Case Study: CNPC Exploration and Production Data Management System (A1 Project)

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ABSTRACT

China National Petroleum Corporation (CNPC) is one of the largest international energy corporations in China, with business covering upstream, midstream and downstream, owning 16 oil & gas companies in China, operating business in 37 countries and regions overseas. In 2016, its oil & gas equivalent reaches 1,466.6 million barrels. In 2001, CNPC planned E&P Data Management System (A1) project, aiming to establish A1 for centralized, high-qualified and standardized management of E&P data, and realize data asset management and service, with data scope covering 11 E&P domains of geophysics, drilling, mud logging, logging, hydrocarbon test, well test & production test, sample experiment, downhole operation, geology & reservoir, and comprehensive research. Main challenges of A1 include: Lack of unified data standards; complexity of data integration with distributed data sources of multi-discipline and multi-data-type; problem of data quality (normalization, accuracy, integrity, consistency, timeliness); difficulty in data exchange due to various types of storage media; poor data sharing. A1 1.0 was constructed from 2004 and put into operation in 13 oil & gas companies of CNPC in 2008. In 2011, A1 2.0 was planned aiming to develop a brand new data management system, and put into operation in 16 oil & gas companies in 2016. Based on CNPC E&P integrated Data Model (EPDM V2.0) derived from EPICENTRE, PPDM, and EDM, A1 2.0 is developed and supports configurable and customized data collection, integration, storage management and services. It provides functionalities of data input, load and ETL to realize data collection, synchronization and integration; provides methods of data parsing, quality rule definition, scanning engine, quality scanning, visualization to carry out data quality control based on life-cycle data management and quality control mechanism; provides functionalities of meta data management, master data management, data model management, security management to realize centralized data management; provides functionalities of online full-text retrieval, data query, browse, display, order, download, etc. Up to now, registered users of A1 2.0 are over 10,000 and data size in A1 2.0 is up to 1,500TB, with seismic surveys up to 6,000, well loggings up to 300,000, wellbores up to 400,000. A1 2.0 brings benefits, such as effective protection of core data assets, efficient data service for comprehensive research, and improvement of research quality and effect.