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The Design of Real-time Communication System Based on RFM and MRG-Realtime for EAST

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For the purpose of keeping a steady-state plasma and avoiding plasma instabilities, EAST plasma control system (PCS) needs more diagnostic data produced by the EAST distributed subsystems to perform complex control algorithms. To solve the transmission problem of the above data, a real-time communication system based on MRG-Realtime (Messaging, RealTime, and Grid) operating system and reflective memory (RFM) network is designed. It is expected to realize that the data acquisition (DAQ) systems of the EAST subsystems can transfer the diagnostic data to PCS in real time through RFM network during capturing data, then PCS uses the available data to carry out the necessary calculations according to control algorithms and sends the commands to the subsystems in every control cycle.
Then a small real-time communication system according to the prototype of the EAST vacuum DAQ system with sampling rate of 10 KHz was built for a performance test. In this test, the vacuum DAQ system transferred the acquired data to PCS in per control cycle of 100 us, which preliminarily meets the above mentioned requirements. The test was performed for 1000s to get a stable and reliable result, which described in detail in the paper. In addition, the future work is also discussed.

Eligible for student paper award?

Yes

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