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Rio Tinto

EXPLORATION, MINING, METALS & MINERALS VERTICAL

www.riotinto.com

www.realirm.com

TOGAF™ 9 to build the EMMMv™ Reference Architecture

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Exploration

Agenda

- Introduction
  - Real IRM, Rio Tinto, EMMMv™
- Industry Drivers
- Reference Architecture and Business Reference Models
- EMMMv™ and TOGAF™
- Conclusion

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Real IRM

- Core Information Resource Management (IRM) team of South African Breweries (SAB) innovatively used Enterprise Architecture (EA) concepts in implementing SAP software
  - Invited to present a paper at the *Zachman Institute for Framework Enhancement* conference in Arizona on using the Zachman Framework to implement ERP systems
  - Member of the SAP AG Global Customer Council for Knowledge Management
  - IRM approach cited by AMR Research as an industry best practice
  - IT Governance Institute™ and ISACA selected Stuart Macgregor as a member of the international expert panel to develop the CobiT 3rd edition management guidelines
- The core Information Resource Management Team of South African Breweries (SAB) broke away from SAB in January 2001 and formed Real IRM Solutions (Pty) Ltd.
- Over the past years provided EA solutions to a number of leading organisations, both locally and internationally.
- In 2005 became The Open Group representative in Africa
- In March 2006 hosted the first EAPC Practitioners Conference in another Cape Town

"I was very impressed with the structured approach you have taken to this, and have not seen (this approach) anywhere else, and I have talked to numerous leading organisations, such a comprehensive and advanced investment in a solid platform for a real return on information and investments."

Rainer Zinow Vice President - GBU Knowledge Management SAP AG

"The structured approach, presented by Real IRM, has had a positive effect on the introduction of Enterprise Architecture as a methodology for business process modelling and management into our organisation. "

De Beers

"The IT Governance Framework development Program has been completed… I do want to add that the work provided was the highest quality and that you had provided invaluable assistance in helping us define our IT Governance program – thank you."

A leading global Health Care Industry

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Rio Tinto

- With founding companies established in 1873 and 1905, Rio Tinto stands today as one of the world's leading mining and exploration companies. It has scale and global presence, operating on nearly every continent.
- We find, mine and process the earth's mineral resources - metals and minerals essential for making thousands of everyday products that meet society's needs and contribute to improved living standards.
- Our products include aluminium, copper, diamonds, energy products, gold, industrial minerals and iron ore.
- Rio Tinto is a modern-day business, committed to serving all of its stakeholders. In all that we do, Rio Tinto follows the very best practices in safety, ethical business, social and environmental responsibility, and sustainable development.
- Our strategy is to invest in large, long life and cost competitive mines driven by the quality of opportunity, not choice of commodity.

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Benefit to members

- Why Rio Tinto Exploration Joined?
  - To improve the support, interoperability and innovation of technical solutions currently used in the industry
  - We see the forum as an independent facilitator to promote technical industry advancements
  - At this point Exploration is involved in the Forum

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The Open Group's EMMMv™

- Exploration, Mining, Metals and Minerals and *not* Natural Resources
- **History:**
  - The concept of an industry group was agreed to at the Gartner Mining and Resource Industry Technology Summit 2007.
  - In September 2008 the first members were signed up, a vision & charter delivered
- **Current active participants:**

Real IRM	Rio Tinto
GijimaAST	Datamine
Lonmin Platinum	Exxaro
SAP	

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Business Drivers in the industry

Align safety with operations

- Safety and health a primary driver for this industry

Reference models enable :

- identify risks
- embedding SHERQ, into business processes

-SHERQ processes will lead to:

- a reduction in accidents and deaths

Increased productivity

- Productivity impact financial performance

Reference models enable:

- Identify & enable shared resources and services
- Increasing productivity & reducing operational costs

Legal and regulatory compliance

- Understanding regulatory and reporting requirements within context of a reference model *simplifies* compliance management and verification

Cost reduction

- Throughput and process optimisation have a major impact on financial performance

- Best practice, industry business process models standardise and optimise operations, facilitating cost avoidance

SHERQ = Safety, Health, Environment, Risk and Quality

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Objectives of EMMMv™

- Specific objectives of EMMMv™ :
  - To realise sustainable business value through collaboration around a common operating model
  - To support accelerated delivery for the organisation
  - To ensure the organisation is at the fore-front of process productivity and regulatory compliance
  - Enable members to put their Business-IT investment into areas of differentiation
  - To facilitate progress towards goals such as shared services
  - To facilitate a global contribution in the Safety, Health and Environmental space that will allow organisations to show return for their green spend following a recognised best practice
  - Support vendors in their delivery of technical and business solutions to the industry

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Reference Architecture

- A **reference architecture** provides a proven template solution for an architecture for a particular domain (Exploration, Mining, Metals, Minerals). It also provides a common vocabulary with which to discuss implementations, often with the aim to stress commonality.
- A reference architecture often consists of a list of functions and some indication of their interactions with each other and with functions located outside of the scope of the reference architecture.
- Reference architectures can be defined at different levels of abstraction.

From http://en.wikipedia.org/wiki/Reference_architecture

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Business Reference Model

- A reference model in general is a model of something that embodies the basic goal or idea of something and can then be looked at as a reference for various purposes.
- A business reference model is a means to describe the business operations of an organisation, independent of the organisational structure that perform them. Other types of business reference model can also depict the relationship between the business processes, business functions, and the business area's business reference model. These reference model can be constructed in layers, and offer a foundation for the analysis of service components, technology, data, and performance.

Reference: http://en.wikipedia.org/wiki/Business_reference_model

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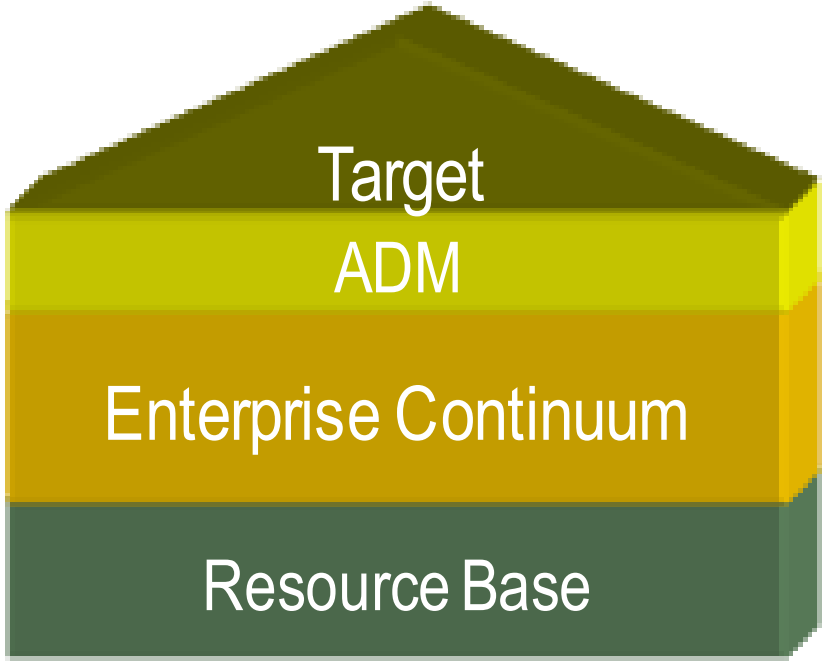
TOGAF™ 8

