Success Story:

Dayton RTA Implements Accurate System-Wide Time

A Transportation Leader

The Greater Dayton RTA is a public transportation leader, providing nearly 13 million passenger trips per year. More than 4,400 RTA bus stops are located countywide, and 94 percent of Montgomery County residents live within 1/2 mile of an RTA bus stop. The RTA operates 365 days a year, 24 hours a day, with buses running 21 hours a day. It provides a valuable transportation option to the community.

The RTA fleet is comprised of diesel buses, electric trolley buses, Project Mobility vans, Wright Flyer streetcars, the Millennium Trolley, and trams. All RTA vehicles are clean, comfortable, and wheelchair-lift-equipped for riders needing assistance when boarding and exiting.

We offer our users a reliable and easy-to-use service. Our destinations and route signs are easy to read. Major time points are called out by operators or by automatic voice annunciators.

Time – Important for Business

As a public transit company, having correct time is very important for our business. The efficiency of our operation was enhanced through the installation of GPS-enabled digital radio systems on all our buses. The drivers are informed of the correct time by the radio's display terminal. The system also provides real-time information for travelers in major hubs and several popular stops.

Shortly after installing the system, we began to experience some problems. One problem we experienced was due to incorrect time on the dispatch computers. False "adherence warnings" were displayed to the dispatcher – a driver was said to be running "hot," a few minutes ahead, or "cold," a few minutes behind – when the driver was actually right on time.

Another application that requires accurate time is our workforce management software. Our maintenance personnel are union members, so accurate time tracking is essential for tracking payroll according to union rules. A more accurate time-keeping solution was needed.

Our dispatch software vendor offered a proprietary solution. A GPS receiver was connected to a single workstation in one of our dispatch centers. This machine, in turn, transmitted accurate time across the network to servers that were running the Windows® NT time service. To facilitate somewhat accurate time, I used a login script on our domain controllers to set the time on the workstation running our dispatch software when a user logs in. The problem was that not everyone logs out every day. The machines would be accurate for the first few days, then the time would be off by a minute or more. In extreme cases it would be off by 30

to 45 minutes! Reliability is important, as the operation runs 24 hours, 365 days a year. A workaround was devised to set up the machines to run the "NET TIME" command every hour back to the dispatch software servers to make sure the time was as accurate as possible. However, the MIS department would still need to respond to requests to reset the time on workstations and the network.

Then disaster struck. The time source started sending out garbage data, which flooded the Ethernet network and our digital radio network. Our systems pretty much grinded to a halt. After I diagnosed the problem and disabled the system, the problem disappeared, but we were right back where we started without an accurate time source.

The Time Server Solution

For a solution, we turned to Spectracom® Corporation, of Rochester, NY. A Spectracom GPS enabled time server was installed and configured in the spring of 2005. We have not had to worry about time since. The Spectracom system continuously receives a precision time code from the GPS signal and distributes the time over a network using a variety of protocols, including Network Time Protocol (NTP). Using Active directory®, all computers on the network will sync, natively, to the time server via NTP. We are syncing all of our workstations (about 175 of them) and servers (about 25 of them) through our firewall. The time server even provides accurate time to the digital radio system.

We are also using the time server to synchronize a digital wall clock provided by Spectracom. Our staff has always relied on the wall clock to display the time used to schedule meetings and manage breaks. The clock has 4" high digits with green LEDs that are much easier to read than the replaced red LED clock.

Conclusion

A GPS time server from Spectracom offers a source of accurate time that is reliable and easy to set-up. That may not seem like such a big thing, but in our business, inaccurate time can affect thousands of people. If a bus is late, it could mean someone will be late to work or to an appointment. It is important that our dispatch centers have accurate time that matches that of our buses. That way we can make doubly sure we have accurate information when a route is truly running fast or slow. We can also determine how a route would be affected by an accident or breakdown. The time server saves us a lot of time and energy in trying to set up workarounds to make sure every workstation has accurate time. Instead of syncing on login or on a schedule through "Scheduled Tasks," Active Directory tells the computers to sync several times per day to the time server.

Accurate Time and the GPS System

The Global Positioning System (also called NAVSTAR) includes 24 satellites, each with three or four onboard precision atomic clocks. The US Naval Observatory monitors each satellite's clocks and sends control signals to ensure they are synchronized to the national and international time standard known as Coordinated Universal Time (UTC).

The most prevalent use of GPS is for location. Dayton RTA uses GPS-enabled digital radio to determine bus location relative to a schedule. These systems use the precision timing signal from the satellites and the principal of triangulation to calculate position anywhere on earth. Spectracom® time servers use the same signal from up to 12 satellites, for error checking, to provide reliable, accurate, and secure time across vital communications and data networks.