EAM Foundations
29.06.2016, Prof. Dr. Florian Matthes

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www.matthes.in.tum.de
1. EAM Foundations
• $10^2 - 10^3$ networked and highly diverse information systems
• Complexity ~ number of relationships between systems
• IT does not keep pace with accelerating speed of business
• Maintenance costs *eat up* IT budget and limit ability to transform
Why to reduce complexity
Example from Credit Suisse

Dr. Alexander M. Ernst, Head of Complexity and Analytics, Credit Suisse, Presentation at TUM on 12/12/2014
Software projects provide functionality and affect the platform efficiency.

Platform efficiency

Platform functionality

Initial state

Δ Efficiency

Δ Functionality

Project X

Platform replacement

Target state

Source: Stephan Murer, Credit Suisse 2007
Managed evolution balances efficiency and functionality.

Source: Stephan Murer, Credit Suisse 2007
System complexity ~ number, variety and dynamicity of elements and their dependencies

What are elements of an Enterprise Architecture?

Enterprise Architecture Model

- Business Capabilities
- Organization & Processes
- Business Services
- Applications & Information
- Infrastructure Services
- Infrastructure Elements

Organization

Visions & Goals
Questions & KPIs
Principles & Standards
Strategies & Projects

Real World

Abstraction

Organization & Processes
What is an enterprise architecture?

Common language for business and IT
- Technical, social, economic and legal aspects
- Layers and crosscutting concerns
- Static and dynamic relationships more important than element details
- Current, planned and target architecture
Enterprise architecture management happens in a larger context.
Example: IT organization of a medium-sized financial service provider
The **organizational context** influences the design of the EAM function.

**IT organization**
- Decentralized, centralized or federated

**Upper management support**
- Bottom-up initiative
- Top-down initiative

**Budgeting**
- EAM team has a budget at its disposal for conducting EA-related projects
- EAM team has a certain budget at its disposal for supporting projects (e.g. to provide a budget for attaining architectural principles)
- EAM team has no budget at its disposal.

**Enterprise culture**
- Innovation
- Communication
- Acceptance of formal models
- Interest in performance data
- Change management approach
The following fundamental governance issues need to be clarified:

**IT organizational structures**
- Which options do we have in structuring the IT organization?
- Can fundamental organizational structures of a company be managed?

**Decision rights & accountability**
- Who holds decision rights? How are they distributed?
- Who is responsible, accountable, consulted, or informed about decisions?

**Strategic planning & organizational issues**
- What about the time frame of decisions on fundamental organizational issues?
- What about the impact of IT organizational issues on the overall business?
- Can those organizational issues be answered on a mere strategic level?
- Where are the sources and boundaries for strategic decision making?

**Compliance**
- Are there external standards or guidelines to be observed?
- Should we implement internal (architectural) guidelines or principles?

**External influences**
- How are external influences taken into consideration?
- Are stakeholders, regulatory authorities, and requirements, ethics, company culture, or business objectives sufficiently respected?

Organizational structures may differ, but these questions remain the same!
IT governance archetypes (Weill and Ross, 2004)

- Archetypes have provocative political names, because most managers identify with these stereotypes
- Classification based on IT / business distinction

<table>
<thead>
<tr>
<th>Archetype</th>
<th>Who has decision or input rights?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Monarchy</td>
<td>Top managers</td>
</tr>
<tr>
<td>IT Monarchy</td>
<td>IT specialists</td>
</tr>
<tr>
<td>Feudal</td>
<td>Each business unit making independent decisions</td>
</tr>
<tr>
<td>Federal</td>
<td>Combination of the corporate center and the business units with or without IT people involved</td>
</tr>
<tr>
<td>IT Duopoly</td>
<td>IT group and one other group (for example, top management or business unit leaders)</td>
</tr>
<tr>
<td>Anarchy</td>
<td>Isolated individual or small group decision making</td>
</tr>
</tbody>
</table>
### Questions to be addressed:

- **What** decisions must be made to ensure effective management and use of IT?
- **Who** should make these decisions?
How enterprises govern: Usage of different archetypes for different decisions

