

Case Study

Celink Modernizes Reverse Mortgage Technology with Gravicore & AWS

Executive
Summary

The Path to
Transformation

Building a Modern
Software Factory

Enabling the Road
to the Future

TABLE OF CONTENTS

INTRO

Executive
Summary

01

The Path to
Transformation

- ⚙️ *Powering America's Most Unique Mortgage Product*
- ⚙️ *Investing in Transformation*
- ⚙️ *Finding the Right Partner*

02

Building a Modern
Software Factory

- ⚙️ *Building a Framework for Success*
- ⚙️ *Breaking Down Data Silos*
- ⚙️ *Developing Innovative, Cloud-Based Applications*

03

Enabling the Road
to the Future

- ⚙️ *AWS Services Instrumental in Celink's Modernization Effort*
- ⚙️ *What's Ahead for Celink and Gravicore*
- ⚙️ *About Celink & Gravicore*

EXECUTIVE SUMMARY



The limitations of Celink’s legacy technology and collocated IT infrastructure were becoming increasingly disruptive to the business following a period of intensive growth...

The reverse mortgage servicer selected Gravicore, an Amazon Web Services (AWS) Select Partner, to architect and execute an enterprise, cloud-first strategy that would position Celink for greater overall business agility and operational resilience while also reducing infrastructure costs.

Over a three-year partnership, Gravicore has helped Celink leverage AWS cloud infrastructure and serverless computing to deploy an array of innovative, AWS-enabled mortgage technologies.

⚙️ *The Path to Transformation*

⚙️ *Powering America's Most
Unique Mortgage Product*

⚙️ *Investing in Transformation*

⚙️ *Finding the Right Partner*

01

Powering America's Most Unique Mortgage Product

Reverse mortgages have helped millions of Americans stay in their homes and enjoy fulfilling retirements as they age — but they are also complex financial instruments that present significant challenges to those who administer them.

A unique product

Whereas typical mortgages require monthly principal and interest payments, reverse mortgages allow homeowners to borrow against the value of their home and receive funds as a lump sum, fixed monthly payment or line of credit. And unlike home-equity lines of credit (HELOC) and closed-end home-equity loans, which require regular monthly payments, reverse mortgages do not have to be repaid until the borrower dies, moves out or sells the home. Reverse mortgages are further distinguished from “forward” mortgages by their unique regulatory requirements and securitization structures.

The subservicer

Although lenders can service their own mortgages, they often outsource servicing to third parties that specialize in day-to-day loan administration. This practice, called subservicing, is widespread among reverse mortgage lenders, many of whom turn to Celink for its domain expertise and track record of servicing excellence.

Roadblocks to Innovation

Reverse mortgages are niche products, accounting for less than one percent of annual mortgage originations in the United States. Like many niche industries, reverse mortgage servicing has been slow to innovate — making

Celink's substantial investments in data and technology all the more noteworthy and helping the company cement its place as a leader in reverse mortgage modernization.

“Companies often face a ‘build or buy’ dilemma in enterprise technology, but buying was never an option for us,” says Celink Chief Information Officer Sergey Dyakin. “With our proprietary platform, ReverseServ Elite, our goal is to redefine how reverse mortgages are serviced with meaningful investments in infrastructure and applications that have a measurable impact on the lender and borrower experience.”

“

Companies often face a ‘build or buy’ dilemma in enterprise technology, but buying was never an option for us...

With our proprietary platform, ReverseServ Elite, our goal is to redefine how reverse mortgages are serviced with meaningful investments in infrastructure and applications that have a measurable impact on the lender and borrower experience.

”

- Sergey Dyakin
CIO, Celink



Investing in Transformation



We had two servicing systems, two analytical systems and two imaging systems ... if you count legacy systems, our efforts in certain areas were more than duplicative.”

- Sergey Dyakin.

At the end of 2019, Celink found itself at a crossroads. After years of market contraction, reverse mortgage originations had grown 5.5% industry-wide from 2018 to 2019, with proprietary reverse mortgages posting even more impressive growth of 58% year-over-year. The increased demand was already beginning to strain Celink’s infrastructure, and analysts expected the growth trend to accelerate in the coming months. Celink had also recently acquired another servicer, a transaction that effectively doubled its size — and its technology systems.

