

# EA Management Patterns for Consolidations after Mergers

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**Abstract:** Mergers between enterprises or carved-out parts thereof are a common phenomenon in today's economic environment. They nevertheless form a major challenge for enterprise architects, who have to consolidate, i.e. to harmonize and integrate the business capabilities in the newly formed enterprise, reducing redundancy as far as possible. This article presents a best practice approach to this consolidation endeavor, detailing a methodology to do so together with a supporting viewpoint on the enterprise architecture (EA). An information model, which outlines the information demands for methodology execution, is presented to complement the approach.

## 1 Motivation

Mergers and the post-merger endeavors to integrate and harmonize the enterprises' business capabilities are issues often occurring in today's economic environment [ORH01]. As almost half of all mergers have been unsuccessful [MH04], making the merger integration process an interesting topic for practitioners and academia.

According to [Pen99] reasons for the high number of mergers in the banking sector are e.g. the reduction of annual cost between 10 and 20 percent, or increased revenues due to an improved appearance in the market. Two kinds of mergers have to be differentiated. The first and most common one is *merger by incorporation* and results in the absorption of the target company. The second one is *merger by equals* and results in a totally new enterprise built from the previously independent enterprises [GPPS97].

This article documents proven practices for addressing the issues arising in a merger situation in the format of *Enterprise Architecture (EA) Management Patterns* [BELM08]. Three types of EAM patterns are thereby used. Methodology Patterns (*M-Pattern*) define

steps to be taken in order to address a given problem. Viewpoint Patterns (*V-Pattern*) provide a language used by one or more M-Patterns and thus proposes a way to present data stored according to one or more *I-Patterns*. Information Model Patterns (*I-Pattern*) supply an underlying model for the data visualized in one or more V-Patterns.

These proven practices for a merger situation consider the various questions, which arise during the integration and harmonization process – e.g. how to determine the business domains of the post-merger enterprise. *Consolidating Architectures after Mergers* documents a methodology to addressing these questions, followed by *Business Domain-based Capability Roadmap* presenting a viewpoint used in the approach and *Business Domain-driven Capability Planning* showing, which information is required during the integration.

This article and the herein included EA management patterns are intended for people concerned with managing post-merger capability integration and harmonization endeavors. Stakeholders are enterprise architects, application owners, and domain architects.

## 2 Consolidating Architectures after Mergers

The M-Pattern *Consolidating Architectures after Mergers* describes a business domain-driven approach to develop a future state of the EA after a merger between previously independent enterprises or parts thereof. The main focus lies on ensuring the business continuity during the transformation process.

### 2.1 Example

After the merger between a business unit of Nokia and a part of the telecommunication branch of Siemens, an integrated future architecture of the newly formed enterprise Nokia Siemens Networks has to be developed. Thereby, decisions on business capabilities needed in the future enterprise have to be taken, leading to questions whether an existing capability of one of the previous independent business units is suitable to provide this support or if there is a need to provide a new one. A major challenge is to ensure business continuity during the transformation process. Prior to such advisements, the future business structure of the enterprise should be explicated in order to provide a foundation for the definition of future business capabilities needed.

### 2.2 Context

Two or more previously independent enterprises or parts thereof with dedicated business capabilities have been merged. The resulting enterprise shares responsibilities and IT environments, which are mostly offered by the mother enterprises<sup>1</sup>. Thus, the new enterprise has limited ability to decide on design and deployment of the used business capabilities.

### 2.3 Problem

You are experiencing problems in overlooking the current state of your EA, as you have to integrate two or more separately developed architectures? You are missing a clear

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<sup>1</sup>The term *mother enterprise* in this context refers to the enterprises, which the new enterprise originates from. In the example presented above Nokia and Siemens are the mother enterprises of Nokia Siemens Networks.

overview about the current situation and are in trouble of explicating future planning states? You feel the risk of an unmanaged evolution of the EA due to limited control over some systems the mother enterprises are in charge of? You want to define a planned state for a consolidated EA and intermediate planning steps to achieve this goal? You are unsure about the impact the transformation might have on the support for your business? **How do you develop a future EA, which provides ideal business capabilities for your new enterprise, and the intermediate planning steps to achieve this goal while ensuring business continuity during the transformation process?**