<table>
<thead>
<tr>
<th>Archetype</th>
<th>IT principles</th>
<th>IT architecture</th>
<th>IT infrastructure strategies</th>
<th>Business application needs</th>
<th>IT investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input</td>
<td>Decision</td>
<td>Input</td>
<td>Decision</td>
<td>Input</td>
</tr>
<tr>
<td>Business Monarchy</td>
<td>0%</td>
<td>27%</td>
<td>0%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>IT Monarchy</td>
<td>1%</td>
<td>18%</td>
<td>20%</td>
<td>73%</td>
<td>10%</td>
</tr>
<tr>
<td>Feudal</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Federal</td>
<td>83%</td>
<td>14%</td>
<td>46%</td>
<td>4%</td>
<td>59%</td>
</tr>
<tr>
<td>IT Duopoly</td>
<td>15%</td>
<td>36%</td>
<td>34%</td>
<td>15%</td>
<td>30%</td>
</tr>
<tr>
<td>Anarchy</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>No data, or don't Know</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Most common patterns for input
Most common patterns for decision

Book Review>
Example of an organization-specific EAM function

1. Communicate
   - Model
   - Collect
   - Motivate
   - Adapt
   - Reflect

2. Stakeholder-specific architecture views
   - Metrics
   - Visualizations
   - Reports

3. Top management
   - Business and IT strategy
   - Business and org. constraints
   - Individual architecture aspects

Top management
- Strategy office
- Business owners
- Application owners
- IT operations
- Purchasing
- Project managers
- Software developers
- Software architects

Business and IT strategy
- Architecture blueprints
- Architecture approval and requirements
- Architecture changes

IT Project 1
IT Project 2
IT Project 3
EAM uses three EA models

- A **current** (as-is) state of the EA reflects the actual architecture (status quo) at a given point in time.
- A **planned** state of the EA is derived from planned and budgeted projects for transforming the EA until a certain point in time.
- A **target** (to-be, envisioned) state of the EA describes an ideal state to be pursued according to the strategies and architectural principles of the organization.
Typical elements of enterprise architecture models

S Aier, C Riege, R Winter Unternehmensarchitektur—Literaturüberblick und Stand der Praxis, Wirtschaftsinformatik 50 (4), 292-304
An enterprise architecture has to be visualized to make it accessible to different stakeholders.
The business architecture model should focus on the current stakeholders and their information demands.

**Principle**

- **Stakeholder** → **Concern (Info Demand)** → **Viewpoint View** → **Model**

**Example Merger & Acquisitions**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Concern (Info Demand)</th>
<th>Viewpoint View</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board of directors</td>
<td>Strategic relevance of Capabilities</td>
<td>Candidate Strategic Relevance Capability Map</td>
<td></td>
</tr>
</tbody>
</table>

**Example IT Landscape Management**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Concern (Info Demand)</th>
<th>Viewpoint View</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIO</td>
<td>Business / IT Alignment</td>
<td>Business Support Map</td>
<td></td>
</tr>
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</table>

**Business Architecture Model**

- Business Capabilities
  - Organization & Processes
  - Business Services
  - Applications & Databases
  - Infrastructure Services
  - Infrastructure Elements
Example 1: Using a business capability map to communicate business goals.

[Image showing a Strategic Relevance Map (SR-Map) with various business functions such as Sales and Service, Product and Service Processing, Business Management and Planning, Marketing and Intelligence, Product and Service Procurement, and Bank Support, each categorized by high, medium, or low strategic relevance.]
Example 2: A business support map relates BA architecture elements with IT architecture elements.

Legend

Map Symbols

- **A**: Business Process A
- **B (1)**: Business Application B with Id 1
- **C**: Organizational Unit C

Visualization Rules

- A is supported by B (1)
- used at C
Architecture management has to be integrated with other management functions.

Architectural changes are performed through a coherent set of projects.

Example of a mature IT organization
Enterprise architecture management
Influence factors, activities and artifacts

Influence factors, changing over time
Maturity of other (IT) management functions

Enterprise Context
Organizational Context
EAM Goals
EAM Questions

Reflect & Adapt
Develop & Describe
Analyze & Evaluate
Communicate & Enact

Architectural Principles
Target Architecture
Planned Architecture
Current Architecture
Changes in the **enterprise context** are often a trigger and driver for EA initiatives.

**Examples**

- New CIO or CEO
- Post-merger integration
- Preparation for a carve-out
- IT cost-cutting initiative
- Market crisis ➔ business consolidation
- International growth strategy
- Changes in legal regulations (Basel II, Solvency, Energy market, …)
- Digital transformation of the business
  - Mobile workforce
  - Social media
  - From car manufacturing to mobility services
  - Industry 4.0
  - From software vendor to service provider
The **organizational context** influences the design of the EAM function.