Celink charged Dyakin with overseeing a multi-year, ground-up redevelopment of its core servicing system, ReverseServ, that would address system redundancy and scalability issues while also heralding the transformation of Celink into a technology-powered enterprise. This was the birth of ReverseServ Elite.

“We set out to shift Celink’s software development to the cloud and build a powerful, flexible and scalable platform utilizing Amazon Web Services,” Dyakin says.

“Externally, we wanted to become fast and nimble — capable of offering our clients and borrowers solutions that would delight them. Internally, we sought to enable data-driven decision-making by equipping managers and employees at all levels with operational and strategic insights.”

Finding the Right Partner

GRAVICORE™
.io

Celink™
Your Reverse Mortgage Ally

Since the Celink team had no native expertise with Amazon Web Services, bringing in an experienced partner to accelerate cloud adoption was a natural choice. Celink turned to Gravicore, whose founders Curtis Over and Jeremy Odle had worked with Dyakin earlier in his career at Fortress Investment Group.

With 50 years' combined experience in mortgage origination, servicing and capital markets, Gravicore fuses financial services domain knowledge with technology delivery expertise to rapidly deploy innovative and highly scalable solutions.



“We chose Gravicore because of the team’s strong **knowledge of AWS**, its **opinionated framework** for building cloud presence and the **impressive set of tools** it has developed,”
Dyakin says.

⚙️ *Building a Modern Software Factory*

⚙️ *Building a Framework for Success*

⚙️ *Breaking Down Data Silos*

⚙️ *Developing Innovative, Cloud-Based Applications*

02

Building a Framework for Success

IaC

*Infrastructure
as a service*

DRY

*Don't repeat
yourself*

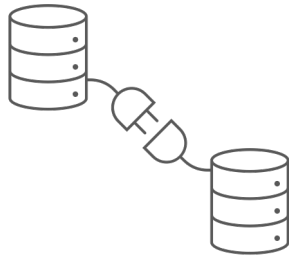
Secure Hybrid Network

First, Gravicore established a secure hybrid cloud environment, connecting Celink's collocated data centers with a new AWS infrastructure. Then Gravicore architects and engineers worked alongside the Celink team to accelerate the planning, configuration and automation of a well architected framework, supplementing AWS best practices with their own opinionated solutions. For example, as outspoken proponents of infrastructure as code (IaC) and "don't repeat yourself" (DRY) software development, Gravicore leveraged Terraform by HashiCorp (an AWS Partner Network Advanced Technology Partner) as an efficient way to manage and provision infrastructure through code and eliminate duplicative backend code.

Managed Devops Services

Gravicore also provided managed services for Celink's DevOps, establishing a variety of teams, processes and tools around cloud architecture, software development lifecycle (SDLC), continuous integration and deployment (CI/CD), security operations (SecOps), site reliability engineering (SRE), release management and developer support. Establishing these processes enabled Celink to better serve customers with high-velocity deployment of both infrastructure and applications.

Breaking Down Data Silos



Gravicare's Experience

To achieve its goals of greater business agility, operational and strategic insights and automation through data-driven decision making, Celink required a complete re-architecting of its data management environment.

Having accomplished full financial services data platform rebuilds before, Gravicare accelerated Celink's transformation through its opinionated implementation of a modern data stack.

Gravicare's Opinionated Solution

Incorporating many AWS native services, the teams rapidly deployed a data lake on Amazon Simple Storage Service (S3), leveraging AWS Athena, AWS Glue and AWS Lambda serverless computing to build event-driven data pipelines and transformations feeding an enterprise data warehouse on the Amazon Relational Database Service (RDS). Serverless computing enables faster deployments and reduces cost by automatically scaling resources based on event-driven demand with zero over-provisioning — welcome benefits for Celink, whose month-end reporting activities generate spikes in computing demand.

Solution Components



Rapidly Deployed Datalake



Amazon S3



AWS Lambda



Amazon Athena



AWS Glue



Data Warehouse



Amazon RDS

“Serverless computing enables faster deployments and reduces cost by automatically scaling resources based on event-driven demand with zero over-provisioning.”

Developing Innovative, Cloud-Based Applications (Part 1)

Mitigating Risk While Increasing Speed

With automated infrastructure and event-driven data management capabilities in place, further modernization of Celink's servicing platform required integration to existing legacy systems and the redevelopment of business process management modules for servicing operations.

