PKS

people knowing software.

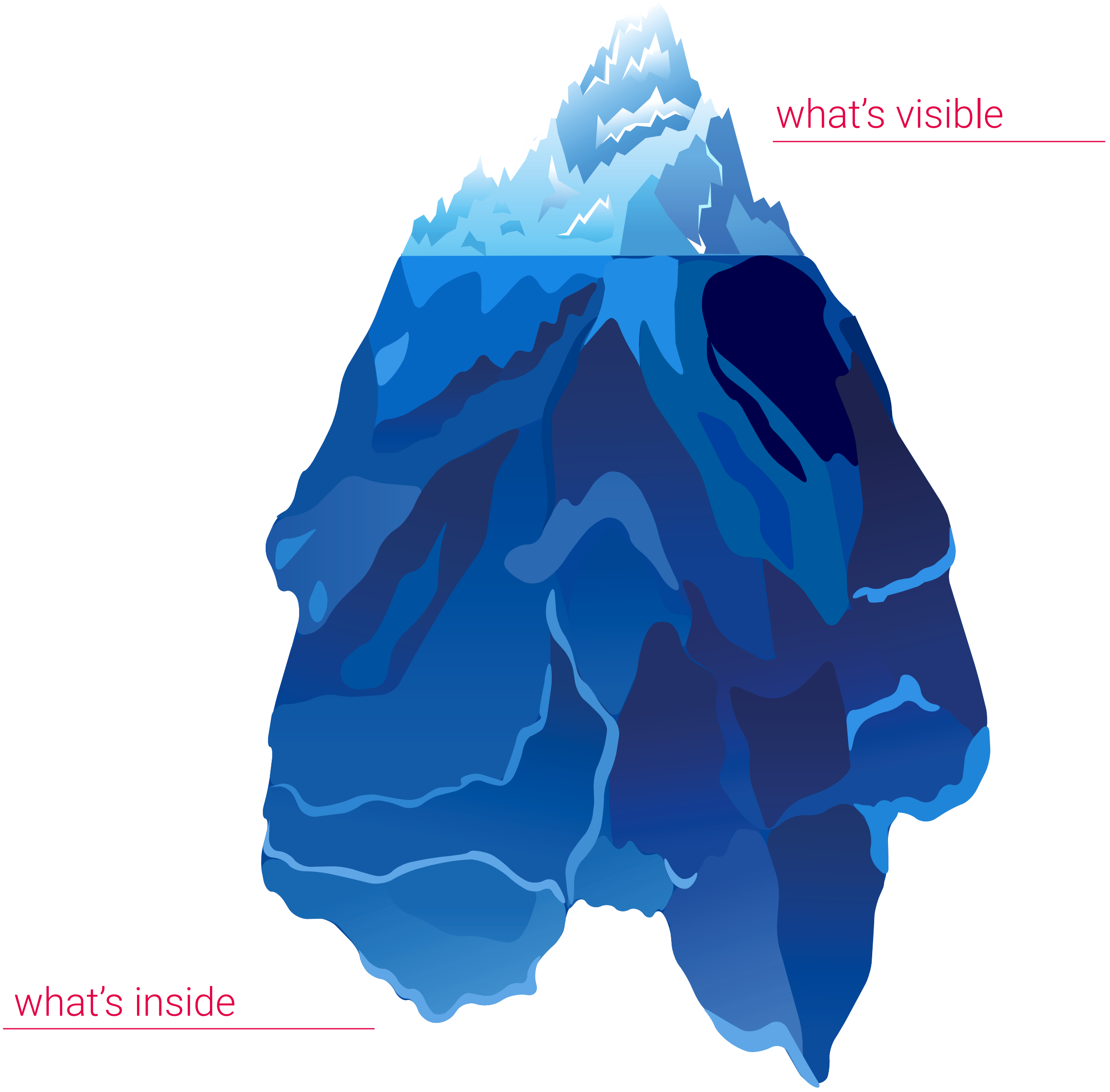
Code analysis with eXplain

The digital mastermind for business-critical legacy applications.

eXplain

■ Legacy applications – valuable, relevant … and highly explosive

No matter whether you withdraw money, book a trip or order something online: ultimately, classic legacy systems still run beneath the mostly modern web interfaces. Written in Cobol, RPG, Natural or Assembler, these stalwart workhorses have been doing their job reliably and efficiently for 20, 30 or even 40 years.



Code-analysis

Over the course of their lifetime, legacy programs become more and more sophisticated; in a sense, they contain the DNA of the company, without which key business processes are at risk of stalling and the company lacks its digital heart!

But increasingly clouds are gathering over such relevant IT landscapes: rarely legacy code was comprehensively documented and the previous system experts take all their knowledge with them into retirement. In the company, however, the core applications are left behind and often continue to perform their services as if they were flying blind.

For companies, this has become an expensive but, above all, very explosive mixture that is causing IT managers sleepless nights:

- **For the few remaining or even new developers,** it is almost impossible or extremely tedious and time-consuming to find their way around the code structures left behind.

- **IT managers and executives are under enormous pressure:** they are held responsible should new specialists not be found or should important IT projects be delayed, which worsens the innovative and economic power of the entire company. In the end, they are often not only pilloried, but at worst lose their jobs. In the well-connected IT world, word of such events gets around quickly.

- **For the development teams themselves,** the current situation poses high risks: in addition to the burden of extra work due to unfilled specialist positions, fewer and fewer young developers can be recruited for such an environment. The laboriously recruited high-potentials are in danger of quickly migrating to the competition if they are expected to find their way around nebulous code structures without proper documentation, guidance and support. The result: more work for the remaining team. The end result is often burnout.

No department likes to give new orders for individual programming to such shaky IT teams. They orient themselves externally towards the market; the result is the often cited shadow IT with all its risks in terms of duplicated data storage, security issues and cost traps.

In addition to these burdens, demands from the business and the inevitable digitalisation fuel this melange of unfortunate circumstances on a daily basis.

- **This results in a worst-case scenario for the company,** because serious risks arise when the business-critical back-end systems come to a standstill due to the developers' limited ability to act: The entire payment transaction comes to a standstill, insurance policies can no longer be serviced, online shops no longer have up-to-date stocks of goods, lorries stand in the yard waiting for delivery notes, and production ultimately comes to a standstill.

■ Money is no longer a solution

While some companies were able to mitigate these risks with additional investments in the past, money is no longer the solution today: a core system that is no longer transparent becomes a super-GAU in the event of an error, because even the use of external IT experts does not help, but only costs money.

The pressing questions facing software managers and IT executives are obvious:

How is it possible to recruit new employees for the current environment and train them efficiently and quickly? And this without existing written system documentation, the involvement of expensive external resources or an extreme expenditure of time for experienced colleagues?

Solutions to these questions are provided by the market-leading code analysis tool eXplain.

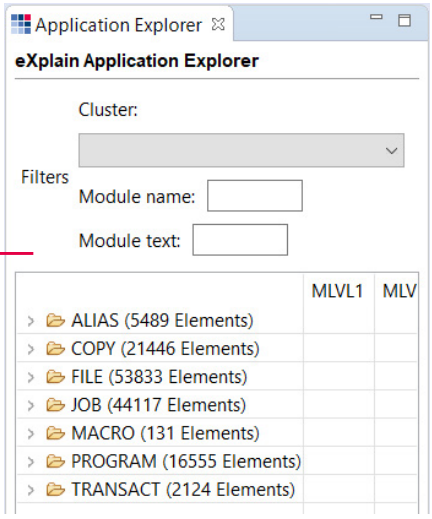
This white paper aims to give you a deeper insight into the technical details and show you a cost-neutral, viable path to a controllable future.

So what exactly is code analysis with eXplain?