- Part I: Reference models and Information Bases
  - Technical Reference Model
  - Application Architecture Reference Model
  - Standard Information Base
- Part II: Building blocks & Enterprise Continuum
  - Develop a consistent and comprehensive model
  - Show multiple views to communicate the model effectively
- Part III: Architecture Development Method
  - Core of TOGAF. Step by step guideline to develop an enterprise architecture.
- Part IV: Resource base to support the ADM
  - Tools & Techniques
  - Architecture Practitioner Conferences



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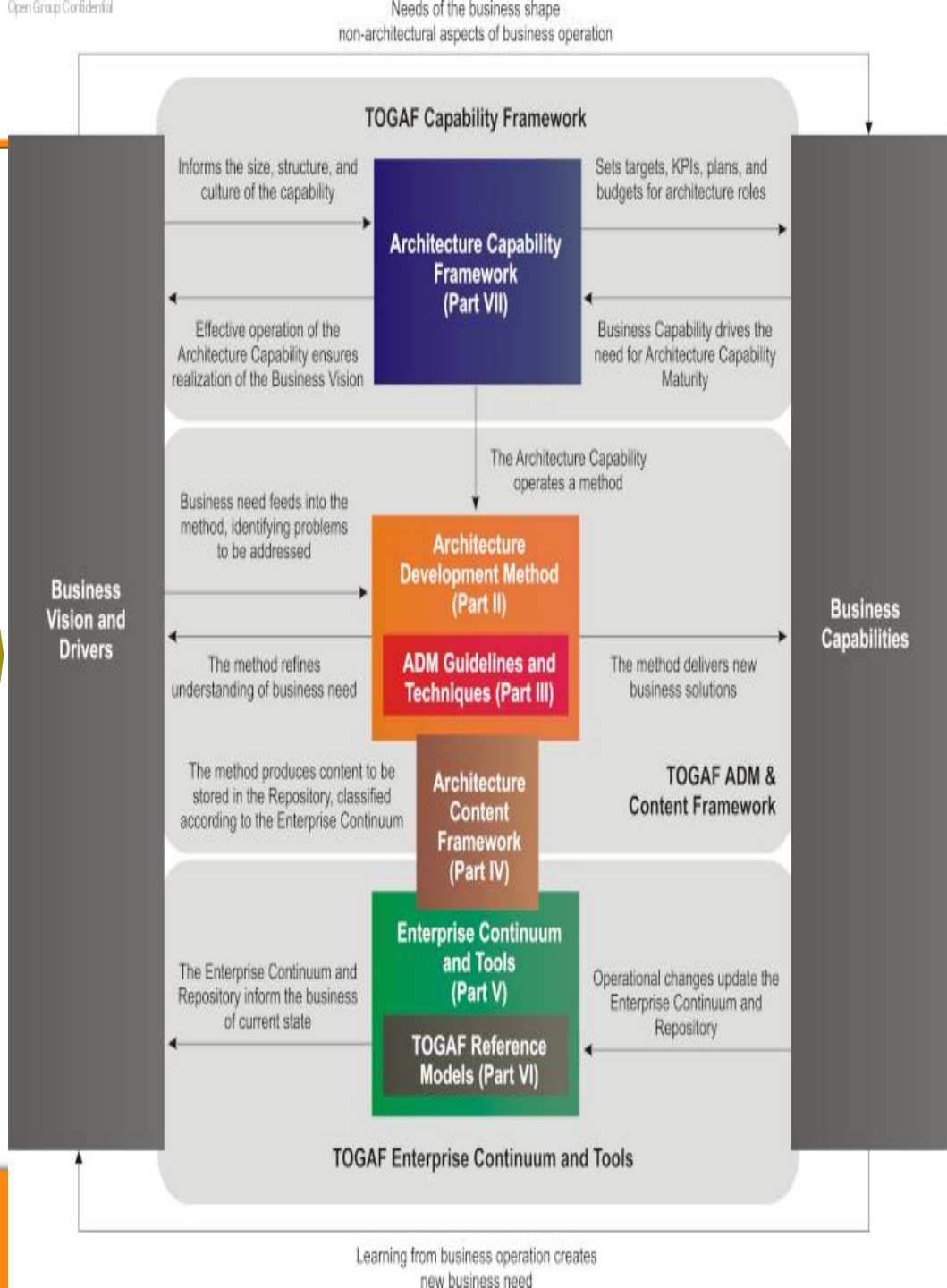
TOGAF™ 9

- Part I: Introduction
- Part II: Architecture Development Method
  - Core of TOGAF. Step by step guidelines to develop an enterprise architecture.
- Part III: ADM Guidelines & Techniques
  - Collection of guidelines and techniques applicable to TOGAF and the ADM
- Part IV: Architecture Content Framework
  - Structured metamodel for architectural artifacts and overview of typical architectural deliverables.
- Part V: Enterprise Continuum & Tools
  - Taxonomies and tools to categorize and store output of architecture activites
- Part VI: TOGAF Reference Models
  - TOGAF Foundation Architecture, TRM, III-RM
- Part VII: Architecture Capability Framework
  - Organization, processes, skills and roles required to operate an architecture function within an enterprise.



Modular structure of TOGAF 9

Practical ADM from TOGAF™ ...(1)

Preliminary phase

- *"where, what, why, who, and how we do architecture'*
- Build the business case for the vertical defining why we are doing this architecture reference model; define the team
- Method & Framework decision
  - TOGAF's ADM with focus on phases: Preliminary, Phase A to D.
- Tools and infrastructure
  - MindManager for mind mapping the workshops
  - ARIS as the repository, Powerpoint to document resulting models
  - Word to capture eventual output

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Practical ADM from TOGAF™ ...(2)

- **Preliminary phase....continued**
  - Forum membership charter and target stakeholder analysis
  - Principles of collaboration defined
  - DELIVERABLE: Forum Charter document

The following assets are envisioned for EMMMv:

- Business Process Framework/ Business Reference model
- Information reference model
- Candidate application reference model

