Continuous Architecture

Building with Continuous Architecture as a language.
By *Bart de Best*

Context:
This practical example takes place at a marketing and sales service organisation that provides support to customers with their marketing and sales activities worldwide. The nature of the service provision requires quick action in order to provide customised solutions.

Challenge:
The challenge of this service organisation was that the existing DevOps team moved quickly but was unable to perform a good risk and impact analysis. The requirements were also often misinterpreted. Finally, the testing coverage was far too low, which caused incidents in the production environment.

Solution:
The solution to this challenge has been found in the concept of Continuous Architecture. This blog discusses this approach through the following steps:

1. Value chain and value stream analysis
2. Cascadation of the value chain
3. Integration of value chains
4. Building blocks and mapping building block plates
5. Use of the building block plates

1. Value chain definition

First, the value chain of the organisation is defined (see Figure 1). The inbound logistics are the customer's requests for marketing support. Operations are the work performed by the service organisation. The outbound logistics are the delivery of the products and services of the service organisation to the customers. Marketing & sales are the activities that the service organisation itself carries out to provide its services to customers and finally the services are the after-sales services of the service organisation to assist customers during their marketing and sales activities. The support activities include the purchase (procurement) of services that support the core business of the service organisation. The technology includes the IT services and products. HRM defines the required competencies based on the business goals and the strategy to implement them. The firm infrastructure concerns the required facility management.

The business's value chain is divided into 15 value streams as shown in Figure 2. In this blog, the value chain and its management are called the Business Value System (BVS).

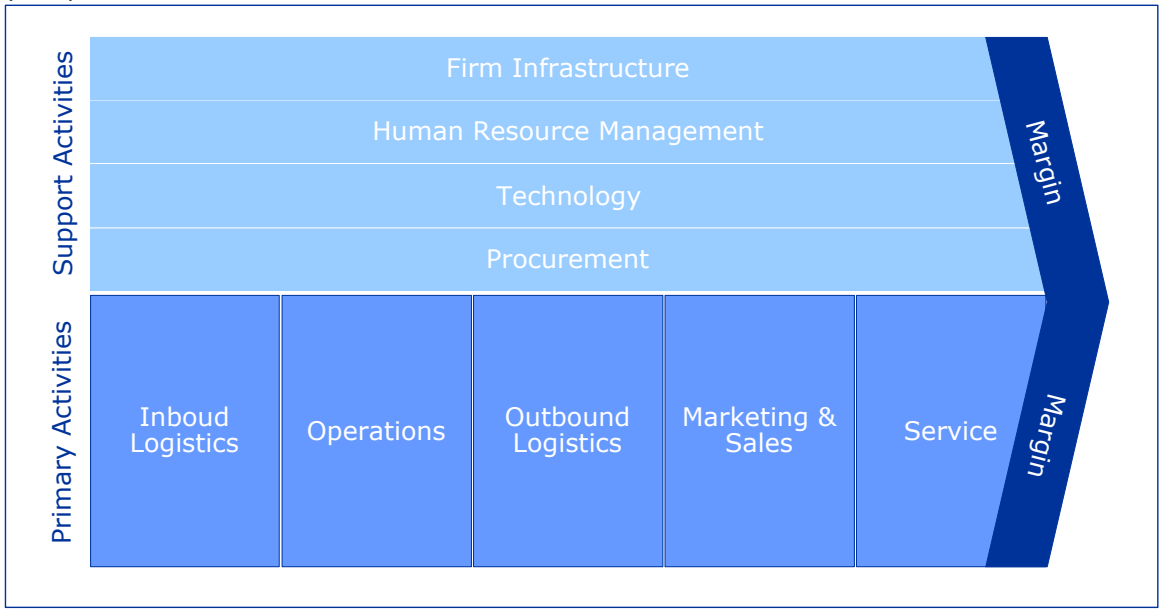


Figure 1. The value chain of Porter.

