Architecture Frameworks – A standard to unify terms, concepts, life-cycles and principles

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ABSTRACT

This document presents the action-plan of the AFWG (Architecture Framework Working Group) of AFNOR (French Member of the International Organization for Standardization).
The main outcome of planed standard documents is a unified view of the information issued by the existing Architecture Frameworks regarding the basis of architecting landscape for Enterprises and Architects, methods, formalisms, terms, concepts and principles for both architecture description and evaluation. The innovative part of the work-plan is a clarification of the Enterprise/System Architecting activities with regards to the Enterprise/System live-cycle. The basic idea is considering Enterprise/System Architecting in the same way as the buildings and naval construction domains. In these domains the Architecting phase is seen as an orientation phase and the architecture elements are considered as a dashboard for the Design Authority.

1.0 INTRODUCTION

Regarding Architecting and architecture a lot of reference documents and architecture frameworks exist today (See section 11.1). But the available frameworks are far from being “holistic” as proposed by the Zachman’s model [16] and are generally giving either the high-level concerns of an acquirer viewpoint or/and information system provider. They are dedicated to either Enterprise organisation, or method, or formalism. None is addressing these 3 subjects as a whole. Most of the reference documents for systems engineering (ISO-15288, EIA-632, IEEE Std 1220, etc) bring confusion with a description of architectural aspects more or less reduced to architectural design considered as an artefact of systems engineering activities. No standard document is providing the foundations in terms of vocabulary, concepts and principles related to the architecting activities.

However architecture views are now requested in many major programs, at least in the Defence, Space and transportation areas. Consequently some works are done but generally poorly formalised in the programs and the level of interoperability between Architecture Frameworks is very low.

Today initiatives like IDEAS [18], MODEM [19] and UPDM [15] are currently on-going to provide a technical level of interoperability. Roadmaps of some of the major Architecture Frameworks plan to take benefits from this technical foundation but no forecast is currently visible to harmonise the usage viewpoint of the frameworks and architecture artefacts.

The AFNOR AFWG action-plan aims at providing the enterprise and architect vision within the Enterprise/system life-cycle scope. The planned proceeding is using the major outcomes of the architecture

frameworks, reference documents and known studies to harmonise them in standard documents expected to become references for architects and enterprises. In particular, the work will clarify the scope of the architecting activities to address the full scale of an enterprise and a system, and relationships with the contractors, the "design authorities", the engineers and the subject-matter experts involved in safety, security, human factors, legal and end-usage activities.

2.0 MOTIVATION

For the civil and military domains the major objectives and stakes of this work are to:

- Improve the needs and solution definition, via a provision of a clear and harmonised set of definitions for common terms and concepts to sustain architecture frameworks.
- Ease the interoperability of systems/equipment, via the evolution of architecture frameworks and their associate tools.
- Allow early validation and potential trade-offs for a better formalised architecture description using common foundations.
- Ease the military and civil transformation process.

Note: this is an opportunity to collect public NATO study results and expectations regarding Architecting terms, concepts and other potential generic concerns.

3.0 ORGANIZATION RELATED TO THIS WORK

The initial work on the draft of standard is currently undertaken by the AFWG working group of the French Association for Standardisation (AFNOR). In addition to industrial products and equipment, AFNOR standardization covers fields such as services, risks, management and more, in order to guarantee openness and consultation, in direct relation with the globalization of markets. As the French representative within European and international standards organizations, AFNOR works for the benefit of innovation, performance and sustainable development of companies and society.

The AFWG working group is currently involving major French companies working in various sectors like transportation, space, defence and security. The background of the working group participants is complemented by attendance to the international conferences and working sessions involving many other business domains like banking and insurance, e-government, energy, and others to capture the largest architecting needs and collect the current state-of-the-art.

The aim is to enlarge the set of participants from a French group to an international organisation with a possible promotion of the standardisation effort to the ISO (International Organization for Standardization) level. This evolution of the standardisation work is currently under work.

4.0 STATUS REGARDING ARCHITECTURE AND ARCHITECTING

4.1.1 Introduction to Architecture and Architecting

Architecture must provide all the agreed descriptions and decisions with rationale of the arrangement, usage, operational environment and principles necessary to build, use, or take benefit of it.

The agreement on the architecture must be got from all the Stakeholders being the Owner, the Acquirer, the Provider, the Builder, the Users, etc. Each stakeholder having a Point of View on the architecture — according to his needs or interest— architecture is the result of compromises in order to get a consensus.

