

# Towards a Modelling Method in Support of Evaluating Information Systems Integration

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**Abstract:** IT organisations face a number of challenges when assessing, realising, and maintaining a level of integration—between IT resources and between IT and business—that is satisfactory. To cope with these challenges, methods are required that support the evaluation of information systems integration by reducing the complexity inherent to the IT of today’s enterprises, by facilitating communication about integration matters among groups of stakeholders with differing perspectives, and by accounting for potential ambivalent effects of integration. In this paper, we investigate the potentials of an enterprise modelling-based method for IS integration evaluation and present initial conceptualisations—with a specific focus on data integration.

## 1 Introduction

Hardly any other characteristic of information systems (IS) is regarded as important as integration. The benefits of integration are undisputed: Integration helps with reducing redundancy and, hence, protecting system integrity; integrated information systems contribute to reuse, e.g., of data or system functions, and thus to a more efficient maintenance; and it is a prerequisite for aligning IT and business by providing information systems supporting a seamless support of the business processes [LZ11]. However, despite these prospects the integration of IS also comes with potential drawbacks: At first, there are the costs and risks that are related to the implementation of integrated systems. Since respective projects will usually require extensive modifications of an information system, many IT managers are reluctant to support them. Second, there are possibly negative effects of integration. Components that were designed for integrating well with a particular system may resist against reuse in another context. Tightly integrated components may compromise the adaptability of the IS and, thus, hamper the flexibility of the company’s IT landscape. It seems thus reasonable to assume that the *quality of information systems integration* is of pivotal relevance for productivity and quality of organisational work.

The challenges of integration can be purposefully addressed *ex ante* during the development phase of an information system, for instance, by accounting for integration on a conceptual level (e.g., by creating conceptual models) and on the implementation level, for instance, by using respective technologies such as DBMS or WFMS. However,

in many companies developing their information systems from scratch is no option nowadays. Instead, IT managers often have to deal with existing IT landscapes and (legacy) systems requiring ex post integration —potentially coming with remarkable costs for integration projects. High costs and the ambivalent effects of integration recommend a thorough course of action. As a result, IT management needs methods that support the analysis and assessment of IS integration in a differentiated manner; especially it is advisable to first evaluate the level (or quality) of integration featured by the existing systems.

In this context, various authors recognise the potential of using conceptual models of the enterprise—enterprise models—for integration matters. Concrete instruments are suggested, for instance, by Johannesson and Perjons, who propose design principles for the design and use of process models and associated data models to facilitate enterprise application integration [JP01]. An enterprise modelling method for supply chain integration based on CIMOSA is proposed by de la Fuente et al. [dlFRO10]. However, existing approaches mainly focus on selected aspects of integration only and lack a comprehensive conception of integration. As a consequence, they do not guide the assessment of integration or provide support for dealing with the ambivalent effects of integration [CLT12].

In this respect, the motivation of the paper is threefold: (1) We propose an elaborate conceptualisation of integration that, among others, allows distinguishing between different levels of integration, (2) investigate the potentials of an enterprise modelling-based method in support of evaluating information systems integration, and (3) present an outline of a corresponding method—in this paper with a particular focus on *data integration*—as a first step towards a comprehensive method for integration assessment and management.

Our research makes use of a research method configured for the epistemological particularities of research on modelling methods and applies a method for designing domain-specific modelling languages [Fra10]. Next, we present a conception of integration. Section 3 introduces requirements a method should satisfy. An outline of the solution and corresponding prospects are presented in Section 4. In Section 5, we discuss design decisions pertaining domain-specific modelling constructs and present a process model. Section 6 provides concluding remarks.

## 2 Conception of Integration

Realising integrated information systems requires an elaborate conception of integration that enables a differentiated assessment of its quality as well as of benefits and risks. Despite its long history in research on information systems, in particular in the German “Wirtschaftsinformatik” (see, e.g., [Ket09, Hei89, MH92, CLT12]), and its relevance in practice, there is still a noticeable lack of an agreed conceptualisation of integration and its various aspects that is differentiated and elaborate enough to allow for an assessment of IS integration. Integration is often used without a definition at all or by referring to the etymological interpretation based on the Latin *integrare* (“to make a whole”). While such a general understanding of integration as the result of constructing a whole from previously isolated parts makes sense, it is not sufficient for dealing with IS integration:

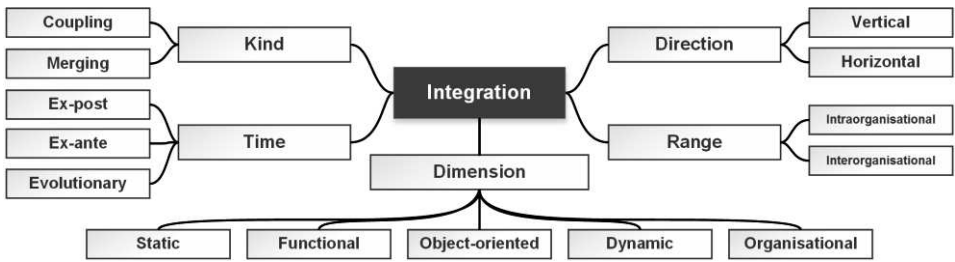


Figure1: Selected Aspects of Integration

First, it does not account for the specifics of information systems [Fra08]; second, it is not at all obvious what to consider the “whole” with regard to the integration of information systems, as this presupposes an unambiguous understanding and interpretation of the required integration; and, finally, such a conception does not allow to assess the quality of integration or to distinguish between different levels of integration. Only very few authors (e.g., [Jun06,Vog06]) present conceptions of integration that account for (selected) peculiarities of IS. However, their focus is different: The former focusses on architectures for data integration while the latter addresses integration based on “Enterprise Application Integration”.

Several proposals for the classification of integration-related phenomena exist (see, e.g., [CLT12] for an overview). Various criteria (e.g., time, direction, reach) allow for describing, for instance, different integration scenarios (e.g., M & A) and integration constructs (e.g., data integration). However, dimensions related to the quality of integration as well as corresponding risks and benefits are missing. Against this background we present our conception of integration, which consists of three parts that build upon one another: the conceptualization of integration itself, selected aspects of integration, and a proposal to distinguish between different levels of integration.

Information systems are linguistic artefacts. Therefore, integration is also mainly a *linguistic* conception, i.e., it is accomplished through language and communication respectively [Fra08]. Accordingly, the integration of two IT artefacts requires them to be able to communicate, either directly or through some kind of mediator. Communication in turn implies the existence of common concepts that define the semantics of the linguistic artefacts that are subject of communication relationships—in other words: Integration requires the existence of a *common semantic reference system*. Examples for such reference systems are data types or database schemas [Fra08].

We further elaborate our conception of integration in that it accounts for multiple aspects. Based on considerations from [Hei89,CLT12] we differentiate the concept of integration into *kind*, *time*, *direction*, *range*, and *dimension* of integration (cf. Fig.1). Although all aspects are relevant for describing IS integration, the *dimensions* are of particular importance—since they, among others, describe the use of a common semantic reference system: *Static* integration, also referred to as *data* integration [GWK92], is accomplished through shared static concepts. A typical example would be a common database schema used by a number of applications. *Functional* integration is

aimed at linking applications by using common functions. It requires static integration to allow for common interfaces. Common function libraries that are accessible throughout an entire—potentially distributed—platform are a typical example for functional integration. *Object-oriented* integration is a combination of static and functional integration. *Dynamic* integration is aimed at synchronising contributions of different applications to support a certain (business) process. It requires a common collaboration or process schema, which includes common event types and implies functional integration. Orthogonal to the dimensions discussed above and of particular relevance for information systems is *organisational* integration. The efficient use of information systems requires them to be integrated with the organisational action systems they are supposed to support—often referred to as “IT-Business Alignment”—which, in turn, requires common concepts. A method supporting an comprehensive and elaborate evaluation of IS integration should account for all of those dimensions and aspects. In this paper we particularly focus on data integration as a first step for development of such a method.

