Enterprise Architecture Management Patterns for Enterprise Architecture Visioning

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1 Introduction and Overview

Enterprise architecture (EA) management is one of the major challenges of modern enterprises. It aims at aligning business and IT in order to optimize their interaction. The general make-up of the enterprise is reflected in the EA, which comprises both business and IT aspects – ranging from visions (business, as well as IT visions are of interest), via business processes, and business applications, to infrastructure elements, like e.g. application servers or hardware.
Documenting and managing the EA is an advanced topic, as the application landscape, which is part of the EA often includes a few hundreds up to a few thousand business applications and their interconnections in a medium-sized or large company. Thereby, managing the EA is a task, that has to be executed as the need for a flexible IT is an integral concern of most companies. Nevertheless, other reasons for maintaining an EA documentation exist, such as compliance requirements or economic causes, i.e. the cost reduction of the IT function.
This article includes patterns on *EA Visioning*, which are part of the *EAM Pattern Catalog*, a *pattern language for enterprise architecture management* [BEL+07, BELM08, BEL+08, Ern08, Ern09], which uses a pattern-based approach to EA management. The complete *EAM Pattern Catalog* is available online at http://eampc-wiki.systemcartography.info [Cha09] and currently includes 162 EAM patterns. For a detailed explanation of the concept of EAM patterns refer to [Ern09]. The intention behind the article is to further extend and enhance the already documented EAM patterns and to document not yet described ones in order to advance the EAM pattern language.

The rest of this section list some remarks to writer's workshop participants, gives a short overview about the intended audience, and a map of included EAM patterns and their references.

1.1 Intended Audience

This article and the herein included patterns are intended for people concerned with governing the information technology (IT) of a company, aligning business and IT, and people concerned with bringing together information about business and IT aspects of the enterprise. Especially the topic of EA visioning is addressed by the patterns included in this article.

Potential Readers for this article are: people caring about strategies and visions for EAs from business and from IT, business architects, enterprise architects, and business application owners.

1.2 Map of included EAM Patterns

The EAM patterns included in this article are part of a larger pattern language and therefore relationships between EAM patterns are an integral part of this approach. Figure 1 shows a pattern map visualizing these relationships and descriptions about their type. The pattern map also includes references to patterns which are not included in this article. Patterns are referenced by their names, page numbers are included in brackets.