Let us take a closer look at six points together:

1. Automated analysis of your legacy software

eXplain is a tool for the automated analysis of legacy software. Developed on the basis of the latest technologies from parser construction, it is a high-tech solution for analyses of all kinds. eXplain is seamlessly integrated into Eclipse, so that it can be used intuitively even by young developers without previous knowledge of Cobol & Co. and provides immediate added value in permeating and understanding grown code structures. eXplain can therefore also be easily integrated into the development tools of the leading manufacturers.



eXplain Application Explorer

Filters

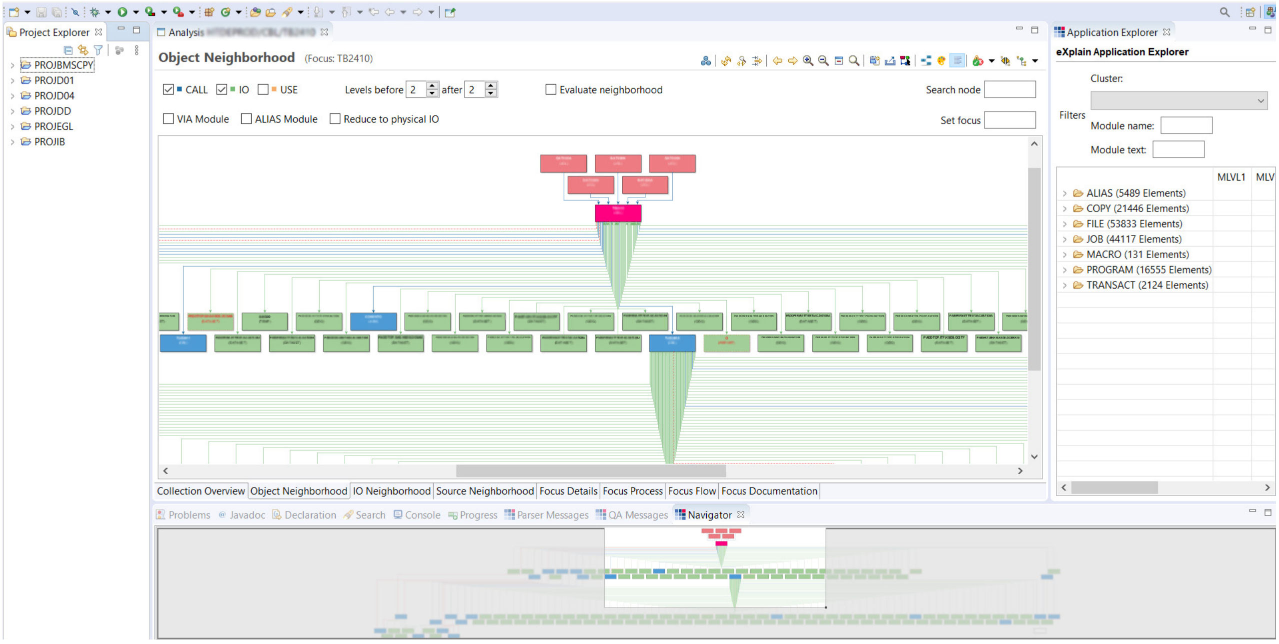
Cluster:

Module name:

Module text:

	MLVL1	MLV
ALIAS (5489 Elements)		
COPY (21446 Elements)		
FILE (53833 Elements)		
JOB (44117 Elements)		
MACRO (131 Elements)		
PROGRAM (16555 Elements)		
TRANSACT (2124 Elements)		

Quickly navigate through **ALL application** artefacts, whether by searching by name or commenting on your sources.



The basis for a cross-language analysis is provided by the **PKS self-developed YYOP technology:**

Essential features of the YYOP technology are:

- simple grammar with object-oriented approach
- rule-based analysis and synthesis
- recognition of non-context-free languages possible
- enables powerful tree arithmetic
- Freely definable symbol tables (transaction-capable)
- Integrated graphical development environment

The following advantages result from the features mentioned:

- significant simplification and acceleration of the entire tool development process
- mastering complex tasks
- simple extensibility
- easy maintenance

2. In-depth code analysis thanks to digital mastermind

Thus, eXplain quickly becomes the digital mastermind for the developer and enables in-depth and comprehensive code analyses. eXplain uses powerful language parsers specialised in procedural programming languages for this purpose. Thanks to this implicit intelligence, both static and valuable dynamic analyses are possible, across languages and technologies, without media disruption, one interface for everything.

Supported languages:

- Cobol
- JCL
- RPG
- CL
- Natural
- REXX
- Assembler

Supported products/technologies:

- Db2
- Adabas
- Tivoli/IBM Workload Scheduler (TWS/IWS)
- AJM Scheduler
- XINFO

Via documented API functions, almost any additional information from external sources can be transferred to the eXplain repository.

3. Customized analysis of your highly individual software

Since individual business software contains numerous specifics, an analysis tool must also be able to deal with these in order to provide correct results. PKS has specialised in this environment and is able to adapt eXplain to the respective specifics. For this purpose, a German-speaking team of experienced analysis experts and developers is available to customers and makes individual adjustments to implementation and configuration. This is the only way to realise the necessary depth, correctness and clarity in code analysis for a “ tailor-made suit of individual software”.

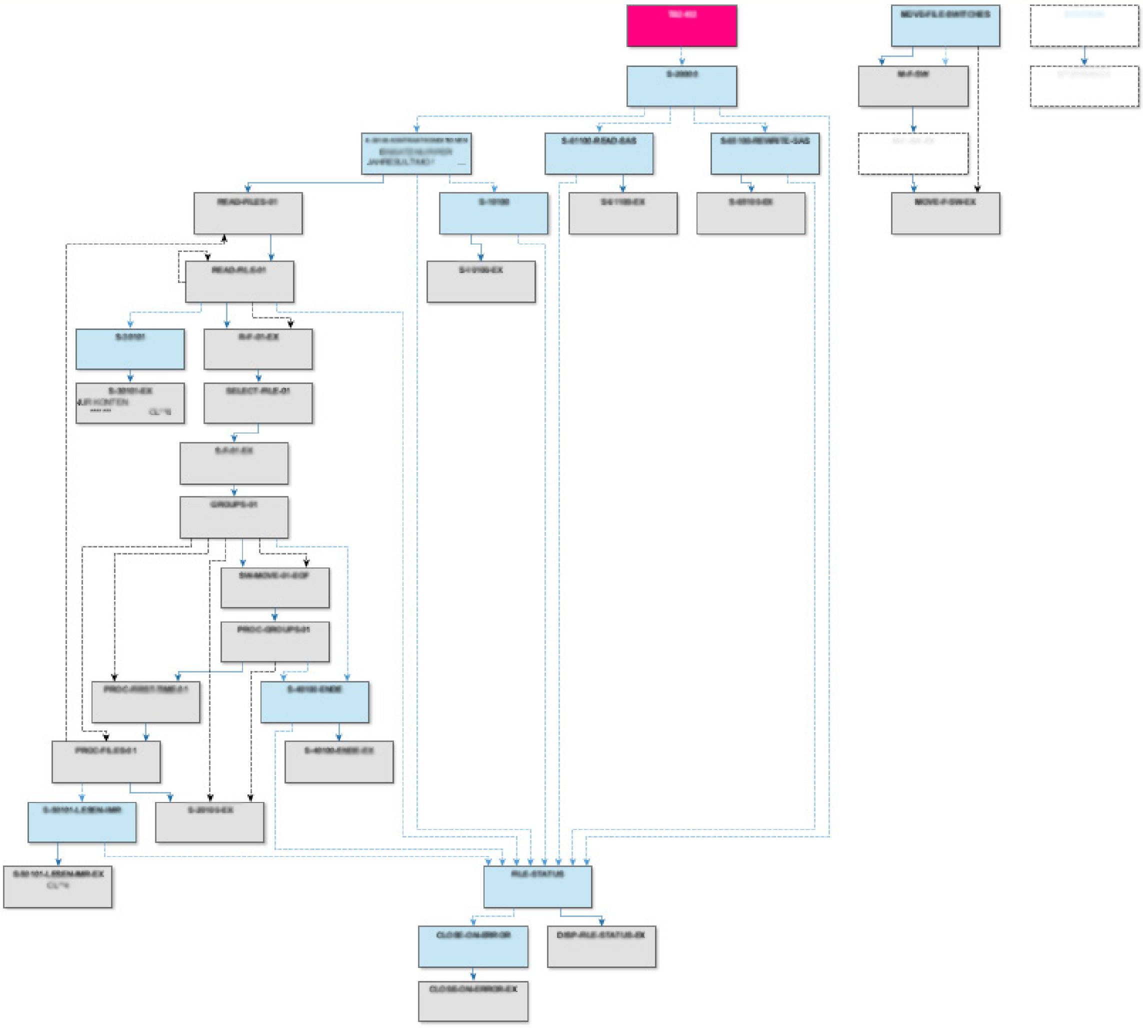
> Generally, we at Wesco rely on a standard ERP solution. However, over the course of decades, we have carried out extensive customisation and developed numerous programes of our own for this purpose. In order to keep track of this and to be able to act quickly and purposefully, especially in the case of necessary changes, we have been using the PKS tool eXplain for several years. With eXplain, development is simply easier for us, dependencies are recognisable at a glance and the implementation of changes is very secure. We can

WESCO

Markus Strotmeyer
IT / Organisation
M. Westermann & Co. GmbH

4. Visualised analysis: intuitive, at a glance, performant

The intuitive graphical display of the analysis results also contributes to efficient and high-performance work with eXplain. This enables the developer to reach the optimal altitude in every application and to set the right analysis focus depending on the task at hand.