Integration is not a mere characteristic of information systems that exists or is missing. To assess the quality of integration we use the concept *level of integration* [Fra08]: The higher the level of semantics the common concepts include, the higher the level of integration they allow for. Note that this concept of semantics corresponds to the concept of information content<sup>1</sup>: The more possible interpretations are excluded by a concept, the higher its semantics. For example, the concept “Customer” is of higher semantics than the concept “String” (data type) [Fra08]. A high level of integration offers appealing benefits. The higher the level of semantics, the more focused and efficient information exchange will be. At the same time, a high level of semantics reduces the effort that is required for reconstructing the meaning of a message; hence, it also reduces the threat a message imposes to integrity [FS09]. However, integration also comes with possible negative effects: A high level of integration between two information systems may, for instance, compromise their adaptability. This, on the one hand, also impairs the potential range of reuse of the common concepts (i.e., they are too specific). On the other hand, a high frequency of changes of the common concepts increases the effort required for maintenance of the integrated systems. Accordingly, integration should not be treated as an end in itself but rather considered as an *ambivalent* concept [GWK92]. Further aspects to consider for assessing quality of integration are, for instance, how common concepts are accessed by the information systems (i.e., read-only access to redundant data reduces the risk for inconsistencies compared to write-access) and to what extent integration can improve action patterns in the organisational context (i.e., the higher the positive impact on the action patterns, the better the integration). Hence, assessing quality of integration specifically requires to account for the context of integration.

Based on this conception of integration we derive requirements for a method in support of evaluation IS integration in the next chapter.

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<sup>1</sup> Note that the notion of semantics we use here is different from the one often used in Computer Science, where semantics denotes a feature of a formal system: Either there is semantics defined for it or not.

### 3 Requirements Analysis

The design of a modelling method requires the specification of corresponding language concepts, which, in turn, implies the need for analysing corresponding requirements.<sup>2</sup> We classify the requirements into three groups: (1) General requirements, (2) requirements related to the assessment of integration, which includes evaluating the quality of integration and accounting for its ambivalence, and (3) requirements addressing the realisation of integration. The underlying rationale is explained briefly along with each requirement.

**(1) General Requirements:** Integrating IT resources, e.g., networks, databases, applications, as well as integrating information systems with the surrounding action system confronts IT-organisations with the complexity of IT infrastructures of present day enterprises as well as of enterprises in general.

*Req. 1–Reduction of complexity:* The method should provide abstractions that allow for focussing on those concepts that are pivotal for analyses and application scenarios concerning integration.

Organisations that analyse information systems integration pursue different objectives and have differing settings (e.g., with regard to existing models of (parts of) the enterprise) as well as stakeholders who are involved.

*Req. 2–Adaptable process model:* The method should provide a process model that can be adapted for different application scenarios with regard to the level of detail and required effort as well as organisations with varying objectives.

Integration, for example realised in projects, requires the participation of stakeholders with different professional backgrounds and perspectives on integration matters including executives, process owners, and IT personnel, which may hamper communication and collaboration between these different groups of stakeholders.

*Req. 3–Support for multiple perspectives:* The method should provide perspectives specific to (groups of) stakeholders involved in integration projects. A perspective should, as far as possible, correspond with the abstractions, concepts and visual representations known and meaningful to the targeted stakeholders. All perspectives should be integrated with each other to foster cross-perspective communication and cooperation.

**(2) Integration Assessment:** Integration is often regarded as a core term, which does not need further explanations [Fra08]. However, such an arbitrary conception of integration does neither account for the peculiarities of information systems nor for the various phenomena related to integration.

*Req. 4–Conception of integration:* The method should provide an elaborate conception of integration that enables a differentiated assessment of benefits and risks. This also includes the various phenomena associated with integration and in particular the distinction between different dimensions of integration.

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<sup>2</sup> Note that requirements for modelling IT landscapes in general are not discussed in this paper. Refer to, e.g., [Kir08] for more details.

As elucidated earlier, integration depends on communication, which can be realised through common concepts. These concepts can be part of a common semantic reference system.

*Req. 5–Common concepts:* Based on an elaborate conception of integration that supports a differentiated evaluation, the method should allow to represent the existence and lack of common concepts as well as to account for common semantic reference systems.

Evaluating the quality of integration, e.g., between two IS, is essential for finding room for improvement. The quality of integration depends on various factors; but first and foremost on the quality of the communication between the IS, i.e., the common concepts. Accordingly, the level of integration allows to assess the quality of integration (cf. Sec. 2).

*Req. 6–Level of integration:* To support the differentiated assessment of integration, the method should enable to distinguish different levels of integration and to identify related effects on, e.g., adaptability, economies, or data consistency and redundancy.

Frequent changes of structures shared between information systems compromise benefits realised by integration as it increases the effort required for maintenance of the integrated systems. If, for instance, several information systems are integrated and use the same database (i.e., share common concepts), changes of the database schema certainly lead to high effort adapting the depending information systems (i.e., a lower integration quality).

