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Enterprise Architecture
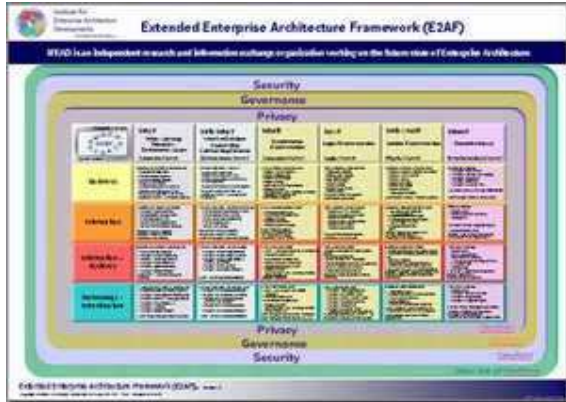**Developments**
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Extended Enterprise Architecture Framework (E2AF)

Essentials Guide

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⇨ **Foreword**

This essentials guide describes the background and philosophy of IFEAD's Extended Enterprise Architecture Framework (E2AF).

This guide describes the Extended Enterprise Architecture Framework (E2AF) style and foundation.

E2AF by itself is a **Communication Framework** describing the topics and relations that can be addressed during an architecture program. The purpose of E2AF is to communicate with all the stakeholders involved in the program.

E2AF at a whole and the identified aspect areas are subject of IFEAD's – research & development and address the relevant topics and process steps to deliver an overall result related to the goals and objectives to achieve in a certain situation.

The **Extended Enterprise Architecture Essentials Guide** is the foundation of E2AF. It describes in generic terms the context, drivers, principles and rules related to the philosophy behind E2AF.

Based on the style elements of this guides, IFEAD has developed several methods, approaches to address specific EA topics.

These **Methods & Approaches** describe the content to address in a specific aspect area and guides the enterprise architect in doing the appropriate activities.

Enterprise Architecture in the context of this essentials guide addresses aspects and issues for the 'enterprise' architecture of organizations & technology as envisioned by IFEAD's Enterprise Architecture style.

➢ **Structure of this Guide**

➢ **STRUCTURE OF THIS GUIDE**

➢ **'ENTERPRISE' ARCHITECTURE**

➢ **ENTERPRISE ARCHITECTURE PRESCRIPTIONS**

➢ **TRANSLATION OF ENTERPRISE ARCHITECTURE PRINCIPLES AND RULES INTO A FRAMEWORK**

➢ **EXTENDED ENTERPRISE ARCHITECTURE FRAMEWORK (E2AF)**

EA PROCESS PRINCIPLES IN GENERAL

➢ **GLOSSARY, EXPLANATION OF TERMINOLOGY**

This document explains in general terms the rules and principles (style) that are used as the foundation for the way IFEAD thinks about enterprise architecture.

It explains the Extended Enterprise Architecture Framework and relates the methods & approaches to the framework. The approaches themselves are described in separate documents like the Enterprise Architecture Score Card and accompanied articles, white papers and books.

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The Glossary is the last chapter of this document. It explains the most common used terms and acronyms used in this guide.

⇨ **Intended audience**

This document is intended for (potential) 'enterprise' architects, using IFEAD 's Extended Enterprise Architecture Framework, who: Are working in the field of 'Enterprise' Architectural Design; Want to understand the role of the E2AF; Are looking for a context description of IFEAD's Architecture approach.

➤ **'Enterprise' Architecture**

IFEAD has developed architectural design methods, which **prescribe** a coherent design and realisation of new business and the supporting IT systems. This guarantees the full integration between the *business* & *human* perspective of an organisation and the *technology* functionality of supporting IT systems.

IFEAD describes architecture as a set of principles, rules, standards and guidelines reflecting the organisational culture and behaviour that prescribe architects, program / program mangers and developers how to deal with the transformation of both the business and IT systems.

See the Glossary for an explanation of the terms: principles, rules, standards and guidelines.

⇨ **The definition of architecture**

IFEAD uses the following definition for 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.

Enterprise Architecture embodies a set of principles, rules, standards and guidelines, expressing and visualising the vision, culture & behaviour of an organisation while implementing certain concepts that serves as prescription for the design and construction of a certain object type. It contains a combination of style, engineering and construction principles, guaranteeing the uniformity and quality of the resulting object.

IFEAD has developed such an architectural approach for the design and realisation of both the business & Information areas of an organisation as well as for the supporting IT systems. This approach is applicable for different organizations, in different situations and at different contemplation levels.

The architecture style reflects the philosophy and mindset behind the framework and approaches and delivers a certain commonality in execution with respect to organizations unique situation.

⇨ **The role of Architecture**

In the development of a house, building or any object we can always identify the following main steps:

• A discovery process to identify the needs and requirements in the context of a certain situation;
• A design process which leads to a design of the object in the form of drawings and/or models;
• A transformation process to plan the realisation of the object in its environment;
• A construction process that regards the
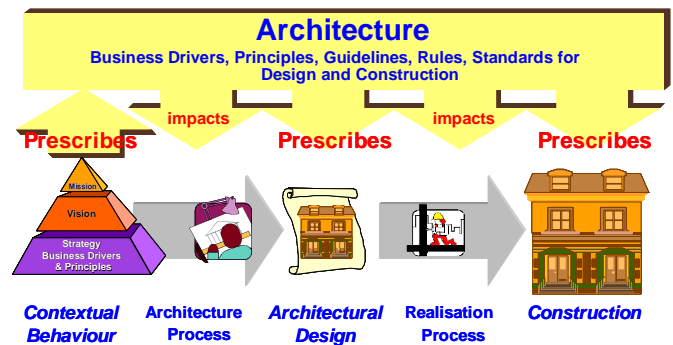
realisation of the actual object based on the design and realisation plan.

