

Autonomous Underwriting: Driving Fundamental Changes with AI

An overview of the most advanced autonomous
solution for mortgage underwriting

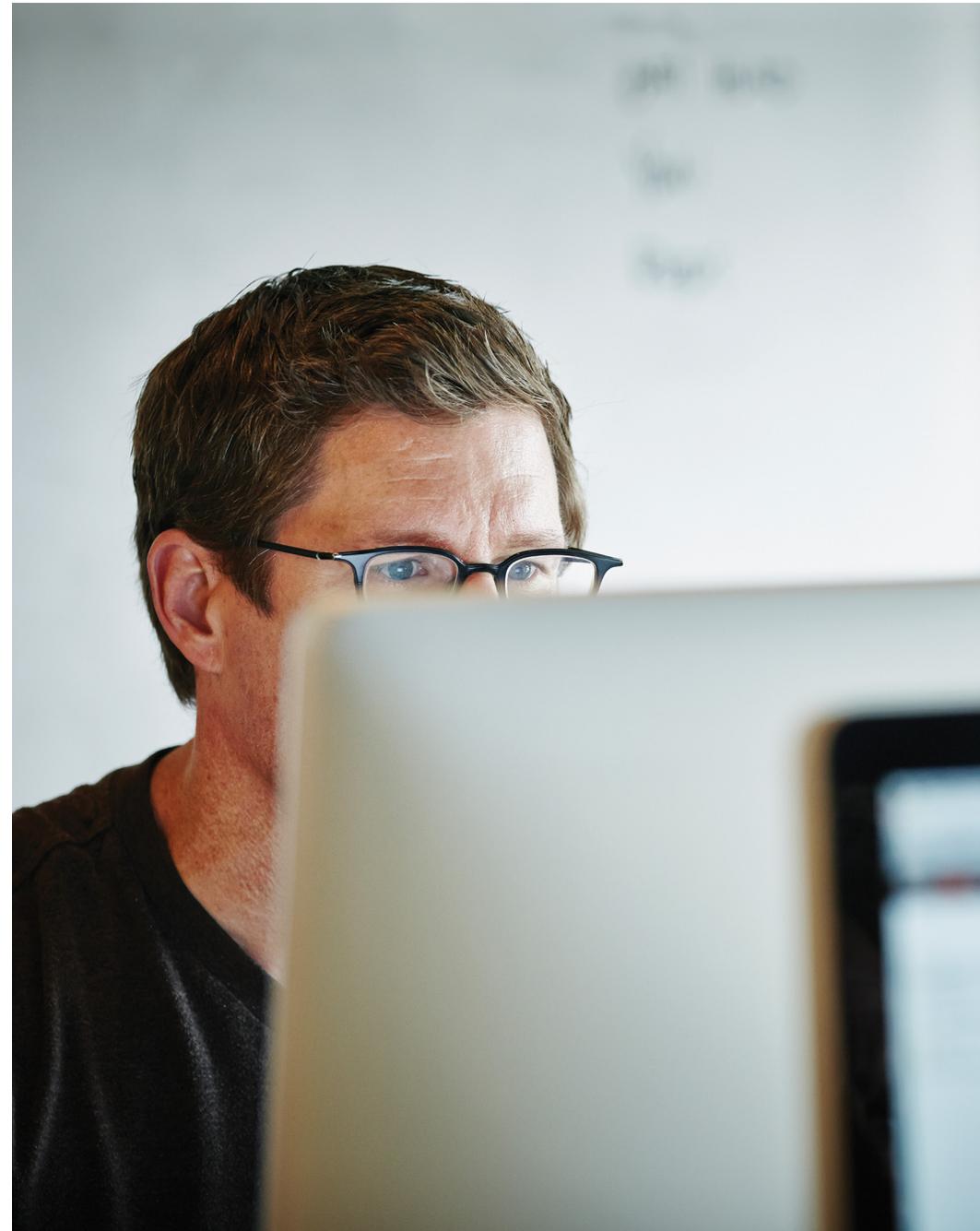
EllieMae[®]

Technology Powering
the American Dream[™]



