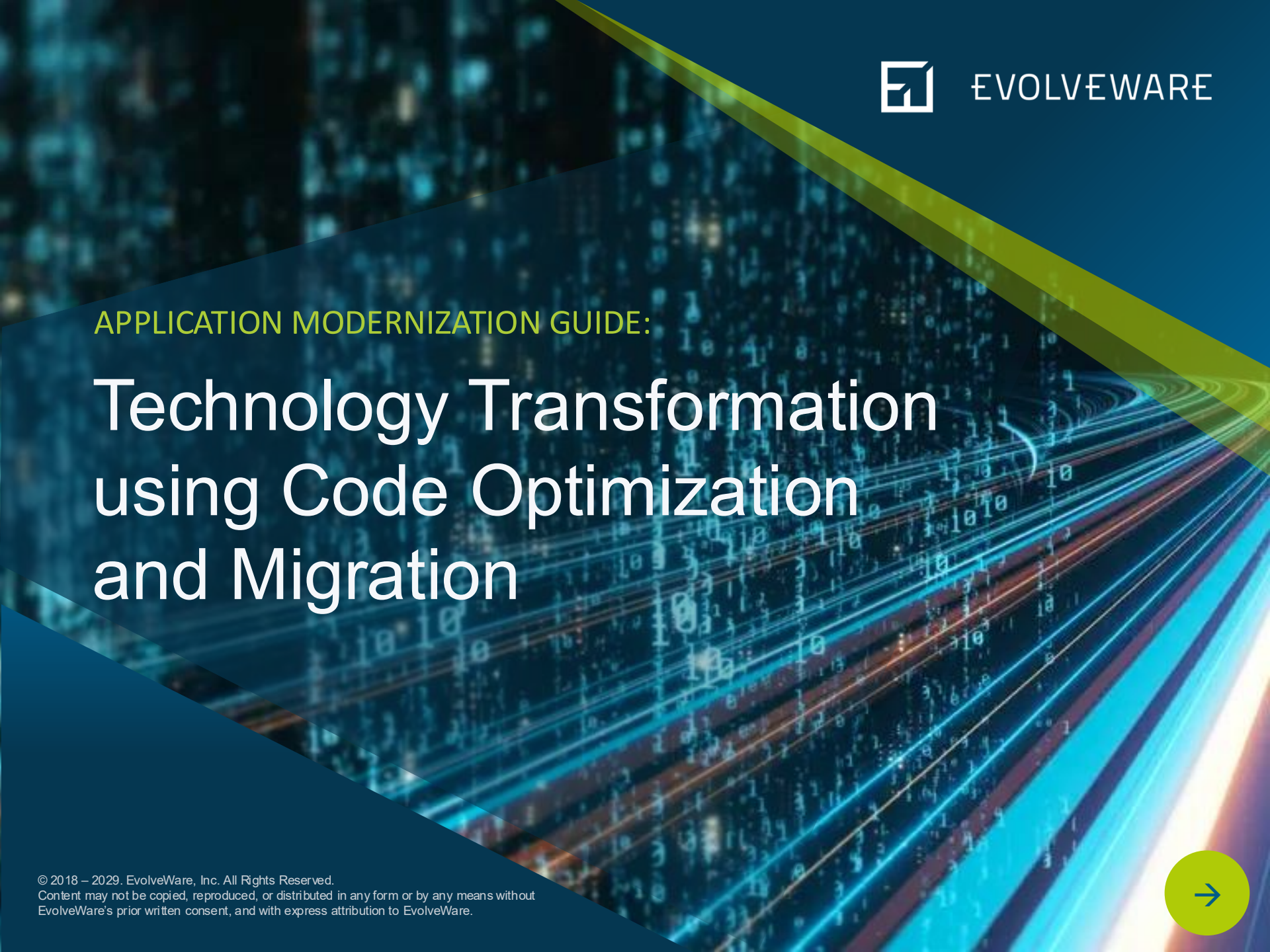

EVOLVEWARE

APPLICATION MODERNIZATION GUIDE:

Technology Transformation using Code Optimization and Migration

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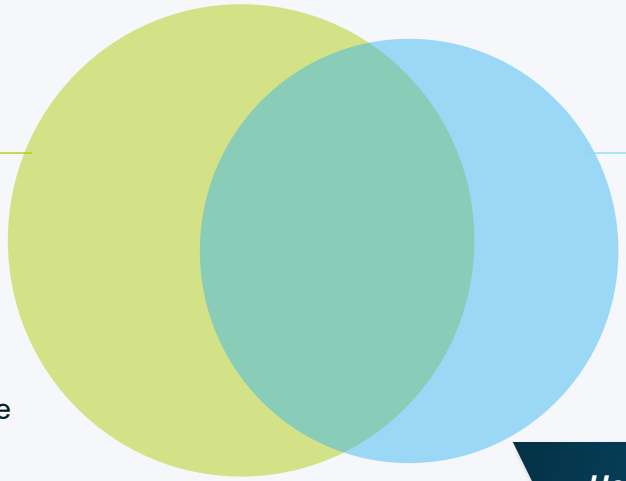
Introduction

Many organizations have created a portfolio of software applications over the years to solve multiple business needs. These applications have become increasingly expensive and difficult to maintain over time as the talent that built them are retiring out of the workforce. Additionally, as these applications have been patched and extended over the years, they have developed hidden security vulnerabilities, making them targets for hackers and ransom-seekers. The urgent need to reduce the dependency on legacy code and languages has spurred even those who initially were hesitant to pursue application modernization initiatives. These specific initiatives are usually part of technology transformations.

There are typically two types of transformation goals that application modernization facilitates:

Business Transformation

- Changing business model, processes, culture, and technology to achieve a significant improvement in performance and competitiveness.
- Larger in scope and can include technology transformations



Technology Transformation

Replacing outdated technology systems to reduce costs and risks of staff attrition and legacy technology

Here we will focus on Technology Transformations.

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Overview of the eBook

This e-book will focus on:

- Technology transformation and associated strategies
- Code migration methods and best practices
- Introduction to the Intellisys™ platform and its optimization and migration capabilities
- Case studies that demonstrate the business benefits clients have capitalized on by using Intellisys™ to successfully achieve technology transformations

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Technology Transformation & Strategies

A technology transformation typically includes some manner of modernizing applications by migrating them to new technologies and environments such as a modern language or the cloud where relevant.

Drivers for Technology Transformations

End of life for the legacy technology

Scarce support resources skilled in legacy technology

Poorly constructed code making it difficult/risky to maintain and update

Lower risk by conducting a Technology Transformation prior to a Business Transformation

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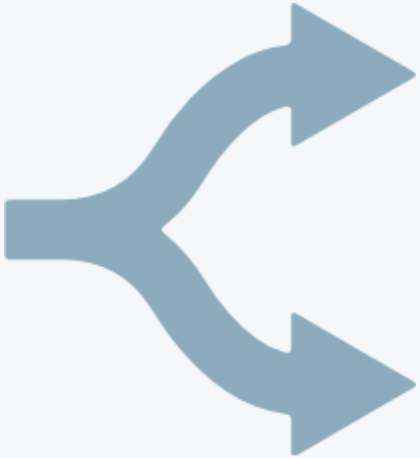
Technology Transformation & Strategies

If your organization has determined there are no business or environmental changes requiring substantial enhancements to your application(s), you will typically migrate the code to modern technologies as part of a pure technology transformation.

There are two ways to go about this:



Migrate As-Is

Move to modern technologies as is

Optimize & Migrate

Move to modern technologies with application code and architectural changes

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Code Migration Methods

There are two common methods to migrate application source code: Migrate As-Is also known as a lift-and-shift or Optimize & Migrate also known as refactoring. While Migrate As-Is may make sense for a limited number of applications, optimizing the code and then migrating to modern languages and architectures generally provides better long-term value.