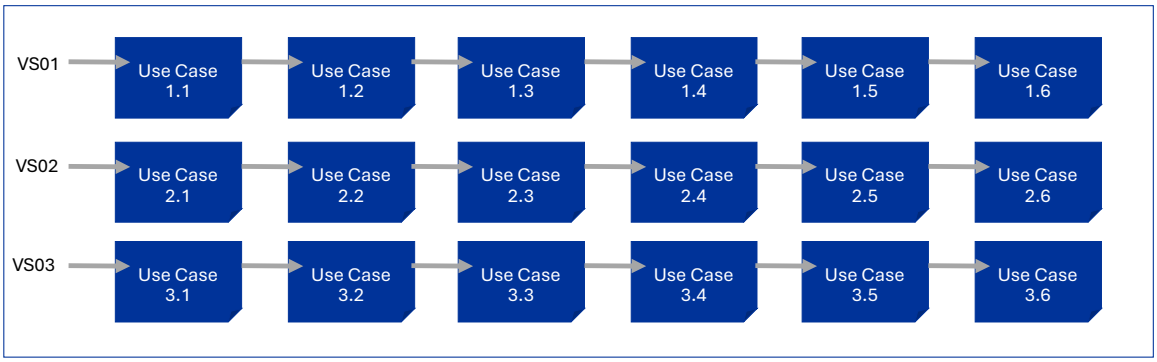
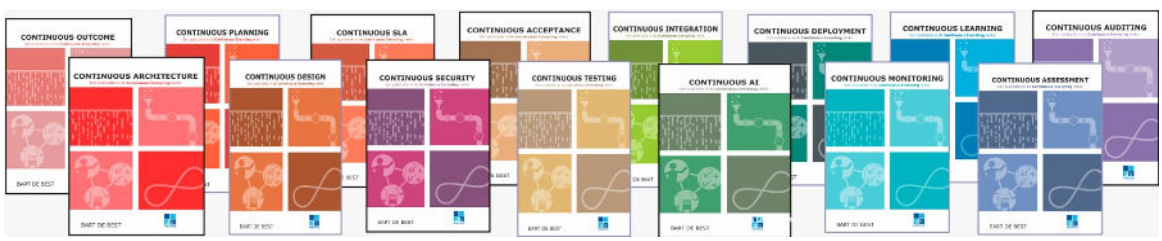


Figure 2. Value stream VS01, VS02, VS03.

2. Cascadation of the value chain

The BVS therefore includes IT support within the value chain. To get a grip on the high time-to-market requirements of the service organisation, ITIL 4 has been introduced to shape DevOps. The application of ITIL 4 based on the value stream ensured that the Service Value System (SVS) was quickly introduced. Value streams have also been defined for information security, which together form the Information Security Value System (ISVS), see the blog: Value creation through Continuous Security) value system. But the DevOps team has also defined a value system for the development of information systems in the form of Development Value System (DVS).



The IT function within the BVS is therefore filled with three value systems, namely the SVS, ISVS and the DVS as shown in Figure 3. All activities within the BVS are designed in this way on the basis of value streams. This means that the dependencies between the value chains and the value streams within them have been determined and optimised.

