

Enterprise Data Orchestration for Geoscience Operations

Solutions for Mass Data Edge Storage and Transfer

Challenge Summary

Enterprise-level data sets are the heart of geoscience solutions. Long before oil and gas companies can successfully drill, or energy companies can look to construct offshore windfarms and erect turbines, massive amounts of raw data measuring seismic, oceanographic, and meteorological information must first be collected, stored, moved, interpreted, and analyzed. This data is just as critical to decision making at the front end as it is to ongoing asset management, subsurface monitoring, and ongoing Environmental assessment and Impact Surveys (EIS).

Collecting this amount of data, however, is costly and difficult to manage. Geophysics continues to innovate with new acquisition systems and datatypes, from broadband technology and extended streamer arrays to multi-azimuth and various OBD 4C/4D types. Each new iteration allows better imaging of the subsurface, with finer granularity and more precision. The consequence of these technological changes is that datasets have vastly expanded in size.

Data is typically collected in raw formats, using industry standards (SEGD in the case of field seismic), then processed on HPC to produce various “products” for geophysical and geological interpretation.

Processing on seismic vessels has now advanced to a point that various stacking and fast-track products can be produced before the raw data reaches the on-shore data center. However, the bulk of pre-stack migration, angle stacks, and depth converted products are still produced in the onshore data centers before shipping to the end client.

This necessitates moving data from the edge to the core, efficiently and securely. Final product data (typically SEG Y and SEG Y gathers), often in the range of 20-30 product types, is then delivered to the oil company for “loading,” i.e. reformatting for use within the E&P companies preferred software suite. Depending on the E&P companies’ preference, these “deliverables” will be provided on USB, tape (e.g. 3592), or via Cloud.

To accommodate the physical transfer of these mass data sets, geoscience solutions require rugged, scalable, and affordable edge storage infrastructure, built both for mass-capacity, vendor agnostic storage at the edge and frictionless physical transfer to any cloud service.

Solution Summary

Seagate Lyve Mobile, a suite of hardware, software, and services purpose-built for enterprise data, is precision-engineered

to support managed service providers like ET Works, who work hard to design and deliver

enterprise-level, multicloud and edge data storage infrastructure to their customers.

Built for the edge, Seagate Lyve Mobile meets geoscience data challenges head on, enabling users to store data anywhere—while only

paying for the hardware they need—consolidate, and physically transport that data securely to their landing destination of choice when the time comes.

Features and Benefits Summary

- Innovative and scalable mass-data storage solution at the edge that overcomes bandwidth limitations, activates unstructured data, and allows for recording of multiple data streams to a single device
- Rugged solution for frictionless physical data transfer to landing destination of choice
- “Pay as you go” model lowers TCO, ensures hardware and software is up to date, and monetizes data from edge to core, driving value and growth
- Vendor agnostic and modular hardware, built to integrate into existing infrastructure, allows user access at all points along the way—all while guaranteeing data is secure, using self-encrypted drives and secure wipe, after the fact



Introduction

Today's geoscience companies rely heavily on data to inform every segment of their workflow. From subsurface imaging to bathymetry, ocean floor mapping and production management onboard a rig or platform—the massive volumes of real-time data on-rig sensors collect is critical to worker safety, asset maintenance, and operational efficiency.

These data sets come from a plethora of devices. Be they inspection drones at facilities and/or well sites, real-time-monitoring or wireline/LWD drill sensors, or Supervisory Control and Data Acquisition (SCADA) systems for production monitoring and maintenance—these sensors amass huge volumes of data at the edge, requiring robust edge storage data to cope with exponential growth, as the energy industry adopts more digital sensors and services and integrates more data from the IoT (Internet of Things).

The most data-hungry operation geoscience companies conduct, however, is seismic mapping. Before any oil rigs can be built, and before any drilling can commence—companies must survey proposed drilling sites using a method of exploratory geophysics called reflection seismology. Fleets of ships (offshore) and vibroseis trucks (onshore) collect massive volumes of data by measuring the reflection of a controlled seismic source of energy, similar to sonar, in order to produce structural maps that visualize the spatial variation in depth of certain geological layers.

Using these maps, teams can identify hydrocarbon traps—i.e. petroleum reservoirs—and produce models of the subsurface using the data collected to calculate precisely where and how deep to drill.

And as is true of all operations that rely on data insights: The more data you collect, the more accurate the insights.

The problems many of these operations come up against, then, are related to:

- Data recording and handling of enterprise data sets at the edge
- The difficulty of transporting these sets to the data centers
- Data sets too large to be moved over satellite or 5G, which require at least one dedicated leased-line to move between sites
- The length of time it takes to run processing on large data sets, due to bandwidth limitations



In this field, balancing IT budgets, data security, and time to insight is critical.

This is where ET Works' 25 years of technology knowledge comes in. ET Works designs and delivers end-to-end IT solutions for geoscience companies that guide and support each of their customers in managing these enterprise-level data sets.

