



## TECHNOLOGY

# The Cyclone Timing Technology

## OVERVIEW

The IEEE 1588 standard defines a protocol for clock synchronization in measurement and control systems communicating by local area networks including but not limited to Ethernet. The protocol enables heterogeneous systems that include clocks of various inherent precision, resolution and stability to synchronize. The IEEE 1588 protocol takes a master-slave approach for clock synchronization where each slave synchronizes its clock with its master.

Researchers at the University of Maryland have come up with an alternative approach to clock synchronization where all nodes can share a notion of common clock in a distributed scheme, and where all nodes are considered peers.

The proposed scheme works by first assuming a local clock model at each node that takes clock offset and drift rate into account. Timestamps are exchanged between neighboring nodes which permit each node to derive a common time base using only its local information. The mathematical basis of the approach comes from linear algebra and is a method which has been used in consensus algorithms.

The initial results have shown that a stable and high degree of clock synchronization can be achieved. The degree of synchronization achieved is affected by perturbations in both i.) The transit time ii.) The clock drift rate, but does not depend on the clock drift rate. We believe that the proposed technique offers several advantages over current master-slave based technique by avoiding a single point of failure and achieving accuracy that does not depend on the actual local clock drift rates. Simulation experiments for different network topologies have also shown the quick convergence of the scheme. Further, the use of only local information makes the scheme highly scalable.

For further information, please contact the Office of Technology Commercialization, (301) 405-3947, E-mail: [otc@umd.edu](mailto:otc@umd.edu).

## CONTACT INFO

UM Ventures  
0134 Lee Building  
7809 Regents Drive  
College Park, MD 20742  
Email: [umdtechtransfer@umd.edu](mailto:umdtechtransfer@umd.edu)  
Phone: (301) 405-3947 | Fax: (301) 314-9502

## Additional Information

### INSTITUTION

University of Maryland, College Park

### PATENT STATUS

Patent(s) pending

## **LICENSE STATUS**

Contact OTC for licensing information

## **CATEGORIES**

- Software + Algorithm
- Information Technology

## **EXTERNAL RESOURCES**

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