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**Budgeting**
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- Change management approach
The **EAM goal(s)** should fit the enterprise context

**Typical examples**

**Increase coherence**
- Increase strategic alignment of business and IT (two-way)
- Provide strategic guidance for IT (one-way)

**Increase transparency**
- Accelerate project execution for new business initiatives
- Support multi-project planning and controlling
- Support IT and business innovations

**Manage and reduce (IT) complexity** (redundancy, heterogeneity, size)
- Reduce operating costs by standardization
- Increase agility by architectural measures
  - Migration to and consolidation of standard software
  - Technology blueprints (web-applications, SAP applications, Big data applications)
  - Portals, service buses, data warehouse, …

**Identify, assess and manage security risks**

**Ensure and document legal compliance**

**Increase disaster tolerance**

**Increase top management satisfaction**
Most frequent EA challenges

1. Ad hoc EAM demands
2. Unclear business goals
3. Hard to find experienced enterprise architects
4. EA demands unclear for EAM team
5. Enterprise environment changes too quickly

**Business capability**

**Definition**

A functional building block of the business architecture that supports the business model and the business strategy. It defines the organization’s capacity to successfully perform a unique business activity.

**Characteristics**

- **Stability**
  - independent from the organizational model, technologies, and vendor solutions
- **Abstraction**
  - encapsulate and abstract from any explicit resource, business process, or IT
- **Horizontal Structure**
  - a complete and non-overlapping functional decomposition of the enterprise
- **Vertical Structure**
  - can be broken down into more granular business capabilities

**Dimensions**

- **People Dimension**: knowledge, skills, and experiences of the enterprise’s staff
- **Process Dimension**: concepts, business processes, and information management
- **Material Dimension**: underlying assets, such as infrastructure, IT, and equipment
Business capabilities in context

**Business Model**
Complete view on value creation

**Business Capability Map**
Complete and non-overlapping view on the enterprise’s business capabilities

**Business Capability**
View on one business capability with its dimensions and lifecycle
Example: Business capability map of Novartis

Novartis Top Level Business Capabilities

Source: Novartis Pharma AG – Marcel Grossert
Global Enterprise Architect
Using a business capability map to communicate business goals.
Using a business capability map to assess the current capabilities.
Using a business capability map to identify EA demands.
Capability-based planning

- Business Strategy targeting
- Business Information sourcing
- Business Processes connecting
- Organizations executing
- Projects implementing
- IT Systems supporting

Novartis Pharma AG – Marcel Grossert Global Enterprise Architect
Digital Business Capabilities
Example: Axel Springer SE (2015)
Digital Business Capabilities

Example: Axel Springer SE (2015)
The business architecture model should focus on the current stakeholders and their information demands.

**Principle**

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**Example Merger & Acquisitions**

- **Strategic Buyer**
  - Functional Fit of Merger Candidate
  - Candidate Assessment Capability Map

**Example IT Landscape Management**

- **CIO**
  - Business / IT Alignment
  - Business Support Map
### EAM: Three schools of thought (1/3)

<table>
<thead>
<tr>
<th></th>
<th>Enterprise IT Architecting</th>
<th>Enterprise Integrating</th>
<th>Enterprise Ecological Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motto</strong></td>
<td>EA is the glue between business and IT</td>
<td>EA is the link between strategy and execution</td>
<td>EA is the means for organizational innovation and sustainability</td>
</tr>
<tr>
<td><strong>Objectives &amp; concerns</strong></td>
<td>Support IT planning, reduce costs, Enable business</td>
<td>Support organizational coherence</td>
<td>Encourage system-in-environment coevolution</td>
</tr>
<tr>
<td><strong>Principles &amp; assumptions</strong></td>
<td>Apply a reductionist (mechanistic) stance, Don’t question business strategies</td>
<td>apply a holist (systemic) stance, Don’t question business strategies and objectives</td>
<td>Environment can be changed, Jointly design all organizational dimensions</td>
</tr>
</tbody>
</table>

