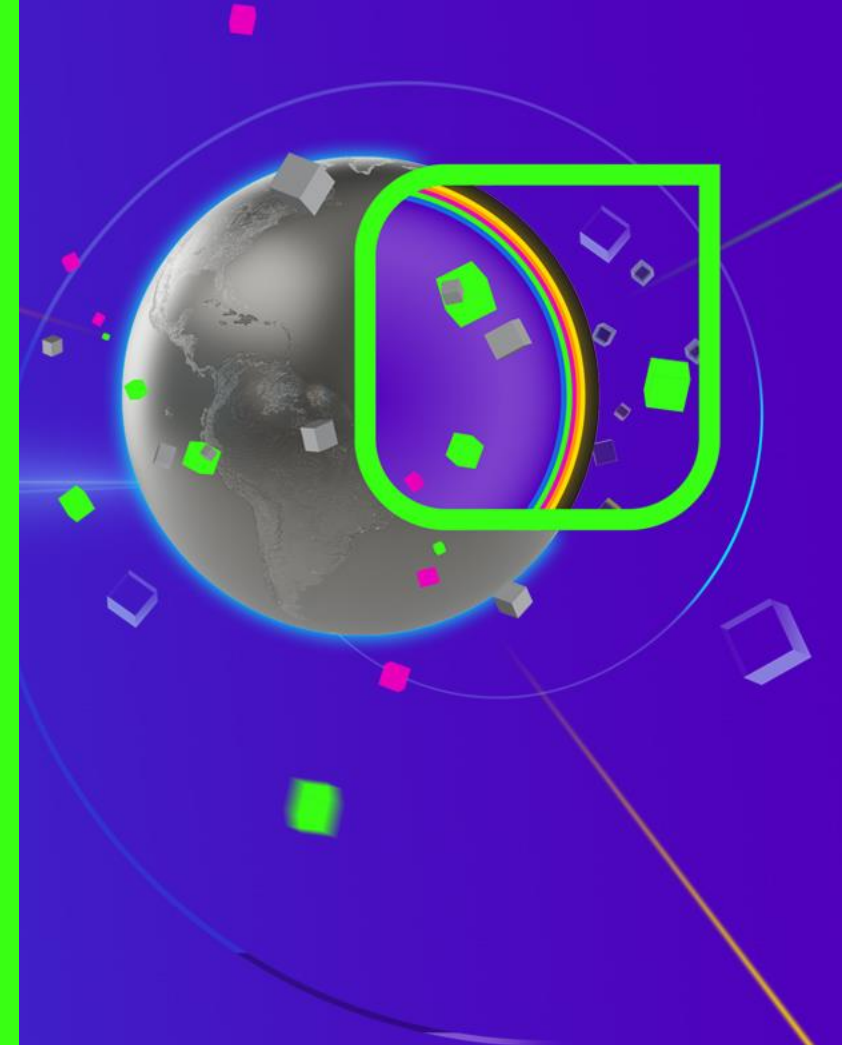


FROM CO-DESIGN TO SCALE: DELIVERING BESPOKE HPC FOR INDUSTRIAL WORKLOADS

Riju John
HPC Technology Director

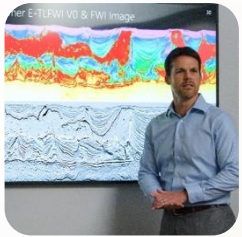
viridiengroup.com



VIRIDIEN



Viridien: Advancing Geoscience Technology for more than 90 years



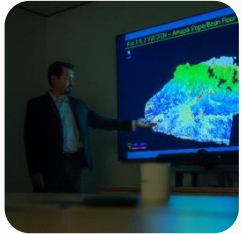
Geoscience

Established leader in subsurface imaging, geology and geoscience services.



Low Carbon

Supporting the transition with technology, data and expertise for Carbon Capture, geothermal & mining



Earth Data

The industry's most technically advanced seismic data and geologic studies in the world's key locations.



HPC & Digital Solutions

HPC solutions and services; Data transformation



Sensing & Monitoring

Established leader in geophysical sensing & monitoring equipment for oil & gas and infrastructure monitoring

