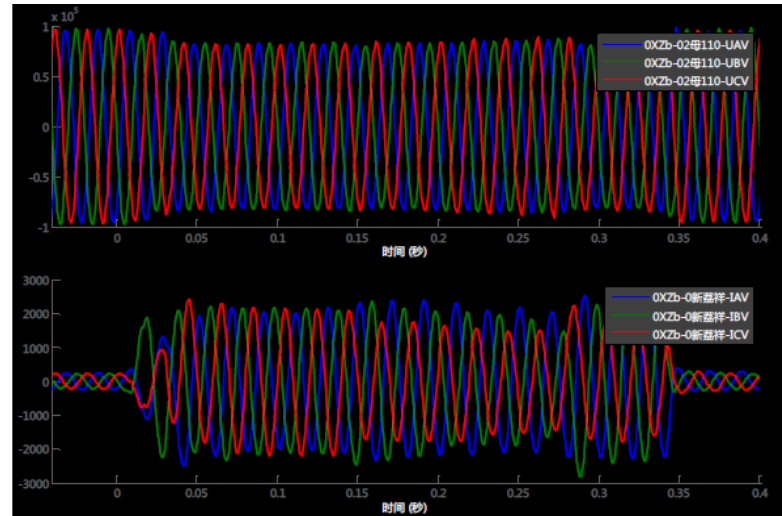


■ Backup protection function

■ For line ground fault and circuit breaker failure case, by conventional Zone 2 relays, the delay for fault clearance is usually **0.5~1.0s**.

■ For above same fault, WAP quickly detects the breaker failure, and after **0.2s** confirmation delay, trips neighbor breakers.

3 phase short circuit fault



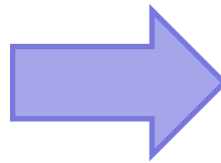
Fault Current

Action of wide area current differential protection



IT Evolution in substation

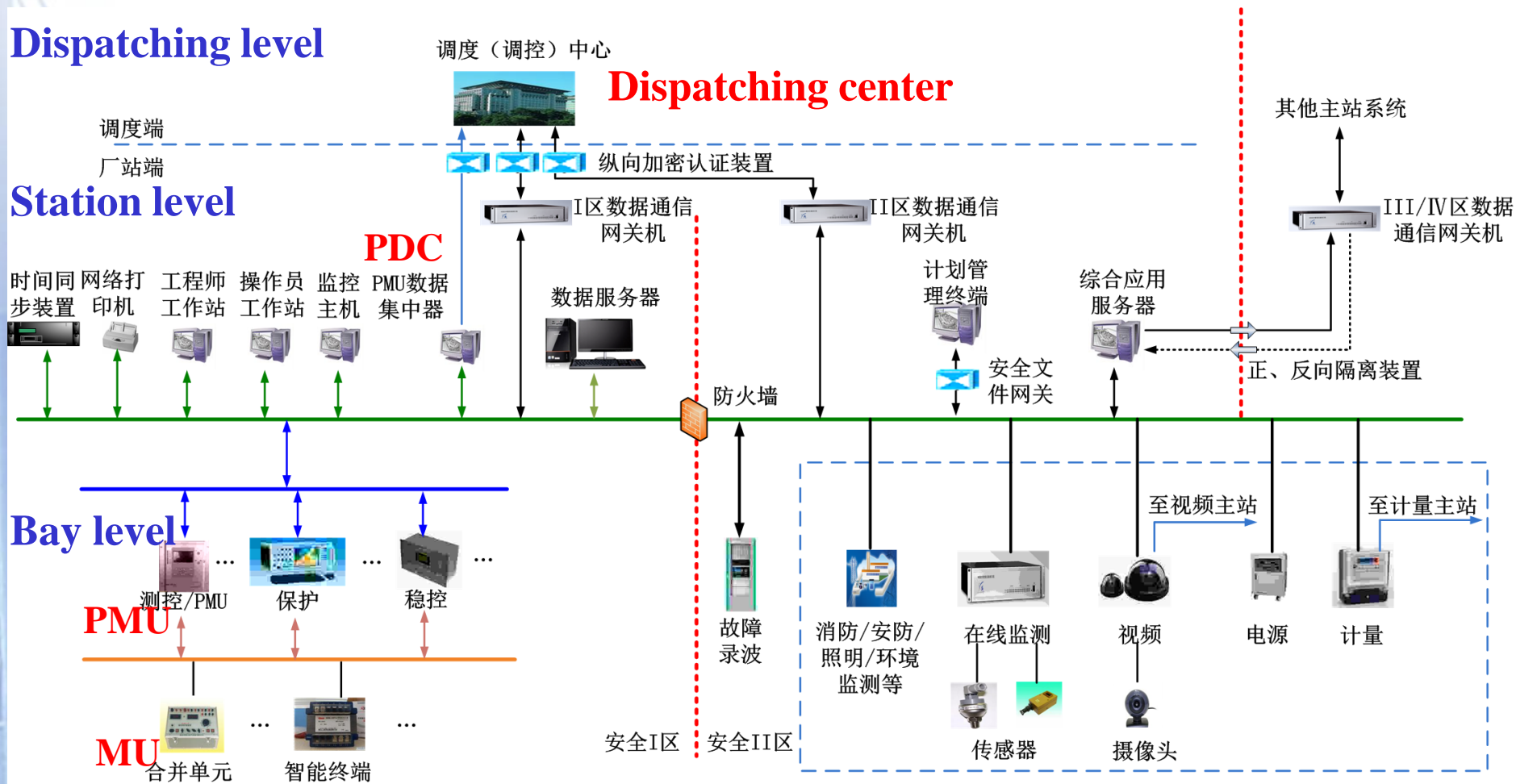
- In China today, all the devices in all 220kV and above substations are microprocessor based, all links between control room and relay room are optical fibers. While links between relay room and switch yard are mainly conventional cables.
- Next steps towards **smart substation**
 - Electronic CTs and PTs;
 - Optical tripping;
 - Adoption of **IEC61850** specification.