To mitigate risk and increase speed-to-production, Gravicore utilized an iterative, microservices-based approach that allowed Celink to incrementally deploy new services as they became ready for business adoption. To date, Celink and Gravicore have modernized more than a dozen technology-enabled workloads representing a comprehensive set of business functions.

First to launch was Celink's Borrower Portal, an external, self-service web application where borrowers can access loan information, download account statements, submit requests for line-of-credit draws and initiate other account services. Before the portal's launch, borrowers had to perform these tasks by calling a customer service center or submitting a request via fax, mail or email. With Gravicore's support, Celink took the portal from a concept to go-live in just 4.5 months.



PATH TO SUCCESS...

Legacy System Integration

Iterative redevelopment

Microservices Approach

E2E Process Improvement

Developing Innovative, Cloud-Based Applications (Part 2)

From External to Internal Process

With this automated, always-on portal newly available to borrowers, Celink turned its attention inward to address inefficiencies in business processes and deliver new, tech-enabled capabilities through the redevelopment of its core servicing system. Working closely with Celink business stakeholders, Gravicore led delivery and adoption of the first ReverseServ Elite Module to achieve full technology and business process reengineering: the Line of Credit (LOC) Processing Module. The LOC Module orchestrates and automates the intake, processing, tracking, decisioning, quality control, document management and accounting of all borrower line-of-credit draw requests. By modernizing the entire LOC workflow, Celink has realized a 40% reduction in processing time.

Optimizing Another Key Process

Customer service wasn't the only internal process ripe for optimization. Celink's investor reporting department had been operating multiple spreadsheets to balance cash transactions daily and issue reimbursement and remittance reporting to its investor clients. This labor-intensive process initiated the movement of tens of millions of dollars each day and was subject to short time constraints. Leveraging the new, cloud-based data management platform and business intelligence (BI) implementation, Gravicore engineered an Investor Reporting Rewrite that automated data workflows, remediated quality issues and produced centralized and systematic reports and analytics.

Other Modernization Efforts

In addition to the Borrower Portal, LOC Module and Investor Reporting Rewrite, other modernization efforts have included AI-driven Document Classification, Intake and Classification of Financial Transactions and a Claims Pipeline Management BI Platform.

⚙️ *Enabling the Road to the Future*

⚙️ *AWS Services
Instrumental in Celink's
Modernization Effort*

⚙️ *What's Ahead for Celink
and Gravicore*

⚙️ *About Celink & Gravicore*

03

AWS Services Instrumental in Celink's Modernization Effort



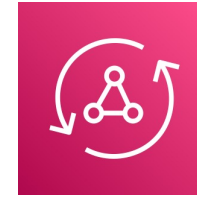
AWS Lambda

Because a mortgage servicer's processing needs can be both cyclical and unpredictable, Gravicore utilized AWS Lambda (a serverless, event-driven compute service) to ensure cost-effective, on-demand and scalable code execution without the need to manage or provision infrastructure.



AWS RDS


And because mortgage servicing is necessarily data intensive, several Amazon Relational Database Services (Amazon RDS) were leveraged to ensure simplicity in setup, operation and scalability.



AWS AppSync

Additionally, AWS AppSync services were key to providing front-end developers centralized endpoints to query databases, microservices and APIs while also enabling real-time data updates.


Inventory of AWS Services Leveraged



Compute

Amazon Lambda
Amazon EC2
Amazon ECS


Amazon ECR
Amazon Fargate



Database

Amazon DynamoDB
Amazon RDS

Amazon Aurora



Networking & Content Delivery

Amazon CloudFront
Amazon VPC,
AWS Transit Gateway


Amazon Route 53
Elastic Load Balancing



Front-End Web & Mobile

Amazon API Gateway
Amazon Simple Email Svc


AWS AppSync



Machine Learning and AI

Amazon Comprehend
Amazon SageMaker


Amazon Textract



AWS Cost Management

AWS Budgets
AWS Cost & Usage Report

AWS Cost Explorer



Analytics

Amazon Athena


AWS Glue



Security, Identity & Compliance

Amazon Cognito
AWS Directory Service
Amazon GuardDuty

AWS ID & Access Mngmt.
AWS Secrets Manager
and more...



