Whitepaper
Architecture Maturity Matrix DYA®

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Index

1   Introduction

1.1   Introduction

This whitepaper explais the DYA®-instrument "Architecture Maturity Matrix" (DYAMM). The instrument can be used to:

- Measure the current situation: getting insight in the current maturity on the relevant aspects
- Set an ambition
- Discover suggestions for improvement to realise the ambition
- Benchmark with others
- Get insight in the approach: setting the right priorities

This instrument is based on the vision of DYA® on the architecture practice. The instrument has also proven itself in environments where DYA is not used. It is set up independently of the architecture method that is implemented and assesses the effectiveness of architectural practice and not the correct application of a method.

1.2   De werking van dit instrument in Agile organisaties

This instrument was developed during the time that project-based work still prevailed in the change organization. Many of the aspects in the text refer to concepts such as *project*, *project manager* and *project*. Architecture gives direction to change, regardless of the chosen method. The effectiveness of architecture in an Agile organization can therefore also be measured and controlled with this instrument. Depending on the chosen Agile method, for example SCRUM, SAFe or LeSS, the terms that refer to project-based working must be translated by the reader into the terminology of the Agile organization. For the sake of readability, the original terms of project-based working have been used because the Agile implementations have several "dialects" from company to company. Some suggestions for the translation to Agile terms:

- Project (as in work package)> Epic
- Project (as in organization)> Scrum Team or DevOps team or Squad
- Working in projects> Working Agile
- Project manager> Product Owner or Scrummaster
- Project phase> Program Increment or Sprint

2 The 17 focus areas for an effective architectural practice

2.1 The 17 focus areas explained

We have broken down the architectural practice into 17 focus areas that must be represented in performing the architecture function within an organization.

Development of architecture

The development of architecture can be undertaken in various ways, varying from isolated, autonomous projects to an interactive process of continuous facilitation in which all architectural initiatives are coordinated and the right stakeholders are being involved. In the first case, the emphasis is placed on architecture considered as a product, in the second, on architecture as a process. The more architectural design is incorporated as a continuous process within an organization's trajectory of change, the greater the chance that real value will be delivered.

Use of architecture

Developing architecture is not an end in itself. Architecture has a goal: it must accomplish something; it needs to be put to use. In practice, the uses of architecture can vary. It may merely be a conduit for information, or it may be a means of governing individual projects or even a tool for managing the entire organization. With increasing levels of maturity, architecture is used more and more as a management instrument throughout an increasingly large part of the organization, guiding the organization to do the right things in the right way.

Alignment with business strategy

Architecture is justified insofar as it supports and facilitates business goals. Alignment with the business strategy (the degree to which the architectural process is in tune with what the business wants and is capable of) is therefore very important. This is about the connection between the choices made in the architecture and the business goals.

Alignment with realisation

Architecture needs to channel changes in such a way that the business goals are achieved in the most effective manner. Alignment with realisation (programmes, projects, operations, maintenance) is therefore extremely important, no matter whether it involves process, organization or IT development. How is the realisation process synchronized with the overarching architectural process?

Relationship to the As-Is state

Architecture is frequently associated with a desired state of affairs: the so-called to-be state. Most organizations also have to deal with an existing situation based on historical growth (frequently without architecture). In assessing the suitability of the architecture, it is important to realize that a set of circumstances already exists, which has its own

range of possibilities and impossibilities. If this relationship to the as-is state is ignored, there is a danger that the organization will be able to do little with its elegantly drafted scenarios for future architecture.

Responsibilities and authorities

If the roles and responsibilities concerning architectural thinking and taking action are clearly and unambiguously outlined to everyone, discussions and differences of opinion about architecture are prevented from falling into limbo. Moreover, parties can then be questioned about their own specific contribution to architecture.

Alignment with change portfolio

In an organization, a (large) number of developments takes place in all sorts of areas at more or less the same time. Some of these developments are interrelated. Architecture is the control instrument to make sure that the content of such developments is coordinated. Of course, architecture must then be employed for this purpose.

Monitoring

It is generally insufficient to just state that projects must comply with the architecture. Without a control mechanism, the temptation will be too great to choose the path of least resistance and to ignore the architecture at certain points.

Quality assurance

Obviously, the successful employment of the architecture depends upon its quality. The goal of quality assurance is to ensure such quality.

Management of the architectural process

Like every other process, the architectural process needs to be maintained. This is the only way to safeguard the effectiveness and efficiency of architecture. Maintenance of the architectural process means that a cycle of evaluation, development, improvement and implementation is periodically re-run.

Management of architectural deliverables

It is not enough to issue architectural products (such as standards, guidelines and models); they must also be maintained. Maintaining architectural deliverables means updates are provided and outdated products eliminated, as necessary. Active maintenance guarantees that the architecture is always current and fully functional.

Commitment and motivation

Commitment and motivation of the architecture stakeholders is critical in bringing the architecture up to speed and making it successful. These stakeholders include not only the architects but also, and especially, senior business and IT management, plus project management. Business and IT management are primarily responsible for creating a favourable atmosphere. This ensures that the architectural process is given sufficient

time, money and resources. Ideally, there is support for the architectural artifacts (architectural principles and models) at all levels of management.

Implementation of the architectural role

Being an architect is demanding. Architects not only need to possess the skills to develop architectures, they also need to have the knowledge and understanding for process development, systems development and technical infrastructures. As if that were not enough, high demands are made on their social and management skills. Acquiring this skill set takes training. Hence defining the architect's role and providing the necessary training is an important concern.

Architectural method

The way an organization develops its architecture is a methodical procedure made up of activities, techniques, tools and deliverables. The method chosen must be aligned with the organisation's culture and mode of operation, and consequent approach to architecture. It is helpful if the architects share the same method.

Interaction and collaboration

A great deal of interaction and collaboration among various stakeholders is required in developing architecture. Stakeholders like business managers, process owners, information managers, project managers and IT specialists are involved. This interaction and collaboration is very important in making the architectural process function well. They make the architectural requirements clear and they create an opportunity to share the results of the architectural process with the users of the architecture (such as projects and operations).

Architectural tools

Working with architecture can be aided by architectural tools. They should be well suited to their task. Using tools in an integrated manner, preferably with the support of a repository, maximizes their efficiency and effectiveness. Of course, the tools should be aligned with the chosen architectural method.

Budgeting and planning

The development of architecture can be budgeted and planned. Careful budgeting and planning helps de-mystify architecture. It also shows the organisation what it can expect. Budgeting and planning can range from drafting occasional plans to collecting past experiences with architecture.

2.2   Not everything must happen at once

Each of the 17 focus areas of effective architectural practices must receive sufficient attention. This does not, however, mean that each must be given equal consideration at all times.

First of all, not every factor is equally relevant at the start. The use of architectural tools will certainly become a key concern at some point, but organisations that are still in the

phase of building up architectural practice can focus more productively on the purpose of the architecture and its alignment with other processes. Tools will have their turn.

Furthermore, any given area need not be brought up to its full state of development right away. Different levels of maturity can be distinguished in each of the various areas. The development of architecture undergoes several growth stages. Often architecture is initially approached in a project-based manner: developing the architecture is a goal-oriented activity within the context of a particular stakeholder. At a higher level of maturity, the development of architecture is viewed as a process in which all relevant stakeholders of architecture participate. There is awareness that the architecture must address the concerns of various stakeholders and that the effect of the architecture depends on the degree to which the architecture is accepted throughout the organisation. In the final stage, the development of architecture is viewed as a integral process in the sense that new architectures are developed as an integral part of the total set of architectures. Thus, each focus area has its own path of development, distinguishable into meaningful levels. The nature and the number of levels in each path depend entirely on the character of the individual focus area and are established independently of all the other focus areas. As shown in Table 1, the path of development in most focus areas passes, in practice, through three levels. One focus area involves only two levels. In one focus area, it is useful to distinguish a fourth level.

