

# IBM® System Blue Gene®/P Solution



The IBM® Blue Gene®/P Solution is the second generation machine in IBM's Blue Gene program. It adheres to the key design strategies of the Blue Gene program, enabling petaflop scale performance in a package that is efficient in term of power, cooling and floor space, thereby helping reduce the total cost of ownership. Compared to Blue Gene/L, its predecessor, Blue Gene/P extends performance through a doubling of processor cores and a frequency increase, and adds 4-way SMP functionality, hardware DMA, 10 Gb Ethernet, and aggressive power management. Blue Gene/P provides a standard programming environment and supports a wide range of IBM and open source software libraries and middleware.

Blue Gene customers note that time-to-solution for many applications has been reduced by orders of magnitude. Scientists can make new runs more often allowing them to explore alternative models and approaches to problems. Blue Gene is making a demonstrable change in the way science can be done.

Blue Gene/P delivers more than ultrascale performance. Because of unique design points that allow dense packaging of processors, memory and interconnects, Blue Gene/P offers efficiency in the areas of power, cooling, and floor space consumption.

Available in configurations ranging from one to 256 racks, Blue Gene/P is the innovative new solution from IBM to further help expand the limits of breakthrough science without sacrificing efficiency.

Many universities and government research labs have deployed Blue Gene for computational studies in weapons research, radio astronomy, climate research, petroleum exploration and production, and drug development.

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## Highlights

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- ***Extends the capabilities of the IBM® Blue Gene® Solution to drive innovation, competitive advantage, and to further enable scientific breakthroughs***
- ***Positioned for workloads where technologies cannot be constructed to handle the workload***
- ***Architecture enables the customer to efficiently manage power, cooling, and space challenges***

| Attribute                      | Details  | Benefits   |
|--------------------------------|--|--|
| Processor                      | IBM® PowerPC® 450 850 MHz; four per node   | Low power allows dense packaging; optimize processor-memory balance  |
| Memory                         | 2 GB SDRAM-DDR per node (Model 0206-850)   | Wider application reach  |
| Networks                       | 3D Torus – 5.1 GB/s; 3.5 usec latency (MPI point to point between nearest neighbors)<br>Collective Network – 1.7 GB/s per port; There are three ports per chip for the collective network; 2.5 usec latency<br>Global Barrier/Interrupt<br>Optical 10 Gigabit Ethernet (machine control and outside connectivity)<br>GB Control Network (system boot, debug, monitoring) | Special networks speed up internode communications; designed for MPI programming constructs; improve systems management  |
| Compute Nodes                  | Quad SMP processor chip; 1024 per rack   | Double FPU improves performance and increases application portfolio  |
| I/O Nodes (10GbE)              | Quad SMP processor. Configurable from 8 to 64 per rack. 8 is the default configuration   | Increases relative I/O performance   |
| Operating Systems              | Compute Node – Lightweight proprietary kernel<br>I/O Node – Linux® operating system<br>Front End and Service Nodes – SUSE LINUX SLES 10  | Kernel tailored to processor design; industry-standard distribution preserves familiarity to end user and administrators |
| Performance                    | Peak per rack – 13.9 teraflops   | Highest available performance benefits capability customers  |
| Power                          | 40 kW power consumption per rack (maximum)<br>200-240 VAC 3-phase; 175 amp service per rack  | Low power draw enables dense packaging, helps reliability and helps reduce costs   |
| Cooling                        | Air conditioning ~13 tons/rack (minimum)   | Low cooling requirements enable extreme scale-up   |
| Dimensions (includes air duct) | Height–1956 mm Width–1220 mm Depth–966 mm<br>Weight–782 Kg Service clearance–914 mm<br>Raised floor height –40.64 cm (minimum) 121.92 cm (recommended)   | Design allows dense floor layout for optimum floor space utilization   |

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