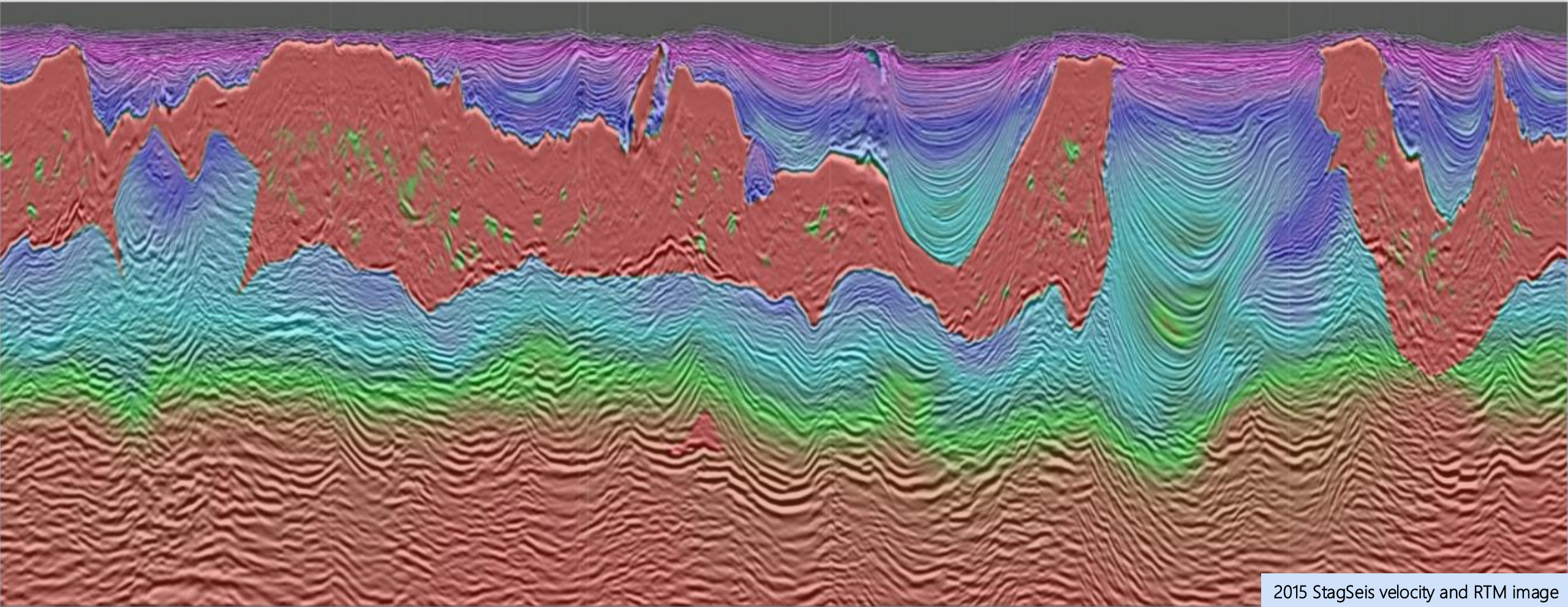


Infrastructure Monitoring

Structural health and earthworks monitoring solutions with advanced sensors.



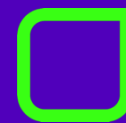
We now see what we could not before, thanks to FWI



2015 StagSeis velocity and RTM image



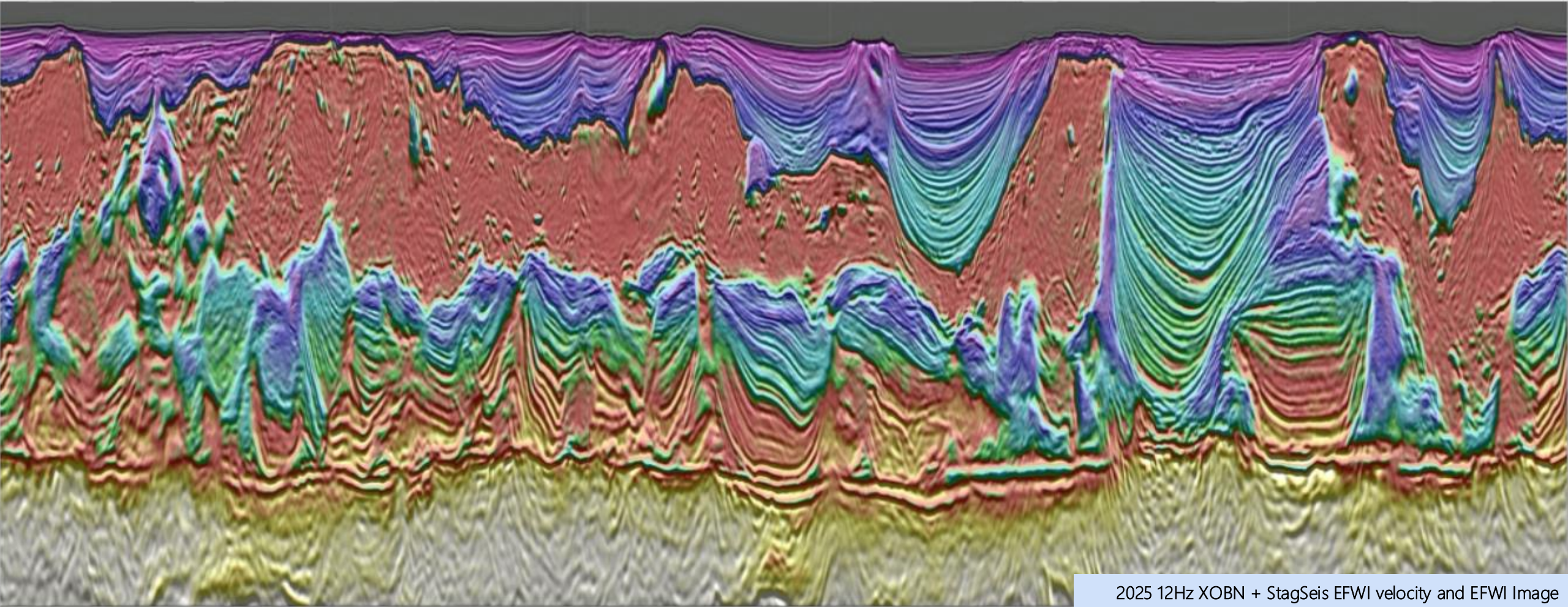
Imaged by
VIRIDIEN geoscience



Powered by
VIRIDIEN HPC



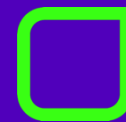
We now see what we could not before, thanks to FWI