5. Established team that can also operate successfully in an international context

Since analysing, understanding and getting to grips with legacy code requires a different approach than reprogramming, developers often need special support and individual coaching for legacy analyses. Only then can the full power of the eXplain suite be used.

> PKS was a reliable partner in the implementation right from the start. With Mr. Butscher and Mr. Albrecht, two competent external colleagues were at our side with advice and support.
>
> I would particularly like to emphasise the speed with which they reacted to our requirements, as well as the flexibility in the deployment of staff. In the coming year, the final steps of the project will be taken, and I am therefore already in contact with the aforementioned colleagues.

Sascha Fey
Project Excellence
DB Cargo AG

6. Suitable analysis for every company, every sector, every size

PKS offers its customers an assigned team of experts who support all tasks in a spirit of partnership and at eye level. As an owner-managed and specialised company, PKS has earned an excellent reputation in the field of code analysis throughout the German-speaking region and, due to its company size and structure, is an ideal and flexible partner for medium-sized companies and large corporations from a wide range of industries.

> With eXplain by PKS, we were able to identify a fair amount of code that was no longer needed in our legacy core banking system and thus fundamentally clean up and streamline the system. The fully automated documentation created by eXplain also meets our auditing requirements in full. These are just two examples of how eXplain supports us in our "core banking system stabilisation" project. I would also like to emphasise the extremely pleasant cooperation with the competent team at PKS as well as the flexible possibilities in the daily project routine, so that we could take Helaba-specific requirements into account at any time.

Helaba | Ṡ

Stephan Böcher
Application Development Group Leader
Helaba-Landesbank Hessen-Thüringen

In summary, the **combined package** of **comprehensive technology** and a **competent team of advisors** provides the key to success in the analysis dilemma.

■ Making a good and safe decision with a proof of concept

To ensure that you, the customer, are confident that you have made the right decision in choosing eXplain and working with PKS, you can easily get to know the tool and our team within the framework of a Proof of Concept (PoC) and check the fit with your requirements.

1. 100% clarity for your investment in just a few days

The PoC brings you complete clarity within just a few days on how the purchase of eXplain will affect your developer productivity. The good thing about it: the costs for the PoC can be offset against the later license purchase. Through the joint work with our experts, your employees are optimally picked up, come into contact with the advantages of the tooling at an early stage and form a common mindset for the upcoming tasks.

2. “ready for the future” as a team - common language, common path

In the end, you and your team are “ready for the future”, the dusty image of the legacy world is a thing of the past and the previously opaque software landscape presents itself to the developers in a transparent and coherent way.

3. Clear steps to success

Take the first step and start a code analysis PoC (Proof of Concept) with us:

Step 01

Define test environment

You define a subset of a few hundred modules from your sources with which you want to get to know and test eXplain. We set up eXplain for you in an isolated test environment - either in your network or on our demo systems. We parse your sources completely and prepare the analysis priorities in accordance with the

Step 02

Know-how transfer in individual workshops

In individual workshops, you will receive hands-on know-how for analysis work with eXplain: we will go through your use cases together and you will experience how, with just a few clicks, you can obtain comprehensive and detailed answers to questions for which you previously spent hours or even days doing manual research.

Step 03

Define supervised test position

You have full access to the test installation for four weeks and can gain experience - accompanied by our experts and according to your wishes.

Step 04

Presentation of results on site

In a presentation of the results on site, we will be available to answer any questions you may still have, as well as to carry out a utility value analysis and ROI analysis.

And what can happen after a successful PoC?

After the PoC, we provide you with a detailed offer for the complete installation. Once the budget has been approved, we start implementation quickly with a personal kick-off on site. After just a few weeks, eXplain is fully available to all your developers with the defined range of functions.

We also support you in the rollout to different or spatially distributed development teams with intelligent train-the-trainer concepts or online training courses and make the initial implementation a success.

Now it's up to **you** ...

- from when on you achieve even more impact with the available developers.
- from when on new team members will be trained in half the previous time.
- when you can implement new requirements from specialist departments more quickly and robustly.
- from when on you will use innovative and swiftly deployed software functionality for the digital future of your business.

We are ready to be a **reliable partner on eyelevel** for you.
We look forward to meeting **you** and **your team!**

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Code-analysis

Use the short questionnaire to quickly find the best possible counselling interview: Simply provide us with your data and send the questionnaire to one of the contact persons mentioned above

Client adress

Contact: ______________________________

Company: ______________________________

Street: ______________________________

City: ______________________________

Phone number: ______________________________

Email: ______________________________

Query Nr.1

Which languages and technologies do you already use (with approximate details of the quantity structure)?

Query Nr.2

Do the developers already work with a modern, Eclipse-based tool? If yes: with which?

□ IBM Developer for i/Z

□ Microfocus Enterprice Developer

□ Software AG Natural ONE/Designer

□ Other: ______________________________

Query Nr.3

How many developers are currently working on the host or POWER? ______________________________

Query Nr.4

What are your 3 most important expectations placed on a code analysis tool?

Query Nr.5

Do you already use code analysis tools? If yes, which ones and with which results?

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Clustering with eXplain

Completely permeate the structure of your core systems in a few months.

eXplain

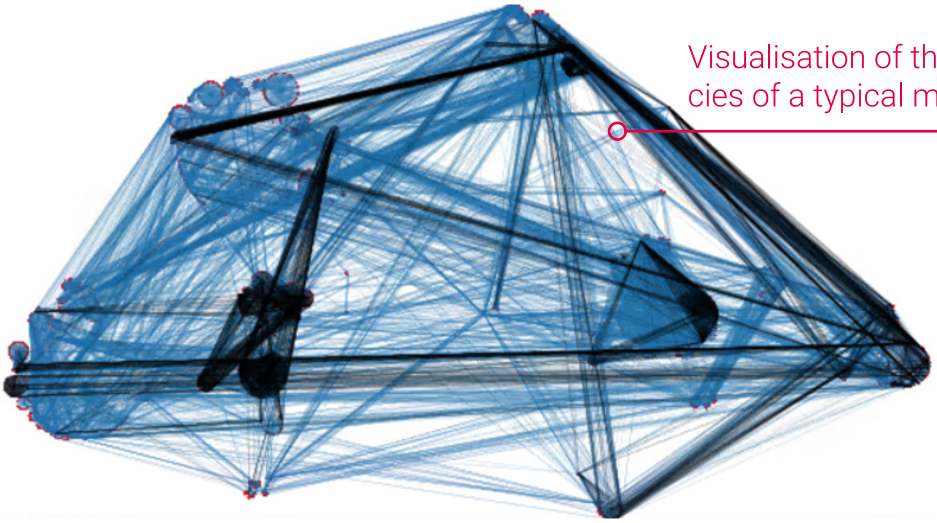
■ Legacy transformation without a controlled and efficient approach often leads to chaos

Mainframe applications today are composed of millions of lines of code and (hundreds of) thousands of modules. They use a wide variety of technologies and programming languages and have been created and extended by several generations of developers. These giants are now predetermined breaking points for digital transformation in companies and one reason why flexible and agile start-ups are increasingly standing up to the top dogs: because the software monoliths are hardly controllable today, let alone easy to replace. After all, they drive the core processes in the company, they contain the company's DNA, and they have provided the basis for its market success to date.

But in the last 10 years, these systems have been severely neglected: new functionalities have often only been „flanged on" due to a lack of insight and resources. This has resulted in a core that no one can fully understand today. Changes quickly become a game of Russian roulette and end up being implemented in such a way that the complexity of the overall system increases further instead of being reduced. When asked about system documentation, one receives a head shake or a mountain of papers with manual drawings, at best in Visio. Rarely, however, do these reflect a state of affairs that is up to date. And the few system experts are now largely retired. At the same time, the pressure to make functional enhancements to the systems is greater than ever before due to market demands: sales, marketing and customers demand new features or products that can only be realised with shorter release cycles and agile architectures.

And this creates a situation that can already be an Achilles' heel for the entire company: the once elementary core system can neither be maintained nor expanded, nor can it be replaced in a controlled manner.

The company is threatened with **operational standstill**, innovations are completely blocked.



Visualisation of the module dependencies of a typical mainframe application

Clustering

On closer inspection, replacement projects turn out to be so complex and expensive that they do not seem financially viable. And a switch to a classic ERP system, such as SAP, would only replace the company's own monolith with a third-party monolith.

