

McCracken Financial Solutions Corp.

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McCracken Update LIBOR to SOFR Transition

As of February 12, 2020

McCracken continues our participation in active industry groups including the ARRC in preparation for the transition from LIBOR to SOFR. Here is what you need to know:

The Alternative Rate References Committee (the ARRC) has defined 4 rate methodologies related to the use of the Standard Overnight Finance Rate (SOFR).

McCracken supports the following 3 rate methodologies for new loans using the SOFR index today with no additional updates to the software.

1 – Daily Simple SOFR in Arrears

- Strategy supports daily reviewable simple interest loans

2 – Forward Looking SOFR Term Rate

- New Term Rate to be published by 2021. Will work the same as LIBOR in Strategy

3 – SOFR Compounded Rate in Advance

- A new SOFR Index will be published in first half of 2020. Indices to be published include tenures of 30, 90, and 180 days. Will work the same as LIBOR in Strategy.
- Fannie Mae announced on February 5th, their intention to begin taking Adjustable Rate Mortgage Loans with embedded caps indexed by SOFR (SOFR Capped ARM Loans) no later than the fourth quarter of this year. Fannie Mae will confirm that they will use an index based on a 30-day average of the SOFR, which is to be published by the Federal Reserve Bank of New York. Fannie Mae promises more details about the SOFR Capped ARM Loans are to follow. The rate adjustments for Fannie Mae's SOFR Capped ARM Loans are supported by Strategy today.¹
- Freddie Mac also made an announcement on February 5th, stating that they have worked closely with their regulator and have selected the Secured Overnight Financing Rate as the alternate index for floating rate debt. They confirmed that they will begin purchasing floating-rate loans using a SOFR based rate by November 1, 2020.²

Existing Strategy functionality supports Rate Caps for each review and provides a Rate Floor and Ceiling for life of loan.

The Observation Shift recently discussed by the ARRC is supported by Strategy's Business Calendar functionality. Strategy considers both Lookback Days and Business Days when calculating the Rate Review Date.

¹ Levin, Rob, Multifamily Customer Engagement, Fannie Mae, "Multifamily Mortgage Business Lender Letter 20-02", Fannie Mae Multifamily, multifamily.fanniemae.com/sites/g/files/koqyhd161/files/2020-02/mfl12002.pdf, February 5, 2020.

² Jenkins, Debby, Senior Vice President, head of Multifamily business for Freddie Mac, "Update on LIBOR Transition", Freddie Mac Multifamily News & Research, mf.freddiemac.com/news/2020/20200205_libor_update.html, February 5, 2020.

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The above three methodologies are supported in Strategy today, for loans transitioning from LIBOR to SOFR IF the proposed Spread Adjustment is static for the life of the loan.

- Strategy supports the ability to use two different margins in conjunction with an Index to calculate a new interest rate.
 - Users can select ARM Method Code 'P' to utilize the fields Operator #1 (ADD), Margin #1 % (Margin from loan documents) and Operator #2 (ADD), and Margin #2 % (Spread Adjustment) in conjunction with any of the 3 SOFR rates above to calculate the new interest rate for the loan.

The fourth rate methodology proposed by the ARRC is SOFR Compounded in Arrears. This methodology is not supported by Strategy today. And it is not fully defined by the industry as of February 12, 2020.

- McCracken needs to expand our compounding functionality to handle the daily compounding in arrears based on several pending decisions from the ARRC.
 - Which compounding formula will be used?
 - Compounding the Rate - Original method that is published in the "A user's Guide to SOFR"³
 - Assumes the Principal Is constant.

Compounded Rate in Arrears Formula

Effective Rate = # of days * SOFR Rate/360

Compounded Rate =

$((1 + \text{the Effective Rate}) * (1 + \text{prior day Compounded Rate}) - 1) * \text{Principal Balance}$

- Compounding the Balance -
 - Does not assume the Principal Balance will be constant.