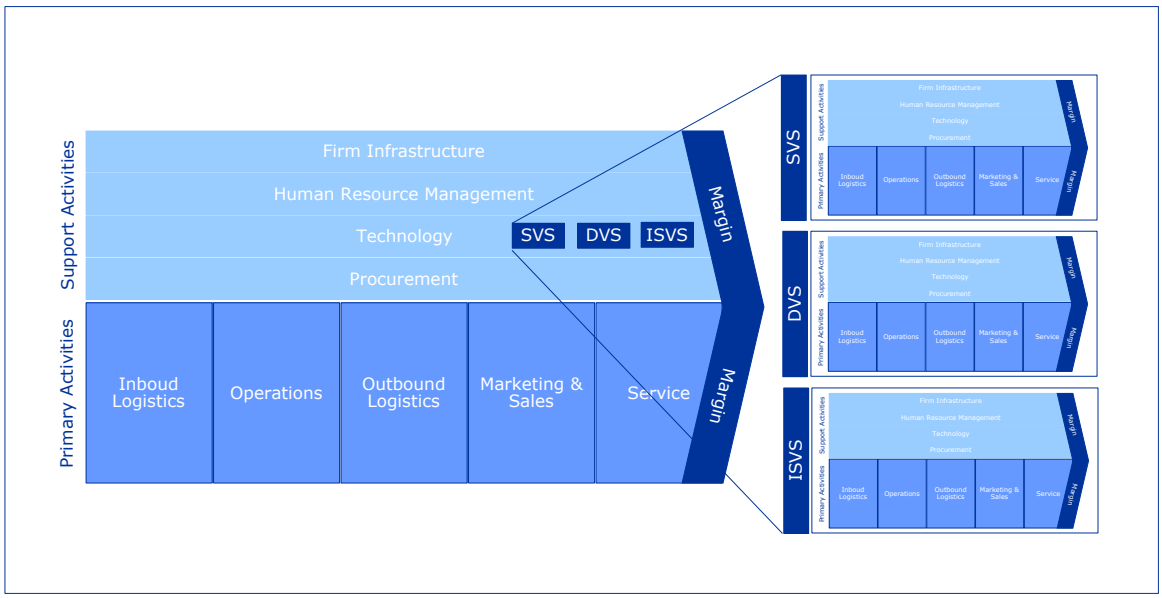


Figure 3. Recursive value chain of Porter.

3. *Integration of value chains*

After cascading the value systems, we looked at where the interfaces are to align the value systems with each other as shown in Figure 4.

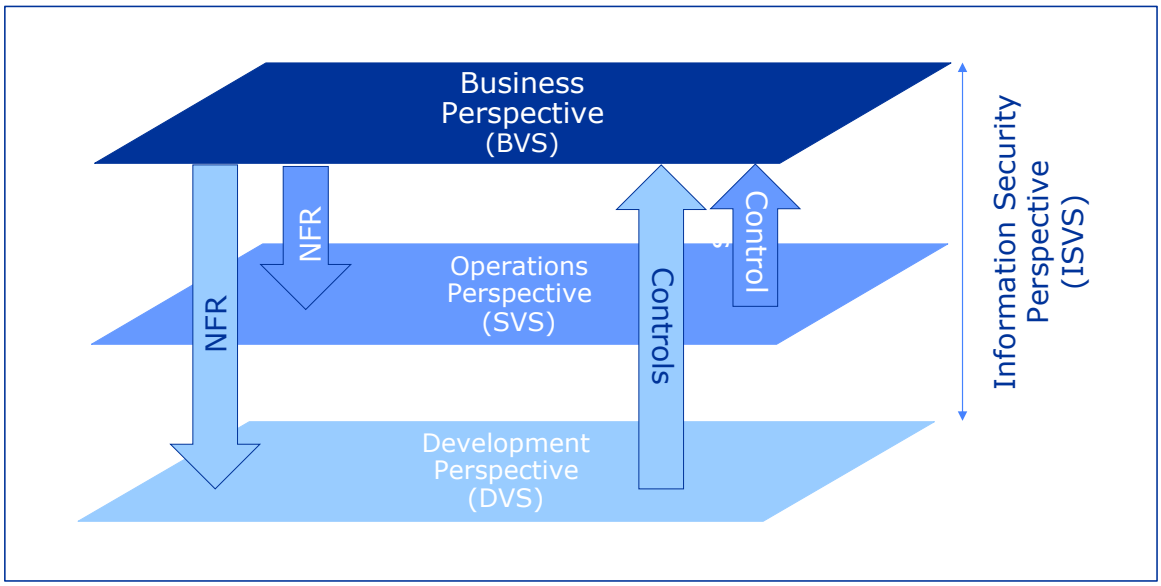


Figure 4. Alignment of value systems.

The Non-Functional Requirements (NFR) have been translated into countermeasures in the form of controls that are secured by the ISVS in the SVS and DVS. In fact, the ISVS is integrated into the work of the DevOps engineers. This also means that the DevOps engineers are trained to apply ISO 27001 in their work.
They have therefore become ultimately responsible for the implementation and monitoring of the recognised information security controls.

