FpML IR 2021 Definitions Work Stream - Discussion Paper

Status of this document

This document is a draft, created to identify the key questions to be answered. It begins to summarize the key issues and some of the possible solutions to consider. It does not yet represent an agreed-on approach or consensus of the FpML IR 2021 Work Stream on next steps.

Contents

1. Summary

- The OTC derivatives industry is transitioning from IBOR-type floating rate indexes to risk free rates, driven by regulatory pressure and market changes.
- ISDA is introducing new 2021 Definitions replacing the 2006 Definitions, to support the IBOR to RFR transition and other market changes.
- The new indexes introduce challenges in how to observe and calculate rate resets that are not fully addressed in the 2021 Definitions.
- There are emerging market practices to address these issues; those practices are not yet standardized and fully adopted in the 2021 Definitions. Some of those market practices require additional trade information to be captured, which may have an impact on the trade terms captured in FpML.
- There are additional emerging IR trading market practices, for example related to clearing that may affect the ISDA 2021 Definitions and FpML syntax.
- This discussion paper will describe these new market practices and their possible impact on FpML and, where known, on market infrastructures.
- A key question to be answered is whether changes are needed in the FpML standard to support the ISDA 2021 Definitions and/or the new market practices, and if so what will those changes be.
- Any changes made to the FpML will need to be backwardly compatible with the ISDA 2006 Definitions; i.e. we will need to retain support for existing representations while adding support for the 2021 Definitions.

2. Background

- ISDA is updating its 2006 Definitions for 2021, with many changes. These changes reflect regulatory driven and other market practice changes that have occurred in recent years. The changes also reflect ISDA's effort to change the structure of the Definitions (e.g. consolidate all supplements, eliminate unused definitions, as well as clean up the Floating Rate Options [FROs].). The changes may have an effect on FpML or on the usage of FpML.
- One of the proposed changes in the 2021 Definitions is a reduction in the set of Floating Rate Options (FROs, also known as floating rate indexes) that are published by ISDA. This may affect users of FpML, depending on how FpML chooses to adopt that change.
- One of the key market changes occurring at the moment, and that may affect FpML, relates to the transition from IBOR rates to Risk Free Rates (RFRs) or other low-risk overnight rates.
    - LIBOR-type rates have underpinned the IR derivative market, as well as many other non-derivative (e.g. cash) asset classes, since the emergence of OTC derivative trading in the 1980s. These rates are computed by polling several market making firms on their rates for unsecured short term loans (of typically 1 month to 6 months) to top rated borrowers. So these rates are for a specified term and incorporate a credit risk premium.
    - Since 2012 there has been a move away from IBOR rates. In 2017 the UK FCA announced that it would no longer compel or persuade banks to submit rates for LIBOR type settings after 2021. The introduction of Risk Free Rates as alternatives to IBOR rates is gaining steam.
    - To replace IBOR rates, new rates have been introduced in the market (e.g. Sonia, EuroSTR,..). Most of these are risk-free (secured) or relatively low-risk unsecured overnight rates, in which the rate is set each day and the payments over each accrual period are based on the rates over the period, generally compounded.
    - An issue arises for existing trades that are documented using IBOR rates: if the rates become unavailable, there is a need to define how the replacement rates will be used. The replacement rates are not a 1-for-1 replacement of the existing rates, and have certain challenges when used in place of the existing rates. These challenges include timing issues, where a rate may not be available at a time when it is needed according to the LIBOR-setting rules. For example, the rate for a LIBOR-type trade typically is fixed in advance, while a SONIA trade requires many rate observations during the accrual period and the actual rate is only known at the end of the period. It is possible that the final rate observations may not be available at a time when the LIBOR payment would normally be made.
    - Many of these issues and their implications are discussed in the following information/analysis: document by Oliver Wyman: https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2018/February/LIBOR-transition-POV-FINAL.pdf
    - To overcome the unavailability of daily RFR observations in the last few days of a calculation period, there are a number of emerging practices in the market. These practices include:

        - Cutting off rate observations slightly prior to the end of a calculation period to allow time for rate setting to occur prior to payment date ("rate cut-off" or "lockout")
        - Having a lag between fixing and setting ("lookback")
        - Delaying a payment to accommodate the rate fixing ("payment delay")
    - Additionally an economic spread is introduced to represent the change in credit risk between an overnight or risk-free rate and a term rate incorporating a risk premium.
    - Overnight rates have been adopted in the industry without an extensive set of public FpML examples, so it can be unclear how trades based on them are intended to be represented in FpML.
    - It's unclear how the various market practices around risk free rate interest calculation will be incorporated into processing of contracts. For example, will ISDA's 2021 Definitions include recommendations on what conventions to use on RFR indexes? (At the moment this seems unlikely). The remainder of this paper looks at these questions.
- The advent of widespread clearing of swaps has also affected how trades are documented. For example, for swaptions it is now important to know how the underlying swap will be discounted, which is affected by the clearing house on which it will be cleared; this has been added to FpML for physically-settled swaptions, but cash-settled swaptions are also affected by the type of discounting, and this hasn't been fully supported in FpML yet.

3. Summary of High-Level Issues

3.1. Known Issues

- ISDA plans to reorganize FROs going forward, publishing fewer FROs and changing some names. Should FpML go with the updated and reduced list? Should we define FpML specific FROs that are not published by ISDA? How do people plan to transition to the new set of FROs? This issue is discussed more fully in section 4.
- The following issues are known for the IBOR transition and the 2021 ISDA definitions:
    - It is unclear how to represent the two different forms of lookback/shift using the existing FpML reset structure. Addressing this may require a change to FpML. It appears that both methods are likely to be supported in the 2021 Definitions. (In the case of the fallback protocol, the observation period shift/rate shift approach is chosen.). RFR interest rate calculations are discussed more fully in section 5.
    - Cash-settled swaption representations (and possibly other cash settlement provisions) may require changes to represent discounting and/or pre-agreed clearinghouse conventions. Some of this is driven by the ISDA 2021 Definitions and previous supplements. For instance, there are changes in the definition of the buyer, there are new fallback cash settlement methods and some previous settlement methods have been deleted. [NB… There will be a rationale for these changes in a document to be published by ISDA., but the underlying idea is that changes in market practice occasioned by the introduction of clearing and enhanced collateralization have affected how market value is calculated for cash settlement purposes. The new cash settlement methods are:
        - Mid-Market Valuation (Indicative Quotations)
        - Mid-Market Valuation (Indicative Quotations) - Alternative Method
        - Mid-Market Valuation (Calculation Agent Determination)
        - Replacement Value (Firm Quotations)
        - Replacement Value (Calculation Agent Determination)

      Questions:

        - Is it sufficient to identify the method, or is there additional information that needs to be captured?
        - Section 15.2.7 has extensive language about the Collateralized Cash Price which needs to be examined to see if this will require any additional fields. (see Appendix 1).
        - There are new settlement matrices and we will need to see if there is any impact on FpML from that.
    - Other market practices described elsewhere in this document (such as settlement delay and rate cut-off) need to be documented with explicit FpML examples for the industry to be sure that it understands how these features will work and what FpML instances will look like. It's possible that during this exercise we will find additional changes that must be made, but at the moment it seems that these should be able to be accommodated in existing FpML. [A first attempt to do this is presented later in this document].

- There may be other impacts to FpML caused by the transition to non-IBOR FROs, such as the need to report that a trade has experienced a pre-cessation event or a cessation event.
- The OIS compounding formula does not self-compound interest on non-business days, and it is unclear whether this convention is/will be followed for daily compounding RFR trades that do not use the OIS formula, but are instead calculated by end users.

3.2. Open Questions

There are other open questions that we may need to address including:

- Are there any other parts in the 2021 Definitions that will require FpML changes? We will need to identify all the major changes in the 2021 Definitions that could potentially affect FpML and analyze their impact. Some changes to consider:
  - Cash settlement provision changes, and early termination provisions
  - Dispute resolution process additions
  - Should we/do we need to adjust annotations in the schema or coding scheme definitions for updated language in the 2021 Definitions - for example, updated Day Count Fraction definitions, updated Business Center definitions.
  - Will the introduction of the Floating Rate Matrix have any impact on FpML? Do we need to specify it, or the version of the matrix used, independently from the floating rate index name?
  - Will there be any impact on FpML from the new Discounting/PV language and provisions? Either schema changes or annotation updates?
- Are there any other changes from industry platforms and service providers (e.g. execution facilities, messaging platforms, confirmation platforms, clearinghouses, administrators, etc.) resulting from the index changes, new market practices, or the new 2021 Definitions that will affect FpML?
- What changes will be required to FpML to support the new indices and the transition to the new indices?
- The FpML standards committee based on industry input needs to consider whether the changes require a new version and whether changes should be made to previous versions of the standard.
- To represent the economic spread and any new calculation terms such as lookbacks, will new trade terms be required or can the new terms be accommodated within existing FpML elements, such as spread, cutoff, fixing lag, etc. (This might be different in older versions of FpML, such as 4.2 which may not have handled OIS/SONIA type trades).
  - need to clarify whether there are actually any terms that are new, or it's just how to document the existing information correctly
  - will there be any other changes to other areas of the standard? for example, how will cash settlement provisions be affected if a LIBOR-based swap experiences a cessation event?