Compounded Balance in Arrears Formula

Effective Rate = # of days * SOFR Rate/360

Compounded Balance =

$\text{Principal Balance} * \text{Effective Rate} + (1 + \text{the Effective Rate}) * \text{Prior days Total Interest}$

- Proposed enhancements to support this rate methodology may include:
 - New ARM Method Codes for Compounding in Arrears (New and Transitioning Loans)
 - New compounding routine to support daily compounding

³ The Alternative Rate Reference Committee, April 2019, 'A User's Guide to SOFR',
https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2019/Users_Guide_to_SOFR.pdf

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Other Outstanding Industry Requirements:

1 – Investor Distribution

- Distribution on a Pro Rata Share – Supported by Strategy today
- Distribution based on Independent Accruals – While Strategy has some functionality to support individual investor calculations, some enhancements will be needed to fully support the requirement.

2 – Fluctuating Spread Adjustment

Recent ARRC discussions have indicated that the Spread Adjustment to help equalize SOFR to LIBOR, may have to fluctuate for some period at the beginning of the transition, possible for the first year.

- ARM Method Code ‘P’ will still work, however, users will have to monitor and maintain the Margin #2 % prior to the Rate Review Date, to allow for a change in the Spread Adjustment and calculate the new Interest Rate properly.
- As of February 12, 2020, the topic remains undecided.

Not Being Considered by McCracken at this time

ARRC is also proposing an additional index based on SOFR to be published this year. This index will allow you to define custom periods and use a compounding sequence to calculate a SOFR average over the custom period. McCracken has not received any requests for this method and does not anticipate the need to support this method at this time.

Frequently Asked Questions Regarding SOFR

Can I get a transcript of the McCracken University Webinar – How to Use Strategy to Transition from LIBOR? (January 23, 2020)

- Copies of McCracken Universities Webinar on Transitioning from LIBOR is available from our website on the Documents page (<https://www.mccrackenfs.com/documentation/>).
- A recording of the webinar is available under training videos (<https://www.mccrackenfs.com/support-center/videos/>)

User IDs to access these pages located in the Support Center area of our website are required. See your Strategy System Administrator for information on how to register if you do not have a User ID.

What is the Package Timeline for SOFR Enhancements?

The patch containing any enhancements for supporting SOFR is scheduled for the end of first quarter, beginning of second quarter. Finalization of formulas for compounding in arrears and variable spread adjustments will affect the availability of the release.

What will be in the Release (Package Functionality)

The planned patch will contain:

- Enhancements to support the Compounded in Arrears methodology
 - in new ARM Method Code,
 - and new compounding routine.

Note that finalization of the compounding formula impacts the delivery of the patch and may delay enhancements.

Is there a charge for the Release?

There is no charge for the update for Customers on the current Strategy release (Release 19D).

- Customer's not on Release 19D may incur nominal development charges to be compatible with the update.
- McCracken is reviewing packaging options at this time. We are trying to keep the SOFR specific changes applicable to Release 19D as a patch.

McCracken Testing and Implementation Deliverable

Customers may begin testing supported methodologies now to become familiar with the functionality. McCracken will provide further details regarding the update to be provided in the upcoming change. McCracken will perform unit and Strategy regression testing. Customers are responsible for UAT testing and file transfer regression testing.

ARRC Vendor Survey Questions

Section 1 - Application

	QUESTIONS		VENDOR RESPONSE	VENDOR RESPONSE
ID	Question		Structured Response	Free Form Response
1	What is your level of awareness of the market developments related to IBOR transition?		High	
2	Have you assessed the potential impact of IBOR transition on your product / application?		Yes	
3	What is the likely impact of IBOR transition on your product / application (e.g. minimal changes or significant redevelopment?)		Low	
4	Do you have a good understanding of the key enhancements that will be required to ensure readiness of your product / application for IBOR transition? If Yes, please outline key enhancements		Yes	Pending final decisions from ARRC
5	Do you have any external dependencies before you can start making changes to your product / application?		Yes	Final decisions on calculation for Compounding in Arrears Final decision on Spread Adjustment, fixed or fluctuating Final decision on Investor Distribution.
6	Have you begun work to implement changes required for the IBOR transition?		Yes	Work is minimal, early design for requirements for changes reviewed
7	For legacy IBOR linked positions, are you working towards functionality / changes that would allow for a systematic transition of those positions to alternative rates (i.e., "operationalizing" fallback rates)?		Yes	Exploring tools within application to smooth transition of loans from LIBOR to SOFR
Communication				
8	Have you started to engage with your clients on IBOR transition? If yes, have you had detailed discussions on business requirements?		Yes	On-going communication, and webinars
9	Do you have a timeline for communicating details on anticipated changes, including implementation timelines and testing strategy?		Yes	On-going communications