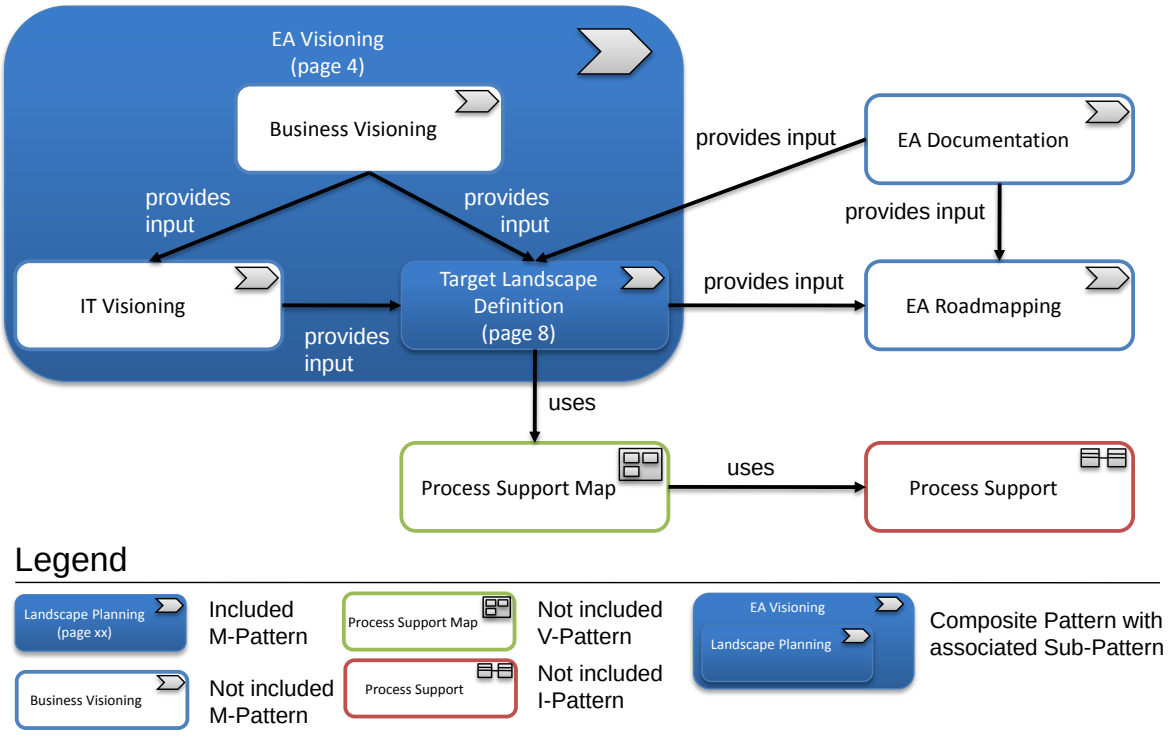

Figure 1: Pattern Map for this Article

The following EAM patterns are included in this article.

- EA Visioning (see page 4)
- Target Application Landscape Definition (see page 8)

These EAM patterns are not included in this article and have to be documented or can be found in the EAM Pattern Catalog Wiki [Cha09]:

- Business Visioning documents the steps to develop a business vision, which is aligned with the business strategy of the company.
- IT Visioning provides insights about how to develop and maintain a vision about the future development of the IT. An IT vision is not as concrete as an IT target and should match the IT strategy of the company.
- EA Documentation cares about how to document the elements an enterprise architecture consists of, like business applications, business processes, etc.
- EA Roadmapping uses the information documented about the enterprise architecture to create and maintain a roadmap on the future developement of the enterprise architecture.
- Process Support Map (see [Cha09]) visualizes, which BusinessApplications support which BusinessProcesses at which OrganizationalUnits.
- Process Support (see [Cha09]) shows how information about which organizational unit uses which business application to support which business process can be stored.

2 EA Visioning

EA Visioning describes the general process of EA visioning. The term *EA strategy* is widely used interchangeably with the term *EA vision*. We prefer the later term in accordance to [Gro08], where a *vision* is referred to as distant goal, while a *strategy* is understood as series of activities to pursue such goal. Based on Business Visioning, IT Visioning, and input from the current EA Documentation a Target Landscape Definition is derived, which then provides input for EA Roadmapping resulting in projects that have to be conducted in order to adapt the EA according to the defined vision.

2.1 Example

The department store *SoCaStore* has to continually adjust its business vision to the changing economic environment and to ensure consistency as well as appropriateness of this vision in respect to regulatory requirements. Additionally, emerging IT-trends and new technologies available make it necessary to adapt the IT vision, in order to effectively use the resulting opportunities. From the business and IT strategy, SoCaStore wants to develop and reshape the vision of the EA to achieve an optimal alignment of business and IT under the changed circumstances.

2.2 Context

An enterprise, which wants to create a holistic vision of its future EA, taking into account market trends, regulatory changes, and emerging IT-technologies to achieve increase alignment between business and IT.

2.3 Problem

You want to ensure that the vision of your company's EA factors in the relevant environmental changes and provides both a consistent business and IT vision to guide the evolution of the EA. **How can you prevent an organization from losing its ability to develop effective long-term strategies?**

The following *forces* influence the solution:

- **Market orientation versus innovative visioning** If the EA visioning goes the same ways as the visioning in other companies acting in the same market, the enterprise might be able to compete with the other companies. Nevertheless, visioning in such a direction is likely to limit the corridor of evolution, especially in respect to new markets.
- **Market uncertainty versus stable markets** Operating in uncertain markets may result in better opportunities but also implies higher risk. Stable markets constitute the contrary situation. In what kind of market is your company operating and how does this influence your EA visioning.
- **Separation of concerns versus smooth transition** The EA visioning process benefits from knowledge and experience of the people fulfilling certain roles. These roles nevertheless demand strongly different skill sets, e.g. in business visioning and IT visioning. In consequence, the boards for performing these activities could be separated

strictly, which might negatively affect innovative power, especially when IT as enabler is considered.

- **Holistic visioning versus selective visioning** The success of EA visioning is dependent on the focus on the business content. A broader focus may lead to better overall results but it is more difficult to get the required input by the business. How do you find the right focus of your visioning approach?
- **Continuous adaptation versus one time approach** Continuously adapting the vision of your EA may lead to the best results but requires high efforts. A one time approach does not require high investments but may be outdated soon. What is a good space of time for reconsidering the created EA vision?
- **Regulatory instability** Rules and regulations do not stay the same over time. They change and require changes concerning the vision of your EA. How do you find a balance between adapting to regulatory changes and keeping already developed visions of the EA?