	✔ PROS	✘ CONS
Migrate As-Is (Lift-and-shift) *Application is migrated line by line to a modern language with no changes to code or architecture*	• Lesser upfront effort • Can be quicker to migrate with run-time dependencies	• Lower cost savings and productivity improvements • Current technical debt and vulnerabilities transfer into target application
Optimize & Migrate (Refactor) *Application goes through code and/or architectural optimizations before being migrated*	• Realize full benefits and cost advantages of the cloud • No code bloat in migration • Maintainable & scalable • Vulnerabilities removed & technical debt reduced	• Requires time and resourcing • Can be more expensive upfront

Technical debt consumes 21–40% of IT spending
(Deloitte, Global Technology Leadership Survey)

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Code Migration Challenges

When migrating legacy applications, you want to make sure you are making the best long-term decision to minimize overall costs and maximize your ROI. Here are some common concerns:

UNDERSTANDING

Lack of in-depth understanding of the source code compromises ability to generate scalable future applications

TIME

Requires upfront time and resources to design and successfully migrate to future application

AGILITY

Lengthy set up time. Need to accommodate code freezes during understanding and optimization phases

USABILITY

Source or target language, framework, and/or architecture not supported. Migrated code is not maintainable or scalable

CHALLENGES

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Solution: Optimization & Migration on Intellisys™

Intellisys™ is the **only software modernization platform that applies AI and 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 modernization effort.

Its Optimization & Migration solution addresses the challenges outlined by providing the breadth of information, features, and intelligence required to create maintainable and scalable target code in cloud native architectures with no traditional set-up time and no run-time dependencies.

UNDERSTANDING	TIME	AGILITY	USABILITY
AI powered, detailed meta-data extraction from source code, including the embedded business logic, algorithms, dependencies, and data accesses	Automation applied to analysis and optimization of the meta-data prior to migration. AI powered generation of tech specs and transformation – **90%+ of code automatically converted**	**No traditional set-up time needed** and ability to transfer on-going code updates made to the legacy application into the source code repository during optimization phase	**Support for 20+ source languages** and most commonly used modern languages and frameworks. Ability to generate modern code in flexible architectures. Target applications have **no run-time dependencies** and **zero vulnerabilities**