Distinguishing focus areas, each having its own developmental path, makes it possible to implement and optimize architectural practices step by step. It provides guidance in giving the proper amount of attention to each area of concern at the proper time. Using it, the organisation can take manageable measures for improvement in those areas offering the greatest added value in light of the as-is state of the organization. To do this, we must set the optimal course the organisation should take to navigate through all the cells in Table 1. What level should we endeavour to attain in a particular area at any given time? The answer to this question is compiled in the Architecture Maturity Matrix.

Focus area	Level A	Level B	Level C	Level D
Development of architecture	Architecture is developed with a clear focus on objectives	Architecture is developed in consultation with the stakeholders	Architectures are developed as a cohesive whole	-
Use of architecture	Architecture is informative	Architecture is prescriptive	Architecture is aligned with the decision-making process	-
Alignment with business strategy	Architecture is related to business objectives	Architectural process is steered by the business objectives	Architecture is an integral part of the strategic dialogue	-
Alignment with realisation	Ad hoc	Structural	Interactive	-
Relationship to the As-Is state	Attention to the As-Is state	Future and existing situations are viewed in connection	-	-
Responsibilities and authorities	Responsibility for architecture as a product has been assigned	Management is responsible for the architectural process	Senior management is responsible for the effect of architecture	-

Focus area	Level A	Level B	Level C	Level D
Alignment with change portfolio	Steering the content of individual projects	Coordination between projects	Strategic portfolio management	-
Monitoring	Reactive monitoring	Proactive monitoring	Fully incorporated monitoring	-
Quality assurance	Explicit quality review	Quality assurance process has been set up	Fully incorporated quality assurance policy	-
Management of the architectural process	Management is incidentally executed	Management procedures have been set up	Continuous process improvement	-
Management of the architectural products	Management is incidentally executed	Management procedures have been set up	Presence of a management policy	-
Commitment and motivation	Allocation of budget and time	Architecture is acknowledged as a management instrument	Architecture is acknowledged as a strategic issue	-
Implementation of the architectural role	Role has been recognised	Role has been detailed	Role is supported	Role is appreciated
Architectural method	Ad hoc	Structural	Fully incorporated	-
Interaction and collaboration	Collaboration between architects	Involvement of the stakeholders	Shared ownership	-
Architectural tools	Ad hoc and product-oriented	Structural and process-oriented	Integration of tools	-
Budgeting and planning	Ad hoc	Structural	Optimising	-

Table 1: Maturity levels for each focus area

2.3   Using the architecture maturity matrix to set priorities

There is a natural sequence to incorporating the various aspects involved in architectural practice. That is, the focus areas and the levels into which they are differentiated can be approached in a specific order. Practice has taught us that it is generally advisable to take first steps toward level A in three areas: *development of architecture* (as architecture can only be incorporated into work if it first exists), *alignment with business strategy* (to prevent, right from the start, architecture work from becoming cut off from business goals), and *commitment and motivation* (to secure the necessary support from management). Once a start has been made on these areas, then concentrate on obtaining "A" levels in the *use of architecture* (to make the aim and intention of the architectural practice clear), *alignment with realisation* (to ensure that the architecture is incorporated into projects and operations), and *interaction and collaboration* (to promote first of all collaboration within the architecture team). In effect, the levels for all 18 focus areas can be comparatively ranked in a similar manner. The resulting set of interdependencies is represented by the Architecture Maturity Matrix in figure 1.

Focus Areas	Scale of maturity												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1 Development of Architecture		A			B			C					
2 Use of Architecture			A			B				C			
3 Alignment with business strategy		A			B					C			
4 Alignment with realisation			A				B			C			
5 Relationship to the As-Is state					A				B				
6 Responsibilities and authorities				A		B					C		
7 Alignment with change portfolio				A				B		C			
8 Monitoring				A		B		C					
9 Quality assurance								A		B		C	
10 Management of the Architectural process							A		B		C		
11 Management of the Architectural products					A			B					C
12 Commitment and motivation		A					B		C				
13 Implementation of the Architectural role				A		B		C				D	
14 Architectural method				A					B			C	
15 Interaction and collaboration			A		B				C				
16 Architectural tools							A				B		C
17 Budgeting and planning					A						B		C

Figure 1: Architecture Maturity Matrix 3.0

Within the matrix the columns represent increasing scales of maturity. The rows contain the 17 focus areas. The letters in the matrix represent the levels of maturity for each focus area. Step by step improvement is done by moving left to right through the matrix.

The letters in the cells of the matrix stand for the levels of maturity of table 1. Reading the matrix from left to right shows the order and extent of progress to be made in each area. This goes as follows. In the column headed 1, there are "A"s in three focus areas (i.e. *development of architecture*, *alignment with business strategy*, and *commitment and motivation*). This means that the minimum level (level A) must be attained in these three areas first. They are immediately followed in priority by the areas *use of architecture*, *alignment with realisation* and *interaction and collaboration* (the "A"s in column 2). And so on. Once the focus areas marked with an "A" in column 3 have been brought to the "A" level, the *development of architecture* needs to be upgraded to the next level, the "B" level. This is indicated by the B that appears in column 4 for this focus area. Concurrently, we are working to attain an initial "A" level in *relationship to the as-is state*. And so on. The model therefore concretely indicates the order in which we can best work on the various focus areas. In this way, it could very well be that one of the areas must first reach the highest level, while others are not yet at level A. An example of this is the relative positioning of the *development of architecture* (at level C in column 7) and quality assurance (only at level A in column 7).

In this way, it is possible to work one step at a time towards scale 12. However, this final stage represents a measure of perfection that not every organisation wishes to attain. The principle "just enough, just in time" also applies to architectural practice. It is more sensible to set a lower stage as an initial target: for example, scale 3. Once this goal is achieved, the organization can then decide if this is sufficient, or if it wants to adopt a higher scale – perhaps scale 6 – as a new goal.

In this process, it is possible to distinguish the following natural stages:
- **Stage 3**: a start is made on the employment of architecture. The most important focus areas are developed to a basic level. There is an awareness that architecture must be embedded into the organization and work is being done on this matter.

- **Stage** 6: nearly all the focus areas are developed to a basic level. Consideration is given to architecture as a process. Architectural practices are structurally established.
- **Stage 8**: architecture now facilitates the most important organizational changes. There is commitment throughout the organisation.
- **Stage 10**: architecture is used as an integral part of all the changes occurring in an organisation. Architectural practices are integral to the organisation.
- **Stage 13**: architectural practices are at such a high level of proficiency that architectural processes and products are continuously optimized.

2.4   Making an architectural profile

The Architecture Maturity Matrix enables any organisation wanting to professionalize its architectural practice to devote the right amount of attention to the right area at the right time. The Maturity Matrix helps you to recognize the appropriate steps for improvement in areas of the organisation that have priority at any given time.
To identify the appropriate improvement steps, it is first necessary to assess the state of the organisation in terms of the Maturity Matrix's 17 focus areas. To enable this, *checkpoints* are defined for every level of each focus area to determine whether an organisation has attained the level in question. If an organisation does not satisfy all the checkpoints of a given level but the organisation still wants to reach that level, some *suggestions for improvement* are made. They are explicitly intended as suggestions and are neither exhaustive nor applicable to every situation. They are meant to be sources of inspiration derived from our experiences – you can extract whatever is useful and then supplement it with your own improvement activities.

