Mine planning and the EMMM Reference Framework
WITS Mine Planning School

Focus:
To provide a platform for the mine planning fraternity to explore best practices and share experiences, in order to create a learning experience and increase their competencies.

Sharing with you here today the following best practices and experience:

- Reference Frameworks
  - Industry focused
  - Collaboration oriented

- Enterprise Architecture
  - Structured approach
  - I present – the enterprise
What is a Reference framework:
A reference model is an abstract framework for understanding significant existence and relationships among the entities of some environment. It enables the development of specific reference or concrete architectures using consistent standards or specifications supporting that environment.
Best practices in other Industries:

*Industry Reference frameworks*

- Information & Communications Technology (TMF with Frameworx)
- Supply Chain (SCOR)
- Retail (ARTS)
- Oil & Gas (PCATS)
- Financial Institution (CIM)

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**PCATS Open Site Architecture Reference Model**

Submitted by swood on Thu, 08/28/2008 - 11:00am

The Device Integration Committee Open Site Architecture Working Group has completed its work on the 1.3.2 of the PCATS Open Site Architecture Reference Model. In accordance with the Operating Procedures, we are commencing a 60 day comment period for members.

To download version 1.3.2 of the specification, go to: [http://cms.pcats.org/project/osarm](http://cms.pcats.org/project/osarm).
Information and Telecommunications Industry

Frameworkx

Frameworkx Overview
Frameworkx Quick Start Library
Business Process Framework (eTOM)
Information Framework (SID)
Application Framework (TAM)
Integration Framework
Business Metrics

Frameworkx Implementation Support

Frameworkx Implementation Support
Frameworkx Conformance Certification
Business Benchmarking
Business Metrics Automation Certification
Training & Certification

Best Practices

Procurement
Revenue Assurance
Service Level Agreement Management
Software Enabled Services Management
IPsphere

Frameworkx 11.5

Suite of standards that enable successful business transformation

Latest Downloads

Select the standard you would like to download.
Application Framework (TAM) 4.5
Business Process Framework (eTOM) 9.0
Business Process Framework (eTOM) 11.5 beta
Information Framework (SID) 9.5
Integration Framework 2.5
Integration Framework 11.5 beta
Revenue Assurance Solution Suite 3.0
Revenue Assurance Solution Suite 3.5 beta
Business Performance Measurement System (BPMS 5.5.0)
The Association for Retail Technology Standards (ARTS) of the National Retail Federation is an international membership organization dedicated to reducing the costs of technology through standards. Since 1993, ARTS has been delivering application standards exclusively to the retail industry. ARTS has four standards: The Standard Relational Data Model, UnifiedPOS, XML, and the Standard RFPs (in partnership with NRF). Membership is open to all members of the international technology community—retailers from all industry segments, application developers and hardware companies.
The intent of these frameworks

- To provide a generic/typical industry answer for the questions organisation in every industry face:
  - **How** are we transforming inputs into outputs
  - **When** does it need to be done
  - **Who** will do it
  - **What** information do we need to do it
  - **Where** will it have an impact/be used
  - and **Why** are we doing it
Common themes in industry reference frameworks

- They all focus on the following elements of the industry
  - Business Process
  - Information/Data
  - Some aspects of integration or flow
  - Some Business Capability
  - Some have an application and/or service component included

- Addressing specific components that make up the enterprise…
  - Notice the link to EA here
A Reference Framework for Exploration and Mining

- Defining the information/data the enterprise needs to keep
- Business capability required for Exploration & mining
- Common definition for business process, operating model
- Business Process
- Information
- Business Capability
Exploration and Mining Business Process model - Context

- Strategic
- Tactical
- Operational / Mine Site

- Green Fields
- Brown Fields

- Discover
- Establish
- Exploit
- Beneficiate
- Sell
- Rehabilitate

- Enterprise Support

- Plan
- Measure
- Control
- Report
1.1 Discover

Defines the process by which an exploration target and/or a mineral resource is articulated and defined for acquisition purposes. The process includes:

- Evaluation of grade and tonnes.
- A pre-feasibility phase.
- Examining the production options.
- Acquisition of the necessary rights.

**At a Strategic level:**
Discover involves the exploration strategy and associated activities to find new or unknown mineral deposits.

**At a Tactical level:**
Discover involves the evaluation of existing or known mineral deposits with the objective of expanding the existing knowledge base.

**At an operational level:**
Discover involves the day to day enhancement of the level of confidence in the geological model.

**Output:**

**Strategic level:**
- Exploration Strategy
- Exploration projects
- Quantification of a potential exploitable mineral resource

**Tactical level:**
- Mineral Deposit evaluation report
- Quantification of a potential extension to known mineral resource
- Updated geological model
- Expanded mineral inventory

**Operational level:**
- Operational budget/ updated short-term exploration plan
- Routine updated geological model
- Definition of ore reserves
Exploration and Mining Information Reference Model

Information Components per Enterprise Process area (subject area level)

**Discover**
- Rights
- Organisation
- Location
- Survey Collection
- Sample
- Geo-technical Results
- Ore Body Model
- Projected Mineral Reserves
- Environmental Impact
- Business Case
- Constraint
- Location

**Establish**
- Legal agreements
- Project
- Resource
- Mineral/Commodity
- Exploitation Option
- Engineering Design
- Equipment/Machinery
- Mine Plan
- Mine Design
- Techno-economic Forecast
- Facilities
- Operational Model
- Operational Performance
- Pre-built documentation

**Exploit**
- Mine Schedule
- Shift
- Workforce/Workbench
- Rock Movement/Ore Flow
- Broken Rock
- Activity
- Process Quality Indicator
- Infrastructure
- Environmental Indicators
- Utilities
- Sample
- Mine Inventory
- Rock Valuation
- Operational Performance

**Beneficiate**
- Beneficiation Schedule
- Plant Performance
- Product Flow
- Stockpile
- Blending
- Distribution Plan
- Marketing Bilateral
- Metal Inventory
- Consumables/Materials
- Product
- Outbound Logistics Schedule

**Sell**
- Customer
- Financial Transaction
- Order
- Marketing Bilateral
- Distribution Plan
- Demand
- Stock

Legend:
- Event/Incident
- Competence
- Role
- Asset
- Record
- Supplier
- Customer
What is Enterprise architecture:
"Enterprise Architecture is about understanding all of the different elements* that go to make up the enterprise and how those elements inter-relate" - IFEAD
My experience

- “If its not written down it does not exist” – Alan Collins
- “You can’t manage what you cannot describe” – John Zachman

**Enterprise architecture** is about the power of description – making things explicit that otherwise are considered based on perception or assumption.
## Making things explicit based on perspectives

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A Zachman derived definition of the six different perspectives
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