2.4 Solution

The development of an EA vision is a compound process consisting of distinct activities as indicated in Figure 2. These activities themselves are quite coarse grained and are detailed in separate M-Patterns: Business Visioning, IT Visioning, and Target Application Landscape Definition (see page 8). In the notion of a *composite pattern* [Cop96, BHS07], this EA Visioning describes the coordinating process of EA visioning, caring about the correct execution of the contained activities. Subsequently, we sketch the role of these activities and detail on the exchange of information and knowledge between connected activities.

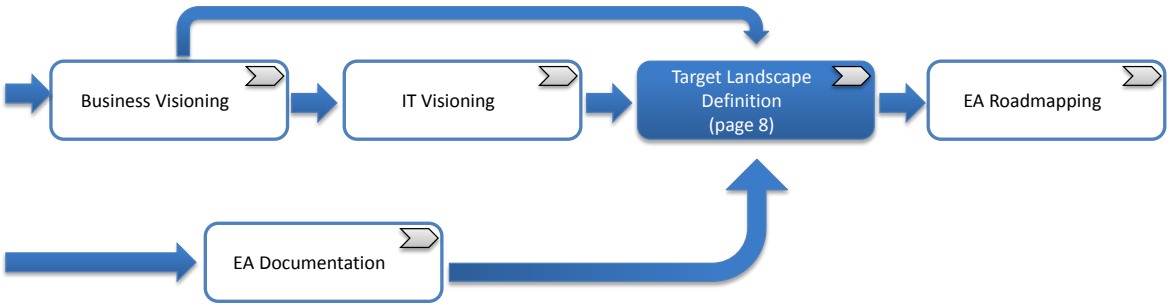

Figure 2: EA Visioning Process

Business Visioning In this activity, business plans and visions are developed. Therefore, current trends in the market fields, which the company is acting in, are analyzed and possible scenarios for the future development of the markets are created and prioritized according to their likelihood. Additionally, related market fields should be taken into consideration to supply ideas for diversification or to give indications on potential future developments. From this input, a joint vision of the business is developed and a complementing business mission is formulated. Subsequently, both vision and mission are detailed to goals and strategies, respectively. The Business Motivation Model (BMM) [Gro08] of the Object Management Group

(OMG) establishes a language, which can be used during business visioning and sketches additional process steps, which could be supportive during the execution of this activity.
IT Visioning The business vision and mission from business visioning provide input to this activity, where new technologies and IT trends are discussed and analyzed in respect to the applicability for supporting the business plans. During the activity, standardization endeavors targeting the IT support in the respective business area are assessed.
Target Landscape Definition The business vision determines the framework for the target landscape to be developed. The target landscape is often (see e.g. [EHH+08]) alluded to as *to-be* landscape. We decided to stay to the former terminology, as the term *to-be* could also apply to *planned landscape*, i.e. landscapes, which result from the execution of concrete project portfolios. For in-depth discussions on this topic see e.g. [BDM+08]. The IT vision lays the basis for the target landscape by defining concepts, standards, and technologies, which are preferably used in realizing the IT support for the business vision. The documented current landscape provides valuable input for the discussions on the target landscape, especially in areas, where business and IT vision do not differ substantially from the currently established business and IT plan, or where business and IT vision do not exert influence upon.

2.5 Implementation

EA Visioning should incorporate people from the business, as well as from the IT part of your company. This is important as EA Visioning has an high impact on the future development of your company and the capability to support new business requirements.
Developing or revising the EA Visioning depends on the planning cycle of your company, which may also be dependent to market demands. Manufacturing companies for example usually feature longer planning cycles then telecommunication companies.

2.6 Variants

A variant of EA Visioning is that there is no business vision, which can be used as an input for the IT vision. In this case an IT vision is created without input from business. This usually results in an IT vision which does not meet the future development and goals of the company. Therefore, this variant should be avoided.