Observe the following rules in applying the Architecture Maturity Matrix:
- An organisation attains a level when all the checkpoints at that level and all preceding levels have been satisfied.
- An organisation achieves a scale of maturity when all the levels at that scale and at all previous scales have been attained.

In this document, the notion of architecture is being interpreted broadly as a consistent set of principles and models that give direction to the design and realisation of processes, organisational structures, information, applications and technical infrastructure of an organisation. If an organisation possesses such principles and models, we consider those to be a part of architecture, even if they are not identified as such by the organisation.
In the context of this document, the term architectural process refers to all the activities involved in making and maintaining architectures, as well as aligning them with such other processes as planning and control, decision making, development and operations and maintenance.
It is furthermore assumed that Development with(out) Architecture is performed in projects, which may be either in-house or outsourced. These projects can involve the development and implementation of IT solutions in either customized or standardized packages, as well as updates to processes and organizational structures.

In the following chapter, individual sections devoted to each of the focus areas in the Architecture Maturity Matrix are presented in the order that the areas are listed in the matrix, beginning with development of architecture. The levels (A, B, C and D) in each of the areas will be discussed. Checkpoints and suggestions for improvement are provided for each level. These can be used to establish where you are in terms of your own situation and how you might improve it. The suggestions for improvement can also be used to take advantage of opportunities in your organisation.

3 The 17 focus areas for an effective architectural practice

In this chapter the 17 focus areas of the Architecture Maturity Matrix are described in more detail. For each focus area is given:
- A description of the focus area
- For each maturity level within the focus area:
  - A description of the level
  - Checkpoints to check whether an organisation has attained the level concerned. Only if an organisation fulfils all checkpoints of a level, it can claim to have attained that level.
  - Suggestions for improvement that an organisation can select from to attain the level concerned. Suggestions for improvement are suggestions, not requirements.

1. Development of architecture

The development of the architectural models and principles can be approached in a variety of ways, ranging from isolated, autonomous projects to an ongoing facilitation process in which the various architecture development projects are coordinated with one another and the right parties are involved.

Maturity levels	
Level	**Description**
A	Architecture is developed with a clear focus on objectives The development of architectural models and principles is taken up as a targeted activity within the context of a clear client, a predetermined final result and an intended end date. *Checkpoints* • An architectural document will only be drafted if there is someone in need of the result. • Prior to developing the architectural models and principles, it is determined who will be using the result. • The architecture addresses issues that are relevant to the organisation. *Suggestions for improvement* • *Arrange for a sponsor*. Ensure that the primary sponsor for any architecture being developed is explicitly indicated. Take the task of finding a sponsor seriously. This means that the sponsor should be actively involved in the development of the architecture. • *Take a goal-oriented approach to developing architecture*. Establish the architectural product that is needed. Determine who wants to have this product, who will be using the product and to what end, and which aspects the product has to address to satisfy these demands. It is useful to document this in a one-page document. Discuss this with the relevant stakeholders and execute it.
B	Architecture is developed in consultation with the stakeholders There is an awareness that the architecture needs to address the interests of the various stakeholders and that its primary impact lies in the extent to which its models and principles are accepted. Stakeholders are involved as far as possible in the architecture's development.

		Checkpoints • All relevant parties are involved in the development of the architectural models and principles (e.g. business managers, administrators, developers, line staff) • The architecture shows how the stakeholders' interests have been addressed. • The non-functional requirements are adequately incorporated in the architectural models and principles. • A distinction is made between enterprise architecture and project architecture. *Suggestions for improvement* • *Multidisciplinary teams*. Perform the actual development of architectural principles and models within multidisciplinary teams, ensuring participation of all relevant stakeholders. Make sure the stakeholders share responsibility for the overall result. • *Workshops*. Involve busy stakeholders by inviting them to workshops. Let others (architects) do the detailed elaboration. • *Make choices traceable*. Make explicit for each architectural choice the rationale behind it and whose concern is addressed by this rationale. This can be done by including the rationale in the descriptions of the architecture principles and/or by connecting principles to each other, for instance in a chain matrix. Models must contain an explicit description of the underlying reasoning and motivation.
C		<u>Architectures are developed as a cohesive whole</u> The development of architectural models and principles is an integral process, in the sense that new components are developed as an integral part of the total set of architectures – they are ordered in an architectural framework, for example. *Checkpoints* • The cohesion between the different architectural deliverables is effectively safeguarded during the development of the architecture. • An effective form of requirement management is in place for all constituent architectures relevant to the organisation. • The architecture covers the relevant segments of the organisation (i.e. those segments for which it is desirable to have direction). • The enterprise architecture and project architectures are consistent with each other. *Suggestions for improvement* • *Demonstrate architectural coherence*. Demonstrate the coherence between architectures by making the relationships among the various architectures in the organization apparent. The DYA framework can be used for this purpose. By positioning all the architectures in this framework, it is possible to reveal overlap and gaps. • *Review teams*. Have architectural products reviewed by at least two architects from architectural domains that are related to the architectural domain described. • *Manage requirements*. Introduce and maintain an architecture requirements document that contains the requirements on the architecture.

2. Use of architecture

At the end of the day, it is not about the development of architectural models and principles per se. Architecture is a means to an end. The whole point is that something is achieved by means of the architecture: its implementation. The level of an organisation's maturity is defined by the extent to which architecture is used as a management instrument by an increasingly large section of the organisation in order to take the correct action in the correct manner.

Maturity levels	
Level	**Description**
A	Architecture is informative The architecture offers a clear picture of the objectives the organisation intends to pursue and inspires its members to pursue them. This picture is furthermore endorsed by the organisation's management. The architecture can be accessed by the entire staff. Other parties than the architects themselves are familiar with and consult the architectural products. Although the architecture inspires others, it is not mandatory to comply with its requirements. *Checkpoints* • The architecture is acknowledged by management. • The architecture offers a clear picture of what the organisation wants. • The architecture can be accessed by all employees. *Suggestions for improvement* • *Publish the architecture*. Ensure that the existing architectures are brought to the attention of the organization. Publish the architecture on a site that is accessible to the entire organisation. Make the site attractive and interactive, for instance in the form of a (semantic) wiki. Present the architecture as representing the vision of where the organization ultimately wants to go. • *Story telling*. Develop an inspiring story that tells why the architecture is there and why it is as it is. In other words, the vision behind the architecture. Ensure that all architects can tell this story in an inspiring way.
B	Architecture is prescriptive The architecture serves as a concrete framework for guiding decisions made within the context of the organisation's projects. *Checkpoints* • The architecture is used to give direction to business and IT developments. • The architecture provides guidelines at the correct level that can be followed during a project's execution. • The architecture has a clear status. *Suggestions for improvement* • *Implement project-start architecture*. Supply each project with a project-start architecture. Project-start architectures are formulated so that they are accessible, understandable and applicable to projects. Project-start architectures also establish the frameworks that give effective direction to the decisions made in projects. • *Versioning of architecture documents.* Provide architecture documents with a number of attributes concerning versioning. In addition to the status of the document, the 'sell by' date is a useful attribute: the date

		until which the given status is valid. Ensure that the person who maintains the document receives a signal to renew the sell by date in time. Also provide an owner of the document.
C		Architecture is aligned with the decision-making process Architecture is an integral part of the organisation's control process. It forms a key factor in its decision-making processes. *Checkpoints* • Architecture plays an integral role in the organisation's decision-making process. • The vision that serves as the basis for the architecture is shared by general management. • The ownership of processes, data and information systems has been effectively arranged. *Suggestions for improvement* • *Incorporate architecture into the planning and control cycle*. Incorporate the role of architecture into the organisation's planning and budgeting cycle. This means that, in formulating annual plans, architectural factors are considered when projects and programs are being selected. In practice, this mostly occurs by involving a member of the architect team in planning.

