

Design of a Network Clock Synchronization Solution Used in Software Monitoring and Control Systems

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Abstract— This paper presents the design and architecture of a computer network clock synchronization software system that is meant to be used inside distributed software monitoring systems. For such type of monitoring system a very important task is to keep all of the clocks of the system's computers synchronized in order to maintain a high consistency for the monitored data and for the issued commands. The proposed system is designed using the client-server architecture with a server component that keeps the system's reference clock and with multiple client components that maintain their local clocks synchronized with the server's clock. The server maintains its clock accurate using a local GPS receiver that sends NMEA 0183 data related to the current GPS clock which is a very accurate one with a drift of nanoseconds each year. The client uses Cristian's clock synchronization algorithm to maintain its clock synchronized with the server's one. The system is designed to allow its users to configure the maximum accepted clock difference between the client and the server and, also to configure, if needed, a time difference to be maintained between these two clocks.