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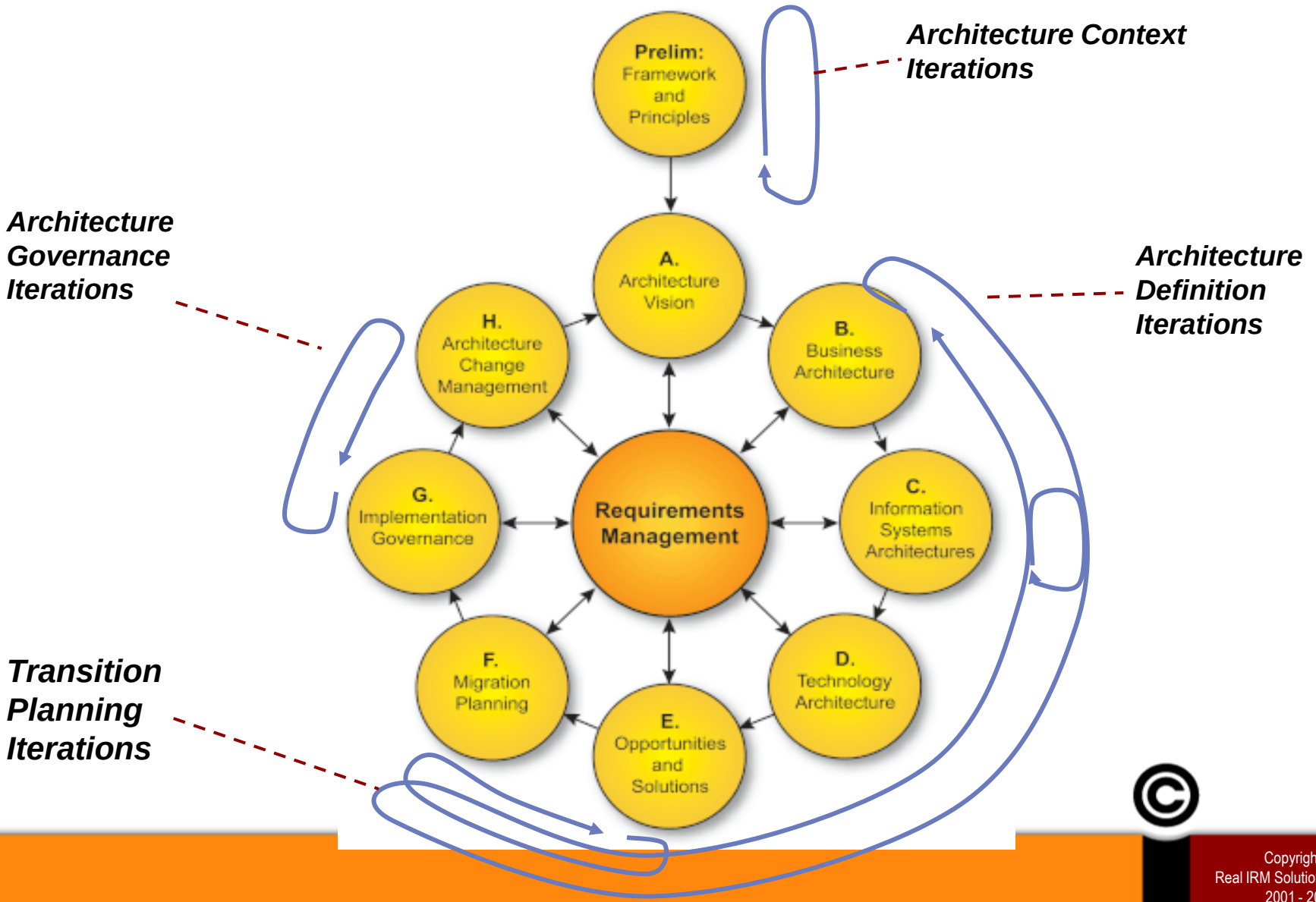
Interjection! - Iteration Cycles in TOGAF™ 9



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Practical ADM from TOGAF™...(3)

- **Vision** phase
  - First iteration: Vision Delivered of the concept for the industry reference architecture
    - www.opengroup.org/emmmv
  - Subsequent iteration: Project Phases identified
    - Phase 1: Exploration
    - Phase 2: Mining
    - Phase 3: Beneficiation

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Practical ADM from TOGAF™ ...(4)

Business Architecture

Viewpoints in Phase B

The following catalogs, matrices, and diagrams may be produced in Phase B

- Catalogs:
  - Organization/Actor catalog
  - Driver/Goal/Objective catalog
  - Role catalog
  - Business Service/Function catalog
  - Location catalog
  - Process/Event/Control/Product catalog
  - Contract/Measure catalog
- Matrices:
  - Business Interaction matrix
  - Actor/Role matrix
- Core diagrams:
  - Business Footprint diagram
  - Business Service/Information diagram
  - Functional Decomposition diagram
  - Product Lifecycle diagram
- Extension diagrams:
  - Goal/Objective/Service diagram
  - Use-case diagram
  - Organization Decomposition diagram
  - Process Flow diagram
  - Event diagram

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Practical ADM from TOGAF™ ...(5)

- **Business Architecture**
  - Process Flow Diagram (Value chain level)
  - Business Service diagram
  - Goal/ Objective/ Business Service Diagram
  - Role Catalogue
  - Event Diagram (Risk Oriented)

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Part V: Enterprise Continuum & Tools

- Enterprise Continuum
  - The Enterprise Continuum is a view of the Architecture Repository that provides methods for classifying architecture and solution artefacts, both internal and external to the Architecture Repository, as they evolve from generic Foundation Architectures to Organization-Specific Architectures.
- Architecture Repository