*Req. 7–Frequency of changes:* The method should include concepts that allow to express the (expected) frequency of changes of existing structures (i.e., their stability), for example of a database schema.

Integration assessment requires, on the one hand, a technical focus to analyse the IT infrastructure, on the other hand, assessing economic aspects of integration requires accounting for the context, i.e., the action system an information system is supposed to support.

*Req. 8–Organisational context:* The method should provide means to link integration initiatives to the surrounding organisational action system. This organisational context is provided by (at least) strategic goals, business processes and organisational structures.

Integration might have a direct (e.g., automation of a business process) and indirect (e.g., higher data quality) impact on the organisational context. However, as integration might also have negative effects, there is need to account for the ambivalence of integration.

*Req. 9–Ambivalence of integration:* The method should explicitly account for the ambivalence of integration: It should be possible to provide justifications for integration endeavours and the method should include concepts that support assessing the effect of integration (or the lack of it) on the business as the lack of integration will not always have the same economic impact. This includes to account for negative aspects of integration such as long-term costs and to reveal underlying assumptions to foster transparency. The method should also include concepts to express circumstances that inhibit integration.

**(3) Realising Integration:** Use of standards (e.g., from an industrial consortium) for realising integration seem to promising: They foster a wide range of reuse of proven (standardized) artefacts and particularly support cross-organisational integration. However, use of a standard might, at the same time, lack potential advantages provided by an enterprise-specific solution and might result in a lower level of integration and less benefits for the enterprise. Accordingly, standards promote and—at the same time—inhibit integration.

*Req. 10–Standards* The method should include concepts that allow to represent standards for integration. This should include, among others, the scope and purpose of the standards, their maturity and the requirements for using them. In the end, the method should allow for a critical assessment of the contribution of standards to integration.

Differentiating between the various technologies and approaches that are promoted in the context of integration is a challenge. They possess specific (dis-)advantages and should be selected carefully.

*Req. 11–Integration technologies:* The method should include concepts that allow to represent the various (types of) integration technologies and different integration architectures. On the one hand, this refers to defining enterprise-wide integration standards. On the other hand, there is need to the support project-specific selection and configuration of an integration approach.

The application of a method that addresses the identified requirements is outlined hereafter.

## 4 Outline of a Solution

With regard to the identified requirements, there is need for a conceptual foundation and corresponding methods. To satisfy this demand, it seems promising to build on an existing method for enterprise modelling for several reasons: (1) It serves to structure an enterprise by providing purposeful abstractions of IT and the surrounding action systems, arranged on different layers and corresponding to multiple perspectives (Req. 3) and, at the same time, reducing the complexity (Req. 1). (2) Accordingly, it provides stakeholders with specific and illustrative views on a company at various organisational levels, such as on value chains, business processes, or IT landscapes. (3) It makes use of domain specific modelling languages (DSMLs), which reconstruct a domain and its language as a *modelling language* and provide users with concepts they are familiar with. Accordingly, a DSML is intended to provide concepts on a higher level of domain-specific semantics. (4) The DSMLs are integrated and include concepts of the organisational and technical context, such as for goal, business process or organisational structure modelling as well as for modelling the IT organisation [Fra12]. This promises to account for the effects of integration on the organisational context, which is, among others, necessary to address its ambivalence as well as to identify strategies and goals that inhibit integration (Req. 8 & 9).

The prospects of extending an enterprise modelling method are illustrated in the application scenario in Figure **Fehler! Verweisquelle konnte nicht gefunden werden.**, which is based on the MEMO approach [Fra12]. Thus the present models are illustrated

presuming modelling languages and notations of MEMO, for instance, for strategic, organisational, and IT landscape modelling. It is, however, important to note that shown excerpts are not intended to predetermine a specific enterprise modelling approach; instead, they serve as an illustration of principle application and potentials of evaluating IS integration using enterprise models. The scenario shows:

- a *goal model* that represents selected goals of the enterprise (top left),
- various business process types as part of a *business process map* (top right),
- a *business process model* for the complaints management process,
- an excerpt of the *IT landscape* (third layer),
- and models of two selected *information systems* showing hardware and software used to realise the information systems (bottom layer).

The relationships between elements of the enterprise model are explicitly modelled using associations (e.g., between the CRM system and the processes it is used in). Additionally, the enterprise model is enriched by exemplary language concepts representing matters of integration: High-level *integration topics* describe and categorise the data managed by the information systems (e.g., customer data). Furthermore, *data exchange* relations as well as *similarities* and *redundancies* with respect to data the IS manage are displayed.

