

## Well360°™: A Reference Architecture for E&P Information Management

### Introduction

Well360°™ is a reference architecture designed to provide upstream oil & gas companies with business-driven operational standards for more effective information management.

Developed by Stonebridge, the Well360° architecture addresses one of the biggest operational problems facing the E&P industry: the inability to leverage data and documents related to well assets. This deficiency leads to misinformed drilling decisions, financial penalties, poor business performance, and a tendency to repeat mistakes.

A framework developed through many years of solution development, the Well360° architecture is an operational standard by which E&P companies can rationalize their information management environment, preserve and extend existing IT investments, and mitigate risk associated with new IT deployments. The result: improved performance.

### Well-centric Information Strategy

The Well360° architecture is built on a straightforward E&P-centric business principle: the E&P business revolves around the well. The well is a core asset tracked, analyzed, and managed throughout a life cycle that may be just beginning or may span decades. The well serves as the linkage across internal business functions in an operating company and to those of affiliated external third parties.

Structured and unstructured data is generated at all points in the well life cycle, and E&P companies may have hundreds – in some cases thousands – of well assets in their portfolio. Traditionally, well data was created and collected using paper-based media and accumulated in physical storage sites. Today, electronic well data is created through many different avenues – desktop computing, mobile devices, e-mail, instant messaging, etc. – all of which exponentially increases the amount of information to manage.

Ineffective well data management undercuts the performance of many E&P companies where it matters most: in the field, in the engineer's office, in the planning meeting. For most companies, the existing environment is characterized by:

- No single electronic repository for storing information about a well
- Departmental information not accessible outside that department
- Standalone software systems supporting parts of the well life cycle
- Multiple storage options for retaining well-related information
- No uniform corporate policy for well information management

The Well360° architecture is designed to leverage the fundamental processes associated with well asset management that are common to all wells, despite differences in output, location, and operability. Well360° establishes a well-centric architecture that:

- Shares enterprise infrastructure, user interface, and well data
- Combines structured and unstructured data related to a well
- Allows for holistic analysis of well activity and performance

### Operational Benefits

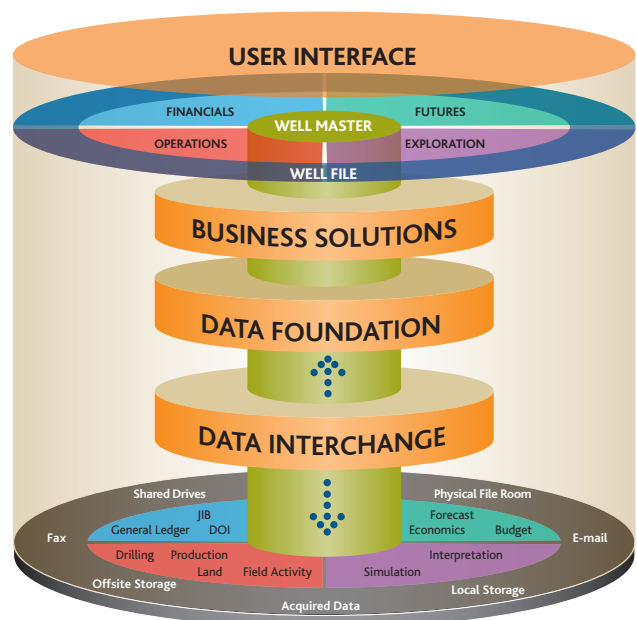
■ **Well Data in a Single User Interface** The Well360° architecture presents structured and unstructured information in one easy-to-navigate user interface. Existing E&P business applications tend to address one data type: either structured data collection for wells or the compilation of their documents and other unstructured content into a repository.

■ **Data Structures Span the Well Life Cycle** The Well360° architecture combines aspects of the entire life cycle into its underlying framework, while leveraging the data and capabilities of departmental information systems. The result: less fragmentation and "silo" data management, and easier information retrieval by parties not directly involved in a particular aspect of the life cycle.

■ **Role-based and Asset-based Filtering** The Well360° architecture invokes features to adapt, modify, and, when necessary, restrict the well data "view" according to the business user's specific job function related to the well or geographic alignment.

■ **Automated Communication Between Systems** The Well360° architecture provides application integration capabilities to provide the "right" data in the right place, reducing the risk of error in data re-entry and saving time for the business user.

■ **Flexibility in Data Organization** The Well360° architecture applies changes to the "master" structure to all wells built on earlier versions, allowing the environment to evolve over time with limited IT intervention.



## Well360° Architectural Components

### USER INTERFACE

- **Portal Site Structure** Standard “look and feel” templates that represent the user experience within the portal framework. The structure includes a GUI that is influenced by the business user, with interchangeable component parts to deliver information for different aspects of the well life cycle.

