With a successfully installed CoolIT Systems Rack DLC solution, Frontera draws on the power of over 16,000 processors and 448,448 cores spread over 8,008 compute nodes to achieve a peak performance of 38.7 PetaFLOPS. According to TACC, to match what Frontera can compute in just one second, a person would have to perform one calculation every second for about a billion years.

This peak performance will help researchers blaze new paths to discovery in virtually all fields of science, from astrophysics to zoology. Some of the initial projects running on Frontera are focused on understanding the influence of distant stars, eradicating emerging viruses, diagnosing and treating brain tumors, and creating a new generation of flexible solar photovoltaics.

"Without Direct Liquid Cooling and the resulting performance increases, Frontera would not have been able to achieve the #5 ranking on the Top 500 list."

-Nathaniel Mendoza, Manager, Networking, Security & Operations, Texas Advanced Computing Center
A pair of vertical manifolds are installed at the back of each rack, to interface between the Passive Coldplate Loops and the Secondary Fluid Network under the subfloor. This allows simple decoupling of a single server without the need to remove a neighboring system by way of the quick disconnects.

The entire CoolIT liquid cooling system inside Frontera is managed by 9 row-based CHx750 CDU which circulate coolant through the Secondary Fluid Network, racks and servers and rejects this energy to a facility water feed connected to the facilities water treatment center.

With DLC components managing over 70% of the server heat through liquid cooling, 91 RDHx provide air cooling for the remaining heat. These RDHx operate in series to the DLC components utilizing the same liquid supply for efficient cooling.

Frontera is separated into 3 rows of 30 data center racks, with each row being coupled to 3 CHx750 CDUs via a secondary fluid network. This network of CoolIT Systems installed sub-floor pipes connects the CDUs directly to the RDHx and Rack manifolds to provide a constant supply of treated PG25 coolant.

HPC Setup
- 8,008 direct liquid cooled Dell PowerEdge C6420 servers across 91 racks
- 9 CoolIT Systems Rack DLC CHx750 CDU’s
- 91 stainless steel 54U Rack Manifolds in each rack, featuring dry-break quick disconnect technology
- 91 Rear Door Heat Exchangers
- 3 subfloor secondary fluid networks

Results
- 5.5 mW total heat load managed
- Significantly lowered data center OPEX
- Continued utilizing existing data center building
- Reduced noise pollution