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How enterprise architecture can contribute to delivering agile transformation

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LeanIX

Executive summary

In today's increasingly connected world, organisations are under enormous pressure to constantly change. Rapidly changing customer needs, technological innovations and external factors such as the Covid-19 pandemic pose particularly significant challenges. Embarking on a continuous journey of transformation has become essential for almost all organisations.

This pressure means that many of these changes have to be made at the same time, even though they vary widely in their form and their levels of complexity, and are overseen by very different teams. Many organisations struggle to coordinate these transformation programmes. In particular, the impact of individual initiatives on the existing architecture must be managed and the results of these initiatives must be made visible and measurable.

To implement this growing number of changes, organisations are increasingly relying on agile ways of working. Agile methodologies provide the flexibility and speed required, but significantly change how transformation programmes are delivered. This paper looks at how the role of enterprise architects needs to change in such an environment to enable them to remain relevant as strategic advisors to the business and IT.

Many agile transformations use agile scaling frameworks such as the Scaled Agile Framework (SAFe)[1] to manage a large number of parallel development teams. In this environment, successful enterprise architects define strategy-driven guardrails at the portfolio level and enable development teams to "think architecturally", allowing architectural decisions to be made at the team level. Minimising top-down decisions allows agile methods to fully realise their strengths and significantly decrease delays while still ensuring strategic oversight.

Integrating modern enterprise architecture management (EAM) tools into the agile toolbox, enterprise architects deliver key insights to all relevant stakeholders of the transformation initiative. Information on the current state and the target state is made available to a larger audience, as well as means of conducting real-time analyses of the impact of changes on the enterprise architecture (EA) landscape. Agile teams, among others, can take on the architect's perspective and make devolved decisions, based on accurate data and real-time architecture information.

[11] For details on SAFe, see also www.scaledagileframework.com.

Managing the complexity of digital transformation programmes

In a recent study, PwC found that 83% of CEOs worldwide – and 91% of German CEOs – want to invest more in digital transformation over the next three years. A large majority of CEOs said they want to invest more in initiatives to improve cost efficiency (globally: 76%, Germany: 81%), and in cybersecurity and data protection (globally: 72%, Germany: 80%).[2]