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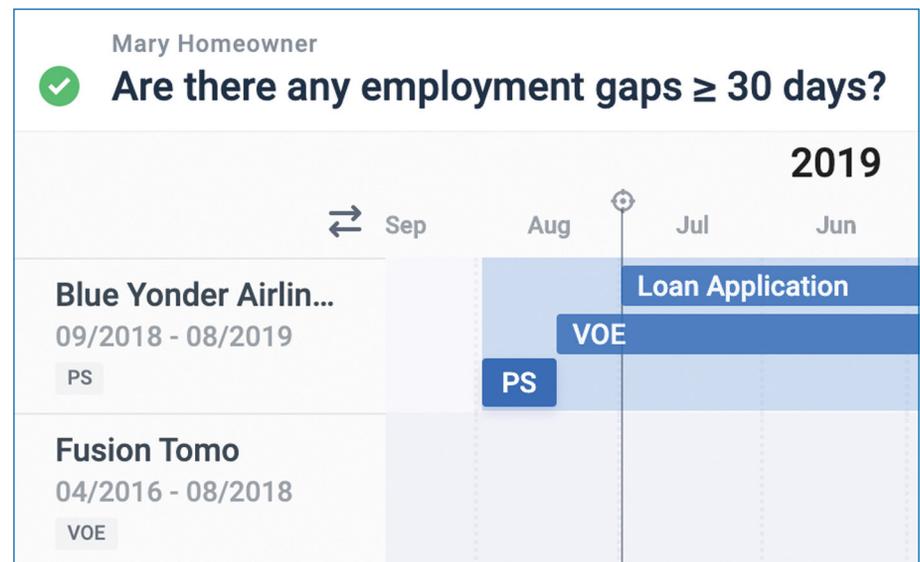


A New Approach to Underwriting

Ellie Mae reexamined the entire underwriting process to identify a new approach that uses technology for scalable productivity gains, balanced with the expertise and judgment of human review. Rather than simply automating a series of tasks, Ellie Mae examined each type of loan and the processing and analysis needed for each loan component. This line of questioning brought about key insights that enabled new underwriting process considerations.

It became apparent that technology could almost entirely handle more basic loan scenarios because the data was simpler and the calculations more straightforward. Then, over time, the solution could be augmented to handle increasingly complicated loan scenarios. This new approach fundamentally changes how mortgage originators work, using enabling technology to handle more underwriting tasks than previously thought possible and with record-setting accuracy and efficiency.

At the forefront of advancements in data, artificial intelligence (AI) and process automation, Ellie Mae AIQ™ is the most advanced solution delivering comprehensive automation technology for underwriting. The goal was to start with the most common components first and then work down the spectrum of tasks completed by underwriters. For example, Ellie Mae classified loans into over 20 scenarios, from lowest to highest complexity, including base salary wage earnings, base hourly wage earnings, overtime, commission, self-employed, as well as other fixed and variable income types.



Wage earners comprise the majority of loan production (50–70+) for originators, while other income types waterfall into more granular classifications, with self-employed as the most complex but least prevalent (10–20%). As an initial priority, Ellie Mae focused on building a solution that addresses the 50–70+% of loans from wage earners through its autonomous software for “touchless” (i.e., no human intervention) underwriting.



With the income foundation firmly set for autonomously underwriting the majority of loans, Ellie Mae continues to expand its footprint to address not only additional income scenarios, but also a full build out of automation for asset and credit analyses. The analysis of other data points and rule sets supporting the analysis of credit reports beyond what AUS findings identify are also part of the roadmap for full automation.

Autonomous Underwriting Technology

While artificial intelligence solutions have a strong legacy, it is their application to mortgage-specific underwriting scenarios that has enabled the industry's first autonomous solution at scale. Several types of expertise are required to build the complex technologies that power an autonomous underwriting solution, which is why it has been so difficult for the industry to execute to date.

First, layers of technologies are needed to accurately extract, and then organize data from loan files and evidence so that it is automation-ready. Second, a host of automation technologies are needed to execute underwriting tasks. Third, clear workflows and an intuitive user experience are required to enable underwriting teams to address any exceptions that require human review. All of the technologies must execute both individually and in concert to ensure that mortgage lenders can successfully realize the immense benefits of autonomous underwriting.

Assembling automation-ready data requires a combination of advanced machine learning techniques and streamlined exception handling.

What constitutes automation-ready data?

- Correct data is used
- Data is sourced from the correct document or data field
- Data has been verified for accuracy and always maintains a link to its source
- Data has the flexibility to be updated if a new version is ingested
- Data is mapped so it can be accessed and used at any time



Ellie Mae AIQ's document and data extraction/recognition capabilities have advanced using an ensemble of deep learning techniques that provide system-wide accuracy levels of 99+% for learned documents. While important, they are only the first step in the process.

