HPE iLO NMI Watchdog Driver
for iLO based ProLiant Servers

Last reviewed: 08/20/2018

The HPE iLO NMI Watchdog driver is a kernel module that provides basic watchdog functionality and handler for the iLO "Generate NMI to System" virtual button.

All references to iLO in this document imply it also works on iLO2 and all subsequent generations.

Watchdog functionality is enabled like any other common watchdog driver. That is, an application needs to be started that kicks off the watchdog timer. A basic application exists in tools/testing/selftests/watchdog/ named watchdog-test.c. Simply compile the C file and kick it off. If the system gets into a bad state and hangs, the HPE ProLiant iLO timer register will not be updated in a timely fashion and a hardware system reset (also known as an Automatic Server Recovery (ASR)) event will occur.

The hpwdt driver also has the following module parameters:

soft_margin	allows the user to set the watchdog timer value. Default value is 30 seconds.
timeout	an alias of soft_margin.
pretimeout	allows the user to set the watchdog pretimeout value. This is the number of seconds before timeout when an NMI is delivered to the system. Setting the value to zero disables the pretimeout NMI. Default value is 9 seconds.
nowayout	basic watchdog parameter that does not allow the timer to be restarted or an impending ASR to be escaped. Default value is set when compiling the kernel. If it is set to "Y", then there is no way of disabling the watchdog once it has been started.
kdumptimeout	Minimum timeout in seconds to apply upon receipt of an NMI before calling panic. (-1) disables the watchdog. When value is > 0, the timer is reprogrammed with the greater of value or current timeout value.

NOTE:
> More information about watchdog drivers in general, including the ioctl interface to /dev/watchdog can be found in Documentation/watchdog/watchdog-api.rst and Documentation/IPMI.txt.

Due to limitations in the iLO hardware, the NMI pretimeout if enabled, can only be set to 9 seconds. Attempts to set pretimeout to other non-zero values will be rounded, possibly to zero. Users should verify the pretimeout value after attempting to set pretimeout or timeout.

Upon receipt of an NMI from the iLO, the hpwdt driver will initiate a panic. This is to allow for a crash dump to be collected. It is incumbent upon the user to have properly configured the system for kdump.

The default Linux kernel behavior upon panic is to print a kernel tombstone and loop forever. This is generally not what a watchdog user wants.

For those wishing to learn more please see:
> Documentation/admin-guide/kdump/kdump.rst Documentation/admin-guide/kernel-parameters.txt (panic=) Your Linux Distribution specific documentation.

If the hpwdt does not receive the NMI associated with an expiring timer, the iLO will proceed to reset the system at timeout if the timer hasn't been updated.

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The HPE iLO NMI Watchdog Driver and documentation were originally developed by Tom Mingarelli.