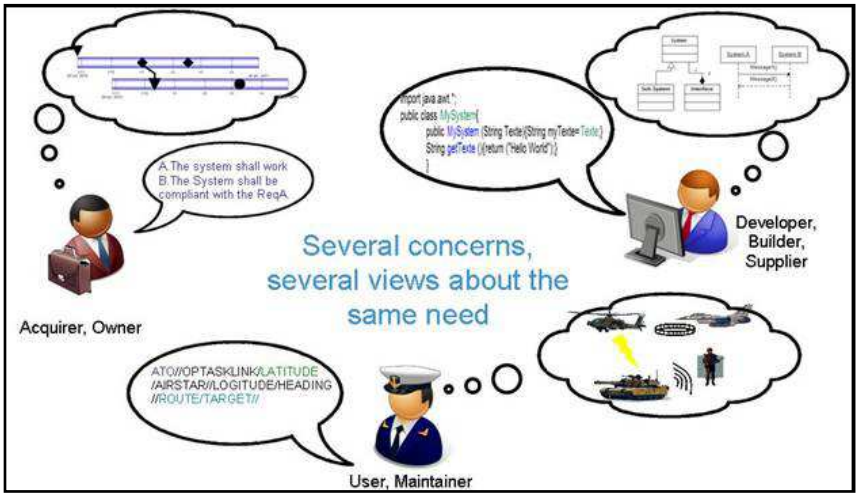

Figure 1: Concerns and needs

Architecting covers any necessary activity to get architectures. As long as architecting needs to express the various viewpoints of the stakeholders –being operational, business, legal, technical, etc. – to get a consensus the activity must involve all the necessary disciplines and expertise in order to be able to formalize each view with the correct information. I.e. architecting is a team work.

Architecting can apply to various levels of organisations, for example:

- Enterprise architecting: to plan the alignment of processes, capabilities and resources (including human resources) with corporate strategy.
- Systems architecting: to allocate engineering requirements to system/product components.
- Service-oriented architecting: to allocate business requirements to business services and the capabilities that these services support.
- Focused architecting: to refine the requirement allocation with the concerns of a particular discipline (software, electronics, mechanics, etc) or specialty (safety, security, human factors).

The main actor of architecting is obviously the Architect. The architect stands at the edge of both the company and the client organisation:

- For his company he is the expert interpreter of the client's wishes and needs.
- And for the client he is the expert interpreter of the world of technological and engineering possibilities that the company offer would mean for him.

An architect contributes to help the company to specify the stakeholders' needs. He:

- Translates these needs into capabilities, functions and constraints,
- Allocates them to engineering disciplines and,
- Effects technical and technological choices between options proposed by experts, so as to obtain the best trade-off between requirements.

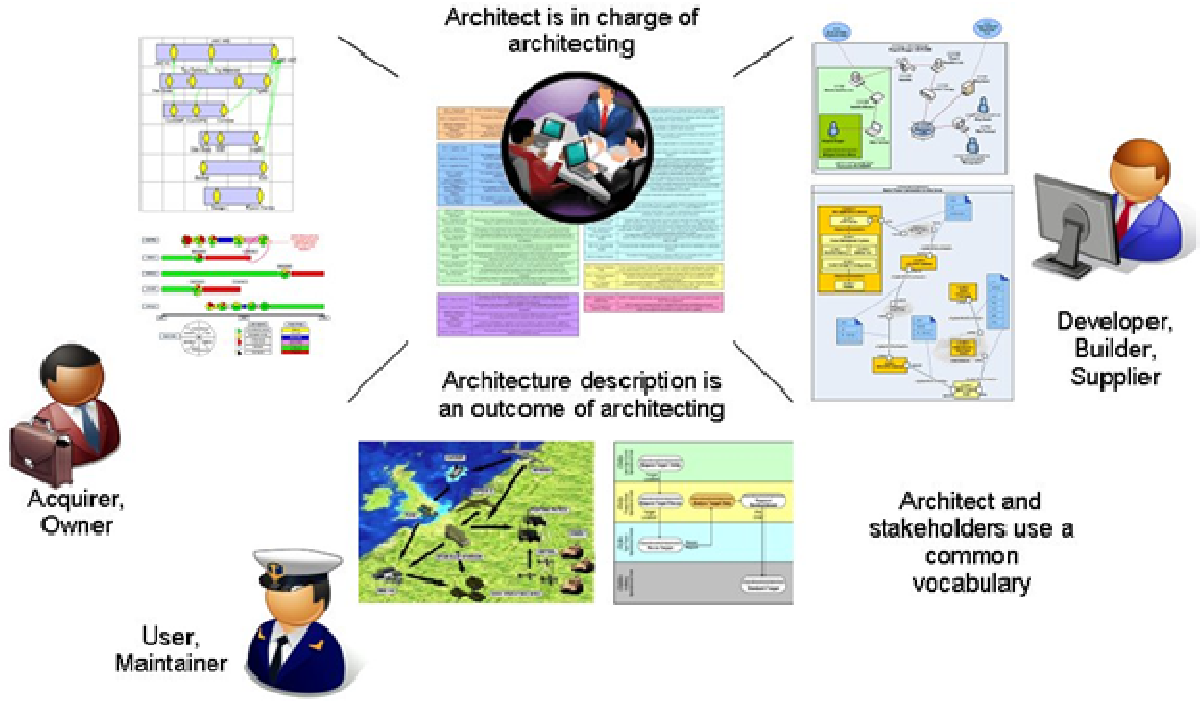

Figure 2: Actors and landscape for architecting

An architect is the expert who can guaranty that the solution is feasible with respect of the stakeholders concerns: cost, delay, performance, features, etc. He is not only responsible for the technical architecture.

Following the thoughts on architecting [17], while an engineer (working on enterprise, systems or components) requires an "initial point" to initiate the successful engineering —employing analysis and decomposition techniques—an architect synthesizes this "initial point" from the collective vision, goals, constraints, and other needs of the stakeholders in the to-be-developed architecture —converting conflicting stakeholder demands into a conceptualized whole that maximizes the satisfaction of each stakeholder.