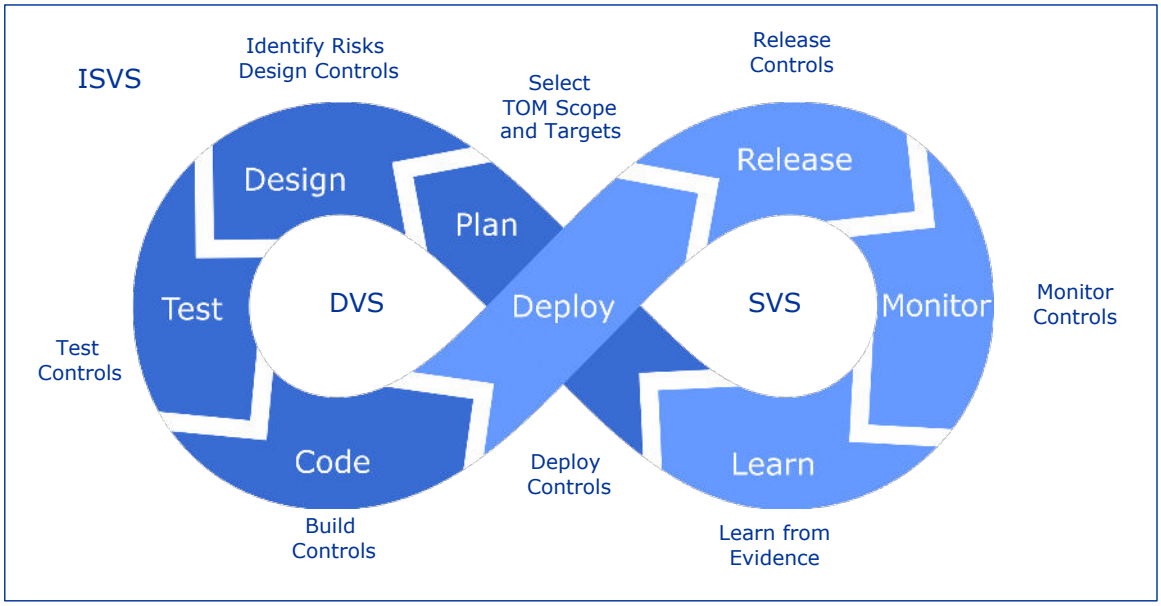
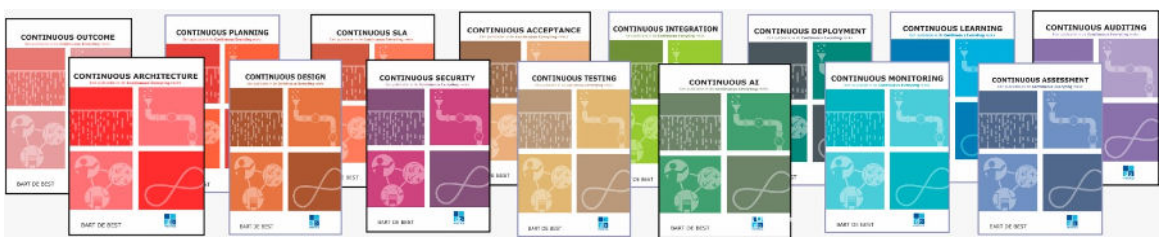


Figure 5. Integration of value systems.



The effect of this perception on the management of the service organisation is that everyone can easily and quickly see what the activities are. The bottlenecks in the value streams of the business can also be quickly identified and resolved by using the value streams in the SVS, DVS and/or ISVS. In this way, all employees of the service organisation have come to understand and help each other much better. This has greatly improved internal communication and reduced tensions between departments.

4. Building blocks and mapping building block plates

The next step that has been carried out concerns the definition of an unambiguous language in the four value systems in the form of building blocks. This was done by mapping the products and services used by the value streams through a value stream / product-service mapping as shown in Figure 6.

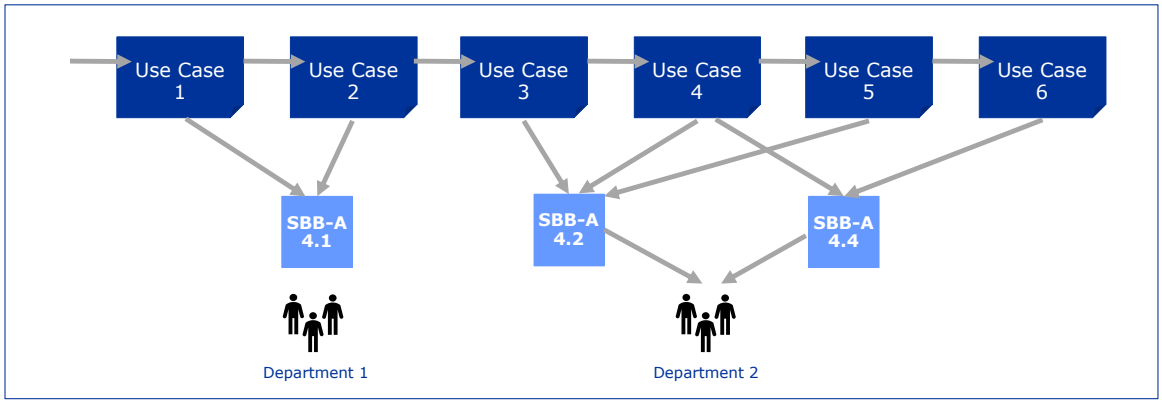


Figure 6, Value stream / product-service mapping.