- Irrespective or whether there will be a recommended practice for calculation of overnight rates or multiple methods such as “lookback” and “rate shift”, each one should be clearly defined and documented with examples.
- Are there any other items in the 2021 Definitions that will require FpML changes?
    - For example, Guy Gurden from MarkitWire reports that cash settlement terms (e.g. for early termination provisions) may need to be updated or redesigned to accommodate RFRs. Also, we may need to make adjustment to agreed discounting for Swaptions, e.g. related to the mutually-agreed clearinghouse on the underlying swap.
- Are there any issues/required FpML changes related to support the transition to the new rates and definitions (and elimination of FRO names), such as documentation/coordination of transition dates, mappings between old and new FRO names, etc., etc.? For example, when the FRO name “GBP-WMBA-SONIA-COMPOUND” was replaced with “GBP-SONIA-OIS-COMPOUND” (the “WMBA” publication source was dropped) it caused a lot of problems from the affirmation and clearing perspective, even though SONIA had a relatively small number of trades at the time. USD-LIBOR- BBA currently has 100 times as many trades as SONIA had at the time.
- Will it be necessary to be able to fully represent trades that mirror trades that work under the ISDA IBOR fallback method, i.e. to fully represent the logic of the fallback method? The fallback method includes the idea that if the fallback rate for the observation date is not available on the reset day, the most recently available fallback rate should be used. This is complex to represent if there are holidays, etc.

4. Floating Rate Option/Index Change

4.1. Introduction

As part of the 2021 Definitions project, ISDA has reviewed the list of FROs as currently defined under the 2006 Definitions. As a result of that review ISDA is proposing to remove a number of existing Floating Rate Options and to change the composition of others. In addition the use in FpML for different business processes has shown the need for additional information regarding FROs.

Below we describe the proposed changes with a goal to receive feedback from infrastructures and implementers, feedback we will feed into the ISDA 2021 Definitions drafting process. Where requirements are not part of the ISDA legal definitions we will seek to define the process by which to obtain the information in question.

4.2. Reduction of the number of FROs

ISDA surveyed members of the ISDA Interest Rate Definitions WG last year to determine which FROs they use. Feedback from members indicated that a number of FROs are not used and it has been proposed that they should be removed from the 2021 ISDA Definitions.

ISDA and FpML have prepared a list of proposed 2021 FROs, and in that list have indicated which 2006 FROs are intended to be discontinued. The FpML community is encouraged to review that list as part of the ISDA Legal review process and return any concerns about rates to be removed.

Questions for the FpML community to consider:

- Are any of these FROs used in existing FpML trade representations?
- How to best indicate that certain FROs only apply to the 2006 Definitions (such as the ones targeted for deprecation in the list above), others can be used with both sets of definitions, still others might only be applicable to the 2021 Definitions. [Note: this is addressed below in “FRO metadata”]
- How will we ensure that we can validate trades using 2006 FROs while also validating that 2006 FROs are not used when the 2020 set is expected?
    - Does this depend on the value of the documentation/contractualDefinitions element? For instance, if the 2021 Definitions are specified, should the set of FpML floating rate index codes somehow be limited to the 2020 FROs?
- Should FpML publish FROs not defined by ISDA? [Note: ISDA plans to publish FROs needed for benchmark/settlement purposes, including some broker rates. As it stands FpML has not plans to publish additional FROs.]
- Other considerations regarding the FRO list above

4.3. Changes to existing FROs

Certain changes to the existing FRO naming structure are being considered. They are explained below in more detail

4.3.1. Possibly Removing "OIS" from the name string:

OIS in the naming of the FROs has not been used consistently. The proposal is to provide a more consistent approach in the naming of FROs going forward and also consider renaming existing FROs.

While there is a recognized need to understand whether an FRO should be classified as an OIS, this does not necessarily mean that information should be reflected in the name of the FRO. (see also section 4 – FRO metadata, for a discussion on additional data points that should be made available for FROs)

Currently 54 of FROs in FpML have OIS in the name [See Appendix II]

Questions for the group:

- Do you agree with the principle to remove OIS from the FRO name in the 2021 Definitions?
- How would you rate (no impact to very high impact) the impact of this change to the FRO names on your implementations
- If the change moves forward, what can be done to reduce the impact/risk of this change?

Resolution: As of Dec 2020, it has been decided to retain the "OIS" in the rate names

4.3.2. Removing rate source from the name string:

Historically, rate sources were included as rate postings by different providers could differ. While this is still a possibility an assumption is that this is increasingly unlikely. Removal of the rate source from the FROs simplifies the structure and further reduces the number of FROs that needs to be published and maintained.

Similar to the OIS change described above, we would like to understand the impact on existing infrastructures. Additionally, we would like to understand whether the rate source is still information firms would expect to record as part of a trade confirmation or other process.

Resolution:

As of fall 2020, we agreed that publication source can be removed from the name string. There are two main reasons for this:

1) Commonly there are several publication sources for the same rate. Including the publication source makes it difficult to treat different strings as equivalent/fungible, e.g. for netting or compression purposes. There is a desire to group trades as broadly as possible to

improve netting as much as possible. Therefore removing the publication source is desirable.

2) Experience has shown that the publication source may change while the underlying rate remains the same. (E.g. Telerate changed to Reuters). Putting in the publication source creates maintainability issue over time.
3) Where there are different publication sources, ultimately it is the administrator of the rate that resolves any dispute about the correct value to use, so the publication source is not necessary.

Typically publication sources for a given rate can be found on the rate administrator website.

4.3.3. Other changes

- Change from BBA to ICE as administrator for Libor: Will administrator be part of the FRO in the future? Will this change happen for any of the LIBOR rates given that they are expected to be discontinued?
- Any other changes?

Reduction of number of FROs:

Currently CAD-BA-CDOR-Bloomberg and CAD-BA-CDOR and UD-BBR-BBSW-Bloomberg and AUD-BBR-BBSW exist as FROs. Removal of Bloomberg as the rate source leaves only CAD-BA-CDOR and AUD-BBR-BBSW.

4.4. FROs for non-compounding RFR

Several firms have requested the publication of and an understanding of the process to follow for the publication of FROs for non compounding RFR.

For the daily averaging rates, it is more difficult to hedge trades when the rate is compounded than when it is flat (non-compounded). This is because the effective notional of the trade slightly increases by a rate-history-dependent amount during each calculation period due to the effect of compounding. (Or another, equivalent way to describe the issue: the unpaid interest amount from the first day is included in the interest calculation for the next day, and that slightly increases the sensitivity of the trade's MTM to rate changes). This means that it's more difficult to hedge the trade - unless the calculation periods line up, the hedges will go slightly out over each calculation period.

For this reason, traders would like to be able to trade non-compounded versions of the daily rates, which can be hedged more easily. The 2021 Definitions are being updated to include some of these, but feedback from the market is needed to ensure that the complete set is published, with the correct definitions.

examples of such non-compounded FROs are:

- USD-SOFR
- EUR-EuroSTR
- GBP-SONIA
- CHF-SARON
- JPY-TONA
- CAD-CORRA
- AUD-AONIA
- HKD-HONIA

(The actual names chosen for publication might vary from the ones above).

4.5. FRO metadata

Additional information around FROs might be required. A current example is the classification of an FRO as an OIS. The requirement itself is driven by regulatory reporting requirements.

For OIS, this information was initially derived from the FRO name. It turns out that the OIS representation is not consistently used in the name. Certain FROs are classified as OIS but do not have OIS in the name, one FRO has OIS in the name but is classified as such.

FpML added a “style” attribute to the FRO scheme to indicate whether or not an FRO is an OIS.

Note: The 2021 draft contains reference to an OIS Formula. Is this sufficient?

The non-compounding overnight FROs, discussed in the section above, will not contain the OIS formula and should not be classified as OIS.

