



Interest Calculations using Time Counting Methods

Q2 Loan Servicing

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Q2

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Interest calculations using Time Counting Methods

What is a Time Counting Method?

Time Counting Method in Q2 Loan Servicing is a day counting method used to determine the number of days in a year and the number of days in a month to be considered for the calculation of interest accrual for a given period of time. It helps to provide standardized methods for calculating interest accruals on various loan products.

For example, if the Time Counting Method selected is Month and Days, which considers that the number of days in a year are 360 and the number of days in a month are 30, then for a due date that falls on the first of every month, the interest accrued on every due date is calculated as follows:

$$= P \times N \times R$$

where:

- P = Principal amount on which interest is to be calculated.
- N = Number of days
- R = Annual rate of interest

$$= P \times \text{Interest rate per day} \times N$$

where:

- Interest rate per day = $R/\text{number of days in a year}$

$$= P \times (R/\text{number of days in a year}) \times N$$

$$= (P \times R/360) \times 30$$

Thus, the formula that the system uses to calculate interest is as follows:

Formula for calculating interest

$$\text{Interest} = \{(\text{Principal} \times \text{Annual Rate of Interest}) / \text{Days in the Year}\} \times \text{Days in the Month}$$

The number of days in a month and the number of days in a year in the preceding formula could vary for each FI.

Note:

The day-counting convention is a complication that stems at least in part from the shortcuts that were used in lending markets before the market participants had ready access to precise ways to determine interest.

Number of days in a year

The number of days in a year considered by an FI depends on various factors and determines how R and N is considered in the preceding formula. The number of days in a year that an FI considers can be any one of the following:

- Always 365: Here, the number of days in a year is always considered to be 365.
- 365 for non-leap year and 366 for leap year: Here, the number of days in a year is based on whether or not it is a leap year.
- Always 360: Here, the number of days in a year is always considered to be 360.

What are the different types of Time Counting Methods available in Q2 Loan Servicing?

Based on the preceding number of years considered in a year, Q2 Loan Servicing offers you the following five Time Counting Methods to select from to help calculate the interest accrual between two dates:

- [Month and Days \(30/360\)](#)
- [Actual Days \(Actual/365\)](#)
- [366/365](#)
- [Actual Days \(366\)](#)
- [Actual/360](#)

You can select any one of the preceding Time Counting Methods either while creating a lending product or a loan contract as highlighted in the following image:

Information

<p>* Loan Product Name ↶</p> <input style="width: 90%;" type="text" value="Loan 1"/>	<p>Loan Product Code ?</p>
<p>* Interest Calculation Method ?</p> <input style="width: 90%;" type="text" value="Declining Balance"/>	<p>* Product Type ?</p> <input style="width: 90%;" type="text" value="Loan"/>
<p>* Payment Frequency ?</p> <input style="width: 90%;" type="text" value="Monthly"/>	<p>Record Type</p> <p>Loan Product Record Type</p>
<p>Interest Only Period ?</p> <input style="width: 90%;" type="text"/>	<p>* Time Counting Method ?</p> <input style="width: 90%;" type="text" value="Month and Days"/>
<p>Actual Interest Only Payments ?</p> <input checked="" type="checkbox"/>	<p>Pre Bill Days ?</p> <input style="width: 90%;" type="text" value="0"/>
<p>Accrual Start Basis ?</p> <input style="width: 90%;" type="text" value="Contract Date"/>	<p>Allow Higher Investor Certificate Rate</p> <input type="checkbox"/>
<p>Payment Application Mode ?</p> <input style="width: 90%;" type="text" value="--None--"/>	<p>Status</p> <input style="width: 90%;" type="text" value="Active"/>
<p>Payment Application Order ?</p> <input style="width: 90%;" type="text" value="Spread"/>	<p>Business Hours ?</p> <input style="width: 90%;" type="text" value="Search Business Hours..."/>

Add Fee Amount To Bill ?

Month and Days

When you select this method, the system considers that a year always has 360 days and hence every month has only 30 days. The interest per day is calculated as $P \times R/360$.

While calculating the interest between two dates, the 31st of a month is ignored and February is considered to have 30 days. For example, if you have to calculate interest from January 30 to February 1, the system calculates interest for one day as all months are assumed to be of 30 days. Also, while calculating interest from February 28, 2023, to March 1, 2023, the system calculates interest for three days instead of one day.