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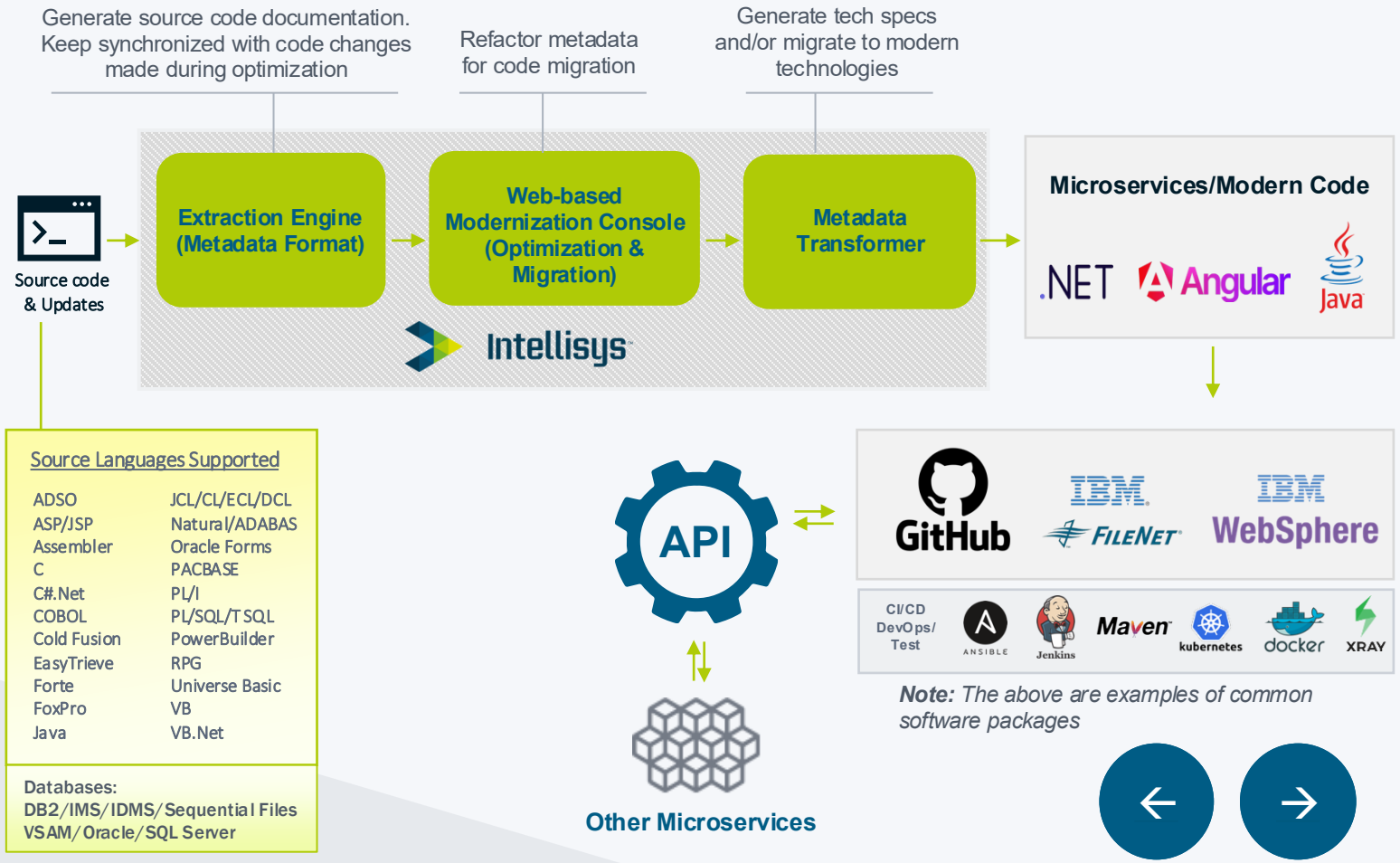
Intellisys – Code Optimization & Migration for a Technology Transformation



Note: *The above are examples of common software packages*

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Intellisys – Tech Specs Generation

Technological specifications (Tech specs) describe the requirements, features, and characteristics of a product or system

Why migrate code using tech specs?

The benefits that they bring to modernization include:

- **Developer-neutral documentation** so that organizations are not tied to talent that understands the system's original programming language
- **Easier future maintenance**, since system changes happen at the spec level instead of through granular code edits

The Intellisys platform uses GenAI to automatically generate tech specs — and then generate code in modern technologies from those specs.

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Business Benefits of Optimization & Migration on Intellisys™

TIME TO GENERATE APP DOCUMENTATION	Time to get to the information needed to plan out your modernization project	90%+ Intellisys **Reduction in time** to generate application documentation*
AUTOMATION RATE	In addition to accelerating timelines, automation ensures that teams understand the full scope of their applications and don't miss critical information in the optimization and transformation process	100% Intellisys **Automated extraction** of metadata* 90%+ **Automated conversion** of source code metadata into modern language with no run-time dependencies*
TIME TO IMPLEMENT SYSTEM	Ultimately, success is migration to a modern, scalable system without losing key capabilities	40%+ Intellisys **Reduction in time** to implement target system including project management & testing*

*as per partner evaluations

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Insurance

Global Insurance Company

A Fortune 50 insurance company faced critical risks across their legacy systems powering insurance policy renewals, premium calculations, and claims processing. These fundamental applications are essential for ensuring revenue, maximizing profitability, and minimizing operational risk. The organization confronted three major challenges with their existing systems:

- Shortage of Qualified Support Personnel
- Critical Security Vulnerabilities
- Escalating Operational Costs

Recognizing that these risks would soon become prohibitive, the insurance company initiated a comprehensive global modernization effort.