It would be helpful if the FRO metadata could include a mapping to the 4-character ISO code used for ISO 20022 reporting, such as under EMIR.

Questions for the group:

- Is there a need to have a broader “style” classification for FROs beyond the OIS classifier?
- Is there other metadata that should be provided for FROs beyond the OIS (for example a date of first publication and “expiry” date, should potential rate sources/source pages be provided as metadata? should compounding be metadata, part of the name or both?)
- If the publication source is not specified in the FRO name, does it need to be specified in the confirmation? Or should another method, such as a matrix, be used?
- How do firms want to access this metadata?
- Other views on metadata for FROs?

What is the FRO End Date?:

- If a rate is explicitly deleted during the life of a given set of definitions (by way of a supplement or definitions republication) then it should have an end date. For example, “JPY-TIBOR-TIBM (10 Banks)”, “JPY-TIBOR-TIBM (5 Banks)” and “JPY-TIBOR-TIBM (All Banks)" have “End Date”=

7/14/2015, as they were deleted from the 2006 ISDA Definitions by means of part C of Supplement 47 to 2006 ISDA Definitions (https://www.isda.org/a/BwMDE/Supplement_47_to_2006_ISDA_Definitions.pdf).

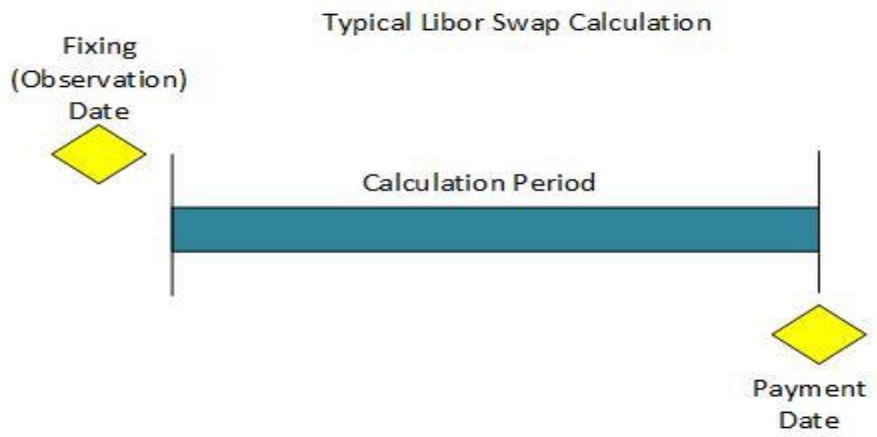
- If a rate name itself is changed by publication of new definitions but all other terms of the FRO remain unchanged, for example the mass replacement of references to "-Telerate" with "-Reuters" going from 2000 to 2006 then it would be valid to add an End Date=2006 for those 2000 versions of the names given the "-Reuters" equivalents are the stated successor codes. Note these are specific and limited cases of name changes and the same wouldn't apply for example with renaming between 2006 and 2021.
- Other than that, the preference would be to leave End Dates unset (at least for now as a starting position)

5. Description of Emerging Market Practices/Example calculations

5.1. Basic Example - Libor-type swap

Description:

Typically calculates and pays periodically (say monthly or quarterly) based on a rate fixing at the beginning of the calculation period. No averaging or compounding. There may be a fixing lag (fixing days offset), which is a number of days between the date of the rate observation and the beginning of the accrual (calculation period).



Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observation (fixing).
- Lag (fixing lag, fixing offset) between the reset date and the rate observation date.
- Whether the rate sets in advance or in arrears
- Day count fraction for the rate calculation
- Payment offset (if any), including amount of lag, day type (bus/calendar), and business days

FpML:

```
<resetDates id="resetDates">
  <calculationPeriodDatesReference href="floatingCalcPeriodDates" />
  <resetRelativeTo>CalculationPeriodStartDate</resetRelativeTo>
  <fixingDates>
    <periodMultiplier>-2</periodMultiplier>
    <period>D</period>
    <dayType>Business</dayType>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>GBLO</businessCenter>
    </businessCenters>
    <dateRelativeTo href="resetDates" />
  </fixingDates>
```

<calculationPeriodAmount>

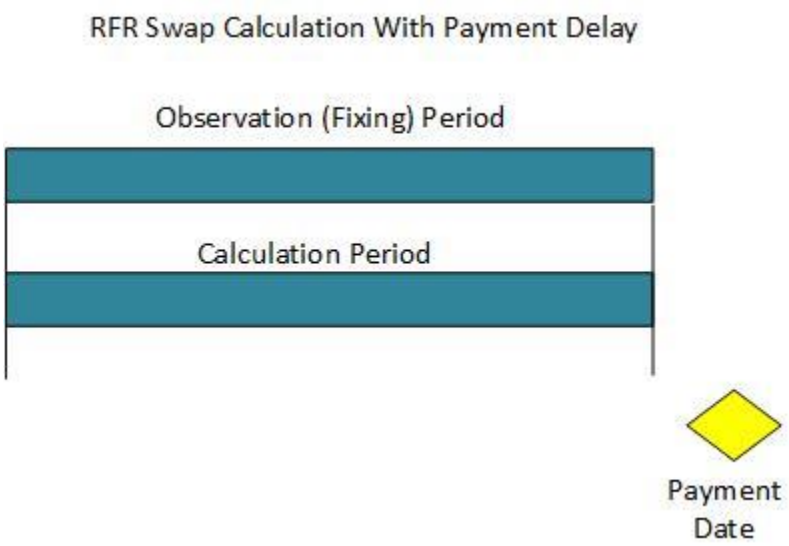
…

5.2. Daily Rate Swap with a payment delay

Typically observes daily and is computed as a single rate by taking either the average or the compound average of the overnight rates over the calculation period. The issue is that the final day or two of the overnight rates may not be available in advance of the payment date for the rate to be calculated. So in this case, the payment date is delayed by a day or two to allow time for all the observations to be made.

Please note that when daily compounding is done in OTC derivative transactions, typically the compounding formula follows the OIS compounding formula. This formula applies compounding on each business day. On non-business days such as weekends or holidays, interest from previous days is compounded, but interest within the weekend or holiday is not compounded. Instead, the rate used is multiplied by the number of days it is in effect. This means, for instance, that interest accrued on a Friday night is not compounded on the following Saturday and Sunday. In the following we describe this as "business day compounding", as opposed to "calendar day compounding", in which interest accrued on every day is compounded on subsequent days. An open question is whether there will be any cases where calendar day compounding is required. This might be the case, for instance, if a swap wanted to match a convention from elsewhere in the financial industry where "calendar day compounding" is the norm. For instance, retail deposit accounts typically use calendar day compounding. This note applies to all of the following daily compounding examples.

A more detailed description can be found at https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2019/ARRC_SOFR_FRN_Matrix_Appendix.pdf on page 8.



Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observations (fixing).

- Lag (fixing lag, fixing offset) between the reset/calculation date and the rate observation date.
- Whether the rate sets in advance or in arrears (typically in arrears)
- Day count fraction for the rate calculation
- Payment offset, including amount of lag, day type (bus/calendar), and business days
- Compounding type
- Averaging type (weighted/unweighted)

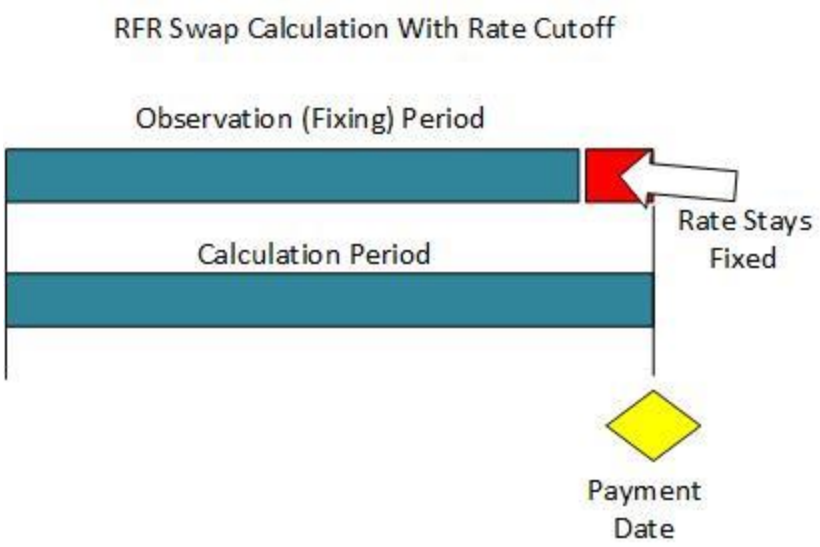
FpML

```
<paymentDaysOffset>
 <periodMultiplier>2</periodMultiplier>
 <period>D</period>
 <dayType>Business</dayType>
</paymentDaysOffset
```

- worked calculation of payoff. (see spreadsheet)
- Please note: The calculation of interest rate in this and the following daily interest worked examples assumes that compounding occurs each day and includes all all principal and interest from all previous days (business or non-business). This differs slightly from the ISDA OIS formula, which simply multiplies the interest rate by the number of days it it in effect prior to including in the self-compounding product, which has the effect of not compounding the most recent days' interest on non-business days. This discrepancy needs to be resolved.
- Specifically, if on a Friday the interest rate is 3.60% and the day count fraction is act/360, the daily interest will be 0.01%. Under the ISDA OIS formula, the interest computed for the weekend would be 0.03%. Under full daily compounding, it would be 0.030003001%. (1 + 0.01%) ^3. The difference between the two approaches is irrelevant for a single weekend, but with compounding over a longer period (like a term of a year) the difference could be noticeable, as the small differences would build up with compounding.

