



# **Low Latency/Jitter Optimization**

## **User's Guide**

Revision 2.0a

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# Introduction

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These instructions are optimized for the SYS-1028-UX-CR-LL1/2 and SYS-6027AX-72RF/TRF-HFT1/2/3 systems using Mellanox MCX354A cards. Steps may vary depending on SW application requirements and operating system.

## 1.1 OS Optimizations

1. Fresh, minimal OS install of either RHEL 6.x/SL.
2. Kernel boot command line options: `intel_idle.max_cstate=0 processor.max_cstate=0 idle=poll pcie_aspm=performance mce=ignore_ce ipmi_si.force_kipmi=0 nmi_watchdog=0 noht nosoftlockup isolcpus=x,x` (isolcpus option not required if using tuna to isolate CPU cores)
3. Disable all unnecessary services using `CHKCONFIG` command.
4. Install `cpupower`, `tuned`, `tuna`, and `numactl` utilities.
5. Run the following commands to tune your system before running your application. It is best to script the following commands for ease of execution.
  - a. `Modprobe acpi-cpufreq`
  - b. `cpupower set -b 0`
  - c. `cpupower frequency-set --governor performance`
  - d. `tuned-adm profile latency-performance`
  - e. `tuna -S1 --i`
  - f. Use of `taskset` or `numactl` to bind application to specific CPU cores

## 1.2 BIOS/IPMI Optimizations

1. Set PCIe transfer buffer for “Maximum Payload” and “Maximum Read Request” according to maximum message size to be sent, preferably 256K and 512K for 64 byte message sizes.
2. Set IPMI fan speed to FULL.
3. Disabling unused devices such as USB controllers and SCU controller (PCH chipset’s storage controller) can help reduce system interrupts.

## 1.3 Reading the CPU Frequency in Linux

To check the CPU frequency consistency in a Linux environment, use the “`turbostat -i 1`” command.

Note: For a bug fix relating to register `/dev/cpu/0/msr offset 0x641 read failed`, please reference to <https://rhn.redhat.com/errata/RHBA-2014-0484.html>.