Given such an enterprise model exists, various analyses to improve integration can be supported. For this purpose, even further representations of the enterprise model such as a portfolio diagram or a matrix can be used. IT managers can analyse, for instance,

- which integration relations exist (by identifying data exchange relations);
- what is the current level of integration (by analysing the common concepts);
- where is potential for further integration and where does the lack of integration threatens data integrity (by analysing the associated business processes and the current data exchange relations as well as by identifying similar and/or redundant data);
- what is the (possibly negative) impact of integration on the organisational context (e.g., a goal) or—in other words—can the performance of the business processes and the achievement of the goals be improved by raising the level of (data) integration (by tracing the associations between the IS and the organisational context)?

In the application scenario (Figure 2), the analysis is aimed at improving the throughput of the “complaints management” process to account for the goal “increase throughput by 10%” (see (1) in Figure 2). For this purpose, existing integration relations between the information systems are identified (2). An assessment of the relation between the “Risk Management IS” and the Investment & Trader IS”, for instance, reveals a low level of integration due to the use of strings stored in flat files for data exchange (3). However, no direct effect of an improvement on the goals under considerations is expected. Integration topics associated with the CRM and the “Account and Deposit Mgmt. IS” (4) indicate that customer data is managed by both systems. This is supported by an analysis of the “use”-associations between the process model for the complains management process and the information systems. However, currently no integration exists. An assessment of integrating the customer data and the corresponding information



systems—based on the context they are used in—shows that it would have a mostly positive impact (5), which is indicated by the green “+” or red “-” next to the affected business processes and goals (6).

