MULTITHREADING

using multiple threads to hide pipeline and memory latencies

multithroading. - primary technique for exposing more parallelism to hardware.

multiple threads to shave the functional units.

of a single processor in an overlapping fashion. (LP

has a great advantage is it is reasonable transparent to

programmer.

multithreading does not duplicate the entire processor multithreading shows must of the processor core among a set of threads duplicating only private state such as registers and PC.

on a single chip and provide multithreading an

hardware must appoint the abolity to charge to a different thread relatively quickly. (thread switching shooted be faster than process switching), amount should be more efficient than process switching.

3 maln hardware approaches to multi-threading.



6 coarse grained mothsthreading.

6 coarse grained multithreading.

6 simultaneous multithreading.

FINE GRAINED MULTITHREADING

ct switches throughput losses that arise from both short

and long stells,

- it slows down the execution of individual threads

thread switch takes place only on costly stalls, us

likely to slow down the execution of any thread.

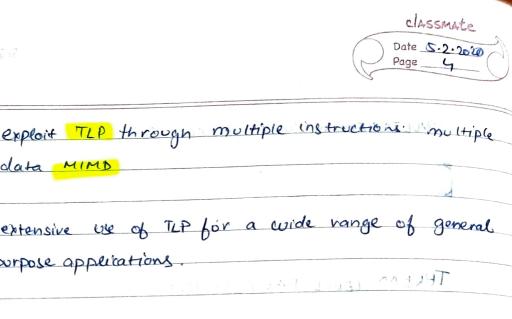
it is limited in its ability to overcome throughput

the most common implementation of multithreading is called simultaneous multithreading SMT.

losses especially from shorter stalls.

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	THREAD LEVEL PAR ALELLISM
	increased importance of multiprocessing
	- the dramatically lower efficiencies in silicon and
j. J	energy use that were encountered in 2002 - 2005.
olivi.	designer attempted to find and exploit more ILP.
	and sessaas beams more important
	- growth in data chansive applications is driven by
	massive amounts of data on the internet.
	- the haddelpt old of the
s 61	- the insight that increasing performance on the desktop
	is less important. highly compute data intensive application are being run on the cloud.
	- an improved understanding of how to use multiprocessors
	effecti vely.

replication rather than by unique design.



data MIMD extensive we of TLP for a wide range of general purpose appelications

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MULTIPROCESSORS.

they are tightly coupled processors and there would be a single of and they will have a shared memory,

the tightly coupled seet of threads nollaborating on

a form of request level parallelism can be executed

an single task - parallel processing,

multicomputescs are less tightly coupled than multiprocessor.

Cin general they will ron on multicomputer systems).