4.1.2 First statement regarding architecture and architecting

Complexity regarding architecture is linked to the number and diversity of participants, components and technologies, involved in organization, design and production, which are difficult to understand and verify. The complexity does not concern only man-made systems but organization and services.

Architecture is traditionally only focused on systems, putting outside other issues like capability, enterprise, services, etc.

The consensus among stakeholders having an interest in an entity (either capability, enterprise, system or service) and having a point of view on the architecture —according to their needs or interest— is difficult to get if there is no guidance and common vocabulary to deal with.

Architecting needs common vocabulary for mutual understanding, but also guidance for architecture.

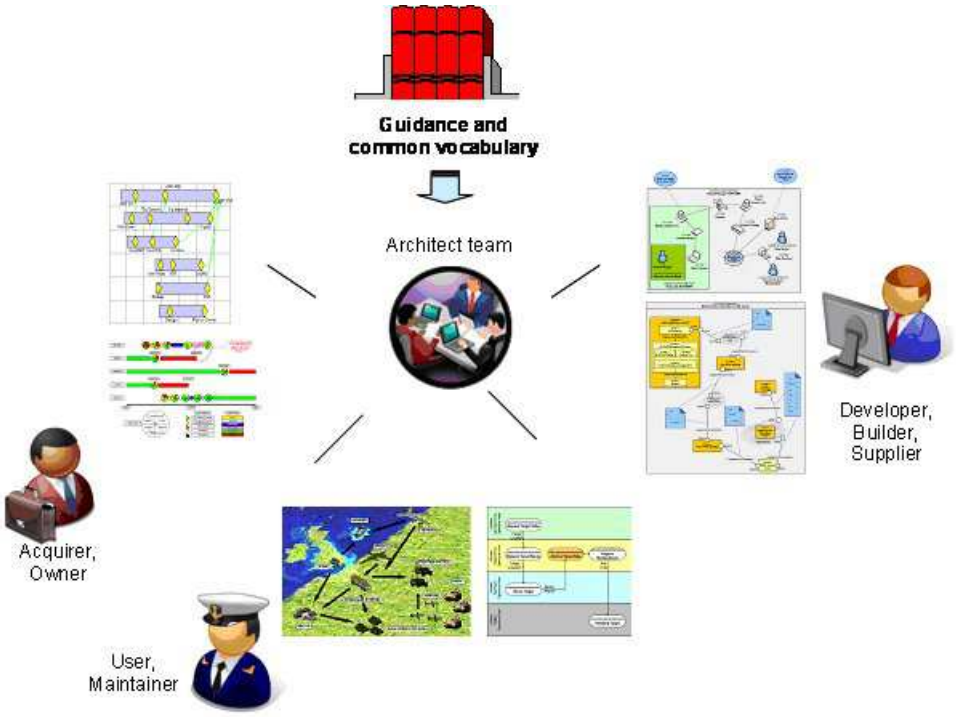

Figure 3: Guidance and common vocabulary

ISO/IEC/IEEE 42010 gives conceptual foundations for architecture description: conceptual model, architecting, architecture frameworks and architecture description languages. ISO 42010 provides also some guidance for architecture descriptions.

However some terms and concepts are not considered:

- Capability as the ability to achieve a desired effect under specified standards and conditions.
- Service as a function, capability or behaviour that is provided by a producer to a consumer.
- Environment as the circumstances, objects, and conditions that will influence the completed architecture.
- Viewpoints not directly linked to stakeholders' concerns.
- Reference system as environment supporting all the architecting activities.
- Overarching, reference and target architectures.
- Architecture repository.
- Architecture governance.

Those concepts ask guidance issues:

- How to identify and draw the key properties pertaining to ontology, behaviour, relationships, composition and evolution, which in turn affect concerns such as the feasibility, utility, security, scalability, maintainability, sustainability, and other architectural "–ities"?
- How to put in coherence semantic, organizational, functional vs. non-functional, physical solutions?
- What is the satisfying description of entities, flows and behaviours (see examples below) when emphasis is put on contextual, conceptual, logical or physical perspectives?
- What is the satisfying description when emphasis is put on architectural "–ities"?

As a first example, in NAF V3_ANNEX 1 to AC322-D(2007)0048, two perspectives of the same process is drawn:

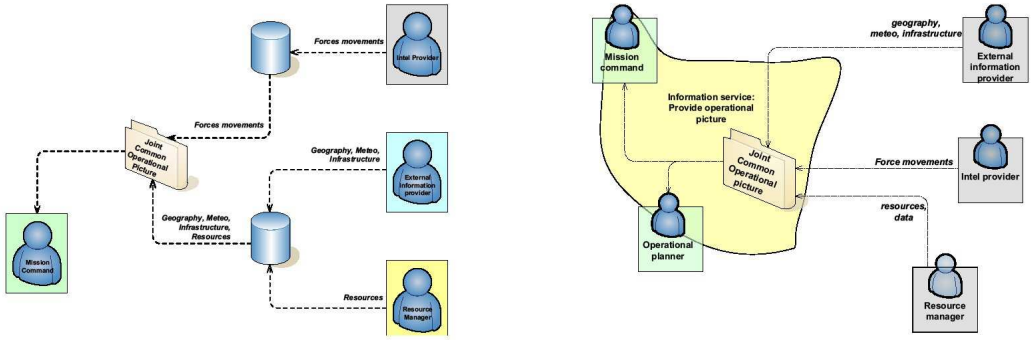

Figure 4: Two perspectives of the same process

Information flow (left) vs. Information service (right) pictures do not gives the clues for understanding the perspectives.

