**Critical Process Monitor**

Maximize mean time between failure and reduce mean time to repair using the QNX® Critical Process Monitor Kit. With the kit, you can create custom high availability (HA) configurations based on your system requirements. Develop self-healing network elements, construct failure-recovery scenarios, and add advanced features such as heartbeat services, instant reconnections, and post-mortem analysis.

### Solution Highlights

- Create self-healing systems using the fault-resilient critical process monitor
- Detect faults before they become unrecoverable, through heartbeating mechanisms
- Design failure recovery scenarios that meet the requirements of your system
- Reconnect components instantly and transparently to minimize failure impact
- Perform regression testing and post-mortem analysis to quickly pinpoint errors

### Fault-resilient Watchdog

Build fault-resilient HA systems using a key component of the kit, the critical process monitor (CPM). A “smart watchdog” that continually monitors system services, the CPM can even completely reconstruct its own state should it stop abnormally. Backed by a mirror guardian process, the CPM provides the foundation for a truly self-healing process-monitoring system.

### Instant Fault Notification

Design your HA system to detect faults before they escalate to an unrecoverable state. The CPM provides heartbeating mechanisms to allow monitoring of the progress of drivers, system processes, and other components. Once the CPM detects certain conditions or faults, it automatically activates an alarm, sending notification of component failure.

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**Figure 1: Critical Process Monitor Architecture**

When the CPM detects component failures, it notifies the system and manages recovery. Together with its backup “guardian” process, the CPM provides the basis for self-healing systems.
Critical Process Monitor Kit

Customized Failure Recovery
Construct custom failure-recovery scenarios according to the needs of your application. Applications can automatically select failure conditions (events) and specify actions to be performed when these conditions occur (e.g. notification to processes that have subscribed to particular events).

Automatic Reconnection
Minimize the impact of component failures by making reconnection virtually transparent. You can design your HA system to quickly re-establish broken connections when components go down — so fast, in fact, that the connections themselves won’t even know that a failure occurred.

Post-mortem Analysis
Simplify the debugging and testing phases of your HA system development. The kit provides tools for regression testing HA components and enables the generation of a core file on crash for postmortem debugging, allowing you to quickly pinpoint and correct memory violations and other error conditions.

What’s in the Kit
- Critical process monitor API — Provides a simple mechanism to talk to the CPM. Implemented as a thread-safe library, the API interacts with the CPM to begin monitoring processes and set up the various conditions (e.g. the death of a server) that will trigger certain recovery actions.
- Client recovery library — Offers a drop-in enhancement solution for many standard libc I/O operations. The CPM library’s cover functions provide automatic recovery mechanisms for failed connections that can be recovered from in an HA scenario.
- Source code — Full source is included for the following:
  - Critical process monitor and the Guardian processes
  - Critical process monitor API functions
  - Client covers and convenience functions
  - Regression test programs
  - Sample code listings (and source)

System Requirements
- QNX Momentics® Development Suite Professional Edition (PE) v6.3 (development)
- QNX Neutrino® RTOS v6.3 (runtime)

About QNX Software Systems
Founded in 1980, QNX Software Systems is the industry leader in realtime, microkernel OS technology. The inherent reliability, scalable architecture, and proven performance of the QNX Neutrino RTOS make it the most trusted foundation for future-ready applications in the networking, automotive, medical, and industrial automation markets. Companies worldwide like Cisco, Ford, Johnson Controls, Siemens, and Texaco depend on QNX technology for their mission- and life-critical applications. Headquartered in Ottawa, Canada, QNX Software Systems maintains offices in North America, Europe, and Asia, and distributes its products in more than 100 countries worldwide.

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