3. Alignment with business strategy

Architecture's raison d'être is its support and facilitation of the organisation's business strategy and objectives. Its alignment with the business strategy – the extent to which the architectural process is aligned to the organisation's aims and abilities – is therefore very important. The key issue is the relationship between the choices that are made within the architecture and the business objectives.

Maturity levels	
Level	**Description**
A	Architecture is related to business objectives The architectural choices are substantiated by explicitly linking them to the organisation's business objectives. *Checkpoints* • The relationship between the architectural choices and the organisation's business objectives is clear. • The architectural choices are in line with the business strategy and objectives. *Suggestions for improvement* • *Explain the basis of the architecture*. Examine the existing architecture and relate choices and statements to the business strategy and goals (to the extent that this has not already been done). If such a relationship cannot be established, take a very critical look at the architectural principles and models. Frequently, choices and statements are made in the architecture without any reference to business goals and requirements. As a consequence, these choices are constantly being questioned.
B	Architectural process is steered by the business objectives

| | | The development of the architectural models and principles is steered by the business objectives as envisioned by the organisation. Architectural changes are triggered by change wishes that are in turn generated by (changed) business objectives. Which specific architectures are worked on is determined by the business changes that are in the pipeline.

Checkpoints
• Architects and business representatives do not hesitate to get in touch with one another.
• Concrete business objectives form the immediate cause for the development of the architectural models and principles.
• When developing architectural models and principles, it is clear to what business objectives the architecture needs to contribute.

Suggestions for improvement
• *Set up account management for business*. Initiate dialogue with business managers and their representatives, such as the information managers of the business units. This can be done by allocating business domains to the architects. The architects build up a lasting, structural relationship with their "accounts." They come to know what is going on inside the given business domain, where the needs are and how architecture can contribute to the achievement of the business goals. |
| C | | Architecture is an integral part of the strategic dialogue
Thinking in terms of architecture is an integral part of the organisation. Architects are involved as a matter of course when management considers making changes. Architects and staff members responsible for business jointly participate in the Strategic Dialogue. Architecture offers concrete support within the organisation's strategic discussions.

Checkpoints
• If the business intends to make changes, it automatically involves architects as a partner in the discussion.
• When giving shape to changes, the business feels supported by the architects.
• The architects proactively bring relevant trends and developments in the market to the attention of business management.

Suggestions for improvement
• *Involve architecture in the pre-project phase (Strategic Dialogue)*. To begin with, collaborate with business management to determine what the added value of architecture has to be for the organisation. Based on this determination, establish the added value of architecture in the business discussions leading up to the initiation of projects – in formulating the business cases, for example. This added value is mostly to be found in the rapid provision of insight concerning the consequences of choices and the manner of achieving business goals.
• *Set up issue management*. Make an agreement with the business managers that the architect team will take on the task of monitoring difficult issues. This means that the architect team will prepare and coordinate the handling and resolution of these issues with business management, and incorporate the results into policy. Of course, the resolved issues are also immediately converted into architecture.
• *Thinking outside in*. Train the architects to think outside in, i.e. to think from the perspective of business issues instead of from the perspective of architecture. If necessary, have the architects attend relevant business courses. |

4. Alignment with realisation

Architecture needs to steer changes in such a way that business objectives are (optimally) realised. It is crucial, therefore, that the architecture is effectively aligned with the realisation process (programme, project, management, maintenance), irrespective of whether this relates to process, organisational or IT development. How are the architectural process and the realisation process aligned in practice?

Maturity levels	
Level	**Description**
A	Ad hoc There is an awareness when carrying out projects and functional/technical management (maintenance) that the staff need to work within certain boundaries. Indeed, from time to time, staff working on projects and maintenance ask for specific guidelines. *Checkpoints* - There are projects that take the architecture into account. - Staff working on projects occasionally ask questions about the architecture. - Architects are occasionally involved in design and construction. *Suggestions for improvement* *Discuss the role of architecture with project managers*. With the project managers, discuss what the relationship is between architecture and projects, why architecture is important and what this means for project execution. For example, have an architect discuss this at a project managers' work meeting. *Discuss the role of architecture with maintenance*. With functional/technical management, discuss what the relationship is between architecture and maintenance, why architecture is important and what this means for maintenance. For example, have an architect discuss this at a work meeting. *Involve design and operations*. Involve design and maintenance in the architecture processes. One way to do this, is to invite senior employees to participate in an architecture community.
B	Structural Staff carrying out projects and maintenance are expected to work within the frameworks of the architecture. Architecture has a place within the organisation's standard procedures for projects and maintenance. Where necessary, architecture is geared towards projects. *Checkpoints* - Architecture has a place within the standard development process. - The architects pay specific attention to the architecture's practical value for projects. - The architecture is taken into account when making changes (maintenance). *Suggestions for improvement* *Embed architecture in the project method*. Many organizations have a method for working on projects. This can be a standard method, such as PRINCE2, but it can also be the organisation's own procedure as laid

		out in a project manual. Give architecture a place in this procedure by literally writing it into the standard project work procedure. The role of architecture is therefore explicitly added to the project method. • *Embed architecture in maintenance procedures*. Include the role of architecture in the description of maintenance procedures. For instance, describe how and when change requests are subjected to an architecture review.
C		Interactive There is an interactive dialogue between architects and the staff working on projects and maintenance, in which the architects support the projects and maintenance staff in the implementation of the architectural frameworks, and the projects and maintenance staff offer feedback regarding the quality and applicability of the architecture. *Checkpoints* • The architectural process is regularly provided with feedback by the development process. • The architects help the developers to tailor the general architectural principles to their specific situation. • The architectural process is regularly provided with feedback by the maintenance function. *Suggestions for improvement* • *Set up account management for the development process*. Initiate regular meetings between members of the architect team and representatives from system development. The purpose of these meetings is to ensure good collaboration between architects and projects. • *Set up account management for maintenance*. Initiate regular meetings between members of the architect team and representatives from functional/technical management. One purpose of these meetings is to collect the requirements on architecture from a maintenance perspective. • *Collectively develop project-start architecture*. Have architects and project teams together develop the project-start architecture, which is architecture focused on the situation of a specific project.

5. Relationship to the As-Is state

Architecture is often associated with a desired situation: the so-called target situation. However, virtually every organisation also deals with existing situations whose development has been informed by historical factors (and often not within an architectural framework). To ensure that the architecture remains applicable, it is important to take the current situation with its specific opportunities and limitations into account.

Maturity levels	
Level	**Description**
A	Attention to the As-Is state The architecture not only outlines the desired future situation, but also pays attention to the current situation (existing processes, organisational structure, provision of information and technical infrastructure) and how to deal with it.