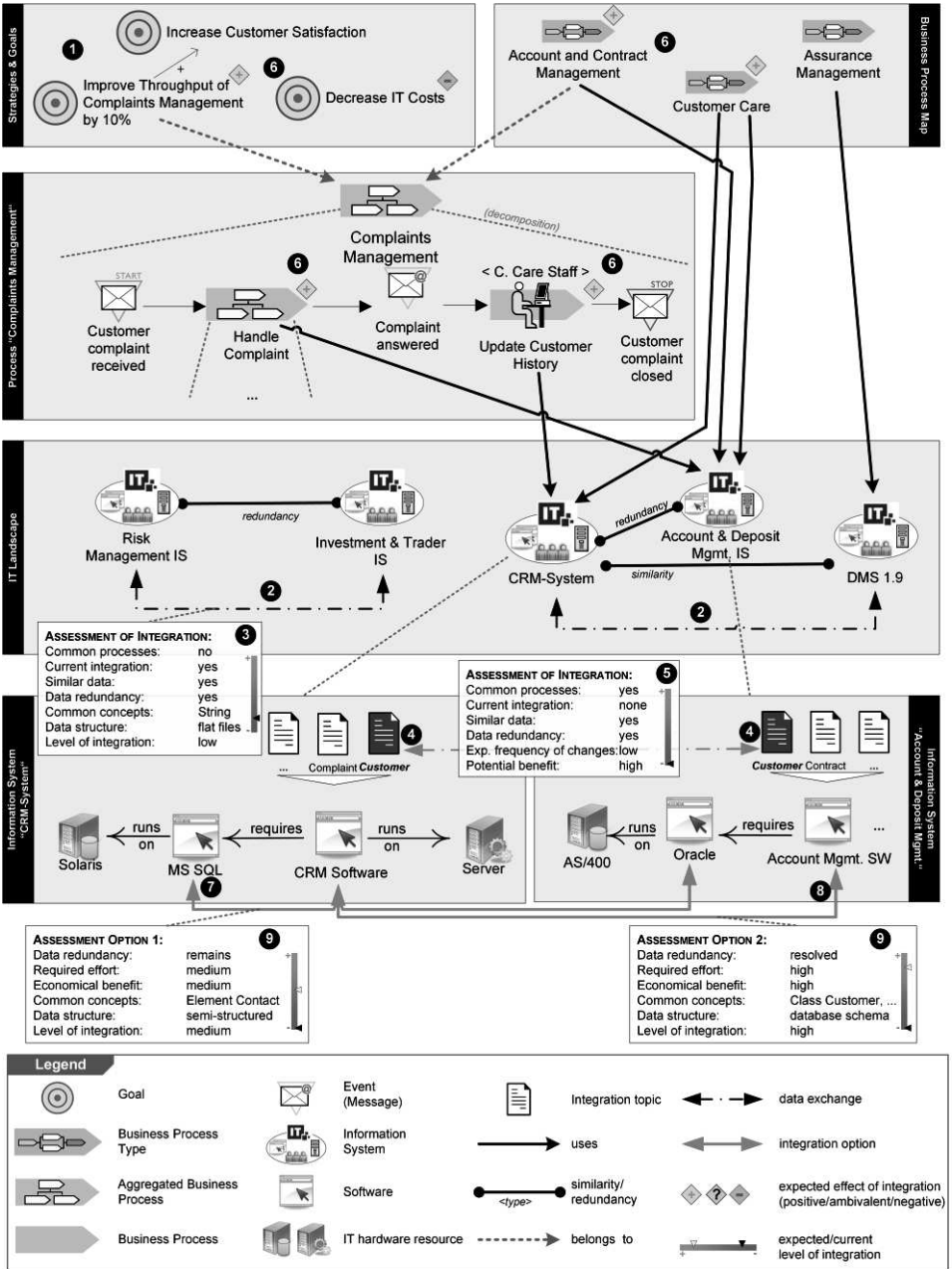


Figure 2: Exemplary enterprise model for integration analysis

Two general options are possible: Integration of the databases (7, e.g., periodic data exchange) or integration of the CRM and the account management IS based on a shared database (8). The latter option would allow for a higher level of integration: Using a common concept such as “Customer” in both systems is of higher semantics than exchanging fragmented data between the two databases. The former solution would be in most situations more flexible as it requires less effort to adapt it to new structures and requirements (9). However, to reduce hardware and software costs for the database server as well as to avoid data redundancy and potential inconsistencies, integration on software-level seems to be the more promising option—albeit initially a higher effort is required.

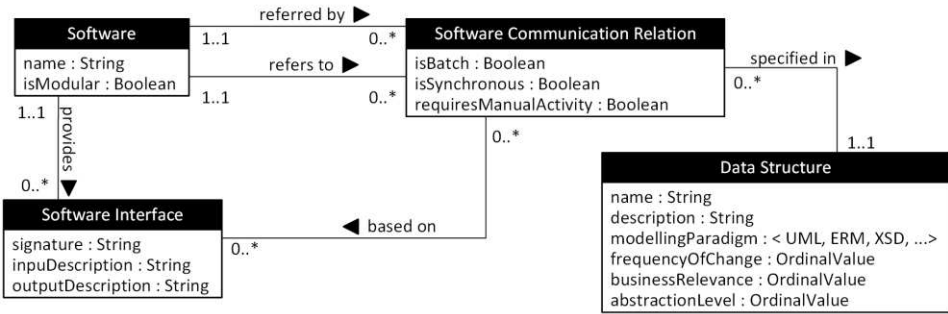


Figure 3: Representing communication relations (constraints & selected attributes omitted)

## 5 Elements of the Method

Based on the requirements analysis and the outlined potentials of an enterprise modelling-based approach, we present first considerations on language concepts and a process model.

### 5.1 Outline of a Metamodel—Selected Concepts

In this section, we present preliminary specifications of modelling constructs as meta model excerpts specified using the MEMO Meta Modelling Language [Fra11]. We assume a modelling infrastructure as described in Sec. 4. The reuse of modelling concepts from existing MEMO modelling languages is visualised by a coloured rectangle attached to the meta type header indicating the concept’s origin (as suggested in [Fra11]).

**Representation of communication relations:** A first basic modelling concept of the method is the representation of communication relations to depict, for example, dependencies between software and, in particular, how data is exchanged. For this purpose, *Software Communication Relation*, which can be based on *Software Interfaces*, allows to specify details related about communication relations. Of particular importance are details describing the need for manual activity (*requiresManualActivity*), whether the communication is (a)synchronous (*isSynchronous*), and if data is batched (*isBatch*) since these details might indicate room for improvement. Furthermore, *Data Structure* allows for a high-level description of the exchanged data (i.e., the common concepts, see Req.

5). It allows to express the *modellingParadigm* the data is specified with, the expected *frequencyOfChange* (cf. Req. 7), the *businessRelevance* of the data for the business as well as the *abstractionLevel* as an indicator for the level of integration (Req. 6) [Kir08].