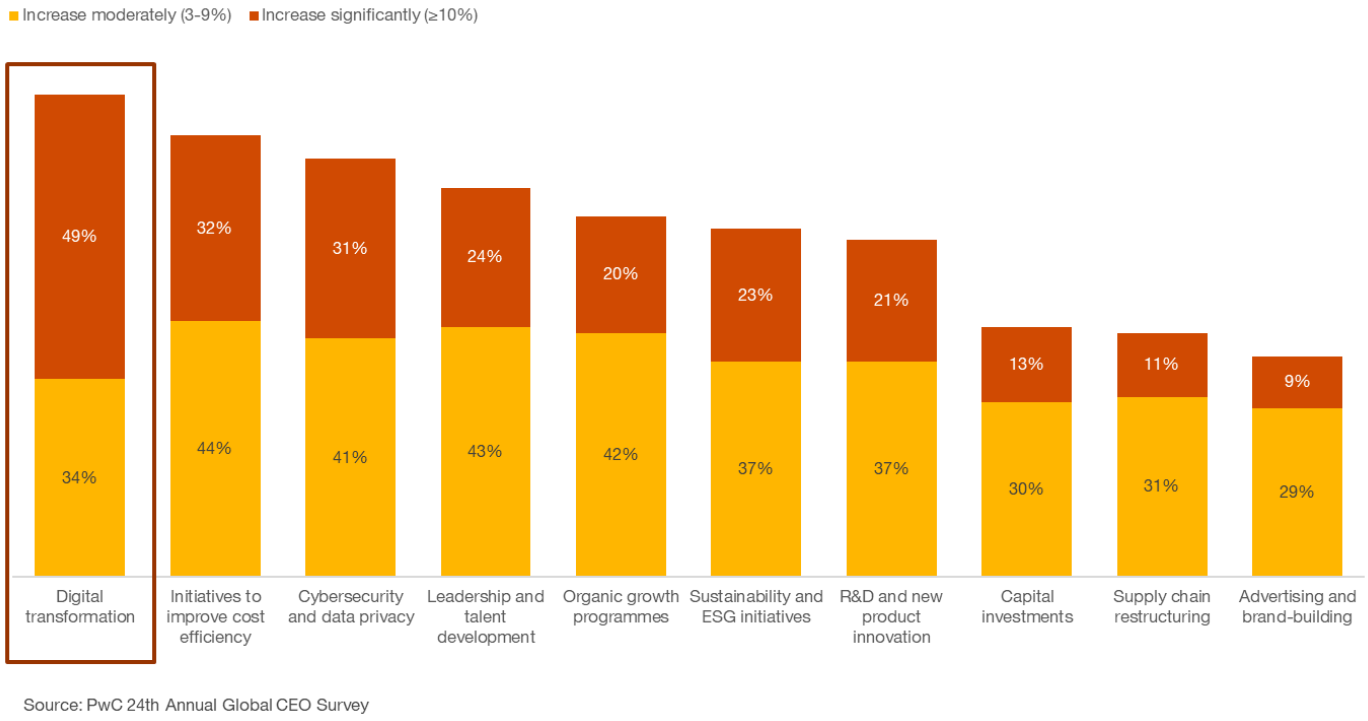


Figure 1 How do you plan to change your long-term investments in the following areas over the next three years as a result of the Covid-19 crisis?

This means that in order to meet their goals, many organisations are undertaking multiple digital transformation programmes in parallel, while at the same time trying to improve cost efficiency and defend themselves against the rapidly growing threats of cyberattacks and data loss.

This increases the complexity of implementing the necessary changes to the company's technological landscape – so much so that implementation becomes almost unmanageable in many cases. It is becoming increasingly necessary for organisations to use methods that can sensibly manage this complexity.

[22] See PwC, 24th Global Annual CEO Survey:
A leadership agenda to take on tomorrow, 2021, www.pwc.de/de/ceosurvey.html.

Using agile methods and tools

In response, many organisations are making use of agile methods to maintain the speed they need in introducing new technology-enabled business models.

Agile is often used as a generic term for a combination of ways of thinking and working, such as lean, agile software development (e.g. Scrum), system thinking and DevOps. In its early days, agile mainly referred to software development in individual, isolated teams, with the aim of making software development faster, more flexible and more oriented towards customer requirements. Decisions had to be made quickly and locally to avoid unwanted delays caused by centralisation. Flat hierarchies and decision-making power at every level are the logical consequences of this.

Approaches for scaling agile ways of working, such as SAFe, are increasingly being used to synchronise different teams and value streams in transformation programmes, foster collaboration, and optimise delivery for a large number of agile teams. SAFe extends the objectives and methodology of Scrum by adding approaches that allow major transformations with various development teams using agile ways of working, but without significantly restricting the teams' autonomy.

The Scaled Agile Framework

Scaling agility: SAFe enables you to synchronise planning and delivery activities across levels and teams