	Checkpoints • The architecture pays attention to the current situation (existing processes, organisational structure, information systems and technical infrastructure). • Policy has been formulated with regard to the current situation (existing processes, organisational structure, information systems and technical infrastructure). • Guidelines have been formulated for the maintenance of systems that do not meet the requirements of the target architecture. *Suggestions for improvement* • *Formulate policy for as-is state*. Develop a vision about the future of the current state of processes, organizational structures, information, applications and technical infrastructure. Based on this vision, formulate concrete guidelines on how to proceed. These guidelines indicate the conditions under which parts of the current state should be replaced or updated.
B	<u>Future and existing situations are viewed in connection</u> The architecture addresses the future and the present as interrelated situations. The architecture offers insight into how the organisation can proceed from the existing situation to the desired situation. *Checkpoints* • The architecture indicates the relationship between the existing situation and the desired situation. • The architecture offers guidelines in the area of migration (how to proceed from an existing to a desired situation). • The architecture clearly distinguishes between different planning horizons. • There is an up-to-date description of the current situation (existing processes, organisational structure, information systems and technical infrastructure). *Suggestions for improvement* • *Draft a roadmap*. Sketch the roadmap of migrating from the as-is to the to-be state based on architecture. Use these roadmaps to initiate projects and to provide guidelines to projects. • *Set up asset management*. Map out the entire set of IT assets (applications and technical infrastructure) and subject it to asset management. Take such matters into account as the functional and technical value of applications, life-cycle management, costs and use. The objective of asset management is to enable well-considered IT investment decisions. • *Make heat maps*. Assess how well processes, data and applications support the business functions and map this onto so-called heat maps. Using scores or colours, a heat map indicates the degree to which a business function is satisfied with the support in several areas, varying from excellent to very bad. A heat map can also show the importance of a business function. In this way, insight is given into where change is needed most.

Public

6. Responsibilities and authorities

When framing and implementing the architectural models and principles, the organisation can prevent discussions and differences of opinion regarding architecture from ending up in a void by clearly and unambiguously establishing each party's responsibilities and authorities. Moreover, this allows parties to be held accountable for their own specific contribution to the architecture.

Maturity levels	
Level	**Description**
A	<u>Responsibility for architecture as a product has been assigned</u> The responsibility for the architectural content has been assigned. Each architectural product has an owner who bears responsibility for the described aspect of the architecture and who will validate the architecture. *Checkpoints* • The responsibility for the content of the architecture as a whole has been explicitly assigned to someone in the organisation. • Each architectural product has an owner (responsible for the content). • The content of the architecture has an official status within the organisation. *Suggestions for improvement* • *Obtain a mandate for architecture*. Ask senior management to express their commitment to architectural practices and to explicitly assign the responsibility for the architecture. • *Draw up a table of responsibilities*. Construct a table of responsibilities in which architecture-related tasks are matched with the various functions in the organization. Indicate the person responsible for each task as well as the person who performs it. For this purpose, use such techniques as RACI (Responsible, Accountable, Consulting, Informed) or RAEW (Responsibility, Authority, Expertise, Work).
B	<u>Management is responsible for the architectural process</u> Responsibility for the architectural development process and the implementation of the architectural models and principles has been assigned at the management level within the organisation. *Checkpoints* • The organisation has a body where decisions relating to the architecture can be taken (an architecture board, for instance). • The responsibility for the architectural process as a whole has been explicitly assigned to someone in the organisation. *Suggestions for improvement* • *Set up an architecture board*. Create an architecture board to formally approve architectural products and to provide an escalation platform to deal with deviations from the architecture. Members of the architectural board are to be recruited from the senior management of both business and IT. • *Appoint a process owner for architecture*. Assign ownership of the architectural process. The process owner of architecture is not only responsible for the processes in which architecture is developed but also for its alignment with other processes, such as the development and maintenance processes. The process owner is responsible for the effectiveness and efficiency of the architectural processes.
C	<u>Senior management is responsible for the effect of architecture</u>

Architecture has been included in the portfolio of one of the members of the senior management team. The effect of having an architectural practice is evaluated.

Checkpoints
- Architecture is included in the portfolio of one of the members of the senior management team.
- Architecture is also the responsibility of business management.
- The manager responsible for architecture is held accountable for the extent to which architecture contributes to the business objectives.

Suggestions for improvement
- *Allocate final responsibility for architecture*. Ensure that senior management is actually involved in architecture, especially on the business side. Ensure that the ultimate responsibility for the architecture is allocated to the portfolio of a business manager.

7. Alignment with change portfolio

Generally speaking, an organisation has to deal with a (large) number of internal developments in a range of areas, which all take place more or less simultaneously. Some of these developments are dependent on one another. Architecture is the management instrument for structuring the coordination of the developments in terms of content. Naturally, architecture will need to be used for this specific purpose.

Maturity levels	
Level	**Description**
A	Steering the content of individual projects The architecture is used to enable the steering of the content of individual projects – in terms of boundaries and high-level design choices – in relation to other current developments. Before a project is started up, it is first checked how it will fit within existing and planned developments. *Checkpoints* • The architecture is used as a guideline within individual projects for making design choices that are in line with the other developments within the organisation. • Architecture is used to prevent projects from carrying out work that has already been done. • Before a project is started up, it is first checked how it will fit within existing and planned developments. *Suggestions for improvement* • *Make project-start architecture mandatory*. The project-start architecture makes architecture accessible to projects and makes it possible to steer their content. Not a single project is begun without project-start architecture. In the project-start architecture the relation of the project to other developments is guarded.
B	Coordination between projects Architecture is used in the steering of the organisation's entire range of projects. With the help of the architecture, the organisation sets boundaries for the projects and ensures that the results of the various projects are aligned with one another. *Checkpoints*

	• The architecture is used to realise integral coordination between all current and scheduled projects. • The architecture is used to distribute development activities among the projects. *Suggestions for improvement* • *Define the tasks involved in project-portfolio management*. If a form of portfolio management exists, which would typically be financially oriented, introduce some architectural requirements into it. These will be specifically concerned with the coherence among projects. Collective or infrastructural elements should be included in collective projects that deliver their products to specific applications. A rudimentary form of enterprise architecture is required to give shape to such activity.
C	Strategic portfolio management The organisation maintains an enterprise architecture at the strategic level, which is actively used for accommodating changes and bundling them in a cohesive portfolio. *Checkpoints* • The architects are involved in the building of a change portfolio on the basis of the strategic objectives. *Suggestions for improvement* • *Implement strategic program portfolio management*. Implement a process in which architects assist senior management in building a coherent package of programs, based on both the strategic objectives and the enterprise architecture.

8. Monitoring

Usually, it is not enough to simply state that things need to be changed in accordance with the adopted architecture. Without a monitoring mechanism, people will often be tempted to choose the path of least resistance and ignore the architecture at specific points.