The principles, guidelines and rules identified in the discovery phase are used in both the design, transformation and construction process. As such, the architecture *impacts* all processes.
The architecture constraints the freedom of the designer and constructor of the object and guides them towards a structure that complies with the business vision and concepts of the architecture. The architecture serves as a *prescription* for the design, transformation and construction of the object. As a result the object

will be recognised as being 'designed and constructed under architecture'.

The object will inherit the added value of the architecture and will support the **(cultural) values**, **goals** and **objectives** of the organisation.

The described role of architecture originates from the building industry. In prescribing the structure, function and style of a *building* the architecture defines principles, guidelines and rules for:
- The type of components of which the building may be composed;
- How these components must fit together;
- What assemblies of the components are allowed;
- What functions (usage, living, and working) do the components and component assemblies support;
- And how the style represents the values of the owner.

The prescription concerns the overall architecture as well as the design models and the actual construction of the building.

IFEAD uses the same approach by defining the architectural steps for architecting business / organisations and IT systems.

In prescribing the structure of *an organisation and its related business* or an *IT system* the architecture defines principles, guidelines and rules for:
- The type of components of which the business or system may be composed;
- How these components must fit together;
- How the components communicate and co-operate;
- What assemblies of the components are allowed;
- What functions (communication, control, security, and information) the components and component assemblies support;
- And how the style expresses the (cultural) values of the stakeholders of that organisation.

The prescription concerns the overall architecture, the design models and the actual construction of the business and the IT system.

A special point of interest in IFEAD's approach is the attention for the dynamics of organizations and systems. This approach is developed not only for IT applications but also for the other aspect areas of the Extended Enterprise Architecture framework. The architecture must describe what criteria are useful to discern components, what functionality should be put in one component and when should functionality be split over more components. Especially the criteria for the design of frameworks are important.

Frameworks are special components that act as base for the structuring and assembly of components in more complex constructions.

The use of architecture will not only has consequences for the design and constructions content but will also impact the design and construction *process.*

The most important consequences are that:
- An architect prepares a design that provides a clear picture of the style, construction and the structure of the resulting business and IT system.
- The organization reviews the design for reflecting the style elements, usability and functionality and the developers assess the feasibility of the design and also the risks and costs of realisation. This may cause changes in the design.
- The organization accepts the final design, which meets their expectations regarding style, usability, functionality and costs of realisation.
- The architect defines the impact of change and realisation in a transformation plan.
- The developers realise the change in conformance to the final design.

The use of components and frameworks both in the design and construction of business and IT system will considerably reduce the effort of designing and building new business and IT systems.

> ➢ **Enterprise Architecture Prescriptions**

⇨ **Architecture Drivers, Guiding Principles and Rules**

This chapter describes the most important business drivers, guiding principles and rules, related to the philosophy of IFEAD's Extended Enterprise Architecture Framework and the Architecture approaches.

These drivers and principles are the rule of the game for the enterprise architects them selves, preserving them for mistakes or uncertain conditions.

Enterprise Architecture Rules and Principles are the fundamental elements of IFEAD's architectural philosophy.

This is the remember icon that depicts the most fundamental guiding principles and rules
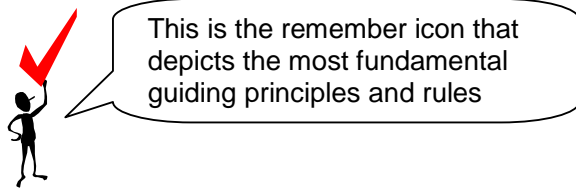
Principles and rules can be translated into visualisations, expressing the style, rules and principles of IFEAD architecture approach.

The Architecture Rules will be described by first explaining what the rule stands for and then why it is necessary.

There are principles and rules related to the context of architecture and there are principles and rules related to the methods & approaches. The approaches describe the architecture process roadmap.

⇨ **Enterprise Architecture Context Principles and Rules**

♠ **Enterprise Architecture is a means not a goal**

Every object from it selves has an architecture, it can be an explicit or be an implicit architecture.

By creating architecture explicitly, the architecture can be used to express harmony, style and construction of a certain situation.

Architecture is a means, not a goal in itself. The general expectation is that having and using an architectural design in the development of IT systems will have added value. But what is that added value and why do we need it?

Every architectural design study should start with the question why? (Contextual level) What are the goals and objectives of the architectural design study? Most of the time we will find that the goal is to enforce a certain change and/or to create or pertain a particular structure in the business, information, information systems or infrastructure area. The architecture should be chosen and applied in such a way that it will support or enable that goal. The goal and objectives have to be clearly defined to enable the right approach to the architectural design process and results.

♠ **Strategies set the direction of the enterprise architecture**

Strategies set the direction the organisation wants to go. The business strategy is the most important one and is leading. Derived from the business strategy, the Information, IT, Security and Governance strategies have to be extracted.

In most situations an architectural design describes the to-be picture of future changes, based on the existing or a Greenfield situation.

An architectural design gives guidelines and prescriptions to support the development of the business enablers, so they support the strategy, to reach the organisation's business goals.

♠ **No strategy, no enterprise architecture**

If there is no strategy, an architecture study cannot be started.

A business strategy describes the direction the business wants to go it shows the goals to achieve and explains the most important environmental variables.