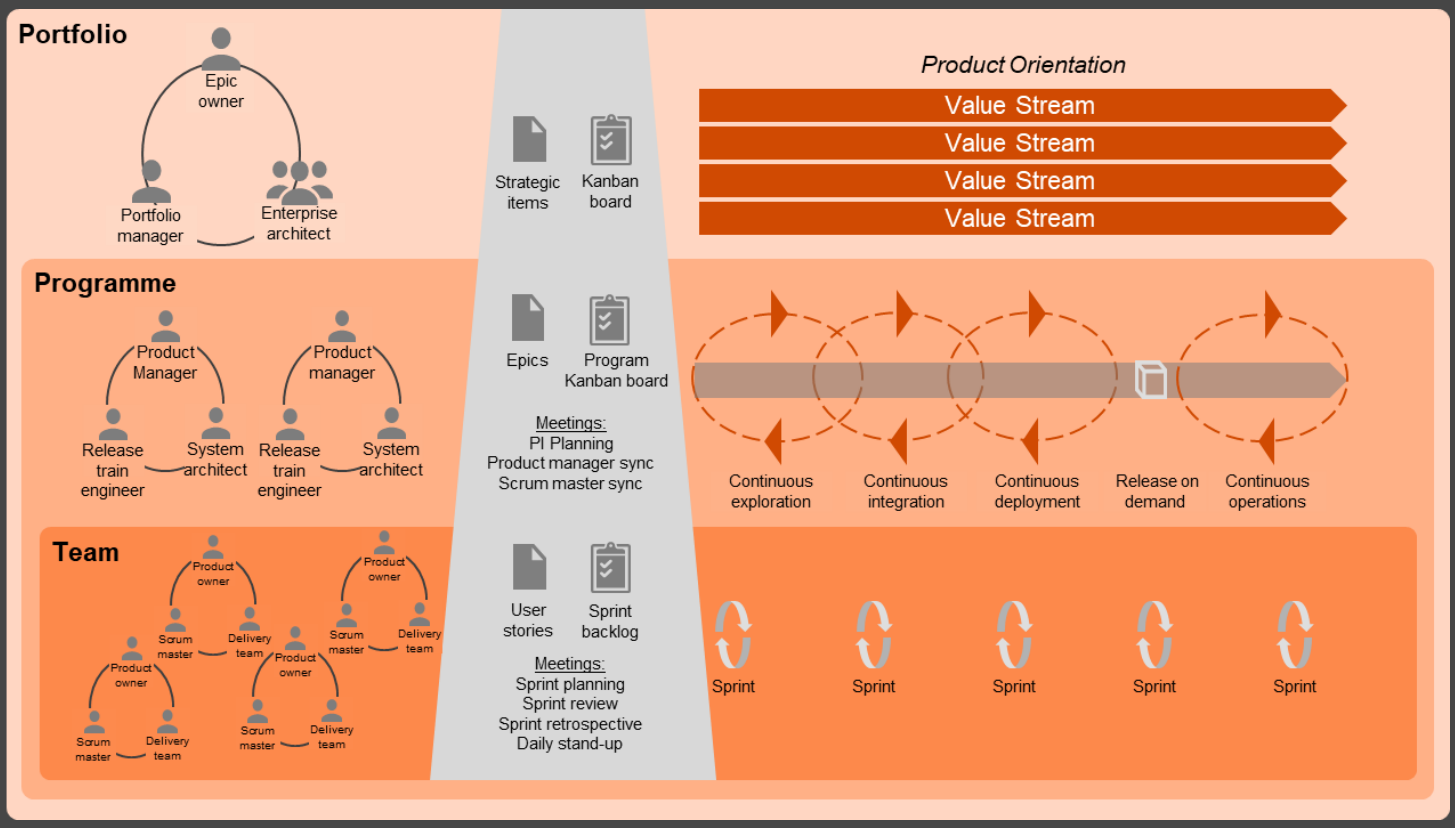


Figure 2 SAFe's three-layer structure

The **portfolio layer** builds a foundational structure, and enables investment/budgeting, programme management and governance decisions to link strategic objectives with the delivery of value.

The **programme** structure fosters alignment and risk management by providing programme-level cadence and synchronisation of teams for delivering value.

Teams are centred around delivering a software product, and are composed of a dedicated set of people with the skills needed to deliver value.

Implementing agile enterprise architecture management

Another approach that can help manage complexity is enterprise architecture management (EAM).

Enterprise architecture (EA) describes the high-level structure of an enterprise – its capabilities, business processes, organisational structure, information needs and underlying IT systems. In other words, it describes the essential elements of an enterprise at an aggregated level and the relationships between these elements. As such, it can be seen as the blueprint of the organisation, providing a clear and viable picture of what is already in place and what is still needed to achieve alignment between the organisation's business goals and its technology landscape.

EAM as a discipline, on the other hand, can be defined as a structured approach in an enterprise to create, manage and use EA to align business and IT. The primary goal of EAM is aligning IT-related activities with the vision and goals of the enterprise. In a transformation initiative, EAM translates business strategy into tangible, workable solutions by analysing the current state of the EA, defining a target state, and creating roadmaps to reach the target state.

By providing information on the current state and potential future states of the EA – enriched with information on planned changes – EAM helps provide decision-makers at all levels of transformation programmes with reliable, up-to-date information at all times. Interdependence and secondary effects of decisions in other areas can be identified at an early stage and resolved. EAM fosters a common language among all stakeholders in a transformation, both on strategic business aspects and on technology, making it a game-changer for transformation programmes.

Modern EAM tools support this by providing transparency to all stakeholders, particularly on the relationships between programmes, projects, initiatives, technological objectives and business objectives. They help to make the impact of changes in any aspect of a transformation (from business objectives to capabilities, processes and technology) visible to the entire EA. Evaluation of different scenarios and their impacts can be carried out in real time by anyone, and even by multiple stakeholders at the same time.

EA challenges in agile transformation programmes

In recent years, we have seen that many of our clients' traditional EAM approaches and methodologies do not provide the speed and flexibility that organisations need for multi-year implementation projects in today's technological environment, where change is becoming increasingly rapid. Many clients have experienced challenges when combining agile and EAM, as the bottom-up approach of agile does not always match the more top-down approach of traditional EAM.