Infrastructure of integrated supervision and control system of smart substation

Dispatching level

Station level



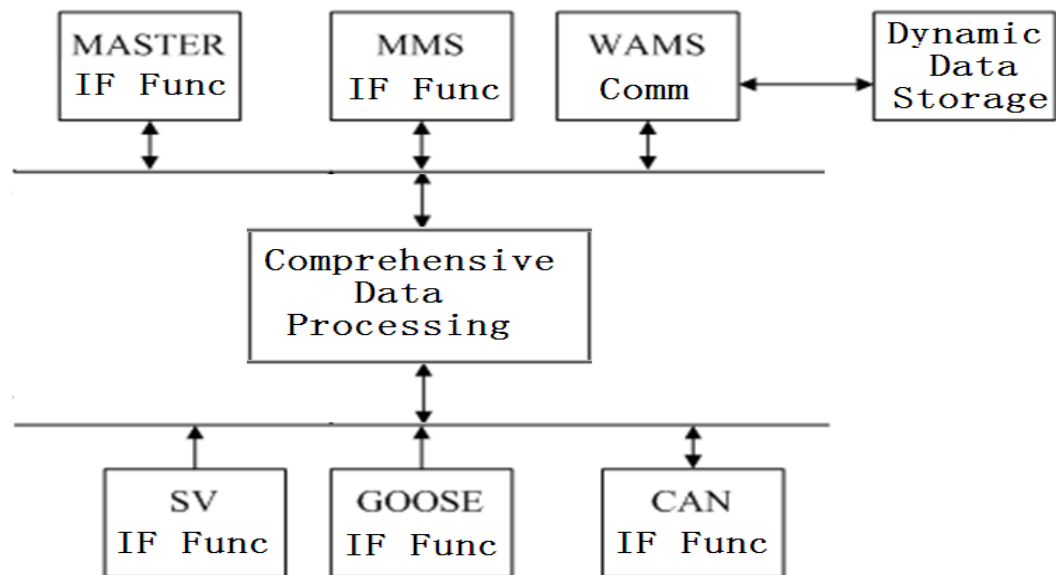
Process level



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Development of Digitalized PMU

PMU interface definition



PMU test platform

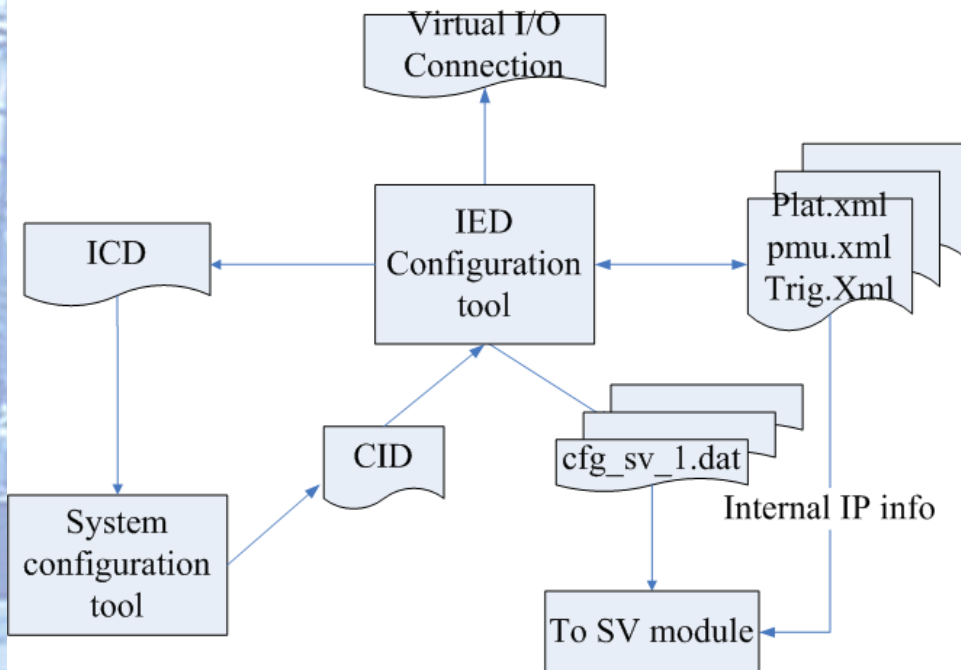


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Application in Changchun South 500kV smart substation

- Phasor calculation and real-time communication to dispatching center
- Under IEC61850, equipment modeling, receiving and processing of SV/GOOSE message, MMS service for sharing data with supervisory devices and other IEDs



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Any Question?

shibonian@sf-auto.com