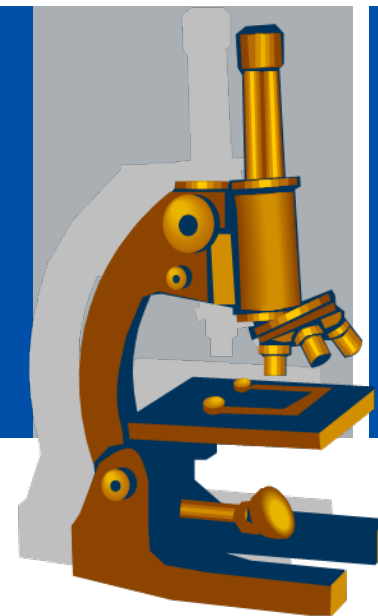# Putting the FOCUS on Data

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W3C Workshop on Semantic Web in Oil & Gas Industry
Houston, Texas
December 9-10, 2008

Fully Instrumented Facility

Current State: So What's New?

- <u>Time</u>: Need to incorporate real time data

- <u>Productivity</u>: Significant amount of time (30-70%) is spent looking for and assessing the quality of the data found

- <u>Trust of what data you find:</u>

  - Do we understand of the meaning of data

  - Lack of consistent data definitions

  - Multitude of systems create their "own versions of the truth"

- <u>Impact</u>: Need to share data with other team members, offsite experts, partners, with regulators and landlords

- <u>Perspective</u>: Need a broader look as asset performance (not just wells or reservoir or processing equipment)

Information Management

At the most basic level Information Management consists of the following:

- 1 – Identify the information

- 2 – Describe the information

- 3 – Organize the information

- 4 – Manage and use the information

These steps pretty much have to be carried out in order – you can't organize the information without the descriptions used for that organization, and so on.

With the special exception of search techniques, which have their own limitations, attempts to implement information management across the enterprise have been largely unsuccessful, often because they have become too complex and difficult to use.

Our successes in IM have mostly been in restricted domains, often involving descriptions and organizations peculiar to those domains, and the isolation of these domain-specific efforts has been worrisome

The Information Pipeline
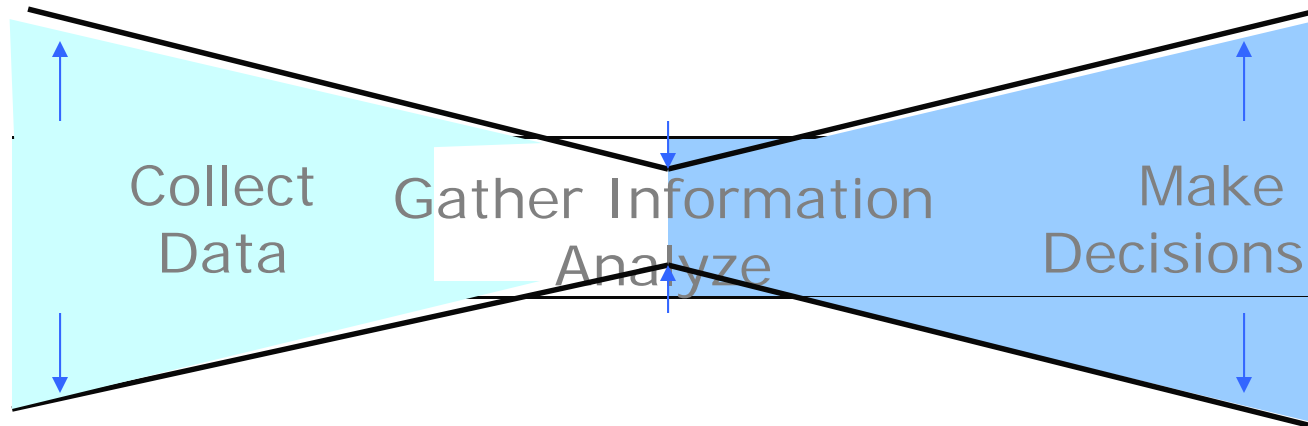
Collect Data	Gather Information Analyze	Make Decisions
Oil Field Automation	**Information Overload**	**Improved Capability for Modeling & Simulations**
•Further process digitization	•Data Access, formatting, quality control	•Increased processing capabilities for simulation, modeling, visualization
•Real Time data collection	•Lack of consistent master data	•More detailed models (earth model, reservoir models, facilities model, economic models, full asset simulation)
•Sensors: downhole, surface facilities, transportation & logistics	•Lack of standards in information exchange	
• Intelligent controls	•Shadow systems	•More capability to run multiple scenarios / what ifs
•Automated Well Tests	•Usability Concerns	
	•Complexity of systems	

We are reasonable people, How did it get this bad?