Typical challenges involve aspects such as the following:

- Traditional EAs focus on developing technologies and detailed target architectures. These are time-consuming, resource-intensive activities which are hard to justify in fast-moving, competitive markets. Increasingly, target architectures developed over many months within the architecture group may not be known to the broader IT and business leadership, and therefore may not be considered and implemented in practical work.
- Traditional EAs provide very precise standards and policies; EA governance models favour centralised decision-making. Exceptions to standards require approvals that may significantly delay agile teams and hinder their ability to quickly adapt to changing requirements.
- Traditional EAs try to provide detailed information on the current landscape. However, in a rapidly changing agile environment, it is almost impossible to keep information complete, accurate and up to date. As a result, the architecture repository – which is meant to increase visibility into the EA landscape – is often outdated and used by only a few architects, adding no value to either the business or IT. This is even more of an issue if transformation programmes continue to use standard office tools such as spreadsheets, presentations and simple drawings to manage work.
- Traditional EAM tools – with a focus on modelling current architectures and detailed target architectures – usually do not provide efficient ways to run automated scenario analyses for evaluating the impact of various strategic business and technological decisions that may have to be made throughout a transformation programme. A high degree of manual work is involved in evaluating the impact of technological decisions on programmes and business goals, and the impact of programmes and projects on the IT landscape, with all its interconnections. As a result, decisions are made based on incomplete and/or inaccurate information, whether related to business goals, transformation objectives or new technologies. Dependencies between competing or parallel initiatives are overlooked, and the impact of changes on the existing IT architecture is not adequately considered.

EAM can become a **valuable partner** and strategic advisor for agile transformation programmes. But as well as changing how enterprise architects work, **EAM tools must be also reimagined.**

Standard office applications and multi-column spreadsheets, though still widely used, do not provide the capabilities required in this new world. To maintain a common and consistent version of the target state across all value streams, companies need **new capabilities** and **modern EA tools**.

What enterprise architects are focusing on

During a round-table discussion in April 2021, PwC discussed the challenges and best practice in agile EA with several enterprise architects and technology officers from various industries.

One of the biggest challenges for our clients when implementing agile EA is keeping long-term strategic goals and short-term targets in sync. However, the starting situation and culture of the company seem to play a significant role in successful implementation. Risk-averse companies that tried to closely control agile teams struggled much more than those that tried to shift responsibility downwards. It was very clear from the discussions that the top-down approach to EA should – as far as possible – not be allowed to interfere with empowered devolved decision-making in an agile environment.

In some companies, enterprise architects are perceived as out of touch with reality, as technology experts sitting in an ivory tower who understand neither the business side of the organisation nor the impact of new technologies on the organisation's business model. With the elaborate sets of rules that enterprise architects create, they sometimes seem to hinder transformation programmes more than they add real value to the business. In this regard, it can be difficult for an enterprise architect to be part of both the technological and business worlds and to keep the agendas of both worlds in balance.

Enterprise architects in an agile setting had to change the way transformation teams look at the organisation. The capability view proved to be an important model for aligning long-term and short-term architectural perspectives across business and technology. As one of our clients put it: "The enterprise architect needs to move towards a designer role. In this strategic designer role, they need to look at capabilities and add value to the business by understanding the connections between the different value streams in an agile setting: if you want the entire business to move along, you have to float above it. You must be able to cover your processes, your organisation, your information, and then the applications and technology, and share a common view on them as well as a common goal across all teams".

In an agile world, it is therefore not surprising that the limitations of traditional architecture covering IT only (e.g. application and technology architecture) are a major hindrance. **Agile approaches require complete EAM, covering business and technological views while also delivering a single view of capabilities, processes and technology to the entire organisation.**

What enterprise architects should be focusing on

As Gartner[3] states:

> By 2023, 60% of organisations will depend on EA's role to lead the business approach to digital innovation.
> (Gartner 2021)

Today, EAM is driven by achieving measurable business outcomes and creating real-world impacts on new and digital business models. Modern enterprise architects act as strategic advisors to the business. They help their business executives to create a deeper understanding of the impact of technology on strategy and execution.

We have identified **three key areas** where enterprise architects should focus their efforts to become a distinctive strategic advisor to the business:

1. **Driving digital business strategy**
   Analyse emerging technologies, business models, trends and innovations to create a common understanding of the impact of emerging technologies on current and planned business and operating models, as well as on the existing and target IT landscapes. Enable the business to plan different scenarios and provide recommendations on how to achieve business goals.
2. **Fostering enterprise change**
   Perform architecture analyses of current and future business capabilities (including people, processes, information and technology) and develop recommendations for business and IT priorities. Create roadmaps showing how to close the gap between current and future business capabilities.
3. **Managing technology and innovation**
   Conduct risk analyses of business models and technological decisions. Provide advice on the use of guidelines and standards to support these decisions. Support the business in fostering awareness of where to be flexible in innovating and experimenting, and facilitate experiments and proofs of concept.

