EVOLVEWARE

THE FOUNDATION FOR
APPLICATION MODERNIZATION

Understanding Your Applications

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Introduction

It has been estimated that large organizations have on average **400 or more custom applications** in active use today. Many of these were developed 30 or more years ago in technologies that would now be considered “legacy”. Understanding what processes and rules are being executed in these applications and how they rely on one another is critical in order to maintain business operations, determine how to move these applications forward and incorporate modern technologies and environments when ready.

There are **three key obstacles** in the way of gaining this understanding:

Retirement / movement of legacy application personnel who understand the logic and policies

No current documentation on these applications

Low motivation to learn and understand legacy technologies given the changing environment

CHALLENGES

In a recent survey[1], the Futurum Group found that organizations are spending over 2/3 of their time on simply maintaining existing systems or applications.

Without a good understanding of the application logic and dependencies, the cost of making any change, whether a small bug fix or a large modernization effort, becomes increasingly cumbersome, time consuming and costly.

1 https://devops.com/app-modernization-adoption-surges-prompting-integration-of-ai/

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Market Examples

Waves of unemployment-claims poured into government systems caused by the economic effects of COVID-19. The States' unemployment related applications developed in decades-old programming languages crashed trying to process the large volumes of claims.

Enhancing these applications to manage the increased volume of data was difficult due to lack of knowledge and qualified personnel.

Over Christmas holidays in 2022, Southwest Airlines' legacy point-to-point system could not keep pace with the volume of plane and staff re-assignments due to bad weather. This resulted in a massive disruption of operations during one of the busiest times of the year for travel.

Southwest's costs are expected to exceed $1B due to lost revenues, refunds, and regulatory fines.

The TSB failure in the UK where 2 million customers were locked out of their accounts after an IT modernization effort was partially attributed to not fully understanding the scope and complexity of how the new system should work.

Replacing an old system requires understanding that system at a granular level. Experience has proved that carrying out legacy modernization projects with poor documentation increases the chance of failure by 70%.

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Foundation for Application Transformation

Organizations need the ability to provide better and more relevant digital experiences, to reduce costs and risks in critical areas, and to innovate and scale quickly. To do so, they must have a foundational understanding of their current application landscape in order to meet today's digital demands and plan for the future.This starts with obtaining the business and technical documentation required for stakeholders to maintain and ultimately extend systems.

Using these documentation artifacts to gain a solid understanding of current portfolios, organizations can:

- Determine if an application is fully reusable, partially reusable, or requires complete transformation
- Identify the resources required to achieve transformation goals in the timeline desired
- Successfully modernize and transform applications

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Overview of the eBook

This e-book will provide:

1. Key requirements for application documentation and analysis
2. An overview of the Intellisys™ platform
3. An introduction to EvolveWare's phased approach to application modernization and the role of application documentation and analysis
4. Case studies that demonstrate significant business benefits

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Application Documentation

Traditionally, creating and updating application documentation was a time consuming and tedious process that relied on manual methods. Newer tools automatically extract high level information from the code. However, most of these tools do not provide sufficient details to truly create a foundational understanding of applications. A good tool should provide:

FEATURES	BENEFITS
A set of “drill down” diagrams of the application showing both internal and external dependencies	Allows the application to be divided into multiple modules as needed so it can be modernized using a phased approach. This mitigates risk substantially.
Renders logic at the paragraph/method level in formats and a language that can be understood both by technical and business analysts	Enables detailed understanding of the application by multiple stakeholders including programmers that may not be experts in the language the application was written in.
Extracts downloadable data model and entity-attributes relationship diagram	Allows the source database schema to be normalized for the target modern application by a third party ETL tool.
Dead and redundant code reports	Optimizes target application by identifying 1) dead code to deactivate 2) redundant code for consolidation and 3) security vulnerabilities for remediation. Results in enhanced performance for target application.

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Application Documentation *continued*

FEATURES	BENEFITS
Objective complexity report, calculating complexity from the system level down to the individual routines	Enables identification of code that may contain business critical rules. If converting to modern code, recommend splits or re-writes for highly complex code to make the target application more maintainable and scalable.
Variable and constant usage reports	Helps identify code that may contain critical business rules by allowing tracing of code using frequently used variables and constants.
Automatically update documentation when changes are made to the application code by processing only changed files	Keeps documentation and its repository of meta-data current in a fraction of the time as compared to manual processes. Allows applications to be updated without incorporating a code-freeze while its business rules are being extracted or its meta-data is being optimized prior to transformation to modern code.
Documentation support for applications written both legacy and modern languages	Allows transformed applications to modern language to be documented and its documentation maintained on an on-going basis.

