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RU Emergent Approach for Data Management in E&P Business - Case Study*

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Abstract

Exploration and Production (E&P) companies realize the importance of good technical data and the role which it plays in the exploration success. Geoscientists and engineers focus on maximizing hydrocarbon extraction by understanding and exploiting field geological and formations data. To achieve their challenging goals, they use sophisticated software to perform virtual field characterizations and analysis which generates terabytes of valuable intellectual data and information. This is one example, and there are many more by which new data is being generated, and stored each day. Companies are investing into hardware and software to tackle these problems, but lack the basic guide lines or policies to manage the growing data volume. This has led to even more problems and waste of valuable resources and funds. One of the key requirements for E&P companies is to have a well defined data management strategy.

OMV (Pakistan) Exploration has accumulated data since its inception in 1991. The amount of data has grown exponentially over the last 15 years. This paper describes the challenges that OMV (Pakistan) Exploration and Reservoir Department faces related to management of its data, outlines effective practices for addressing these challenges, and summarizes complementary relevant solutions. The paper is based on a case study, elaborating the workflow adopted by OMV (Pakistan) to manage its Exploration and Reservoir data.

Introduction

OMV (Pakistan) exploration is one of the biggest international natural gas producers (operated volumes) in Pakistan. It is operating Sawan and Miano gas fields and appraising/developing Tajjal and Latif gas discoveries. OMV (Pakistan) is also operating three

exploration licenses and is Joint Venture partners in four non-operated exploration blocks. Its ongoing operations in Pakistan generates huge amount of data and information. This data is immensely beneficial for its effective exploration, appraisal and development activities.

Data Is an Essential Source for Business Success

Business critical decisions rely on accurate data and information. “Wisdom, knowledge, information, and data are all closely related through being on the same continuum from wisdom, to knowledge, then to information, and finally to data” (Gordon, 2007).

Although very critical for the success of the business, data is often given less importance when compared to other strategic resources within an organization; therefore, it is often poorly managed. There are usually no guidelines or standards set for effective information and data management (also known as information life cycle management) which includes managing of data from its creation to when it is no longer needed (Sevounts et al., 2007).

Need of Data Management

According to Moore’s Law, data doubles every 18 months (Moore, 1965). New applications currently being developed or in use require more data as input and in turn generate huge amounts of output data. Examples are 4D seismic and online data acquisition systems

This increase in data volumes has raised many challenges, some of which are: where to store the data, how to retain only useful data and remove the obsolete/duplicate data, proper management and storage of digital and hardcopy data, and how to enforce naming convention.

Solution

In OMV (Pakistan), exploration and reservoir data is being managed by an Application and Knowledge Management (AKM) section, which is a part of the Exploration and Reservoir department. All data from an external source or generated within the E&R department is treated as a company asset and it is the responsibility of the AKM section to ensure its quick, timely, and accurate access.

In order to address these challenges a Data Management Policy and procedure was developed. Its main purpose is to establish a structure for the usage, archival, distribution, security, and abandonment of the data in a rational and efficient manner. Currently its scope is restricted only to the company’s Exploration and Reservoir (E&R) department.

Data Management Policy – Key Element

The purpose of the Data Management Policy is to lay down a framework for effective Data Management. The key elements of Data Management policy are:

- Data is readily available to those with a rightful business need.
- Obsolete data is destroyed that will render it unreadable.
- Users know what types of data should be retained, the length of their retention, means of storage, and when and how they should be deleted or destroyed (Angie, 2009).
- Standards, naming conventions, and data hierarchy rules are followed for data storage.
- Data is recorded accurately and completely as possible and close to their point of creation, at the earliest opportunity.
- Minimum cost for data collection, sharing, and archiving is maintained.
- Data is protected from unauthorized access and modification.
- Data structures are under strict change control, so that the change can be properly managed due to various business and system implications.