End User Computing


Amazon Workspaces



Storage

Amazon FSx
Amazon S3

Amzn Elastic Block Store
AWS Backup



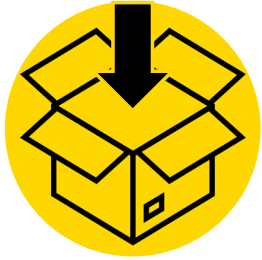
Application Integration

AWS Step Functions
Amazon SNS

Amazon SQS

Results that speak for themselves

With the help of Gravicore's partnership, Celink's investment in modernization has paid off in a big way, delivering measurable business value that spans cost savings, staff productivity, operational resilience, organizational controls and business agility.



40% reduction in fulfillment times

Automating previously manual processes has allowed Celink to reduce the days required to fulfill line-of-credit draws from five to three. Similar gains in efficiency have been reported across Celink's business processes.



100's of hours in time savings per month

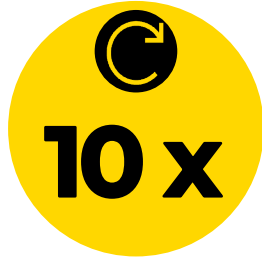
By replacing manual spreadsheets with automated investor reports, Celink has saved its investor reporting team an estimated 14 to 16 man-hours per business day while greatly reducing reporting lag and strengthening controls. Moreover, automating LOC draw intake and processing resulted in the reduction of over a dozen full-time resources.



Eliminating late disbursement penalties

Consistent and timely fulfillment of line-of-credit draws has virtually eliminated Celink's exposure to regulatory penalties imposed when mortgage servicers fail to make timely disbursements to borrowers..

(More) Results that speak for themselves



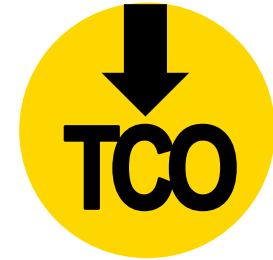
10x increase in software deployment frequency

The move to Amazon Web Services has significantly improved Celink's agility. Whereas the previous IT structure supported no more than two code deployments per month, now Celink can deploy changes multiple times a day for faster bug resolution and rollout of new features.



A best-in-class borrower experience

Celink's Borrower Portal has quickly become a beloved tool for the more than 50,000 active users on the system to date. Whereas borrowers once had to call, fax or mail Celink for customer support, today more than 40% of borrower LOC Draw requests come in through the portal — a digital transformation that is especially impressive given that reverse mortgage borrowers in America have a median age of 73.



Lower total cost of ownership (TCO)

Going serverless has allowed Celink to control its infrastructure spend at will, eliminating expenses associated with over-provisioning and server management while improving uptime. For example, the technology systems and software expense of Celink's production borrower portal is currently less than \$1,000 per month.



The migration to Amazon Web Services has had an overwhelmingly positive effect on Celink, our clients and the customers we serve on their behalf. The whole industry is talking about it; we've even drawn praise from competitors.”

“Gravicores partnership was a key accelerator of our technology transformation and an unquestionable contributor to its success. If you're looking for opinionated solutions from a team that is fluent in both technology and financial services, start with Gravicores.”