[33] See Gartner, Top Priorities for IT: Enterprise Architects' Leadership Vision for 2021, 2021, www.gartner.com/en/information-technology/role/enterprise-architecture-technology-leaders.

Establish "architecture thinking"

In the constantly changing environment of an agile transformation programme with several highly autonomous agile delivery teams, EA itself – including methodologies and deliverables – must also become more agile and flexible.

As we mentioned at the beginning, simply prescribing architectures from the top down, providing detailed standards (even if they are in line with business objectives) and implementing strict controls is not helpful: doing so creates bottlenecks and delays the transformation programme instead of safeguarding its success.

To provide worthwhile support, a sense of "architectural thinking" must be established in these teams. Instead of developing hundreds of pages of detailed architecture guidelines and models, enterprise architects must transparently and effectively communicate the strategic direction and the big picture. They need to get delivery teams to understand the overarching strategy and objectives and use them as guardrails for implementation. This avoids the need for constant supervision by the architecture function.

Develop new skills and capabilities

Modern enterprise architects still utilise key parts of traditional EAM methodologies, such as establishing adequate governance structures, architecture modelling and guideline planning. However, we are seeing that successful enterprise architects have developed new capabilities and practices which are now key to their success:

- Flexible, minimum viable architectures (MVAs)[4], which are iteratively and incrementally developed during the programme and adjusted to business needs
- EA skills integrated within agile delivery teams to enable architectural thinking among teams and organisations as a whole
- Top-down governance balanced with bottom-up community approaches (e.g. providing top-down guardrails and integrating bottom-up feedback from development teams and solution architects for continuous improvement)
- Modernised architecture planning tools for creating a single source of truth for the entire organisation. Ensuring that these tools are easy to use and provide enhanced scenario planning functions is a key priority. This is so that teams can analyse the impact of changes during a transformation with real-time data and make interconnections between individual streams visible.

Key principles of modern architecture governance

- **Pragmatic and value-oriented**: EA work focuses on business value rather than methodology and frameworks.
- **Lean**: keep it simple with fit-for-purpose architecture. Avoid architectural "waste" going into frameworks and methodologies, and enable workflow.
- **Agile**: work iteratively and incrementally, starting with the core architectural components. Focus on artefacts with the most business value. Embrace change and quickly adapt to new requirements.
- **Collaborative**: work closely with the business and delivery teams to include their feedback, provide governance to streamline development, and ensure alignment with the business strategy.

[44] Similar to the concept of a minimum viable product (MVP); an MVP is a product with just enough functionality to be usable, designed to be enhanced later with further features and improvements; likewise, an MVA includes the most fundamental, business-critical components of the target architecture. MVAs can be released much faster and can be developed over time as new insights are gained, and they can be adapted quickly if the environment changes.

Maximising success with EAM tools in agile environments

In the previous sections, we discussed the need for enterprise architects to adapt how they work in agile transformation programs. The EA function is evolving, shifting its focus from technologies and standards to business outcomes. In this section, we'll take a look at the key capabilities of the EAM tools required to help enterprise architects become valued strategic advisors to transformation programmes.

Benefits and pitfalls of EAM tools

Many companies already have EAM tools in use, but are only seeing limited added value in the context of transformation programmes. Why is this? In many cases, the tools are very technical, and can therefore only be used by well-trained architects and IT staff. This creates a barrier that discourages external parties from using the tools to keep their information up to date. This is exacerbated by the sometimes very complex way in which the information is presented, which meets with little understanding from non-architects.

But how can EAM tools add real value and generate transparency about companies' transformation programmes? How can they become an accepted source of information across all value streams?

It is crucial that the information is made available to all relevant stakeholders in a comprehensible way. Everyone who has a legitimate interest in transformation-related information must be given the opportunity to access it. This promotes a shared understanding of the transformation activities and their individual added value for the business, and provides a basis for decision-making. If the information can be independently and locally maintained by the agile teams, data maintenance will be massively accelerated, and the architecture will always be up to date. This collaborative approach and an intuitive user interface minimise the barriers to using the EAM tool as a single source of truth.

Client example: HR transformation

The enterprise architect at a global oil company was tasked with planning the transformation of the company's HR function. For modelling the target picture, the architect decided to use the formal architecture modelling language ArchiMate to avoid misunderstandings that could have arisen from poorly structured text in PowerPoint slides and Word documents.