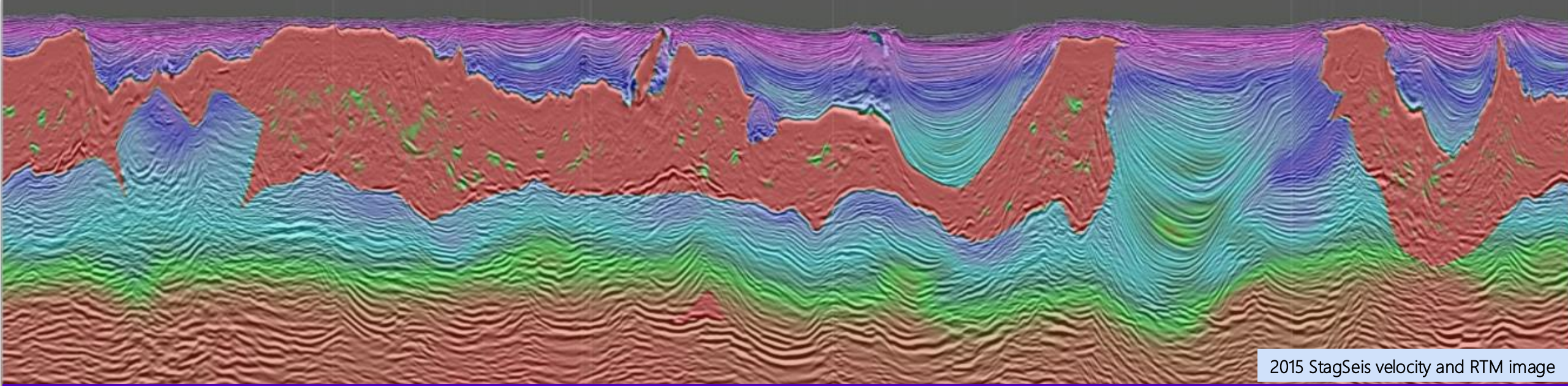
2025 12Hz XOBN + StagSeis EFWI velocity and EFWI Image



Imaged by
VIRIDIEN geoscience



Powered by
VIRIDIEN HPC



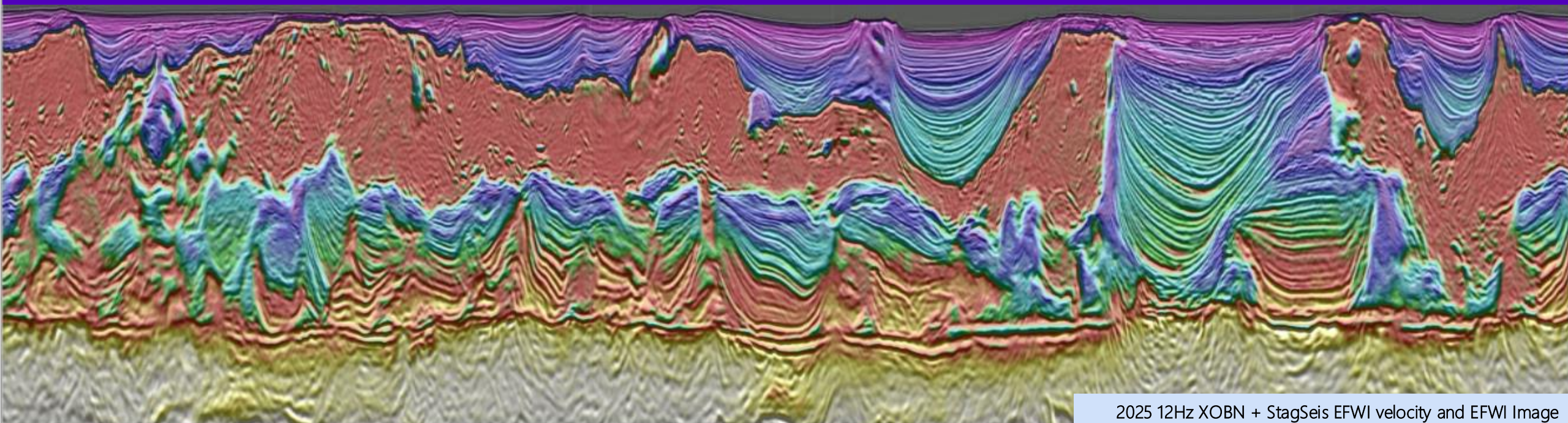
2015 StagSeis velocity and RTM image



Imaged by
VIRIDIEN geoscience



Powered by
VIRIDIEN HPC



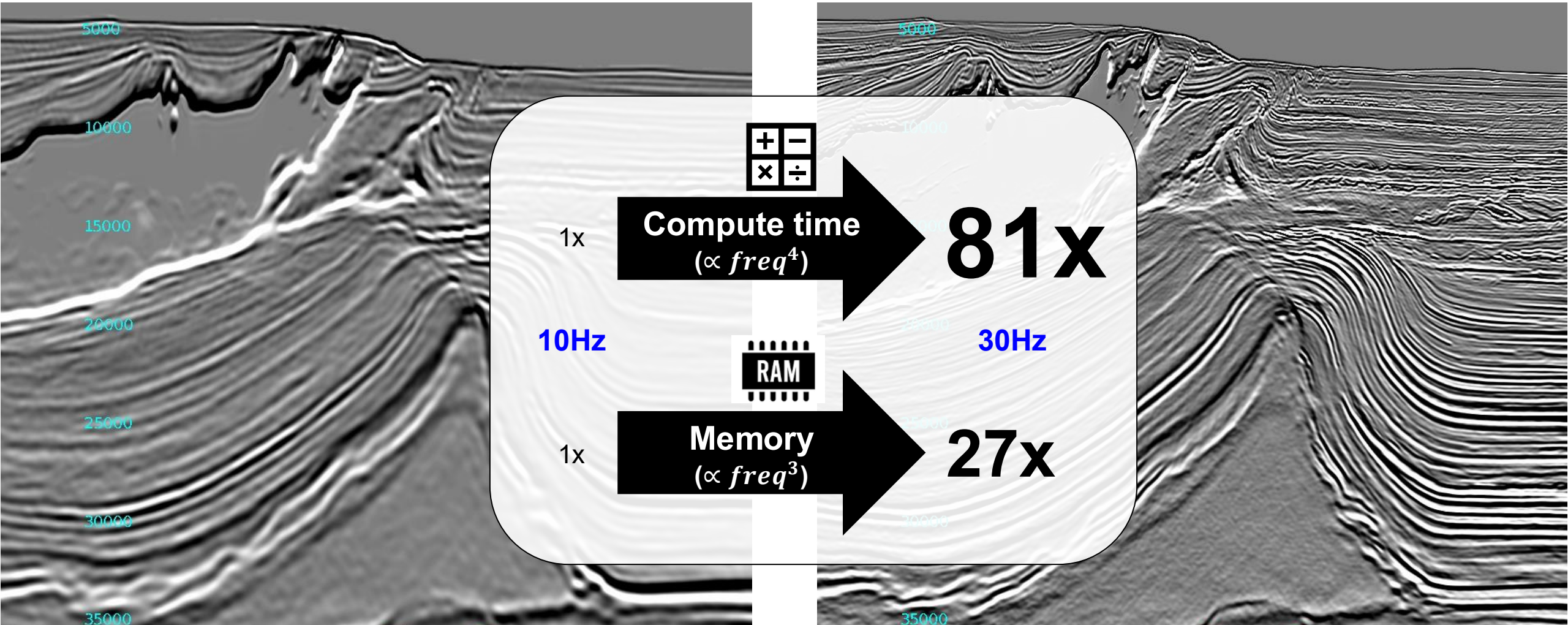
2025 12Hz XOBN + StagSeis EFWI velocity and EFWI Image