The non-existence of decades-old monoliths enables start-ups to act and react more agilely on the market. It is not for nothing that many corporations are founding their own start-ups on greenfield sites; namely, in order not to completely lose touch. But this is not a sustainable solution: because even in the core business there are requirements for the further development of business-critical applications, and be it only regulatory requirements or Bafin specifications. This can quickly lead to the threat of exclusion from the market or high regulatory standards, which initially bring the balance sheets and ultimately also the stock market price to its knees. And ultimately, even the agile start-up needs solid back-office systems at the back end when the business grows and contract, customer or product data increases.

For the Project Manager

who have to take responsibility for a transformation project in such environments, at first glance there are often only radical paths and hard cuts with the existing systems. But such jerky projects have failed all too often in recent years: either because of their complexity or because of the availability of financial resources.

For the Software Architects

the situation is similarly precarious: they fail to lift the old system to a new target architecture and cannot establish modern software architectures. You end up with no more mandate for your work.

For the Application Owner

and business managers, the use of customised applications with all their advantages in terms of flexibility and quality is increasingly becoming a brake on day-to-day business. The former tailor-made suit becomes a corset and restricts the company‘s ability to act.

In summary, it can be said that the costs for the overall system are far out of proportion to the utility value. And in the end, experienced Cobol, Natural or PL/1 developers are dismissed, although it is them who hold the valuable process knowledge in the company. The company's „blind spot" becomes even greater.

The pressing question is:

How can the software monoliths of the past be brought onto a modern and sustainable technological and architecture basis without consuming myriads of project resources, with low risk and an acceptable budget?

The solution for this Herculean task is provided by the **clustering** with **eXplain**.

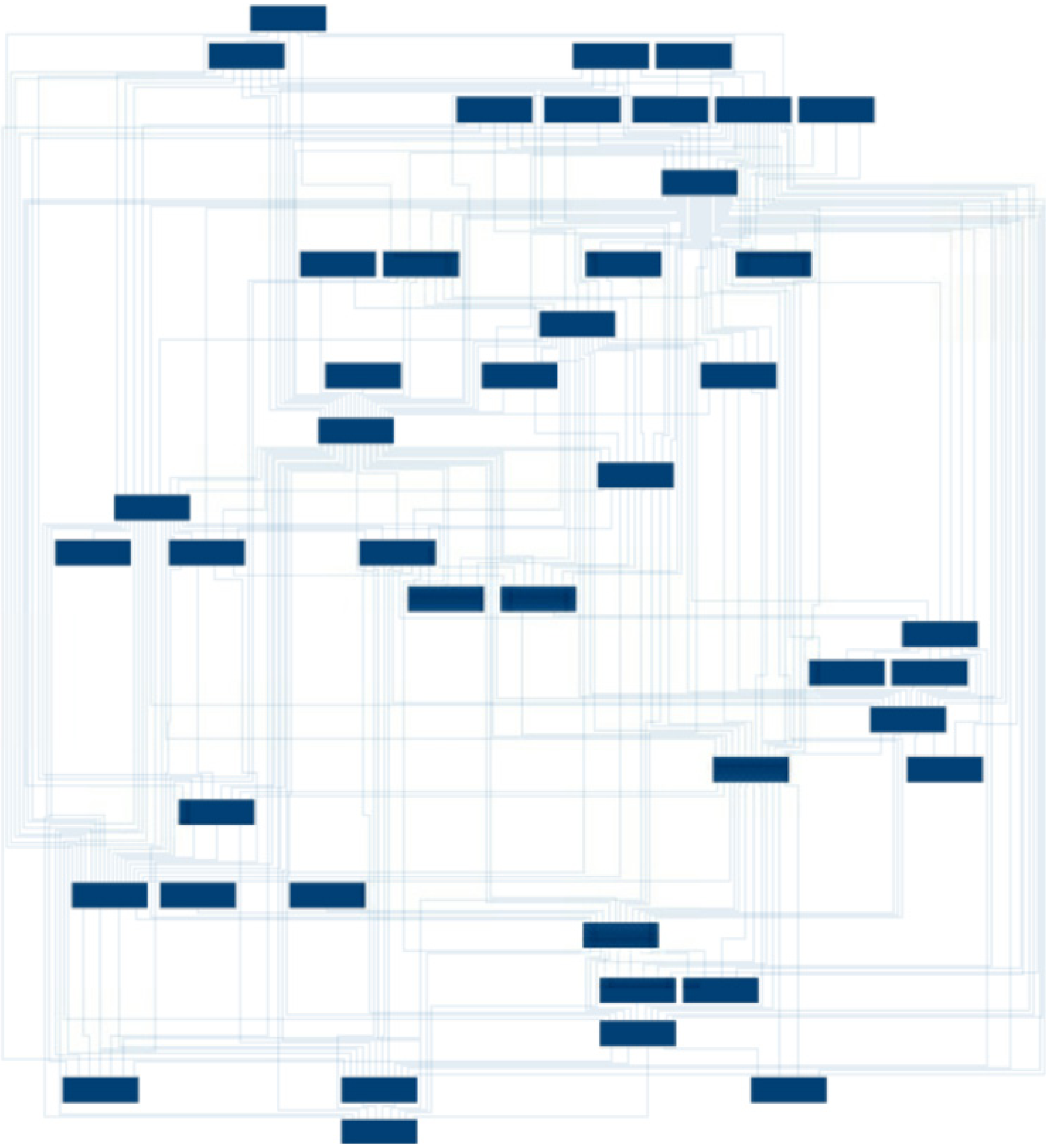
With eXplain you can break down your monoliths technically and professionally, create transparency and clarity and take control of the transformation process.

But what exactly is the clustering feature of eXplain?

Let us take a closer look at seven points together:

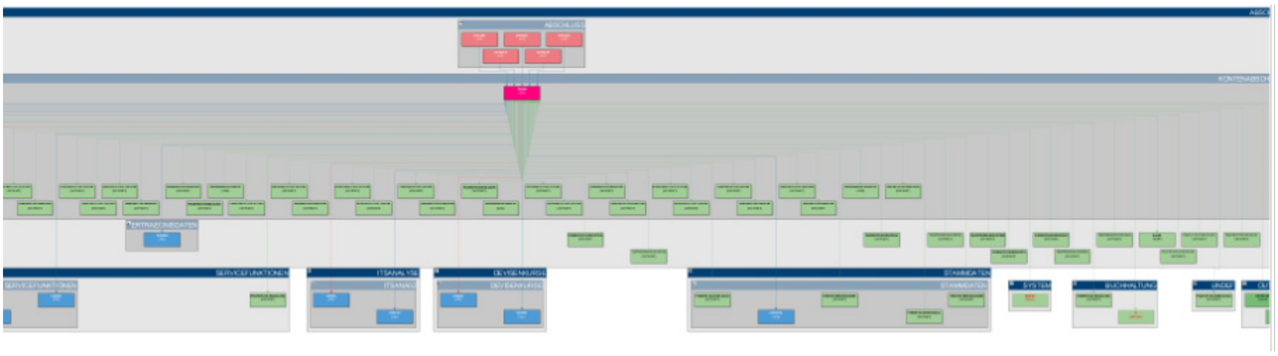
1. Automated and computerised analysis of your technical and functional structure

The clustering feature of eXplain builds on the source code analysis (details on request) and enriches it with the possibility of functional grouping and structuring of the technical artefacts. This makes it possible to systematically order tangled and opaque software systems, to identify interfaces between application systems without errors and to obtain a clear structure of the current architecture.



2. A logical hierarchy above the source code level

The clustering feature enables you to structure your application systems technically and clearly link them in eXplain with the associated technical artefacts at source code level. This reduces complexity without losing the technical details: because in the intuitive eXplain user interface, both types of information - technical and technical - are linked. A drilldown and drillup is possible at any time and also fun thanks to the performant visualisation. Gone are the times of days of manual analyses and laboriously compiled drawings and information! Communication with the department now functions transparently and without detours.



At a glance, subject responsibilities/areas of expertise are visible.
This view can be activated in ANY analysis graph:

- In classical code analysis at module level
- In the data flow analysis of a variable
- In scheduler analysis within job networks

3. Recording the professional/organisational structure from multiple perspectives

Since it can make sense to look at the subject order from different angles, you are completely free and flexible in defining the order hierarchies. An example: In many applications, developer groups are assigned to specific application areas. With eXplain clustering, exactly this structure can be faded in at any time in the analysis. At the same time, this organisational view of the developers does not necessarily correspond to the functional divisions of its users. Therefore, this view can be shown separately, so that both views are available. Transparency in communication is given. This not only applies to the case where the application has to be adapted or extended but is also available in daily use. Thus, questions such as „what effects does a ... have?" are easy to answer and problems in ongoing operations can be managed quickly and easily, as clustering can provide the necessary input in the form of a cluster view here as well. For more complex structures, levels with corresponding sublevels can be defined, which allows even more flexibility and adaptation to your operational needs.