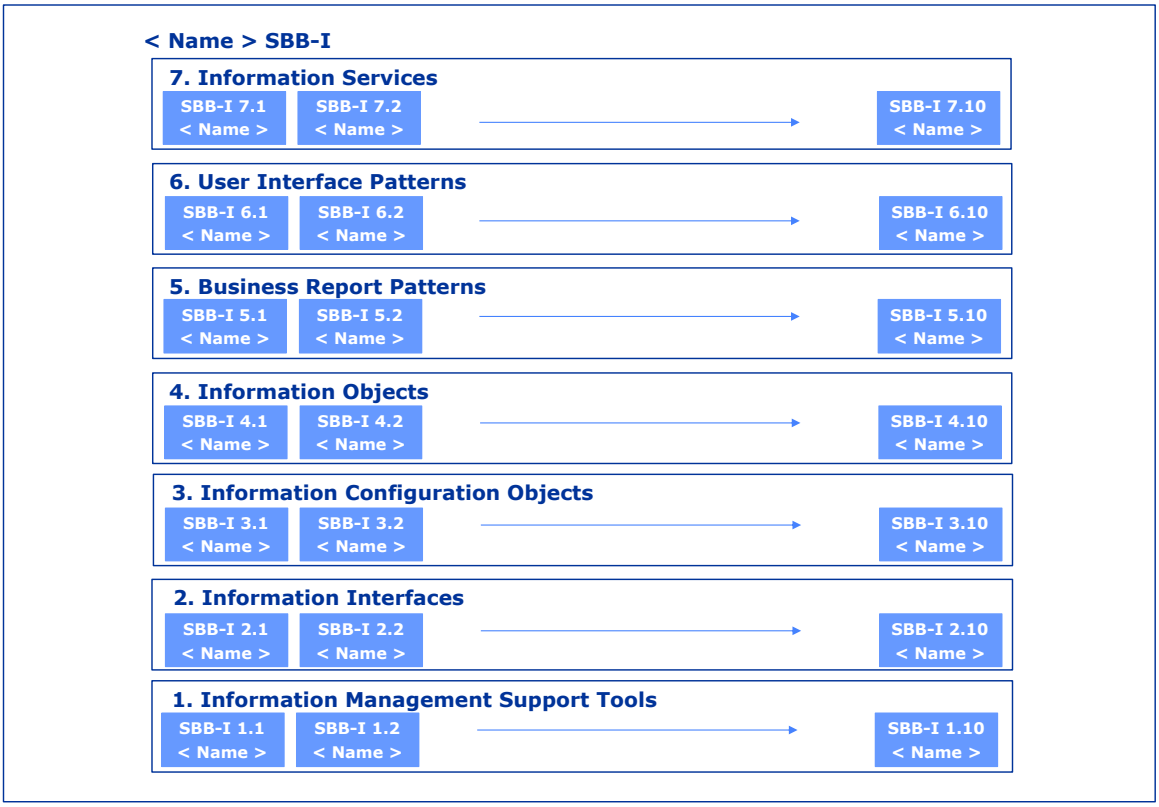
The service portfolio has been composed on this basis. The underlying products for each service have been analysed and placed in the product portfolio together with the already recognised products.

Three building block plates (System Building Block = SBB) have been drawn up of the products that support the core value streams of the BVS, namely the Information plate (SBB-I), the application plate (SBB-A) and the technology (infrastructure) plate. (SBB-T). Figure 7 shows the template of the SBB-I plate.

The plates are stable over time and provide a good decomposition of the functionality at all layers of the enterprise architecture. Subsequently, it was determined which building blocks apply to each value stream and, where possible, at use case level.

The effort to go through steps 1, 2, 3 and 4 was not too bad. Defining a value stream including determining the bottleneck took an average of one hour, with 3 employees involved per value stream. 15 value streams have been recognised for the BVS, 10 for the SVS and 7 and 13 for the DVS and the ISVS. So a total of 45 value streams have been recognised and defined in Confluence.