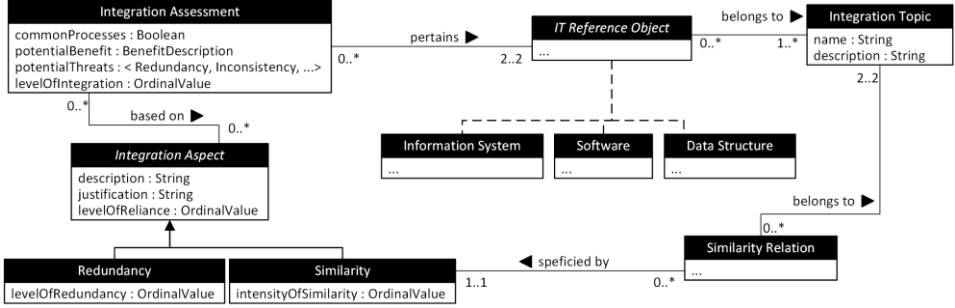


Figure 4: Representing integration assessment (constraints & selected attributes omitted)

**Assessment of integration:** At the core of the method for assessing IS integration are two metatypes: *Integration Assessment* and *Integration Topics*. *Integration Assessment* serves to describe the assessment of relations between two IT artefacts (represented in Fig. 1 as *IT Reference Object*, which acts as a surrogate, e.g., for software, information systems, and in particular data structures). The metatype allows to express whether the IT artefacts are used in identical processes (*commonProcesses*) and to assess the integration’s benefits and threats (*potentialBenefit* and *potentialThreats*). The *levelOfIntegration* (Req. 6) is based on identified similarities and redundancies of data between the artefacts, which allows to assess potential redundancies and inconsistencies. We propose to include corresponding concepts: *Similarity* allows to assess the intensity of similarity (i.e., related but not overlapping data), whereas *Redundancy* allows to describe the level of redundancy (i.e., data is stored redundantly). Furthermore, these concepts provide means for *justifications* and assessing the modeler’s *levelOfReliance* with respect to the modelled relation. If applicable, attributes of *data structure* (e.g., *businessRelevance* or *abstractionLevel*) provide further insights. The metatype *Integration Topic* allows for a high-level categorisation of IT artefacts—with regard to the focus of the paper based on the data managed by or exchanged between the IT reference objects (e.g., “Customer” or “Contract”). Accordingly, a new information system needs only be associated with corresponding integration topics and candidates for integration can be identified automatically based on identical or similar integration topics. Hence, integration topics should be stable over time. We propose a dedicated concept (*Similarity Relation*) for describing similarity relations between integration topics. The *Similarity Relation* in turn is specified by the aforementioned concept for *Similarity*.

**Accounting for context:** To account for the organisational context (Req. 8) and to differentiate between different types of utilisation (*utilizationType*) of data in business processes, we suggest a metatype *Utilization Relation* between *Process* and *Software*. The relation is further detailed by the *Data Structure* that serves to describe the data managed by the *Software*, affected by a *Process*, and related to an *Integration Topic*.

These metatypes present a first draft of basic language concepts as extension for an enterprise model-based approach in support of IS integration evaluation. In the next section, we briefly outline a process model that guides the application of these concepts.

## 5.2 Outline of a Process Model

The purpose of our approach is to systematically support the assessment of integration—with a particular focus on data integration. Creating and maintaining an elaborate enterprise model that covers, among others, strategies, goals, business processes, and the IT landscape might require too much effort or is out of scope (see Req. 2). Therefore, we promote an adaptable approach: Integration analysis can focus on the business processes that depend on the information systems (top-down) and/or the information systems themselves (bottom-up) using integration topics to describe data exchanged and managed by the IS. Accordingly, step 1 and 2 are optional and the level of detail can be adapted (Req. 2). Note, that the process model does not provide a “universal solution” for integration analysis, instead enterprise specific adaptations are necessary to account for stakeholders with, for instance, different qualifications as well as the available resources.