5.3. Daily Rate Swap with Rate Cut-off/Lockout

Typically observes daily and is computed as a single rate by taking either the average or the compound average of the overnight rates over the calculation period. The issue is that the final day or two of the overnight rates may not be available in advance of the payment date for the rate to be calculated. So in this case, the final day or two of the observation period are not observed ("cut-off") in the calculation of the reset rate; those days are computed as normal using the rate in effect the day before the cut-off, rather than the rate normally published for that day.



Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observations (fixing).
- Lag (fixing lag, fixing offset) between the reset/calculation date and the rate observation date.
- Whether the rate sets in advance or in arrears (typically in arrears)
- Day count fraction for the rate calculation
- Payment offset (if any), including amount of lag, day type (bus/calendar), and business days
- Compounding type
- Averaging type (weighted/unweighted)
- Rate cut-off period and type

FpML

```
<rateCutOffDaysOffset>
        <periodMultiplier>-2</periodMultiplier>
        <period>D</period>
        <dayType>Calendar</dayType>
</rateCutOffDaysOffset>
```

- worked calculation of payoff (see spreadsheet)
- See note above on calculation issues

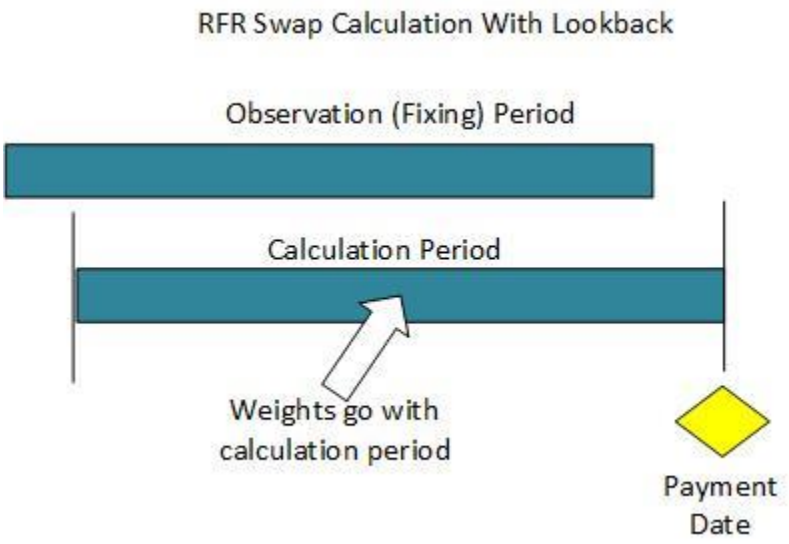
5.4. Daily Rate Swap with Lookback

Typically observes daily and is computed as a single rate by taking either the flat (additive) average or the compound (multiplicative) average of the overnight rates over the calculation period. The issue is that the final day or two of the overnight rates may not be available in advance of the payment date for the rate to be calculated. So in this case, the observation dates are made a day or two earlier than the

corresponding dates of the calculation period. Where the rate has a weighted average (which is the norm), the observation weights are based on the dates in the **calculation period**.

More specifically, the rates are weighted higher when they correspond to a calculation date before a weekend or holiday, to reflect that the rate will remain steady during the non-business days. For example the rates are weighted 3 for Fridays occurring within the calculation period - the rate used will be the rate for the previous, say, Wednesday, if lookback lag is 2. Other rates are weighted 1.

A description can be founds at https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2019/ARRC_SOFR_FRN_Matrix_Appendix.pdf on page 2. It may be worth pointing out that when the rate is compounded, the rate cannot simply be multiplied by the weight… rather, the rate must be compounded the number of times defined by the weight. For instance, a rate of 5% with a weight of 3 would correspond to (1 + 5%)^3 in the rate calculation.



Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observations (fixing).
- Lag (fixing lag, fixing offset) between the reset/calculation date and the rate observation date.
- Whether the rate sets in advance or in arrears (typically in arrears)
- Day count fraction for the rate calculation
- Payment offset (if any), including amount of lag, day type (bus/calendar), and business days
- Compounding type
- Averaging type (weighted/unweighted)
- That the averaging weighting is done on the **calculation** period business days
- Rate cut-off period and type (if any)

FpML

```
<resetDates id="resetDates">
  <calculationPeriodDatesReference href="floatingCalcPeriodDates" />
  <resetRelativeTo>CalculationPeriodEndDate</resetRelativeTo>
  <fixingDates>
   <periodMultiplier>-2</periodMultiplier>
   <period>D</period>
   <businessDayConvention>PRECEDING</businessDayConvention>
   <businessCenters>
    <businessCenter>EUTA</businessCenter>
   </businessCenters>
   <dateRelativeTo href="resetDates" />
  </fixingDates>
  <resetFrequency>
   <periodMultiplier>1</periodMultiplier>
   <period>T</period>
  </resetFrequency>
  <resetDatesAdjustments>
   <businessDayConvention>MODFOLLOWING</businessDayConvention>
   <businessCentersReference href="primaryBusinessCenters" />
  </resetDatesAdjustments>
 </resetDates>
```

[but it's unclear how the averaging works!]

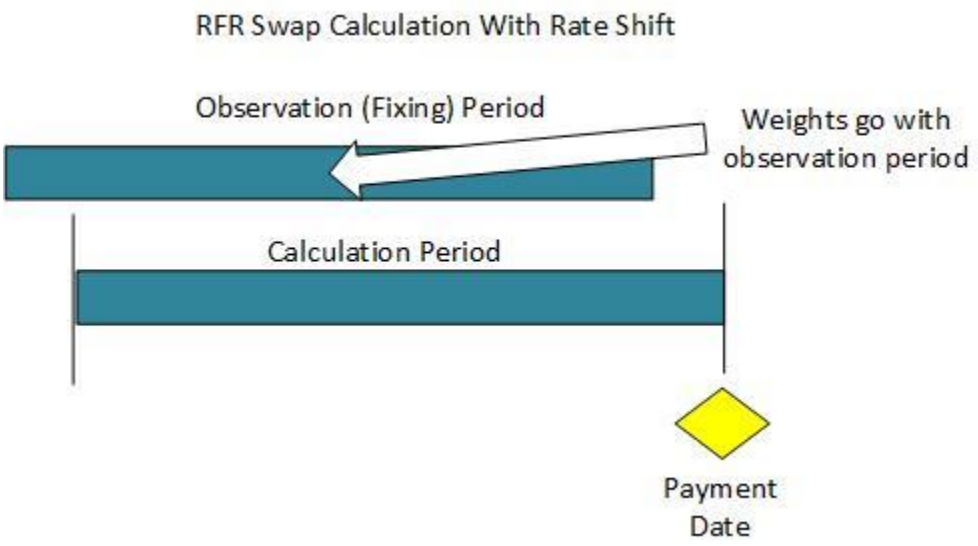
- worked calculation of payoff: see spreadsheet.
- See note above on calculation issues

5.5. Daily Rate Swap with Observation Period Shift.

Typically observes daily and is computed as a single rate by taking either the flat (additive) average or the compound (multiplicative) average of the overnight rates over the calculation period. The issue is that the final day or two of the overnight rates may not be available enough in advance of the payment date for the rate to be calculated. So in this case, the observation dates are made a day or two earlier than the corresponding dates of the calculation period, i.e. there is an observation lag. Where the rate has a weighted average (which is the norm), the observation weights are based on the dates in the **observation period.**

More specifically, the rates are weighted higher when they occur on an observation date before a weekend or holiday, to reflect that the rate will remain steady during the non-business days. The whole observation period is shifted back by a day or two, and the weightings shift with that. The rates observed on Fridays during that period are weighted 3, and other rates are weighted 1, and similarly any rate before a non-business-day is weighted more highly.