2.7 Known Uses

The approach documented in EA Visioning is in use in the following companies:

- BMW

The approach documented in EA Visioning can be used in the following EA management tools

- planningIT (alfabet AG)
- ARIS IT Architect (IDS Scheer AG)

2.8 Consequences

Market orientation versus independent visioning EA Visioning may encompass higher future benefits if you don't only consider your own market because you may penetrate other markets which you right now cannot address appropriately. If you try that approach you have the problem, that you cannot consider every available market. For this reason, you have to select a few markets you orient at for for EA Visioning. Orienting only on your own market may be the safe way but may lead to lower benefits in the future.
Market uncertainty versus stable markets The business vision does not only account for today's market situation, but has to anticipate future market trends and identify developing opportunities. Especially the latter are inevitably associated with risks, so that during business visioning you have to decide on an appropriate spread between safe and risky business goals.
Separation of concerns versus smooth transition The separation of concerns, i.e. the assignment of domain experts *only* to the boards deciding on the business and IT vision respectively, may be helpful for keeping this boards small and agile. Further, bringing together experts from one domain reduces the potential for misconceptions during the discussion, which is in such case more likely to be based on a consistent understanding of the used terms. In contrast, bringing together experts from the business and IT domain for visioning can help to leverage the full potential of IT as an enabler for business opportunities. Additionally, a joint discussion board for visioning may help to avoid error-prone translations between the domain terminologies.
Holistic visioning versus selective visioning On one hand, focusing you EA Visioning to only some business aspects of your company may reduce the required effort. On the other hand this may lead to sub optimal overall solutions for your whole company. For this reason, you have to find the right focus for you EA Visioning.
Continuous adaptation versus one time approach Doing EA Visioning once is relatively simple and requires less effort compared to an iterative approach, which regularly checks for required changes to your EA vision. Although, you should consider to establish a continuous approach if you have once invested in an EA Visioning. The benefits exceed the required effort.
Regulatory instability Rules and regulations usually have to be adopted in an appropriate way. For this reason, you have to find a solution to incorporate changes to rules and regulations within you EA Visioning. In some cases there are transition periods, which you can use to adopt your vision to match the new guidelines.

2.9 See Also

EA Visioning is a composite pattern and therefore the following sub patterns should be considered:

- Business Visioning
- IT Visioning
- Target Application Landscape Definition (see page 8)

Additionally EA Documentation should be considered as it provides input for Target Application Landscape Definition.

3 Target Application Landscape Definition

Target Application Landscape Definition describes the process of defining a target landscape derived from the business and IT vision of the enterprise. In addition, the current documentation of the EA is used as input for the development process. Thereby, the target landscape defines the vision of future business processes and the support provided by the IT.

3.1 Example

The department store *SoCaStore* wants to gain a common understanding how the target landscape of their enterprise looks like. As the existing application landscape has grown historically, the impacts and influences current projects might have on the application landscape are hardly predictable and the direction in which the landscape should be developed is not clear. Therefore, a common vision of the *optimal* future landscape derived from the strategies – both business and IT – of the enterprise is necessary.

3.2 Context

An enterprise, which wants to gain a common understanding how the target landscape providing optimal business support according to the currently defined strategies looks like.

3.3 Problem

You want to ensure that the evolution of your application landscape takes a direction, which conforms to the strategies of your enterprise. You want to know how an optimal future landscape would look like. **How do you define an optimal target landscape according to the strategies of your enterprise?**

The following *forces* influence the solution:

- **Planning intervals versus effort** Small planning intervals may be required to do detailed planning, but require high efforts as you need up-to-date information. Which planning intervals should be selected for landscape planning?
- **Complete control versus laissez-fair** Do you want to control all projects changing the application landscape within your company or is there a limit in project size or cost, which allows to ignore smaller projects?
- **Long-term versus medium-term planning** Do you just care about a medium-term planning cycle or do you consider a long-term, visionary target?
- **Efficiency versus thoroughness** Detailed planning of the target landscape up to the level of individual components of business applications may be required, but results in high efforts, which may not be worthwhile. What is the right level of detail for planning a target landscape for your enterprise?
- **Business versus IT demands** The demands of the business units of a company may conflict with the demands of the IT units concerning the future development of the landscape. How do you find a good balance between these conflicting requirements?

- **Long-term integrity versus short-term business benefits** Planning of a target landscape should consider long-term integrity of the landscape, e.g. to reduce heterogeneity, this usually conflicts with short-term business benefits. What is a good balance between those two aspects?
- **Ideal target landscape versus pressure of time** Developing an ideal target landscape requires time to develop it. This conflicts with pressure of time in an operative department. How much time can you invest to define a target landscape useful for the future development?
- **Legal requirements versus freedom of choice** In some situations legal requirements may apply, which delimit the freedom of choice for the target landscape development. What legal requirements do you have to consider?
- **Holistic planning versus partial planning** Considering the whole landscape in target landscape planning may lead to optimal results but demands high efforts. Contrary, planning of parts of the landscape requires less effort but may lead to suboptimal results. How do you balance holistic versus partial target landscape planning?

