How **cloud-enabled innovation** helps financial institutions, federal agencies and U.S. housing equity

Cloud strategies at Fannie Mae, HUD, and FHA offer lessons on how financial institutions and federal agencies are reducing financial risks and developing new ways to address housing equity in the U.S.

By FedScoop Report

When Fannie Mae, one of the nation's leading sources of mortgage financing, began to fully assess the shockwave of 23.1 million people in America suddenly unemployed in April 2020, executives at the government-sponsored enterprise faced a situation unlike any they had seen.

"We had no historical reference point to suggest how borrowers or mortgages might perform under conditions like that," recalled Kimberly Johnson, Fannie Mae's then-executive vice president and chief operating officer, speaking at an Amazon Web Services customer conference last December.

With a balance sheet of $4 trillion, the stakes were enormous. One out of every four homes in the U.S. were purchased or refinanced last year with Fannie Mae. It has also become one of the nation's largest providers of financing in the multifamily rental market.

Fannie Mae had already committed to using the cloud to enable digital transformation, drive operational efficiency, and improve speed, security and resiliency. Nevertheless, it's data processing requirements were vast: "We need to understand the creditworthiness of borrowers, the value of our properties, and we need to do it all continuously for millions and millions

of loans," Johnson explained. Fannie Mae also must maintain "really sensitive personal information and do it efficiently and securely," while simultaneously gauging localized shifts in home prices and a host of other macroeconomic trends.

Suddenly, however, Fannie Mae "needed to discover new data sources; we needed to understand them; and we needed to develop solutions [quickly] for troubled homeowners," she said.

Johnson and Fannie Mae CIO Ramon Richards credit the cloud for allowing analysts to move quickly — and specifically cloud-based tools including Amazon Kinesis (a real-time, scalable streaming data platform), Amazon Aurora (a relational database), Amazon SageMaker (a machine learning and analytics platform) and Amazon Simple Storage Service (Amazon S3). Not only did those capabilities help Fannie Mae develop new risk models, but they also helped in creating an innovative new approach to expanding access to credit for historically underserved populations.

Credit history is a key element in evaluating a borrower's ability to make a mortgage payment, but fewer than 5% of renters today have their rent payments reported on their credit bureau report,

putting many prospective first-time homebuyers at a disadvantage. Tapping specialized AWS tools like Amazon RedShift to analyze "a sea of cash flow data," as Johnson described it, Fannie Mae last year "began using rental payments as part of our underwriting system. Now lenders can factor in a mortgage applicant's consistent rent payment history when assessing eligibility, helping more renters become first-time homeowners."

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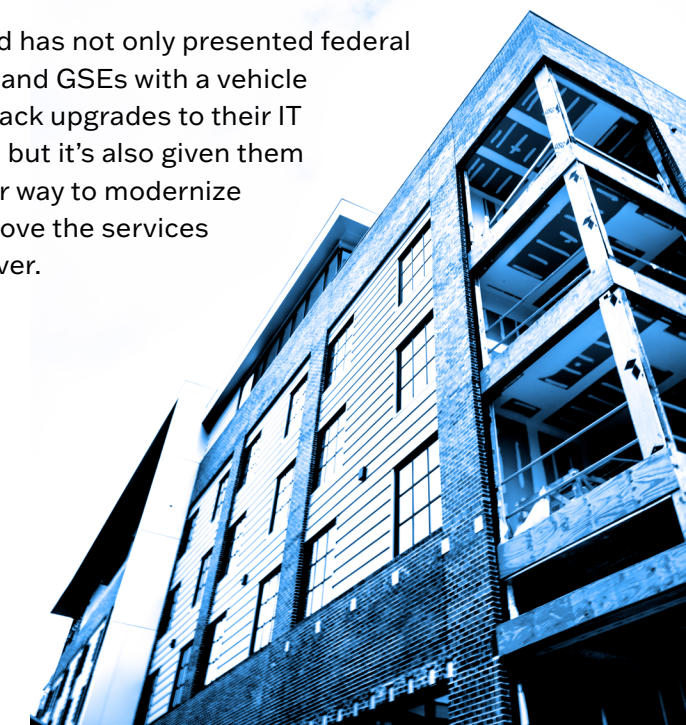>
> **-Fannie Mae presentation**

Financial institutions lean into the cloud

As a government-sponsored enterprise (GSE), Fannie Mae is one of many leading financial institutions that are leveraging the cloud to help modernize their IT operations, reduce lending risks and improve institutional services, according to Olivia Peterson, a former Freddie Mac director and now head of U.S. Federal Financial Services at AWS.

- The IRS, for example, has continued expanding its reliance on AWS for a wide range of FedRAMP-authorized data, software and infrastructure services that have helped improve the online experience for taxpayers, while strengthening security controls.
- The Bureau of Fiscal Service at the Department of Treasury created a FedRAMP "high security" data lake to store, access and analyze data from across the department, break down data silos and build a platform to support AI and machine learning.
- The Financial Industry Regulatory Authority (FINRA), the nation's securities industry self-regulator, has built a petabyte-scale data lake on AWS, allowing hundreds of analysts and partners to query terabytes of financial trading data daily across the U.S. securities market.

"The continuing speed and impact of technology changes underway at banks, investment firms, insurers and other financial institutions are also putting enormous pressures on government monetary officials and financial regulators to keep up," said Peterson in a recent interview.

