

DnA Contract BPMN Processes

1 Overview

1.1 Why BPMN?

BPMN (Business Process Model and Notation) diagrams have been used to provide a graphical notation for specifying the processes in each of the following:

- (a) a sample interest rate swap as documented using an ordinary paper Confirmation ("**Traditional IRS**"); and
- (b) a sample 'smart contract' as documented using Digital Terms and Analogue Terms, which together comprise the transaction (for more details on this structure refer to [Readme](#) or [alert](#)) ("**DnA IRS**").

The BPMN processes set out in the accompanying diagrams show the functions and processes undertaken by different 'actors' throughout the life cycle of each of the Traditional IRS and the DnA IRS. As the diagrams demonstrate, the DnA IRS drastically reduces the amount of input required from a 'human' actor and shows the amount of processes that can be automated and carried out by computer code, increasing speed and efficiency, and decreasing the risk of human error.

1.2 Interest Rate Swaps

As set out in our [alert](#) we have deliberately chosen a simple interest rate swap to demonstrate how using the DnA smart contract architecture could work.

For the purposes of the BPMN diagrams we have used the same contractual terms that have been used in the sample Digital Terms and Analogue Terms set out our github [repository](#), which are briefly summarised as follows:

- a fixed/floating AUD interest rate swap commencing on 1 June 2016;
- the floating rate is determined by reference to a 3-month BBSW rate published on Reuters; and
- quarterly payment dates on 1 September 2016, 1 December 2016, 1 March 2017 and 1 June 2017 (the latter of which is also the Termination Date).

1.3 BPMN Notation

Whilst BPMN is a useful tool for demonstrating the processes involved in each of the Traditional IRS and DnA IRS, it is a prescriptive form of notation. Consequently, for our purposes we have used the following terms in the following manner:



denotes a task that an entity is anticipated to perform manually, through the use of human actors.



denotes a task or set of tasks that a corporate or human entity must perform (whether this be entirely manually through the use of human actors or through the use of an entity's own computer systems)



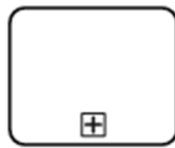
denotes a task that is completed through a coded function within the Digital Terms.



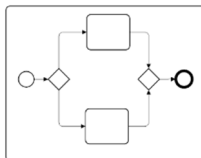
denotes a task which involves the sending of messages to other actors.



denotes a task which involves the polling of other actors or information sources.



denotes a number of sub-tasks or processes within a larger task (which are not set out).



denotes a task with a number of sub-processes and sub-tasks set out within that task



denotes that the set of processes or tasks is repeated for each Calculation Period



denotes a question with a binary answer which must be determined



denotes the sequences in which processes take place



denotes the flow of messages between actors



denotes a repository or external information source



denotes a time event which commences a flow of processes and tasks



denotes an event which commences a flow of processes and tasks that is conditional on something else first occurring.



denotes an instruction which commences a flow of processes and tasks



denotes a process which is commenced by the receiving of a message from another actor



when used in conjunction with a task, denotes that the task may only occur at certain times