A more detailed description is available at https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2019/ARRC_SOFR_FRN_Matrix_Appendix.pdf on page 5. It may be worth pointing out that when the rate is compounded, the rate cannot simply be multiplied by the weight… rather, the rate must be compounded the number of times defined by the weight.



- worked calculation of payoff. See spreadsheet.
- See note above on calculation issues

Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observations (fixing).
- Lag (fixing lag, fixing offset) between the reset/calculation date and the rate observation date.
- Whether the rate sets in advance or in arrears (typically in arrears)
- Day count fraction for the rate calculation
- Payment offset (if any), including amount of lag, day type (bus/calendar), and business days
- Compounding type
- Averaging type (weighted/unweighted)
- That the averaging weighting is done on the **fixing (observation)** period business days
- Rate cut-off period and type (if any)

5.6. Representation of the ISDA IBOR Fallback methodology

The ISDA IBOR fallback methodology is similar to section 5.5. However, there is a difference. Bloomberg will publish a fallback rate for each original IBOR fixing date. However, it may happen that that rate is not available when required for a given swap (typically 2 days prior to payment), because of holidays. In

these cases, the fallback methodology requires the rate to be used to be the latest available rate at that time. That has the effect of adding an additional, holiday-dependent observation period shift.

Required Data fields:

- Business days for adjusting the calculation period
- Business days for adjusting the index observations (fixing).
- **An indication that the whole observation (fixing) period is shifted if the final 2 observation dates are on a holiday, not just the final observation date. [This needs some clarification on the exact details to be captured.]**
- Lag (fixing lag, fixing offset) between the reset/calculation date and the rate observation date.
- Whether the rate sets in advance or in arrears (typically in arrears)
- Day count fraction for the rate calculation
- Payment offset (if any), including amount of lag, day type (bus/calendar), and business days
- Compounding type
- Averaging type (weighted/unweighted)
- That the averaging weighting is done on the **fixing (observation)** period business days

5.7. Representation of non-compounded daily average trades

TBD: we need to create an example of a daily averaging trade on a RFR that does not have compounding.

5.8. New Market Practices Related to Cash Settlement

The transition to clearing of most swaps or collateralization, and to the expanded use of RFRs, has affected pricing in the swaps market. This, in turn, has affected how Cash Settlement calculations are made for cash-settled swaptions and swaps with break clauses. More specifically, the curves used to determine the appropriate discount rate for swaps are affected by which clearing service is used to trade (or hedge) swaps. And in addition, the cash settlement methods have been adjusted to include the idea of valuation based on collateralized swaps, and other approaches such as replacement value.

The existing FpML representations of cash settlement provisions and cash settled swaptions have the following limitations:

- It is not currently possible in FpML to designate a mutually-agreed swap clearinghouse for cash-settled swaptions. This causes problems for determining the appropriate discount curves for cash settlement calculations.
- The existing FpML cash-settlement structure does not support several new settlement methods included in the 2021 Definitions in section 15.2. Specifically, the following 2020 cash-settlement methods are not currently supported by FpML:
    - Mid-market Valuation (Indicative Quotations)
    - Mid-market Valuation (Indicative Quotations) – Alternate Method
    - Mid-market Valuation (Calculation Agent Determination)
    - Replacement Value (Firm Quotations)

    - Replacement Value (Calculation Agent Determination)
- There are some cash-settlement methods currently supported in FpML that have been removed from the 2021 Definitions, specifically:
    - Par Yield Curve – Adjusted
    - Zero Coupon Yield – Adjusted
- The Collateralized Cash Price method now may reference a mutually-agreed clearinghouse for obtaining the discount factors to use.
- There are other cash settlement methods that have had slightly tweaked language.

5.9. Market Practices around the transition

[description about how different practices could emerge related to the actual transition, e.g.

- there is an ISDA protocol for how much the economic spread between LIBOR and RFR should be, based on 5 years of history for the given rates. That spread is calculated and published each day [under the aegis of ISDA] by Bloomberg. When a cessation event happens, the spread on that day would be fixed and added to the regular rate spread from then on.
- We may wish to define and/or provide support for the transition between IBOR rates and RFRs, and between old names and new names for rates. What would the best practices be?
- ESMA is requesting the trade repositories report when LIBOR-style rates have fallen back to risk free rates, and but have provided no mechanism and not much guidance on how to accomplish this. A possibility is to create new FRO codes that would indicate that the FROs have fallen back to a risk free rate.

6. Proposed Solutions

Following are a set of possible ways to address the issues listed above, presented for discussion by the working group. They do not represent any consensus or agreed upon approach.

6.1. Floating Rate Options

a) Non-compounding FROs

An anticipated change is the addition of at least the 8 non-compounding FROs listed above in the 2021 Definitions. ISDA could consider adding non-compounding versions of all compounding rates.

Status:

As of Dec. 2020, non-compounding versions of key risk free rates are being added to the ISDA FRO set to enable trades with customized calculation logic to be created.

b) OIS name transition

Alternative 1: ISDA/FpML could maintain metadata about each FRO involved in a name change. For the "old" FROs (FROs replaced by another name), we could list the new FRO name that should be used in its place. For the "new" FROs (newly created FROs that replace a previous name), we could list the previous FRO name. To further assist, we could provide metadata around the transition date – e.g. when an FRO name is no longer valid, when an FRO name is intended to be replaced by another, when an FRO name is first valid to be used, etc.

Alternative 2: To simplify transitioning, ISDA could retain "-OIS" in FRO names that currently use that, and not remove the publication source from existing FRO names.

Status:

As of Dec. 2020, the general principle of retaining "OIS" in the FRO name and removing the publication source has been agreed. In addition, it has been agreed to remove the administrator names where these are not required for identifying the rate. We have also agreed in principle to provide meta-data to show mappings from 2006 FRO names to the new 2021 names.

c) FRO categorization

To improve understandability of the FROs so that technologists and middle office staff understand how to support trades, ISDA Legal is introducing a categorization system to group FROs into related sets. There is a 3 level structure, with the top level being "Category", the second level being "Type" or "Style", and the third level being "Method", where needed. The overall system looks as follows:

Category

1. **Screen Rate** (requires no Calculation Agent input - rate viewed from chosen source - operative provision in Main Book)

[Type/Style]

a. **Term Rate**
b. **Overnight Rate**
c. **Swap Rate**
d. **Published Average Rate** (this would pick up SOFR Averages which would just be a screen rate and does not require input from Calculation Agent)
e. **Other** (likely to require a catch-all as there are various FROs that are screen rates, such as USD-CP and USD FFBC DISCO, which don't fit into any of the above categories)

2. **Calculated Rate** (requires the Calculation Agent to take the rate from the FRO and input it into a formula to produce the rate for the Calculation Period)

[Style]

a. **Compounded FRO**

[Method of Compounding]

i. OIS Compounding

b. **Average FRO**

[Method of Averaging]

i. Straight Averaging

c. **Index** (operative provision in Main Book will explain that the rate is calculated by applying the Index Method)
d. **Bespoke Formula** (set out in the Matrix)

3. **Reference Bank Rate** (these merit being a category of their own as they follow a different process from Calculated Rate and have separate operative provisions explaining how to determine the rate. This "Reference Bank Rate" category will encompass both Reference Bank rates and Reference Dealer rates. ISDA proposes to use "Reference Bank Rate" to encompass both terms on the basis that a greater number of FROs in the 2006 ISDA Definitions were "Reference Bank" rates.)

d) Meta-data

To ensure that users of the floating rate index names in the FpML coding schemes have an understanding of what those indexes mean, FpML could provide reference meta data such as described below. This metadata would be available to implementers to populate their systems (e.g. for validation or reference data population) but would not be included in the FpML transaction data.

