Hyper-Threading

OPERATING SYSTEMS PROJECT ABSTRACT

* HIRAL PANCHAL (121017)
* NISHANSHI SHUKLA (121030)

Hyper threading technology was first introduced and implemented by Intel processor. It allows a single physical processor core to behave like two logical processors, i.e. the processor is enabled to run two independent applications at the same time.

The physical execution resources are shared and the architecture state is duplicated for the two logical processors. This means that the operating system and the user programs are equipped to schedule processes or threads to logical processors like on multiple physical processors. Also, the instructions from both logical processors will execute simultaneously on shared execution resources.

When hyper threading is applied the processor’s core executes two concurrent threads of instructions. Having two streams of execution allows more work to be done by the processor during each clock cycle. To the operating system, the processor with hyper threading appears like two separate processors, so the operating system is known as symmetric multiprocessing (SMP). It is useful for operating systems where multiple tasks are needed to be scheduled such that the processor remains idle for no time. In hyper threading, two different threads of two different applications can be executed together, but it is not possible to simultaneously execute two different threads of same application or two threads requiring same resource.

While hyper threading does not double the performance of a system, it can increase performance by better utilizing idle resources leading to greater throughput for certain important workload types. An application running on one logical processor of a busy core can expect slightly more than half of the throughput that it obtains while running alone on a non-hyper threaded processor. Hyper threading performance improvements are highly application-dependent, and some applications might see performance degradation with hyper threading because many processor resources are shared between logical processors.

Hyper threading technology offers improved overall system performance, increased number of users a platform can support, improved reaction and response time because tasks can be run on separate threads and increased number of transaction that can be executed.

In this project we look forward to implement hyper threading mechanism in linux operating system and execute many kernel level threads simultaneously.