3.4 Solution

In order to develop target landscapes of the enterprise, a step-wise approach to decrease complexity should be used [EHH+08]. Before executing the five steps illustrated in Figure 3, you should decide on the level of detail regarding the planning and about the planning interval in order to decide on the effort required to execute the process.

Figure 3: Target Landscape Definition Process

Step 1:
Prior to starting with the actual development of the target landscape some decisions about the approach used have to be taken. Based on the environment and context of the initiative a *disruptive* or *evolutionary* approach should be chosen. Whereas a disruptive approach is well suited if a comprehensive reorganization of the enterprise is desired, e.g. after a merger has taken place, the evolutionary approach provides a softer transformation as it is build on existing structures of the enterprise and supports smoother transitions. The choice between these two approaches implies major impacts on the following steps.
Step 2:
If a disruptive approach is followed, the organizational model of the enterprise is developed from scratch based on the business vision of the enterprise. Otherwise, if an evolutionary approach is used, the current organizational model is augmented utilizing the business vision [Sch08]. Elements of this model, e.g. business processes, domains, business units, etc. are used as clusters to structure the landscape and decrease complexity. These clusters may be used to split-up the planning activities. This may lead to sub optimal results but requires less effort. If the complexity of the landscape demands a stronger clustering, the clusters may contain subclusters, e.g. business processes may be structured into sub business processes.

Step 3:
Based on the business and IT vision of the enterprise the areas should be identified where business support is provided by the enterprise itself and where support is gained from third parties via outsourcing. Thereby, regulatory limitations, like taxes, originating e.g. from country-specific laws are taken into consideration.
Step 4:
Based on the developed framework, derived from the organizational model – business processes and organizational units – the business support provided by IT has to be derived. Thereby, the business and IT vision of the enterprise is considered to identify parts of the application landscape where horizontal or vertical integration should be applied. Although both kinds of integration lead to synergy effects e.g. homogenization and cost reductions, they might not be applicable:

Vertical integration, which refers to uniform process support for different organizational units, products, or locations, is e.g. not applicable if the business vision of the enterprise asks for diversification in different markets.

Horizontal integration, which means that several successive business processes are continually supported by one business application, is e.g. not applicable if the IT vision demands for different kind of IT support during the execution of two sequenced business processes.

Furthermore, regulatory limitations as mentioned in Step 3 should be considered during the definition of business support provided by business applications.
Step 5:
The derived target landscape needs to be communicated among the various stakeholders of EA management to gain an enterprise-wide understanding of the future vision of the application landscape. In this step you should consider the required level of detail in documenting the planned landscape. Documenting on business application component level may be very accurate but requires high effort.
Different versions of Process Support Map (see [Cha09]) are commonly used to document the picture of the target landscape. In order to create these documentations, the respective data has to be stored in a repository implementing Process Support (see [Cha09]).

3.5 Implementation

There is no ideal planning interval for Target Application Landscape Definition but it should be aligned with the interval defined for developing/revising the strategies of your company.
The time required to execute the steps described in Target Application Landscape Definition may also vary based on the size of the application landscape respectively the cluster selected for landscape planning. Another factor influencing the execution is the selected level of detail. In both cases you have to balance between effort and benefit.
There are various people, which should be incorporated in Target Application Landscape Definition. *Business application owners* should be considered when trying to replace one business application by another one, e.g. when trying to increase vertical integration. *Enterprise architects* should also be incorporated as they have a more holistic view on the application landscape in contrast to the business application owners, which focus on single

business applications. The enterprise architects should be in lead of the process of Target Application Landscape Definition and should thereby keep contact to the people deciding on the business and the IT strategy of your company.

3.6 Variants

Variants of Target Application Landscape Definition may emerge if the subject of planning changes. The previously described steps may apply to business applications but they may also apply e.g. to services. This may result in a more fine grained planning leading to higher efforts but also to higher flexibility because services are typically smaller in functionality or supported capability.