4. Each department, each stakeholder gets its relevant view of the „ball of wool"

Clustering can be adapted specifically to the interests of the different departments or stakeholders by simply providing different technical structures. In this way, everyone involved has an optimal view of the system.

5. Highly flexible and always up to date

Once configured, the clustering always reflects the current state, as changes in the programming are directly and automatically reflected in the visualisation. You can be sure that you have an up-to-date view of the system whenever you work with eXplain.

6. Magic Button: Press once and see the interfaces

Due to the high degree of automation of eXplain, with just a few mouse clicks you are able to decompose even complex source code structures and maintain a clear overview. You recognise the interfaces between different clusters right away and can thus carry out your replacement projects in a structured and controlled manner.

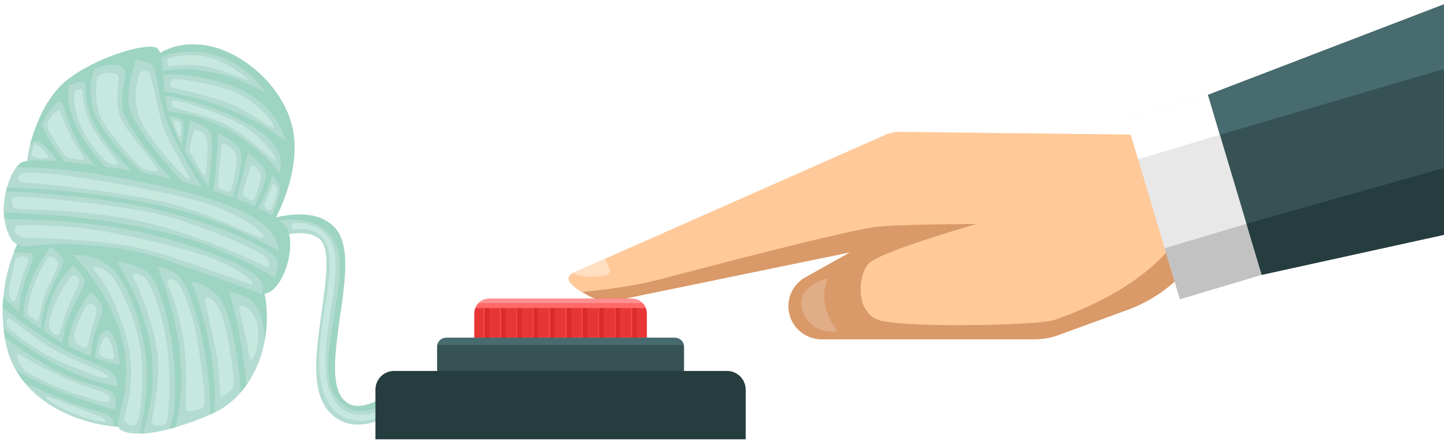
Fast and at the push of a button:

Untangle your software monoliths and create a permanent overview of the legacy thicket.

7. Easy to use interface

When creating and further developing the clustering interface, we work closely with UI/UX experts and incorporate the latest findings in user interface optimisation. This way, you can be sure that an intuitively operable interface makes your work easier and can also be quickly grasped by new colleagues.

With **eXplain Clustering**, you get the **structural insight** you need **for your transformation projects**, without having to spend months or even years laboriously capturing the correct as-is state. eXplain provides the **foundation for success** in the transformation of monolithic application landscapes.



- The eXplain clustering advantages are apparent:

1. Advantage:
It pays off from day one

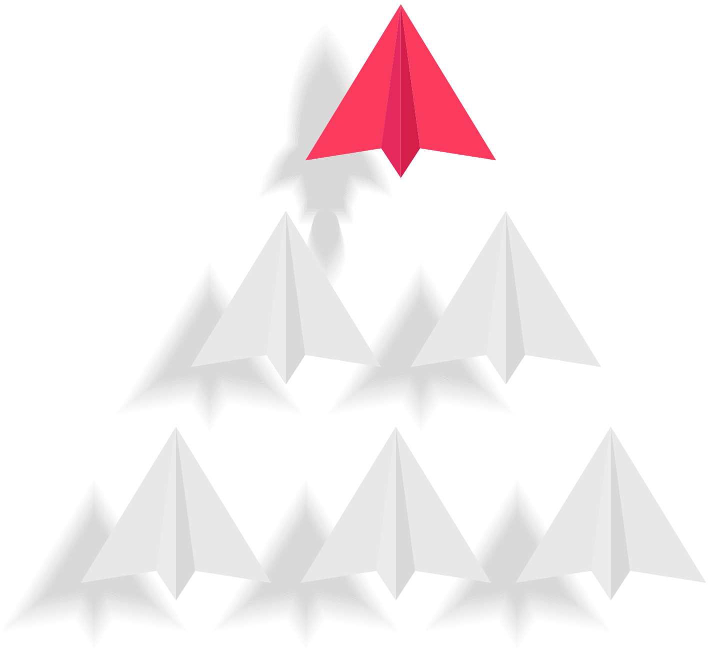
An example:
You currently have 30,000 active software modules in your system. If you set aside half a day for the analysis and documentation of each module, then with 200 working days per calendar year you would need up to 75 man-years of manual, error-prone work. With eXplain, you can achieve the same in only 6 months and, in addition, you are always up to date even when the application is updated.

2. Advantage:
The truth is in the code

eXplain is based on your source code, which is automatically analysed and structured according to your specifications. You can therefore be sure that the „real truth" comes to light and that you ALWAYS see the current view of your structures.

3. Advantage:
Immediately improves the collaboration between departments and IT

Thanks to clustering, colleagues from IT and the specialist department are able to communicate without errors and misunderstandings are a thing of the past. This is because everyone looks at the visualisations of the applications provided by eXplain on the basis of the source code. The specialist department can better estimate how much effort will be needed for certain implementations or replacements. The complex legacy structure becomes transparent again for everyone, which in the end also restores trust among all parties involved. The basis for any project's success in this demanding environment is created. For the IT department itself, this also brings the advantage that its own work and performance can be presented more clearly to management and stakeholders. In the end, all those involved are less frustrated and work together with motivation towards the goal of the overall transformation of the legacy monoliths.



4. Advantage:
Invincibly strong going forward: innovative like a start-up - experienced like a top dog

With eXplain clustering, you are finally able to reuse the potential hidden in your core systems. In a finite amount of time and with minimal risk, you can open your company's structural treasury and access valuable data and logics. With eXplain, you can leverage your valuable BigData history as the basis for the AI potential of the future. This puts you years ahead of any start-up!

Curious about how you can use eXplain Clustering for your very specific use cases and reach your goal turbocharged?

Get convinced in 3 steps:

Step 01

Book your use case demo

As part of the use case demo, you send us the concrete tasks that are currently causing you headaches in the context of legacy transformations. Our experts will use reference examples to show you how you can solve the outlined problems with eXplain. This service is free of charge and available to you without any obligation

Step 02

Seeing is believing: the real test

In the second step, we define a Proof of Concept (PoC) together: here we rehearse the clustering very concretely using your source code and provide answers to the purposes you require. In the end, you will receive a fixed price offer for the desired implementation that serves all your specifics and special requirements.

Step 03

Vollimplementierung und Gesamtclustering

Convinced and secured by the PoC, we implement eXplain and the clustering definitions for you, train your team and provide you with the basis for successful, controllable and transparent transformation projects in your legacy context within a few months.

- The pressure in terms of „legacy transformation“ is increasing day by day!

Start solving the problem now: Use eXplain clustering to swiftly get comprehensive clarity and a structure to your business-critical application landscape before it's too late.

Outsmart the start-ups in your industry and overtake them on the right lane by unbundling your comprehensive but tangled software. Get back on track and use eXplain clustering, the market-leading and innovative technology that enables you to make this smart move.

It is now up to **you**!

For the step to an individual use case demo, simply fill out the questionnaire and we will show you how we can remove the blockages in your transformation projects.

Our competent consultants will be happy to **directly answer** any questions you may have:

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Clustering

Use the short questionnaire to quickly find the best possible counselling interview: Simply provide us with your data and send the questionnaire to one of the contact persons mentioned above

Client adress

Contact: ______________________________

Company: ______________________________

Street: ______________________________

City: ______________________________

Phone-Number: ______________________________

Email: ______________________________

Query Nr.1

What are your TOP three problems in transforming your legacy systems?

