

MEET FRONTIER

Oak Ridge National Lab's new supercomputer for the exascale era

Oak Ridge's new exascale supercomputer will be able to perform **1.5 quintillion operations per second**—the equivalent of solving 1.5 quintillion difficult math problems every second.¹ The supercomputer—named Frontier—will support a wide range of scientific applications for advanced modeling and simulation, application of high-performance data analytics, and artificial intelligence to advance scientific knowledge. The exascale-capable hardware required to deliver this performance is massive.



**HOW BIG IS A QUINTILLION?
IT'S A BILLION BILLION
EQUAL TO THE WIDTH OF THE²
MILKY WAY GALAXY
IN KILOMETERS**

1,000,000,000,000,000,000

BANDWIDTH

The network bandwidth of the Frontier system is 2,800,000X greater than the top home internet connection.

With it, you could download



100,000
HD MOVIES IN
ONE SECOND^{3, 4}

SIZE

Frontier will cover over 7,300 square feet

That's almost

2

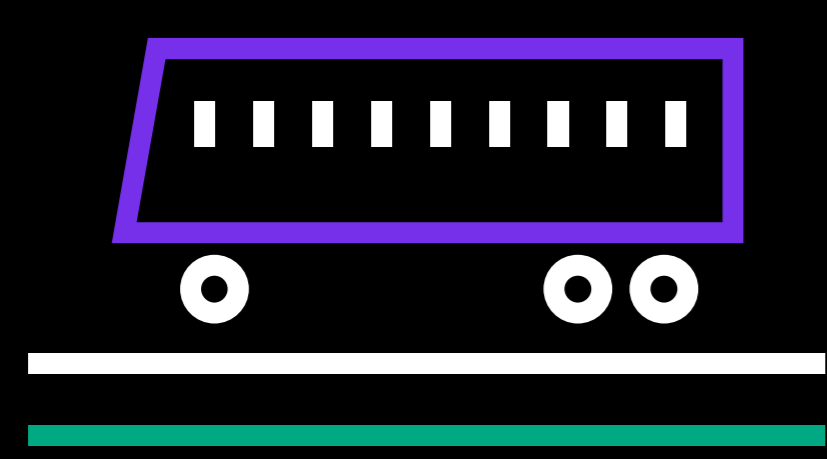
BASKETBALL
COURTS



WEIGHT⁵

IT TAKES MORE THAN

35
SCHOOL BUSES
TO EQUAL THE WEIGHT OF
FRONTIER



HORSEPOWER