Intellisys helped the client:

- Generate comprehensive documentation artifacts at 100% automation
- Migrate just under 2MM LOC from several legacy technologies to modern languages and frameworks using an AI-centered process which passed all test cases.
- Execute this part of the project in a total of 9 months including delays on the customer end.

PROJECT HIGHLIGHTS

6MM

6MM lines of COBOL, Oracle Forms and Reports, legacy .NET, and PL/SQL stored procedures

95%

complete and compilable code

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Federal Government
U.S. Air Force

A U.S. Department of Defense agency's critical recruitment management system had been compromised due to problems with keeping the application up and running. It had been installed on an old operating system that was no longer being supported. In addition, little knowledge existed in the agency about the workings of the system, which had been developed over several years using third-party vendors. The combination of multiple legacy technologies along with lack of support personnel made the system complex and impossible to maintain and extend.

Intellisys helped the client:

- Modernize the COBOL/Pro-C source code to a Java/Hibernate application with enhanced process interfaces
- Convert batch scripts to Windows PowerShell scripts
- Reduce maintenance cost by creating a target application that had no runtime dependencies
- Execute the project in a total of 6.5 months (document, modernize, convert, test, and deploy the source system)

PROJECT HIGHLIGHTS

220K
lines of legacy COBOL/Pro-C code

100%
automated extraction of meta-data

6.5
months to transform to a modern Java system

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Local Government
Arlington County

Arlington County had two complex systems, the Client and Service Event System (CASE) and the Purchase of Service System (POS) that were incurring increasing maintenance costs and were neither scalable or extendible. These systems were written over 20 years ago in COBOL, CA-IDEAL and DATACOM and were installed on an IBM mainframe. The County had invested a considerable amount of time and resources in accumulating business drivers in the systems, and it simply was not possible to throw away this investment and start from scratch. At the same time, migrating to modern platforms was not without risk.

Intellisys helped the client:

- Automate 100% the extraction of embedded information from roughly 500K lines of source code distributed across COBOL, CA-IDEAL, and DATACOM
- Optimize the extracted information in preparation for generation of modern, web-based code that would be scalable and maintainable
- Automate the generation of target systems in C#.Net code in 8 months. Automation rate achieved was 82%
- Experience no performance degradations in newly generated systems and resulted in extensive operational cost savings

PROJECT HIGHLIGHTS

500K
lines of source code

80%+
automated generation of target system with no run-time dependencies

Zero
performance degradation

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Financial
Global Investment Company

An American multinational financial services firm looked to modernize a legacy transactional system written in COBOL that was running on IBM's AS400 system. The modernization project required reverse-engineering of the COBOL application, optimization of the extracted meta-data, and transformation of the optimized meta-data to Java and PL/SQL code using Oracle as a database. The client felt that the complete set of automated capabilities provided by Intellisys was the ideal solution to facilitate the migration while mitigating risks.

Intellisys helped the client:

- Extract meta-data from approximately 300,000 lines of iSeries COBOL code
- Analyze and optimize the extracted meta-data
- Automate the transformation of code to:
- Java with Hibernate and Struts
- PL/SQL for Oracle 12c
- Generate documentation for the new Java and PL/SQL application