3.7 Known Uses

The approach documented in Target Application Landscape Definition is in use in the following companies:

- BMW
- Nokia Siemens Networks
- Munich Re

The approach documented in Target Application Landscape Definition can be used in the following EA management tools

- planningIT (alfabet AG)
- ARIS IT Architect (IDS Scheer AG)

Similar approaches for Target Application Landscape Definition can be found in literature, see e.g. [Der06].

3.8 Consequences

Planning intervals versus effort At first sight it may be appealing to be able to plan the future development whenever this is needed. To be able to do this requires high efforts as the information needed for the future planning has to be up-to-date the whole time and this fact has a high impact on the information collection style used in the company (see [MJBS09]. E.g. it is not possible to update information about the application landscape once a year if you want to do continuous planning. An advantage of continuous planning is that you are able to react instantly on new demands. The method described in Target Application Landscape Definition supports various planning intervals, but you should always consider the required effort, which is tied to the length of the planning intervals. Typically planning according to Target Application Landscape Definition is done once a year.

Complete control versus laissez-fair You can try to control every project affecting your application landscape, but in this case you will have to spend most of your time on performing this task. Another way to cope with this situation is to define a limit, e.g. on project size or costs, which has to be exceeded for the project to come into focus in planning the target application landscape. You may now miss some of the smaller projects, but you can focus on the important ones.

Long-term versus medium-term planning The easy way is to only care about the next planning period, because you don't have to care about the strategies or goals of your company, and you can find an optimal solution for your current problems. But you will miss an overall goal, bringing together all future developments. If you also consider long-term planning you have to care about the strategies and goals of your company and even have to define your own strategies or goals but on the long run this approach will pay off.
Efficiency versus thoroughness Selecting the right level of detail for Target Application Landscape Definition is no easy to address task. As a rule of thumb you should always think about what amount of information do you really need when you want to implement your planning and what efforts are required to reach this level of detail. Typically it should be enough to stay on the level of business applications restraining from going into more detail.
Business versus IT demands Demands from business and from IT units usually differ. One reasons for this is that business is first of all interested to get a required functionality as fast as possible into place for the lowest price, without considering the future development of the business application and its surrounding application landscape. This conflicts with IT units demands, which should incorporate the future operation and development of the business application. In cases where this conflict appears you should try to find a compromise between the two positions.
Long-term integrity versus short-term business benefits This force is similar to business versus IT demands. And the resolution is also similar. Try to find a compromise between the two positions at least in a long-term perspective.
Ideal target landscape versus pressure of time Pressure of time is a problem that is always hard to address, but you should consider the result of not spending a minimum amount of time on Target Application Landscape Definition. This may result in a future landscape, which becomes more and more hard to manage and at some point the investments needed to improve the landscape to be manageable again exceed the costs required for Target Application Landscape Definition.
Legal requirements versus freedom of choice In some cases legal requirements may apply in Target Application Landscape Definition. In this cases the possibilities are limited to increase the freedom of choice again. For this reason, you should try to get along with the restrictions and try to find a solution still fitting your future demands.
Holistic planning versus partial planning Holistic planning should result in an overall better solution then restricting Target Application Landscape Definition e.g. to a single cluster. But the efforts to plan the overall solution may exceed the benefits of an overall optimal solution. Again, try to find a solution which balances both approaches to find the solutions fitting your demands.

3.9 See Also

In order to support the implementation of Target Application Landscape Definition the Process Support Map (see [Cha09]) should be considered. Additionally, EA Visioning as a composite pattern should be considered for supplemental advice which other patterns should be taken into account.

4 Acknowledgment and Outlook

This section includes acknowledgments to the people who supported the creation of this article and gives an outlook to the next steps in the development of the EAM pattern approach.

4.1 Acknowledgments

We want to thank all participants of the writer's workshop of EuroPloP09 and especially our shepherd **Wolfgang Keller** for the time they spent for reading, commenting, and discussing this article.

4.2 Next Steps in EAM Pattern Approach Development

The *EAM Pattern Catalog* is currently available at
http://eampc-wiki.systemcartography.info, based on the results of an extensive online survey. Certainly, the EAM patterns should continually be revised for readability and understandability and be extended to give more detailed guidance in addressing the problems of EA practitioners, preferably by an EAM Patterncommunity.
In order to improve the current version and to further exploit the advantages of patterns in EA management, an excerpt of the *EAM Pattern Catalog* had been included in this document to be discussed in the pattern community.

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