

# Research on an agile enterprise architecture design method

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**Abstract.** Recently, many companies have built their own enterprise architecture to manage the complexity of the whole company. According to the traditional method of enterprise architecture, the speed of enterprise architecture change is slower than the speed of business change. This leads to the inconsistent and discordance of company's strategies, businesses and IT applications. In this paper, we built a layered decoupling, testable, flexible and agile method to speed up the process of enterprise architecture design, and to modeling the changing business more efficiently.

## 1. Introduction

We propose an agile enterprise architecture design method that defines specifically the component elements and their relationship of agile architecture, and based on this, we proposed an agile enterprise architecture design method which is combining top-down and bottom-up ways with circular feedback. In this paper, Section 2 will explain the connotation of agile enterprise architecture, and propose the basic principle and method of agile enterprise architecture meta-model construction and methodology. Section 3 will apply the above principles and methods, referring to the Archimate [2], CSG-EA2.0 [3] meta-model and design an agile enterprise architecture meta-model. According to the above meta-model, Section 4 has proposed an agile enterprise architecture design method. Section 5 concludes the paper and describe development future of management and control for agile architecture design, organizational mechanisms, and supporting tools.

## 2. The Connotation of Agile Enterprise Architecture

Through its own agility, Agile Enterprise Architecture can support agile enterprise strategy and business, but also the agile application development.

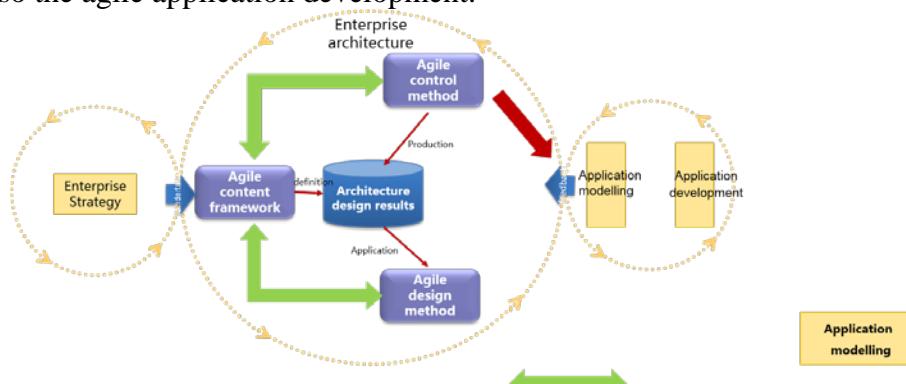


Fig. 1 The overall agile enterprise architecture framework

### 2.1 Agile content framework

The key problem in constructing the agile content framework is effectively resolving the complexity of meta-model itself. The main principles of resolving the complexity of the meta-model are as follows:

1) Distinguish architecture and design: architecture will divide the overall structurally, and will also divide the elements, specific the mechanism of correlation and interaction between elements, design is the realization of the element.

2) Distinguish internal and external: describing the component elements from internal implementation and external interface these two perspectives. The internal will incorporate with design meanwhile the external will incorporate with architecture.

3) Decoupling between layers and inner independent evolution within layers: dividing the layers according to the element types and characteristics, decoupling between layers, and inner independent evolution within layers, which can effectively adapt to change.

4) The results can be displayed and measured: specific the influence of individual elements to the overall architecture, supporting the index deduction and forecast all-round and multi-angle, guarantee the architecture evolution direction and effect by deduction and prediction.

## **2.2 Agile construction method**

1) Comparing with the traditional construction method, agile architecture construction methods emphasize the continuous delivery and fast iterative improvement of architecture outcome, and also emphasizing the team flat, efficient processes, the main principles are as follows:

2) Outcome construction: use different targeted method according to the different characteristics of architecture and design stage, in the architecture stage, methods can be rapidly form the evolvable and measurable overall architecture, which can be iterated frequently in strategy ,business, application and technology, and helping the team members in better cooperation and improving the overall architecture quality with timely feedback.

3) Team and process: the team will have clear responsibilities, process will efficiently operate, with the use of management tools and technical tools, it can support the business, architecture, and the communication and cooperation between design staff.