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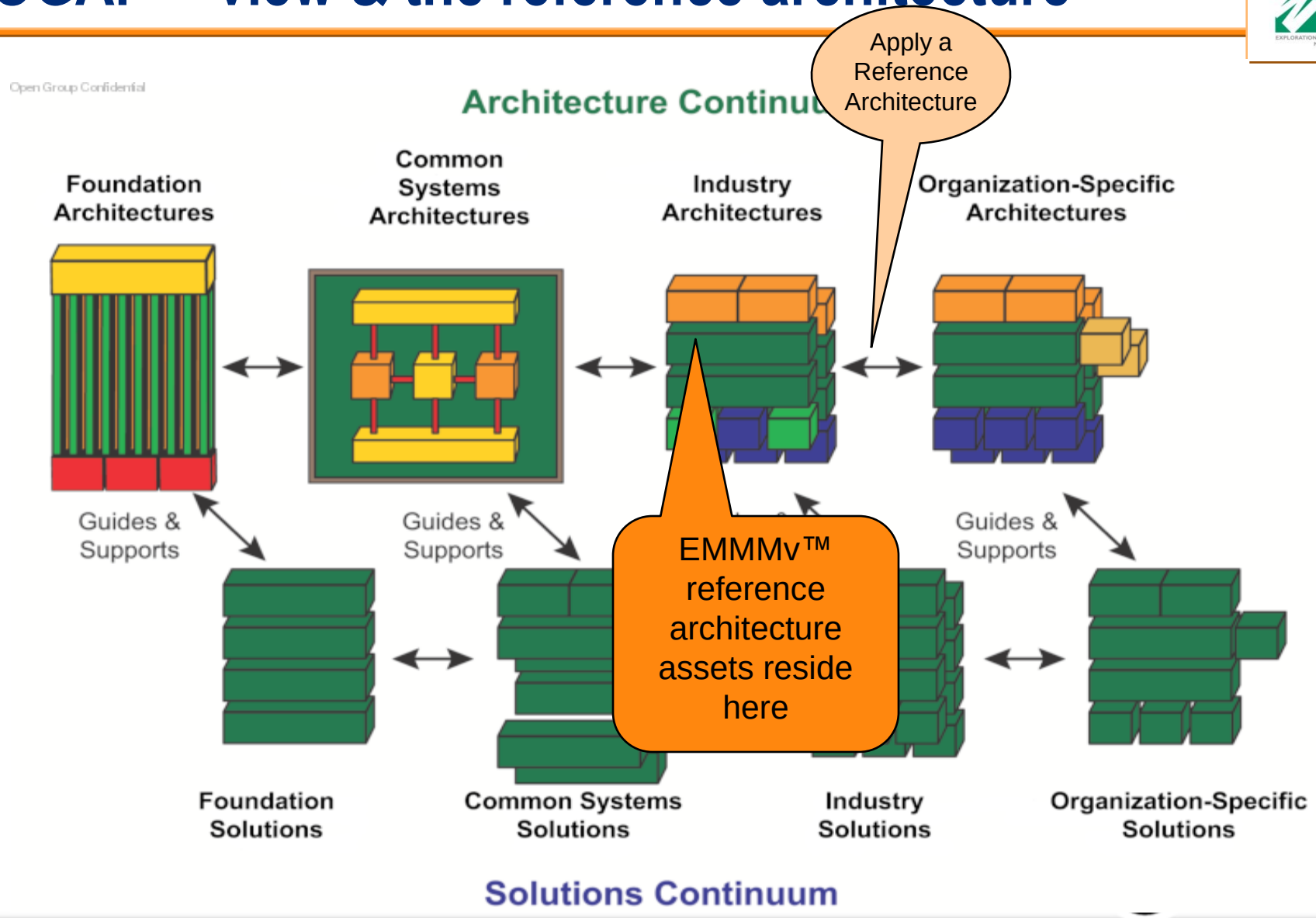
TOGAF™ view & the reference architecture



Enterprise Continuum from TOGAF™ and where the reference architecture artefacts fit