Maturity levels	
Level	**Description**
A	Reactive monitoring Projects are assessed with regard to their compliance with the requirements set by architecture. *Checkpoints* • Whether projects take the architecture into account is noticed. • Deviations from the architecture are recorded. *Suggestions for improvement* • *Implement an Architectural Review*. Schedule testing at points along the system development trajectory and test a project for compliance with architectural prescriptions. In addition to testing at the start of the project, test at other appropriate moments, like the delivery of the functional and technical design and the acceptance of the business solution. Link up with any feedback or check mechanisms that may already exist (review procedures, go/no go moments, progress

		reports) If there are no check mechanisms in place, an instrument such as an architecture certificate may be used. • *Assign a project architect*. Assign a project architect to each project. The project architect is the primary contact for the project regarding architectural issues.
B		Active monitoring The organisation takes active measures to monitor projects' compliance with the architecture. *Checkpoints* • Mechanisms are in place to stimulate compliance with the architecture (e.g. as part of the project management method or by way of formal reviews) • Actions are taken to ensure that projects satisfy the requirements of the architecture (e.g. communication sessions or trainings). • Deviations from the architecture are actively managed (e.g. in an architecture board). *Suggestions for improvement* • *Implement project assistance*. Have an architect assist a project from its initiation or kick-off to its completion. The architect advises the project about architectural concerns and indicates how the project can comply with the architecture. Ultimately, the project decisions are made by the project manager and sponsor (with a mechanism to alert the project architect of risky or unintentional deviations from the architecture). Project assistance can be implemented project by project, beginning with the most strategic projects. • *Implement a deviation registration*. Maintain a general record over all projects of all deviations from the architecture. Put this deviation registration on the agenda of the architectural board regularly.
C		Fully incorporated monitoring Compliance with the requirements set by the architecture is a standard feature of a project's execution and is fully incorporated in the procedure. *Checkpoints* • Architectural compliance is part of the project assignment. • Architectural compliance is a matter of course in a project. • There are processes in place for the conscious and controlled exemption – in incidental cases – of projects from the need to comply with the architecture. *Suggestions for improvement* • *Embed the monitoring of architecture compliance in the project method*. Make compliance with architecture a standard component of the project method. Many organizations have a standard method, such as PRINCE2. Indicate how monitoring compliance with architecture is incorporated into the project method. Make compliance with the architecture one of the criteria for project decharge. • *Embed the monitoring of architecture compliance in the planning and control cycle*. Include architecture compliance in the review of annual plans. This can be implemented by having a representative of the architectural team participate in the yearly control review sessions of the annual plans.

9. Quality assurance

Naturally, the quality of the architecture is also important for the effectiveness of an architectural practice. The quality assurance process is intended to guarantee this quality.

Maturity levels	
Level	**Description**
A	Explicit quality review The architectural models and principles are checked as effectively as possible with regard to quality. It is determined whether the decisions made are in line with the organisation's strategy and business objectives and will indeed yield the intended advantages. *Checkpoints* • Attempts are made to review the architectural models and principles in some way or other with regard to quality. • Quality standards have been formulated for the architecture. *Suggestions for improvement* • *Establish an Architectural Review procedure*. Set up a review procedure to ensure that architectural products are reviewed by all the relevant stakeholders in the organisation. Using a review matrix, it is possible to establish in advance the parties who should review architectural products. • *Formulate quality criteria*. Establish a list of the most important criteria for architectural products.
B	Quality assurance process has been set up A process has been set up to guarantee the quality of the architecture. *Checkpoints* • The organisation pays structural attention to the quality of the architecture. • The organisation has set up a quality assurance programme for the architecture. *Suggestions for improvement* • *Audit architecture*. Establish the quality requirements that the architecture must satisfy (both in terms of its process and content). Have audits regularly conducted in order to ascertain whether these requirements have been satisfied.
C	Fully incorporated quality assurance policy Quality assurance for the architectural processes and products is part of an integral quality policy at the organisational level. *Checkpoints* • The quality of the architecture is part of a general organisation-wide quality assurance policy. • The organisation pays structural attention to the effect of the architectural practice (examining, for example, to which extent having an architectural practice contributes to the achievement of its strategic and business objectives). • When thinking about architecture in terms of quality, the relationship between architecture and the other processes within the organisation is taken into account (e.g. strategy formation processes, development

processes and by assigning responsibility for the quality assurance to an audit service).

- Afterwards, it is possible to determine on the basis of registrations how the assurance of the architectural quality took place.

Suggestions for improvement
- *Include architectural processes in the quality system*. Include architectural processes in the organization's overall quality system. If there is no overall quality system, the architecture process can perhaps be used as a pilot to set up such a system. The objective of the quality system is to structurally evaluate and improve the architectural process.

10. Management of the architectural process

As with any process, the architectural process needs to be managed. Only then can the organisation ensure that the process is – and remains – effective and efficient. Managing the architectural process means periodically completing the cycle 'evaluation, formulation of points for improvement, execution'.

Maturity levels	
Level	**Description**
A	Management is incidentally executed There is an awareness that the architectural process needs to be managed. *Checkpoints* • The architectural process has been described. • The organisation is acquainted with the architectural process. • It is occasionally checked whether the architectural process still meets the organisation's needs. *Suggestions for improvement* • *Conduct an assessment*. Conduct an assessment of the current state of affairs in the architectural process. The Architecture Maturity Matrix can be used for this purpose. • *Describe the architectural processes*. Describe the architectural processes, such as the establishment and maintenance of architecture, the formalization of architectural products, the role of architecture in projects and maintenance, and the role of architecture in the pre-project phase. Communicate this.
B	Management procedures have been set up The organisation has formulated procedures to maintain the architectural process. *Checkpoints* • Management procedures have been set up for the architectural process. • Responsibility for the management of the architectural process has been assigned within the organisation. • Changes in the architectural process are immediately communicated to the relevant stakeholders. *Suggestions for improvement* • *Establish a maintenance procedure for the architectural process*. Establish procedures to deal with changes to the architectural process.

		The aim of these is to actively maintain the architectural process and to keep it up to date.
C		**Continuous process improvement** The organisation regularly scrutinises the architectural process. It implements improvements on the basis of its findings. *Checkpoints* • The architectural process is evaluated according to a regular cycle. • A mechanism has been introduced for the submission of improvement proposals for the architectural process. • Improvement proposals regularly result in actual modifications to the architectural process. *Suggestions for improvement* • *Implement assessment and improvement cycle*. Establish a system in which assessments of the architectural process are regularly made. Ensure that the resulting proposals for improvement, along with any other suggestions for improvement that may occasionally arise, are evaluated according to a standard procedure and result in the necessary changes to the architectural process. Publish, communicate and implement these modifications.

11. Management of the architectural products

It is not enough for an organisation to simply develop architectural products such as standards, guidelines and models; it also needs to manage them. The management of architectural products means making updates where necessary and discarding obsolete products. Active management will ensure that the architecture is up to date and useful at any given moment.

Maturity levels	
Level	**Description**
A	**Management is incidentally executed** At fixed times, the organisation checks whether its architectural models and principles are still up to date. If this proves not to be the case, the organisation carries out a maintenance drive. *Checkpoints* • It is occasionally checked whether the architecture is still up to date. • Outdated components are removed from the architecture. • A new version of the architecture is published from time to time. *Suggestions for improvement* • *Update the architecture*. Examine the existing architectures. Are the principles and models still valid? Are there any inconsistencies? In making these evaluations, constantly ask whether the architecture continues to serve the current business goals. Eliminate any elements that have become outdated or redundant, and adjust the architecture to meet current requirements.
B	**Management procedures have been set up** Procedures have been set up to ensure that the architectural products remain up to date. *Checkpoints*

| | | • A management procedure has been formulated for architectural products.
• The organisation has a procedure for dealing with change proposals for architectural products.
• Management of the architectural products has been included in the architect's job responsibilities.
• Changes to the architecture are immediately communicated to all relevant stakeholders.