PROJECT HIGHLIGHTS

87%
automated transformation rate

8 months
to place target system into production

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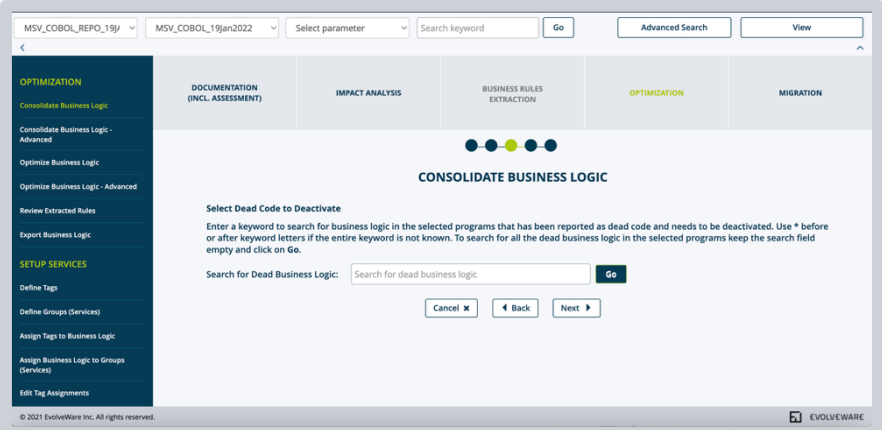
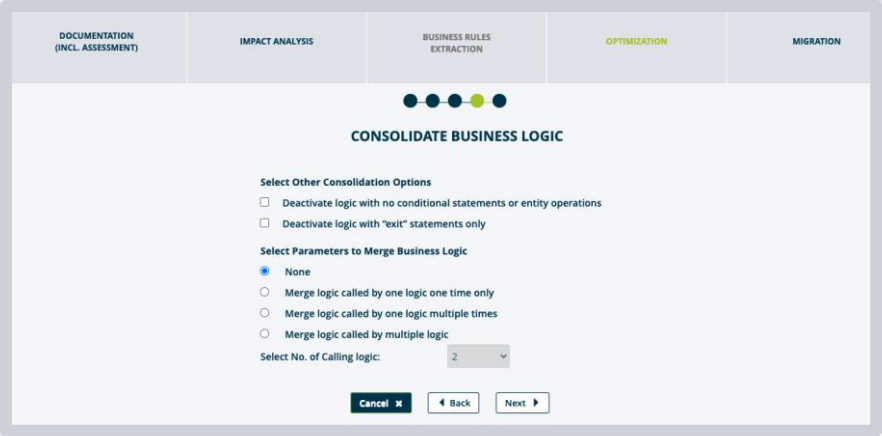
The Intellisys Platform

Key Features: Consolidate Business Logic





- Identify and deactivate dead & unwanted code.
- Bring together disjointed processes.
- Reduce redundancies reported in documentation reports by creating callable functions.
- Reduce complexity reported in documentation reports to ensure generation of maintainable and scalable target code with zero vulnerabilities.

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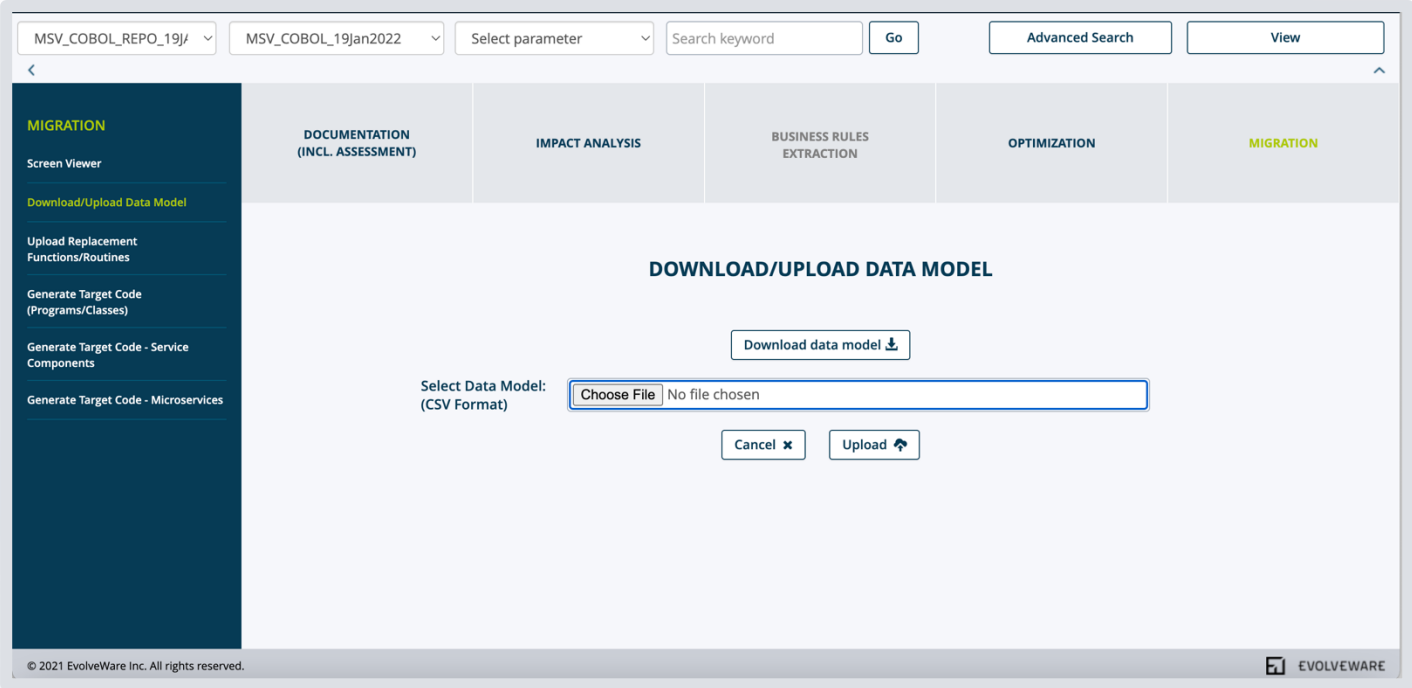
The Intellisys Platform