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The Enterprise Continuum expanded in TOGAF™ 9

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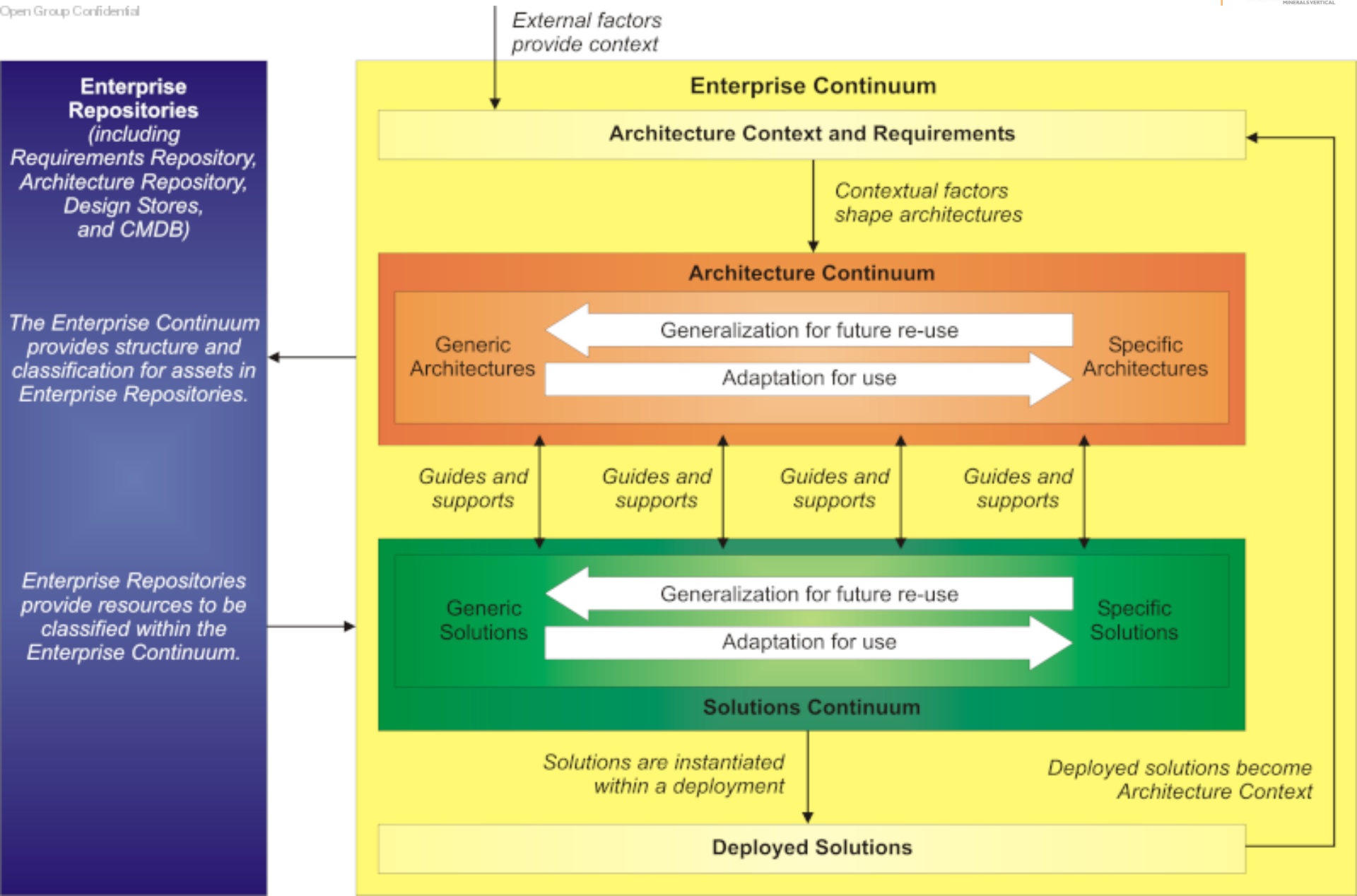
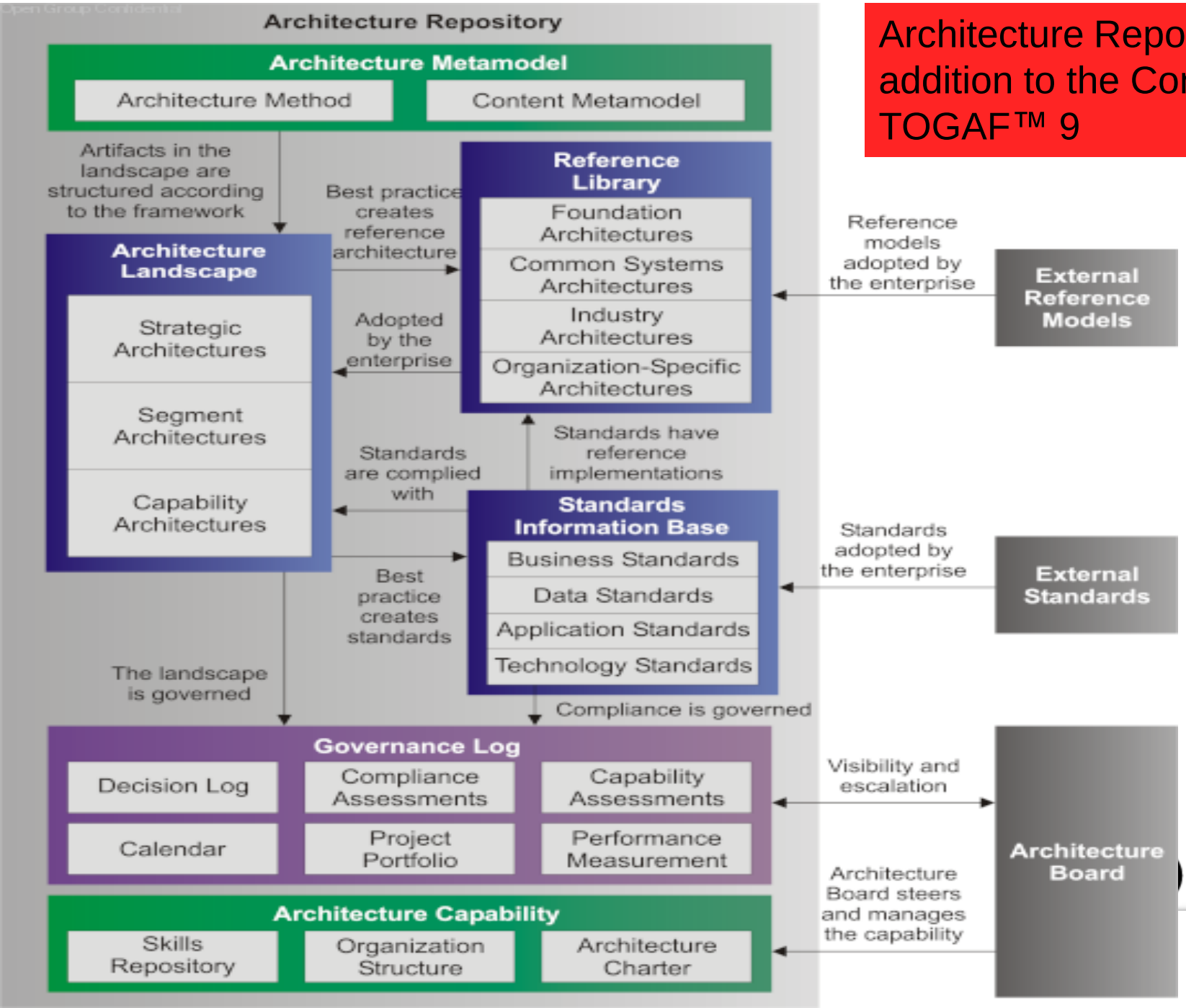