☞ *Development policy is Input*

A part of the IT strategy is the development policy. The development policy expresses the development direction, based on development techniques, tools or products, etc. from the viewpoint of the client. These development

statements are input for an architecture study and verify the usability related to the business principles.

♠ No Scope - No enterprise architecture

Before we can start a program, it is necessary to know the boundaries of the program, the level of detail required the purpose of the program, the timelines, the roles and responsibilities, etc.
The program scope has to be clear before the architecture study can start, otherwise architects don't know what to describe or to design.

☞ The Scope and the Goals & Objectives sets the level of abstraction of the enterprise architecture

The program scope, goals & objectives define the level of contemplation to start with.
An enterprise wide program requires a different level of detail than a program that is scoped at unit level or information systems level. The enterprise level encloses the overall view and is the foundation for a program level approach.

☞ Organisation not in the right "maturity phase" for enterprise architecture

The architecture maturity model shows the architecture maturity level an organisation is in, regard to architecture usage. The organisation's maturity phase determines if the organisation is ready to use an architectural approach at all.
Organisations, which are not in the right phase, must be facilitated to get enough value out of using architecture.

♠ Enterprise Architecture teams

A combined, organization – enterprise architects team; will execute an enterprise architectural design study.
The team must be mandated to make decisions regarding enterprise architectural issues for the whole scope of the program.
The organization provides business specific input and makes decisions regarding the business direction during the architecture study as well as its architect's carries the architecture result.
(Certified) Architects bring in practical architecture experience, knowledge of the

methods, business and IT content and will facilitate the organization's architecture process fulfilling the program goal and objectives.

☞ Only enterprise architects can facilitate enterprise architectural design studies

(Certified) Enterprise Architects are trained in enterprise architectural approaches and have the knowledge and understanding of the impact of the business drivers and guiding principles for the architecture process. They have the experience to facilitate enterprise architectural design studies and to improve the methods based on scientific background and practical experience.

☞ Toolbox ➜ flexibility

Enterprise Architectural design studies have to be flexible to adapt to the organization's requirements. The approaches are like a toolbox, not a cookbook. Many decisions that have to be made during an enterprise architectural design study have to be discussed with the organization and have to be relatively weighed in relation to other topics. Most of the time during an ea design study, the enterprise architect uses the approach as a guideline to check the completeness of his activities, not to do the entire task and activities in every situation. Methods & approaches are used as process tools for the architect to plan and check the necessary steps in a certain organization situation.

♠ Business Drivers, Goals & Objectives are leading

Business drivers, Goals & Objectives are the most fundamental elements of the contextual level describing the ambition of the organisation and supported by strategic elements, they explain the motivators of the organisation to achieve a certain goal.
During decision-making in the architecture process, different possible solutions are presented in terms of business benefits (often translated to costs or benefits).

This is the one of the most important architecture rules.

☞ ***Business related choices***

All major choices made in the enterprise architecture process will be related and validated to business issues (drivers / requirements / principles).

An enterprise architectural design in the context of Business change or IT System support delivers a coherent and integrated set of visualisations of the future situation related to its environment.
Our opinion is that IT systems have to support the business; therefore the choices made during an architecture study have to be translated to added value to the business.

☞ ***Business centric thinking instead of technology centric thinking***

The business activities to be performed are key in the way of setting up the enterprise architecture process.

Technology can enable and support the business in a certain way; however the benefits for the business must be the driver to use these technologies.
There must be a balance between the business perspective from the business architecture and the human perspective from the information architecture to deliver these benefits.

☞ ***Business principles are mandatory***

Business principles are a subset of all guiding principles and mandatory in guiding and evaluating choices. All the decisions during an architecture process will be guided by these principles.
Therefore the business principles are the discriminators during the architecture process.

☞ ***Business Concepts thinking***

Different business situations, can be fulfilled by different business approaches, therefore different scenarios can be identified up front to achieve the goals & objectives. These scenarios are called concepts; so different business concepts have to be discussed at contextual level and the preferred concept will be used to start the architecture study.

♠ **Different enterprise architecture areas fulfil different goals.**

Enterprise Architecture in the context of this guide addresses the aspect areas required to design an Extended Enterprise Architecture of organisations and IT systems. Therefore the following main architecture areas are identified as mandatory for an Extended Enterprise Architecture.

- Business or Organisation; starting point and expressing all business elements and structures in scope.
- Information; extracted from the business an explicit expression of information needs, flows and relations is necessary to identify the functions that can be automated.
- Information - Systems; the automated support of specific functions.
- Technology - Infrastructure; the supporting environment for the information systems.

All these areas have to be related to each other in such a way that a coherent set of relations can be identified.
Integration of these aspect areas is a necessity for an Integrated Architectural design.

These four aspect areas are internationally accepted as the basis areas for enterprise architecture.

☞ ***Technology Infrastructure is more than hardware and networks***

The status and position of specific architecture items can change in time. For example software developed for a specific situation can become so common, that it is used throughout the whole organisation in such a way that it actually is part of the technology infrastructure. Physical examples are the 'Office Suite' packages with common business functionality used by the whole organisation. In our terms this type of common functionality (realised in products) has become part of the technology infrastructure.

♠ **Enterprise Architectural Viewpoints**

Enterprise Architectural Viewpoint: a perspective from which to view an

architecture (IEEE 1471-2000).

Besides the aspect areas of enterprise architecture, specific views can be created, based on specific viewpoints of themes.

Viewpoints deliver added value to the aspect areas by addressing and focusing on specific themes, covering all aspect areas.

The results of viewpoints should be incorporated in the Extended Enterprise Architecture. This is necessary, because the results of these viewpoints influences at all levels.