Data Management Procedure

Data Management (DM) procedure lays down steps required for proper management of E&R data. It divides most of the available data into three main data categories:

- Applications Data
- Unstructured Data
- Source Data

Application Data

Data which is generated by a software application or which forms an input to it is categorized as Application data, e.g. seismic data (SEG-Y), logs data (LAS), maps, and software generated data files.

To better manage resources at the global level, software applications have been standardized across all company branch offices worldwide. Petrel has been selected as the standard tool for reservoir characterization, modeling, and Petrosys for mapping.

To manage the data generated from these and other applications the following key steps has been laid down in the DM procedure:

1. Allocation of dedicated network drives and directory structure for the storage of application data.
2. Implementation of naming convention standards and development of Plug-in software for its enforcement.
3. Routine Project data updates and removal of redundant or obsolete projects.

Figures 1 and 2 illustrate the implementation of these steps for Petrel application.

Figure 3 illustrates how Petrel projects are managed through reference/user structure. Users work in their own User project and afterwards copy the final data to Reference project. Reference projects are read only, which insures that the user work is preserved and can be easily accessible.

Similar steps have been defined for other E&R applications. It is the AKM team which ensures that these procedures are followed and strictly implemented.

Unstructured Data

Unstructured data comprised of word, power point, excel, pdf, JPEG, emails, tiff, video etc. Most data stored on network drives apart from application data falls in this category.

To manage the unstructured data, the DM procedure lays down the following steps:

1. All working files will be placed in Work in Progress (WIP) folder structure to which users will have full access rights, please refer to Figure 4.
2. Once a document is finalized it will be moved to department hierarchy through a designated team lead, as this directory structure will have limited access rights.
3. Files will be deleted routinely in WIP folder.

The main purpose of dual directory structure is to ensure that the final versions of documents are preserved and all unnecessary files are restricted to user directory (WIP), which is occasionally cleaned.

The company is also using EDMS (Electronic data management system) since 2002 to manage its unstructured data and to make it readily available to users. Final copies of all documents are loaded in it. It also acts as a global repository accessible to head office and branch offices.

Source Data

All data received from an external source is categorized as Source data. This includes but not limited to seismic data, well data, study reports, partner data etc.

The DM procedure lays down the following guidelines for the management of Source Data:

1. Source Data to be received by a single designated AKM person.
2. All received source data to be logged in a database and bar-coded.
3. The source data to be stored in a temperate controlled data storage room.
4. All digital data received to be stored in Master Data store which will act as corporate repository for all source data.
5. Technical documentation related to facilities and company library to be managed by Document Control Center (DCC) a sub section of AKM.

Roles and Responsibilities

- Department manager, section heads and team leads are responsible to enforce the procedure and will ensure all department members follow it.
- AKM will be the single point of contact for all incoming and outgoing data.
- AKM team to ensure compliance to this procedure and in case of deviation will notify the respective team leader/section head.
- All E&R users should understand and comply with the procedure.

Feedback and Implementation

DM policy and procedure was presented to users and their feedback was incorporated before its roll out. The DM procedure has been well received by all though there were some initial problems which have been rectified. The users have accepted the changes well and are currently following the guidelines given in the procedure.

Conclusion

Effective Data Management is essential to handle the growing amount of data and information. The DM policy and procedure highlights the importance of data and provides the required frame work through which it can be done in an effective manner. The DM policy and procedure is only good if it is followed and acted upon. Management can play an important role for its acceptance and promotion. The end users should be trained and their concerns should be addressed in order to have a successful program.