Architecture Repository addition to the Continuum in TOGAF™ 9



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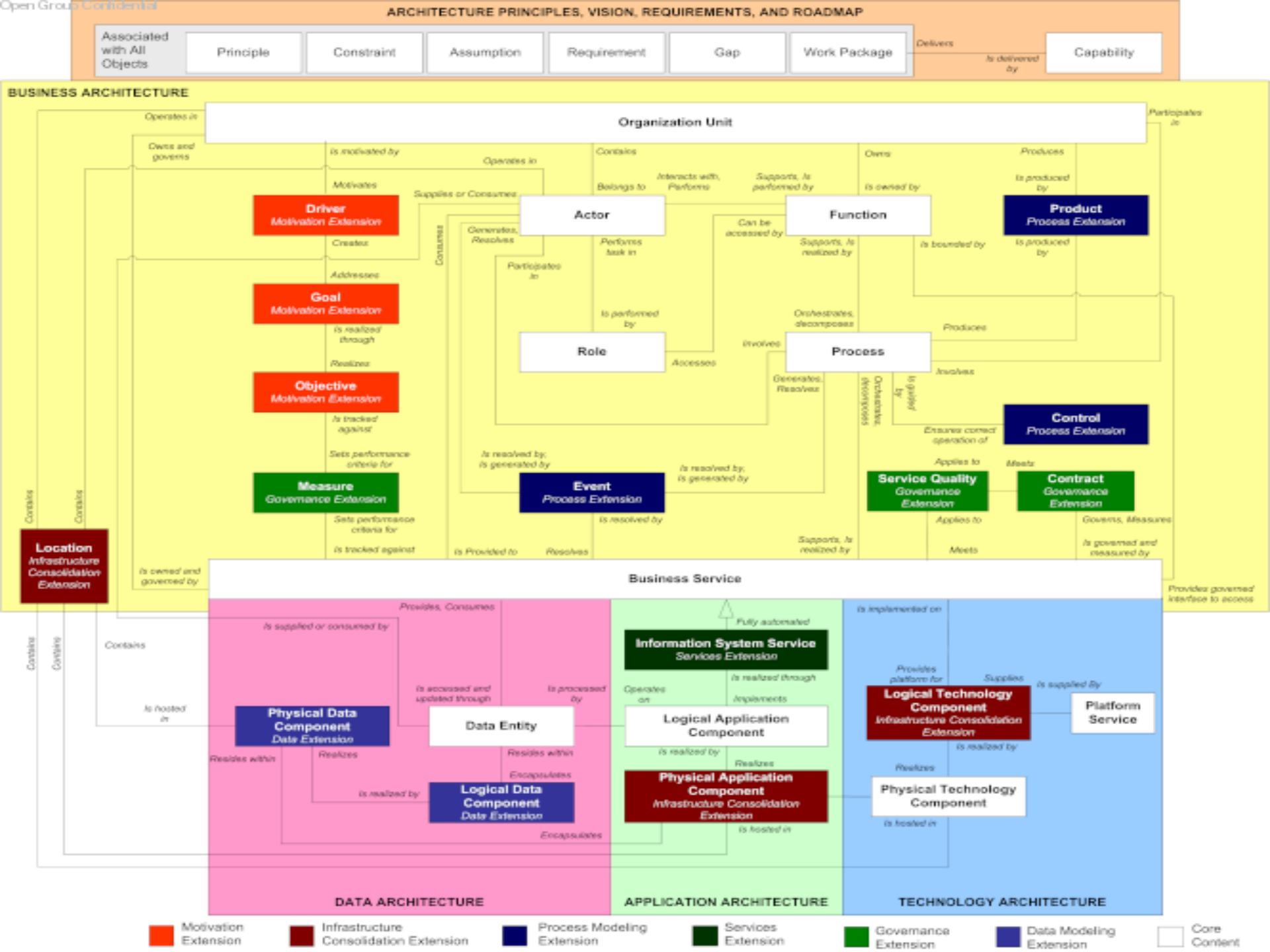
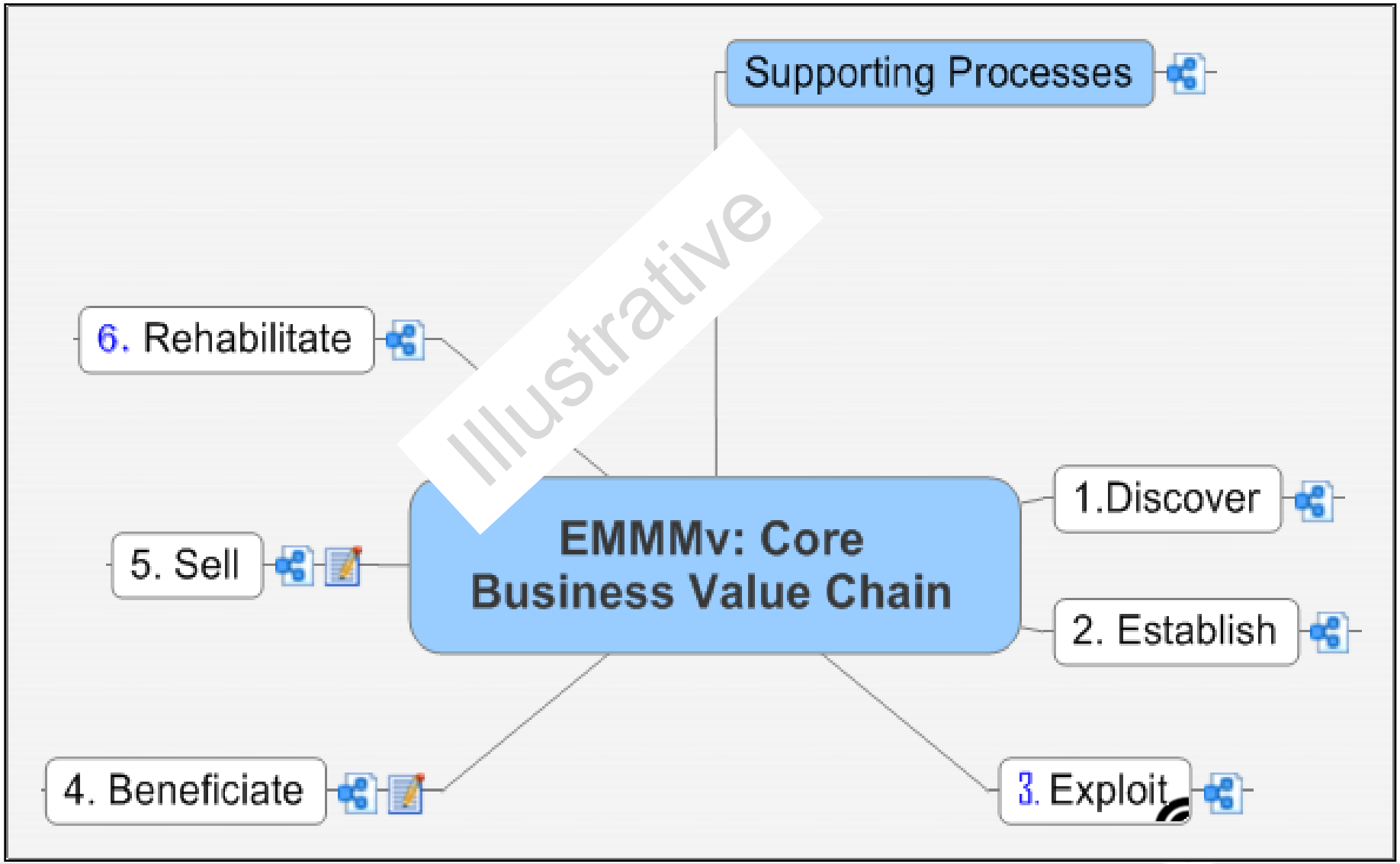


EMMMv™ : Core Business Value Chain



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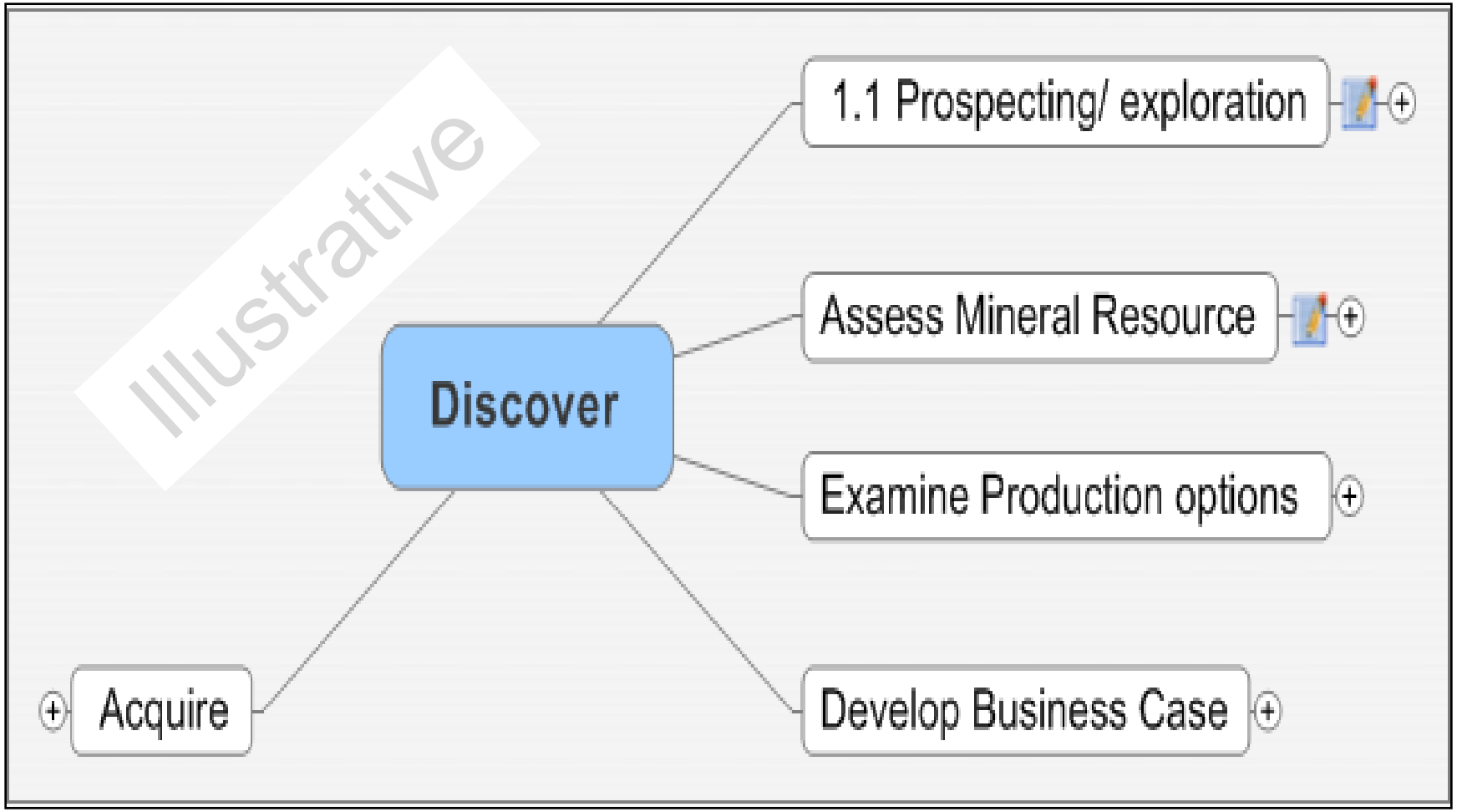
Discover