) *Governance is an important Viewpoint*

Governance is one of the viewpoints taken into account when creating an enterprise architecture.

Especially the organisational governance structure, responsibilities and service level agreements are influencing architectural decisions.

) *Security is an important Viewpoint*

Security is one of the other important Viewpoints supporting the organisation and IT in a consistent way.

Working on an Extended Enterprise Architecture or dealing within a specific aspect area, security has to be taken into account all the time. Always balancing between maximum security and maximum usability.

⇨ **Separation of Concerns**

'Separation of concerns' allow us to deal with conflict of interest between these concerns. We distinguish five main levels of concern within architecture studies often called levels of abstraction:

1. The Contextual level, describing the context of the organization and the scope of the architecture study;
2. The Conceptual level, addressing the Requirements;
3. The Logical level, addressing the ideal logical solutions;
4. The Physical level, addressing the physical solution of products & techniques.

5. The transformational level, describing the impact for the organization of the proposed solutions.

♠ **Separate the context from requirements**

The clear distinction between the context and the requirements is necessary to identify all environmental aspects, stakeholders and elements that can influence the progress of the architecture trajectory. The contextual level is key for the success of the overall result, by identifying the Business Mission, Vision, Strategies, Business Drivers, Guiding Principles and all stakeholders involved.

Cultural elements have to be taken into account by reflecting the organisation values. The maturity level of the organisation reflects the feasibility of the possible solutions. Market conditions are identified as well as the Governance and Security policies of the organisation. At contextual level all influencing factors have to be identified.

♠ **Separate requirements from logical solutions**

The clear distinction between requirements (conceptual level) and logical solutions (logical level) helps to separate business drivers, principles and requirements from logical solutions. Visualising and modelling the requirements helps understanding the needs of the organization to support his business.

At logical level, the logical solution can be developed based on a clear understanding of the drivers, principles and requirements.

This 'separation of concerns' between requirements and solutions allow us to deal with the conflict of interest between business requirements versus functional / quality solution constraints.

♠ **Separate logical solutions from physical solutions**

The clear distinction between logical solutions and physical solutions helps to design the best-fit solution and create the boundaries for a migration path toward that solution.

Logical solutions are implementation independent, physical solutions are related to specific products, frameworks and technology.

By focussing on logical solutions only, we can compare multiple architectural designs without being disturbed by physical issues. We can then make a clean choice for a particular design and pursue the 'ideal' solution to fulfil the organization requirements.

At physical level we focus on the techniques and products available to implement a preferred solution. By focussing on techniques only, we can compare multiple products in order to find the best possible support for the selected solution.

This 'separation of concerns' between logical solutions and physical solutions allow us to deal with the conflict of interest between implementation independent solutions and implementation dependent solutions.

[Example:] In the discussion of data placement we can choose the solution to have a single central database solution. This is a decision on a logical level that will impact the structure of e.g. the information system and the concerning solutions for transaction management and data locking. Due to technical constraints of the available technology we could however choose to implement the 'central' database on multiple locations using a replication mechanism. This mechanism can be provided by e.g. the DBMS. By using this mechanism we can comply with required performance or availability service levels without compromising the 'nature' or structure of the information systems itself.

♠ Separate physical solution from the transformation path

The timeframe to implement a physical solution can be differ in time, priority and scope based on technological or organisational constraints.

So for each aspect area the impact of the transformation has to be defined and the dependencies have to be clear.

♠ Architectural designs exist at different abstraction levels (following the rules above)

There are five levels of abstraction we are dealing with, a contextual level (context of the environment), conceptual level (the principles & requirements), a logical level (the logical solutions), a physical level (the physical solutions) and the transformation level (impact for the organisation).

A level of abstraction deals with specific issues and topics of the content and addresses a specific question within the architectural process.

♠ Adoption of international standards

International standards are used where necessary or possible, to align the way of working with the international community.

International standards are widely accepted and adopted and will therefore be used as anchor points to the international community.

This is done to improve communication of the architectural design results.

♠ Common source of information

Common information that is used in different architecture areas should have the same sources.

An architectural design reflecting the best result of all the identified architecture areas requires that all architecture areas start with the same source of information and the same starting-points (the results from the contextual level).

♠ Single entrance point of input

All information necessary for the architecture study in all aspect areas is collected at the contextual level or at least identified at the conceptual level.

This is done to validate all information and to prevent unexpected manipulations in the architecture process. Iterations to the contextual level can be fulfilled to collect new input information.

☞ AS-IS situation is input

The AS-IS situation will be most of the time, the start situation for the Architecture study.

This is done because only a few architecture studies are starting from a Greenfield situation.

⇨ **Architectural design principles and rules**

Architectural design principles and rules also deal with the methods and approaches, i.e. how to do an architecture study. All the architectural design methods have the same foundation and therefore encompass all architectural process rules. Characteristic for all the architectural design approaches is the presence of a process roadmap and an architecture framework.

The process roadmap describes the process steps in general –which phases to address during an architectural study- in a certain situation; the architecture framework identifies the topics to address.

♠ **Process roadmap is your guide**

The process roadmap will be established after a clear opinion of the goals & objectives and the supporting deliverables. It will guide the team to deliver appropriate results.

☞ *The Process Roadmap distinguishes the following phases: start-up, discovery, design and transform.*

The process roadmap (start-up, discovery, design, transform) is universal for all architecture approaches. TOGAF's ADM process is also a well known and open standard with clear process steps.