High-frequency Elastic FWI Imaging gives unprecedented images

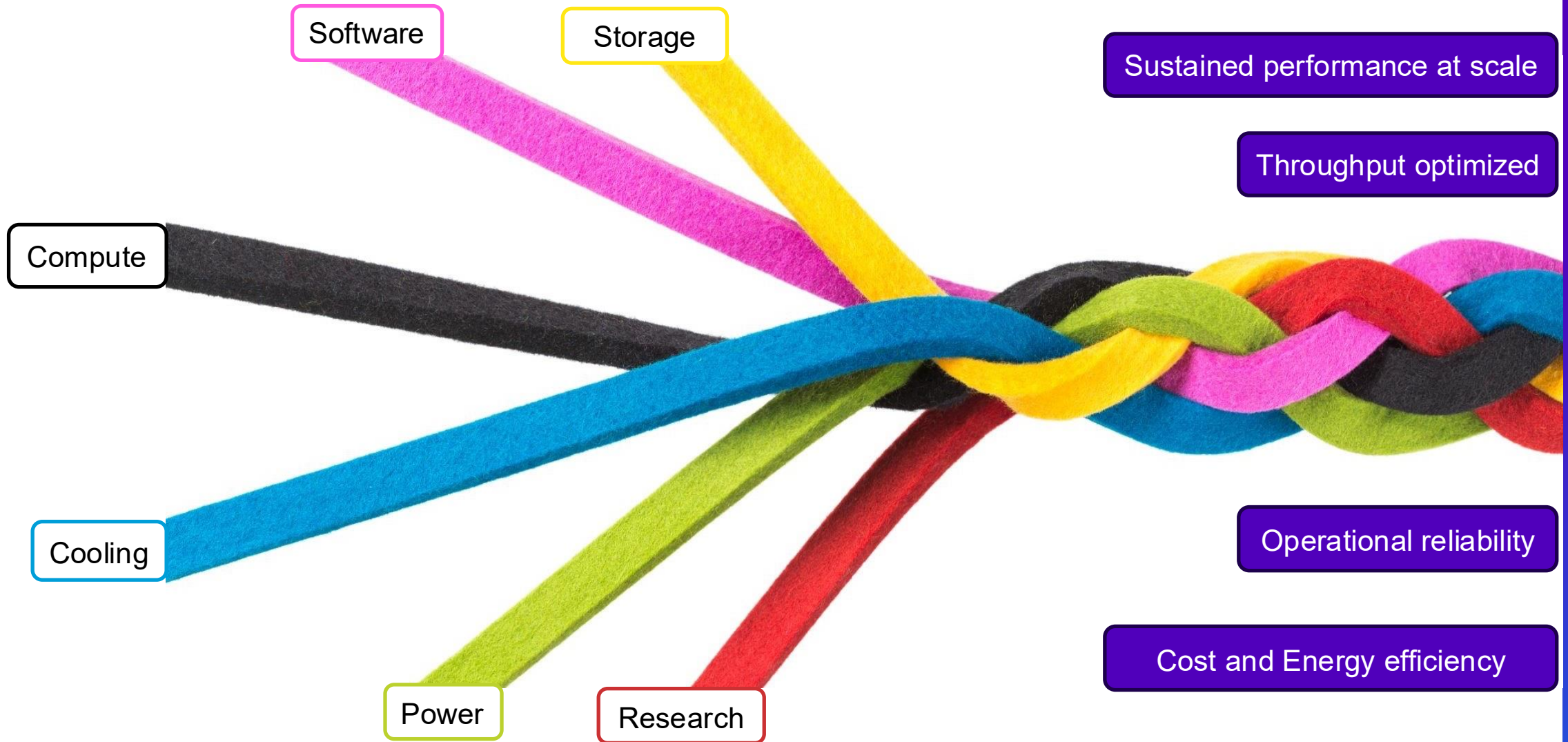
10Hz EFWI Image

30Hz EFWI Image



Challenge: how to support this dramatic growth in compute demand sustainably and cost-effectively.

