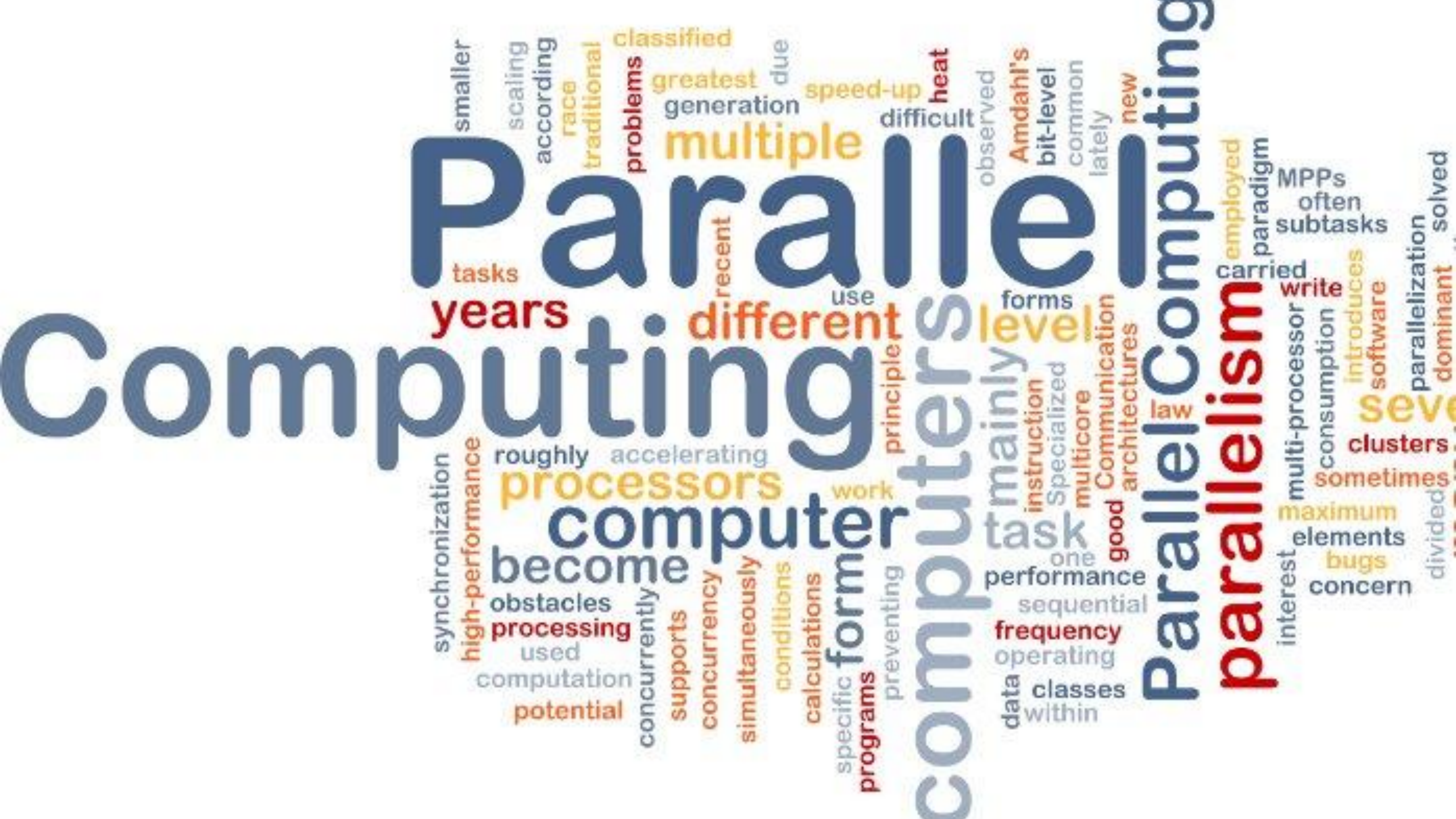
Parallel
Computing
Parallel Computing
computers
parallelism
computer
processors
become
multiple
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level
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generation
speed-up
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Amdahl's
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MPPs
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subtasks
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parallelization
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introduces
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multi-processor
consumption
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maximum
elements
bugs
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divided
interest
tasks
recent
use
forms
Communication
architectures
law
principle
instruction
Specialized
multicore
good
one
performance
sequential
frequency
operating
classes
within
data
roughly
accelerating
work
synchronization
high-performance
obstacles
processing
used
computation
potential
concurrently
supports
concurrency
simultaneously
conditions
calculations
specific
programs
preventing

WHAT IS PARALLEL COMPUTING?

- ***PARALLEL COMPUTING*** IS THE SIMULTANEOUS USE OF MULTIPLE COMPUTE RESOURCES TO SOLVE A COMPUTATIONAL PROBLEM: A PROBLEM IS BROKEN INTO DISCRETE PARTS THAT CAN BE SOLVED CONCURRENTLY
- EACH PART IS FURTHER BROKEN DOWN TO A SERIES OF INSTRUCTIONS
- INSTRUCTIONS FROM EACH PART EXECUTE SIMULTANEOUSLY ON DIFFERENT PROCESSORS
- AN OVERALL CONTROL/COORDINATION MECHANISM IS EMPLOYED

IBM's Blue Gene/P massively parallel supercomputer

Types of Parallel Computing:

There are several Types of Parallel Computing which are used World wide.

1) Bit-level Parallelism.
2) Instruction level Parallelism.
3) Task Parallelism.

Bit Level Parallelism:

It is a form of parallelism which is based on increasing processors word size. It shortens the no. of instructions that the system must run in order to perform a task on variables which are greater in size.

Instruction Level Parallelism:

It is a form of parallel computing in which we can calculate the amount of operation carried out by an operating system at same time. For example

1. Instruction pipelining.
2. Out of order execution.
3. Register renaming.
4. Speculative execution.
5. Branch prediction.

Task Parallelism:

Task Parallelism is a form of parallelization in which different processors run the program among different codes of distribution. It is also called as Function Parallelism.

The advantages of parallel computing

- Parallel computing offers the possibility of overcoming such physical limits by solving problems in parallel.
- In principle, thousands, even millions of processors can be used to solve a problem in parallel and today's fastest parallel computers have already reached teraflop speeds.
- Today's microprocessors are already using several parallel processing techniques like instruction level parallelism, pipelined instruction fetching etc.
- Intel uses hyper threading in Pentium IV mainly because the processor is clocked at 3 GHz, but the memory bus operates only at about 400-800 MHz.