Key Features: Download/Upload Data Model



Download source data model and upload normalized data model for the target environment.

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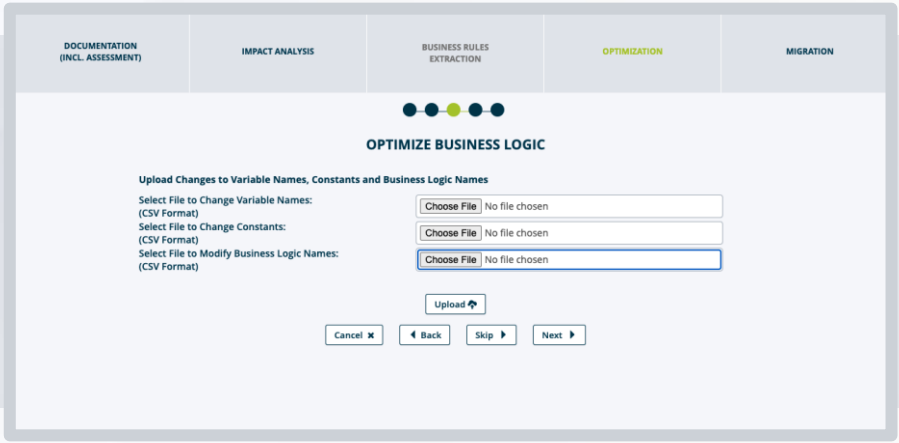
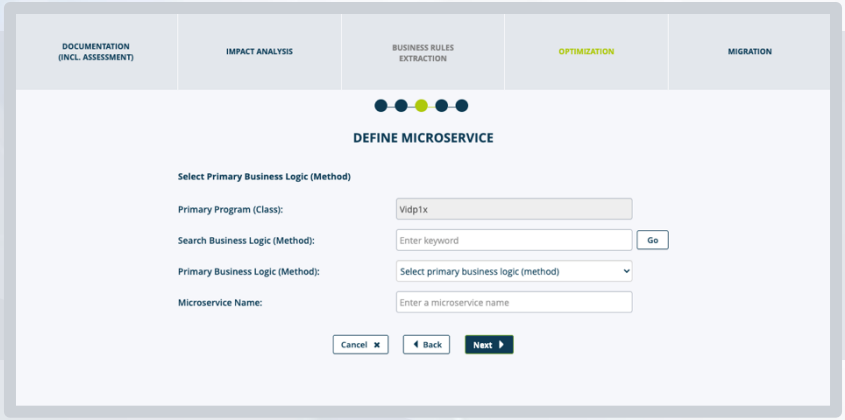
The Intellisys Platform

Key Features: Optimize Business Logic & Define Microservices

Optimize business logic

- Rename variables, constants and extracted logic to ensure generation of readable new code.
- Replace standard source functions with target functions in the desired target language.