Suggestions for improvement
• *Establish a maintenance procedure for architectural products*. Establish procedures for making changes to architecture (change management), for including architectural artifacts in the total architectural package and for maintaining the consistency of this totality. The aim is to actively maintain the architecture as a whole and to keep it up to date. |
| C | | Presence of a management policy
The organisation has formulated a policy outlining how architectural products are to be managed. This policy is based on a clear vision regarding the integration of architectural products.

Checkpoints
• There is policy in place outlining the management of the architecture.
• The organisation differentiates between how different components of the architecture are managed.

Suggestions for improvement
• *Develop a maintenance policy*. Formulate a policy indicating how the maintenance of the various architectures is to be handled. This can, for example, indicate the architectures that are actively maintained, the times when such maintenance occurs and the individual(s) who perform(s) it. |

12. Commitment and motivation

Strong commitment and motivation on the part of the management are major factors in the successful development and implementation of architecture. The business and IT management teams play a particularly important role when it comes to creating the preconditions for architecture. If management is sincerely interested in the architectural process, this process will receive sufficient time, budget, resources and attention and the architectural products (architectural principles and models) will enjoy the management's support. The management's actual and perceived attitudes to architecture determine to a very large extent the behaviour of the rest of the organisation.

Maturity levels	
Level	**Description**
A	Allocation of budget and time The organisation has structurally reserved time and money for the architectural process. *Checkpoints* • Architecture is viewed as an important issue by the IT management. • Budget and time are structurally allocated to architecture. *Suggestions for improvement*

		• *Bring architecture to the attention of management*. Discuss with management the value that architecture adds to the organization. Make this value as specific as possible. Ask management to widely acknowledge architecture's value in both words and actions. • *Obtain a budget*. Make a budget available for architectural work. This can be done by explicitly including the role of architecture in annual plans or budget proposals or by earmarking time and/or money for it.
B		<u>Architecture is acknowledged as a management instrument</u> Management recognises and promotes architecture as an inextricable part of the management and execution of changes. *Checkpoints* • Business and IT management promote architecture as an inextricable component of business and IT projects. • Management bases its policies on time, money and quality considerations, in which compliance with architectural requirements is viewed as an essential aspect of quality. *Suggestions for improvement* • *Have management make the case for architecture*. Together with management, evaluate the value added by architecture and commit managers to the open support of it. • *Include compliance with architecture in the project assignment*. Make compliance with architecture a standard component of the project assignment. While the project method describes how a project is executed, the project assignment indicates what the results of the project are to be.
C		<u>Architecture is acknowledged as a strategic issue</u> There is widespread awareness within the organisation's management team that architecture is of strategic importance and that it is justified to pay constant attention to the quality of the architectural practice. *Checkpoints* • Architects are supported by management in the ongoing improvement of the architectural process. • Architecture is viewed by general management as a strategic issue. *Suggestions for improvement* • *Involve the organisation in the improvement trajectory*. Do not undertake a series of improvements on your own but involve the rest if the organization in the process. Make clear that architecture can only add value if it is a shared responsibility.

13. Implementation of the architectural role

The architect's job is extremely demanding. Architects not only need to have the skills required for developing architectural models and principles, but also knowledge of and insight into process development, systems development and infrastructures. In addition, heavy demands are made on the architects' social and management skills. Study programmes play a vital role in acquiring this knowledge and these skills. The development of the architectural role is consequently an important focus area.

Maturity levels	
Level	**Description**

A	Role has been recognised
	The architect's role has been recognised within the organisation.
	
	Checkpoints
	   • The role of architect exists within the organisation.
	   • The architects can explain the architecture's added value for the organisation.
	
	Suggestions for improvement
	   • *Set up an architect team*. Assign a number of employees the role of architect, whether or not on a full-time basis. Adopt a principle requiring part-time architects to spend a minimum of 16 hours a week on architectural activities. If desired, the architects can be coached by experienced architects from outside the organization, either individually or in group training sessions.
	   • *Practice the elevator pitch*. Train the architects in effective communication. Coach the architects in thinking outside in and translate this to their way of communicating.

B	Role has been detailed
	The tasks and responsibilities of the architect have been clearly described. The architect has the required basic knowledge and skills.
	
	Checkpoints
	   • The architects's tasks and responsibilities have been laid down.
	   • The architects have the required knowledge.
	   • The architects have the required skills.
	
	Suggestions for improvement
	   • *Provide coaching*. If necessary, provide coaching for the architects by experienced architects from outside. Make sure sufficient attention is paid to soft skills.
	   • *Clarify the role of the architect*. Make the architect's tasks and responsibilities explicit and ensure that this role is approved at the management level. Often it is not clear to the organisation what to expect from the architects. Also, the ideas of the architects may differ from the expectations of the organisation. This kind of situation may easily lead to disappointment and ineffectiveness.
	   • *Draft a service catalogue*. To make the added value of the architect team clear to the organization and to indicate the services that architects provide to the organization, compile a service catalogue for the team.

C	Role is supported
	The architect is supported in the performance of his/her tasks and responsibilities with training programmes, tools and a platform that allows for the exchange of best practices.
	
	Checkpoints
	   • The architect is supported with methods and tools.
	   • Training programmes have been defined for the architects.
	   • The exchange of best practices is supported.
	
	Suggestions for improvement
	   • *Professionalize the role of the architect*. Create an environment that nurtures and promotes professionalism. Architects have the resources

	that they need, the exchange of best practices is facilitated and training or coaching is provided. In short, architecture is looked upon as a discipline that is worthy of attention and further development.
D	Role is appreciated The architect's role is appreciated and acknowledged. Employees are able to make a career for themselves in architecture. *Checkpoints* • The organisation has an educational plan for architects. • The organisation has a career path for architects. *Suggestions for improvement* • *Remunerate the architect and recognize the role of the architect*. Provide architects with a career path and give them the opportunity to distinguish themselves. Enable them to become certified and to make a career of architecture (with appropriate remuneration). Facilitate their ongoing education.

14. Architectural method

To develop architectures, the organisation has adopted a certain method or procedure that involves specific activities, techniques, tools and products (deliverables). It is important in this context that the adopted method or methods connect to the organisation's culture and procedures and the associated approach to architecture. It is helpful in this context when the architects all use the same method or methods.

Maturity levels	
Level	**Description**
A	Ad hoc Specific architectural methods are used in specific cases, but do not yet constitute an integral approach that is shared by all architects. *Checkpoints* • The architects have adopted certain conventions for describing architecture. • The architects have a good idea of which components the architecture should contain. *Suggestions for improvement* • *Establish a method in an architectural Project Plan*. Define the method for developing architecture in an architectural Project Plan. The method describes the results that will be delivered and the activities required for this purpose. Describe the results as accurately as possible. Make distinctions among the various aspects (for example: processes, data, applications), forms (principle, policy directives, models) and/or perspectives (enterprise architecture, domain architecture, project-start architecture). • *Facilitate knowledge exchange*. Provide facilities for the architects to exchange knowledge, for instance by making it possible to access each others results and by providing opportunities for interaction. Build an architectural community.
B	Structural There is a cohesive architectural method that has been adopted by all architects. This method is based on a framework or model.