Industrial HPC: The co-design approach





15+ Years of single-phase Immersion Cooling at Viridien



- Improved (PUE) energy efficiency



- Lower component temperature
- Reduced cooling cost
- Enhanced lifespan and reliability



- Increased compute density
- 12 SP PFLOPS per tank at 125 kW



- Quieter datacenter



- Support sustainability goals





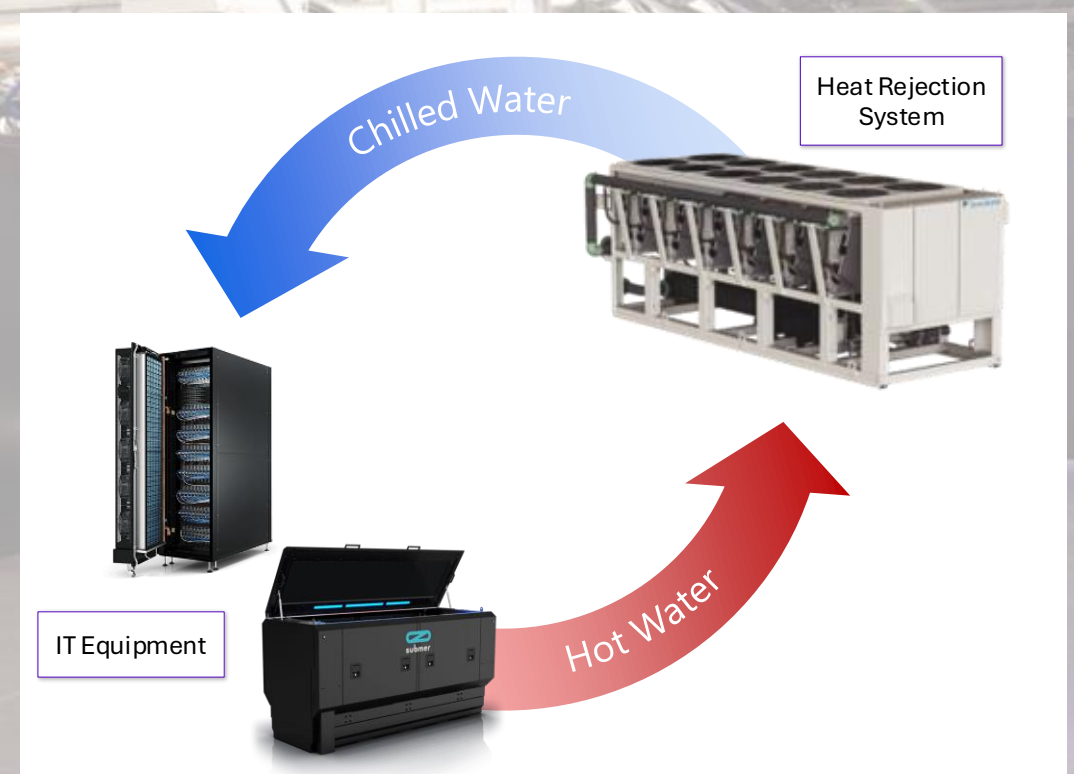
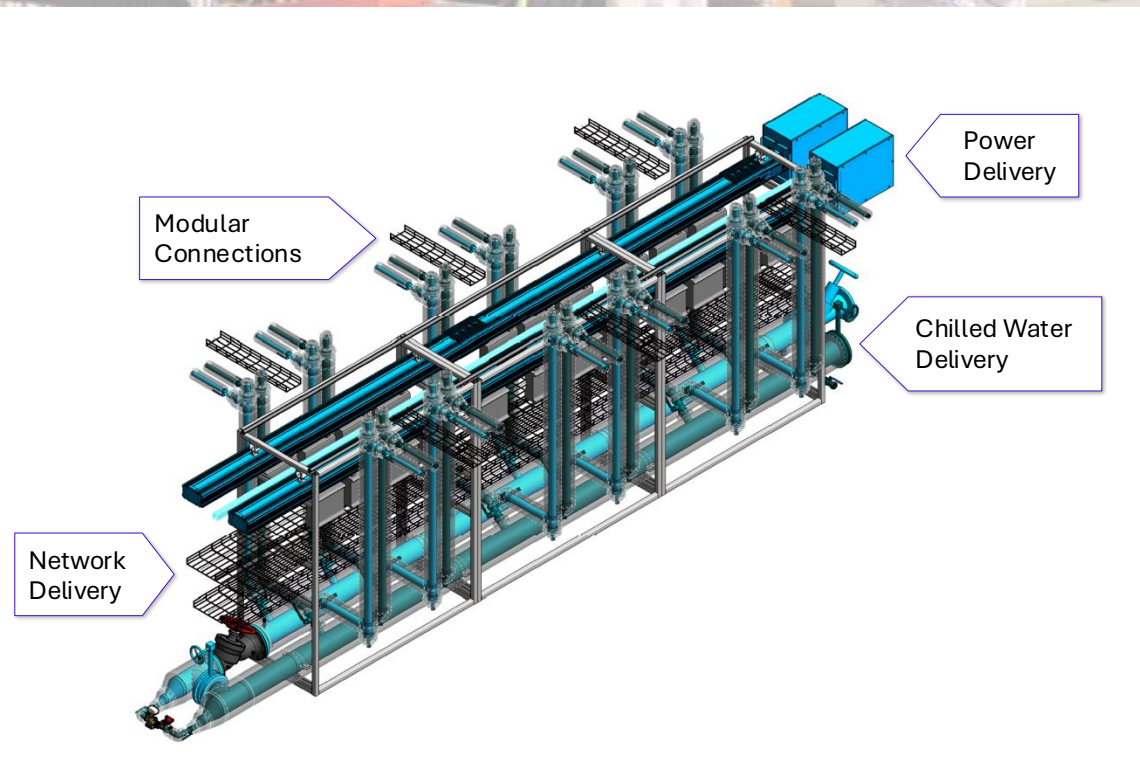
UK HPC Hub: Innovative fully water-cooled HPC data center