	QUESTIONS		VENDOR RESPONSE	VENDOR RESPONSE
ID	Question		Structured Response	Free Form Response
10	Have you planned a forum in which you expect clients to communicate business requirements? Or do you plan to coordinate with clients via one-on-one communication?		Yes	We have had discussions with several customers in both group and one on one settings. User group to form early March to review changes planned.
Release Framework				
11	Have you considered the changes needed for all existing versions of your product?		Yes	Any required changes will be provided above Release 19D. Small patch release.
12	Do you have a well-defined release strategy for your product / application for IBOR transition? Does it include key milestones and capabilities?		Yes	Yes, position papers have been supplied, Key milestones will be published with finalized decisions from the ARRC. (compounding calculation, investor distribution, fluctuation of Spread Adjustment)
13	Please highlight how the changes required for IBOR Transition will be delivered?		Patch	Customers requiring the change will receive a patch release for testing and implementation into production.
Information Requests				
14	Is there any guidance needed from the industry for you to determine implementation timelines / required updates? If yes, have you made your needs known?		Yes	Finalized decisions from the ARRC. (compounding calculation, investor distribution, fluctuation of Spread Adjustment)
Product Applicability				
15	Identify key products or financial instruments that are likely to use your product / application		[Business Loans]; [Syndicated Loans]; [Securitization]; [Floating Rate Notes];	Participations and bilateral loans.
16	Identify key functions / processes that are likely to be dependent on your product / application		Select Multiple: [Contract Management]; [Payment, Settlement, and Clearing]; [Risk Management]; [Treasury Management]; [Finance, Accounting & Tax]; [Other]	All aspects of loan servicing

Section II - Capabilities

ID	Asset Class	High Level Requirement	Vendor Response	If Yes, Timeline for Release
4.1	Loans	Ability for FO trading, syndication and agent bank systems to perform calculations for SOFR loans - <i>Forward Term SOFR / Compound or Simple Average SOFR In Advance</i>	N/A	Supported Today with Publication of Term Rate
4.2	Loans	Ability for FO trading, syndication and agent bank systems to perform calculations for SOFR loans - <i>Simple Average SOFR In Arrears</i>	N/A	Supported Today
4.3	Loans	Ability for FO trading, syndication and agent bank systems to perform calculations for SOFR loans - <i>Compound Average SOFR In Arrears</i>	Yes	End of 1 st Quarter 2020/Early 2 nd Quarter. Dependent on finalized requirements
4.4	Loans	Ability for BO settlement, servicing, accounting systems to calculate accruals, P/L, settlement - <i>Forward Term SOFR / Compound or Simple Average SOFR In Advance</i>	N/A	Supported Today with Publication of Forward Term SOFR/ Compounding Average in Advance Term Rates
4.5	Loans	Ability for BO settlement, servicing, accounting systems to calculate accruals, P/L, settlement - <i>Simple Average SOFR In Arrears</i>	N/A	Supported Today
4.6	Loans	Ability for BO settlement, servicing, accounting systems to calculate accruals, P/L, settlement - <i>Compound Average SOFR In Arrears</i>	Yes	End of 1 st Quarter 2020/Early 2 nd Quarter. Dependent on finalized requirements
4.7	Loans	Ability for trading platforms/exchanges to accommodate SOFR loans (if any are applicable)	Yes	No timeline established, waiting on finalization of Investor Distribution from ARRC.
4.8	Loans	Ability for borrowers to calculate accruals & settlement values	N/A	Not current functionality for borrowers. System displays for users daily balances and rates at both loan and investor level for calculating accruals and settlement values. Borrowers can run their own amortization schedules.
4.9	Loans	Ability for calculations based on compounded SOFR conventions such as lookbacks (including observation period shift), payment delays and floors	N/A	Supported today
4.10	Loans	Ability to set various payment frequencies in accordance with various product type conventions	N/A	Supported today