As a second example –ibid– two perspectives of the same services is depicted:

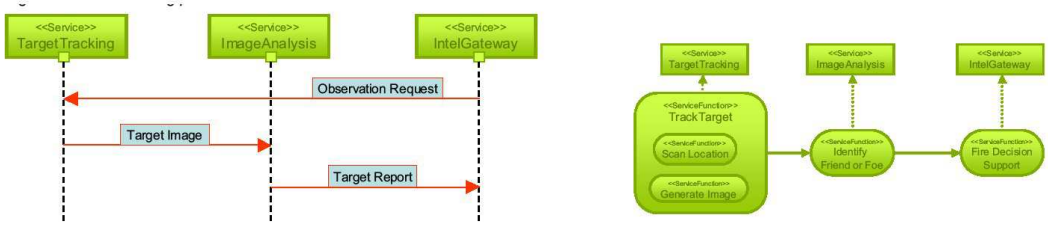

Figure 5: Two perspectives of the same service

Service behaviour sequence –i.e. orchestration– (left) vs. relationship between services (right) diagrams do not enable to clarify service notion (provider/consumer and related actions/capabilities). On top of this, note that the illustrated services are three web services.

The traditional "state of art" engineering approach (reductionist, optimizing, quantitative costs, deductive, value of "how") is not efficient for architecting complex entities.

An original architecting approach [16][17] would be preferably based on holistic, satisfying stakeholder, abductive, value of "what".

4.1.3 One functional- and capability-oriented example

During the works on the French Future Land Combat Force (Scorpion) different combat architectures are evaluated to identify the best constitution of the inter-weapons tactic group enabling different types of operational missions.

To perform these evaluations, combat architectural alternatives are structured per architectural dimensions:

- Functional capabilities typically owned by an inter-weapons tactic group
- Four different axis of specialization of an inter-weapons tactic group.
  - Automation
  - Centralization/decentralization
  - Data-valuation

- Specialization.

Usage of Architecture Framework allows building these combat architectures from the combination of the functional capabilities and the four axes according to the following breakdown:

- Operational viewpoint
- System viewpoint
- Technical viewpoint.

In this way, it was possible to formalise these combat architectures in virtual operational missions and at least, to evaluate them and identify the best of them.

The main difficulties in this work were to:

- Find formalisms and communication means to cover all the concerns, cultures, expectations and background of the stakeholders (end-users, acquirers and providers). I.e. NAF architecture views are not understandable by most of end-users and consequently the architects needed to "translate" the views in simpler "drawings" and technical-operational simulations with a huge additional explanation.
- Get evaluation method and data agreed by all the stakeholders with:
  - A clear weighting of the evaluation criteria: quotation of the individual importance of each criterion with regards of the whole architecture value.
  - A normalisation of them: harmonisation of the criteria valuation to allow equitable comparison of architecture according to these criteria.
  - And priority-ordering of the multi-criteria analyses: phasing of the evaluation and decision process to browse the architectural alternatives and to converge towards valid architectures.

This 3-year work gives a formalised and justified definition of 4 candidate architectures. These architectures are currently under final trade-offs analysis to frame the implementation of the operational capabilities and all necessary assets (platforms, information system, interoperability means, human roles and skills, etc).

4.1.4 One platform-centric example

Development of a vehicle –in civil and military domains– has become very complicated with regards of the increasing multiplicity of the constraints: affordability, competitively, short time-to-market release, etc.

This development complexity is increasing due to the constant augmentation of the delivered features and used technologies, worked as differentiators. Mechanics, electronics, optics, software, safety, security, human factors and many other disciplines and specialties have to be involved.

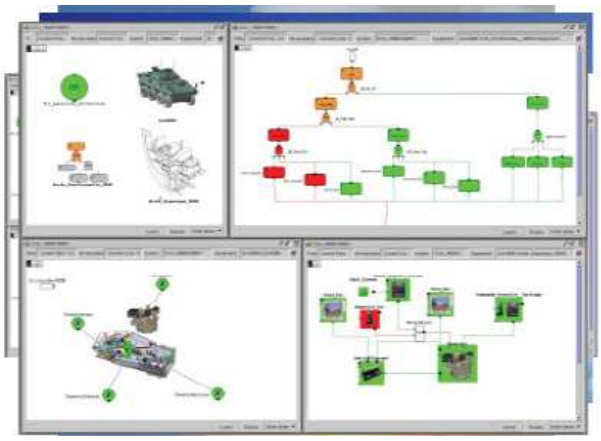

Figure 6: Multiple models for multiples concerns

For many years project organisation and systems engineering were thought with a “classic” top-down approach structured by OBS, WBS and PBS (respectively, organisational, work and product breakdown structure). In this process the work-packages are generally defined by a prime management office during the early phase of the project according to the vision a set of chief-engineers. This kind of organisation leaded to a work done per “stove pipes”. The consequence was that each discipline and speciality, year after year, has developed his domain-specific background with a solid set of processes, methods, languages and tools to be efficient in his own job with few consideration of the Enterprise optimum.