## **2.3 Agile management and control method**

Updating the current architecture management and control method, relying on enterprise architecture management and control platform and application modeling technology which makes the architecture management and control mode highly fits the agile development mode, accelerating the architecture result effectively landing and effectively guiding the application development.

## **3. Agile Architecture meta-model**

Establishing engineering and perfect enterprise architecture method, the primary issue is to establish a unified description language which adapt to the agile enterprise architecture (meta-model). Agile Architecture meta-model reconstruct the architectural elements from the field (X-axis), layer (Y axis), particle size (Z-axis) of the three dimensions, the overall relationship as below:

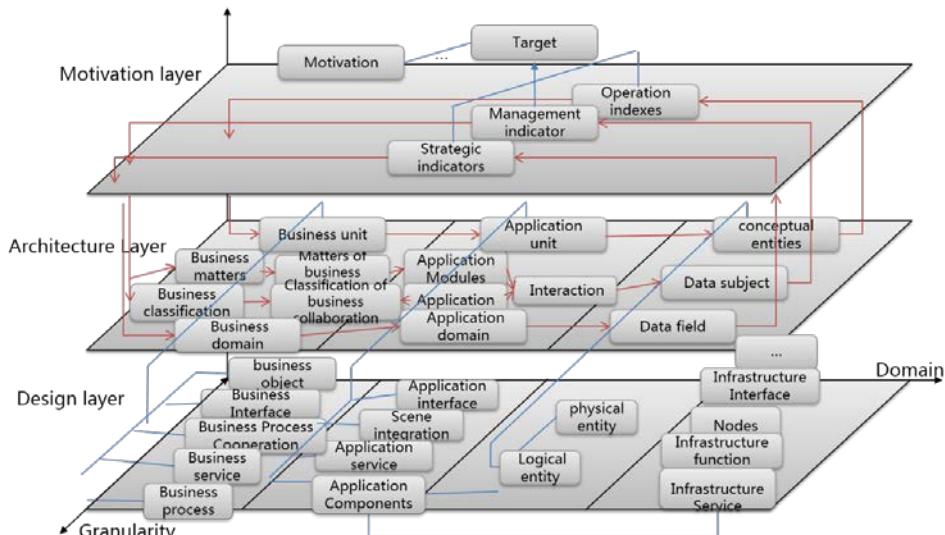


Fig. 2 Agile enterprise architecture framework meta-model

1) Characteristics of Agile Architecture meta-model are as follows:

The architectural layers will be segmented by top-down layer structure in business domain, application domain and data domain. The design layer will different the basic business unit, application unit gradually, distinct the internal implementation (such as process, collaboration, objects) and an external interface (business services, business interfaces, application services, application interfaces, etc.), and constantly improve the internal element details.

2) Constructing 3 layers which are motivation layer, architecture layer, design layer, through the inter-layer interface decoupled, all layers can independently evolve.

3) Establishing the instruction and feedback relationship of strategic indicators, management indicators, operating indicators with the architecture layer elements. The motivation layer will propose requirements and constraints to the architecture layer, the architecture layer will provide the feedback of indicator measurement, through the feedback cycle of motivation layer and architecture layer to achieve the overall architecture evolution and measurement.

Specific structure of all layers are as follows:

1) At the layer of motivation, introduce the driving force, evaluation, objectives, principles, requirements and constraints on the motives of specialization. At the same time, through strategic indicators, management indicators and operation indexes to quantify the target measurement.

2) At the architecture layer, performing stepwise refinement for each fields which are business domain, application domain, data domain.

i ) In the business domain, segmenting the business from the perspective of business classification, business classification collaboration, business matters, business matter collaboration or segmenting the organization unit from the perspective of organization structure. Business is associated to the most derived classification of organization unit and business unit.

ii ) In the application domain, segmenting application domain according to the application, application modules and interaction. The most derived classification is associated with the application unit.

iii) In the data domain, segmenting the data domain according to the data domain, data subject and conceptual entities.