Impact of Downsizing and M&A Activity

Consequences of Best of Breed Technology selection

Powerful Desktop tools became the default solution. The data you need is in a spreadsheet on a shared drive, somewhere

Legacy Solutions never die, until the user does

Data explosion: Growth in data volume is increasing, especially with field automation on new major capital projects and with digital oil field programs :

Absence of a widely deployed industry standard upstream metadata and master data management process

Business Impact of Current State

Need to manage assets in real time

"*Engineers use month-old data generated by financial process.*"

Need to optimize operations from global / OPCO view

"*Current operations are redundant and attempt to address the same goals in different locations with varying solutions which increase implementation costs implementation durations and support costs.*"

Need to understand most appropriate decisions or priority

"*Currently, we have challenges in understanding most appropriate decisions and their priority and we may not be taking action on the highest impact initiatives.*"

Need to be more proactive

"*We currently react to issues once they reach certain thresholds and many times we are not aware of the issue until they become a full blown problem.*"

How much to we really Value Data?

Haven't we tried this before? - *Lessons Learned*

Getting the Business involved – *Who Me?*

Value of the Information Infrastructure – *Making the Business Case for enabling investments?*

Data Quality- *It can't be that bad, can it?*

Let's go back to the good old (paper, mainframe) days – *It never used to be this bad, what happened?*

How to make this a priority when everyone is already busy – *We don't need another project!*

Complex Business Rules – *Why is this business so complex?*

Linking Structured Data and Unstructured Documents – *But I need both of them*

How do you get the engineer to give up shadow systems – *Excel runs the Oil Field*

Information – the Missing Asset?

We spend a great amount of time and $$ to manage our financial, human and reputational assets.

Do we even know what our information asset is worth?

What we Own
**Physical assets
The Balance Sheet**

Financial Asset

What we can do
**Talents, Relationships
Our "Human Energy"**

The Human Asset

What we know
**Data, Records,
Knowledge, Know-how**

Information Asset

How we are seen
**Partnerships,
Stakeholder Opinions
Customer views**

Reputation Asset

Path Back to Sanity: Information Architecture

Data Governance

Upstream Reference Master & Meta-Data

Business Architecture: Start with your key decisions, understand the work process that produces that information

Unstructured Documents **&** Structured Data

Information Quality Assurance & Standard Systems of Record

Data Integration & Information Visualization Framework

Information Lifecycle Management

Information Architecture

- Information Architecture is the process and framework for planning the management of information

  - Planning Information Quality improvements

  - Identifying opportunities for increasing information value

  - Establishing standards for information quality, data ownership, and data shareability

  - Demonstrating the information value chain across company business functions for KEY information

- Enables a company to develop:

  - Common language for data

  - Shared, distributed, accurate and consistent data resources

Architecture Reference Model

* Source: UAT / Preedy
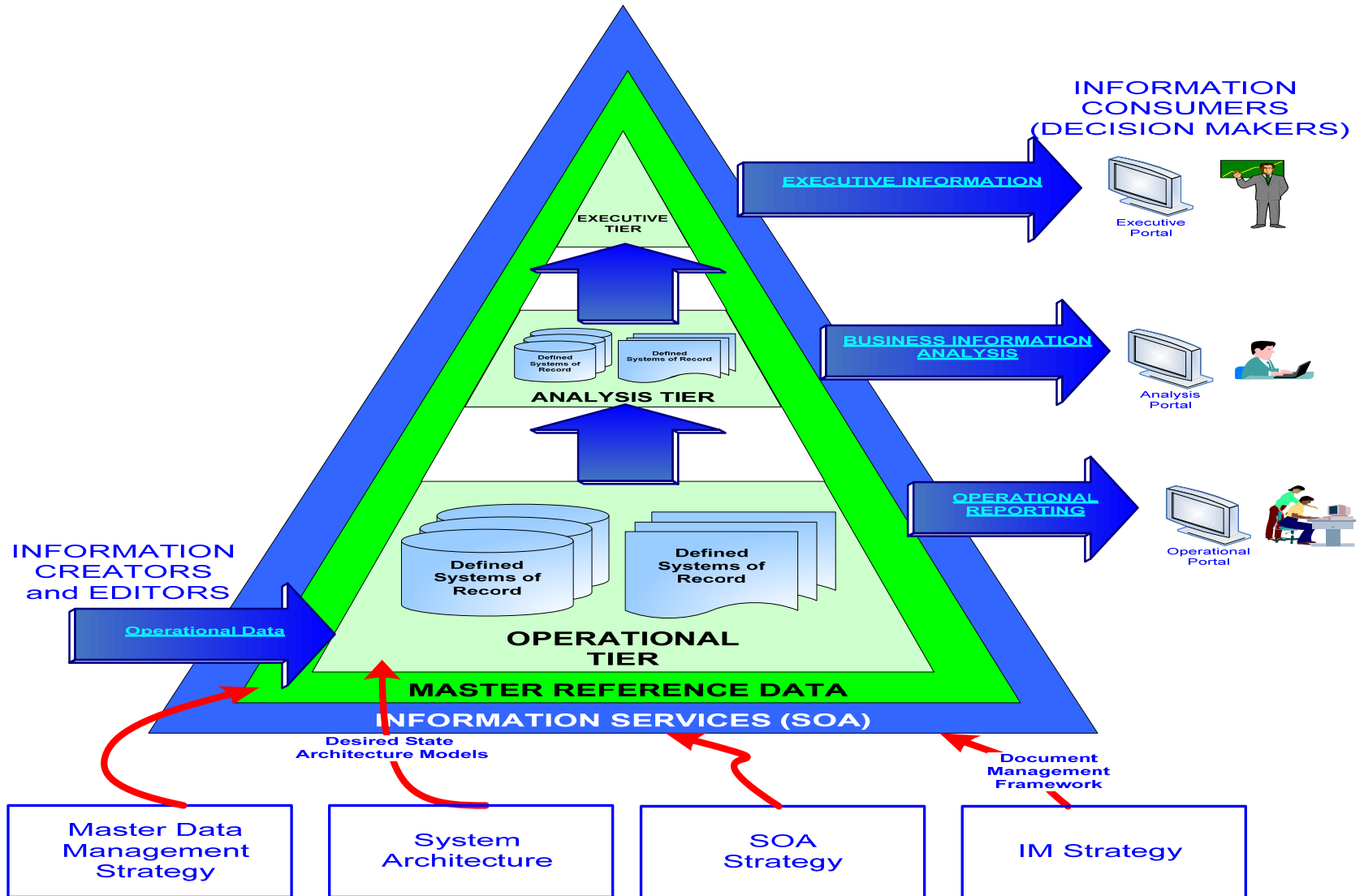
Role for Semantic Web?