Figure 7: Collaborative working

With the emergence of the Architecture Frameworks and the collaborative design approach (see as example the space domain with collaborative environment like NASA JPL and ESA CDF) the trend is to involve as far as possible the concerned teams collectively. Consequence is to:

- Put in place facilities and methods for multi-disciplinary team working along the whole life cycle. As example, serious-gaming techniques in obeya rooms
- Check that all the artefacts developed by each discipline and speciality are concurring the solution.

Architecture frameworks are normally thought to work in this logic; but up to now they are limited to only some aspects of the architectural works and many disciplines and specialities are not covered (physics, human factors, etc.).

4.1.5 Status

4.1.6 Formalism and description

Currently the formalisms provided by the architecture frameworks for architecture description are mostly oriented towards information systems and do not address the physical aspects. The description is generally complemented by other modelling practices to cover the mechanical, electrical, thermal, etc. Consequence of this way to proceed is a heterogeneous set of views and models difficult to master consistently along the time.

The main strength of the framework are on description of business [acquisition and provision], operational and system views. Technical description is poorly addressed even if this is absolutely needed by the industry and the operational logistics. The main lack is on what is called “non-functional” [safety, security, human

factors] and performance.

The more promising trend is certainly the service-orientation description but it suffers from ambiguity existing between the software "web-services" and usage of service as a real paradigm for interaction between architectural entities.

4.1.7 Evaluation

Method and tooled-up process is extremely limited for architecture evaluation:

- No method and commercial-of-the-shelf tooling exist for qualimetry of architecture views. Evaluation of the quality is only limited to the diagram expressed with standard language. In that case the architecture framework specific semantic and symbology cannot be taken into account, except with a huge effort of tooling extension.
- Some simulators allow evaluating the functional views only for detection of dead-locks, dead ends and inaccessible paths. As performance description is not done as such there is no possibility to do better.
- The rest of the model has to be evaluated manually by expects.

4.1.8 Reference management

Due to a current immaturity and instability of the architecture description formalisms and evaluation methods, architecting practices and tooling are very weak. In particular:

- Enterprises and companies are trying to build their own architecting environment and personnel skills for their own business.
- Tool vendors generally provide commercial solutions generally derived from historical core assets initially targeted to model-based approaches of engineering disciplines. Tooling is generally based languages like BPMN, UML/SYSML and IDEF; with proprietary extension and adaptation to fulfil the framework formalisms with different interpretation and correction of the proposed semantics.

Consequences are:

- A very limited capitalisation on architectures at enterprise level.
- Tool interoperability is very limited.
- Consequently architecture exchange of architectures is weak leading to poor efficiency and small benefits within their ecosystems.

5.0 STATUS REGARDING ARCHITECTURE FRAMEWORKS

The best definition of what the architecture framework may currently be given by the Open Group within TOGAF [13]:

An architecture framework is a tool which can be used for developing a broad range of different architectures. It should describe a *method* for designing an information system in terms of a set of building blocks, and for showing how the building blocks fit together. It should contain a *set of tools* and provide *a common vocabulary*. It should also include a list of *recommended standards* and *compliant products* that can be used to implement the building blocks.

It must be stated that:

- No Architecture Framework is currently fully compliant with this definition; but each is providing assets and values according to this definition.
- Part of an Architecture Framework is related to Architecture Domain with reference standards and products. This part is to be defined and adjusted according to enterprise organisation and policy.

Today the architecture frameworks are mainly developed by acquirers and address various concerns:

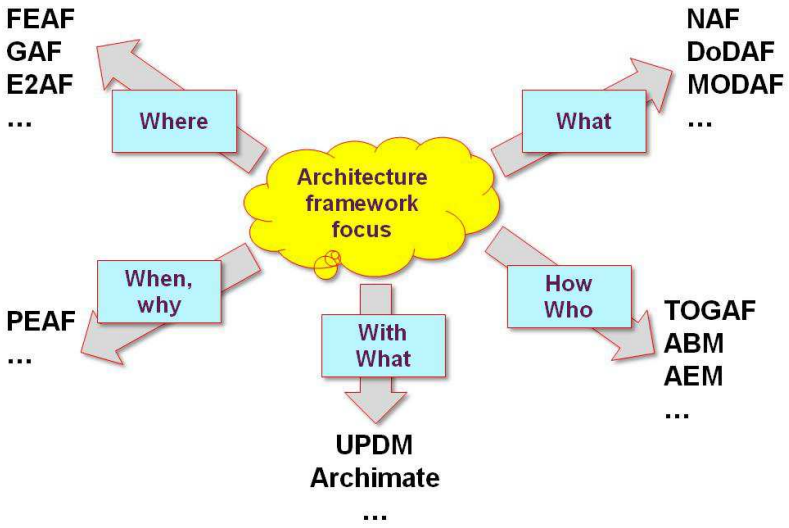

Figure 8: Architecture Frameworks address specific concerns

- Frameworks like FEAF [8] provide principles and guidelines to build an enterprise architecture reference system at enterprise level. The enterprise vision could be enlarged to extended-enterprise when considering references like E2AF [6].
- Others like NAF [10] describe generic formalism (I.e. architecture viewpoint, views and data) at enterprise level. This generic could be refined to address particular domains like Air traffic management with EAEA [7] and railways with TRAK [14].
- Others like TOGAF [13] give principles and guidelines to put in place an architecting environment and govern it.
- Others like PEAF [12] cover the enterprise concerns and processes to be considered to set-up architecture frameworks and architecting activities within an organisation.
- Others like UPDM [15] and Archimate [3] are focussing on languages and representation.
- Very few references like AFUS [1] are standardising target architectures.

Up to now these frameworks are not developed in a coherent manner. Even if important initiatives are taken with IDEAS and MODEM to provides foundation respectively for standardisation of the framework exchanges and unification of the core set of basic terms of main compatible with NAF, DoDAF and MODAF, we are far from having a unified set of terms and concepts covering the scope of Architecting and Architecture Framework with the definition given in the beginning of this section.

Consequently Architecting stakeholders (solution acquirers, users, providers, etc) are using architecture frameworks in many different ways focussing on their own concerns and priorities. The results are:

- Stakeholders build Architecting environments with generally a mix of several Architecture Frameworks customised according to their knowledge on the domain, business strategy and constraints coming from the contracts.
- Interoperability between project teams for exchange of architecture elements is done with different strategies:
  - Exchange of documents: generated or derived from architecting artefacts.
  - Web-portal: The architecture provider is giving access to the architecture repository via a web portal to browse a published web-format of the artefacts.
  - Read-only cloud: the architecture database is accessible via source-reading tool(s).
  - Collaborative cloud: each stakeholder may contribute to enrich and comment the architecture database.
  - Peer-to-peer: each stakeholder negotiates with each other the way and the format to get an

architecture artefact.

In the two first cases the consistency checking by the readers is very limited, especially if the architecture artefacts are not managed in a single architecture repository with preliminary checks done by the architecture provider. For the two following cases the current practices is to use a same limited set of tools for the entire project. The consequence is generally that part of the architecture description and evaluation are not done or are not shared due to effort and budget. For the last case, the enterprise strategy is very complicated to build and this could lead rapidly to a lack of consistency and global understanding of the architecture

With the lack of common vocabulary provided by the used architecture frameworks and the use cases of interoperability described above, major misunderstanding may appear if the lacks of semantic interoperability must be offset by project rules to explicit project- or enterprise-specific definitions even if they are in usage.

This lack of definition is the first motivation of the on-going standardisation work of the AFNOR AFWG. The second one is to put this set of definitions at work through the clarification of the architecting activities within the enterprise process with definition of roles and responsibilities.

6.0 OVERVIEW OF THE STANDARD PROJECT

The objective is to provide a comprehensive description of the activities and artefacts of architecture frameworks.

The deliverable described by this proposal will form four parts:

Part1: Terms and Concepts

This part provides the definitions of the main terms relevant to the Architecting activity (I.e. Architecture description, evaluation and trade-offs); and the associated concepts (I.e. main features, principles and artifacts related to architecting). The concept description also explains the relationship between the terms and their context of usage.

Part2: Life cycle and architecting process

The aim is describing Architecting as an integrated activity within the Enterprise processes, the inputs and outcomes regarding the notion of Enterprise reference system, and what an architecture life-cycle is with regards the covered item: Enterprise, system, product, equipment, etc.

Part3: Architecting – description principles

Architecture framework content and principles are explained to provide: architecture reference systems (like FEA), architecture description landscape (Like TOGAF), architecture method (like TOGAF/ADM), architecture formalisms (Like TRAK) and architecture tooling and language specification.

Part4: Architecting – evaluation principles

This part provides the typical context, phases, stakeholders, actors, activities, inputs, outputs and principles for architecture evaluation: including criteria, metrics, measures, decision and choice processes.

Considering the ISO standards the outcomes will complement mainly:

- The vocabulary of ISO-24765

- The elements of architecture description and evaluation of ISO-42010 and draft of ISO-42030
- The Information Technology reference model of ISO-10746 (RM-ODP).
- The Enterprise reference model of ISO-15704
- The service-orientation of ISO/IEC WD 18384.
- The architectural design of the system life-cycle process of ISO-15288

7.0 PROGRESS ON THE PART-1

On the French side the AFNOR AFWG has been working on the Part-1 for 2 years. The work began with collection and elaboration of the definitions of terms needed to addresses architecting and architecture. Then work on concepts has been started, with meta-modelling for some concepts, to stabilise the definitions and to express the overall logic behind the architecture and architecting.

The work on the Part-1 has focused on a limited set of key words that are used to define architecting activities, architect tools and materials. These words are then showed in practice through the definition of the 3 main activities of the architect: need specification, solution description and solution evaluation.

