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E&P data lifecycle: a case study in Petrobras Company

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Petrobras, the biggest Brazilian Petroleum Company, has been studying and working on Brazilian sedimentary basins for nearly 60 years. The corporate database currently registers over 25000 wells and all their associated products (geophysical logs, cores, sidewall samples) and analyses. There are thousands of samples, descriptions, pictures, measures, and other scientific data resulted from petroleum exploration and production. This data constitutes a huge scientific database which is applied to support Petrobras economic strategy.

Geological models built during the exploration phase continue to be refined during both the development and production phases: data should be continually manipulated, correlated and integrated. As E&P assets reach maturity, a new cycle starts: data is re-analyzed and new hypotheses are made in order to increase hydrocarbon productivity. Initial geological models then evolve from accumulated knowledge throughout all the E&P phases. Therefore the quality control must be performed in the first phases of data acquisition, i.e. during the exploration phase, to avoid reworking and loss of information.

The last decade witnessed a great evolution in petroleum industry technology. As a consequence, the complexity and particulars of the information generated have increased accordingly. Current technology has also facilitated access to networks and databases, making it possible to store large amounts of information. This scenario makes available a large mass of information from difference sources, which uses heterogeneous vocabulary as well as different scales and measurement units. In this context, knowledge might be diluted and the total amount of information cannot be applied in E&P process. In order to provide adequate data governance, data input is controlled by rules, standards and policies, implemented by corporate software systems.

Petrobras' integrated E&P database is a centralized repository to which all E&P systems can have access. The quality of the data that goes into the database can be increased by means of information management practices:
• data validation,
• language internationalization,
• dictionaries, patterns, metadata.

Moreover, stored data must be kept consistent, and any changes in the data should be registered while maintaining, if possible, the original data, associating the modification with its author, timestamp and reason. These practices lead to the creation of a database that serves and benefits the company's knowledge.

Information retrieval and visualization is one of the main issues concerning petroleum industries. In order to make significant information available for end-users, it is fundamental to have an efficient data integration strategy. The integration of E&P data, such as geological, geophysical, geographical and operational data, is the end goal of the exploratory activities. Petrobras corporate systems are evolving towards it so as to make available various data from diverse sources and to create a dashboard that can be easily accessed at any time by geoscientists and reservoir engineers. The main goal is to maintain scientific integrity of information, from generators to consumers, during all E&P data life cycle.