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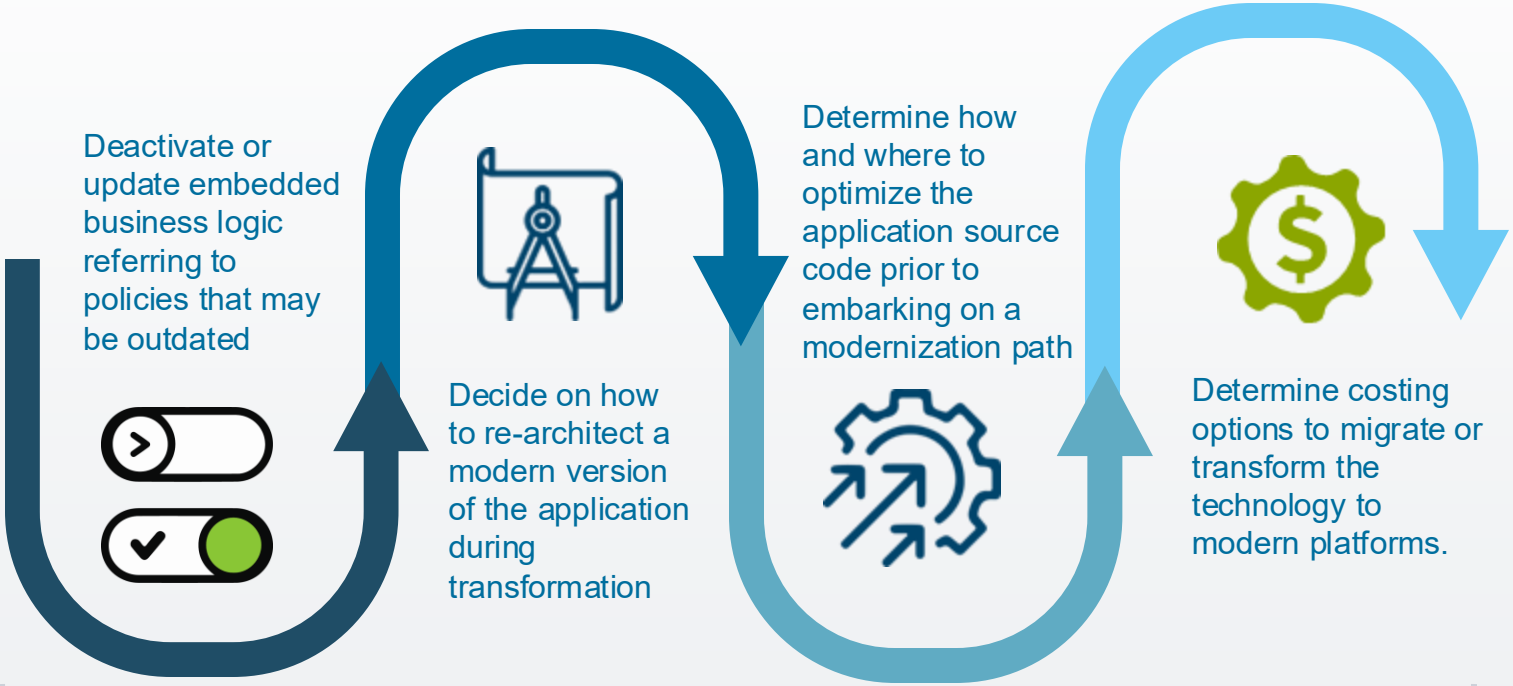
Application Analysis

Once you have sufficient documentation, that tool should be able to provide analysis features that allow you to:



Is there a single tool that provides all this and more?

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SOLUTION:
Documentation & Analysis on Intellisys™

Intellisys™ is the **only software modernization platform that applies automation across core processes involved in modernizing applications** – from documentation and analysis to rules extraction and code migration. It plugs into your system development ecosystem and provides key information and outputs to speed up and de-risk your maintenance & modernization initiatives.

It's Application Documentation & Analysis solution:

- **Automates extraction of meta-data** from source code, including the embedded business logic and data accesses for applications written in over 20 languages
- **Generates documentation artifacts** including a series of reports, drill-down diagrams, and logic representations in multiple formats including in a neutral language and a business analyst language (BAL)
- **Provides a repeatable process** across the entire portfolio to keep the documentation updated and current

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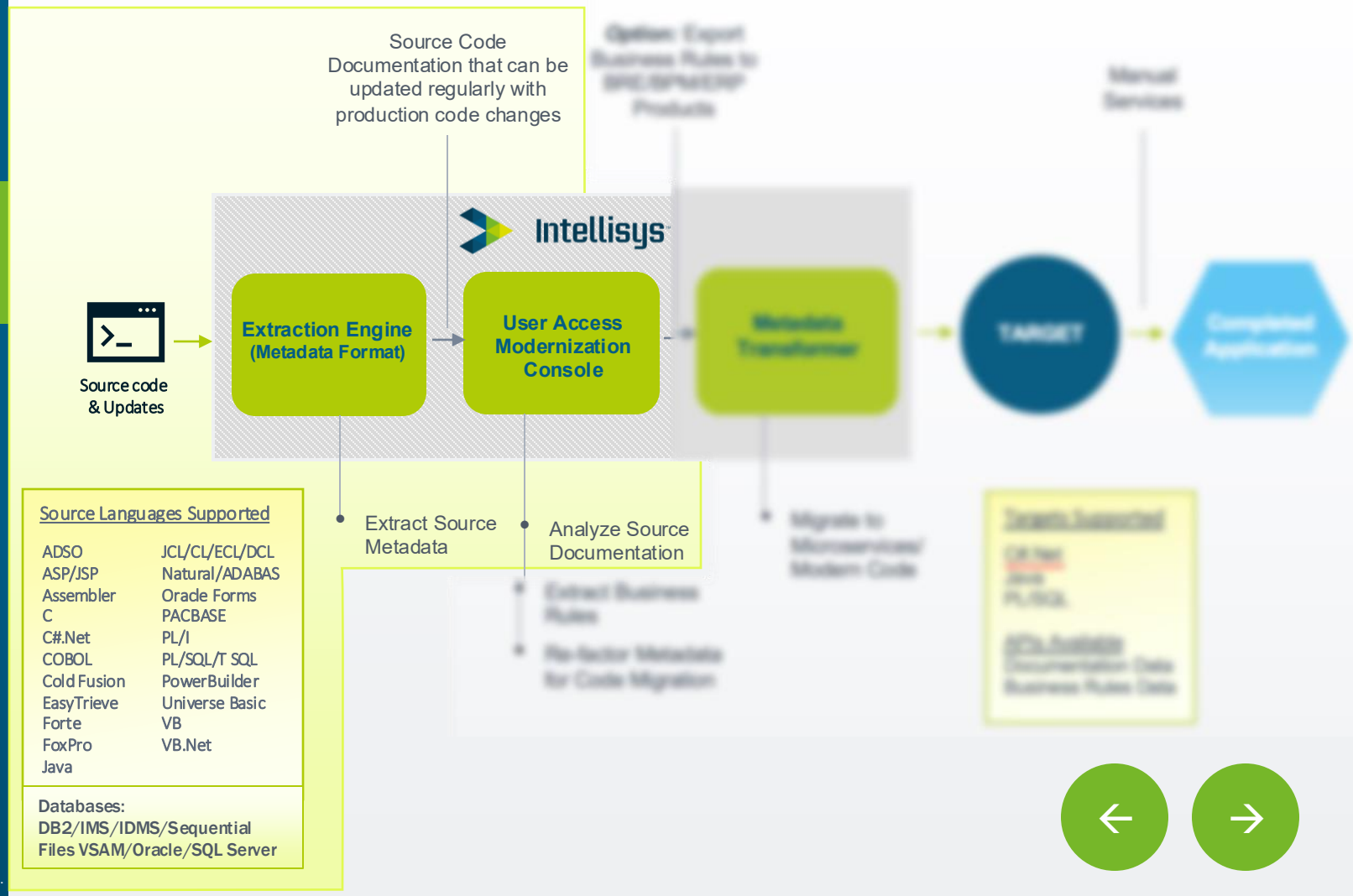
The Intellisys Platform