Drawing up a building block plate took 1 hour and involved 2 employees. The mapping of the building block plates onto the value streams and checking the consistency took 2 days. All information is stored on Confluence without using MS Office. This has made the administrative organisation accessible to everyone. This has also been used for auditing for the ISO 27001 certification.



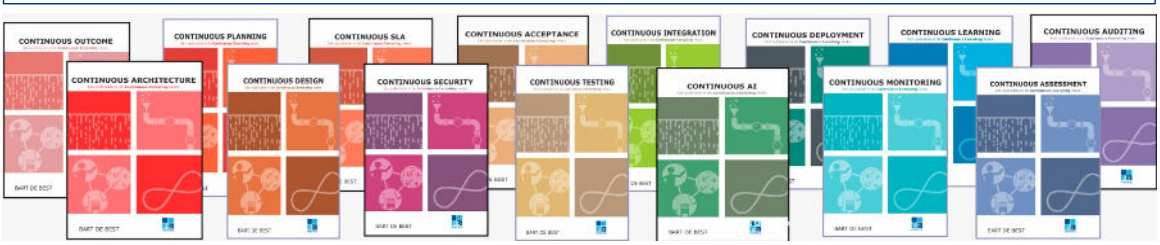
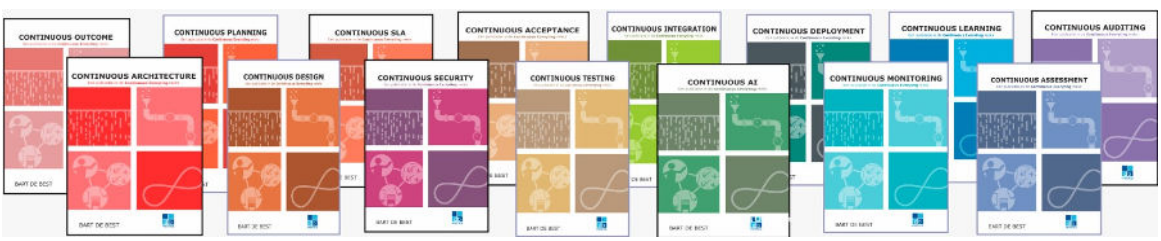


Figure 7, System Building Block Information.



5. Usage of building block plates

The use of the building blocks has solved the following bottlenecks:

1. Lack of risk and impact analysis
2. Interpretation requirements
3. Coverage of the tests
4. Incidents in production

Risk and impact analysis

For each epic on the product backlog, a mapping has been done of the value streams and building blocks involved. The value streams and building blocks are added to the epic as meta data in Jira, which defines the scope of the epic. It is then determined which building blocks are new, changed or used alone. Based on this, the colouring red, yellow, green is given in the building block plate (SBB-A). In the event of a user interface or reporting change, the SBB-I plate is also used. Where the infrastructure (AWS cloud) is adjusted, this is indicated in the SBB-T plate.

The countermeasures required are determined for each red and yellow building block. This means that every major change (epic = 3 months) is under control. The management of this control is vested in the change management value stream of the SVS. Where information security controls are affected, the ISVS value streams are also involved, such as issue management and risk treatment.

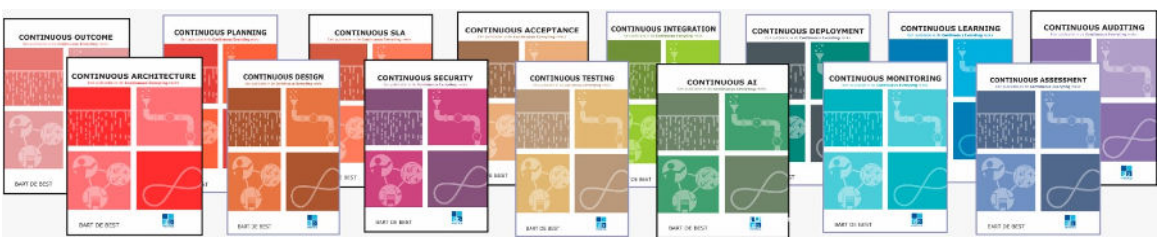
Interpretation requirements

The errors in the requirements were mainly due to the fact that only the functionality was requested, and a requirement was missing. With the introduction of Behavior Driven Development (BDD), the behavior of the requirements has also been described in the format of Given – When – Then. The Given is the pre-condition, the When is the trigger of a value stream and the Then is the execution of the value stream.