Query Nr.2

Have you already decided whether you want to migrate, rehost, redevelop or switch to purchased software? If yes: Where do you want to go?

Query Nr.3

Which tools do you use for code analysis, as a data dictionary or for metadata management so far?

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Quality analysis with eXplain

Combine agility with quality!

eXplain

The curse and blessing of legacy software: Unique, vital ... out of control

In a highly standardised and automated business world, customised applications are often the only way to stand out from the competition. It is therefore not surprising that all large corporations and market leaders continue to rely on self-developed software for their business-critical core processes. These applications are often developed in Cobol, Natural or similar programming languages and are indispensable for the company.

Because this is where the music is:

- The contribution margin is generated here
- Here you will find some clever algorithms that the competition does not have
- Here, the decisive step ahead of the competition is realised through rapid provision of new functionalities

But for some years now, the foundation of this successful model has been getting shakier and shakier: as IT specialists retire, the internal development teams are bleeding out increasingly. The shortage of skilled workers makes it more and more difficult to fill vacant positions, and in the end, resources can often only be bought in from external service providers.

In view of the dangers of this model, the **alarm lights** are now on red for those **responsible for IT**:

1. Alarm lamp:
No control over purchased developer resources

To avoid the departure of system experts with a simultaneous lack of internal resources, many companies are switching to the involvement of external partners or freelancers. But controlling the bought-in developer resources is difficult, because in the end the service provider decides for himself if and when he withdraws his employees from a customer environment or replaces them with newer colleagues. Each time, valuable knowledge about the applications is lost again, because the time and the necessary budget for sensible system documentation or handovers are always lacking.

Quality control of the implemented programmes can often not be ensured without time-consuming manual code reviews, and there are no internal resources available for this either. The external service provider therefore has the best prerequisites to further increase the dependency of its customer.

2. Alarm lamp:
No more know-how in the own company

Within a few years, the company no longer has any system know-how, but even more dangerous is that the service provider no longer feels responsible or has any system know-how. Within a few quarters, the maintainability of the applications falls to its knees to such an extent that a change of service provider becomes an unaffordable undertaking. If you change nevertheless, you pay twice as much for the new provider to make the system controllable and developable again.

3. Alarm lamp:
High costs for little quality and a lot of dependency

Of course, it then stands to reason that the previous service provider will also know how to take advantage of this situation. As a customer, you are in a dilemma and spend a lot of money for little service, but also find no one else on the market who can help you. The perfidious thing about it: this scenario costs a lot of money and yet you have to remain very dependent on this provider.

The use of external service providers for the maintenance and further development of individual software lulls the application owner into a dangerous and ultimately fatal sense of security.

Conclusion of application outsourcing:

The valuable and vital core applications of the company are in the end „broken“

- No one can or wants to adapt them anymore - the customer and the market hear about this
- Maintenance is costly and error-prone
- Agile further development oriented towards business requirements is no longer possible
- Applications are like „frozen"
- The reputational damage raises the question of responsibility within the company

Top management naturally seeks responsibility for this disaster with the application owner:

How could he allow the control and know-how of the business-critical applications to migrate completely to the outside without actively controlling and regulating the external partner?

In the end, the person who awarded the contract to the external partner is also the one who is held accountable and whose decision-making power for future projects is massively curtailed. Sleepless nights are therefore preprogrammed. Of course, contractual formulations can give the impression that the responsibility for the systems is shifting to the service provider, but as a rule these contractual passages, if they are written down at all, are not really controllable and measurable.

The pressing questions facing executives and managers responsible for customised software are thus:

How can the software quality remain controllable when using external resources, without me having to spend a lot of time and effort on manual checks? How do I recognise in time that I have to intervene before it is too late, and the quality and maintainability of the system are in enormous danger?

Intelligent solutions for these tasks are provided by **eXplain‘s Quality feature!**

This white paper gives you a deeper insight into the technical details and shows you a way to secure and accelerate the development of custom software thanks to external resources, without losing control yourself.

What exactly is the Quality Feature of eXplain?

Let us take a closer look at eight points together:

1. Multidimensional, automated measurement of software quality

In eXplain, there are two fundamentally different approaches to the topic of software quality:

Rules:

For each programming language, there is a specific set of quality rules that are checked by special parsers and, in the event of rule violations, are recorded via an entry in a database (repository). Typically, these rules check code properties such as exceeding defined nesting depths, unprogrammed error handling after an SQL call or IF loops without a cleanly programmed ENDIF.

Another use case is the verification of programming guidelines and customised naming conventions: here, too, the parsers check the conformity with the rules and write an entry in the repository in case of an error.

Metrics:

In addition, the parsers determine many metrics („numerical values") known in computer science, which are largely based on function points, Halstead metrics and the like. These metrics are stored in the repository and available for evaluations.

Furthermore, additional metric values are calculated based on cluster definitions (which introduce a technical view of the application) and stored accordingly in the repository. The so-called cluster interface metrics, which make a statement about the interfaces between clusters (application areas), e.g. about the existing service encapsulation, play a special role here.

The QA information generated can be used in unique ways within eXplain, including the generation of user-defined quality reports or complex interface analyses.

2. Automated monitoring, early fault detection and immediate warning

The quality feature of eXplain is integrated directly into the programmers' development environment on the basis of Eclipse and thus runs concurrently. Warnings and potential errors regarding code quality are thus detected and made visible at the time they occur. For this purpose, eXplain comes with an extensive rule set with many standards. In addition - and this is what makes the tool so valuable - we can implement individual rules for you that optimally cover your specific use cases. After all, the individuality of the applications must also be supported by quality control.

3. Recognise and act on trends in your software quality in time

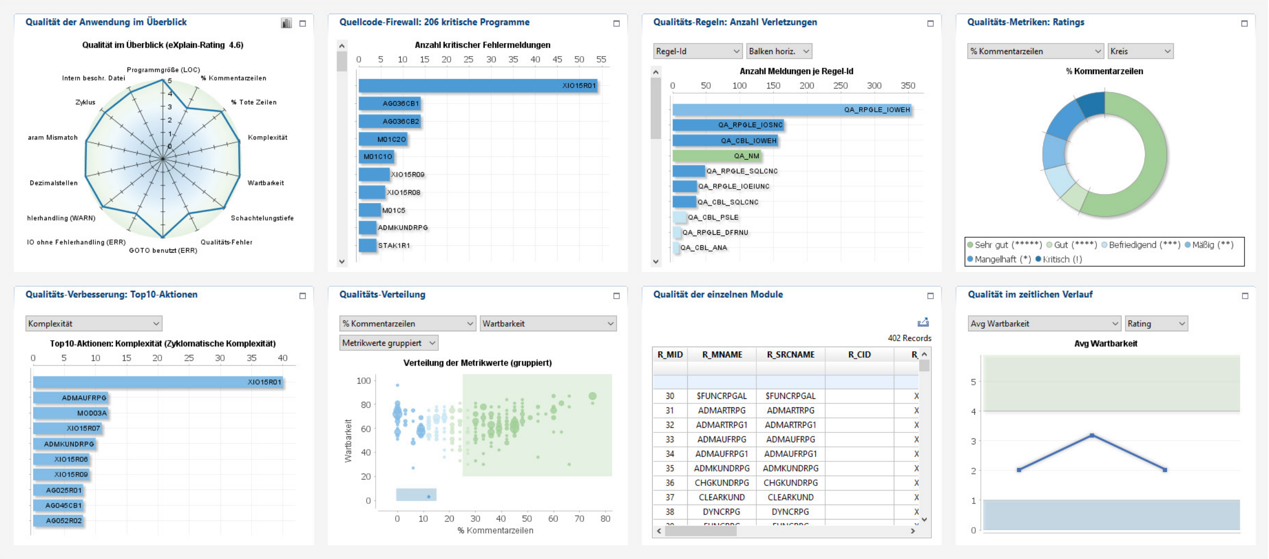
The Quality feature of eXplain is able to create snapshots over time. This makes the overall quality development, as well as the development of individual metrics or even dedicated programme subsets, measurable and displayable over time. You can see the quality status of a system or certain programmes when they are transferred to a new programmer, as well as how this status changes in the course of maintenance and further development - both positively and negatively. This puts you in a position to recognise trends in time and, if necessary, to act before it is too late.