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The Intellisys Platform: Benefits

90%+ **Reduction of time** to create application documentation

100% **Automated extraction** of source code metadata

SUPPORT FOR 20+ PROGRAMMING LANGUAGES		
ADSO	Forte	PACBASE
ASP/JSP	FoxPro	PL/I
Assembler	Java	PL/SQL/T SQL
C	JCL/CL/ECL/DCL	PowerBuilder
C#.Net	Natural/ADABAS	RPG
COBOL	Oracle Forms	Universe Basic
Cold Fusion	PACBASE	VB
EasyTrieve	PL/I	VB.Net

DATABASES
DB2
IMS
IDMS
Sequential Files VSAM
Oracle/
SQL Server

EvolveWare also has the flexibility to add additional source language support in Intellisys depending on the use case. Contact us if interested.

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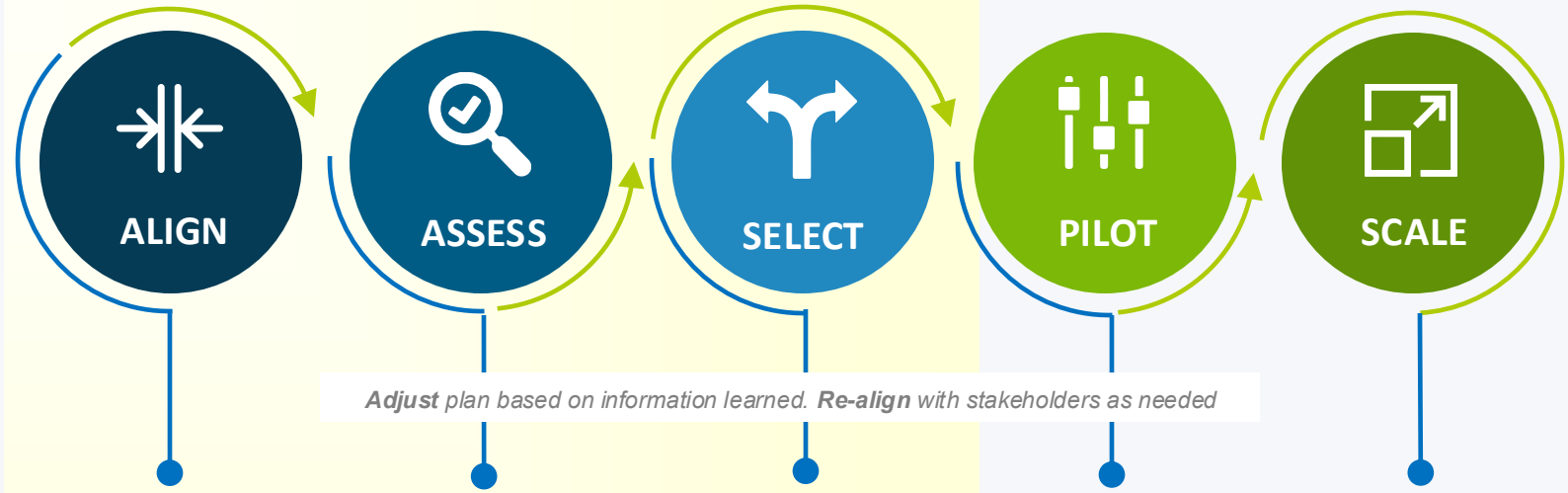
USE CASE:
Transform Applications using Documentation & Analysis