The following *forces* influence the solution:

- **Business capability integration versus stakeholder resistance:** Integrating business capabilities requires removal of overlap to reduce costs, which may yield resistance from the stakeholders involved.
- **Costs versus insight:** Combining business capabilities requires insight in their respective qualities, resulting in higher costs.
- **Costs versus contracts:** How do you cope with the numerous existing contracts and associated costs concerning the business capabilities of the preceding enterprises?
- **Homogeneity versus heterogeneity:** What is a good balance between homogeneity and heterogeneity concerning business capabilities, which may rely on different technologies, and how can it be achieved?
- **Corporate cultures versus balance of power:** How do you cope with corporate cultures and account for the balance of power between the parties?

## 2.4 Solution

The M-Pattern *Consolidating Architectures after Mergers* addresses the problems described above by guiding and documenting the transformation process of two historically grown isolated enterprises to an integrated, standardized one. Thereby, it provides an overview about the high-level process to achieve this goal. The single steps mentioned below summarize the major tasks, which need to be accomplished. For each of these steps one specialized M-Pattern details on a methodology how to perform this step. The M-Pattern *Consolidating Architectures after Mergers* can therefore be regarded as an *umbrella pattern*, which is detailed in multiple (*Sub-*)M-Patterns.

The high-level process starts with the identification of the business domains for the post-merger enterprise, which are used as a *business domain framework* for the future planning of business capabilities. Thus, the business domains can be used to allocate capabilities, assign responsibilities, etc. Prior to the development of prospective states, the current situation of the enterprise has to be documented according to the business domain framework. Based on these domains, a future post-merger state has to be developed and the transformation process from the current to the post-merger state has to be planned, derived from a gap analysis. In the development of a roadmap from current to post-merger state, securing business continuity during the transformation is a major goal of the approach presented. The different planning states of the EA, which have to be considered, are:

- The *current* state representing the status quo of the EA today,
- the *planned* state representing a to be state of the EA at a specific time in the near future, and

- the *post-merger* state illustrating the aspired architecture after the merger has taken place and an integrated business capability support for the business domain has been established, which should be independent of the mother companies.

Figure 1 describes the four process steps of the business domain driven approach to the post-merger state.



Figure 1: Business Domain-driven Approach to post-Merger Architecture Planning

Due to the fact, that mergers between enterprises usually occur infrequently, the aforementioned planning process is typically executed once after the merger has taken place and then followed by the typical iterative (application) landscape planning cycle as e.g. described in *Analysis of the Application Landscape* or *Development of Planned and Target Landscapes* [BELM08]. Subsequently, an overview about the four steps of the process shown in Figure 1 is given.

### Business Domain Identification

In order to develop a roadmap for the realization of future business capabilities after the merger, the different business domains of the resulting enterprise have to be identified. These domains are later used to cluster objects, e.g. services, business processes, business applications, in order to identify potential redundancies. Candidates for domains are e.g. top level business processes of an enterprise, management and support processes, or product and markets [EHH<sup>+</sup>08].

### Documentation of Current State

Based on the business domain framework developed in the preceding process step an assessment of the current business capabilities is performed. Therefore, information about currently existing business capabilities, which provide support for the different business domains, needs to be gathered. The results of the information collection should be discussed with the stakeholders with business or IT background using a visualization according to V-Pattern *Business Domain-based Capability Roadmap* (see Section 3) in order to ensure the right assignment between business capabilities and supported business domains.

### Development of post-Merger State

Based on the strategies and goals of the new enterprise a post-merger architecture has to be developed. Whereas, in the current state, the existing business capabilities might on the one hand constitute redundant competences, or on the other hand lack support for future business domains, the business capabilities are perfectly harmonized and integrated in this post-merger situation. Considerations, which might influence the post-merger state are:

- minimize dependencies (functional and technical) between different domains,
- ensure integrated IT support,
- avoid/minimize redundancies caused by the merger,
- achieve independence from mother enterprises, and
- integrate business support, where appropriate, horizontally or vertically [BELM08].