The cloud has not only presented federal financial and GSEs with a vehicle to fast-track upgrades to their IT systems, but it's also given them a smarter way to modernize and improve the services they deliver.

Ginnie Mae advances the user experience

The Government National Mortgage Association (Ginnie Mae), a division of the Department of Housing and Urban Development, has also been engaged in a multiyear cloud migration effort, aimed at modernizing business processes essential to administering Ginnie Mae's $2.1 trillion mortgage-backed securities programs.

By moving to a consumption model, "we no longer need to [tie up] huge capital expenditures," said Ginnie Mae's Barbara Cooper-Jones, senior vice president, enterprise data and technology solutions, during a recent AWS summit. "We're able to dynamically scale up and down based on actual resource needs … allowing us to achieve cost savings [and] eliminate some of the pain points experienced in the traditional data center such as operational failures and the overhead."

The cloud has allowed Ginnie Mae to replace an aging enterprise portal with a more secure, and user-friendly platform to facilitate internal business processes. It also facilitated the launch of Ginnie Mae Platinum, which allows investors to receive a single payment each month, instead of multiple payments from various holdings, lowering administrative costs and improving liquidity for customers.

The cloud also means you don't have to "limit yourself from using a new or better technology that might prevent you from change" down the road, added Ginnie Mae Deputy Technology Architect Jeremy Yates.

Building on cloud lessons at HUD

Elsewhere at HUD, the department has earned uncommon praise from its inspector general for efforts to modernize IT systems using cloud services at the department's Federal Housing Administration (FHA) and Office of Public and Indian Housing (PIH).

Beginning in 2019, the FHA launched a sweeping cloud migration initiative called FHA Catalyst to modernize a $1.3 trillion single-family housing mortgage insurance program. The program enables homeownership for more than 100,000 citizens a month but requires massive volumes of applications and supporting loan documents to be submitted to various FHA offices. Processing became dramatically more difficult for lenders and FHA during the pandemic.

By scaling up the use of Amazon Elastic Container Service (Amazon ECS), Amazon Relational Database Service (Amazon RDS) and other AWS services, FHA Catalyst helped the agency navigate through the pandemic's turmoil and is now expected to save lenders approximately $200 million annually by eliminating paper-based FHA processes. HUD also expected to decommission 11 legacy IT systems at annual savings approaching $20 million, according to the IG's report.

Building on the lessons of FHA Catalyst, PIH officials targeted seven opportunities to improve its operations, including its Voucher Management System, which provides $22 billion in payments to public housing agencies for tenant-based rental assistance. Using the cloud, PIH will be able to monitor and manage voucher obligations and disbursements using data that's one to two days old rather than the 45-60-day-old data officials normally rely on.

In addition to HUD's loan modernization program, a variety of other cloud initiatives have also been launched or completed at HUD involving AWS and its partners, including:

- Three critical applications that support HUD's nationwide asset management programs, through its National Servicing Center.
- An innovative data visualization tool used by more than 400 regional and local organizations to better address homelessness in the U.S.
- HUD Exchange, a website providing program guidance, services and tools to HUD's grantees, including state and local governments and nonprofit organizations.
- A sweeping effort to digitize 3 million pages of paper documents and develop a document management system for HUD's Real Estate Settle Procedures Act and Interstate Land Sales divisions.

Expanding capabilities and housing equity

While the cloud is helping federal financial institutions and GSEs like Fannie Mae, and HUD keep up with escalating user demands, "it's also helping those GSEs and agencies focus more on their primary missions — by using data in new and more powerful ways, to expand housing equity and affordability in the United States," according to Felipe Millon, senior manager, federal financials at AWS.

That broader mission gained new national attention, he said, with the March announcement by the Biden-Harris administration of a new action plan by the Interagency Task Force on Property Appraisal and Valuation Equity (PAVE). The task force, co-chaired by HUD Secretary Marcia L. Fudge and White House Domestic Policy Advisor Susan Rice, is the first-of-its-kind interagency initiative aimed at addressing racial bias in home appraisals and includes the heads of 13 cabinet and independent agencies and components of the Executive Office of the President.

Fudge laid out the challenge facing many consumers in America, citing Freddie Mac research that revealed that 12.5% of appraisals for home purchases in majority-Black neighborhoods and 15.4% in majority-Latino neighborhoods result in a value below the contract price (the amount a buyer is willing to pay for the property). That compares to only 7.4% of appraisals in predominantly white neighborhoods, according to Fudge.

"While only governments at the local, state, and federal level have the capacity to implement more effective housing policies, we [at Amazon] believe the private and public sectors can work together to address this challenge," said Millon, quoting the company's position in support of housing opportunities in the U.S. In that vein, Amazon has launched a $2 billion Housing Equity Fund to preserve and create 20,000 affordable homes in a handful of cities where it operates.

However, if federal financial, regulatory institutions and GSEs are to develop the mechanisms for change, said Millon, it will also take the kind of cloud-enabled innovation that Fannie Mae demonstrated when it initiated 1.4 million single-family forbearance plans during the initial economic downturn of the pandemic.

The ability to respond rapidly to changing market conditions is paving the way to longer-term projects, like assessing housing resiliency.

That type of innovation will likely prove increasingly important in the coming months as a persistent national housing shortage, rising home prices and other economic forces promise to complicate the dynamics shaping housing equity in America.

Learn more about how AWS is helping federal financial agencies and GSEs innovate

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