The Contribution of the Generalised Enterprise Reference Architecture and Methodology GERAM to Consensus in Enterprise Integration

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Aim

- Enterprise Integration (EI) as an interdisciplinary field of study, or discipline, collecting and organising knowledge necessary to better implement change processes in the enterprise

- Need to define commonly acceptable terms of the field
Is a generalisation of existing architectures and other necessary elements…..

• The ‘offerings’ of EI related results can be characterised in this framework

• Mapping of existing architectures, tools, languages,… to GERAM

• Shopping list (what capabilities are needed for an enterprise)
**PEMs**
Partial Enterprise Models
provide reusable reference models of human roles, processes and technologies

**EEMs**
Enterprise Engineering Methodologies
describe process of enterprise engineering

**EMLs**
Enterprise Modelling Languages
provide modelling constructs for modelling of human role, processes and technologies

**EETs**
Enterprise Engineering Tools
support enterprise engineering

**GEMCs**
Generic Enterprise Modelling Concepts
define the meaning of enterprise modelling constructs

**EMs**
Enterprise Models
represent the particular enterprise operation

**EMOs**
Enterprise Modules
provide implementable modules of human professions, operational processes, technologies

**EOS**
Enterprise Operational Systems
support the operation of the particular enterprise

**GERA**
Generalised Enterprise Reference Architecture
identifies concepts of enterprise integration

**utilise**

**implemented in**

**employs**

**support**

**used to build**

**used to implement**
GERA

Generalised Enterprise Reference Architecture identifies concepts of enterprise integration

Enterprise entities, life-cycles and history modelling framework
Life-cycle of an enterprise entity

Identification
Concept
Requirements

Preliminary design
Design
Detailed design
Implementation
Operation
Decommission
Relationship between life-cycles

entity A

identification
concept
requirements
preliminary design
design
detailed design
implementation
operation
decommission

entity B

operation

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Life histories

Life-cycle phases:
- Identification
- Concept
- Requirements
- Preliminary design
- Design
- Detailed design
- Implementation
- Operation
- Decommission

Time:
- Redesign/continuous improvement project
- Enterprise Engineering Projects
- Enterprise Operation
- Decommissioning project
Change processes are based on a relatively small set of functional capabilities that the enterprise must have.
GERA modelling framework

Life-cycle phases

Views

Examples for areas described/modelled

Instantiation

Sw resource requirements

Hw resource requirements

Operational policies

Operational requirements (business process models)

Operational requirements (information models)

Management requirements

Personnel requirements

Commissioning and deployment of production machinery

Production machinery configuration

Personnel training, hiring

Development of personnel instructions

Commissioning and testing

Production machinery and database development

MIS & control software

MIS & control hardware

Installation and testing

Applications and database development
EEMs

Enterprise Engineering Methodologies describe process of enterprise engineering

For each type of change activity they describe ways of progression, identify tasks and tools - need not be intrusive
EMLs
Enterprise Modelling Languages provide modelling constructs for modelling of human role, processes and technologies

All areas in the modelling framework need suitable languages - some formal, some not...
GEMCs

Generic Enterprise Modelling Concepts

*define the meaning of enterprise modelling constructs*
GEMCs

For end users

- Glossary and examples
- Metaschema
- Ontological theories

For tool developers
Generic enterprise modelling concept definitions (the concepts of the modelling languages)
Software tools allowing model construction, management, analysis, decision making in enterprise design
EMs

Enterprise Models

*represent the particular enterprise*

... all those models and descriptions that document the particular enterprise and is needed in the design or implementation
(particular) Enterprise Models

Life-cycle phases

Views

Instantiation

EMs
Partial Enterprise Models

provide reusable reference models of human roles, processes and technologies

High quality tested models used for ‘drag and drop’ enterprise modelling - quickly and cost effectively
Partial enterprise models (reusable trusted components)
Forms of ‘partial’ models or ‘Reference Models’

- Typical models (e.g. earlier cases) that can be modified, adapted
- Abstract (fill in the detail)
- May be available on various levels of detail
- Building blocks (tested components)
EMOs
Enterprise Modules

Implementable modules or products (sw and hw); human professions, operational processes, technologies

Major functional components of the enterprise can only be planned for implementation if they are embodied in products available on the market. This includes available human resource on the job market, machinery, IT products, services.
Conclusion

- GERAM is a shopping list for enterprises defining the capabilities needed for change.

- GERAM allows the end user to select from existing components; e.g. combine the modelling capabilities of CIMOSA and associated tools with the Purdue guide for master planning - extended with change initiation methodology of Griffith / CSIRO, and reusing organisational blueprints from MIT and decision system analysis techniques of GRAI.