Three basic approaches are known for consolidating the capabilities for the new company [Kel07]: *Complete new development* of the needed capabilities, *cherry picking* of the best available capabilities of the mother companies, and selecting either mother company and using its available capabilities only, also known as *steamroller*.

Thereby, the choice of one of the aforementioned approaches leads to different emphasis of the forces identified above. Table 1 provides an overview about how the different forces are considered and addressed if the respective approach is utilized. Thereby, the consideration or addressing respectively is indicated by symbols ranging from complete (●) via partial (◐) to no consideration or addressing at all (○).

	Complete new development	Cherry picking	Steamroller
Removal of overlap	●	●	◐
Cost savings	○	●	◐
Insights	○	●	◐
Contracts	●	○	◐
Heterogeneity	●	○	◐
Corporate cultures	○	◐	◐
Balance of power	●	●	○

Table 1: Different Approaches and their Emphasize regarding the Forces

### Development of Planned States

Based on a gap analysis between the current state and the post-merger state a roadmap containing intermediate planning states has to be developed. Therein, especially the topic of business continuity has to be considered, if supporting business capabilities are replaced or retired. Therefore, a stepwise approach utilizing planned states is more promising than a *big bang* approach [Pen99]. According to [MH04] the majority of changes occur within two years after the merger but the integration process may continue for several years. Utilizing visualizations, e.g. *Business Domain-based Capability Roadmap*, the differences between the current state and the post-merger state can be illustrated using color-coding in order to provide starting points for the derivation of planned states.

Potential intermediate states for the planned business support are:

**Carve out pilot:** a well-contained part of the IT with limited business impact has been transformed, as a feasibility study.

**Complete carve out:** all business capabilities have been detached from the mother enterprises and are managed as well as operated mostly independently by the new enterprise.

**EA stabilization:** the architecture of the new enterprise has settled.

**EA consolidation:** the EA has been optimized and freed of redundancies except those kept e.g. for performance reasons.

In order to ensure the evolution of the EA towards the ideal post-merger state, a set of architecture guidelines and rules needs to be set up.

## 2.5 Implementation

This M-Pattern can be useful for the handling of the complexity arising in the context of a merger between enterprises. Nevertheless, different challenges arising from the involvement of different enterprises (mother enterprises and the new resulting one) have to be addressed and demand for special attention. For example, decisions on the retirement of a business capability might have additional social impact due to dissolving responsibilities. Therefore, a steering committee should be set up, in which stakeholders from the formerly independent enterprises are equally represented. This committee should be involved in the different process steps described before and acts as final decision board.

## 2.6 Known Uses

The approach documented in M-Pattern *Consolidating Architectures after Mergers* is used at AXA Winterthur, Nokia Siemens Networks, and Uni Credit Group.

## 2.7 Consequences

**Business capability integration versus stakeholder resistance:** The emotionality of discussion and the fear of the affected employees about the future [WL04] can be faced by making the decision process and the reasons for decisions taken transparent to the stakeholders involved. Another way to cope with stakeholder resistance is the pattern *Early Decision* [Kel01], which tries to avoid too many workshops often used for political discussion instead of reasonable discussions about the future development.

**Costs versus insight:** In order to reduce overlaps in business capabilities you need insight knowledge. The effort needed to gain this knowledge has to be balanced to the benefit of this knowledge. This is important in the documentation of the current state.

**Costs versus contracts:** Merger endeavors lead to a high amount of different contracts, that need to be maintained and produce costs in the future. Therefore, you have to consider the existing and new contracts in the phase development of post-merger state, as these have a high influence on costs.

**Corporate cultures versus balance of power:** In the new enterprise both formerly independent enterprises have equal rights, which more often than not lead to emotional *tit-for-tat* decisions. These decisions try to balance retirements of business capabilities from both mother enterprises, leading to a situation, where high effort has to be spent in integrating business capabilities developed independently. Another important aspect for the successful execution of the merger is to define the new positions and responsibilities of the new IT department as soon as possible [WL04] to be able to focus on the upcoming decisions and not on discussion about people and their roles.