These GWT statements are included in the use cases of the value stream in Confluence. This makes it possible to quickly locate and manage requirements. requirements have therefore been given their own life cycle.

Because the building blocks are also linked to the use cases, it is easy to relate the requirements to the building blocks. Each GWT requirement therefore has a use case and a building block as meta data.

When refining the epic to 1 or more features, the distribution of the building blocks by feature level is also determined. In Jira, the use cases and building blocks and GWT requirements are linked at feature level.



By refining the feature scope at use case and building block level, the completeness of the requirements can also be tested. After all, building blocks that are named in the feature that do not have GWT requirements are potentially gaps in the requirements.

Coverage of the tests

GIT is used for version management of the source code that fulfils the requirements. In Jira, the build is linked to the feature via a link to GIT. The source code for each feature can therefore be viewed with one mouse click. Introduced for testing in Test Driven Development. This means that 80% of the test case concerns the unit test case that tests the smallest executable object based on code-based testing (writing a test case in the programming language of the source code).

As a result, writing source code and test cases is mainly the responsibility of the DevOps engineer. The source code and test cases are linked to each other in GIT so that when the source code is checked out, the test cases are also checked out and are visible in the software development tool. Because TDD prescribes to first write the test case before writing the source code, the coverage rate is 100%. Thanks to the connection of Jira and GIT, it is immediately traceable at check-in whether the GWT requirement has been translated into test cases.

This also makes it possible to check the coverage of the test cases at requirement level. The value streams of the DVS have been adjusted in such a way that this control actually takes place in the pull request from GIT.

Incidents in production

After the introduction of this method, the number of incidents immediately decreased. Where incidents have still occurred, back tracing has been used to determine where there are still gaps in the working method. All incidents are classified according to a building block and the use case involved. The advantage of this is that the incident management value stream provides the meta data for the problem management value stream to use a Pareto analysis to find 80% of the incidents that affect 20% of the building blocks and 20% of the use cases for these incidents to determine the root cause.