Note:

While working on an Excel, to verify the calculations for Month and Days, you can use the following formula in excel:

- `DAYS360(start_date, end_date, [method])`

For example, to calculate the number of days between February 28, 2024 and March 31, 2024, you can use the formula in Excel as follows:

Start Date	28-Feb-24
End Date	31-Mar-2024
Days counted using Month and Days	=DAYS360(O35,O36,TRUE)
	DAYS360(start_date, end_date, [method])

This leads to the days counted as 32 as follows:

Start Date	28-Feb-24
End Date	31-Mar-2024
Days counted using Month and Days	32

Actual Days (Actual/365)

When you select this method, the system considers that a year always has 365 days irrespective of a leap year, and hence, February will always be considered to have 28 days irrespective of the leap year. The interest per day is calculated as $P \times R/365$.

For example, if you have to calculate interest from February 28 to March 1, the system counts one day and not two days even if it is a leap year.

366/365

When you select this method, the system considers that a year always has 365 days. Thus, the interest per day is calculated as $P \times R/365$. However, even though the year is always considered to have 365 days, the month of February is considered to have 28 days in a non-leap year and 29 days in a leap year.

Actual Days (366)

When you select this method, the system considers that a year has 365 days in a non-leap year and 366 days in a leap year. Thus, $P \times R/365$ is calculated as the interest per day for non-leap year and $P \times R/366$ as the interest per day for a leap year.

Actual/360

When you select this method, the system considers that a year always has 360 days. The interest per day is calculated as $P \times R/360$. However, the days in a month are considered to have the actual number of days based on whether or not the year is a leap year. Thus, the system considers 28 days in February in a non-leap year and 29 days in February in a leap year.

Note:

Daily accruals are calculated at the start of the next day (SOD) when the StartOfDayJob batch job runs in the morning. For example, the accrual for December 31 is calculated when the StartOfDayJob runs at the start of the day of January 1.

Thus, to calculate accrual from December 31 to January 5, the system considers the interest accrued on the SOD of January 1, January 2, January 3, January 4, and January 5.

Time Counting Methods explained in a snapshot

The following table describes each Time Counting Method in a snapshot:

Time Counting Methods	Days in a month considered	Days in a year considered	Description
Month and Days (30/360)	30	360	This method considers all months to be 30 days long and each year to be of 360

Time Counting Methods	Days in a month considered	Days in a year considered	Description
			<p>days.</p> <div style="border-left: 2px solid #008080; padding-left: 10px; margin-top: 10px;"> <p>Note:</p> <p>For weekly and bi-weekly loans, the Time Counting Method is always Actual Number of Days/364 days.</p> </div>
Actual Days (Actual/365)	Actual days in a month, with the exception of February, which is always believed to have 28 days regardless of leap years.	365	<p>This method takes into account the actual amount of days in each month with February having 28 days regardless of whether the year is a leap year or not, and each year being 365 days long.</p> <p>So, regardless of leap years, the system counts 31 days for January, 28 days for February, and so on.</p>
Actual Days (366)	Actual days in a month	<ul style="list-style-type: none"> • 365 for non-leap year • 366 for leap years 	<p>This method takes into account the actual days in a month, and considers a leap year to be 366 days long whereas a non-leap year to be 365 days long.</p> <p>This means that if the year is a leap year, then the system will count 29 days in February and 366 days in a year.</p>

Time Counting Methods	Days in a month considered	Days in a year considered	Description
366/365	Actual days in a month	365	<p>This method takes into account the actual number of days in a month, but it assumes the year is 365 days long, regardless of whether it is a leap year.</p> <p>This means that if the year is a leap year, then the system will count 29 days in February but 365 days in a year.</p>
Actual/360	Actual days in a month	360	<p>This method takes into account the actual number of days in a month, but assumes the year is 360 days long.</p> <p>This means that if the year is a leap year, then the system will count 29 days in February but 360 days in a year.</p>

Note:

In instances where the CL Loan Contract uses Financial Calculator Version 2.0, the system ignores February 29 and considers only 365 days as the actual number of days in a year.

For example, let us say there is a loan of the amount of \$100,000 and an interest rate of 10%. The Time Counting Method selected is Month and Days, which means that the days in a month are considered as 30 and the days in a year are considered as 360. Then the interest accrued in a month is calculated as follows:

$$\text{Interest} = 100,000 \times (10/100) \times (30/360) = \$833.33.$$

Examples

Example 1: Time Counting Method = Month and Days; Interest accrued on every due date

Let us say that the interest is to be calculated on every due date considering 360 days in a year (Month and Days), then the system counts the number of days for which the interest is to be calculated as follows:

Due Dates	Number of days in a month	Number of days for which the interest is to be calculated
January 31	30 days in January	
February 28	30 days in February	28 days From January 31 to February 28, the system counts 28 days. This is because the system considers 30 days for both January and February.
March 31	30 days in March	32 days From February 28 to March 31, the system counts 32 days. This is because the system considers 30 days in each month including February and March.
April 30	30 days in April	30 days From March 31 to April 30, the system counts 30 days. This is because the system considers 30 days for both March and April.
May 31	30 days in May	30 days

Due Dates	Number of days in a month	Number of days for which the interest is to be calculated
		<p>From April 30 to May 31, the system counts 30 days. This is because the system considers 30 days for both April and May.</p>

Note:

While working on an Excel, to verify the calculations for Month and Days, you can use the following formula in excel:

- DAYS360(start_date, end_date, [method])

For example, to calculate the number of days between February 28, 2024 and March 31, 2024, you can use the formula in Excel as follows:

Start Date	28-Feb-24
End Date	31-Mar-2024
Days counted using Month and Days	=DAYS360(O35,O36,TRUE)
	DAYS360(start_date, end_date, [method])

This leads to the days counted as 32 as follows:

Start Date	28-Feb-24
End Date	31-Mar-2024
Days counted using Month and Days	32

Example 2: Interest accrued between two defined dates for each Time Counting Method

Assume a loan with an interest rate of 8% and payment due dates of February 25, 2016, and then March 05, 2016. Then, the system calculates the interest accrued between these due dates as described in the following table:

Note:2016 is a leap year.

Time Counting Method	Per day interest	Number of days	Interest accrued for the period
Month and Days (30/360)	$P \times (8/100) \times (1/360)$ $= (0.08/360) \times P$	10 (25th to 30th Feb + 30th Feb to 5th Mar)	Per day interest x Number of days $= (0.08/360) \times P \times 10$
Actual Days (Actual/365)	$(0.08/365) \times P$	8 (25th to 28th Feb + 28th Feb to 5th Mar)	$(0.08/365) \times P \times 8$
Actual Days (366)	$(0.08/366) \times P$	9 (25th to 29th Feb + 29th Feb to 5th Mar)	$(0.08/366) \times P \times 9$

Note:

Since 2016 is a leap year, the days in February

Time Counting Method	Per day interest	Number of days	Interest accrued for the period
		are 29.	
366/365	$(0.08/365) \times P$	<p>9 (25th to 29th Feb + 29th Feb to 5th Mar)</p> <p>Note: Since 2016 is a leap year, the days in February are 29.</p>	$(0.08/365) \times P \times 9$
Actual/360	$(0.08/360) \times P$	<p>9 (25th to 29th Feb + 29th Feb to 5th Mar)</p> <p>Note: Since 2016 is a leap year, the days in February are 29.</p>	$(0.08/360) \times P \times 9$

Example 3: Interest accrued for different periods for each Time Counting Method

Assume a loan with an annual interest rate of 8%. Now let us look at how the interest is calculated for various periods using each of the following Time Counting Methods:

- [Example with Month and Days \(30/360\)](#)
- [Example with Actual Days \(Actual/365\)](#)
- [Example with Actual Days \(366\)](#)
- [Example with 366/365](#)
- [Example with Actual/360](#)

Example with Month and Days (30/360)

Year	Period of calculation	Number of days	Number of days in a year	Per day interest	Interest accrued for the period
Leap year or Non-leap year	April 1 to May 1	30	360	$P \times 1 \times (8/100)/360$	$P \times (8/100)/360 \times 30$
Leap year or Non-leap year	July 1 to August 1	30	360	$P \times 1 \times (8/100)/360$	$P \times (8/100)/360 \times 30$
Leap year or Non-leap year	February 1 to March 1	30	360	$P \times 1 \times (8/100)/360$	$P \times (8/100)/360 \times 30$
From leap	December 1, 2016, to	30	360	$P \times 1 \times (8/100)/360$	$P \times (8/100)/360 \times$

Year	Period of calculation	Number of days	Number of days in a year	Per day interest	Interest accrued for the period
year to non-leap year	January 1, 2017				30
From non-leap year to leap year	December 1, 2015, to January 1, 2016	30	360	$P \times 1 \times (8/100)/360$	$P \times (8/100)/360 \times 30$

Example with Actual Days (Actual/365)

Year	Period of calculation	Number of days	Number of days in a year	Interest
Leap year or Non-leap year	April 1 to May 1	30	365	$P \times (8/100) \times (30/365)$
Leap year or Non-leap year	July 1 to August 1	31	365	$P \times (8/100) \times (31/365)$
Leap year or Non-leap year	February 1 to March 1	28	365	$P \times (8/100) \times (28/365)$
From leap year to non-leap year	December 1, 2016, to January 1, 2017	31	365	$P \times (8/100) \times (31/365)$
From non-leap year to leap year	December 1, 2015, to January 1, 2016	31	365	$P \times (8/100) \times (31/365)$