The architect presented the transformation plan, but was unable to convince management to go along with it.

Management did not understand what the architect had planned: while ArchiMate was well known to IT specialists and enterprise architects, it was not well known in a business context. The architect had chosen the wrong language for the audience.

Typical questions asked

First, let's take a look at the questions that stakeholders need to answer in a typical transformation programme, before diving deeper into the capabilities required to answer them.

CIO

Role: creating business value from technology

- What is the application roadmap?
- Which applications can we invest in, and which can we divest?
- Which business capabilities will benefit from/be affected by the transformation?

Programme management

Role: ensuring successful delivery of several related IT projects

- When will the project for consolidating customer platforms be completed?
- Is the project budget on track?
- Is the transformation project linked to other projects currently in progress?

Solution architect

Role: translating business requirements into solution architecture

- Which technologies are standard technologies? Which technologies can be re-used for the solution?
- How should we integrate a solution into the existing landscape?
- Which applications are creating, modifying or deleting employee data?

Figure 3 Typical questions among architecture stakeholders

The CIO

Among other things, the strategic and advisory role of the CIO involves examining whether new technologies and business models are applicable to the organisation and, if necessary, planning implementation in a way that creates added value. New technologies such as cloud computing, artificial intelligence or low-code/no-code platforms are having an increasing impact on organisations, whether in individual business areas or across the entire organisation. Companies need to verify the impacts of these technologies – on current business models, future business models and the target architecture.

Effective use of EAM tools provides insights into the architecture to help answer these questions – from both a technical and a business perspective.

Scenario planning techniques can be used for evaluating issues such as how business capabilities will be affected (e.g. as their maturity increases) or how a planned initiative would impact the current application landscape. The impacts of all initiatives on the business – even IT-driven ones – must be clear.

Based on these evaluations, business benefits can be quantified and possible areas for pilot projects that will create the greatest value can be identified. However, this requires business goals, projects, programmes and IT systems to be connected in the EAM tool. The tool plays a central role as the single source of truth of the current and target EA. If used sensibly, EAM tools can help business and IT find a common language to oversee all aspects of a transformation and its impacts on the enterprise.

Our client example above shows how transformations can fail at an early stage if there is no common language.

The CIO and the transformation managers should also examine the relationship between **risk and business value** of decisions. This allows low-hanging fruit to be identified and prioritised, in turn generating quick wins and building momentum for transformation.

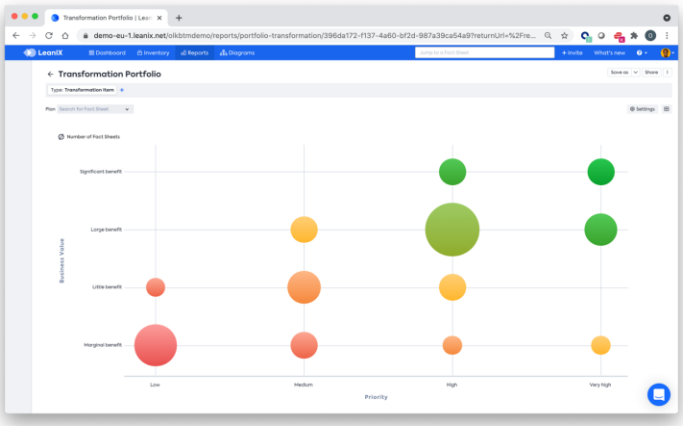


Figure 4 Example of a transformation roadmap report in an EAM tool

Programme management

Linking IT architecture and information from agile delivery tools in an EAM tool allows the impact of a particular project or release on the application landscape to be made visible. The linked information also enables programme managers to see when and how changes to the application landscape occur.

Scenario analysis can be used to show which IT systems are affected by particular projects and if there are potential overlaps and conflicting requirements for the target architecture. In other words, this enables programme managers to see when and where different value streams or agile release trains will make conflicting changes to the IT systems. These problems can then be analysed to develop consistent solutions and realise synergies.

The following screenshot depicts change in IT architecture during a transformation programme. Changes can be made even more visible by making use of the interactive timeline and adding additional information, such as the status of an application or its technical fit. Using this information, programme managers can then analyse multiple architecture scenarios to find out which one adds the most value to the company overall.