PHASED APPROACH TO APPLICATION MODERNIZATION



***Adjust** plan based on information learned. **Re-align** with stakeholders as needed*

ALIGN on Goals & Constraints

What are the goals?
- Business transformation
- Technology transformation

What are the constraints?
- Resourcing
- Budgets
- Timelines

ASSESS Application(s)

For each application, assess:
- Current state
- "To be" or future candidate requirements
- Costing options to migrate or transform technology

SELECT Path(s) to Modernization

For all relevant applications, determine where and when to:
- Extract, audit, & categorize the current policies (rules) & algorithms being run
- Optimize algorithms/code
- Transform rules/algorithms to target platforms & technologies

Start Small & run a PILOT

Structure pilot project based on:
- Code that is representative of full application
- Processes needed to achieve target state
- Intermediate deliverables to validate the approach

SCALE
- Scale once good processes and a path to success have been determined

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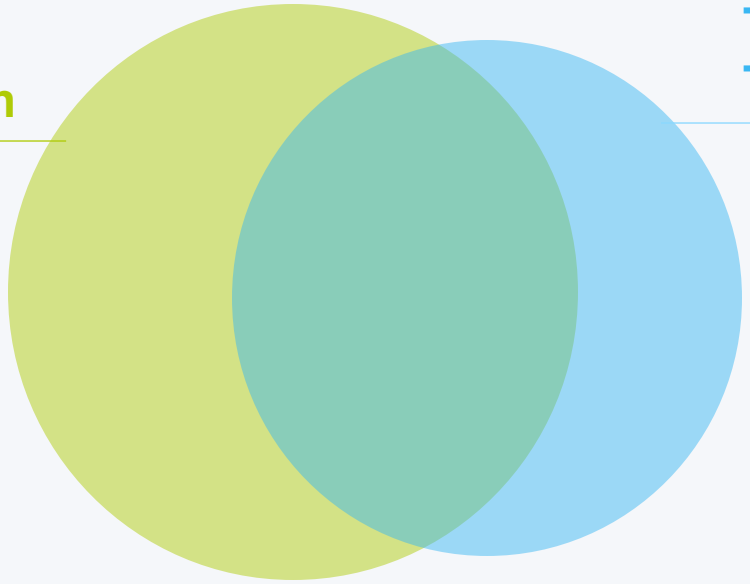
ALIGN on Goals and Constraints

IT teams and business stakeholders must work together to determine the goals for modernizing applications. They must also check in on organizational constraints and how that may factor into defining goals and preparing for modernization.

Business Transformation

- **Change in business/ environmental conditions**: Current applications can't keep up
- **Innovation**: Newer technologies allow businesses to try new things and redefine experiences



Technology Transformation

- **Excessive costs**: Legacy application operation, maintenance, and updates can become expensive both from a money and time perspective
- **Skills shortage**: The availability of personnel with the appropriate skills is getting rarer
- **Security risks:** Legacy applications were not built for the types of cyberattacks that occur today

How does my organization choose the type of transformation needed given our goals and constraints?

** Resourcing, budgets, and timeline constraints may affect the transformation types chosen*

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ASSESS Application(s)

Compile the inventory of applications that need to be reviewed to determine the best path forward. For each of these applications:

- Conduct a thorough assessment of the current state
- Compare these to the future functional and technological requirements
- Determine transformation options
- Adjust the plan and re-align with stakeholders as needed.

What should be included in the assessment?

Current State	Functional Requirements	Technological Requirements
Source application metadata including logistics, areas of optimization, dependencies, etc.	Updated policies and improved processes	Programming language
Legacy application architecture	Algorithms needed	Infrastructure and associated architecture
Data model, access details, and variable/constant usage	System interfaces needed	3rd party tools and platforms

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ASSESS Applications – Documentation & Analysis

Use the Intellisys Documentation & Analysis outputs to:

IDENTIFY

Identify core inputs to calculate level of **Investment** for the transformation types and paths to modernization you are interested in. Sample inputs include:

- Complexity metrics
- Lines of code
- Screens
- Interfaces
- Missing objects

DETERMINE

- Determine **Return on Investment (ROI)** for each transformation option and align with stakeholders on the best modernization path(s) forward.
- Use level of investment calculations* and your own expected qualitative and quantitative business return.

PLAN

Plan modernization pilot(s) and overall effort once ready to scale.

Contact us to learn how Intellisys uses automation to increase your ROI. We can help you calculate your time and cost savings by using the platform.

