Supercomputer: Frontier

- **Country:** United States
- **Manufacturer:** Hewlett Packard Enterprise (HPE) & Oak Ridge National Laboratory (ORNL)
- **Performance:** 1.194 exaflops (1,194 petaflops)
- **Usage:**

Frontier is the world's first officially recognized exascale supercomputer, meaning it can perform more than one exaflop (one quintillion floating-point operations per second). Developed by Hewlett Packard Enterprise in collaboration with Oak Ridge National Laboratory, Frontier became the fastest supercomputer in the world when it was ranked first on the **TOP500** list in 2022.

Frontier is designed to push the boundaries of computational science by providing researchers with unprecedented processing power. It is used for a variety of applications, including artificial intelligence, machine learning, materials science, quantum mechanics, nuclear simulations, and healthcare research. One of its key contributions is in climate modeling, where it helps scientists simulate and predict climate patterns with higher accuracy. This is essential for understanding climate change and developing strategies to mitigate its effects.

In addition, Frontier plays a crucial role in drug discovery and medical research. By simulating complex biological processes, it accelerates the development of new medicines and treatments. The supercomputer is also instrumental in nuclear research, where it helps scientists conduct virtual experiments on nuclear reactions and energy production.

Frontier's massive computational power is made possible by its **AMD EPYC** processors and **AMD Instinct GPUs**, which enable it to perform at extreme efficiency. With its cutting-edge architecture, Frontier is expected to drive groundbreaking scientific discoveries for years to come.

- **References:**

- **Oak Ridge National Laboratory.** *Frontier Supercomputer.* **Available at:** https://www.olcf.ornl.gov/frontier
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- **Wikipedia.** *Frontier (Supercomputer).* **Available at:** https://en.wikipedia.org/wiki/Frontier_(supercomputer)
- **IEEE Spectrum.** *The Beating Heart of the World's First Exascale Supercomputer.* **Available at:** https://spectrum.ieee.org/frontier-exascale-supercomputer
- **FedScoop.** *Department of Energy Ready to Use Frontier Supercomputer to Solve Complex Problems.* **Available at**: https://fedscoop.com/exascale-computing-project-frontier-24-problems.

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