Frontier will have the performance of the

TOP 100 fastest supercomputers
in the world **COMBINED⁶**

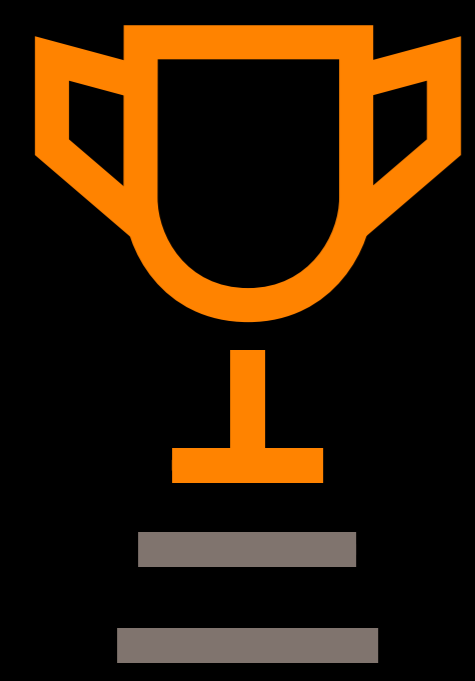
CABLING

THE 90 MILES OF CABLES
IN THE FRONTIER SYSTEM

would span the distance from Philadelphia to New York City



COOLING

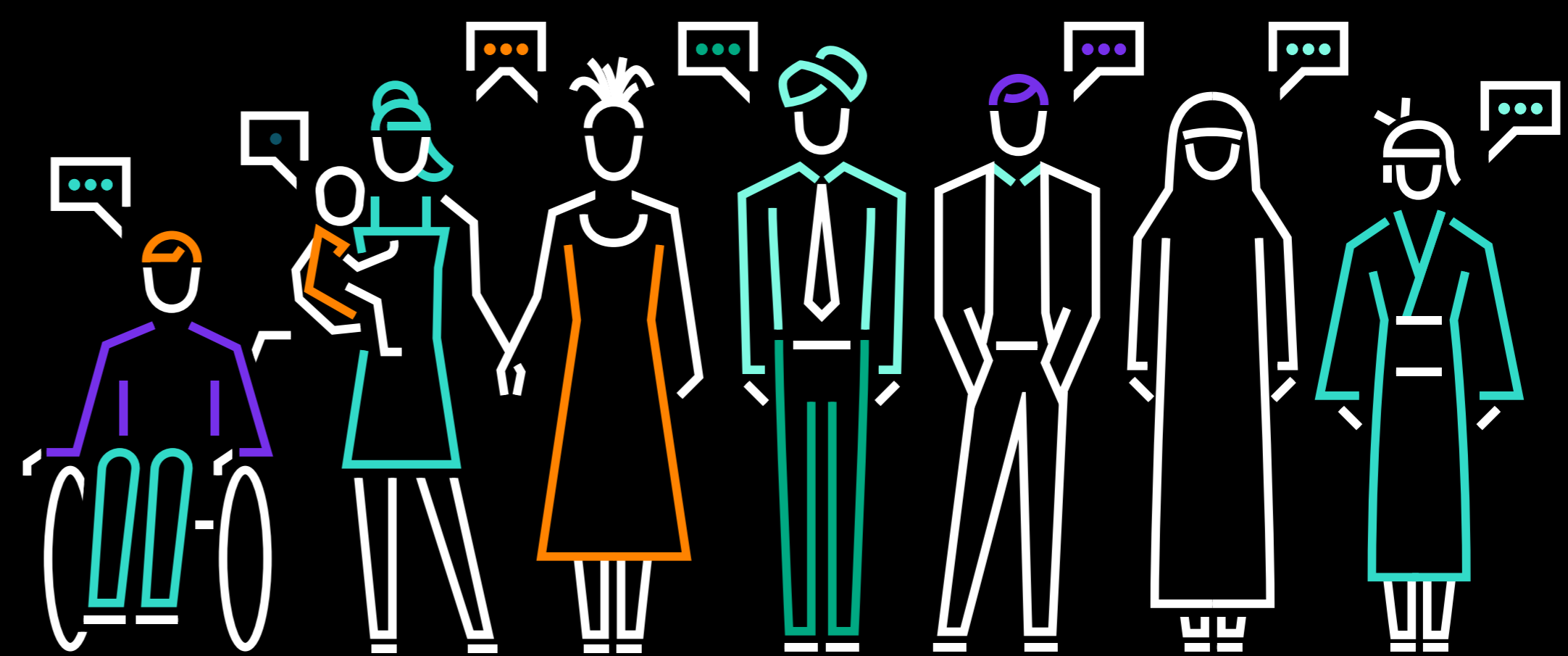


Frontier circulates **5,900** GALLONS PER MINUTE of water flow through its cooling infrastructure, which could fill an Olympic-sized pool in less than two hours⁷

SPEED

If all 7.7 billion people on earth each completed one calculation per second, it would take over

6 YEARS
to do what the Frontier system can do in
1 SECOND



¹ energy.gov/articles/us-department-energy-and-cray-deliver-record-setting-frontier-supercomputer-ornl

² imagine.gsfc.nasa.gov/features/cosmic/milkyway_info.html

³ Used 100 megabit/sec as top home internet connection speed

⁴ Used 4.5 GB as typical HD movie size

⁵ Assumed 29,500 lbs. for a school bus

⁶ Based on June 2020 Top500 Supercomputing List top500.org

⁷ Assuming 660,000 gallons as average for Olympic swimming pool

LEARN MORE AT
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