The following metadata is at the FRO level:

- replaced-by (if this FRO has been or will be replaced by another FRO, what that FRO is)

- replaces (if this FRO replaces another FRO, what that FRO is)
- underlying rate type (term, overnight, index)
- Whether the rate includes an embedded formula, and if so what it is.
- style (OIS, term overnight)
    - OIS means that an overnight rate is obtained daily during the specified index tenor and compounded according to the rules specified for the FRO
    - Overnight means that the rate has a single tenor of 1 business day ("overnight").
    - Term means that there may be one or more tenors of different terms. For example, Overnight, 1 Month, 3, Month, 6 Months, 12 Months.
    - A more complete list of style values is being developed, including such values as "swap rate", "reference bank rate", "average rate", etc.
- daycount - default daycount fraction for calculations based on this index
- publication-calendar - the business centre or publication calendar that represents the dates that the FRO is published
- administrator
- ISO Code - the 4-character ISO floating rate code used for ISO 20022 EMIR reporting, where available.
- fixing lag – default offset for this index in business days
- In 2006 Defs - Is the FRO included in the 2006 Definitions or supplements?
- In 2021 Defs - Is the FRO included in the 2021 Definitions matrix?
- In Loan - YES / NO to flag FROs that are used in commercial Loans
- First defined in - Which definitions or supplement the FRO first appeared in
- Added date - The date the rate was added to the ISDA FRO definitions/supplements

The following metadata is at the tenor level. For OIS and overnight rates, this is the same as the index level. For term rates, this is at the tenor level – the values may be different for different tenors.

- dates, e.g:
    - first-publication-date - when the FRO became or will become active (i.e. available for pricing)
    - last publication-date - when the FRO became (or will become) inactive
    - nonrepresentative-declaration-date - when the FRO was declared non-representative
    -
    - tenor (Designated Maturity, Index Term)

Related to this, FpML would be helped if there were clear definitions developed under the ISDA 2021 Definitions of

a) What an OIS index is (or alternatively what an overnight risk free rate is)
b) What is a non-compounded vs. compounded index.
c) How to use all types of rates and indexes to calculate settlement amounts, by reference to standard formulas for interest calculation and index-based settlement. For instance,

- term interest is typically computed as Interest_rate * year_fraction * notional, where year_fraction is # days in period / day_count_fraction_denominator (but the rules for counting # days in period vary)
- interest based on index = ((index_at_end_of_period / Index_at_start_of_period) – 1) * notional

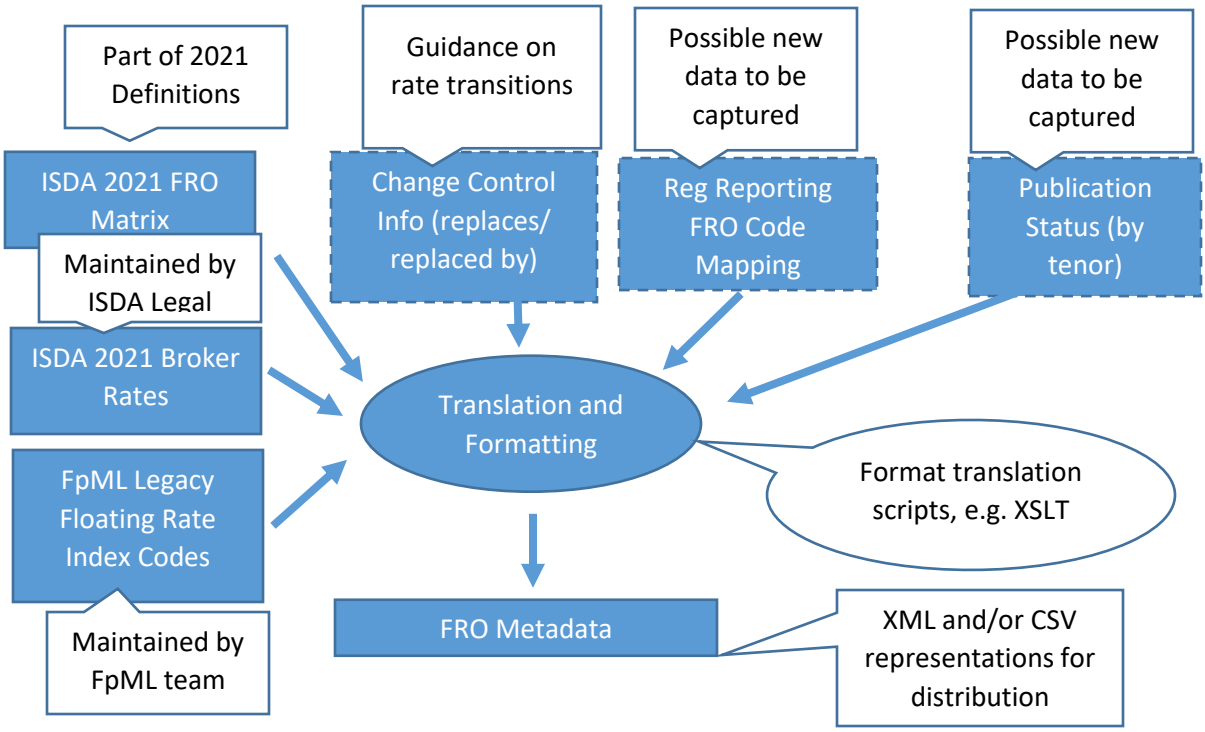
Alternatively, FpML is likely to have to develop this type of definition in order to be able to clearly define floating rate index metadata.

Status:

As of Dec. 2020, the principle that metadata will be defined and published has been agreed. Still to be fully determined is which categories of metadata will be maintained, and how those categories will be maintained. It appears that there will be multiple sources for this metadata, as follows:

- The ISDA 2021 FRO definitions will include a FRO matrix table, listing many metadata fields. The intention is to automatically translate those into XML (and possibly CSV) metadata for publication by FpML. Some examples of the FRO matrix fields may include:
  - The FRO name
  - Day count fraction
  - Various classification fields (style, underlying rate type, embedded calculation flag, multiple tenor flag)
  - Embedded calculation code/type (if any)
  - Fixing fields (fixing time, business center, fixing offset, publication calendar)
- Some of the fields have to do with change control and are likely to be maintained in a separate data store (e.g. file or spreadsheet). These may include fields like:
  - Definition dates: effective date (data definition first published/available), last modification date, retirement date
  - Which definition versions (e.g. 2000, 2006, 2021) the FRO can be used with
  - Predecessor and successor type information (“replaces” and “replaced by”)
- Some of the fields have to do with the publication status of the rates by administrators. These may include fields such as:
  - Tenor – which designated maturities are published for a given FRO
  - The first publication date for that tenor
  - The final publication date for that tenor (if known)
  - The non-representative date for the tenor (if specified by a regulator)
- Mapping for regulatory reporting:
  - Where FRO codes need to be mapped to specific values for regulatory reporting, the mapping or translation. (E.g. mapping to ISO 4-charater index code).

The metadata generation and publication process could be visualized as in the following diagram.



In the above diagram,

- the boxes at the top represent the data sources described earlier in this subsection,
- the bubble in the middle represents code that we will need to write to translate between the data in those sources and the output formats, and
- the box at the bottom represents the output formats (e.g. Unicode and other XML formats as well as possibly CSV) that will be used to distribute the metadata to market participants in electronic form.

Some thoughts to consider:

- We don't need to maintain both "replaces" and "replaced by" as one implies the other. We could maintain information on "replaced by" for the legacy rates and if desired map that to "replaces" in the metadata for 2021 rates. Or we might not even bother. If we take this approach, the "replaced by" information could be combined in with the legacy rate sheet, and eliminated as a separate file.
- The publication status information should be a separate file (possibly a spreadsheet tab) for the following reasons:
    - There is one row per FRO tenor, instead of one row per FRO
    - One some FROs will have this information – specifically LIBOR-style rates that are expected to be discontinued or to become non-representative, and possibly newly published term rates, if any. Possibly other rates that are discontinued could be indicated there, also, if desirable.

- The regulatory reporting mappings could be maintained separately. They only apply to certain FROs, and aren't part of the Matrix. Merging this with the legacy and 2021 rate could be a nuisance.
- For information such s the "in loan" indicator, it's a little unclear how best to maintain this across both legacy and 2021 rates. For legacy rates it could be a simple list…

6.2. FRO Naming Convention or Guidelines

We could define a naming convention for FROs to give more predictability of how rates will be named, and possibly provide more consistency for existing rates.

If we do this, an open question is whether to rename existing rates to follow the new naming conventions. This would affect more FRO names, and the mapping between old and new names may be less obvious. On the other hand, the new names would be more consistent.

Alternatively, we could retain the existing names, except where they must be changed for other reasons, and rely exclusively on metadata to determine what type of rate it is.

6.3. Overnight Rate Calculation Enhancements

The ISDA 2021 Definitions should clearly define "lookback" and "rate shift" so that they can be distinguished in contracts. As it stands the terminology around "lookback" is somewhat ambiguous in the market.

FpML should provide a simple way to distinguish between "Lookback" and "Observation Shift" averaging methods.