♠ **Deliverables drives the appropriate process**

The goals and objectives of the architecture study define the set of deliverables that will support these goals and objectives. Related to the deliverables, a process will be defined that at the end delivers the results in such a way that the goals and objectives can be achieved.

This means the process is unique to the organization's situation for every architecture study.

Besides the developing results, creation of buy-in for the results is one of the most important things to do.

♠ **Program Management Rules**

Every architecture study has to be set up as a normal program, with a program plan, resource plan, communication plan, time plan, risk analysis and validation milestones with the organization.

♠ **Communication to all stakeholders**

The process roadmap describes the tasks and activities to derive the appropriate results, the results can be architectural design models or free format visualisations.

Using tuned visualisation techniques these architectural results can be used for communication purposes to all stakeholders.

☞ *Visualisation of results*

All major results are visually presented.

This is done to show the structure and to show the impact of the decisions made during the architectural design study. It makes the abstract effects of a decision on the architectural design visual, which supports communication, between architects and all stakeholders.

➢ **Translation of Enterprise Architecture Principles and Rules into a Framework**

⇨ **Enterprise Architecture Environment Principles and Rules**

IFEAD has created an Extended Enterprise Architecture framework by translating the most important enterprise architecture environment rules & principles into a coherent framework. This framework is the foundation of IFEAD's architecture world of thought.

The following paragraphs depict the elements of the framework and the principles and rule that have been used to create it.

♠ Definition of the major architecture aspect areas

Principles and rules used to define this part of the model are:

- *Business Benefits are leading*
- *Business based choices*
- *Business centric thinking instead of technology centric thinking*
- *Business Principles are mandatory*
- *Business Scenario thinking*
- *Technology enabling by business benefits (Or Technology rationalised by business benefits)*

☞ *The Structuring of the enterprise architecture areas is from business to IT.*

> Starting from a business point of view, a structuring in aspect areas from business to IT is a way to address the right areas.
> All these areas have to be related to each other in such a way that the business will and can be supported by IT.
> Integration of these aspect areas is a necessity for Architecture.

Architecture in the context of this document is addressing topics to design the architecture of organisations and IT systems.

♠ Separation of levels of abstraction

The 'separation of concerns' between levels allow us to deal with the conflict of interest between these levels.

- *Separate the Strategy from Requirements*
- *Separate Requirements from solutions*
- *Separate solutions from implementations*
- *Separate implementations from transformations*

☞ *Enterprise Architectures exist at different abstraction levels (Following the rules above)*

There are five levels of abstraction we are dealing with, the context, a conceptual level, a logical level, a physical level and the transformation level. A level of abstraction deals with content and addresses a specific question as part of the architectural process activities.

Combining the structuring from business to IT and the identified abstraction levels, the following matrix appears:

♠ Adding Viewpoints to the framework

Certain specific viewpoints of the architecture are not by default incorporated in the overall result. These viewpoints are difficult to implement after implementation, so they should be taken into account during every phase of the architecture process. These architecture viewpoints are covering all cells of the framework.

- *Governance incorporation from start over all the main areas*
- *Security incorporation from start over all the main areas*

When an organisation is in the "maturity phase" of using Architecture for its Business and IT, the importance of security of business & information becomes a vital issue. So by taking security into account in the Architecture the business can decide on the importance of security on specific services.

During the architecture study, the architects have to establish the impact of these viewpoints for every aspect area. Examples of architecture viewpoints are Security and Governance.

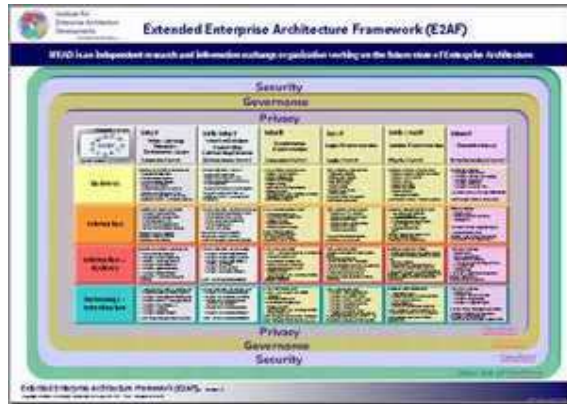## ⇨ Integrating all these elements into a Framework

The combination of the aspect areas and the abstraction levels together with the architecture viewpoints delivers an Extended Enterprise Architecture framework.
This framework represents the most important architecture rules and principles of IFEAD ' architecture philosophy and mindset.

♠ Combining aspect areas with abstraction levels

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> ## Extended Enterprise Architecture Framework (E2AF)

IFEAD's Extended Enterprise Architecture Framework (E2AF) positions the way IFEAD communicates about architecture with all stakeholders, based on the philosophy and mindset behind the framework.

So these principles and rules guide the architect by approaching architectures and reflect IFEAD's Architecture Style.

⇨ ## Visualization of E2AF

Based on the basic model of E2AF described in the former chapters, IFEAD has created a simpler framework, with fewer details, which can be easily used to explain E2AF.

This chapter explains why IFEAD believes that enterprise architecture needs to be created in an integrated approach, what E2AF is, how E2AF is used and which methods, tools and techniques are available to conduct an Extended Enterprise Architecture Study.

⇨ ## Why E2AF

 Every complex thing that has to operate as a whole has to be designed as a whole. This to guarantee integration and coherency of all its components and to ensure the whole will operate the way required when it is created.

The Extended Enterprise Architecture Framework forces enterprise architects to ensure that the organisation fully benefits from

the alignment of business and IT by integrating all enterprise architecture aspect areas into one overall result, i.e. The enterprise architectural design has to consist of interlinked business, information, information systems, infrastructure, security and governance aspects.