Define microservices

- Allows generation of microservices for modern languages like C# and Java.

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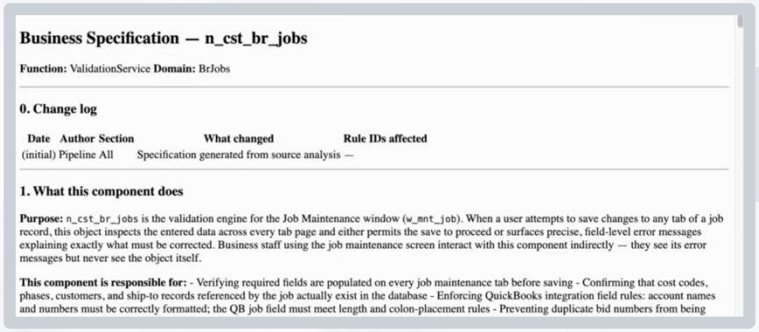
The Intellisys Platform

Key Features: Generate Tech Specs & Migrate to Modern Code



Business Specification — n_cst_br_jobs

Function: ValidationService **Domain:** BrJobs

0. Change log

Date	Author	Section	What changed	Rule IDs affected
(initial)	Pipeline	All	Specification generated from source analysis —	

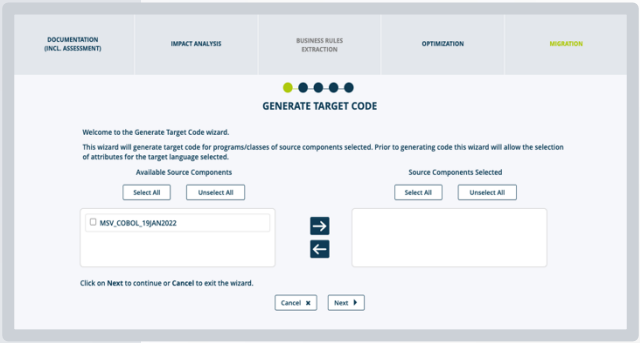
1. What this component does

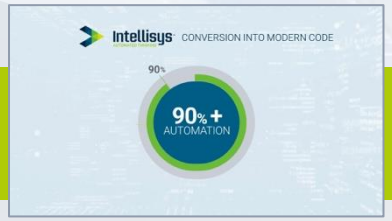
Purpose: `n_cst_br_jobs` is the validation engine for the Job Maintenance window (`w_mnt_job`). When a user attempts to save changes to any tab of a job record, this object inspects the entered data across every tab page and either permits the save to proceed or surfaces precise, field-level error messages explaining exactly what must be corrected. Business staff using the job maintenance screen interact with this component indirectly — they see its error messages but never see the object itself.

This component is responsible for: - Verifying required fields are populated on every job maintenance tab before saving - Confirming that cost codes, phases, customers, and ship-to records referenced by the job actually exist in the database - Enforcing QuickBooks integration field rules: account names and numbers must be correctly formatted; the QB job field must meet length and colon-placement rules - Preventing duplicate bid numbers from being

Generate technical specifications using LLM technology

- Transform optimized meta-data or tech specs to generate code with no proprietary libraries i.e. the generated code can be maintained using standard development environments.
- Generate code that is 90% or more complete i.e. 90% or more of the source code will be automatically converted to target code.
- Allows selection of architectures and a desired framework for modern technologies like Java.





Check out the video of full features on our site: https://evolveware.com/code-migration

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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 AI-augmented 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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