Illustrative
Discover
1.1 Prospecting/ exploration
Assess Mineral Resource
Examine Production options
Develop Business Case
Acquire

Illustrative

Develop Business Case

Consider Economic Options

Produce Costing Model

Examine Financial Alternatives

Complete Business Analysis

Business Case

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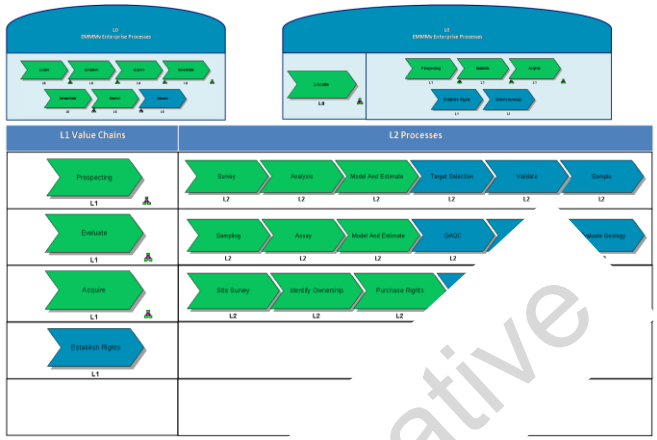
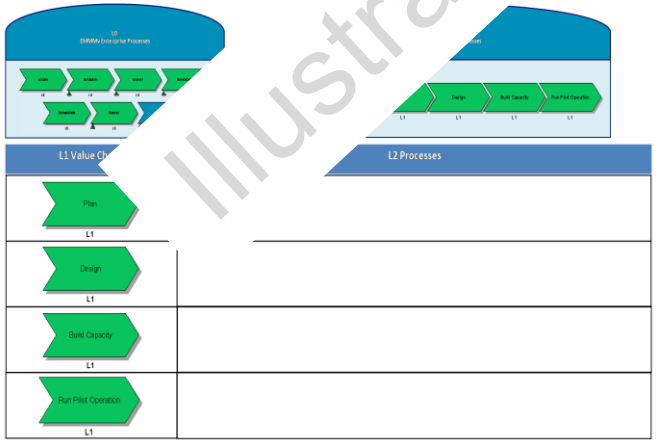
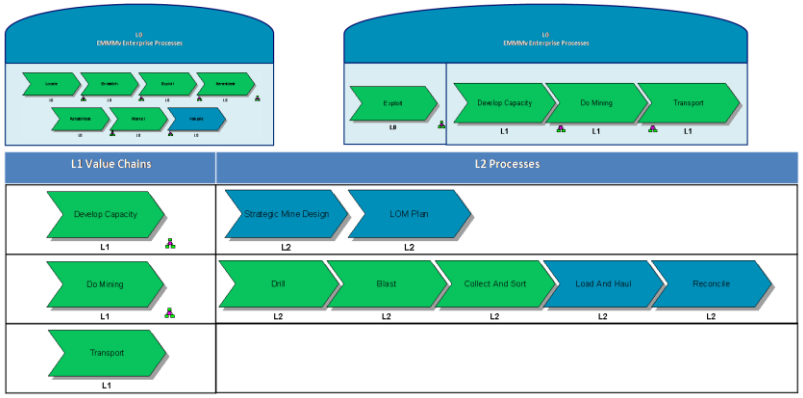
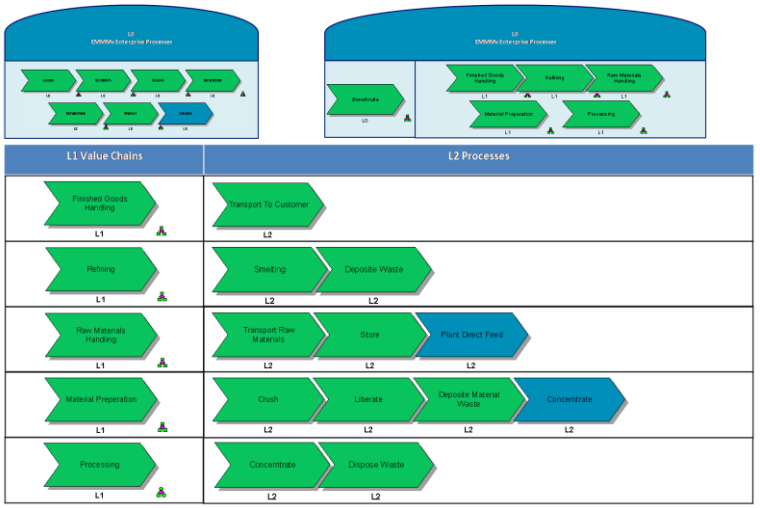
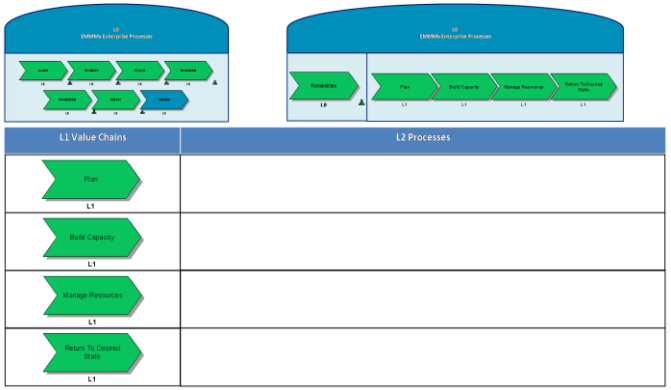
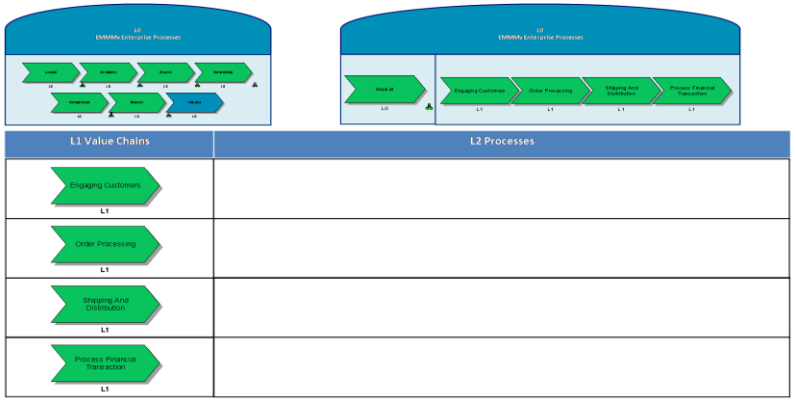