To deliver the hardware, software, and services necessary for these complex operations, ET Works relies on industry-leading enterprise vendors, like Seagate, whose portfolio of edge data storage solutions ensure geoscience companies can collect data in the field, aggregate and process that data at edge centers, transport final stacks to main data centers, and store those insights in private and/or public clouds for archive and future reference.

In the most challenging environments, where data mobility, accessibility, and security matter most, Seagate's precision-engineered solutions are fit for the job.

Seagate Solution

When it comes to seismic acquisition, processing, and enterprise-level data management, it takes a purpose-built solution to do the job right. ET Works has delivered that core service since the business was born in 1993. Now that 28 years have passed, edge data storage and transportation needs have changed. To meet this head on, ET Works and Seagate Lyve Mobile have brought their innovative technologies and cutting-edge, end-to-end data management solutions together.

Built for the edge, Seagate Lyve Mobile's cost-optimized hardware, software, and services enable users to consolidate and store data in any environment and quickly move it to their landing destination of choice for immediate processing, analysis, informed decision making, and positive business outcomes.

The Lyve Mobile portfolio of products, including the Lyve Mobile Shuttle, Lyve Mobile Array, and Lyve Mobile Rackmount Receiver, culminate Seagate's 40 years of expertise to streamline data acquisition, edge data aggregation and storage, and data transfer to the cloud.

Lyve Mobile Shuttle

Optimized for compact data ingestion, transfer, and transport, the Lyve Mobile Shuttle is a three-in-one, portable storage device that guarantees frictionless data mobility. With direct attached storage (DAS) mode, network attached storage (NAS) mode for shared storage, and an ingest mode through USB-C, the Lyve Mobile Shuttle is built for plug-and-play simplicity, ensuring edge network data transfers are quick, safe, and painless.

Best Use Applications:

- Onshore seismic transfer from edge to cloud using in-field direct ingest and data copy, without the need for a host computer
- Multi-sensor IoT edge data storage
- Offshore asset maintenance data aggregation



Lyve Mobile Array

The rugged, high-performance Lyve Mobile Array is designed to accelerate workflows by capturing multiple data streams at once, consolidating large data sets created by seismic mapping and other Geoscience applications. With fast throughput of up to 2.8GB/s in direct-attached mode or up to 6GB/s through PCIe connection, the Lyve Mobile Array has enough processing power to generate large image files directly from the RAW data captured.

This mass-capacity edge storage device also ensures users stay in control of their data's movement at every point, using industry-standard AES 256-bit hardware encryption and off-appliance encryption keys (KMS). A ruggedized transport case also guarantees robust physical security for data at rest with tough shock/vib and environmental specifications, making the Lyve Mobile Array an ideal solution for in-the-field workflows, all the way to a data offload station.



Best Use Applications:

- Offshore enterprise data aggregation and analysis from multiple data streams, during months-long ocean floor mapping operations
- Quick, mass-capacity data ingest for onshore seismic mapping operations—accelerating time to data and time to insight
- Robust enterprise-level edge storage and data accessibility for real-time monitoring of wireline drill sensors and/or SCADA systems

Lyve Mobile Rackmount Receiver

The Lyve Mobile Rackmount Receiver can simplify and accelerate data ingestion to any data center or multicloud environment. With two slots operating independently, a user can load two Lyve Mobile Arrays into the receiver, which fits a standard 19" data center rack. The Lyve Mobile Rackmount Receiver also turns mobile transfer devices into highly portable data center storage systems, outfitted with redundant power and high-speed interfaces, such as SAS, Fibre Channel, or iSCSI, ensuring seamless data migration into enterprise environments.



Best Use Applications:

- Create a miniature data center for highly mobile onshore seismic mapping operations
- Streamline enterprise data ingestion for offshore ocean floor mapping operations
- Consolidate mass-capacity data sets for frictionless edge-to-cloud physical data transfer



Lyve Mobile Array Shipper

Transport your Lyve Mobile Array in extreme conditions with this ruggedized carrying case.

Real Life Applications

When collecting, processing, and transporting seismic data, Seagate Lyve Mobile's scalability, portability, and reliability activate oceanographic data like never before. Fleets of ships collecting hundreds of petabytes of data need data storage infrastructure that is built for both enterprise edge data capture and rapid data mobilization.

Seagate Lyve Mobile is purpose-built for these operations. Where capacity, performance, and accessibility matter most—Lyve Mobile's suite of hardware, software, and services balance speed, safety, and affordability to ensure users get the most value out of their data.



Conclusion

When it comes down to it, data efficiency begins with smart, forward thinking data management. Frictionless data movement leads to quicker insights for improved business operations—it's that simple.

Seagate is proud to support ET Works at every step of the way. Together, Seagate and ET Works offer an efficient, multi-tier storage solution that allows customers to reduce the cost of high-end storage solutions without compromising data security, accessibility, and performance.

ET Works has built their business on three key features:

- High performance
- High availability
- Ease of physical movement of the data storage medium

For more information about ET Works, explore their service offerings.

Products Used



**LYVE MOBILE
SHUTTLE**



LYVE MOBILE ARRAY



**LYVE MOBILE
RACKMOUNT
RECEIVER**



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Our storage specialists are here to help you find the right solution for your data challenges.

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