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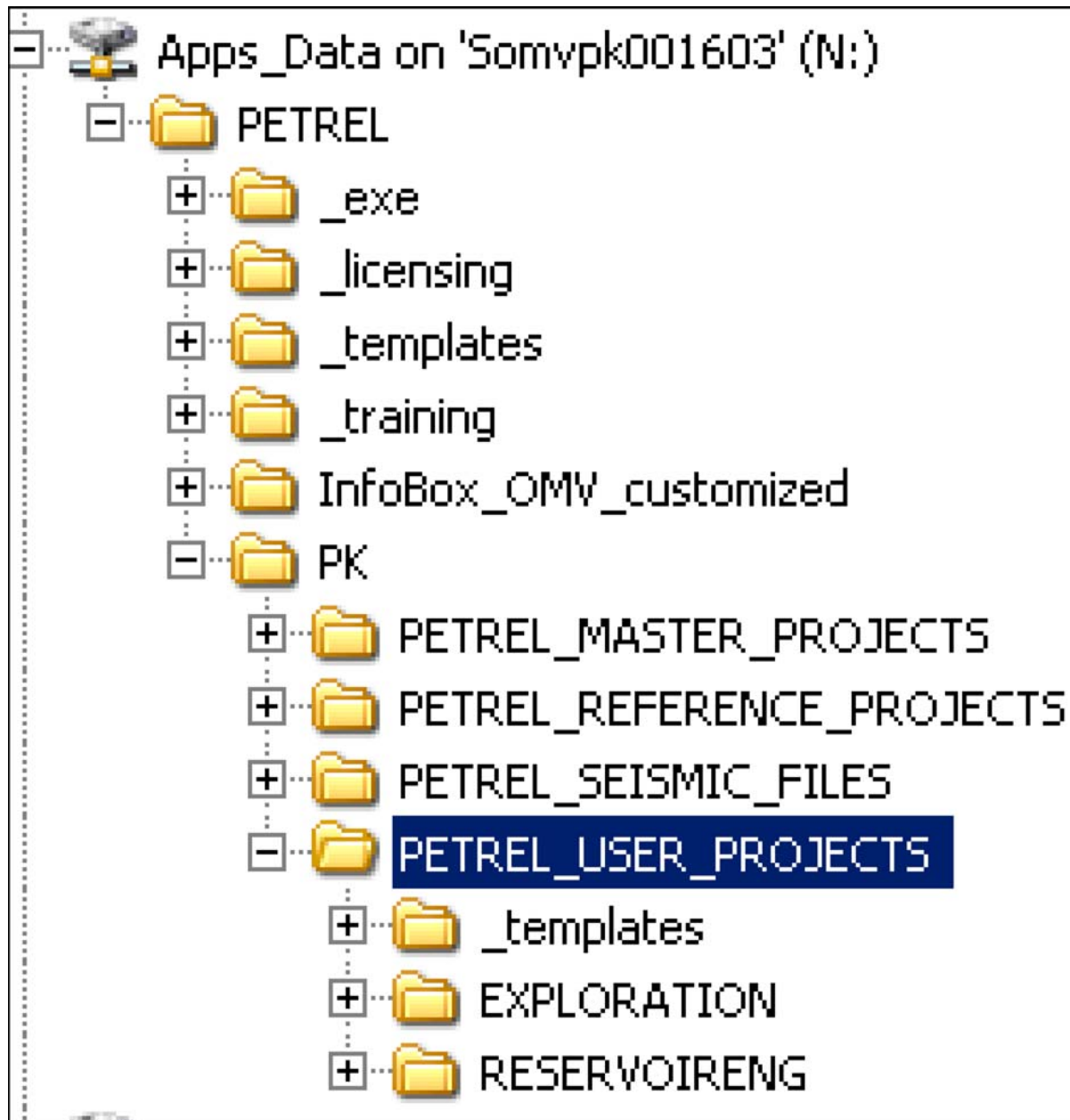


Figure 1. Petrel – Directory structure.