## EAM: Three schools of thought (2/3)

<table>
<thead>
<tr>
<th></th>
<th>Enterprise IT Architecting</th>
<th>Enterprise Integrating</th>
<th>Enterprise Ecological Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skills</strong></td>
<td>Have technical competence and engineering knowledge</td>
<td>Facilitate small-group collaboration</td>
<td>Foster dialogue apply system and system-in-environment thinking</td>
</tr>
<tr>
<td><strong>Challenges</strong></td>
<td>Convince the org. to accept the designed plans</td>
<td>Understand org. systemic dynamics</td>
<td>Foster sensemaking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaborate across the org.</td>
<td>Collaborate across the organization</td>
</tr>
<tr>
<td><strong>Insights</strong></td>
<td>Fosters the creation of high quality models and planning scenarios</td>
<td>Enables significant organizational efficiency by eliminating unnecessary contradictions and paradoxes</td>
<td>Fosters organizational innovation and sustainability</td>
</tr>
</tbody>
</table>

## EAM: Three schools of thought (3/3)

<table>
<thead>
<tr>
<th>Limitations</th>
<th>Enterprise IT Architecting</th>
<th>Enterprise Integrating</th>
<th>Enterprise Ecological Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can produce inadequate or unfeasible solutions for the larger organizational context</td>
<td>Susceptible to “perfect” designs that support unsustainable strategies</td>
<td>Requires many organizational preconditions for management and strategy creation</td>
</tr>
<tr>
<td></td>
<td>Struggles with solution acceptance and implementation barriers</td>
<td>Requires a paradigm shift from reductionism to holism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Susceptible to “perfect” designs that support unsustainable strategies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

1. What are key challenges for your company?
   Refer to the cybernetic view on the enterprise

2. What are key stakeholders for your enterprise architecture function?

3. Which school of thought is your EAM team currently following?

4. Which school of thought might be suitable for your company in the future?
ISO Std. 42010: Recommended practice for architectural description of software-intensive systems

### Scope
- Software-intensive systems
- Individual systems
- „Systems of systems“ (also application landscapes, enterprise architectures)

### Goals
- Supports documentation, explanation, and communication of architectures.
- Does not provide a graphical notation nor defines any conformance of systems, projects, organizations, processes, methods, or tools
- Defines notions in the context of architectural description – how to describe an architecture

### Architecture framework
Predefined set of concerns, stakeholders, viewpoints, and viewpoint correspondence rules; established to capture common practices for architecture descriptions within specific domains or user communities
ISO Std. 42010: Recommended practice for architectural description of software-intensive systems

Mission

fulfills 1..*  

Environment

influences

System

has an

Architecture

described by 1

Stakeholder

is important to 1..*

is addressed to 1..*

has 1..*

identifies 1..*

Concern

identifies 1..*

used to cover 1..*

has source 0..1

Library Viewpoint

establishes methods for 1..*

View

selects 1..*

conforms to

Viewpoint

Concern

organizes by 1..*

View

participates in 1..*

Model

aggregates 1..*

Rationale

participates in

1471-2000 - IEEE Recommended Practice for Architectural Description for Software-Intensive Systems
Notions: System and environment

System
A collection of components organized to accomplish a specific function or set of functions.

Software-intensive
Software contributes essential influences to the design, construction, deployment, and evolution of the system as a whole.

Environment
Environment or context, which exerts influence on a system’s design. This comprises also other systems interacting with the latter one. The environment determines settings and circumstances of developmental, operational, political, and other influences upon that system.

➡ Delimitation between the system and its environment
Example: Apple’s iTunes store

- **System**
  - iTunes Store Server
  - iTunes 7.1.-Client
  - Contentmanagementsystem to Create content
  - Reporting-Systems

- **Environment**
  - client-PCs of the customer
  - Internet
  - different iPods variants
**Notions: Architecture and architectural description**

**Architecture**
Fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution.

**Architectural description**
Collection of products to document an architecture. An architectural description selects one or more viewpoints for use. The selection viewpoints typically will be based on consideration of the stakeholders to whom the architectural description is addressed and their concerns.

→ Every system has an architecture, whether understood or not; whether recorded or conceptual.
Notions: Concern, stakeholder, and mission

**Stakeholder**
Individual, team, or organization (or collections thereof) with interests in, or concerns relative to, a system.