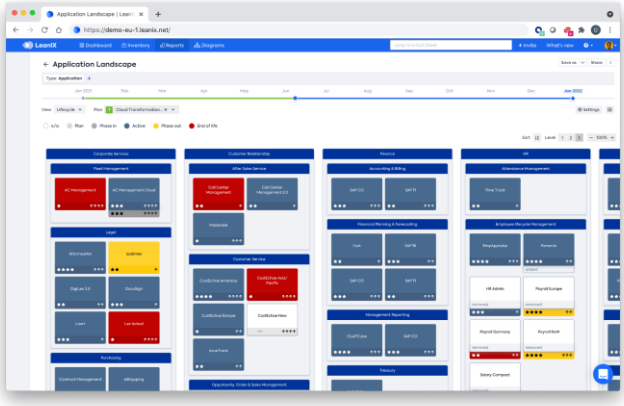


Figure 5 Example of an application landscape in an EAM tool

Based on the agreed target state, well-coordinated **transformation roadmaps** can now be created. Here, too, scenario planning helps to identify interdependence and prevent conflicting plans at an early stage.

The following screenshot shows an example of such a roadmap. It combines transformation roadmaps for each application, grouped by transformation programme.

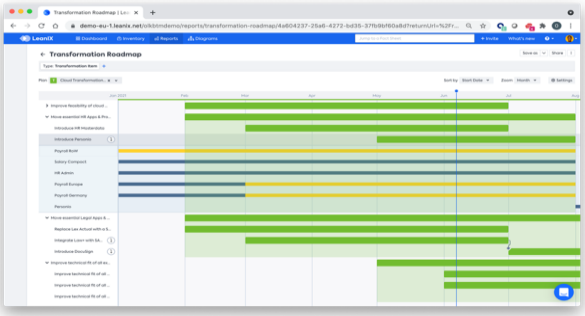


Figure 6 Example transformation roadmap

Progress on the various value streams and projects can be monitored by integrating the EAM tool with agile development tools, such as Jira. This allows the architecture roadmap to be adjusted as necessary based on data from the agile planning and delivery process. It ensures that the actual progress of a development and its impact on the application landscape is correctly matched and visible to all stakeholders at any time, in near-real time.

Combining agile and EAM tools makes it possible to establish an integrated ecosystem for transformation management. This ecosystem provides a complete and up-to-date overview of the various aspects of the transformation.

In contrast to traditional EAM tools and/or simple office solutions (e.g. Excel, PowerPoint, Visio), information is updated automatically. Everyone with access to the EAM tool can create their own reports and overviews on the progress of a transformation programme. Users can see the programme's impact on the enterprise architecture based on accurate and up-to-date data – and all without the hours, days or weeks of manual work once needed to achieve the same results.