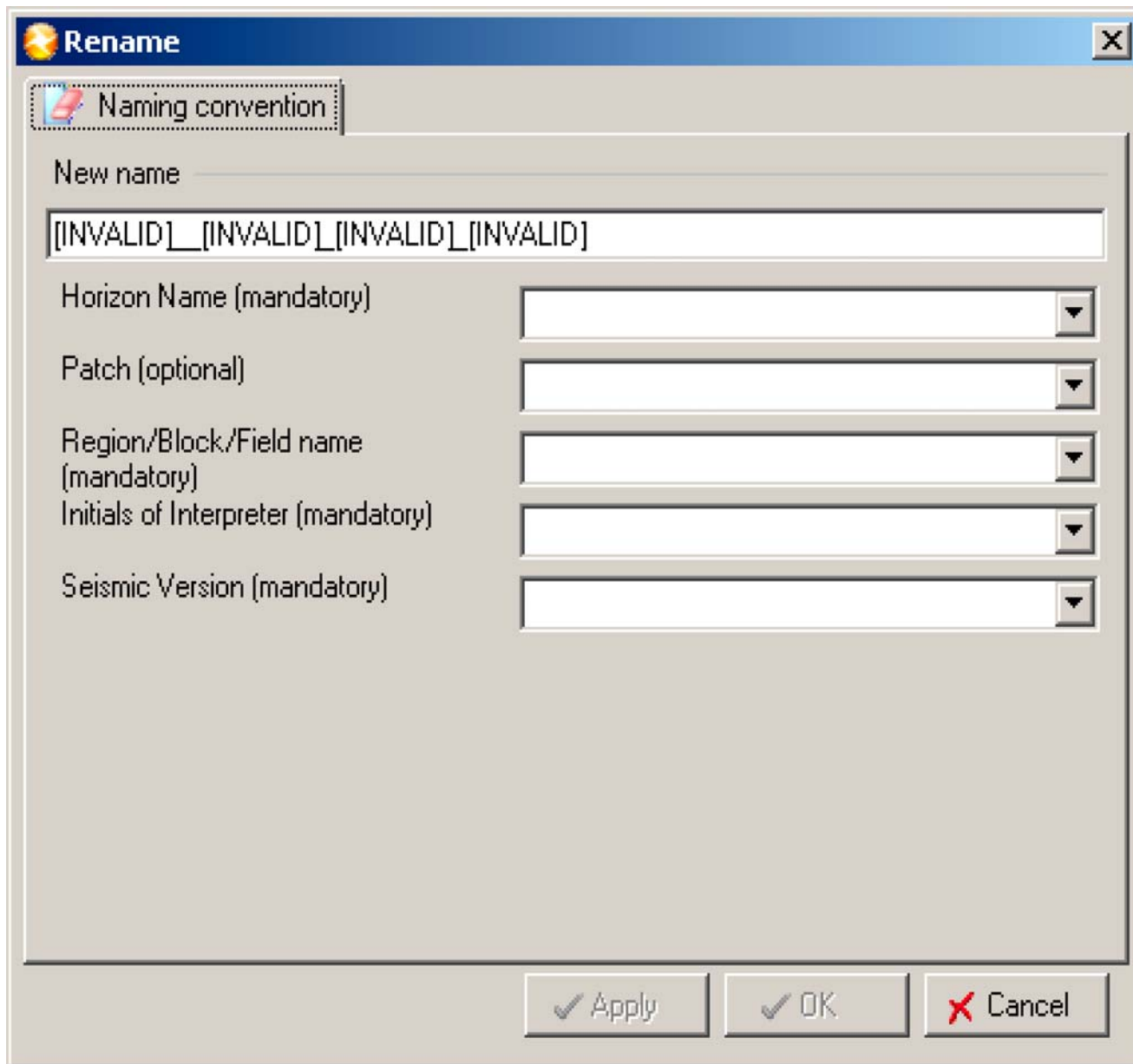


Figure 2. Petrel – Naming convention plug-in.

