Creating Business Value from IDEF0-Based EA Modelling – Making Software More Process Aware

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Outline

• Datamine - Background
• Mining Challenges
• Datamine’s Solution
• Requirements Analysis using IDEF0
• Data Integrity
• Benefits of Process
• Questions
Datamine - Background

• UK Based Company – started in 1980’s
• Supplier of Software Technology & expertise to Mining Industry
• Regional Offices on all major mining continents
• >80% of staff are graduate mining / exploration trained
• Goal
  – The Datamine Group is the world's leading supplier of technology to the mining industry. Our goal is to become a key business partner for mining companies and consultancies by offering the best products and the best people in every major mining region in the world.

• More information from
  – http://www.datamine.co.uk/
Mining Challenges (1)

- Booming World Economy
- Raw Material Shortage
- Many Resource Companies
- Technical Skills Shortage
- The Next Big Mine
- Maximise Shareholder Return
Mining Challenges (2)

Different commodities
- Platinum
- Gold
- Base Metals
- Uranium
- Diamonds
- Coal etc.

Different Mining Methods
- Underground Mining Methods
- Drift mine
- Shaft mine
- S.G.
- Surface Mining Methods
- Dragline removing mountain top
- Auger mining
- Dragline m pit
- Waste

Variable Data Sources
- Paper Records
- MS Excel Spreadsheets
- Various proprietary Database Systems

Mining Terminology
- Stopes
- Rings
- Development
- Drives
- Waste
- Reconciliation
- Cubbies
- Ore
- Exploration

So how do you get a single software suite to support all these challenges?
1. Have a set of modules that cover the whole Mine Planning Cycle
2. Have Process Methodology as a key part of doing work.
3. Use IDEF0 Modelling to perform
   - Requirements Analysis
   - Produce Process Aware Software Solutions

This is known as the **Datamine Enterprise Methodology**.
The Solution for the Mine Planning Cycle

- **Open Pit**
  - Geological Data Management Solution
  - Resource / Reserve Management Solution
  - Mine Design & Scheduling Solution
  - Mine Production Solution

- **Underground**
  - Geological Interpretation
  - Mine Strategy
  - Mining Strategy Solution

- **Ind. Minerals**
  - Operational Mine Plan
  - Mine Design

**Presentation Tools**
- Datamine Enterprise (Process Integrity)
- Datamine MineTrust (Data Integrity)
- Environment
# Operational Process Analysis to Solution Footprint

## Datamine Enterprise (Process Integrity)

<table>
<thead>
<tr>
<th>Open Pit</th>
<th>Underground</th>
<th>Ind. Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHLite, DHLogger, SSLite, SampleStation, MineMapper 3D, Fusion Server, Fusion Client, Downhole Explorer, Terrain Laboratory Information Management System (LIMS)</td>
<td>Studio, Block Modeling, Grade Estimation, Wireframing, Statistics, Stereonet, Geo-Sculpting Geostatistics, Variogram Analysis, Unfold, Conditional Simulation, etc.</td>
<td>Present InTouch MineCAD Mining Power Pack</td>
</tr>
<tr>
<td>Operation Scheduler Mine2-4D Open Pit Production Scheduler</td>
<td>Mine2-4D Underground Production Scheduler</td>
<td>Operation Scheduler Mine2-4D Open Pit Production Scheduler</td>
</tr>
<tr>
<td>OreController, Survey, Blast Design, ISTS Blend/Grade Optimizer</td>
<td>Survey, Blast Hole Ring Design</td>
<td>Raw Materials Manager Blast Design, ISTS Blend/Quality Optimizer</td>
</tr>
</tbody>
</table>

*GRE = Geo-risk Enabled

**Environment**

**Release 2006**
Why Capture Requirements?

• To understand and document work processes within a business
  Facilitates information flow
  Introduce business process concepts

• To improve business processes
  Analyse performance
  Reduce Costs

• To develop software that is useful and functional to a business

• To provide the business with what is required

• Datamine want to be in a situation where software
  • Is easy to use – intuitive
  • Controls processes and to assist in the workload
  • Is generated (partly) from designs of operational processes
Datamine Preferred Analysis Tool