The risk taken when not creating an **Extended Enterprise Architecture** is that time and money are thrown away due to inefficiencies and insufficient insight in the complexity of the overall structure.

⇨ ## How to use E2AF

Enterprise Architecture isn't a panacea for all problems in the world of business and information & communication technology. It serves its own specific objectives and has to be used when appropriate.

The framework is a communication vehicle for all stakeholders involved in an architecture study to explain en show relations, dependencies, influences and complexity of the situation of study.

> Enterprise Architecture results as well as E2AF itself can be used as an Atlas for management to navigate to all relevant topics.
> From E2AF, roadmaps can be defined to identify the necessary tasks and activities.
> E2AF can show the complexity of elements to be addressed.
> E2AF can show the people to be involved in the process.
> E2AF shows the relations and dependencies.
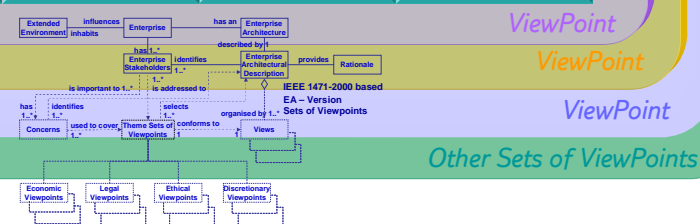> E2AF is your Guide in all Architectural Activities.

⇨ ## E2AF Full Blown

Security
Governance
Privacy

Abstraction Levels / Aspect Areas	Why? Vision / Strategy Principles / Environment / Scope — Contextual Level	With Who? Value Net Relations Cooperating / Collaborating Elements — Environmental Level	What? Requirements Representation — Conceptual Level	How? Logical Representation — Logical Level	With what? Solution Representation — Physical Level	When? Enterprise Impact — Transformational Level
Business	*Business Goals, Drivers and Concepts* • Corporate Strategic Plans • Extended Business Drivers • Extended Guiding Principles • Scope of Collaboration • Environmental Dynamics, e.g. Laws • Business Goals & Objectives, KPI's Viewpoints = Competition, Value Net, etc. Ends/Means = As-Is / To-Be Business Situation	*Extended Enterprise Value Net* • Collaborative Value Parties • Scope of the Collaborative value • Collaboration Contracts, Service Levels • Law & Regulations • Collaborative Business Goals & Objectives Viewpoint = Collaborative Value, etc. Ends/Means = As-Is / To-Be Collaborative Environment	*Level of Business Collaboration* • Program Goals & Objectives • Business Requirements • Business Relationships • Budget of Change • Stakeholders / Win-Win Conditions • Quality of Services Characteristics = Time, Flexibility, Availability, Security, Maintainability, etc. End = Business Purpose	*Type of Business Collaboration* • Organisation Structure • Business Area Structure • Role Players / Actors • Value Net Position • Business Culture • Business Commitment • Business Rules Viewpoint = Business Perspective End = Business Behaviour	*Solutions of Business Collaboration* • Business Functions structure and relations • Business Tasks / Activities • Business Objects • Business Resources • Business Knowledge • Business Benefits • Technology Possibilities End = Business Outcome / Business Solutions	*Granularity of Change* • Enterprise Business Case • Enterprise Transformation Roadmap • Enterprise Priority Plan • Enterprise Budget Plan • Enterprise Development Plan e.g. Business Process Redesign or Outsourcing End = Enterprise Business Transformation
Information	*Activities the Business Performs* • Enterprise Information Policy • Responsibilities & Competencies • Ownership of Information • Internal / External Dependencies • Internal / External Activities in Scope Activities = Generic or Specific Activities = Critical / Overhead End = Information Situation	*Extended Enterprise Information Exchange* • Extended Information Exchange Services • Extended Information Ownership • Parties Information Confidentiality • Extended Dependencies • Activities out of Scope Information = Generic or Specific Information = Critical / Overhead End = Ext. Enterprise Information Exchange	*Level of Information Interaction* • Functional Requirements • Non-Functional Requirements • Quality of Services • Information Relations • Information Characteristics Policy = Business Purpose Domains = Functional Areas I/O = Business Resources End = Information Resources	*Type of Information Interaction* • Information Tasks / Activities • Information Objects & Relations • Information Interaction • Information Flow Characteristics • Information Resources • Information Locations Viewpoint = Interaction Perspective End = Information Behaviour	*Solutions of Information Interaction* • Type of Information Exchange • Formal / Informal • Grouping of Information Objects • Grouping of Information Resources • Type of Triggers / Events • Grouping of Information Types Priority = Dependency of Information Relation = Information Flow End = Information Solutions Sets	*Impact of Change* • Business Case • Information Systems Roadmap • Security Plan Selection = Set of ICT Supported Objects e.g. Information Roadmap Interface = Type of Information Exchange End = Activities to be supported by ICT
Information – Systems	*Systems Goals, Drivers and Concepts* • System Development policy • Enterprise Interoperability Policy • Business - Technology Enablers • Enterprise Responsibility of IS • Enterprise Application portfolio • Enterprise Guiding Principles End = As-Is / To-Be Information-System landscape	*Extended Enterprise Interoperability* • Enterprise Interoperability Standards • Enterprise Interoperability Governance • Enterprise Interoperability Quality of Services (e.g. Security) • Enterprise Interface portfolio • Enterprise Collaboration Principles End = To-Be Interoperability Definitions	*Level of Interoperability* • As-Is / To-Be Information Systems Environment • Functional Requirements • Non-Functional Requirements • Information-Systems Behaviour • Abstraction & Precision of Data • Quality of Services Characteristics = Time, Availability, Security, Maintainability, etc. Structure = Interfaces	*Type of Interoperability* • IS Functions & behaviour • Choice of Middleware Technologies • Shared & Pluggable IS Services / Solution sets • Interface Definitions & Standards • Official & De-facto IS Standards Standards = IS Interoperability Standards End = PIRS	*Solutions for Interoperability* • Product-Independent Reference Solution (PIRS) • Product-Specific Reference Solution (PSRS) • Map PSRM to Product Solutions and options, etc. • Interface Solutions • Implementation of Quality of Services • Refinement Technical Reference Model Viewpoints = Selection of a Product Solutions Structure = Spectrum of Styles & Solutions sets Quality = Solution Interface Characteristics End = PSRS	*Timeframe of Change* • Business Case • Make or Buy Decision • Implementation Roadmap • Governance Plan • Security Impact e.g. Design of Application & Components Priority = Dependencies End = Roadmap for realization
Technology - Infrastructure	*Technology Goals, Drivers and Concepts* • Locations in which the Business Operates • Enterprise Technology Infrastructure policy • Enterprise Business - Technology Enablers • Enterprise Responsibility of TI • Enterprise TI Portfolio • Enterprise Guiding Principles Node = Major Enterprise Business Location	*Extended Enterprise Inter-Connection* • Enterprise Inter-Connection Standards • Enterprise Inter-Connection Governance • Enterprise Inter-Connection Quality of Services (e.g. Security) • Enterprise Inter-Connection portfolio • Enterprise Inter-Connection Principles End = To-Be Inter-Connection Definitions	*Level of Inter-Connection* • As-Is / To-Be Enterprise Infrastructure • TI Principles • Functional Requirements • Non-Functional Requirements • Quality of Services Characteristics = Time, Availability, Security, Maintainability, etc. Link = Enterprise Business System Connection Node = Enterprise Business System Environm.	*Type of Inter-Connection* • Enterprise Technology Standards • Enterprise Infrastructure Profile • Enterprise Hardware Systems Profile • Enterprise Communication Profile • Enterprise Security Profile • Enterprise Governance Profile • Technical Reference Model & Standards Positioning = Allocation of IT Services – TRM Interaction = Concepts of Service Layering	*Solutions of Inter-Connection* • Technology Overview • Solutions & Products for Inter-Connection • Formats of Communication • Security Integration • Refinement Technical Reference Model Node = Hardware + System Software, etc. Connectivity = Middleware / Messaging, etc. End = Structure of Relations, Products + Specifications	*Timeframe of Change* • Business Case • Enterprise Transformation Plan • Enterprise Priority Setting • Enterprise IS Alignment Impact e.g. Blue Print of Technology Implementation Portfolio of Products and Components. Catalogues of used Standards End = Roadmap for Enterprise Implementation