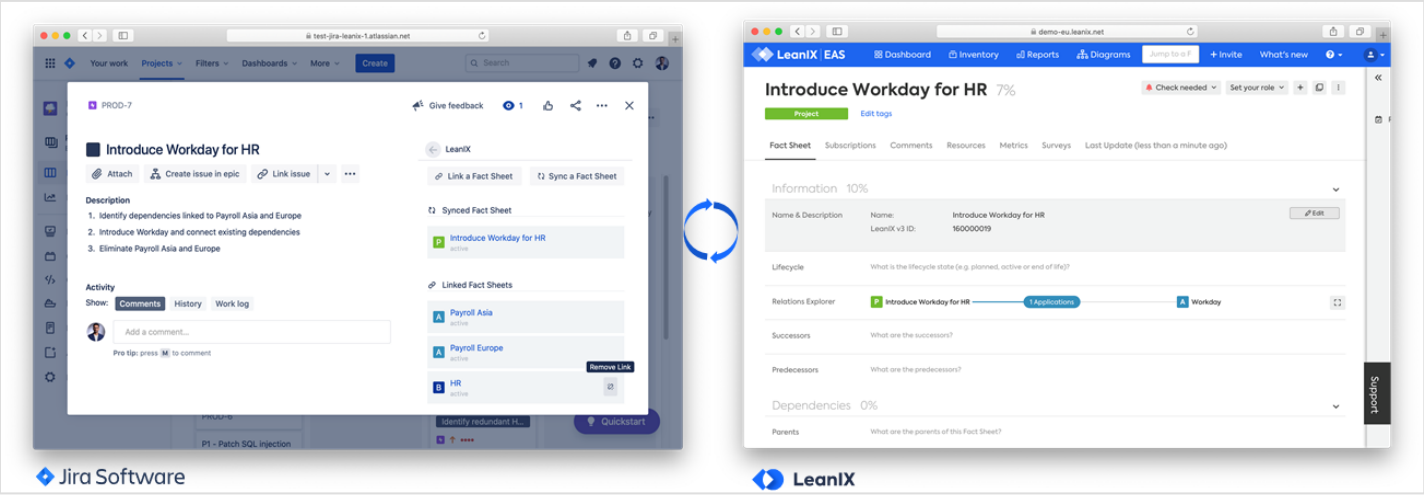


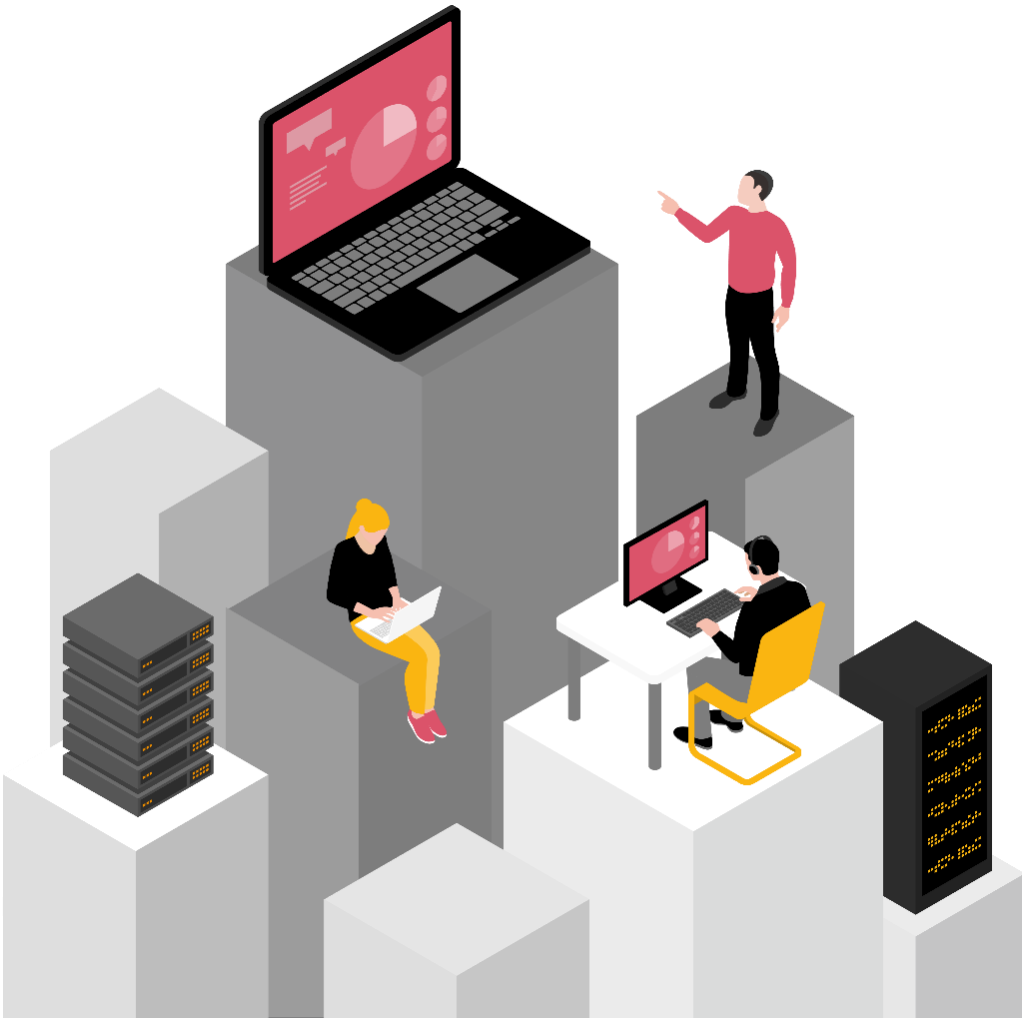
Figure 7 Example showing how agile planning tools and EAM tools can be synchronised

Solution architects

Solution architects need to know how their solution fits into both the existing architecture and the planned architecture, and if there are other initiatives that will affect applications that are to be changed as part of their work. Solution architects must also know when these changes will be implemented, and must have a consistent and accurate overview of the existing application landscape, existing data flows, integration projects, and the relationships between applications.

The techniques mentioned above, such as scenario analyses, provide additional tools to support solution architects in their daily work. These techniques reduce the amount of proactive coordination needed between teams and prevent inconsistency due to lack of awareness of the big picture. Everyone in the various agile development teams has access to the same data.

Some of these challenges can be addressed with traditional, model-oriented EA tools and office solutions. Modern EA tools, however, have the advantage of being able to create a variety of visualisations much faster; they are also more accessible, and they are easier for business users and stakeholders across IT to use. This enables much more accurate and up-to-date data than is possible with traditional tools.



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