		Checkpoints • There is a shared architectural method within the organisation. • The basic ideas of the prescribed architectural method are adhered to when developing architectural models and principles. • During the development of architectural models and principles, possible deviations from the prescribed architectural method are substantiated and documented. *Suggestions for improvement* • *Implement an architectural method*. Implement an organization-wide architectural method. This means that agreements are reached on the ways of differentiating architectures, the manner in which architectures are documented and how they are developed. The architects can opt for a standard modelling language or they can establish their own conventions based on proven examples.
C		Fully incorporated The adopted architectural method is incorporated in the organisation's change processes. The organisation distinguishes between different stakeholder views. *Checkpoints* • The architectural method distinguishes a variety of perspectives for describing the architecture to different stakeholders. • The architectural method establishes a relationship between the architecture and the organisation's change processes. *Suggestions for improvement* • *Integrate the architectural method*. Ensure that the architectural method adopted is not isolated, but is embedded in the change processes of the organisation. Align with existing conventions, make use of existing deliverables and milestones.

15. Interaction and collaboration

To be truly effective, architecture needs to be embraced by the entire organisation – not just by the architects. In other words, each of the architecture's stakeholders needs to be committed in the right way to having an architectural practice. This requires interaction and collaboration in a number of areas and between a variety of stakeholders.

Maturity levels	
Level	**Description**
A	Collaboration between architects The architects form a single virtual team, exchange experiences and engage in the joint discussion of substantive issues. The architects all feel responsible for the architecture as a whole and do not hesitate to get in touch with one another. *Checkpoints* • There is structural interaction between the architects. • The architects do not hesitate to get in touch with one another. • The architects share a common perspective on architecture. • Activities are effectively distributed among the architects. *Suggestions for improvement*

		• *Organize interaction*. Stimulate the architects to make use of each others knowledge and experience. One way to stimulate this, is to have them participate in differing teams with specific objectives. Another way is to institute a periodic (weekly or biweekly) architect meeting. Following courses together can also create unity. • *Shared responsibility*. Make the architects responsible for the whole architecture. Don't allow architects to distance themselves from parts of the architecture because they are outside their personal scope. Ensure that the architects act as one for the outside world.
B	Involvement of stakeholders The architects take active measures to involve the rest of the organisation in the development of the architectural models and principles as well as their application. Attention is paid to communication relating to the architecture and to transferring the required knowledge and skills to non-architects. In many cases, the architects are still expected to take the initiative, however. *Checkpoints* • The organisation's employees have a genuine interest in the architecture. • The architects effectively communicate with the organisation regarding relevant developments in the architectural area. • The architects enjoy sufficient visibility and credibility within the organisation. *Suggestions for improvement* • *Conduct a Stakeholder Inventory*. Identify the stakeholders of architecture, what their interests are, what roles they play insofar as architecture is concerned and how they can be involved. This inventory can be used to determine the appropriate manner of interaction and collaboration with stakeholders. • *Draw up a Communication Matrix*. Construct a Communication Matrix in which a record of communication with each target group (group of stakeholders or interested parties) is kept, indicating what architectural topic is to be discussed, when, how and by whom. In this way, the Communication Matrix constitutes an instrument in which all communications concerning architecture are planned and monitored. In planning communication activities, it is extremely important to have a clear idea about what the objective is. In addition, the timing of the actions is important. Waiting too long before communicating to stakeholders leads to an ivory-tower situation. Communicating too soon creates the risk that expectations may be aroused that cannot soon be fulfilled. • *Establish an architectural community*. Establish a community in which architects and stakeholders talk about issues in an informal manner. The aim of the architectural community is to involve people in the organization with architecture and, at the same time, to create a sounding board for the architects. The issues can involve both the content and the process of architecture.	
C	Shared ownership Not just the architects, but the 'whole' staff feels ownership when it comes to architecture. It's not just the architects' pet project, but a common method of working for the entire organisation. People can hold each other accountable for architectural issues. *Checkpoints*	

- The architectural stakeholders have the required knowledge and skills to effectively work with architecture.
- The architectural stakeholders assume responsibility for the development and application of the architecture.

Suggestions for improvement
- *Set up an architectural platform*. Set up an architectural platform in which architects and stakeholders can come together and, in a formal manner, discuss issues and make decisions. The most important stakeholders are business managers, project managers and IT management (system maintenance and development). The issues can involve both the content and the process of architecture. If necessary, work groups can be instructed to research and elaborate certain elements.

16. Architectural tools

The architectural practice can be supported by architectural tools. These tools are the most efficient and effective when used on an integrated basis – preferably supported by a repository. The tools must of course be suitable for the selected methods.

Maturity levels	
Level	**Description**
A	Ad hoc and product-oriented A tool is used to support the registration and maintenance of (part of) the architecture. *Checkpoints* • Architectural tools are used to record and maintain the architecture. *Suggestions for improvement* • *Run a pilot using an architectural tool*. Undertake a pilot project using a tool to support the development and maintenance of architectures. Use the pilot project to acquire experience with the tool and to determine the usefulness of a tool.
B	Structural and process-oriented The architects all use the same tools. These tools not only serve to support the definition of the individual architectural models and principles, but also the process for arriving at the architectures and managing them (examples include support for collaboration, version management, status indications, etc.). *Checkpoints* • All architects use the same tools. • Responsibility for the management of the architectural tools has been explicitly assigned within the organisation. • The architectural tools support the architectural process. *Suggestions for improvement* • *Implement architectural tool*. Select the architectural tool that best supports the architect's work and implement it organization-wide in such a manner that the use of the tool is integrated into the organization's architectural process.
C	Integration of tools

	The architects are supported by an integrated set of tools that can be used, among other things, to check the mutual consistency of architectures.
	Checkpoints - The architectural tools that are used are all integrated with one another. - The mutual consistency of architectures can be checked with the aid of the architectural tools. *Suggestions for improvement* *Implement an integrated toolkit*. Implement an integrated toolkit that not only develops various architectures but also ensures consistency between architectures, by integrating the various tools. An alternative is one tool that covers all parts of the architecture.

17. Budgeting and planning

It is also possible to budget and plan the development of architectural models and principles. A serious approach to budgeting and planning can help to demystify architecture. Furthermore, the organisation knows what to expect, and when. Budgeting and planning approaches can range from the incidental drafting of a plan to collecting and benefiting from past experiences.

Maturity levels	
Level	**Description**
A	Ad hoc The development of architectural models and principles is preceded by the drafting of a plan. This plan is monitored over the course of the development process. *Checkpoints* - A plan is drawn up prior to the development of architectural models and principles. - The progress of an architectural development process is monitored. *Suggestions for improvement* *Make plans for architectural projects*. Formulate a plan for architectural development projects. This plan at least includes an estimate of the project duration, the human and other resources required, and time frames for the completion of project components and milestones.
B	Structural The organisation has a standard budgeting and planning method for the development of architectural models and principles. *Checkpoints* - There is a standard budgeting and planning method in place for architectural development processes. - During an architectural development process, deviations from the established budgeting and planning are substantiated and documented. *Suggestions for improvement* *Implement a planning method*. Implement an organization-wide planning method. This means that a plan is always formulated for architectural projects in accordance with a prescribed set of standard activities, rules and guidelines for budgeting and planning.

C	Optimising The budgeting and planning of architectural assignments is professionalised by structurally examining the quality of the plans. *Checkpoints* • There is a structured process for collecting feedback regarding the budgeting and planning method adopted for architectural development processes. • Statistical data about budgets and plans that have been made for architectural development processes in the past are available. *Suggestions for improvement* • *Evaluate architectural plans*. Collect data on planning and execution of previous architectural projects and use these empirical figures to professionalize the planning process.