

CTERA for Predictive Maintenance

Consolidate data within a single global namespace and integrating edge devices with cloud storage.

Predictive maintenance plays a crucial role in equipment management across various sectors, including industrial, military, and transportation. It is especially important for organizations that leverage IoT-enabled assets, advanced analytics, and real-time data to make informed maintenance decisions and implement effective protocols. The primary goal is to prevent failures, minimize downtime, and optimize maintenance processes.


To achieve these objectives, predictive maintenance relies on real-time data analysis to proactively identify and address potential equipment failures before they occur, thereby avoiding significant downtime or damage.

A robust data management platform is essential in this context, as it provides a unified source of truth for data. By centralizing data storage and management, organizations can better understand and analyze their assets, leading to valuable insights for optimizing maintenance protocols and reducing the risks of equipment failure. Cloud storage ensures the security and protection of the data, facilitating streamlined decision-making and reducing errors, ultimately enhancing overall equipment performance.


Global File Systems: Empowering Predictive Maintenance


Global File Systems are transforming the way organizations manage large volumes of data for predictive maintenance. By consolidating data within a single global namespace and integrating edge devices with cloud storage, these systems can reduce storage costs by up to 80% compared to legacy NAS systems. This approach enables organizations to access, share, and collaborate on real-time data securely, regardless of location or device.


CTERA's platform addresses the unique pain points of predictive maintenance, such as:

 **High speed cloud data ingestion**
CTERA Direct is a high-speed data acquisition and ingestion solution that uses a patented file transfer protocol to boost file transfer performance. It supports up to 100 concurrent connections per client, mitigates network latency, and provides an exceptional ingestion speed for machine-generated data, including sensor-generated data, SCADA log files, thermography and imaging data.

 **Data management and collaboration**
CTERA allows agile global collaboration on large files, including those produced by condition-based monitoring systems, CMMS software, and data science tools, both internally and with third party vendors.

 **Latency elimination**
CTERA's caching capabilities at the edge ensure that latency and connection speed issues are minimized, providing fast access to essential files and data for efficient maintenance planning and execution.

 **Ransomware protection**
With AI-based ransomware detection and powerful, instant rollback capabilities based on immutable versioning, the CTERA platform offers robust security measures to protect against ransomware and other cyber threats.

 **Scalability**
CTERA's solution allows for easy scaling as data requirements grow, ensuring that organizations can adapt to changing needs without costly hardware upgrades.

CASE STUDIES

Streamlining Predictive Maintenance for a leading Metro



One of the largest metro systems in the world faced challenges with managing and ingesting signaling data from underground train stations, and providing it to analysts for predictive maintenance and network optimization. The metro operator needed a scalable and secure data management solution to consolidate data from their new signaling and control system, and make it available to multiple stakeholders and analysts across different regions. CTERA provided the solution by implementing an Edge-to-Cloud Data Pipeline to ingest signaling sensor and log data from multiple sites into the AWS cloud.

CTERA solution has provided the metro operator with several benefits:

1. **Single source of truth:** Consolidating signaling log data from multiple locations for a unified view of all their data.
2. **Seamless data sharing:** Enabling data sharing with multiple stakeholders across the globe, fostering improved collaboration and decision-making.
3. **Enhanced data security:** Robust security measures protect data stored in the cloud.

Revolutionizing US Armed Forces Failure Prediction Workflow



In a data-centric era, efficient data management and predictive maintenance are vital for informed decision-making. The US Armed Forces once faced challenges in managing data from their land and satellite sites. The data required up to two months to reach analysts, and manual hard drive transportation led to data loss and inconsistencies, impairing critical decisions and adding costs.

These issues were addressed by adopting CTERA's data services platform. This enabled near real-time data access at the headquarters by replicating files from various sites. New file additions to the platform trigger an Apache NiFi data pipeline, generating metadata tags. These tags, along with original file attributes, feed a machine learning model to predict equipment failure.

CTERA has revolutionized the way the US Armed Forces manages its failure prediction workflow:

1. **Faster access to data:** Instead of waiting for two months, analysts now receive data on the same or next day.
2. **Cost savings:** The need for personnel to transport data and associated costs has been significantly reduced.
3. **Reliable results:** Standardization and automation of the data analysis process have provided analysts with more accurate and trustworthy results for predictive maintenance.

Unstructured Data Lake for Predictive Maintenance

CTERA's Global File System can be utilized as an unstructured data lake, making datasets available to predictive maintenance teams anywhere. This data lake enables organizations to efficiently store and access large volumes of data, to help maintenance teams identify patterns in machine performance and predict when maintenance will be needed. By integrating the data lake with CMMS software, teams can effectively analyze the data to optimize equipment performance and reduce downtime.

CTERA's platform offers a range of features designed to meet the unique requirements of predictive maintenance in industrial, military, and transportation applications:



CTERA Edge Filers

These replace legacy file servers with a centrally-managed, caching-enabled edge solution for better unstructured data management and multi-site collaboration.



Military-grade Security

The platform, deployable 100% in-firewall, uses end-to-end military-grade encryption. It's FIPS and DISA APL certified, ensuring data privacy and protection from industrial espionage and sabotage.



CTERA Mobile

CTERA Mobile enables anytime, anywhere file access on iOS and Android devices, promoting seamless collaboration and communication among team members.



Global File Collaboration

File changes are continuously replicated to the selected cloud, enabling global file collaboration and ensuring business continuity in case of data loss.



CTERA Drive

CTERA Drive clients for Windows and Mac deliver secure, accelerated file sync and share to roaming users' devices. This aids workers in monitoring equipment health, troubleshooting, and performing preventive maintenance.



Multi-cloud Data Management

CTERA Cloud Storage Routing offers admins full control over data storage locations, enabling file replication across multiple clouds and ensuring data residency control for compliance and data governance.

Unlocking Predictive Maintenance Insights with CTERA

CTERA's extensive Python SDK, REST API and Amazon S3-compatible interfaces, allow seamless integration with popular data science tools like Jupyter Notebook and Google Colab, enabling data analysts to efficiently process and analyze unstructured data from various sources.

Leveraging the potential of cloud-processing and analytics, CTERA enables organizations to efficiently manage data generated by IIoT devices, SCADA systems, and log files in real-time. With this technology, companies can perform precise data classification and feed information into advanced AI models, which can be used to predict equipment failures, optimize maintenance schedules, and improve overall operational efficiency.

Pain Point	CTERA Solution
Rapid Data Ingestion	CTERA Direct is a high-speed data ingestion solution that provides exceptional cloud ingestion speed over intermittent and high latency connections, ideal for sensor-generated data, SCADA log files, thermography, and imaging data.
Data management and collaboration challenges	CTERA allows agile global collaboration on large files, including those produced by condition-based monitoring systems, CMMS software, and data science tools, both internally and with third-party vendors.
Ransomware and cybersecurity threats	CTERA provides AI-based ransomware detection, instant rollback capabilities, and military-grade encryption to protect against ransomware and other cyber threats.
Integration with data science tools	CTERA's extensive Python SDK, REST API and S3 protocol compatibility allow seamless integration with popular data science tools like Jupyter Notebook and Google Colab, enabling data analysts to efficiently process and analyze unstructured data from various sources.
Real-time data accessibility and collaboration	CTERA Edge Filers, CTERA Drive, and CTERA Mobile ensure seamless access to files and data across devices and locations, facilitating collaboration and communication among team members.