denotes the completion of a process



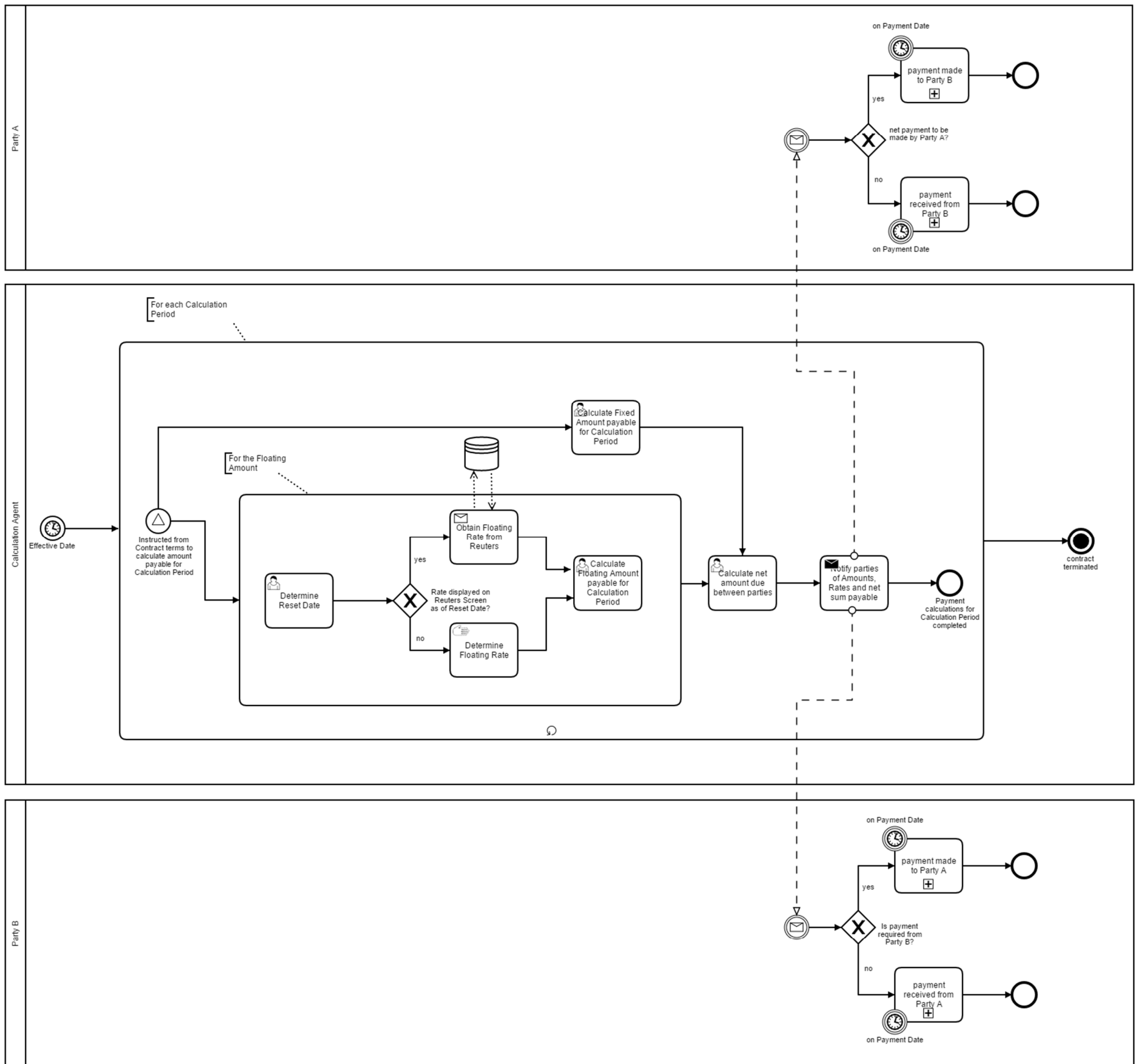
denotes the completion of the contract



denotes that the Digital Terms cannot continue as the contract no longer satisfies the relevant requirements at that time