- Oil & Gas Industry has not been able to agree on a common relational taxonomy

- Lack of agreed to definitions of common terms and hierarchies

- Large amount of historical data to "re-tag"

- Some success with xml based data protocols to exchange data

- Maybe understanding of data relationships between functional taxonomies can unlock integration opportunities

The Prize:
# Increasing the Value of Information

- **Making data more available for decision-making**

  - Making data easier to find

  - Providing better analysis tools

  - Integrating data into standard workflows

- **Improved data quality**

  - Clearly identified systems of record

  - Improved accuracy, increased trust

- **Integration / Interoperability**

  - Data is stored once and re-used

  - Minimize re-entry of data

- **Effective operations of data management systems**

  - Quickly respond to customer requests

  - User-friendly systems

Chevron Has over 6,000 Terabytes of Data and growing

Categories of Data

Financial 5%

Business 25%
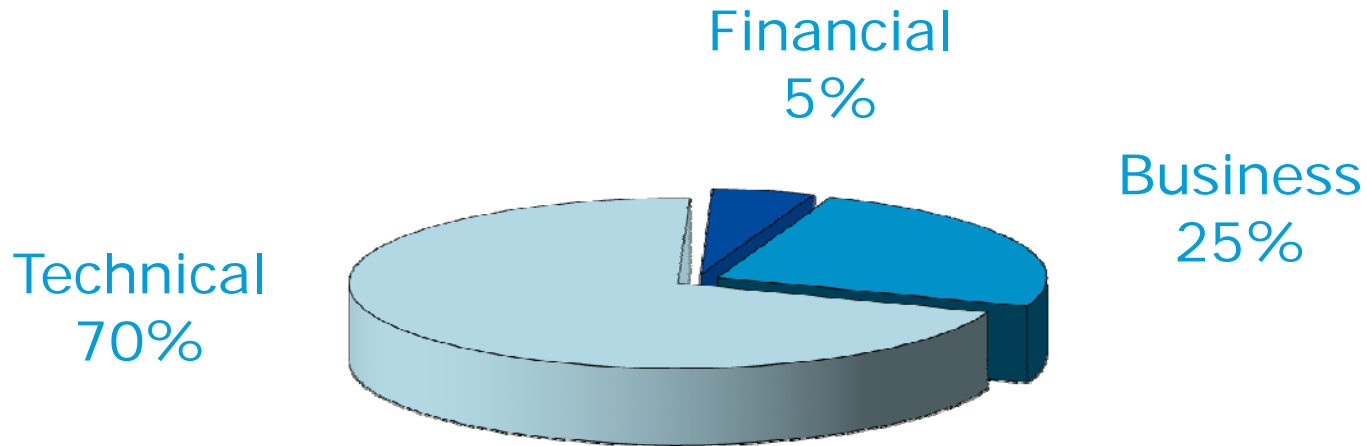
Technical 70%

- 80% annual growth rate of technical data last year (2007)

- 60% compound annual growth rate of business (unstructured) data for the last two years. This means we will have 10x the data in 5 years, 100x in 10 years and 1000x in 15 years

- Nearly 300 million office documents

ASSET DECISION ENVIRONMENTS	i-field	INTEGRATED ASSET MANAGEMENT

REUSABLE BUILDING BLOCKS	SURFACE & SUBSURFACE PROCESS OPTIMIZATION	REAL TIME DATA & DECISIONS	PARTNERSHIPS & JOINT VENTURES	ORGANIZATION CAPABILITY & CHANGE MANAGEMENT	FOUNDATION OF ENABLING TECHNOLOGIES