Illustrative

TOGAF™ 9 meta model workshop Illustration for EMMMv™

Illustrative

Develop Business Case

INFORMATION SYSTEM SERVICE

Report Generator; Spreadsheet: Financial Analysis

...sfy Strategic Objective	DRIVER
...ccept Business Case	GOAL
Satisfy Strategic Objective	OBJECTIVE
Business Appropriate and Quality	MEASURE

Examine Financial Alternatives

EVENT

Business Drivers	External Influences
Business Requirement	Changing Economic Circumstances

FUNCTION

Economic Indicators

ACTOR

Mining Financial Analyst

PRODUCT

Economic Values

Produce Costing Model

EVENT

Business Drivers	External Influences
Business Requirement	Change in Costs

FUNCTION

Finance/Economic Forecasting

ACTOR

Individual Economist

PRODUCT

Costing Model

Consider Economic Value

EVENT

Business Drivers	External Influences
Business Requirement	Change "Cost of Money"

FUNCTION

Strategy

ACTOR

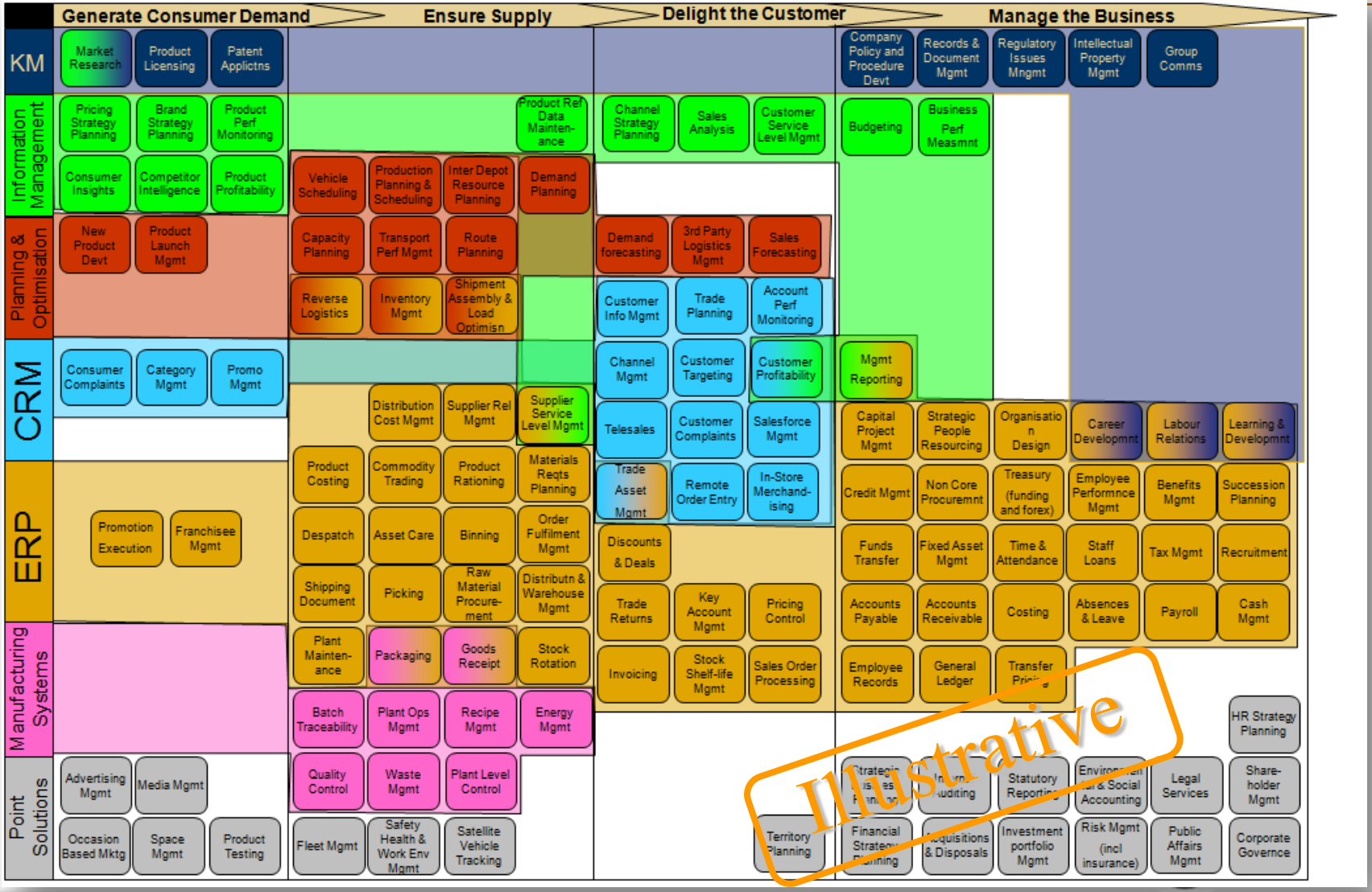
Corporate Strategist

PRODUCT

Financial Alternatives

Organisation Unit: Finance

Application Architecture – Services View



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Conclusion

- The ADM is used practically to develop a reference architecture
- Part V: The Content Framework with its meta model, is one of the valuable contributions in TOGAF 9
- Current TOGAF terminology may turn off business leaders – can we package the message better?
- Current economic conditions is impacting on a more aggressive approach to developing the vertical
- Collaboration by industry players is critical for the success of the Exploration, Mining, Metals and Minerals vertical

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Questions?

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