**Homogeneity versus heterogeneity:** Different corporate cultures and the balance of power between the parties may also be detrimental to homogenization endeavors. You have to find a balance between homogenization and heterogeneity to fit your needs.

## 2.8 See Also

In order to support the implementation of M-Pattern *Consolidating Architectures after Mergers* the V-Pattern *Business Domain-based Capability Roadmap* should be considered.

### 3 Business Domain-based Capability Roadmap

This V-Pattern provides a way to visualize information about business domains of one or more enterprises in relation to the available and required business capabilities. Thereby, also planning aspects as e.g. the introduction or the removal of capabilities are considered.

#### 3.1 Example

A business unit of Nokia has merged with a part of the telecommunication sector of Siemens. This resulted in the need to define the new business domains and merge the previously independent business capabilities of both enterprises. In order to appropriately support this task, views have to be created showing the business domains of the new enterprise together with the available and required business capabilities supporting the business domains. Subsequently, the reduction of existing redundancies and the creation of missing capabilities have to be planned using the visualization.

#### 3.2 Context

In a merger situation of multiple formerly independent enterprises an overview about the business domains and the available and required business capabilities is required.

#### 3.3 Problem

You want to get an overview about the business domains and the available business capabilities in order to identify redundancies or to harmonize the existing capabilities. If needed capabilities are missing, you want to introduce new business capabilities to fill this gap. **How do you visualize the capabilities supporting your business domains when integrating two or more enterprises?**

The following *forces* influence the solution:

- **Completeness versus readability:** How can you include enough information in the visualization to support analysis of the situation without overstraining the user with too much details?
- **Static versus dynamic:** How can you visualize the transition from the current state to a planned or an envisioned state of your business domains and capabilities?
- **Belonging versus planning:** Do you want to show the belonging of a business capability to one of the previously independent companies or do you focus on the result after the merger?
- **Redundancies versus gaps:** How do you visualize redundant business support for business domains but also consider missing capabilities (gaps)?

#### 3.4 Solution

*Business Domain-based Capability Roadmap* uses grouping to show which business capabilities are available for which business domain and from which enterprise the business capabilities originate. This is exemplarily shown in Figure 2. Thereby the belonging of a business capability to one of the previously independent enterprises or to the merged enterprise is shown via color coding and the border types indicate, whether a capability is planned to be unchanged, introduced, or retired. However, If your company is part of an industry for which a standardized reference model is available, like eTOM [For09] for

telecommunication, IBM Insurance Application Architecture (IAA) [IBM09], etc. it may be used instead of a company specific business domain model.

In Figure 2 identical business capabilities are named the same. This can be used to identify and consolidate redundancies in business capabilities . Missing business capabilities shown as an rectangle with a dotted border, as these capabilities have to be introduced.

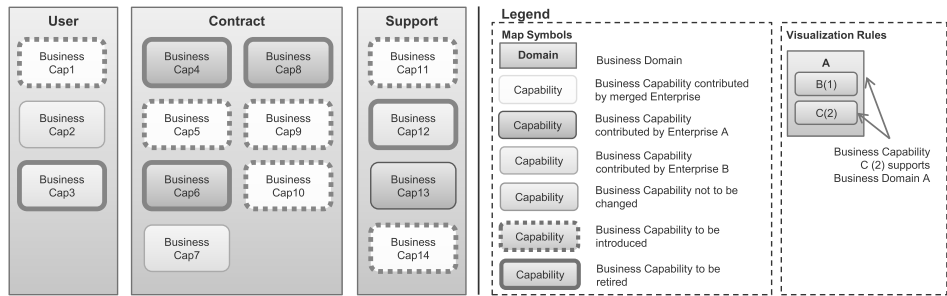


Figure 2: Exemplary View for V-Pattern *Business Domain-based Capability Roadmap*

### 3.5 Implementation

Views according to this viewpoint can be created manually by any drawing tool, like e.g. Microsoft PowerPoint. As manual creation is time consuming and error prone it is advised to use a tool, which can automate the creation of such visualizations.