4. Use the shift-left paradigm for software quality

The error paradigm of software testing naturally also applies to the quality aspect of programmes: the earlier the developer recognises that the quality and maintainability of a system are declining, the more cost-effectively this can be cleaned up and improved. Therefore, all quality messages are immediately available to the developer in his usual coding environment.

5. Visual representation of the quality parameters at a glance in the dashboard

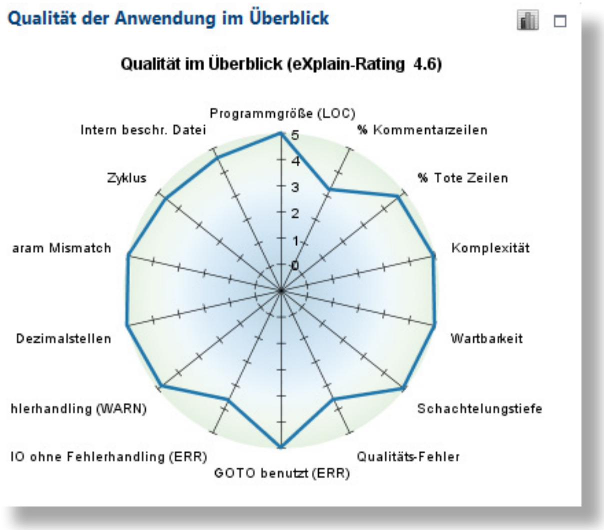
A picture says more than the listing of thousands of error messages. The QA dashboard from eXplain is a real highlight for every system manager: it displays the relevant quality aspects clearly and visually. You can zoom into a single area or application cluster or view a larger section of the system as a whole: always intuitively operable and highly performant. In summary, the QA dashboard gives you an overview of the most important parameters at any time and, above all, of the changes in individual quality features over time (quality history).



402 Records

R_MID	R_MNAME	R_SRCNAME	R_CID	R_
30	$FUNCRPGAL	$FUNCRPGAL		X
31	ADMARTRPG	ADMARTRPG		X
32	ADMARTRPG1	ADMARTRPG1		X
33	ADMAUFRPG	ADMAUFRPG		X
34	ADMAUFRPG1	ADMAUFRPG1		X
35	ADMKUNDRPG	ADMKUNDRPG		X
36	CHGKUNDRPG	CHGKUNDRPG		X
37	CLEARKUND	CLEARKUND		X
38	DYNCRPG	DYNCRPG		X

QA Feature

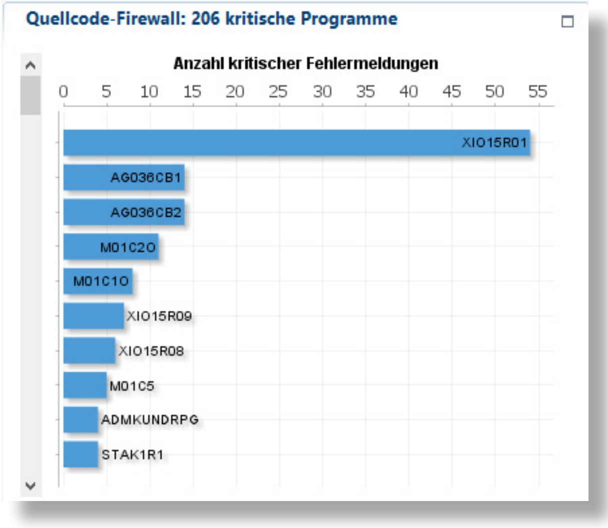


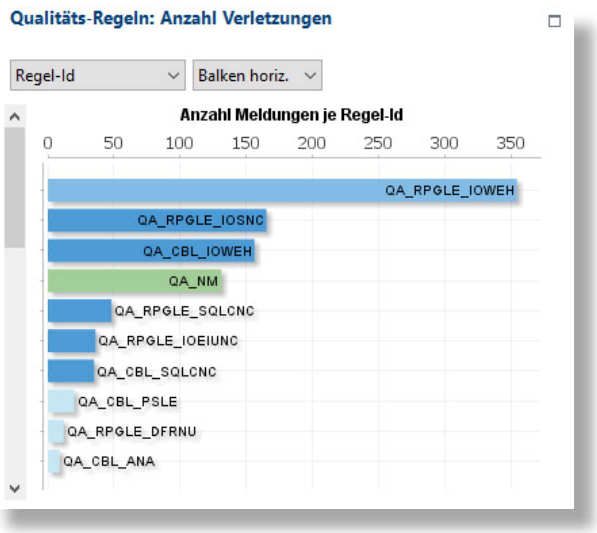
Quality of the application at a glance:

The most important metrics are displayed in the form of a „spider's web" so that it is clear at a glance which metrics are more in the green zone or classified as highly critical. The classification is based on threshold values that can be defined customer-specifically.

Code-Firewall:

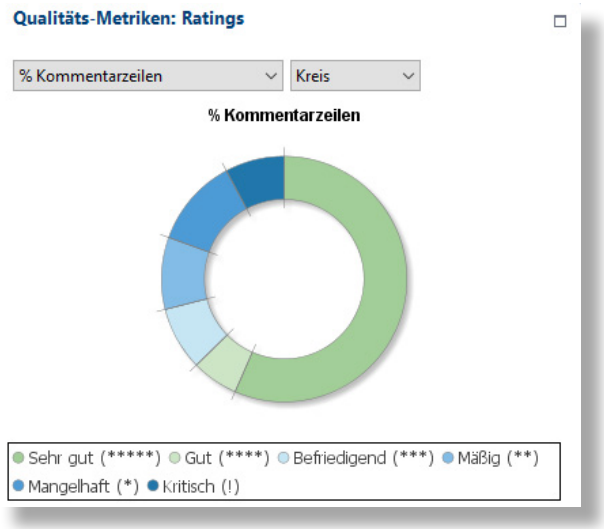
Listing of the programmes with the most violations of rules with severity level 3 (customisable). By clicking on a diagram bar, an overview of all affected sources or all violated QA rules is displayed for this programme. Each violation can be displayed directly in the source code! These rules with a high degree of seriousness show source code points that may lead to defects that are difficult to find at runtime, such as loop overflows or uncaught error situations.





Quality rules- Frequency of problem areas:

Overview of the defined QA rules and their frequency, the defined severity leads to the corresponding colouring. One then knows that, for example, the main problem of the application is a too high nesting depth of the programme structures.



Qualitäts-Metriken: Ratings

% Kommentarzeilen | Kreis

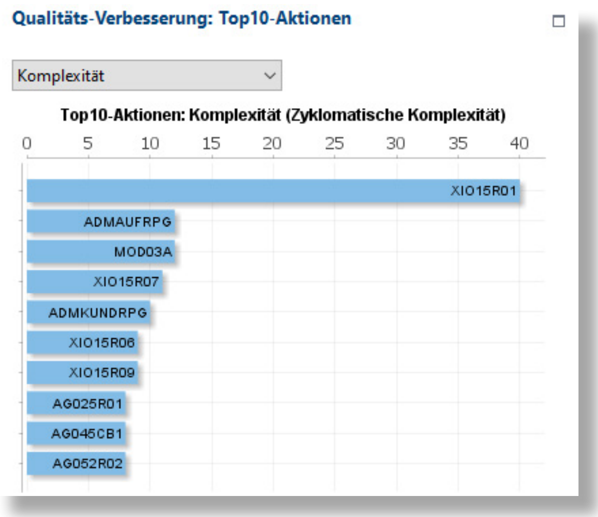
% Kommentarzeilen
● Sehr gut (*****) ● Gut (****) ● Befriedigend (***) ● Mäßig (**)
● Mangelhaft (*) ● Kritisch (!)

Quality metrics - Categorisation of the programmes:

Provides an overview of the quality of the programmes with regard to a single metric. The categorisation is based on the defined threshold values or the eXplain rating behind them. This results in statements such as „70% of all programmes have very good maintainability, while 10% of all programmes have poor maintainability“. The programmes belonging to each group can be displayed interactively as a grid, etc.

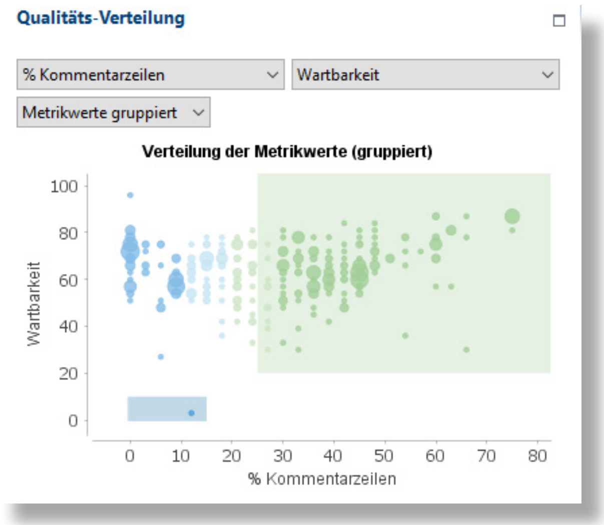
Quality improvements: Top10 Actions:

For each metric, the 10 programmes that produce the worst metric values can be displayed. It may be a good idea to focus on these programmes when making improvements and to eliminate „the worst mistakes“.