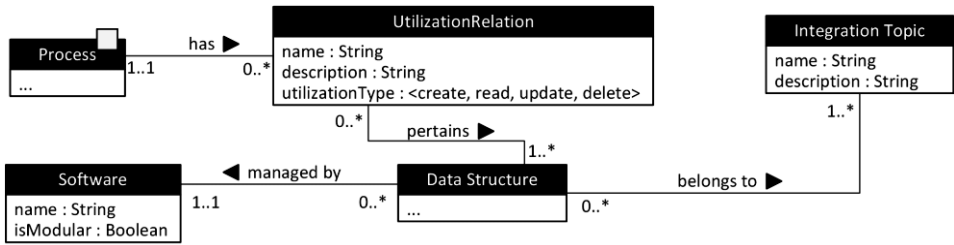


Figure 5 : Representing organisational context with regard to data utilisation (constraints & selected attributes omitted, *Process* is specified in MEMO-ORGML [Fra12])

**(1) Clarification of IT-strategy (optional):** For a long-term orientation, the (IT-) strategy needs to be clarified. This applies especially to aspects that might inhibit integration (e.g., a proposed carve-out) or demand integration (e.g., a new business process).

**(2) Modelling of relevant business processes (optional):** Information systems are predominantly intended to support business processes. Hence, requirements resulting from the business processes determine the required integration of data. To identify these integration requirements the (relevant) business process are modelled. For a first analysis, aggregated processes and a high level of abstraction respectively are sufficient.

**(3) Modelling of involved information systems:** The relevant parts of the application landscape are modelled, for instance, applications, databases, or data exchange connections. The models can either focus on information systems and abstract from the underlying details or include them, too. To allow for better analysis, descriptive relationships between the IT artefacts (e.g., similarities or commonalities) as well as relations between information systems and business processes or integration topics respectively are modelled using the corresponding metatypes.

**(4) Assessment of current state of integration:** The integration topics or associated business processes help to identify information systems that share commonalities or are related for further investigations. Therefore, the current state of integration between these information systems is assessed, among others with regard to the level of static integration, using the metatype *Integration Assessment*. For a more detailed analysis, similarities and commonalities as well as the pertained data structures and the level of integration they support can be analysed. Based on this analysis, the organisational context is considered to identify room for improvement. On the one hand, applications, for instance, that handle similar data (e.g., customer data) or are used in related business processes should potentially be integrated. Or, on the other hand, strategic considerations might require the integration of information systems to provide support for new processes.

**(5) Identification & assessment of integration options:** Options to realise the identified potentials for integration are assessed. This includes further aspects such as economic pressure for or against integration, strategic relevance of integration, required investments, related risks, life cycle of involved information systems, architecture standards of the enterprise, and regulatory restrictions that might prohibit integration of information systems. A survey and an assessment of integration technologies completes the analysis of the identified integration options. Based on the assessment of the identified integration options, projects are planned for an evolutionary path for changing the enterprise.

**(6) Project realisation:** The project is realised using the enterprise model as the central coordination mechanism.

## 6 Conclusions

This paper investigates the potentials of extending an enterprise modelling approach to support evaluation of IS integration—with a particular focus on data integration. The approach is based on the conclusion that enterprise models provide a substantial foundation for integration analyses in that they, e.g., represent both information technology and the organisational context (Req. 8), reduce complexity (Req. 1), and support multiple perspectives (Req. 3). Our contribution in this paper is threefold: First, we provide an elaborate conception for integration. Second, we provide results of a requirements analysis. Third, we illustrate the potentials of the intended method and discuss initial considerations pertaining modelling concepts and process model. The results presented in this paper are part of a larger research project and intended as a first foundation for discussion with and discursive evaluation by peers and domain experts. The scope of this paper was, therefore, limited to selected aspects of a method for IS integration evaluation: Application scenario and method elements (meta model and process model) focused on data integration and on the key basic language concepts; various requirements (e.g., Req. 10 & 11) remain, thus, unaddressed and will be topic of our next research activities. Accordingly, the paper provides first steps towards evaluation of IS integration. However, additional factors might be needed for a more comprehensive quality assessment of integration. This might, in the end, lead to revised language concepts and process model. Besides the discussed prospects an enterprise model-based approach for integration evaluation promises for further, more advanced

application scenarios, e.g.: First, enterprise models enriched with details about integration may be used to define “integration patterns” that provide proven solutions for recurring integration scenarios. Second, enterprise models covering integration aspects can be used as the foundation for advanced “dashboards” to support IT integration management. Third, information systems could describe themselves (e.g., need and potentials for integration, data they manage) by referring to IT models extended with business models—hence, enabling self-referential information systems [FS09].

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