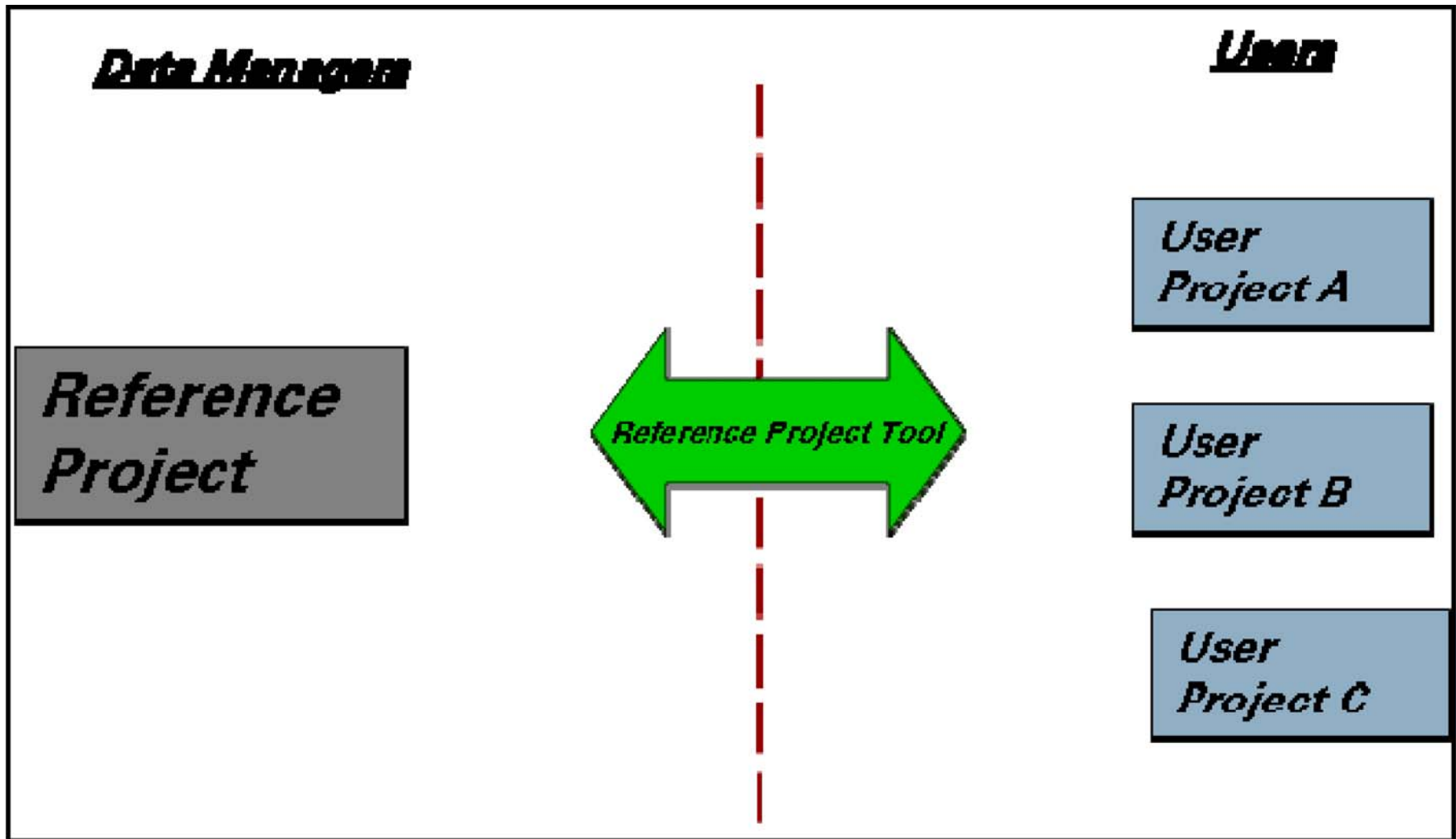


Figure 3. Petrel – Reference-User project updates.