One way to do this would be to add a new element (possibly in the reset structure and possibly in the calculation structure) to distinguish between the cases. The element could be called "averagingWeightDayType" and have values

- CalculationPeriod - This would mean that the observations weights would be based on the weekends and holidays of days in the calculation period. In other words, a rate would be determined for each business day in the calculation period, and for Fridays or other calculation dates before holidays, the weight would be increased to reflect the subsequent non-business days. This corresponds to a "Lookback" type of averaging.
- ObservationPeriod - This would mean that the observation weights would be based on the weekends and holidays of the Observation Period. In other words, the observation period would be determined based on the calculation period, and then the rate would be weighted higher for observations occurring before a weekend or holiday. This corresponds to an "observation period shift" type of averaging.

<averagingPeriod>CalculationPeriod</averagingPeriod> <!-- lookback-->

<averagingPeriod>ObservationPeriod</averagingPeriod> <!-- shift -->

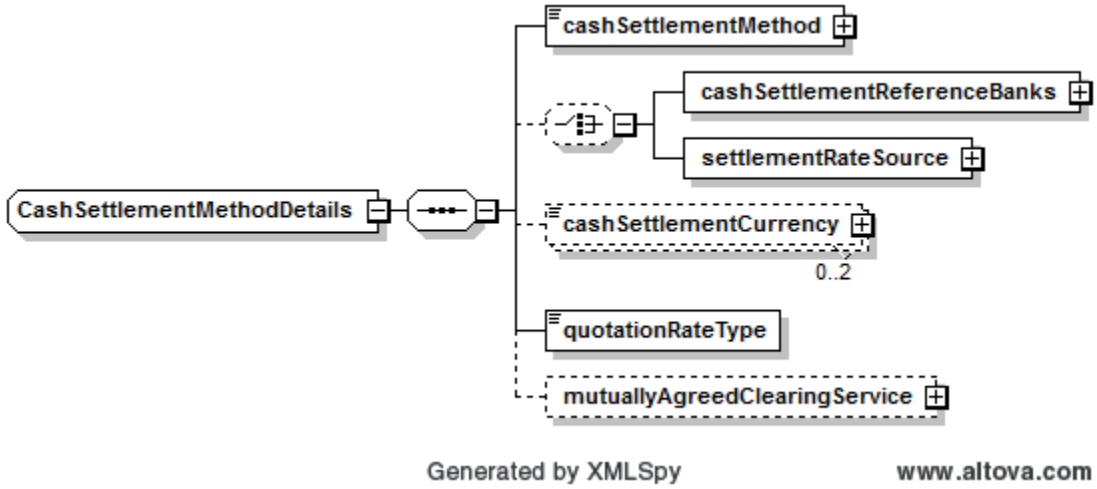
6.4. Overnight Rate Examples

We should provide fully worked examples (with full FpML example files) of the calculation types described in this paper).

6.5. Cash Settlement

We should add new structures to the cash settlement provisions to reflect the new 2021 Definitions.

Specifically, we could add a new, generic cash settlement method structure with a coding scheme to indicate the specified method. The structure could look as follows:



6.6. Cash-Settled Swaptions

We should add to the swaption cash settlement block the ability to reference either a designated clearing service, or a designated discount rate, for the underlying swap, to specify the discounting method for cash settlement calculations. See under Cash Settlement for an example of how this could be done.

6.7. Documentation

To be able to reference the 2021 Definitions, we should add a new value to the "contractual-definitions" coding scheme, e.g. "ISDA2021". This value would be used in the <contractualDefinitions> element of the <documentation> structure.

Related to Libor fallbacks, there are several things we could document. We could include the ability to report that a transaction is covered by the Libor fallback protocol, as well as whether a fallback has been triggered under that protocol. An indicator like this could also be helpful for transactions that have experienced a pre-cassation fallback (or a cessation fallback) without being covered by the protocol.

This could perhaps be done as an <otherAgreement> element in the documentation section. For instance, a simple solution (not covering all of the information listed above, but using existing structures) could be:<documentation>

```
<otherAgreement>
        <type>FallbackProtocol</type>
        <date>2021-03-01</date>
```

```
        </otherAgreement>
</documentation>
```

Or alternatively, with new structure, we could perhaps do something like this:

```
<documentation>
        <protocol>
                <name>Libor Fallback Protocol</name>
                <date>2021-03-01</date>
        </protocol>
        <event>
                <type>Precessation Fallback</type>
                <eventDate>2021-05-06</eventDate>
        </event>
</documentation>
```

Update: Feb/March 2021: ESMA is requesting that TRs report when LIBOR trades have fallen back to an underling risk free rate. It is unclear how to do this. One option would be to use a separate FRO code for fallen back rates. Another would be to simply report the RFR that is actually being used and ignore the contractual definition. Some open questions include:

- Is it necessary to report both the original (contractual) FRO and the actually used FRO?
- If so, how? Would a new FRO code be sufficient for that?
- What about the other differences, eg. compounding, etc.? Would the contractual or actual terms need to be reported? Would both ever be needed? If so, how could this be done without data format changes from the regulator, which do not appear to be forthcoming? If not, for a fallen back rate should the contractual or actual (fallen back) terms be reported?

7. Next Steps and Timeline

- Refine this document based on discussion with members of the XAPWG Interest Rate 2021 Definitions Stream. This will include developing proposed answers to the listed issues (Target: early July 2020)
- Syndicate this paper more widely to the FpML Standards Committee, other ISDA groups, and industry stakeholders such as major dealers and platforms to get consensus on the proposed approach
- As part of this syndication process we may wish to develop a higher level PowerPoint presentation deck to summarize the key issues. (Begun Oct 2020)
- Proposed stakeholder types to review this would include:
    - Major IR swaps broker/dealers
    - Trade execution platforms/facilities/venues (e.g. Bloomberg)
    - Middleware and confirmation plaforms (e.g MarkitWire)
    - Clearinghouses (e.g. CME, LCH)
    - Trade repositories (e.g. DTCC GTR)
    - Buy-side operations processing platforms, custodians, fund administrators, messaging facilities (e.g. SWIFT FpML closed user group, BNYMellon)
- Provide feedback to the ISDA 2021 Definitions drafting team with proposed changes as necessary and applicable. (Begun Sept 2020)
- Begin designing and implementing the changes in more detail, in schema and example form. (Target: The discussion paper could include suggested approaches. Work designing and mocking up the actual changes could begin in late July. We developed initial samples in Sept 2020, and would aim to produce a working draft in early 2021. The definitions are planned to be published May 2021, with the implementation work occurring during the spring and summer of 2021.
- Discuss implementation process and timelines

8. Appendix I - Collateralized Cash Price Definition in 2021 Definitions

1.1.1 **Collateralized Cash Price**.[1]

(i) Subject to paragraphs (iii) and (v) below, if "Collateralized Cash Price" applies, the Fallback Cash Settlement Amount shall be the present value of an annuity equal to the difference between:

(a) the amounts that would be payable by the Fixed Rate Payer under the Relevant Transaction if the Fixed Rate were the Settlement Rate; and

(b) the amounts that are payable by the Fixed Rate Payer under the Relevant Transaction.

(ii) For the purposes of paragraph (i) above:

(a) the parties to the Relevant Transaction are deemed to have a bilateral ISDA VM Credit Support Annex, with cash denominated in the same currency as the Relevant Transaction as the only Eligible Collateral (VM) or Eligible Credit Support (VM), as applicable (where the terms "Eligible Collateral (VM)" and "Eligible Credit Support (VM)" have the same meanings as in the ISDA VM Credit Support Annex);

(b) the discount factors used to calculate the present value pursuant to paragraph (i) shall be:

(I) if "Mutually Agreed Clearinghouse" is specified in the Confirmation, the discount factors that would apply if the Relevant Transaction were cleared through the relevant Mutually Agreed Clearinghouse;

(II) if "Mutually Agreed Clearinghouse" is not specified in the Confirmation, calculated from a current zero coupon curve, derived as of the Cash Settlement Valuation Time on the Cash Settlement Valuation Date from the interest rate used to calculate payments on cash collateral denominated in the same currency as the Relevant Transaction pursuant to the ISDA VM Credit Support Annex described in paragraph (ii)(a), which benchmark shall be:

(1) the Discount Rate specified in the Settlement Matrix with respect to that currency; or

(2) if no such Discount Rate is specified determined by the Calculation Agent;

(c) the Settlement Rate shall be:

(I) the Settlement Rate specified in the Settlement Matrix for the currency of the Relevant Transaction; or

[1] Original definition of "Collateralized Cash Price" was inserted by Supplement number 28 to the 2006 Definitions (published on 30 September 2011) as amended by Supplement 48 to the 2006 Definitions (published on 23 March 2016) and Supplement 58 to the 2006 Definitions (published on 21 November 2018).