Within the current list of 100 terms already identified, half of them have already been worked out to create a suitable definition derived from a large set of existing but sometime incompatible definitions. At a first glance, it is seen as an impossible goal matching exactly with what an architect has to face: contradiction and multiple views. To find light in this tunnel, the following some rules have been chosen:

- Gather for each word a large set of recognised definitions (dictionary, standards, guides) making sense.
- Focus on a limited set of words that is core to the architect activity.
- Understand the definitions in the broad scope of the architecting activities and avoid domain-, discipline- and speciality-specific expressions.
- Consider the wording according to its common sense in everyday life.

For example, one set of words are related to the architecture description that needs to be split into viewpoints, perspectives and aspects. To allow a robust selection of the term definitions, in addition to the current standards, the original etymology of the word has been used as a key driver.

7.1 Example of concept description: viewpoints, perspectives and aspects

This example is highlighting the orthogonal concerns that can be elaborated to describe an architecture. According to the concepts defined by the AFNOR AFWG:

- A view is what is seen from a viewpoint.
- Perspective is an entity form or appearance related to an objective to achieve or a transformation to be done.
- Aspect is an entity form or appearance brought out from functional and non-functional considerations.

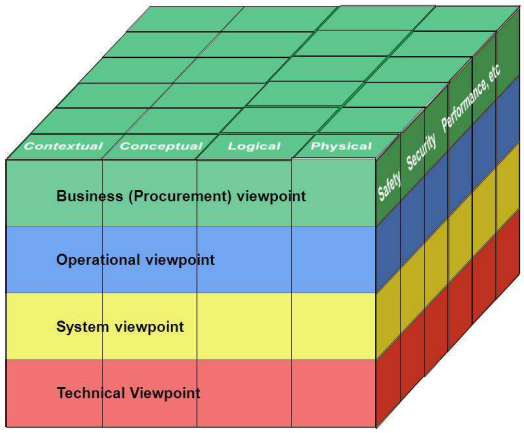

Figure 9: Viewpoints, perspectives and aspects

As example, an architecture description could be done on a car:

- With the driver viewpoint providing the operational view
- Considering the physical perspective: shape, weight, etc.
- Identifying the performance and safety aspect: e.g. resistance during a crash-test.

7.2 Example of concept description: Architecture kinds

In this concept development, it has been stated to provide first the definitions addressing architecture kinds and architecture repository. Then this leads to formalise relationship between the terms and better understanding of expectation of the concerned disciplinary and multidisciplinary teams.

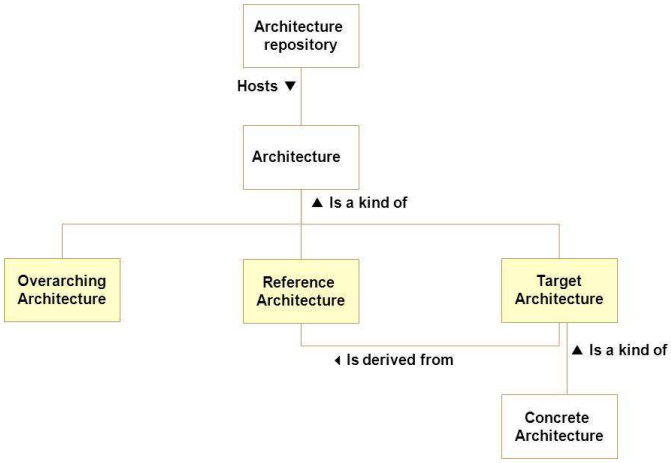

Figure 10: Architecture kinds

7.3 Other concept descriptions

Some other concepts under work are more related to:

- The architecture landscape of the architect like enterprise, project, product, stakeholders, roles and responsibilities.
- The architecture terms and concepts:
  - Starting with the bases: system, scenario, function, interface, etc
  - Towards more sophisticated terms like: capability, service, choreography, collaboration,

cooperation, capability, interoperability, pattern, etc.

Most of these concepts have already strong meanings in the Architecture Frameworks. The difficulty is to align these in a unified semantic, keeping in mind that architecting has to be considered at various levels of organisations (Enterprise, Project, Disciplines and specialities), to ease collaborative working, interoperability (in widest way), decision making and systems engineering. The result of this effort should be at least to satisfy these objectives between architects and users of the architecting result.

7.4 Current contents of Part-1

The current table of contents formalises the area of concerns of the AFNOR AFWG. It will be updated according to the evolution of the working group in both French and international perspectives.

Tableau 1: Current content of the Part-1

1	Scope	4.3.1	Roles: Architect and stakeholders
2	Normative references	4.3.2	Architecture description
3	Terms, Definitions, Notations, and Conventions	4.3.3	Architecture evaluation
		4.3.4	Architecture framework and repositories
3.1	Definitions	4.3.5	Enterprise Architecture
3.2	Acronyms	4.3.6	Extended Enterprise Architecture
3.3	Notations	4.3.7	Architecture elements
3.4	Conventions	4.4	Architecting Principles
4	Architecting Principles and Concepts	4.4.1	Architecting activities and processes
4.1	Introduction to Architecture	4.4.2	Architecture w.r.t. entity
4.2	Introduction to Architecting	4.4.3	Architecture life-cycle
4.3	Architecting Concepts	4.4.4	Architecting w.r.t. Engineering
		4.4.5	Architecture governance

8.0 LINKS AND CONSISTENCY WITH NAF EVOLUTION

The proposed standard aims at complementing the NATO architectural foundation and NATO Architecture Framework:

- Within a possible new ontology-based foundation, term and concepts of the proposed standard can sustain the meta-modelling works done by the IDEAS [18], MODEM [19] and other complementary initiatives.
- The terms, concepts and principles can provide bases for forecasted NAF extension targeting new views (as example for physical description), plus method to describe and evaluate architecture.
- They may also be useful to improve the NATO Architecture Repository in addition Afghanistan Mission Network and other military returns of experience.