Qualitäts-Verbesserung: Top10-Aktionen

Komplexität



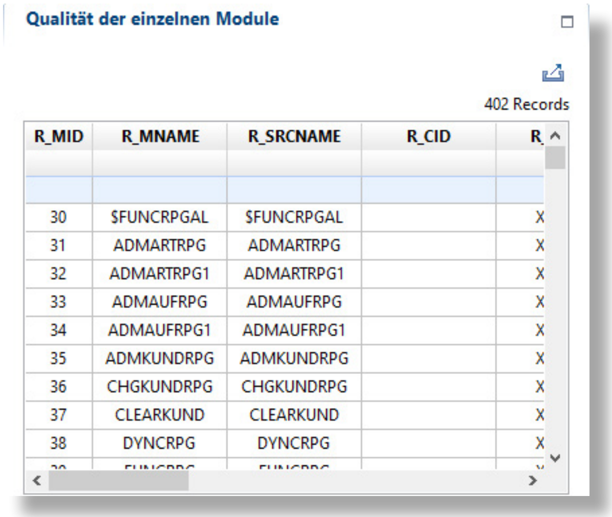
Qualitäts-Verteilung

% Kommentarzeilen | Wartbarkeit

Metrikwerte gruppiert

Quality distribution:

This view is used to keep an eye on two different metrics at the same time in order to concentrate on the essentials in improvement projects. For example, while a poor comment score may seem acceptable on its own, its occurrence in combination with a high programme complexity is very critical. So the goal is to identify programmes that score very poorly on two metrics at the same time. The diagram shows how the programmes are distributed with regard to the two selected metrics, and the desired subsets can be selected and edited interactively.



Qualität der einzelnen Module

402 Records

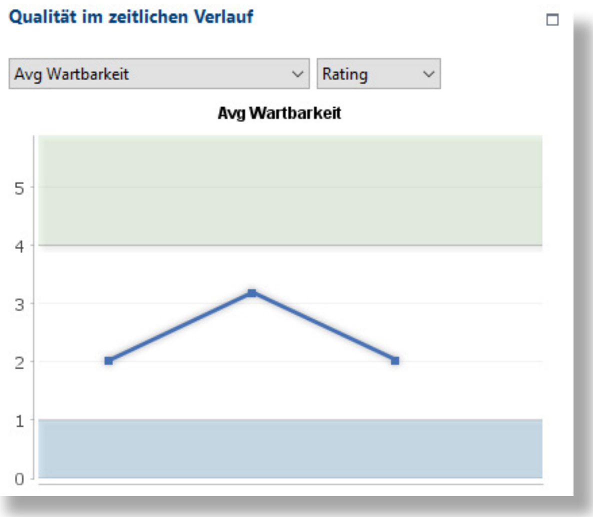
R_MID	R_MNAME	R_SRCNAME	R_CID	R_
30	$FUNCRPGAL	$FUNCRPGAL		X
31	ADMARTRPG	ADMARTRPG		X
32	ADMARTRPG1	ADMARTRPG1		X
33	ADMAUFRPG	ADMAUFRPG		X
34	ADMAUFRPG1	ADMAUFRPG1		X
35	ADMKUNDRPG	ADMKUNDRPG		X
36	CHGKUNDRPG	CHGKUNDRPG		X
37	CLEARKUND	CLEARKUND		X
38	DYNCRPG	DYNCRPG		X

Quality of the individual modules:

Display of metrics for each programme in grid form, sortable as desired, etc.

Quality over time:

A very important aspect of the quality of a software application is the question of how it changes over time. Is the quality of a particular metric getting worse and worse? Do the improvements that have been made actually have the desired effect? Through regular snapshots, the current state of the application can be stored in the repository, so that temporal progressions for each individual metric can be displayed in this view.



Qualität im zeitlichen Verlauf

Avg Wartbarkeit

Rating

6. Unique parser technology that brings intelligence to the process of code analysis

In order for eXplain to be able to deliver the high-quality analysis results described above, it is based on a high-performance technology that has been developed and continuously improved by PKS for over 30 years. Essentially, it can be said that, thanks to intelligent algorithms, the parser technology is able to perform a dynamic analysis of the code in addition to the purely static analysis.

On the basis of the generated AST (Abstract Syntax Tree), it is possible to simulate the code flow during the parsing process and thus, for example, trace back the contents of variables. This is the only way to correctly resolve, among other things, the frequently occurring dynamic programme calls via variables. This is unique and can only be realised in this form thanks to the high specialisation in procedural languages.

The parser technology is rounded off by an integrated test and debug environment for creating the language-dependent grammars. This allows customised extensions to be realised safely and quickly (and thus cost-effectively).

7. Custom-fit tools for your highly complex and individual core systems

Anyone who builds custom-fit business software also needs custom-fit tools: this is the same in the craft as in software development. That is why we adapt eXplain precisely to the millimetre to the special features in your application systems. Only in this way can they retain their unique value for your company. For this fine-tuning, we provide you with a highly specialised team of parser builders, visualisation professionals and consultants, so that in the end everything works smoothly and without any breaks.

8. Quality „Made in Germany“ and an established team that can also operate successfully in an international context

Since your applications are highly complex and individual systems, we are convinced that any unnecessary language, cultural or time barrier in the cooperation can cause misunderstandings, difficulties and problems. That‘s why we support you with a team of German-speaking experts, on site and with the corporate culture and sense of responsibility of an owner-managed medium-sized company.

In summary, with the combination of fully integrated tooling, individually definable quality standards and a highly specialised team, you will be able to **maintain control over your core applications without sacrificing the benefits and flexibility of external development teams.**

- Our promise: With us, you have security and control in your decision for eXplain right from the start:

Let us convince you in 4 steps:

Step 01

Proof of Concepts (PoC)

As part of a Proof of Concept (PoC), we test the eXplain QA feature against your source code and give you direct insight into the performance of the tool, the underlying technology and our team of experts. The costs for the PoC are also a budget-neutral investment, as they are offset against the subsequent licence purchase.

Go/NoGo decision

Step 02

The PoC secures your decision, because you do not buy a pig in a poke, but on the basis of a reference implementation for exactly your environment.

Step 03

Support from the PKS team

The PKS team supports you and is flexibly available to you on site or via video sessions .

Recognise

Step 04

You recognise the potential offered by the AI potential of eXplain technology and take the quality and controllability of your custom software to a new level.

Regain control and take the first step now

Fill out our QA questionnaire so that we can present you with a PoC offer optimally tailored to your requirements. Start the PoC with full investment protection due to creditability. In a personal kick-off workshop, we get to know each other, jointly determine the details for the PoC process and fix the final framework conditions for the cooperation. You are closely involved during the implementation of the PoC, can ask all questions and will receive competent answers. Together in a team, your QA standard for the future is created. The PoC results provide the basis for the successful and efficient overall implementation in your environment, including training and know-how transfer sessions for all relevant groups of people.

Don‘t wait until it‘s too late, regain **control of your core systems NOW.**

- The increasing retirement of experts has now already reached critical proportions and will soon reach a tipping point.
- The staff shortage will not change in the coming years, and may even worsen.
- At the same time, the demands on developer capacities will increase as digitisation or replacement are high on the agenda in top management.
- The technical debt in the applications will grow exponentially and so will the compound interest on it.

Our competent advisors will also be happy to **answer your questions directly:**

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- **Use the short questionnaire to quickly find the best possible counselling interview:** Please provide us with your data and send the questionnaire to one of the contact persons mentioned above

Client adress

Contact: ______________________________

Company: ______________________________

Street: ______________________________

City: ______________________________

Phone-number: ______________________________

Email: ______________________________

Query Nr.1

What are your main objectives in introducing a quality analysis of your applications?

Query Nr.2

Can you give us examples of programming guidelines to be adhered to that are important to you?

Frage Nr.3

Which metrics are of particular interest to you from today‘s perspective?

Query Nr.4

Do you already use (maybe self-developed) tools for quality analysis? If yes, what aspects of these tools do you miss?