3) At the design layer, highlighting the concept of unit, including business unit, application unit and infrastructure units, each unit calls and coordinates with each other; large size unit is further differentiated into a small particle size unit. For each unit, the four sides of one body mode (including service, interface, structure, behavior) describes the core element of its internal organization and composition relations.

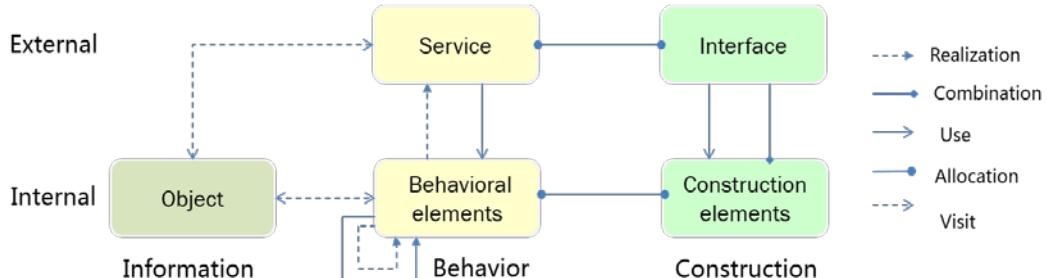


Fig. 3 The unit structure diagram

1) Referring to the BPMN specification [5] [6], describe the business processes, business roles, business services, service interfaces, business process collaboration, business objects, process node, business collaboration and business forms to depict. To establish logical entity relationship of business object and data field.

2) Describing the application unit based on the application components, application functions, application services, application interfaces, and integration scenarios. While building logic entity relationship of application functions, application services and data domain, also the relationship of application components and technical domain products.

3) Describing the details of concept of physical entities and logical entity in data domain.

4) Referring to the technical unit, describing the nodes, infrastructure services, infrastructure capabilities, infrastructure interfaces, products, communication paths, networks, devices, systems, software and etc.

#### 4. Agile Architecture Design method

Adapting to the agile content framework, transform the traditional one stage construction into two stages. In the architecture stage, gradually break down the architecture with the top-down method. At the design stage, focus on data, using the method of top-down and bottom-up method to confirm the specific realization of elements, which is shown as below:

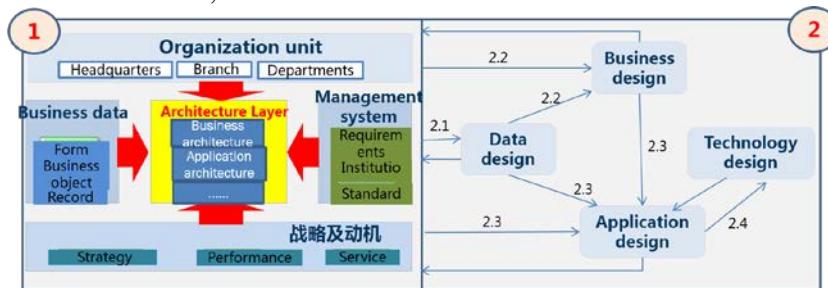


Fig. 4 Overall process introduction of architecture and design

#### 5. Conclusion

This paper focus on the problems of architecture evolution is relatively slow which resulting in architecture design, strategy, and application software adaptation issues in the process of current enterprise architecture and design practice, also the paper specify the principles and methods of constructing the agile enterprise architecture.

#### References

- [1] Andrew Josey, Marc Lankhorst, Iver Band, Henk Jonkers, and Dick Quartel, ArchiMate® 3.0 Specification, Open Group White Paper, 2016.
- [2] Vikas Hazrati, Agile and Architecture Conflict, Jun 15, 2011.
- [3] Huan Tang, Gao. Agile top-level design method, <http://www.ltesting.net/ceshi/ruanjianzhi/liangbaozheng/zlmx/mjkf/2013/0325/206072.html>, 2013.
- [4] OMG. Business Process Model and Notation (BPMN) Version 2.0. <http://www.omg.org/spec/BPMN/2.0.2011.1>.
- [5] Zhangli Cai, Shuping Yi. Business process integration modeling method based on BPMN[J]. Computer integrated manufacturing system, 2010, 16(3):551-557.