Simulation time-step phases

Note the colouring convention used to represent the various Source phases:

Undertaken if using River Operations
Plugins
Resource Assessment
Ordering phase
Run network
Ownership
Flow phase

The phases of execution followed in a standard run are:-

1. Start the simulation time-step.
2. Read and Assign input values from a time series for the current time-step. For example, if you are using an inflow node and the data source for the inflow node is a time series, then a value is read from the time series corresponding to the current time-step and assigned to the inflow node.
3. Start River Operations mode (if used in the scenario): This overrides the values assigned from the input time series from the tabular view.
4. Start the forecasting phase: Run the forecast models which do not use expressions (if River Operations is being used).
5. Expression editor StartOfTimeStep execution: This phase collects the variables and executes the expressions whose evaluation time is equal to '*StartOfTimeStep*'.
6. Format the Tabular editor: The Tabular editor's cell highlighting can be driven by expressions. In this phase, all the expressions with evaluation time '*StartOfTimeStep*' are evaluated to a boolean value, which can be used to colour a cell or bolden the text when the expression is true.
7. Continue forecasting phase: Run the forecast models which use expressions (if River Operations is being used).
8. River Operations override expressions and forecast values: If River Operations is used, then:
    a) Override the values generated by expressions.
    b) Override the values generated by forecast models.
9. Plugins: All valid Source plugins will be notified before each simulation time-step is run.
10. Initialise Resource Assessment:
    a) Enforces the rules for ordering/water accounting.
    b) Collects the variables and executes the expressions whose evaluation time is equal to '*DuringResourceAssessment*'.
11. Ordering phase:
    a) Processes the release of water to supply downstream water orders.
    b) Collects the variables and executes the expressions whose evaluation time is equal to '*DuringOrderingPhase*'.

    NetLP Ordering: All the expressions with evaluation time '*DuringOrderingPhase*' are evaluated
        i. Initialise NetLP iteration.
        ii. NetLP iteration.
        iii. Finalise NetLP iteration.

    Rules Based Ordering: Steps *i* and *iii* above represent the phase where all the expressions with evaluation time '*DuringOrderingPhase*' are processed.
        i. ProcessWaterUsers
        ii. ProcessConstraints
        iii. ProcessOrders
12. Run the network by one time-step
    a) Order the nodes, links and catchments for sequential running.
    b) Then, for every element in the network:
        i. Collect model variables and execute expressions whose evaluation time is equal to '*DuringFlowPhase*'.
        ii. Pre time-step phase of water ownership tracker.
        iii. Pre-flow phase of river management. Generates additional release requests as off-allocation allocations are known at this point.
        iv. The wetland cluster that the element belongs to is solved for this time-step.
        v. Flow phase is executed for the current simulation time-step.
        vi. Post time-step phase of water ownership tracker.
        vii. Post-flow phase of river management is run. In this phase, constraint factors are calculated in the new rules based ordering system. A constraint factor signifies a constraint relationship between actual flow and requested orders.
        viii. Constituent modeling is executed.
13. Resource Assessment *PostRunTimeStep* call: This phase fixes any shortfalls for ordering/water accounting.
14. End of constituent management.
15. Recording phase: Writes the current time-step results to the requested recorders.
16. Format the Tabular editor: Evaluates all the expressions with evaluation time '*EndOfTimeStep*'. Updates the Tabular Editor formatting according to the results from the current time-step.
17. End of the forecasting phase.
18. Expression editor *EndOfTimeStep* execution: This phase collects the variables and executes the expressions whose evaluation time is equal to '*EndOfTimeStep*'.
19. Plugins: All valid Source plugins will be notified after every simulation time-step is run.
20. End of the simulation time-step.