Example with Actual Days (366)

Year	Period of calculation	Number of days	Number of days in a year	Per day interest
Leap year	April 1 to May 1	30	366	$P \times (8/100) \times (30/366)$
Non-leap year	April 1 to May 1	30	365	$P \times (8/100) \times (30/365)$
Leap year	July 1 to August 1	31	366	$P \times (8/100) \times (31/366)$
Non-leap year	July 1 to August 1	31	365	$P \times (8/100) \times (31/365)$
Leap year	February 1 to March 1	29	366	$P \times (8/100) \times (29/366)$
Non-leap year	February 1 to March 1	28	365	$P \times (8/100) \times (28/365)$
From leap year to non-leap year	December 25, 2016, to January 25, 2017	December 25 to January 1 in leap year + January 1 to January 25 in non-leap year = 7 days in leap year + 24 days in non-leap year See more	366 for leap year and 365 for non-leap year	$P \times (8/100) \times (7/366)$ + $P \times (8/100) \times (24/365)$
From non-	December 25,	December 25 to	365 for non-leap	$P \times (8/100)$

Year	Period of calculation	Number of days	Number of days in a year	Per day interest
leap year to leap year	2023, to January 25, 2024	January 1 in non-leap year + January 1 to January 25 in leap year = 7 days in non-leap year + 24 days in leap year See more	year and 366 for leap year	$\times (7/365)$ + $P \times (8/100)$ $\times (24/366)$

Note:

While using Actual Days (366), when interest is to be calculated for a period that crosses the year from non-leap year to leap year or vice versa, such as from December 25, 2023, to January 25, 2024, the system calculates the interest as the sum of the following:

- Interest between December 25, 2023, to January 1, 2024, for 7 days, considering 365 days in a year

Here, the interest calculated on January 1 SOD (Start of Day) is for the previous year and hence the interest calculated on January 1 must consider 365 days in a year and not 366 days in a year.

- Interest between January 1, 2024, to January 25, 2024, for 24 days, considering 366 days in a year.

Note: 2023 is a non-leap year and 2024 is a leap-year.

Thus, although the accrual process is still run during SOD (January 1 morning), the system takes the number of days in a year for calculation purposes from the previous year. This is because the actual amount that is calculated on January 1 of any year belongs to the previous years accounting. Because of this, the system uses the previous years days in a year to calculate the interest.

This behavior is only applicable for Time Counting Method - Actual Days (366) from Platinum release onward. Before the Platinum release, the system calculated the January 1, 2024, accrual considering 366 days in a year.

Example with 366/365

Year	Period of calculation	Number of days	Number of days in a year	Per day interest
Leap year	April 1 to May 1	30	365	$P \times (8/100) \times (30/365)$
Non-leap year	April 1 to May 1	30	365	$P \times (8/100) \times (30/365)$
Leap year	July 1 to August 1	31	365	$P \times (8/100) \times (31/365)$
Non-leap year	July 1 to August 1	31	365	$P \times (8/100) \times (31/365)$
Leap year	February 1 to March 1	29	365	$P \times (8/100) \times (29/365)$
Non-leap year	February 1 to March 1	28	365	$P \times (8/100) \times (28/365)$
From leap year to non-leap year	December 1, 2016, to January 1, 2017	31	365	$P \times (8/100) \times (31/365)$
From non-leap	December 1, 2015,	31	365	$P \times (8/100)$

Year	Period of calculation	Number of days	Number of days in a year	Per day interest
year to leap year	to January 1, 2016			$x (31/365)$

Example with Actual/360

Year	Period of calculation	Number of days	Number of days in a year	Per day interest
Leap year	April 1 to May 1	30	360	$P x (8/100) x (30/360)$
Non-leap year	April 1 to May 1	30	360	$P x (8/100) x (30/360)$
Leap year	July 1 to August 1	31	360	$P x (8/100) x (31/360)$
Non-leap year	July 1 to August 1	31	360	$P x (8/100) x (31/360)$
Leap year	February 1 to March 1	29	360	$P x (8/100) x (29/360)$
Non-leap year	February 1 to March 1	28	360	$P x (8/100) x (28/360)$
From leap year to non-leap year	December 1, 2016, to January 1, 2017	31	360	$P x (8/100) x (31/360)$
From non-leap year to leap year	December 1, 2015, to January 1, 2016	31	360	$P x (8/100) x (31/360)$