### 3.6 Variants

A similar visualization is proposed by [Kel01], where it is called *application map*. Even though [Kel01] focuses on a single company the intention is the same as in *Business Domain-based Capability Roadmap*. In an application map the applications of a company are mapped to its domain architecture.

Additional variants exist as not only the relationship between business domains and capabilities are of importance, but also concepts like *products*, *services*, *organizational structures*, *customers*, etc. may be considered [Pen99]. The concepts mentioned before can also be visualized in combination offering the possibility to perform extended analyses.

There are also variants known concerning redundancy of business capabilities. These can, e.g. be visualized by overlapping rectangles.

The same is true for visualizing the changes of business capabilities. In this case it would be possible to use an animation to show the develop over time. This would also improve the understanding that the integration of the enterprises is a continuous, step-wise process.

### 3.7 Known Uses

The V-Pattern *Business Domain-based Capability Roadmap* is in use at AXA Winterthur, Nokia Siemens Networks, and Uni Credit Group.

### 3.8 Consequences

In contrast, a benefit of this V-Pattern is that it supports easy identification of redundancies as capabilities are grouped by business domains.



Getting an overview about the original contributor of a capability is another benefit of this V-Pattern, as well as an easy to use tool to plan the future support of business domains.

**Completeness versus readability:** When visualizing not only the business domains and the corresponding capabilities but also the relationships to other concepts like the ones introduced in the variants section, you have to keep in mind that the resulting views are getting more difficult to understand.

**Static versus dynamic:** The variants section of this pattern mentioned the possibility to show the transition of the current state to a future state using animation. At first this might be an appealing approach, but you should consider that this may require using special tools, which support animations a functionality typically not supported by EA management tools. Another drawback would be that the usability of an animation is limited, e.g. if you consider a text based document.

**Belonging versus planning:** You should think about you focus when using this pattern. If your focus is on showing to which of the "old" companies a business capability belongs to or if your focus is on the future plan. If you try to included both aspects this has negative effects on the readability of the resulting visualization. A way to get around this problem would be to use the layers to differentiate between those aspects but still include the complete information.

**Redundancies versus gaps:** If your focus is on identifying gaps. You should to develop the domain map first, add the required capabilities and then try to match the required capabilities with the available ones by the "old" companies. If redundancies are in your focus you can skip the step to add the required capabilities and instead directly add the available ones to the domain map. Now you can start to consolidate and look for missing business support afterwards.

### 3.9 See Also

This V-Pattern may be useful when using M-Pattern *Consolidating Architectures after Mergers* (see Section 2). The visualized information is based on I-Pattern *Business Domain-driven Capability Planning* (see Section 4). A detailed description of the application map pattern can be found in [Kel01].

## 4 Business Domain-driven Capability Planning

This I-Pattern provides a way to store information about the existing and future business capabilities providing support for the a new enterprise after a merger has taken place.

### 4.1 Example

During the merger between a part of the telecommunication sector of Siemens and a business unit of Nokia an information model specifying which information is needed to harmonize and integrate the business capabilities in the post-merger enterprise had to be defined. Thereby, aspects of redundancies and gaps concerning business capabilities as well as the origins of the capabilities were of interest.

4.2 Context

Getting an overview about the capabilities, which provide support for a business domain, together with information about their origin is important when merging two enterprises.

4.3 Problem

You want to analyze redundancies or gaps in the support of business domains provided by capabilities during the integration of multiple enterprises. Thereby, also the origin of the capabilities is of relevance. **How do you store and manage information needed to plan the capabilities required to support business domains in a merger situation?**

The following *forces* influence the solution:

- **Accuracy versus costs:** How do you find a compromise between the level of detail needed for analyses and the costs required to collect the data?
- **Traceability versus planning:** How do you assure traceability about the origin of a capability in one of the previously independent enterprises but also consider planning aspects, e.g. introduction or retirement of capabilities?