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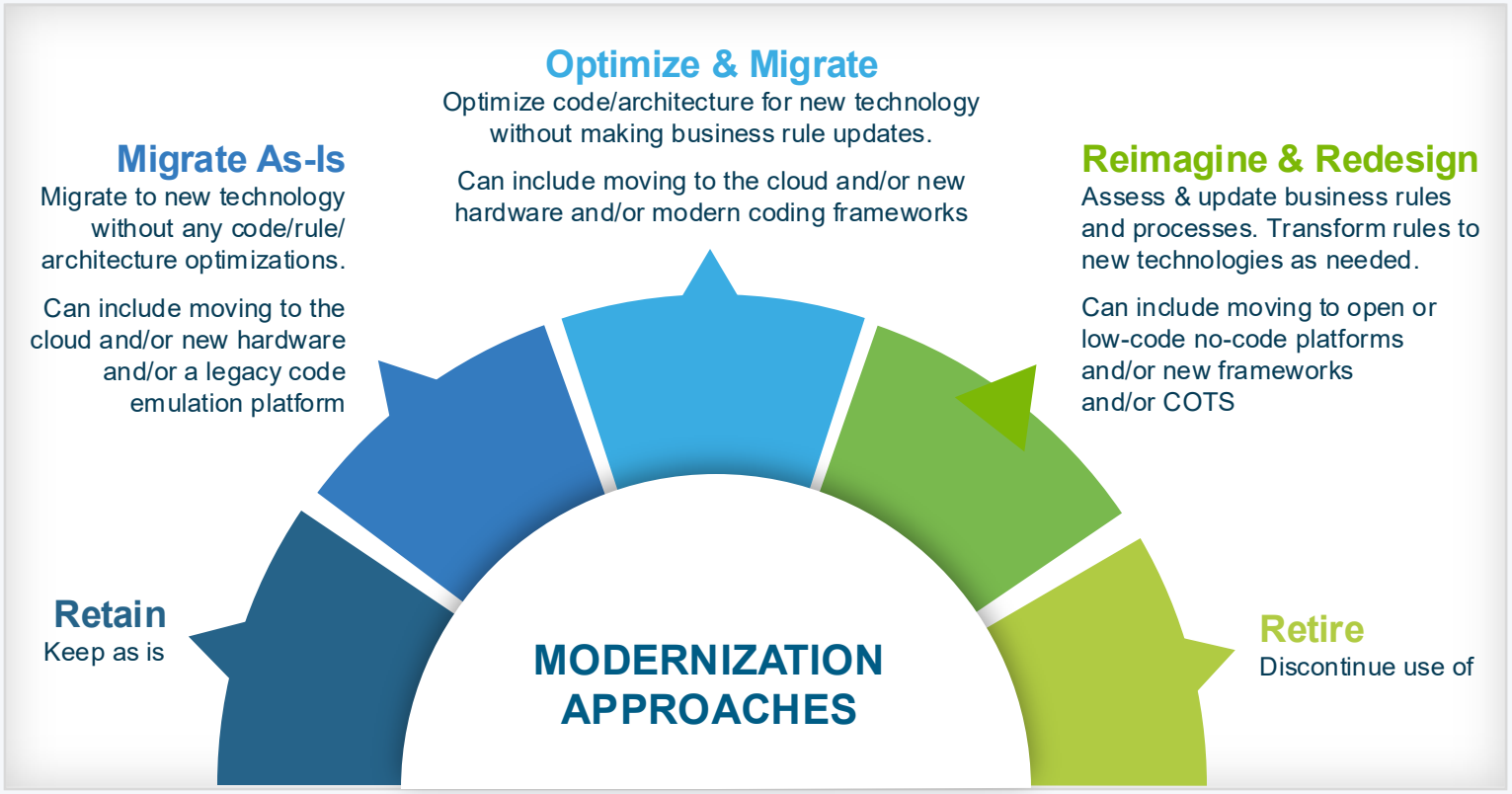
SELECT Path(s) to Modernization

Based on the transformation option chosen, there are several modernization approaches you can choose from.



Once a modernization path is chosen, the Intellisys Documentation & Analysis capabilities will help determine how to plan the initiative.

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MAJOR GLOBAL SERVICES PROVIDER

Deloitte

Deloitte, a global leading service provider, utilizes cutting edge tools and techniques to help their customers that have embarked on an application modernization journey. This initiative has become a high priority over the last few years and involves the discovery, mining, analysis, transformation and migration of both code and data. To optimize the process, Deloitte has partnered with best-of-breed solutions like EvolveWare's Intellisys Platform to automate the assessment, documentation, analysis and extraction of business rules—saving their customers valuable time and resources in the modernization process. Working together, EvolveWare and Deloitte have extracted and analyzed millions of lines of code.

Intellisys helped the client:

- Consistently generate assessment and analysis reports for applications written in multiple legacy and modern languages that range from COBOL, Assembler, PL/1 to C, C++, Fortran to C#.Net, VB.Net and Java
- Deliver documentation that is (1) quick-to-generate, (2) comprehensive, (3) understandable by analysts and programmers and (4) analyzable using automated features

GOALS

Generate assessment and analysis reports to determine optimal modernization paths .

HIGHLIGHTS

500 – 1M
lines of code
per month/server

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GOVERNMENT

UK Driver and Vehicle Licensing Agency

UK's Driver and Vehicle Licensing Agency is an executive agency sponsored by the Department of Transport that holds more than 49 million driver records and over 40 million vehicle records. The agency was experiencing escalating maintenance costs for its permit and authorization system for motor vehicles. They realized that a re-write of the system to a low-cost platform was the best solution. However, to execute on this, the agency needed to generate target specifications by extracting the source application's logic and database model with a high degree of accuracy. A team of analysts and SMEs leveraged the Intellisys platform to get them over the finish line after 2 years of manual efforts that had been largely unsuccessful.

Intellisys helped the client:

- Generate documentation for 1.2 million lines of Natural/ADABAS code in 4 weeks including logistics, dead code, connectivity diagrams, business logic, data model etc.
- Determine optimal target specifications after review and analysis that spanned about 4.5 months

GOALS

Prepare for a modernization effort to reduce rising maintenance costs

HIGHLIGHTS

1.2M
lines of code

4 weeks
to complete documentation

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GOVERNMENT

State Department of Transportation

A state's Department of Transportation was looking to adopt commercial-off-the-shelf (COTS) solutions to replace some of their business process mainframe applications. They needed to start by understanding their legacy applications and only had 2 part-time staff who understood the languages these applications were written in. And no current technical documentation was available. The agency turned to its longtime partner and IT Consultancy, Auctor, who in turn turned to EvolveWare and the Intellisys platform.