Privacy
Governance
Security

ViewPoint
ViewPoint
ViewPoint
Other Sets of ViewPoints

IEEE 1471-2000 based
EA – Version
Sets of Viewpoints

Economic Viewpoints — Legal Viewpoints — Ethical Viewpoints — Discretionary Viewpoints

Extended Enterprise Architecture Framework (E2AF)SM Version 1.4

EA Process Principles in General

The following enterprise architecture process principles derive from best practices throughout a lot of complex enterprise architecture assignments.

They are identified as a starting point in the architecture process. Each individual organization, with unique needs and requirements, should first consider these, then modify, add to, or replace this list as appropriate to its purposes.

1. Enterprise Architectures must be appropriately scoped, planned, and defined based on the intended use of the architecture.

Rationale: The enterprise architecture development effort needs direction and guidance to meet expectations for specific uses of the architecture end products. Detailed models may not be needed for high-level decision-making; similarly, simple, descriptive architectures may not provide enough information to support engineering choices.

Implications: The enterprise architecture must be generated with a specific purpose and for a specific audience to ensure it meets the expectations of its intended stakeholders.

2. Enterprise Architectures must be compliant with the law as expressed in legislative mandates, executive orders, Governmental regulations, and other Governmental guidelines.

Rationale: Organizations must abide by laws, policies, and regulations. However, this does not preclude business process improvements that lead to changes in policies and regulations.

Implications: Organizations should be aware of laws, regulations, and external policies regarding the development of enterprise architectures and the collection, retention, management, and security of data. Changes in the law and changes in may drive changes in architectural processes or applications.

3. Enterprise Architectures facilitate change.

Rationale: In the rapidly changing Business & IT environment, organizations need tools to manage and control their business and technical growth and change. As the technical development life cycle shortens, with new technologies replacing older systems every 18 months, organizations require an overarching architecture to capture their systems design and operating environment. Even so dynamics in business had to be supported by an enterprise architecture.

Implications: Systems developers and the enterprise architects should ensure the coordination between technology investments and business practices. Architectures must be used in the evaluation function of the Capital Planning and Investment Control process.

4. Enterprise architectures must reflect the Business strategic plans.

Rationale: The to-be architecture has maximum value when it is most closely aligned with the organization's strategic plans and other corporate-level direction, concepts, and planning.

Implications: The to-be architecture must be developed in concert with strategic planners as well as the operational staff. As the strategic plan changes, so do the future environment and the target architecture.

5. Enterprise Architectures continuously change and require transformation.

Rationale: The organization is constantly evolving towards its future. As today's architecture transformation to the to-be architecture, the to-be becomes the organization's baseline enterprise architecture at some point in the future. The baseline enterprise architecture continuously moves and transitions toward the to-be enterprise architecture as a continuous change of the as situation.