Modular Data Hall with closed loop water system



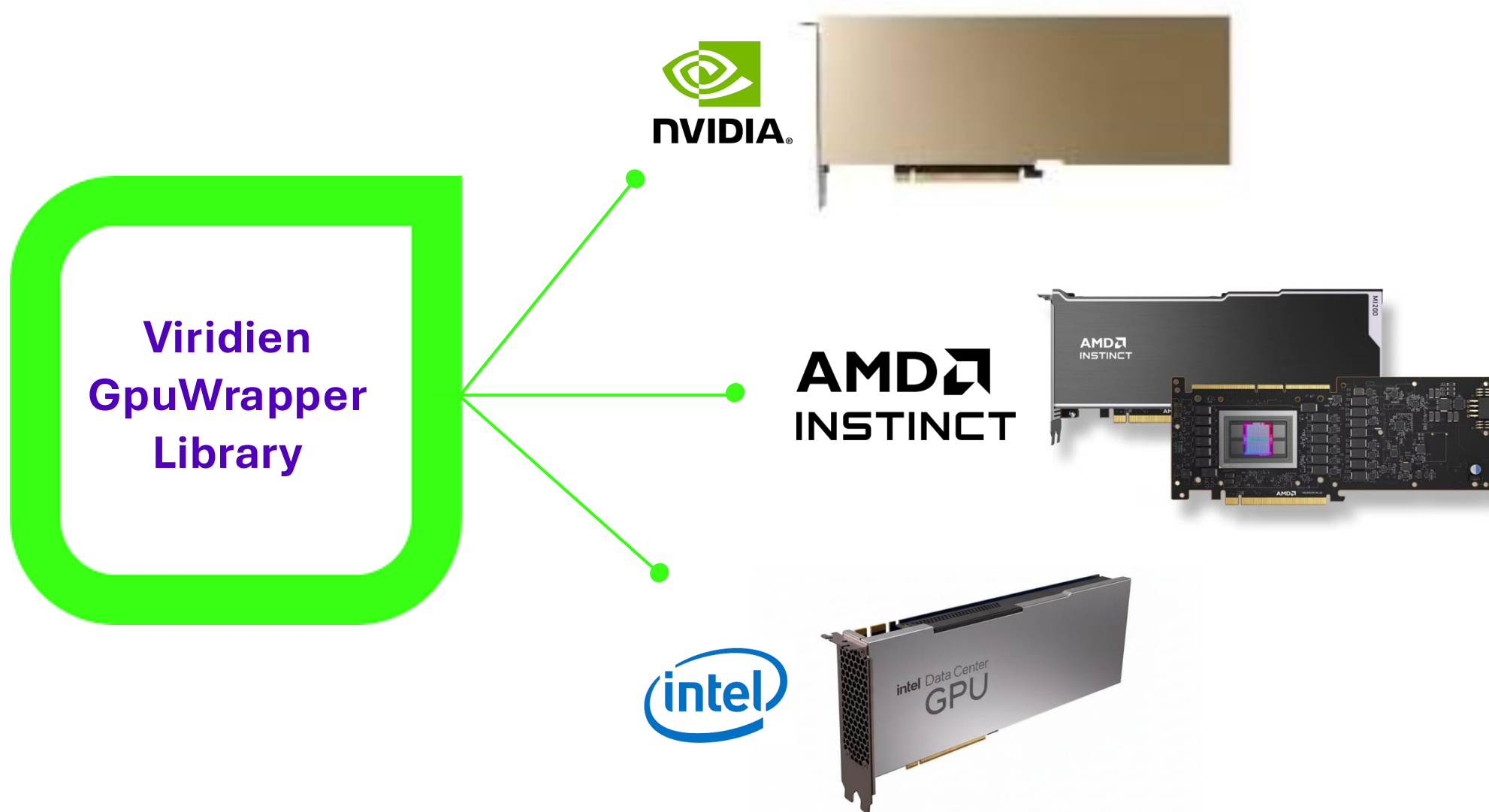
The **PowerSpine**: A proprietary scaling and flexible design to accommodate any type of liquid cooled equipment

Closed chilled water loop to collect the heat from the Data Hall and deliver it to Chillers or Dry Coolers (zero operational water use)