**Concern**
Those stakeholders’ interests, which pertain to the development, operation, or other key characteristics of the system (e.g., performance, reliability, security, evolvability, distribution, …)

**Mission**
Use or operation for which a system is intended by one or more stakeholders to meet some set of objectives.

⇒ The architectural description has to be aligned with the stakeholders’ concerns.
Example: Apple’s iTunes store

- **Mission**
  - Profitable sales of music, videos, and applications by means of an internet platform
  - Increase Customer loyalty

- **Stakeholder and concerns**
  - Management of the iTunes store Germany
  - Responsible for operating and maintaining the website
  - Software Developer (comprehensibility, testability, …)
Business Strategy

External Demands

Strategic Direction

The Market Promise

Customer Value

Business Models

Supply
Value Proposition
Demand

Cost
Profit
Income

Business Processes

Organisation

Network

Skills & Competencies

Management

Goals & Metrics

Business Planning

Performance management

Source: Siamak Amjadi (Nordea), What is Business Architecture? Dansk IT EA 2012, 31/10/2012
Notions: Viewpoint and view

**View**
Representation of a whole system from the perspective of a related set of concerns. Views are the actual description of the system.

**Viewpoint**
Specification of the conventions for constructing and using a view. A pattern or template from which to develop individual views by establishing the purposes and audience for a view and the techniques for its creation and analysis.

⇒ Separation between viewpoint and view
Notions: Library viewpoint

Library viewpoint:
Viewpoint-definition from literature.

→ Reuse of techniques and notations for architectural descriptions in order to avoid ad-hoc notations for “boxes-and-lines everywhere viewgraphs”
Notions: Rationale and model

**Rationale**
Describes the reasons, leading to the selection of an architecture as well as the intention an architect pursues with his decisions.

**Model**
Represents a certain aspect of an architecture, according to a notation defined through a viewpoint.
### Example: Apple’s iTunes store

#### Rationale
- Ease of use for the customer
- It shouldn’t be possible for customers to download registered video and music material without paying it
- ...
Influence factors for EAM

**Enterprise Context**
- Top management
- Strategy office
- Business owners
- Application owners
- IT operations
- Purchasing

**Organizational Context**
- Business and IT strategy
- Business and org. constraints
- Individual architecture aspects

**EAM Goals**
- Communicate
- Collect
- Motivate
- Adapt
- Reflect

**EAM Concerns**
- Architecture blueprints
- Architecture approval and requirements
- Architecture changes

Influence factors changing over time

Maturity of other (IT) management functions
Empirical results on application scenarios for EAM

S Aier, C Riege, R Winter Unternehmensarchitektur−Literaturüberblick und Stand der Praxis, Wirtschaftsinformatik 50 (4), 292-304
How does Enterprise Architecture add value to organizations?

EAM Benefits

- Organizational alignment (common goals → consensus)
- Information availability (access, standardized → faster & better decisions)
- Resource portfolio optimization (no redundancy → reduced cost & skill variation)
- Resource complementarity (integration, interoperability → performance, re-use)

Proxy Measures for Evaluating EA Quality

<table>
<thead>
<tr>
<th>Appropriate scope-detail-cost balance</th>
<th>Intermediate deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate CIO skills</td>
<td>Skilled architecture team</td>
</tr>
<tr>
<td>Compatible organizational culture</td>
<td>Sufficient (on-going) funding</td>
</tr>
<tr>
<td>Clear and agreed-upon arch. principles</td>
<td>Suitable management practices</td>
</tr>
<tr>
<td>Documentation tools</td>
<td>Stakeholder acceptance &amp; involvement</td>
</tr>
<tr>
<td>Effective presentations</td>
<td>Top management support and involvement</td>
</tr>
<tr>
<td>Effective project management</td>
<td>Use of consultants</td>
</tr>
</tbody>
</table>

Tamm et al. (2011) "How Does Enterprise Architecture Add Value to Organisations?," Communications of the Association for Information Systems: Vol. 28.
Discussion

1. Describe specific examples of (actual or potential) benefits/added value of EA in your company?
2. How does your company assess/measure EA benefits?
Summary of the results of Weill & Ross

Lessons learned
- Not every company governs IT in the same way
- Different group types and competence centers (archetypes) make decisions

Further analysis required
- How to measure governance performance (key values for governance)?
- What governance arrangements work best?
- How do profit and non-for-profit organizations differ in governance arrangements?

Bottom line
- IT governance
  is heavily influenced by the IT structural organization
  influences the evolution of the IT structural organization
  influences the structural and process organization
- An outsourced IT department with a responsible manager acts different to an IT department, in which also the business departments do have decision rights!
Evolution trajectory of managed evolution

The classical layers and elements of a business architecture
Implementing architectures is a process of change.