### BUSINESS SOLUTIONS

- **Automatic Well File Creation** Automatic generation of the well file and the linkage to other application systems. Within the Well360 architecture, this is built as a process that runs without user intervention and minimizes the amount of manual work required for maintenance.
- **Event Handling** Automated handling and routing of documents once they are placed in their respective electronic well file. This capability creates metadata about the document, communicates with other dependent applications, and initiates a business process.

### DATA FOUNDATION

- **Well Master Database Model** A central database for capturing well header-related information; derived from the Public Petroleum Data Model (PPDM). The model is populated by many sources, including the general ledger, operations systems, and engineering applications.

- **Well Analytics Model** Structured data – i.e., data housed in database tables as a “star schema” as well as in an OLAP cube structure – needed to better track and analyze the performance of a well. This data includes such events and transactions as production volumes, allocated expenditures, reserves estimates, and downtime events.

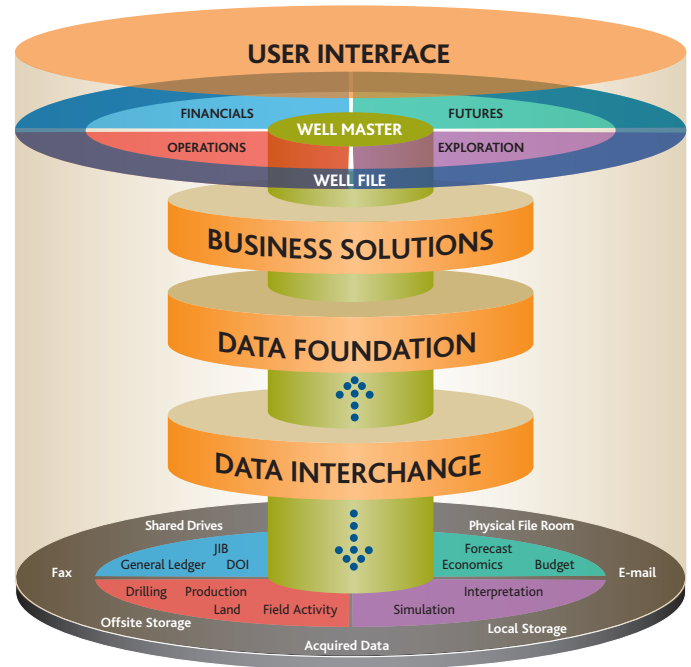
- **Adaptive Taxonomy** The organization scheme by which the unstructured data for a well is managed, typically represented as a hierarchical structure related to departments, functions, and content types. This taxonomy establishes the common vocabulary used within the company to describe a well and its activities.

### DATA INTERCHANGE

- **Metadata Synchronization** The attribution to individual documents of well-specific data values from other data sources or systems. This allows documents to be searched based on the characteristics of their parent well (i.e., county, producing states, total depth).

- **Process Workflow** Automated notification of all parties dependent on the process. This improves efficiencies and captures an audit of the activities as they occur.

- **Information Services** Web services platform for simple communication between points. This makes the complexities of the underlying application transparent to the sender and the receiver.



## Well360° Technical Components

The Well360° architecture is designed to create a cohesive, well-centric information management strategy by utilizing and enhancing standard vendor technologies, including:

- **Portal** This user interface allows presentation of multiple types and styles of information through a single Web-based view. This is commonly delivered through standard portal technologies such as Microsoft Office SharePoint Server 2007.

- **Relational Database** The database engine serves as a collection point from the various underlying source systems. This is commonly delivered on standard database vendor technologies such as the Microsoft SQL Server 2005 or Oracle 10g database platform.

- **Content Management System** This application serves as the repository for unstructured data in the electronic well file. The content management system also delivers search functionality. These capabilities are commonly delivered on standard ECM vendor technologies such as the Microsoft Office SharePoint Server 2007 or the Open Text ECM platform.

- **Reporting and Analysis Suite** Various views of data about the well's performance are built and presented in tabular, chart, or other visualized form. This is typically delivered on standard vendor technologies such as the Microsoft Reporting Services / Analysis Services suite or the Cognos 8 Business Intelligence suite.

- **Workflow Engine** Business processes associated with the well are automated to allow system-to-system and system-to-stakeholder communication to be handled and reported in the portal interface.

- **Message-Oriented Middleware** A 360° view of the business often requires a “real time” connection with other systems to send and receive information. This can be conducted using standard message-oriented middleware such as Microsoft BizTalk, TIBCO, or standards such as JMS.

## Industry-Tested, Client-Proven

The Well360° reference architecture reflects Stonebridge's collective knowledge of the industry's unique challenges, functions, processes, regulatory environment, and information management infrastructure gained from more than 30 consulting engagements at E&P companies. For more information about Stonebridge's Well360° reference architecture, contact Stonebridge at **800-776-9755** or **well360@sbt.com**.

## About Stonebridge

Stonebridge provides IT consulting and systems integration services to help our clients solve systemic business problems caused by data management and data integration issues.