- The preferred analysis method is IDEF0 – using AIOWin software
- Allows the capture and visual representation of any real world process
- Can be used to model the same functionality from different viewpoints
  - This is a very important topic
    - A model is an idealised view of objects, activities, properties and relations designed to imitate the character of a real-world system
    - The power of a model comes from its ability to simplify the real-world system it represents, and to be able to predict facts about that system
  - IDEF0 handles complexity by decomposing an activity into finer levels of detail
Steps in Requirements Analysis

Interview Client

As-Is Model

To-Be Model

Datamine To-Be Model

Embellished with information to allow automatic generation of code
IDEF0 Model Content

- **Activities** – things that need to be done

- **Mechanisms** – things or persons that act on the activity in order to produce an output. Mechanisms support the execution of the activity

- **Inputs and Outputs** – things that are input and output from the system

- **Controls** – things that constrain the activity to work in a certain way, they specify the conditions required for the function to produce correct outputs. Think of items such as
  - Company standards
  - Guidelines
  - Templates
  - Legends and limits
Data Integrity

**Common “As-Is” Data Repository**

- Paper Records
- MS Excel Spreadsheets
- Various proprietary Database Systems

**Desired “To Be” Data Repository**

- Data stored in a central repository
  - Accessible at all times
- Data storage is within context
  - Files relating to a particular part of the client hierarchy are stored together
- Client data is organised in a way that allows files to be version controlled
- Uses Microsoft Visual Source Safe (VSS) and Mine Trust
Standard IDEF0 Model

Diagram:

A1 Enter and manage raw data

I1 Raw exploration drilling data
I2 Raw geological mapping data

A2 Model Geological Structures

A3 Carry out Geostatistical Analysis

A4 Prepare Resource Model

O1 Ore Resource Model
O2 Ore Resource Report

Event:

C1 Lithology legend

External Inputs:

- Desurveyed exploration drillholes
- Resource model prototype
- Geological mapping strings

External Outputs:

- Lithology model
- Orebody wireframe
- Drillhole composites
- Variogram model
- Search parameters

Data:

- Lithology legend
- Raw exploration drilling data
- Raw geological mapping data
- Desurveyed exploration drillholes
- Resource model prototype
- Geological mapping strings
- Lithology model
- Orebody wireframe
- Drillhole composites
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Processes:

- Enter and manage raw data
- Model Geological Structures
- Carry out Geostatistical Analysis
- Prepare Resource Model
Datamine Enhanced IDEF0 Model

Linking Data Sources to Process Activities

Outputs GMPR, GLST etc are Datamine files, with defined structure and position within the Database
Creating Client Specific Menus

Linking Processes to Application Menus

Transfer of IDEF0 Data to Enterprise Application Builder uses XML export functionality from AOIWin & some editing of XML Scripts
Using Client Specific Menus

- Select the Site and Product and click OK
- Select the menu and secondary menu item to display the dialog

User doesn’t need to know where the data is stored or what happens – and each time the same action will be undertaken the same way.
Link between IDEF0 & Menus

Executive Summary Presentation
**Summary of Process (1)**

Requirement capture and analysis of the As-Is and To-Be models

Modelling of the As-Is and To-Be models and generation of the Datamine To-Be model

Generation of XML Code from the Datamine To-Be model

Re-organisation of data model hierarchy and construction of the application code
Summary of Process (2)

Re-organisation of data model hierarchy and construction of application code

Application and data model code may be modified. Stored in central repository along with data and the rest of the codebase that it refers to

Use of application and data model in Datamine Studio

Central Repository used to store data in Hierarchical fashion
Benefits of Process (1)

For Datamine

- Common method of project assessment
- Projects can be aligned to standard activity listing
- Closer alignment of activities to data sources and software modules
- Single documented database of all Project deliverables
- Quickly identify business improvements by deploying ‘To Be’ solution
- Monitor actual business improvement vs. expected business improvement
- Model outputs can be used to do peer review of projects by other Datamine OpCo’s & training of Consultants.

‘Datamine Enterprise’ methodology can be rolled out to all projects – not just those using ‘Datamine Enterprise’ module.
**Benefits of Process (2)**

**For Clients**
- Often this is the first time their Operating Process has been reviewed and documented.
- Client team can work off the same page as the Datamine Consultants
- Industry Best Practice can be easily shared
- The solution is more likely to fit the Client requirements than if this methodology wasn’t followed.
- Process changes can be analysed using IDEF0 Models, BEFORE the software change is made – so Client spends money on the important changes first.