

Western tackling embedded systems

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Everyone has heard of Y2K—the date-related problem that, when 2000 rolls around, will cause some computers to misinterpret the new century as 1900. The immensity of the problem looms large when we consider how computer-dependent our society and our personal lives have become. But how will the stroke of midnight make these systems see cross-eyed?

Embedded systems

Much of the answer involves "embedded systems." According to EPRI, the science and technology organization for the energy industry, an embedded system is a device or combination of devices that contain "dedicated computers" as controllers and calculating elements. In less technical terms, they are the "computer chips" that perform specific tasks. Such tasks could be very complex, like the flight-control system of a Boeing 777—or as simple as the microprocessor that controls your lawn sprinkler system. And they are found almost everywhere.

How do these embedded systems become confused, and why? It has to do with how the systems tell time. Some software applications and operating systems determine date and time using an arbitrarily determined "epoch" date and a counter. The counter is incremented periodically, typically once a second, and represents the number of seconds from the epoch date. A software "thought process" called an algorithm is then used to calculate the current date and time using the epoch date and the counter contents. Eventually the counter reaches the highest number it can and, like the odometer on an automobile, rolls over to all zeros.

If software hasn't been programmed to expect this rollover and interpret it properly, the date and time start over again at the epoch date. This rollover can occur before or after midnight Dec. 31, 1999, depending on the epoch date, size of the counter and how frequently the counter is incremented.

Typically the two dates and times are seconds or minutes apart, but immediately

after rollover (one time is before rollover, the other after), they will be years apart. How this is interpreted by the system depends on how the application was programmed.

Impacts to Western

Embedded systems are found throughout Western operations; however, the systems most critical to Western's mission involve power system operations. Power operation equipment with embedded systems can be lumped into three categories: relays, telecommunication and controls. Losing the function of any of these could impact transmission and reliability.

What is Western doing about the problem?

Western became aware of the embedded system problem in 1997. In 1998 Western began monthly agencywide video conferences to discuss test procedures and testing status. Today, all equipment that could potentially have a Y2K problem has been identified. All Western regions will have completed or nearly completed testing or have vendor compliance certification in hand by March 31, 1999. An embedded systems database maintained by CPO is being used to coordinate the embedded systems testing. Western is also working on remediation (fixing, upgrading or replacing) and implementation, which will take longer to complete, but which will be finished well before Dec. 31, 1999.

What will happen on the Y2K rollover?

No one is completely sure. The testing conducted to date has found no real "show-stoppers." As dedicated Western crews test, remediate and implement Y2K compliance changes, our readiness levels increase. And just in case something is missed, the regions and CSO have developed detailed contingency plans to deal with potential failures at all levels of operations. Given all this preparation, we expect our system to operate and the lights to stay on. ☛