(II) if no such Settlement Rate is specified in the Settlement Matrix for the currency of the Relevant Transaction, the Settlement Rate, determined by the Calculation Agent.

(iii) If "Collateralized Cash Price" applies to a Transaction to which Optional Early Termination or Mandatory Early Termination applies and the Optional Early Termination Date or Mandatory Early Termination Date, as the case may be, falls on a date which is not both a Fixed Rate Payer Payment Date and a Floating Rate Payer Payment Date under that Transaction, then the Fallback Cash Settlement Amount shall be an amount equal to the Fallback Cash Settlement Amount determined pursuant to paragraphs (i) and (ii) above in respect of the period from, and including, the next such Payment Date, as increased or decreased, as applicable, by an amount in respect of the amounts accrued for the Calculation Period in which the Optional Early Termination Date or Mandatory Early Termination Date falls but in respect of which the Payment Date for such Calculation Period has not yet arisen as at the Optional Early Termination Date or Mandatory Early Termination Date.

(iv) If the parties are unable to agree on the Fallback Cash Settlement Amount(s) in accordance with paragraphs (i) to (iii) above:

(a) the Calculation Agent shall ask each Cash Settlement Reference Bank to provide a quotation for the Fallback Cash Settlement Amount using the Collateralized Cash Price methodology described in paragraphs (i) to (iii) above (as of the Cash Settlement Valuation Time on the Cash Settlement Valuation Date); and

(b) the Fallback Cash Settlement Amount shall be the Arithmetic Mean of the amounts (or, in the case of a Transaction involving two Cash Settlement Currencies, for each Cash Settlement Currency, the Arithmetic Mean of the amounts expressed in that Cash Settlement Currency) specified in those quotations. However, if fewer than three such quotations are provided, the Fallback Cash Settlement Amount shall be determined by the Calculation Agent using the methodology described in paragraphs (i) to (iii) above.

(v) If a "Mutually Agreed Clearinghouse" is specified in the Confirmation or otherwise agreed in respect of a Swaption and either party so elects, by giving notice to the other party prior to the Cash Settlement Valuation Time on the Cash Settlement Valuation Date, the Settlement Rate used shall be increased or decreased, as applicable, by the Adjustment Amount.[2]

(a) "**Adjustment Amount**" means:

(I) the amount (if any) by which the relevant Settlement Rate would be adjusted by the Mutually Agreed Clearinghouse if the Cash Settlement Valuation Date were the Trade Date of the Relevant Transaction and the Relevant Transaction were cleared by the Mutually Agreed Clearinghouse as agreed by the parties; or [***Q to WG: Does the Adjustment Amount concept still make sense? Is it an***

[2] Clearinghouses will be changing their PAI/discount rates from Fed Funds to SOFR next year. SOFR will therefore apply to swaptions which are exercised after the date of the switch. There should be no need however, for any compensation on the underlying cleared transactions as they will be cleared following the PAI change. Further, it is not expected that a party will have to compensate the other party to preserve the MTM under the bilateral OTC swaption as there is no prescribed compensation mechanism in standard OTC swaptions confirmations.

amount which is capable of being determined by the Parties/Cash Settlement I Reference Banks?]

(II) if the parties are unable to agree on such amount, an amount determined by the Calculation Agent on the basis of quotations from the Cash Settlement Reference Banks. The Adjustment Amount will be the Arithmetic Mean of the amounts specified in those quotations. However, if fewer than three such quotations are provided, the Adjustment Amount will be determined by the Calculation Agent.

(vi) Notwithstanding paragraph (v) above, if the process for determining the Adjustment Amount is the process set out in paragraph (v)(a)(II) above or if the Settlement Rate in respect of which the Adjustment Amount is being determined is itself required to be determined on the basis of quotations received by Cash Settlement Reference Banks pursuant to Section **Error! Reference source not found.** (*Settlement FX Rate*), no separate q uotations will be required to be provided by Cash Settlement Reference Banks in connection with the determination of the Adjustment Amount but the Cash Settlement Reference Banks shall instead be requested to factor the Adjustment Amount into their quotations of the Settlement Rate.

9. Appendix II – list FpML Floating Rate Indices with style=OIS

[Source: FpML floating-rate-index coding scheme]

1.	AUD-AONIA-OIS-COMPOUND	
2.	AUD-AONIA-OIS-COMPOUND-SwapMarker	
3.	CAD-CORRA-OIS-COMPOUND	
4.	CHF-OIS-11:00-ICAP	Broker page, but has OIS in the name
5.	CHF-SARON-OIS-COMPOUND	
6.	CHF-TOIS-OIS-COMPOUND	
7.	CNY-Shibor-OIS-Compounding	
8.	COP-IBR-OIS-COMPOUND	
9.	DKK-DKKOIS-OIS-COMPOUND	
10.	EUR-EONIA-OIS-10:00-BGCANTOR	Broker page, but has OIS in the name
11.	EUR-EONIA-OIS-10:00-ICAP	Broker page, but has OIS in the name
12.	EUR-EONIA-OIS-10:00-TRADITION	Broker page, but has OIS in the name
13.	EUR-EONIA-OIS-11:00-ICAP	Broker page, but has OIS in the name
14.	EUR-EONIA-OIS-4:15-TRADITION	Broker page, but has OIS in the name
15.	EUR-EONIA-OIS-COMPOUND	
16.	EUR-EONIA-OIS-COMPOUND-Bloomberg	
17.	EUR-EURONIA-OIS-COMPOUND	
18.	**EUR-EuroSTR-COMPOUND**	Is OIS, but does not have “OIS” in the name
19.	**GBP-SONIA-COMPOUND**	Is OIS, but does not have “OIS” in the name
20.	GBP-SONIA-OIS-11:00-ICAP	Broker page, but has OIS in the name
21.	GBP-SONIA-OIS-11:00-TRADITION	Broker page, but has OIS in the name
22.	GBP-SONIA-OIS-4:15-TRADITION	Broker page, but has OIS in the name
23.	**GBP-WMBA-RONIA-COMPOUND**	Is OIS, but does not have “OIS” in the name
24.	GBP-WMBA-SONIA-COMPOUND	deprecated
25.	HKD-HONIX-OIS-COMPOUND	
26.	INR-FBIL-MIBOR-OIS-COMPOUND	
27.	INR-MIBOR-OIS-COMPOUND	
28.	**INR-MIOIS**	Is not OIS, but has “OIS” in the name
29.	INR-MITOR-OIS-COMPOUND	deprecated
30.	JPY-OIS-11:00-ICAP	Broker page, but has OIS in the name
31.	JPY-OIS-11:00-TRADITION	Broker page, but has OIS in the name
32.	JPY-OIS-3:00-TRADITION	Broker page, but has OIS in the name
33.	JPY-TONA-OIS-COMPOUND	
34.	NZD-NZIONA-OIS-COMPOUND	
35.	PLN-POLONIA-OIS-COMPOUND	
36.	REPOFUNDS RATE-FRANCE-OIS-COMPOUND	
37.	REPOFUNDS RATE-GERMANY-OIS-COMPOUND	
38.	REPOFUNDS RATE-ITALY-OIS-COMPOUND	
39.	RUB-RUONIA-OIS-COMPOUND	
40.	SEK-SIOR-OIS-COMPOUND	
41.	SGD-SONAR-OIS-COMPOUND	deprecated
42.	SGD-SONAR-OIS-VWAP-COMPOUND	
43.	**SGD-SORA-COMPOUND**	Is OIS, but does not have “-OIS” in the name

44.	**THB-THOR-COMPOUND**	Is OIS, but does not have "-OIS" in the name
45.	TRY-TLREF-OIS-COMPOUND	
46.	USD-Federal Funds-H.15-OIS-COMPOUND	
47.	USD-OIS-11:00-BGCANTOR	Broker page, but has OIS in the name
48.	USD-OIS-11:00-LON-ICAP	Broker page, but has OIS in the name
49.	USD-OIS-11:00-NY-ICAP	Broker page, but has OIS in the name
50.	USD-OIS-11:00-TRADITION	Broker page, but has OIS in the name
51.	USD-OIS-3:00-BGCANTOR	Broker page, but has OIS in the name
52.	USD-OIS-3:00-NY-ICAP	Broker page, but has OIS in the name
53.	USD-OIS-4:00-TRADITION	Broker page, but has OIS in the name
54.	**USD-SOFR-COMPOUND**	Is OIS, but does not have "-OIS" in the name