Intellisys helped the client:

- Streamline workflows by building an enterprise level repository for all applications across multiple programming languages
- Generate documentation for 1.65 million lines of code written in COBOL, C#.NET, and VB.NET
- Eliminate the risks and costs of needing to find additional support staff to understand how to navigate the development environment
- Perform continuous impact analysis and on-going maintenance for current code while waiting to move forward with the modernization effort

GOALS

Prepare for modernization effort to minimize risks of dwindling support staff

HIGHLIGHTS

1.65M
lines of code

5 months
to combine information across applications into single repository

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MEDIA COMPANY

BMI

BMI, a global leader in music rights management, has represented over 18 million pieces of musical work. The company wanted to determine a path to modernization for 3 of its applications, written in COBOL, VB6, and C#. Altogether, these applications consisted of 2.8M lines of code for which no documentation existed. With so many lines of code across multiple programming languages, this project was at risk of becoming a huge time and resource sink. BMI needed a tool that would provide them the full set of information they needed across all applications within a manageable time frame.

Intellisys helped the client:

- Generate documentation artifacts for all 3 applications
- Identify areas of optimization for possibly moving the applications to a third-party platform
- Analyze the artifacts that eventually led to a decision to rewrite all 3 applications to meet their requirements

GOALS

Prepare for modernization effort without wasting time or resources

HIGHLIGHTS

2.8M
total lines of code

3
applications

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THE INTELLISYS PLATFORM:
Key Documentation & Analysis Features

KEY FEATURES

- Web-based and may be installed on premises or hosted on the cloud
- Facilitates updates to documentation in an automated fashion
- Automatically generates a series of documentation artifacts, both graphical and non-graphical
- Detailed view into the connectivity between and within files, their composition and logic, as well as database accesses, details and dependencies
- Trace execution of statements and variables
- Trace data structures for batch applications
- Export logic in multiple formats including RTF, Excel, XML, Flowcharts and as Decision Tables
- Export extracted rules to business rule engines, business process management (BPM) tools and business rules management systems (BRMS) like IBM's ODM and Oracle's ODM

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The Intellisys Platform

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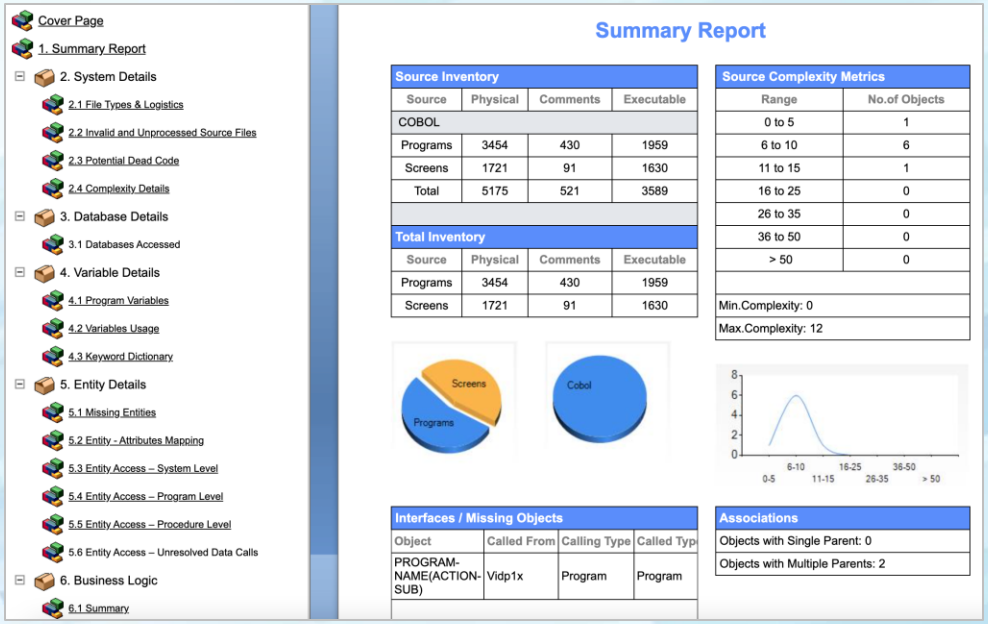
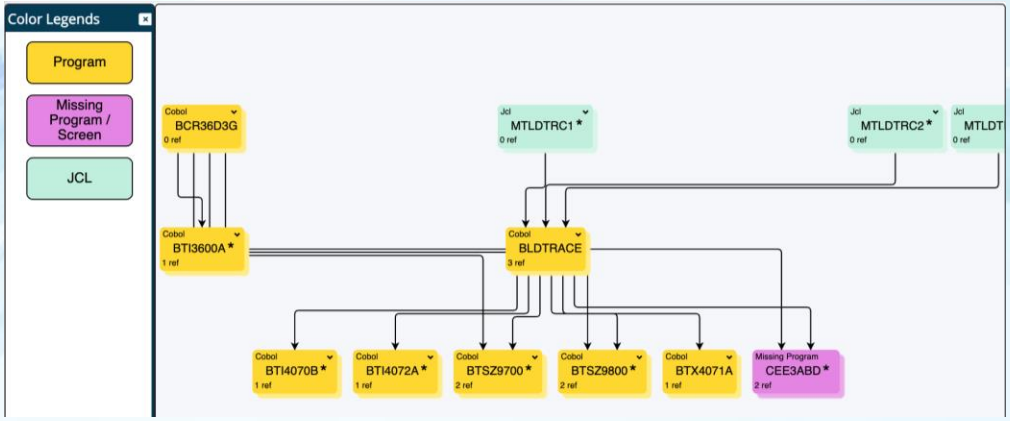
Assessment Report



