CONDITION-BASED MONITORING AND TRAINING IN HARSH ENVIRONMENTS AT THE EDGE

Background

For the oil and gas industry, testing, inspection and certification services of the pipelines are essential to ensure a safe and productive supply chain. The work often involves internal and unmanned inspections to maintain the integrity of the pipelines, as well as repair and maintenance on a regular basis, all under harsh and perilous conditions. To obtain the most accurate results, data processing and transmission need to be in real time as much as possible, which requires a robust processor to handle the large volumes of data generated through the inspection. With the pipelines running over hundreds of kilometers in remote areas, the inspections use machine learning to predict potential future events so that they can be resolved during the inspection without the need for costly return maintenance.

Business Challenges

The large volumes of data generated are integral for predictive asset maintenance and repair planning. All this data needs to be processed, analyzed and used at the edge with as little delay to be of use to the engineers. Pipelines often require harsh or hazardous certified equipment to withstand the rugged conditions – systems at the edge must be able to process high volumes of data and execute analysis, run continuously and maintain high performance without any downtime or skilled IT resources on-site. With the remote nature of the pipelines it is often not possible or cost prohibitive to send the data to train the machine learning models in the cloud. As this is a key requirement to improve the predictive results of the underlying algorithms, the training of the machine learning models needs to be done at the edge. Training at the edge also enables real time predictive results to support resolution of issues during the ongoing inspection.

Solution

HarshPro™ IP66 Servers are rugged server class hardware designed to support containerization and virtualization whilst offering high availability and performance in harsh conditions at the edge. Configurable for memory, storage and connectivity, the servers are ideal for supporting complex analytics processing in rugged conditions like unmanned pipeline platforms. With no moving parts, the need for and cost of on-site servicing and maintenance is drastically reduced. In addition, the HarshPro IP66 Server is 100% remotely managed, enabling scalability and compute elasticity despite constraints at edge locations. By utilizing the server class processor and storage ability of the HarshPro Server, predictive maintenance algorithms can be trained at the edge resolving the challenges of expensive or intermittent communication with centralized or cloud-based models.

Benefits

HarshPro Servers are easy to deploy and maintain despite harsh edge conditions enabling data acquisition and analytics to be collapsed and streamlined into a single function on any site. Analytics can be run under any site conditions with no loss of performance, reducing latency in analysis and decision making anywhere including at the edge. The ability to train machine learning algorithms at the edge on HarshPro Servers mitigates privacy and data security concerns, reduces time and network latency, and offers scalability when deploying machine learning to harsh and hazardous locations. HarshPro servers are a meaningful cost-effective way of rolling out condition-based monitoring and training at the edge, a benefit to oil and gas or any industry with similar operational requirements.

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**HarshPro™
Servers**