- Sergey Dyakin
CIO, Celink

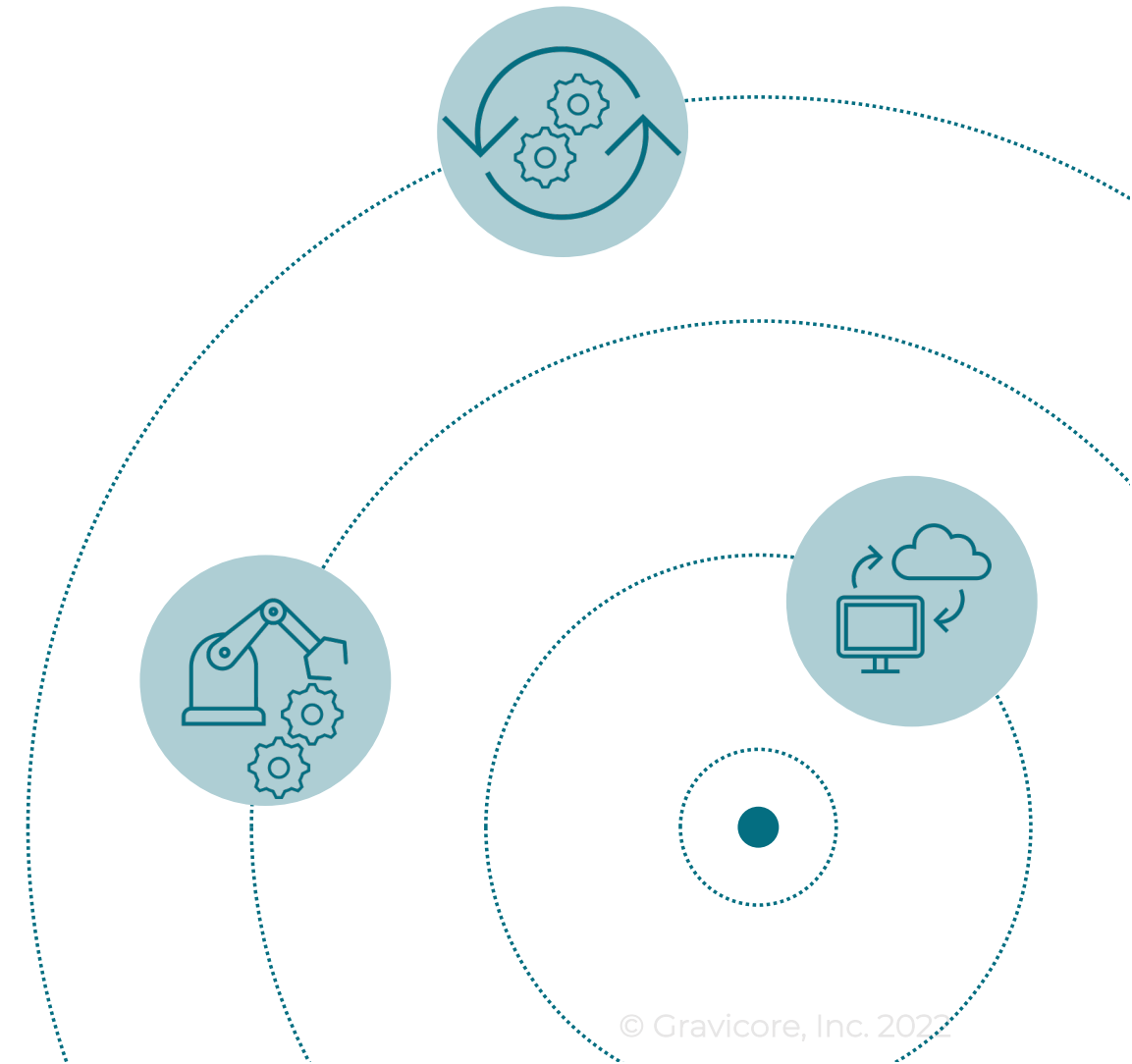


What's Ahead for Celink & Gravicore

Celink and Gravicore continue to partner on this journey of mortgage tech modernization.

Projects underway include initiatives as far-ranging as a Call Center Workflow Management Module to the automation of financial transaction coding and posting.

These and other initiatives are made possible by the AWS infrastructure-as-a-service cloud computing model as well as the success framework implemented at the onset of Gravicore's engagement with Celink.



About Celink

Celink is the United States' leading servicer of reverse mortgages. With a portfolio of over two hundred and fifty thousand loans, Celink is the servicer of choice for the nation's largest reverse mortgage lenders. Celink's fully scalable servicing platform, ReverseServ Elite, supports proprietary reverse mortgage products and the government-insured Home Equity Conversion Mortgage (HECM). Reverse mortgages are home-equity products that help older homeowners stay in their homes and enjoy fulfilling retirements. Celink maintains an SQ2 rating as a primary servicer of reverse mortgage loans from Moody's.



About Gravicore

Gravicore helps customers accelerate innovation by leveraging the cloud and big data. The leadership team at Gravicore has over a decade of experience deploying cloud computing platforms and cutting-edge data management, analytics, and reporting solutions. And with deep mortgage, capital markets and fintech leadership experience, Gravicore's clients have come to rely on their domain expertise to design effective solutions while eliminating execution risk.

Gravicore is an AWS Partner (Select Tier Services) and has earned the following designations and certifications: AWS Certified Cloud Practitioner, AWS Certified Solutions Architect, AWS Certified Developer and AWS Partner: Cloud Economics Accreditation.

GRAVICORETM.io