In addition, the solution's machine learning extends to its data audit and data rationalization functionality. These building blocks comprise the most advanced cloud storage system that maintains every document and data point, adds relevant data associations (such as data tied to each borrower), and tags the "final" data while enabling automatic updates.

To automate underwriting, entirely new software had to be created. Ellie Mae translated hundreds of conditional "if, then" investor guideline requirements into clearly defined rules that the system can execute at scale. Ellie Mae AIQ then applies the rules and algorithms to the appropriate automation-ready datasets to adhere to investor guidelines for income, assets, credit review, and ultimately every aspect of the underwrite.

With the exception-based automation that Ellie Mae AIQ provides, lenders enjoy the best of both worlds—adjusting to be autonomous (or "touchless") for standard loan scenarios, and semi-autonomous (or "low-touch") for scenarios that require human review.

DATASET

98% Complete

	DATA LIBRARY	LOAN APPLICATION	W-2	PAYSTUB
Name	John Homeowner	<input type="radio"/> John Homeowner	<input checked="" type="radio"/> John Homeowner	<input type="radio"/> John Homeowner
Total Income	\$110,000	<input checked="" type="radio"/> \$110,000	<input type="radio"/> \$112,000	<input type="radio"/> \$110,000
Employer	Best Company	<input type="radio"/> Best Company	<input checked="" type="radio"/> Best Company	<input type="radio"/> Best Company
Position	Engineer	<input type="radio"/> Engineer	<input checked="" type="radio"/> Engineer	<input type="radio"/>

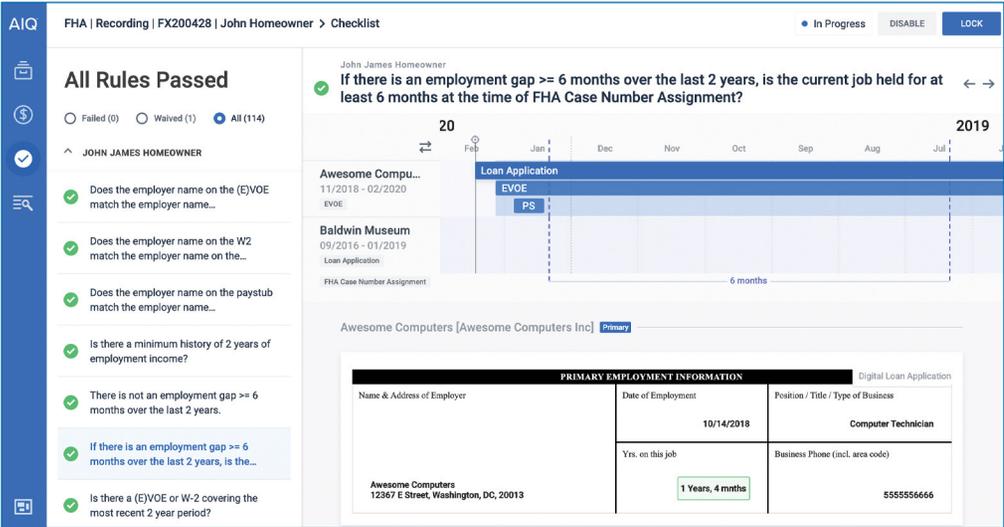
The User Experience

Ellie Mae AIQ provides a streamlined user experience, where back-end technology handles the complex recognition and organization of automation-ready data and its subsequent automation.

Now unburdened from manual calculations, checklists, and a monotonous “stare and compare” routine, underwriters can focus on applying their knowledge and experience to review exceptions via an intuitive interface.

Lenders also enjoy upstream benefits since Ellie Mae AIQ enables the initial origination, processing and loan setup tasks to be performed more accurately and completely, removing these tasks altogether from the underwriting function. By freeing up high-value underwriters to focus on exercising judgment rather than performing manual tasks, lenders realize lower costs and improved efficiency—key drivers to a more profitable operation. While other solutions in the market offer touchless components, the usage rates have been low thus far. Ellie Mae AIQ drives greater scale since it creates a greater productivity lift on a far larger population of loans.