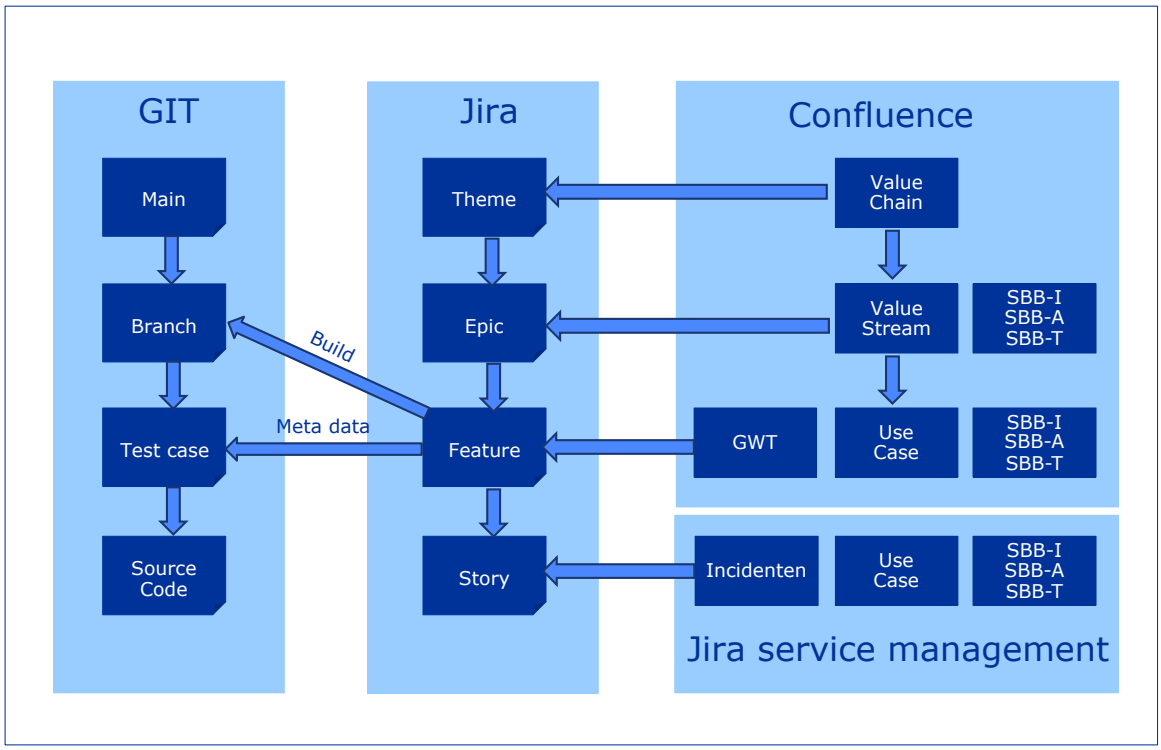
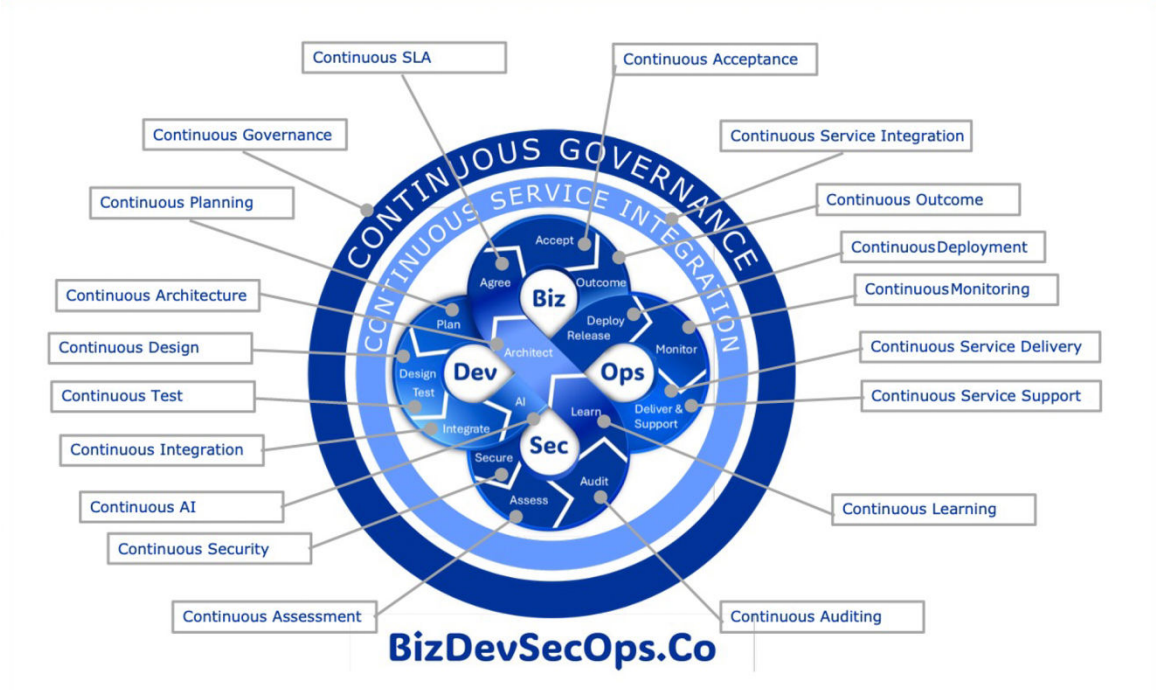


Figure 8, Overview of the tools used.

Figure 8 is a summary chart showing the relationships of the tools mentioned in this blog and the objects they contain.

This approach provides a continuous application of architecture in the service organisation and a very practical interpretation of architecture as a guiding unit. This has given the service organisation a unique proposition that has also been passed on to all end customers.

Employees of suppliers to the service organisations have indicated that they would like to join the service organisation because they also want to learn how to get in control of such a light governance in terms of workload. This was the biggest reward of this application of Continuous Everything!



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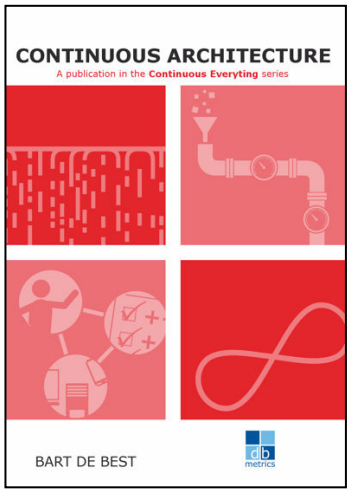

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