Source System Diagram



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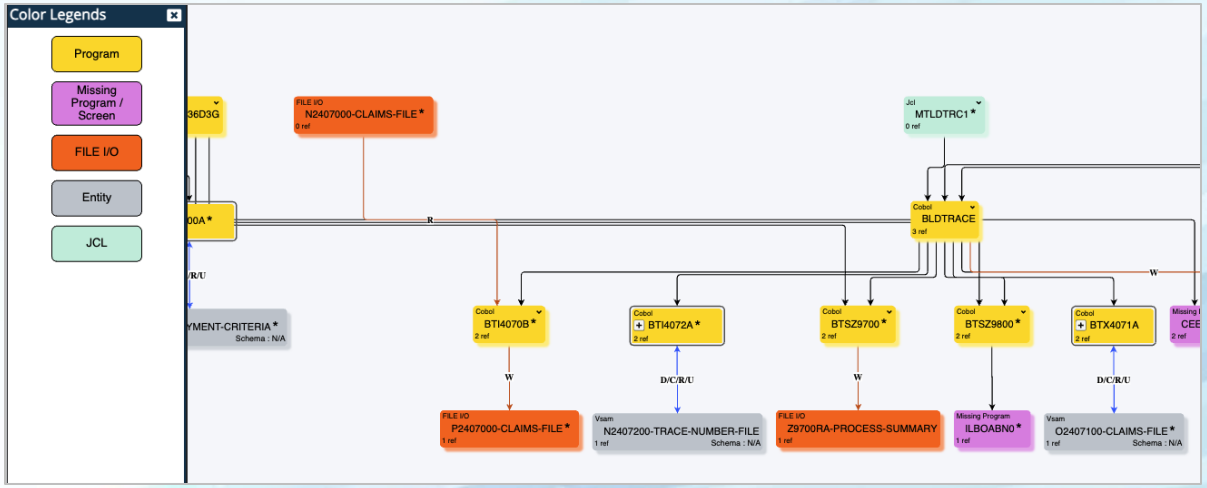
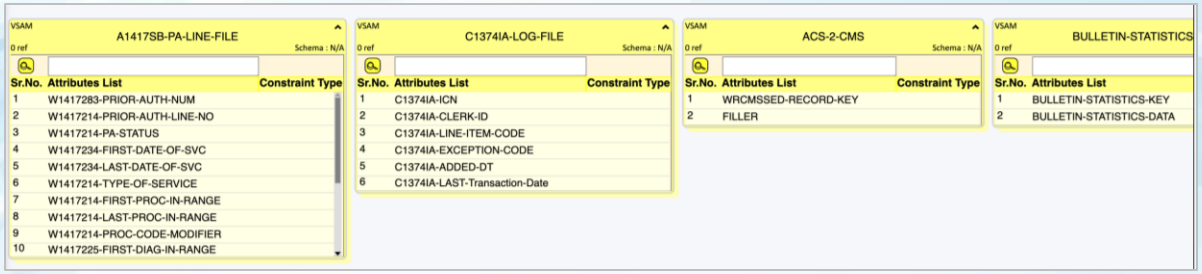
Data Flow Diagram



Entity Relationship Diagram



A1417SB-PA-LINE-FILE

Sr.No.	Attributes List	Constraint Type
1	W1417283-PRIOR-AUTH-NUM	
2	W1417214-PRIOR-AUTH-LINE-NO	
3	W1417214-PA-STATUS	
4	W1417234-FIRST-DATE-OF-SVC	
5	W1417234-LAST-DATE-OF-SVC	
6	W1417214-TYPE-OF-SERVICE	
7	W1417214-FIRST-PROC-IN-RANGE	
8	W1417214-LAST-PROC-IN-RANGE	
9	W1417214-PROC-CODE-MODIFIER	
10	W1417225-FIRST-DIAG-IN-RANGE	

C1374IA-LOG-FILE

Sr.No.	Attributes List	Constraint Type
1	C1374IA-ICN	
2	C1374IA-CLERK-ID	
3	C1374IA-LINE-ITEM-CODE	
4	C1374IA-EXCEPTION-CODE	
5	C1374IA-ADDED-DT	
6	C1374IA-LAST-Transaction-Date	