Implications: The to-be enterprise architecture is a rolling set of products, continually portraying the out-year environment. As a component of strategic planning and change management, the to-be architecture captures the future environment including all business requirements and systems transitions. The transformation

plan is the organization's roadmap to systems migration.

6. To-be enterprise architectures should project no more than 1 to 3 years into the future.

Rationale: Technology life cycles currently are in the neighborhood of 12 months, and new IT products appear on the market every 18 months. Acquisition practices must be aligning to these rapid changes, which mean that an organization's future information needs and technical infrastructure requirements are changing just as rapidly. Consequently, no one can accurately predict what business practices will prevail 5 to 10 years into the future and what type of IT capabilities and resources will be available.

Implications: To-be enterprise architectures will need to be revised and updated regularly. The transformation plan, illustrating intermediate points in time, may become more valuable than the target architectures.

7. Enterprise Architectures provide standardized business descriptions and common operating environments (COEs).

Rationale: Commonality improves interoperability, cost avoidance, and convergence. For example, the integration of enterprise architectural Activity Models and Operational Transformation Diagrams (on the business side) and the Technical Reference Model and technology forecasts (on the technical side) helps establish a COE within the organization's logical and physical infrastructures.

Implications: The systems architect and the enterprise architect must ensure the coordination between technology investments and business practices. A COE grounded on standard business practices yields improved information structures.

8. Enterprise Architecture products are only as good as the information collected from subject matter experts and domain owners.

Rationale: The enterprise architect is not vested with the organizational information. It is incumbent upon the enterprise architect to collect the needed enterprise architectural information from the members of the organization who possess the knowledge of the business processes and associated information. These subject matter experts tend to be process owners, operational staff, field representatives, systems developers, software designers, users, etc. The domain owners are the responsible managers of specific business areas.

Implications: The development of the enterprise architecture can be a slow process, dependent on the enterprise architect's access to subject matter experts and domain owners. The validity of the enterprise architecture can be limited by the accuracy of the collected information. Development of the enterprise architecture is an iterative process of information gathering and interviewing to obtain verification and validity checks of the architectural products.

9. Enterprise Architectures minimize the burden of information collection, streamline information storage, and enhance information access.

Rationale: Information, as a corporate asset, is key to an organization's mission, vision, goals, objectives and daily work routine. The more efficiently an organization gathers information, stores and retrieves that information, and uses the information, the more productive the organization. Information is power.

Implications: Business processes are best improved by streamlining the flow and use of data and information. The development of enterprise architectural Node Connectivity Descriptions, Information Exchange Matrices, and other information models will aid in the design of improved data management systems.

10. To-be enterprise architectures should be used to control the growth of technical diversity.

Rationale: The rapid adoption of new and innovative IT products can easily lead to introducing a diverse set of IT products that may not always be fully compatible within the existing enterprise infrastructure. This necessitates the selection and implementation of proven market technologies.

Implications: The to-be enterprise architecture must be used in conjunction with the organization's investment review process and technology insertion plans. Relying on the enterprise architecture as an integral component of Business & IT decision-making helps control the introduction of incompatible solutions.

➢ Glossary, Explanation of Terminology

⇨ Standards

In the international community we can identify several types of standards. Standards set by an international standardisation organisation; defacto standards adopted as a standard by the users of the techniques or products (mostly known as a supplier standard) and standards set by an organisation them selves.

A standard is an agreement on how things should be done, or, in other words, *a rule (or a set of rules) on which an agreement exists*.

These agreements can reach from a project scale (using a certain layout for the documentation of the program) to an inter-company or even international scale (like the famous IEEE, ISO-OSI standards). The use of standards enhances the ease with which interfaces (couplings) can be made. They allow computers to communicate, for example. Standards, in other words, enhance the connectivity. Another benefit of standards is that once a standard has been issued, and is supported widely, this will lead to economies of scale, decreasing prices and possibly enhancing the general quality of implementation.

⇨ Guidelines

Guidelines are less strict than rules or standards. The idea behind a guideline is, that it should be followed, because in many cases it will guide to (a route to) a good solution. Creativity or craftsmanship of the user of the guideline may lead him to deviate from it. A guideline can thus be simply formulated as being a *rule of thumb*.

⇨ Rules

In general, a rule is a prescription on how something has to be done. The aforementioned discussion suggests that a rule (in the narrow sense of the word) would be a prescription that has to be followed, but on which no agreement exists. Speaking of "in the narrow sense" doesn't clarify discussions. We think it will be clearer to speak of *prescriptions* for the broader sense of the word rule, and *rule* for the narrower sense.

⇨ Principles

Principles are definitely on a higher level of abstraction than the aforementioned prescriptions. A principle expresses an idea, a message (culture / behaviour) or value that comes from corporate vision, strategies, and business drivers, experience or from knowledge of a subject.

In dictionaries (e.g. [Webster]), the word principle has a few meanings. The first one mentioned is that of a *comprehensive and fundamental law, doctrine or assumption*. An important word in this definition is "fundamental"; other things (rules, prescriptions, and sometimes (-mathematical) laws) follow from principles. Another important element in this definition is the word "assumption"; apart from the fact that a principle can be an assumption the most fundamental parts of sciences often have to rely on assumptions.

⇨ Definition of terminology

Standard   A prescription or a set of prescriptions on which an agreement exists and that must be followed.

Guideline   A prescription that is non-compelling.

Rule   A prescription that has to be followed.

Principle   A fundamental idea meant to fulfil a general requirement.