

Cluster time-scale: distributed time synchronization utilizing atomic clocks in wired and wireless communication networks

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We introduce our research and development project on distributed time synchronization using small atomic clocks and high-precision time comparison, which we call "cluster time-scale", an ensemble time-scale of small atomic clocks in a local network, with the aim of achieving robust and resilient time synchronization. In this R&D project, we aim to generate a maximum likelihood time-scale and high-precision time synchronization in a local wired/wireless network by sharing the time information of communication devices equipped with multiple small atomic clocks. This presentation will focus on the experimental results of an initial study of a distributed time synchronization system using Microchip's chip-scale atomic clock and Orolia's White Rabbit product as a high-precision time comparison device. In addition, the latest research progress will be presented, including an emulation environment for distributed time synchronization using virtual machines built on StarBED, a large-scale network emulation environment, and a time-scale generation algorithm suitable for deploying in communication networks.

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