4.4 Solution

The solution for the aforementioned problem is based on the classes and relationships, which are described as follows: **BusinessCapability** Describes a business supporting capability provided by an enterprise.

**BusinessDomain** Describes a logical grouping into areas relevant to business, e.g. customers, products, contracts, organizations, locations.

**Enterprise** Represents the responsible provider of a business capability. An enterprise in this context is one of the previously independent legal entities or the post-merger company.

**SupportRelationship** Auxiliary class used to describe the existing support by a business capability (**supportBy**) of the providing enterprise (**supportAt**) for a business domain (**supportOf**). The auxiliary class holds attributes **validFrom** and **validTo**, indicating the period of validity for the support. These attributes can take `null` values to indicate, that the support is not introduced respectively not retired in the timeframe of the roadmap.

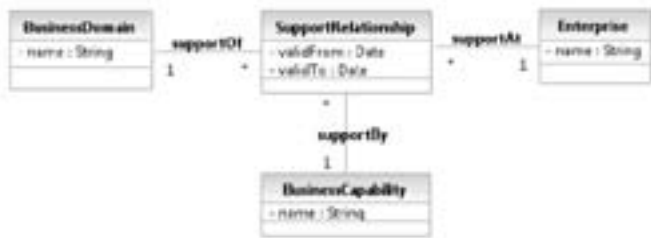


Figure 3: UML class diagram for the I-Pattern

To enforce model consistency, it has to be ensured, that the begin of a support relationship’s period of validity (**validFrom**) is prior to the respective end (**validTo**), with special respect of the aforementioned semantics of `null` values:

```
context SupportRelationship
inv: validFrom==null OR validTo==null OR validFrom<validTo
```

The information mode fragment shown in Figure 3 only gives the basic classes, attributes, and relationships required to support tasks like identifying business capabilities and grouping them according to business domains. In cases where more detailed analysis is required, e.g. for supporting decisions between business capabilities, the class *BusinessCapability* may be enriched by additional attributes like relative costs, quality, external dependencies, etc. This is not further detailed here as the additional attributes are context specific.

#### 4.5 Implementation

Tools suitable for implementing this I-Pattern are database management systems, spreadsheets, or other tools, which can store entities and relationships, e. g. using XML.

#### 4.6 Variants

A multitude of variants exists as there are different types of business capabilities. A focus may thus be set e.g. on business applications, services, or roles.

#### 4.7 Known Uses

The I-Pattern Business Domain-driven Capability Planning is in use at AXA Winterthur, Nokia Siemens Networks, and Uni Credit Group.

#### 4.8 Consequences

**Accuracy versus costs:** Gathering information as described above in the context of mergers can be seen as a challenging task. Due to the possible varying cultures of the formerly independent enterprises, it might happen that in one enterprise an available description of the current EA exists, while the other does not have a sufficient one or no documentation at all. Such circumstances may lead to delays as missing information has to be gathered first. In such cases it can be reasonable to start with information with reduced accuracy in order to support patterns like *Early Decision* [Kel01].

**Traceability versus planning:** The main focus of your analysis has an influence on what information has to be collected first. If planning is your focus you can start designing your new business domains and required capabilities without too much considering the business domains of the "old" companies. If traceability where which capability originated from is of importance, you should start by collecting this information first.

#### 4.9 See Also

V-Pattern *Business Domain-based Capability Roadmap* (see Section 3) may be utilized to perform analyzes on information stored according to this I-Pattern.

## 5 Outlook and Acknowledgment

This article represents a first attempt to apply the approach of EA management patterns in the context of mergers and acquisitions. Whereas, the presented approach depicts a procedure, which has been successfully applied in practice, it is limited to the context of a merger between two enterprises in which none of the formerly independent companies

has a dominant role. In the case of an acquisition or an absorptive merger [MH04], one of the participating enterprises may have the power to enforce decisions, which leads to a different situation. While yet no methodology, or M-Pattern respectively, for such cases exists, the aforementioned patterns can be used as a starting point for the development of such patterns. In addition, further enhancements of the presented approach are possible, e.g. regarding the identification of relevant business domains, etc.

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