Now unburdened from manual calculations, checklists, and a monotonous “stare and compare” routine, **underwriters can now focus on applying their knowledge and experience to review exceptions via an intuitive interface.**



The chart below underscores the efficiency gains of Ellie Mae AIQ, with a comparison of the traditional underwriting review process versus an automated underwriting solution, and cases where human intervention is no longer required (“touch removed”).

Traditional underwriting review process	Autonomous underwriting solution	Touch removed
Documents are gathered during setup but no logic exists regarding qualifying amount calculations for true income, assets or liabilities	Documents are presented to the document management system to calculate qualifying amounts and to identify missing documents	X
Loans are typically routed to underwriting by program type	In addition to program type, loans can be routed by difficulty to enable smarter assignments to team members	
Underwriter reads AUS message and attempts to gather all of the required documentation to meet guidelines, engaging in time-consuming “stare and compare” of docs and data	Underwriter is not needed—documents are recognized, categorized and labeled through various layers of data recognition	X
Underwriter begins income analysis by reviewing all of the income documents presented in order to determine which data to use	Underwriter is not needed—data is automatically extracted, natural language processing and machine learning perfect the data, and a final automation-ready data set is provided	X
Underwriter uses manual worksheet or calculator to determine eligible income amount, introducing potential for manual error	Underwriter opens Ellie Mae AIQ and views results; any issues are flagged in red for the underwriter to review and resolve within an intuitive user interface	
Underwriter manually completes income worksheet	Worksheets are auto-completed to memorialize the analysis results	X
Underwriter may need to halt analysis to request additional data	Step not needed—lenders can choose to not send Ellie Mae AIQ loans to underwriting until the documentation is fully gathered	X

With the new process implemented using Ellie Mae AIQ, many loans will not be routed to underwriters or can be reviewed by more junior level staff since they follow a well-defined set of rules. Thus, for the company as a whole, the combination of autonomous processing for certain loan scenarios and faster loan analysis for underwriters leads to the large productivity benefit, which Ellie Mae conservatively estimates at eight new loans per underwriter per day.

Driving Results for Lenders

Ellie Mae AIQ has been driving impressive results—below are highlights summarized from lenders using Ellie Mae AIQ to gain a competitive advantage with faster closings.

Traditional underwriting at high loan volume is error-prone

- In over 50% of cases, underwriters do not execute 100% of guideline requirements with complete accuracy
- Ellie Mae AIQ avoids these mistakes because it identifies the appropriate income sources, applies a consistent set of rules, and automatically flags exceptions for underwriters
- As an example, Ellie Mae AIQ only uses the correct earnings for base income calculations and excludes unqualified overtime or bonus income that is not consistent over a two-year period

Autonomous underwriting improves efficiency and accuracy across loans

- The elimination of manual calculations and data entry into worksheets and checklists removes significant risk from the process
- Ellie Mae AIQ captures all exceptions, decisions made, and reasoning for decisions—providing a clear audit trail with traceability and ability to confirm derived values
- Higher-quality underwriting leads to fewer defaulted loans, translating to fewer audits and buybacks



>30%
increased productivity



400%
average customer ROI



10 hours/week
reclaimed time per employee

Autonomous underwriting delivers unprecedented velocity

- Specific features of Ellie Mae AIQ lead to outsized productivity gains:
 - Summary view improves efficiency by enabling review “at a glance”
 - Underwriters can quickly model different scenarios for income, assets and credit
 - Easy access to evidence removes need to hunt for info in a file
 - Automated worksheets reduce time and transcription errors, compared to creating the worksheets from scratch
- Ellie Mae AIQ enables downstream improvements:
 - Allows loan officers and processors to access underwriting logic without sending partial documents to the underwriter
 - Provides better guidance to the borrower regarding “how much house” the borrower can afford
 - Improves loan package submission quality to avoid multiple underwriting touches
 - Reduces rework time between processor and underwriter
 - Reduces rework time between auditor and underwriter
 - Accelerates loan delivery and allows underwriters to deliver on SLAs to investors more rapidly

“Ellie Mae AIQ has been an innovative partner throughout this process. Their understanding of the mortgage business helped us build a customized solution that boosts productivity across channels.”