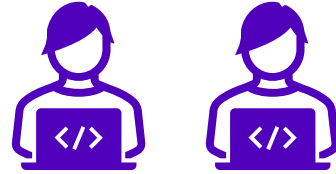


Software Portability: Strategies for Multi-Vendor Ecosystems





Flexible software platform designed for scale



Production & Research

DevOps, software distribution, management, analytics

Resource Management and Monitoring

32K GPU
700 PFlops



1 million HPC jobs/day

Data Access

Data Management

250 PBytes

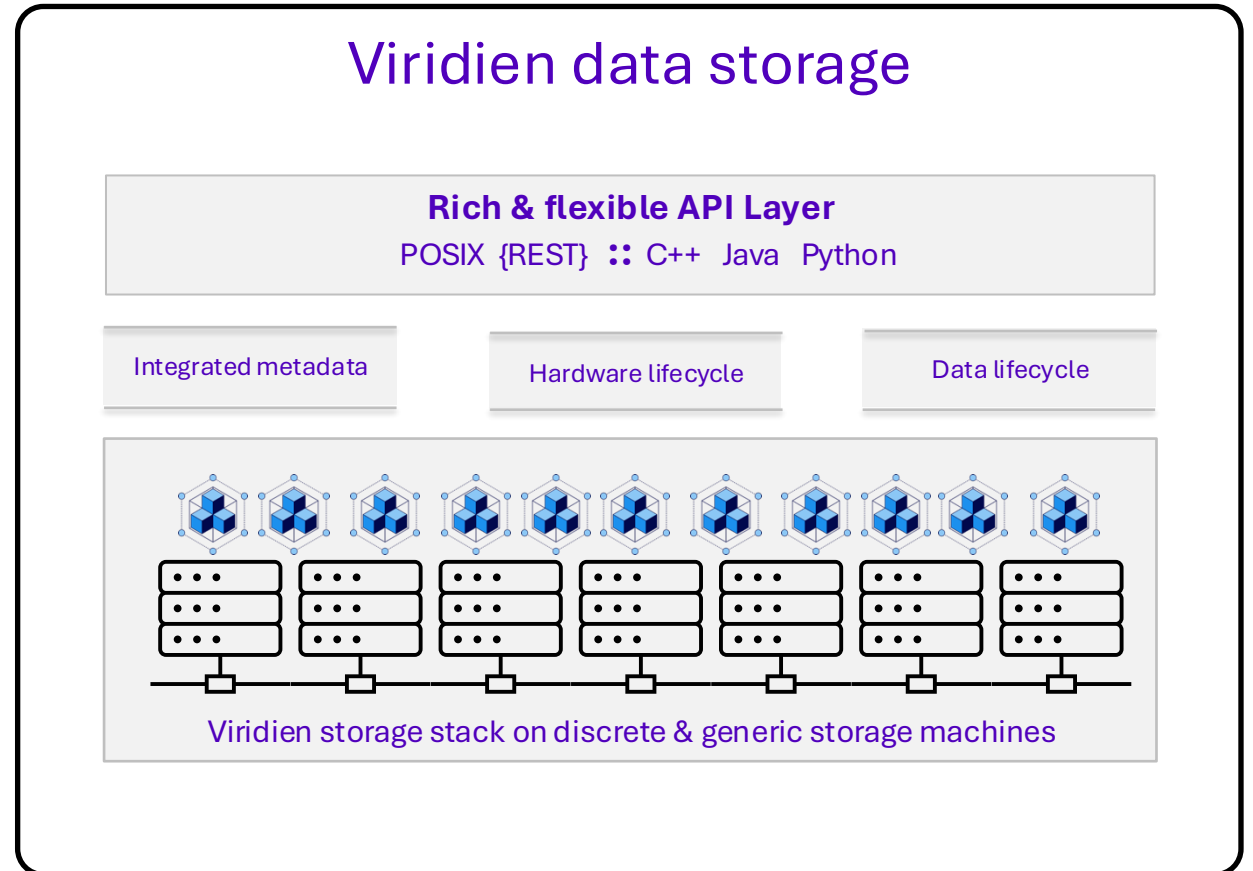
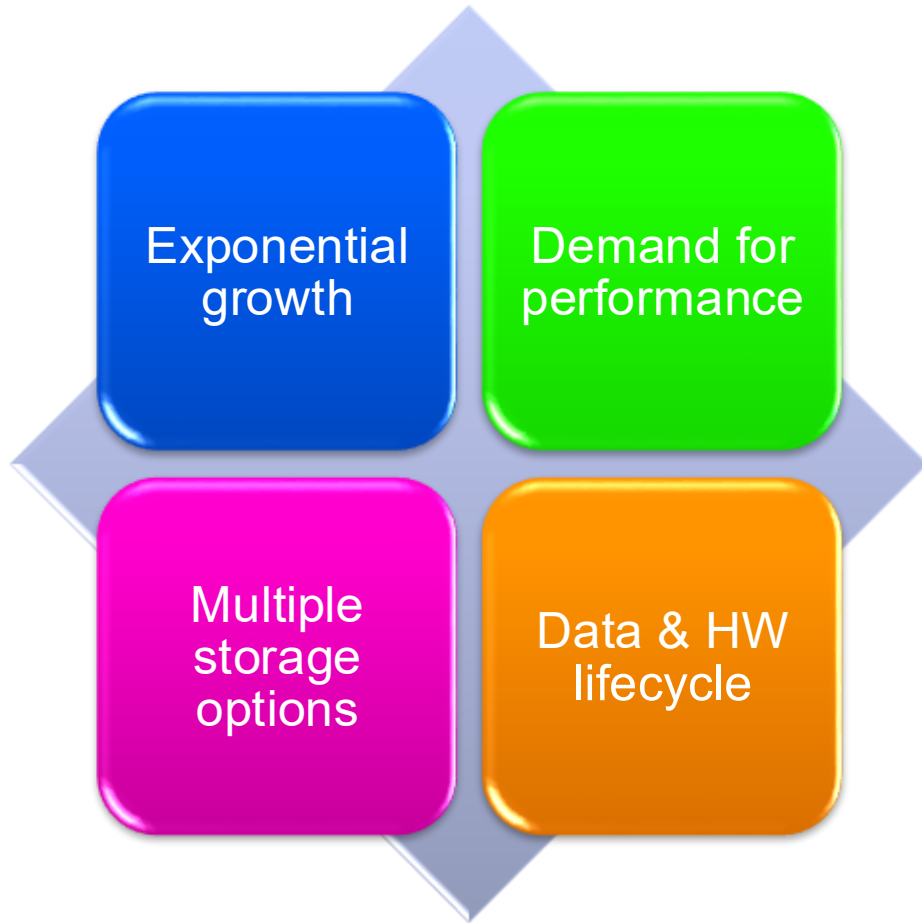


