

Integrated Cloud Cockpit: A viable approach to surveillance and detection of leaks in oil pipelines

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Abstract

Building a secure platform to connect distributed products, software and hardware simplifies digitization of businesses. This calls for platforms that can help companies ideate, prototype, validate and develop using cutting edge technologies such as Artificial Intelligence, Internet of Things, Block Chain, Big Data and Analytics.

In this paper, we illustrate how such Integrated Cloud Cockpits (ICC) provide a seamless environment with services that facilitate development of next generation smart applications that are scalable, resilient, secure and provide decreased price-performance ratio. We support this research by presenting an empirical study on how intelligent surveillance and predictive maintenance of oil pipelines is made practicable by employing collaborative cloud services. We have leveraged the services provided by Google Cloud Platform to show how existing cloud platforms can suffice the needs of a secure and fully featured enterprise use case.

Keywords: Cloud Integration, Oil and Gas Pipelines, Machine Learning, Big data, IoT, Security, Google Cloud Platform

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1. Introduction

One of the prominent reasons why the software industry is shifting to cloud computing is the need for fast innovation. Software vendors should be able to provide their innovations to the customer for testing, learning and improvising at a rapid pace. For this purpose, Integrated Cloud Platforms are working like a one stop destination to provide services that ease the development and maintenance of such a new breed of next generation applications. These cloud platforms have a mix of diverse services that cover all aspects of software development. For instance, there are services that provide the infrastructure for development (development environment, database instance, authorization/authentication etc.) as well as there are technical and functional services like speech to text, blockchain service and big data management services.

These Cloud Platforms suffice the needs of end to end development and aid in solving business problems via intelligent software in the recent times. One such elusive business problem has always been maintenance and surveillance of oil and gas pipelines. There are multiple reasons why this is one of the most cumbersome scenarios to be handled via software. As pipelines are spread across geographies and in extreme remote areas, it's nearly impossible to have human inspection planned in an optimized manner. Even to find the exact location of the failure requires a lot of time due to the vast spread of the pipeline. It's also not very easy to plan maintenance of these pipelines on a short notice due to unavailability of experts at the required locations. In the below sections, we first explore the key characteristics and features of cloud platforms [1], and then we dive into the reference architecture, details and design of how this case study is made practicable by an Integrated Cloud Cockpit.