- They say “yes”, but if I need people, forget it!
- Short term always has priority
- Still considered an IT hobby
- Business units go their own way anyhow
- How do I design and implement a state-of-the-art architecture?
- How do I coax them into working under architecture?

© Twynstra Gudde / Labyrinth IT Strategy Solutions January 2014
Redeveloping the entire systemset is quite an investment. 

_Do they dare to jump with you into the deep?_
The color theory distinguishes five fundamental approaches to change.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Ambition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Success is the result of co-ordinated ambitions of the people in charge</td>
</tr>
<tr>
<td>Blue</td>
<td>Everything is makeable, planable, manageable</td>
</tr>
<tr>
<td>Red</td>
<td>A right match between the interests of employees and organisation</td>
</tr>
<tr>
<td>Green</td>
<td>Learning organisation and intentional learning</td>
</tr>
<tr>
<td>White</td>
<td>Spontaneous evolution &amp; self-organisation</td>
</tr>
</tbody>
</table>
Understand your primary change approach and the change culture of your enterprise.

- Is there a difference between thinking and doing?
- Are there different change cultures in parts of your enterprise?

- Consider the dominant color of the environment and deliberately choose an appropriate approach to change.

Influencing  Planning  Motivating  Learning  Encouraging
The transition from project architect to other architect roles is often underestimated in terms of learning new skills.
EAM method building blocks (2012)

**Develop & Describe**
The activity develop & describe covers MBBs for developing current, planned states and target states of the EA. Furthermore, MBBs for the development of architectural principles that guide the future evolution of the EA, are provided. Similarly, MBBs for maintaining descriptions of the different EA states are provided.

- Approve architecture description
- Derive projects from target state
- Describe automatically by crawler
- Describe by central repository
- Describe by interview
- Describe by questionnaire
- Describe by workshop
- Develop planned states of the EA
- Develop target state based on business strategy
- Develop target state based on IT strategy
- Develop target state based on potential for improvement
- Develop target state in strategy board
- Document lessons learned
- Ensure information consistency

**Communicate & Enact**
The communicate & enact activity contains MBBs for communicating EA artifacts and enacting EA plans. Various ways to perform this activity exist, ranging from fairly non-infering ways of informing via enacting, i.e. consulting and conducting workshops, to enforcing, i.e. punishment for deviating from existing plans.

- Caution deviating projects
- Control adherence to conditions
- Educate in-house training
- Impose conditions for deviations
- Officially gratify standard conformance
- Provide financial rewards
- Publish architectural description
- Request acknowledgement of architectural description
- Require justification for deviations
- Review architectural compliance
- Tax non compliant projects
- Veto non compliant projects

**Analyze & Evaluate**
The analyze & evaluate activity provides MBBs for different kinds of analysis, which can be performed on one state of the EA, e.g. the current state to identify potential for improvement as well as measure the achievements of objectives, or gap analysis between different states of the EA, e.g. to evaluate different planned states.

- Aggregate analysis results based on prioritization
- Control adherence to business capabilities
- Control adherence to conditions
- Develop by group discussion
- Multi expert evaluation
- Pattern-based analysis
- Perform single expert evaluation
- Quantitative assessment
Example: Your EAM goal is to “improve compliance of projects with EA principles”

The BEAMS method library provides several method building block variants

1. Financial reward for conformance to EA principles
2. Request justification for deviations
3. Request financial reserves for deviations from EA principles
4. Power of veto for enterprise architects

Governance structure of your enterprise
- Centralized IT
- EA architect participates in project portfolio management

Organizational context of your enterprise
- EA management team has no budget power
- Business can overrule EA project portfolio recommendations

BEAMS method base recommends variant (3) for this situation
### Enterprise architect education and certification

<table>
<thead>
<tr>
<th>Organization</th>
<th>Program/Activity</th>
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</table>
| TUM          | Master Course Business Informatics  
               Strategic IT Management and EAM |
| Euro CIO Professional Programme | Business and Enterprise Architecture |
| NETACAD      | EAMKON Conferences & Workshops |
| User Group Architekturmanagement | |
| GI Arbeitskreis Unternehmensarchitektur, Fachgruppe Architekturen, Fachbereich Software Engineering | |
Thank you for your attention. Questions?