150 million database transactions/day

Scalable-by-design HPC that enables differentiating and disruptive technology

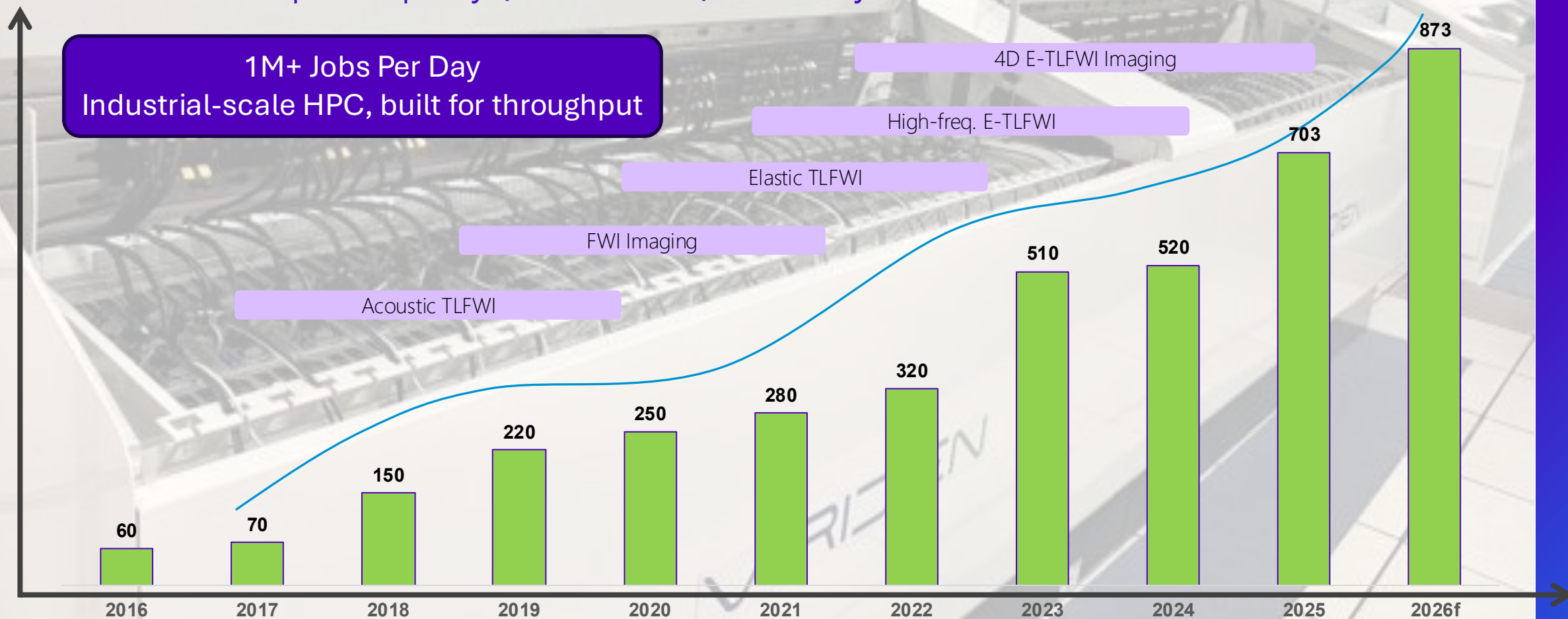


Optimizing operations – managing data



FWI fueled the growth of HPC in seismic imaging

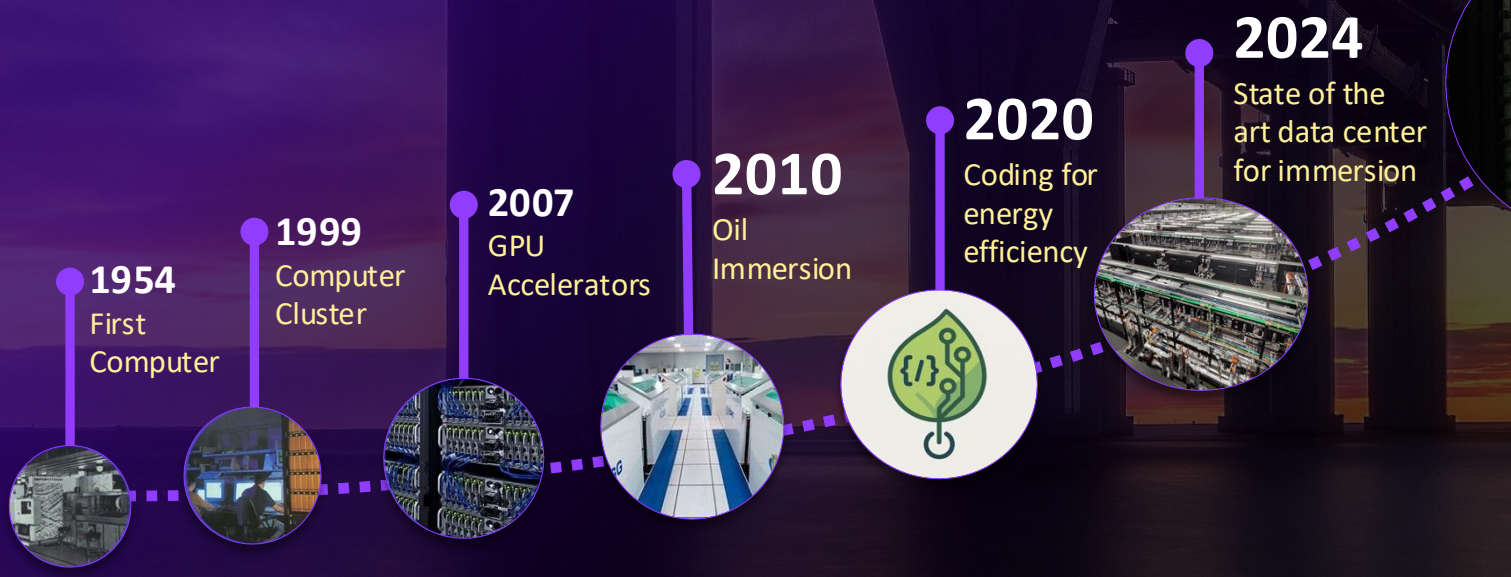
Viridien HPC compute capacity (FP32 PFLOPS) over the years



FWI has driven a 10-fold increase in compute requirements for seismic imaging over the past 10 years. Emerging FWI algorithms are projected to drive even greater growth in compute requirements

- End-to-end optimization drives performance, cost efficiency, and sustainability
- Our co-design approach turns complex HPC challenges into scalable solutions
- Industrial HPC creates real business advantage

VIRIDIEN



- HPC Hubs in Houston, London, and Paris
- 11 HPC OnPrem Centers, including 2 Client centers
- 700+ petaflops (SP)
250+ petabytes
- 21K Servers & 32K GPUs
- More than a million HPC jobs per day



THANK YOU