This standard development is also an opportunity for NATO members to influence ISO architecture norms via collaborative or joint works. No doubt that the NATO experience and concrete use cases can significantly contribute to efficient and ready-to-use standard.

9.0 NEXT STEP IN THE ISO STANDARDIZATION PROCESS

The proposed AFNOR standard is currently not allocated to a Working Group of the ISO organisation. Several hypotheses are currently analysed.

Several entities of ISO are concerned by this proposed standard:

- JTC1/SC7 Software and systems engineering: working on:

- ISO-42010 Architecture description.
- And ISO-42030 Architecture evaluation

However the working group in charge of these two norms is more oriented on the "what" than the "How". I.e. up to now these two architecture standards are oriented on the concepts and not on the architecture life-cycle and architecting activities. This is completely in line with the aim of the Part-1 of the AFNOR proposed standard; but not the other parts.
This sub-committee is also working on:

- ISO-10746 Reference Model – Open Distributed Processing (RM-ODP).

This standard addresses concepts and methodological aspects useful for architecture frameworks but the scope is limited to the software domain.

- TC 184 /SC5 Automation systems and integration: working on:
  - ISO-15704 Industrial automation systems — Requirements for enterprise-reference
  - And other norms related to Enterprise modelling.

  All these documents consider a whole enterprise vision; but limited to modelling and the architecture aspects are not expressed currently.

- TC 184 /SC4 Industrial data: is promoting the formalism elaborated by OMG as an ISO standard:
  - ISO-17729 Unified profile for DoDAF and MODAF (UPDM)

  But now roadmap is currently available to show that this sub-committee will continue works on Architecture frameworks.

The more probable allocation being the JTC1/SC7, a formal presentation of the AFNOR New Work Item Proposal will be done by end of May 2013 during the next SC7 meeting at Montreal. This proposal needs will be accepted if at least five nations declare their interest to participate.

When accepted by an ISO entity, the Part-1 of standard is expected to be released after a 24 month process. In parallel the proposal for the other parts will be submitted.

10.0 CONCLUSION

The standard proposed by the AFNOR AFWG tries to align the terms and concepts proposed by a broad range of heterogeneous Architecture Frameworks in order to perform architecting at the different levels of Enterprises –Enterprise, project, system and product levels– with consideration of both life-cycles, repositories, activities, stakeholders, roles and responsibilities.

It aims to complement both:

- The ISO norms with the background coming from the Frameworks and practices already used in Industry.
- The Architecture Frameworks with a formalised set of terms and concepts, and a complete scope of use.
- Initiatives like IDEAS and MODEM with formalised and Industry proven definitions.

The quality of the outcomes depends entirely on the level of involvement of the co-authors. In this perspective all the countries are welcome to participate to get a common, agreed and efficient standard.

The complete standardisation process will take time; however the division into parts allows progressive and concrete results with first coming in short-term.

Collaboration between NATO and ISO bodies is a win-win opportunity to be studied.

11.0 REFERENCES

11.1 Architecture frameworks

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[4] DoDAF, US Department of Defense, https://dars1.army.mil
[5] DNDAF, Canadian Department of National Defence,http://www.img-ggi.forces.gc.ca/pub/af-ca/index-eng.asp
[6] E2AF, IFEAD, http://www.enterprise-architecture.info
[7] EAEA, Eurocontrol, http://www.eurocontrol.int/oca/gallery/content/public/docs/OATA-MCS-22-01 EAEA Framework v1.31.pdf
[8] FEAF, US Federal Enterprise, http://www.feapmo.gov
[9] MODAF, UK Ministry of Defence, http://www.modaf.com
[10] NAF (NATO AF), NATO, http://www.nhqc3s.nato.int/ARCHITECTURE
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[12] PEAF, PragmaticEA, http://www.pragmaticea.com/
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[15] UPDM, Object Management Group, http://www.omg.org/spec/UPDM/1.0/PDF
[16] Zachman, Zachman, http://www.zifa.com/framework.html

11.2 Publications

[17] MITRE Thoughts on Architecting, http://www.nps.edu/Academics/Institutes/Meyer/docs/Jan_31 2008Thoughts_on_Architecting.pdf

11.3 Other references

[18] IDEAS
IDEAS Group is the International Defence Enterprise Architecture Specification for exchange Group. The deliverable of the project is a data exchange format for military Enterprise Architectures. The scope is four nation (plus NATO as observers) and covers MODAF (UK), DoDAF (USA), DNDAF (Canada) and the Australian Defence Architecture Framework.

[19] MODEM
MODEM (MODAF Ontological Data Exchange Model) is the result of a Swedish led effort within IDEAS aiming for an evolution of MODAF Meta-Model by exploiting the IDEAS foundation.