ACS-2-CMS

Sr.No.	Attributes List	Constraint Type
1	WRCMSSED-RECORD-KEY	
2	FILLER	

BULLETIN-STATISTICS

Sr.No.	Attributes List
1	BULLETIN-STATISTICS-KEY
2	BULLETIN-STATISTICS-DATA

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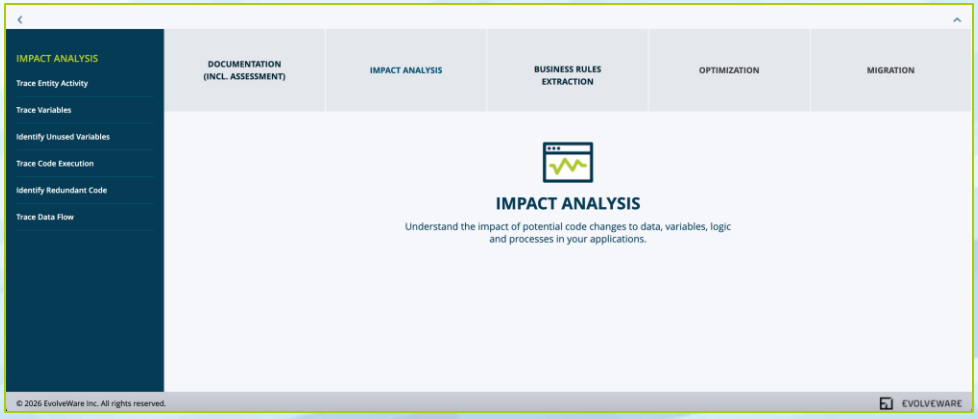
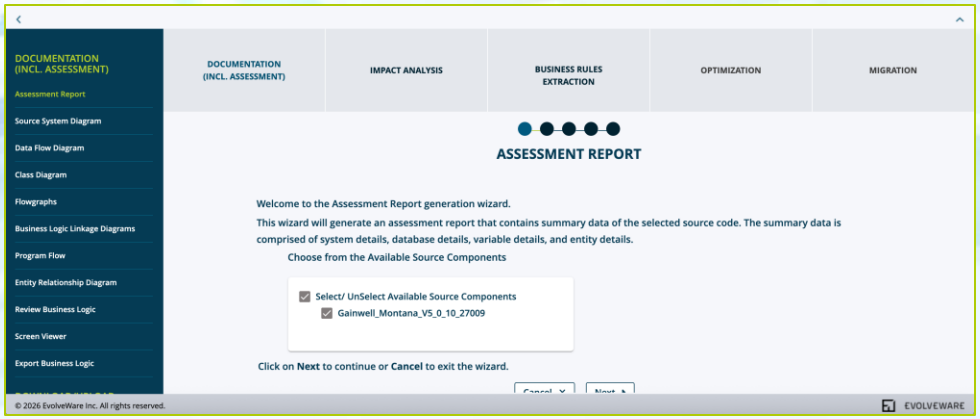


Documentation Reports Generation



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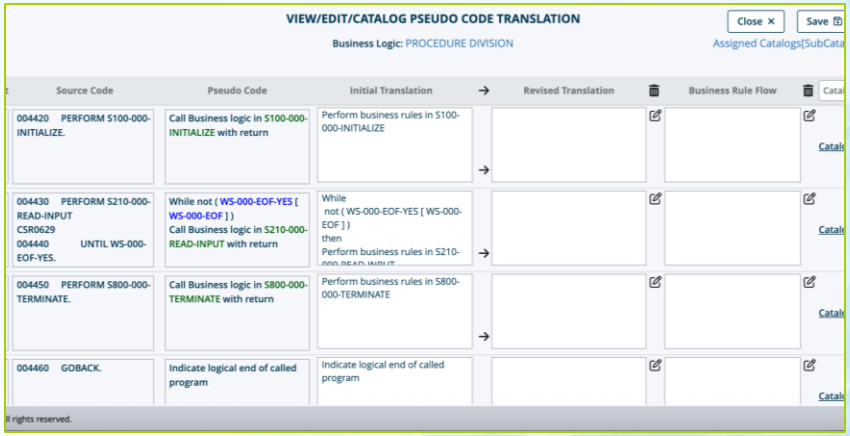
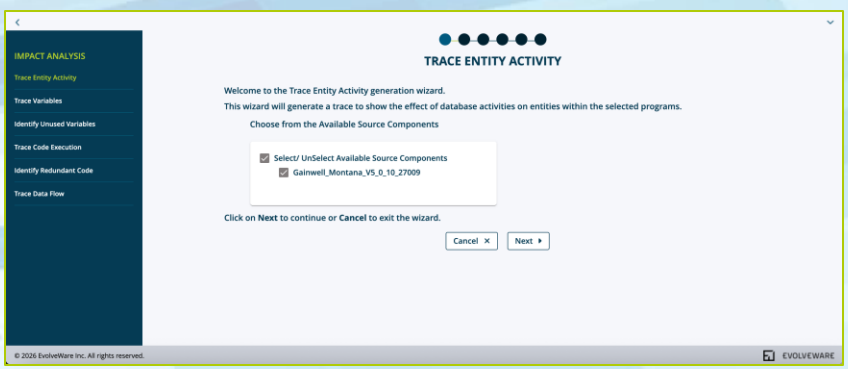


Logic in Multiple Formats

Analysis Reports Generation



Check out the video of full features on our site:
https://evolveware.com/documentation-and-analysis

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Interested in a demo or have questions about the Intellisys platform?

Email us at contact@evolveware.com

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About us

EvolveWare has been dedicated to providing enterprises, partners, and government organizations with a seamless application modernization journey since 2001. Its industry-leading Intellisys™ platform is the only solution that automates the core processes involved in maintaining and modernizing applications written in 20+ programming languages. Incorporating a unique, patented technology, this automation platform mitigates risk with a phased approach and delivers a truly agile modernization experience. EvolveWare is proud to have strategic partnerships with Deloitte and KPMG amongst others, and to have delivered successful results in record time for customers such as BMI, the State of New York, and the U.S. Department of Defense. Headquartered in Silicon Valley, CA, EvolveWare's global team is committed to continuous innovation, outstanding client services, and support. For more information, visit http://www.evolveware.com/.

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