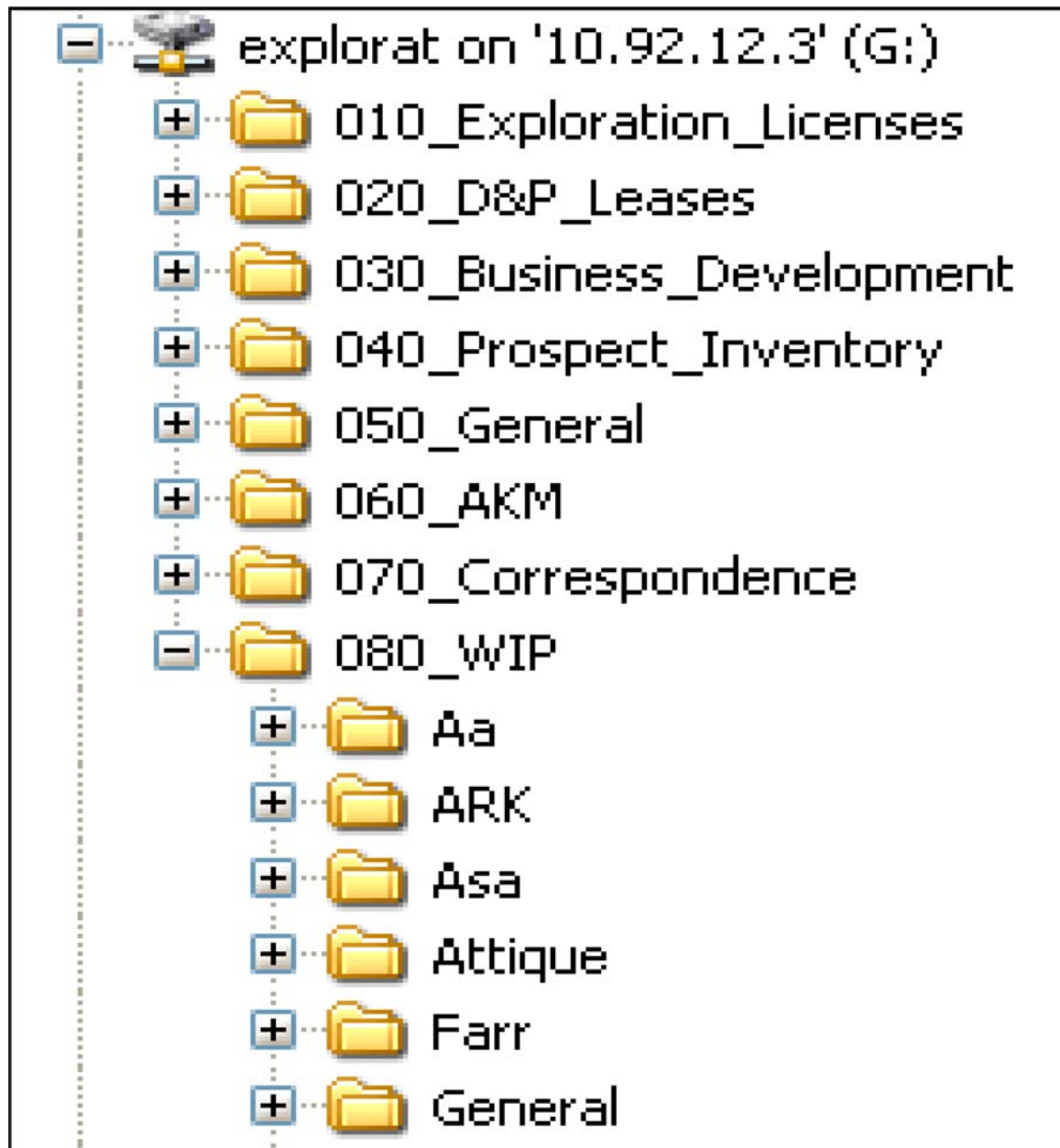


Figure 4. Main directory structure.