Maria Fregosi, Chief Capital Markets Officer
Home Point Financial

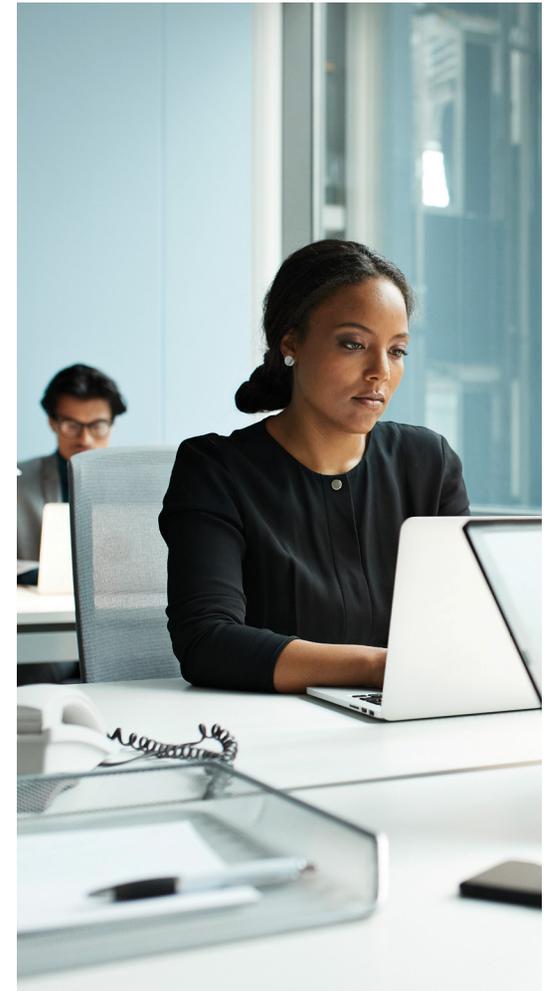
Implementation

Ellie Mae AIQ is a cloud-based software solution that can be configured to a lender's environment within 90 days. It enables the underwriter to view results from within the Ellie Mae AIQ interface, clear any exceptions noted, and then move forward with updating the LOS data and condition status.

Further value is realized since documents and data are also synchronized across Encompass® by Ellie Mae®, the Ellie Mae Digital Lending Platform, and the Ellie Mae Partner Network. Other LOS platform integrations are available and can be readily deployed with connectivity to the Ellie Mae AIQ user interface. In addition, robust APIs and integrations with third-party solutions and loan origination systems further extend Ellie Mae AIQ's intelligent automation.

On the back end, integration is needed with Ellie Mae AIQ to ensure data and document synchronization

- Data
 - Initial data integration is required to set up loans in Ellie Mae AIQ's data cloud and provide applicant and employer details from the LOS
 - A data connector integration exists to pull this data from Encompass and other leading LOSs
 - For other LOSs, key data fields from a 3.2 file format are exported to be ingested into Ellie Mae AIQ's data cloud
- Documents
 - Ellie Mae AIQ's IQ Synch synchronizes the worksheet documents back to the LOS (e.g., Encompass, Blue Sage, NetOxygen, Byte, or can be configured with other third-party systems)
 - These documents are also stored in Ellie Mae AIQ's cloud



The End Result

By applying AI and process automation to the loan manufacturing process, Ellie Mae AIQ streamlines document collection, data validation, calculations, and risk analysis so that lenders can originate loans faster and with greater consistency.

Ellie Mae AIQ fundamentally changes underwriting productivity, enabling lenders to underwrite greater than eight loans per day per underwriter, and allowing more of the process to move upstream into the hands of processors and loan originators. As a result, underwriters can largely avoid spending time on simpler tasks, providing a significant competitive advantage and freeing up capacity to provide heightened customer service, increased capacity and quicker turn times.

It is the most comprehensive, automated solution of its kind, built on twin foundations of automation-ready data and underwriting-specific software. Ellie Mae AIQ was developed and tested alongside a deeply experienced underwriting team, and is now utilized at some of the largest lenders in the U.S.

While other solutions in the market allow the underwriter to completely avoid reviewing various components, the vast majority of loans today (and tomorrow) have supporting documentation that calls for underwriter review. Such exception-based review can now be accomplished in a more streamlined, accurate and profitable manner across not only underwriting, but also countless upstream and downstream processes.

The end result is that Ellie Mae AIQ delivers a consistent, accurate, and scalable approach to underwriting that is unique in the mortgage industry.

Ready to automate loan intake and perform risk assessment in minutes, not hours? Schedule a full solution demo at explore.elliemae.com/aiq

It is the most comprehensive, automated solution of its kind, built on twin foundations of automation-ready data and underwriting-specific software.



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