2 Traditional IRS

2.1 Diagram



2.2 Transactional processes

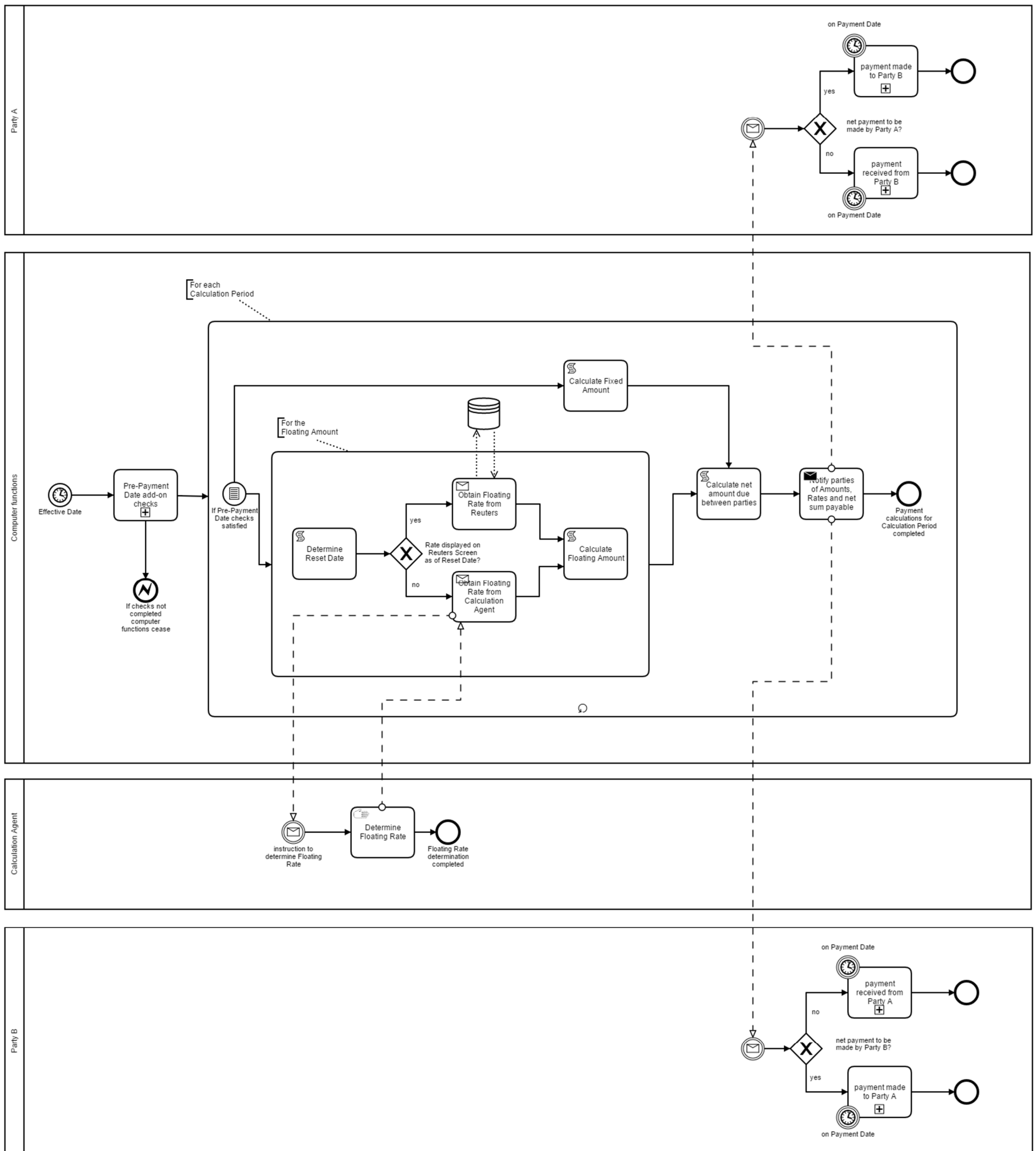
The above diagram shows the business processes behind the Traditional IRS as follows:

- Following the Effective Date of the contract, the Calculation Agent is instructed, pursuant to the terms of the Traditional IRS, to calculate the amounts payable on a Payment Date by reference to the relevant Calculation Period.
- To determine the Floating Amount payable by the Floating Amount Payer for a Calculation Period:
 - the Calculation Agent must determine the Reset Date on which the Floating Rate is obtained;
 - if the relevant rate (in our example BBSW_Reuters) is displayed on the relevant Reuters Screen at the appropriate time (each as set out in the contract) as of the Reset Date then the Calculation Agent obtains the Floating Rate from Reuters;
 - if the relevant rate is not displayed on the relevant Reuters Screen at the relevant time on the Reset Date then the Calculation Agent must determine the Floating Rate manually, using the appropriate method as set out in the contract (or if none is specified, in its discretion);
 - after obtaining the Floating Rate, the Calculation Agent will then determine the Floating Amount due using the formula and inputs (such as Spread) as set out in the contract.
- To determine the Fixed Amount payable by the Fixed Amount Payer for a Calculation Period, the Calculation Agent will determine the amount due using the formula and Fixed Rate as specified in the contract.
- As the Traditional IRS only has payments payable by both parties in the same currency, the Calculation Agent will then determine the single net sum payable between the parties.

- (e) The Calculation Agent will inform each of Party A and Party B of the Floating Rate, Fixed Amount, Floating Amount and net sum payable.
- (f) Party A and Party B will then pay the net sum between them on the Payment Date corresponding to the relevant Calculation Period.
- (g) The processes set out in (b) to (f) above are repeated for each Calculation Period and Payment Date during the term of the Traditional IRS.

3 DnA IRS

3.1 Diagram



3.1 Transactional processes

The above diagram shows the business processes behind the DnA IRS as follows:

- Following the Effective Date of the contract, prior to each Payment Date, the Digital Terms will undertake any additional checks required (for instance to determine continued regulatory compliance etc) prior to continuance of the contract. If the DnA IRS no longer meets the relevant requirements, the Digital Terms cease to function and the parties must manually determine whether to continue with the performance of the contract or not.
- If the pre-Payment Date checks (if any) have been completed successfully, the Digital Terms will continue to execute the processes required for the Calculation Period corresponding to the next following Payment Date
- To determine the Floating Amount payable by the Floating Amount Payer for a Calculation Period:
 - the Digital Terms determine the Reset Date on which the Floating Rate is obtained. This is able to be calculated by a computer script;

- (ii) if the relevant rate (in our example BBSW_Reuters) is displayed on the relevant Reuters Screen at the appropriate time (each as set out in the contract) as of the Reset Date then the Digital Terms obtain the Floating Rate from Reuters automatically by polling the relevant Reuters Screen;
 - (iii) if the relevant rate is not displayed on the relevant Reuters Screen at the relevant time on the Reset Date then the Digital Terms automatically message the Calculation Agent that the Calculation Agent must determine the Floating Rate (along with any appropriate instructions);
 - (iv) the Calculation Agent will determine the Floating Rate manually, using the appropriate method as set out in the Analogue Terms (or if none is specified, in its discretion);
 - (v) the Calculation Agent will then input the Floating Rate into the Digital Terms;
 - (vi) following the input of the Floating Rate (whether by polling Reuters or by input manually by the Calculation Agent), the Digital Terms will then calculate the Floating Amount due automatically using a formula and inputs (such as Spread) as set out in the Digital Terms.
- (d) To determine the Fixed Amount payable by the Fixed Amount Payer for a Calculation Period, the Digital Terms will automatically calculate the amount due using the formula and Fixed Rate as set out in the Digital Terms.
 - (e) As the DnA IRS only has payments payable by both parties in the same currency, the Digital Terms will then calculate the single net sum payable between the parties.
 - (f) The Digital Terms will then message each of Party A and Party B informing them of the Floating Rate, Fixed Amount, Floating Amount and net sum payable.
 - (g) Party A and Party B will then pay the net sum between them on the Payment Date corresponding to the relevant Calculation Period.
 - (h) The processes set out in (a) to (g) above are repeated for each Calculation Period and Payment Date during the term of the DnA IRS.
 - (i) If a party does not wish to continue performing the contract they may input a stop command into the Digital Terms at any time (this may be because they have not received payment from the other party in relation to a Payment Date or any other Event of Default or Termination Event has occurred under the contract, or for any other reason).

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