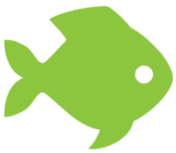
Nodes - SRG

Nodes enable the modelling of actions or measurements that occur in a river system. For example water can be added, extracted, stored, recorded, or have a change in ownership. A node can be used to represent things that actually happen over a large physical area but which, for modelling purposes, occur at a single point, such as extractions from a group of off-takes.

Table 1 summarises the core purpose of each of the node types in Source. Each node has distinct behaviour in both the Flow Phase and the Ordering Phase of the model and these behaviours are described in the corresponding section for each node. These sections deal mostly with water quantity. In addition, each of the nodes have some influence on the routing of ownership and constituents (where enabled). These behaviours are covered in the corresponding chapter of this document (Ownership, Catchment Water Quality Processes - SRG for constituents).

Table 1. Nodes in Source

Node name	Node icon in Source	Description	Refer to
Inflow		Defines the flow (including constituents and ownership) entering the network as a result of tributary inflows, inter-basin transfers, discharge of groundwater systems and outflows of infrastructure such as sewage treatment plants.	Inflow node - SRG
Gauge		Used where there is measured flow (and/or constituent) data at some point in the river network, OR where modelled outputs are required for reporting. Gauge nodes can be used as comparison points, or the observed flow can be used to override the upstream modelled data for downstream. When overriding the modelled flow with observed, the gauge icon changes to the icon in the next row and the node reports the 'unaccounted difference' between the observed and predicted data.	Gauge node - SRG
Unaccounted Difference		Used when overriding the modelled flow with observed flow data (e.g. when modelling river operations). The gauge node icon changes to this one and the node reports the 'unaccounted difference' between the observed and predicted data.	Gauge node - SRG
Bulk Licensing		Used to represent an administrative arrangement where a group of water users (e.g. the NSW irrigation corporations) share a common portfolio of accounts.	Bulk licensing - SRG
Confluence		Represent junctions in a river system where two upstream flows join into one downstream flow without loss or delay. The bulk of the configuration of a confluence is in terms of influencing the passage of orders from downstream to storages upstream of the confluence. Confluences can be unregulated, where neither upstream branch contain any storages, or they can have regulating structures upstream on one or both of the branches.	Confluence node - SRG
Environmental Flow Node		Used to define environmental flow requirements at a given location in a river network; e.g. when modelling environmental flow rules.	Environmental Flow Node - SRG
Loss		Describe the amount of water that is lost from the stream network at a point. Loss relationships can represent physical processes, such as transmission losses, or they may be used to represent measurement error in the input data for the model.	Loss node - SRG

Maximum Order Constraint		Used at points in the network where a physical or management constraint exists to prevent regulated flows exceeding a certain threshold. These thresholds can be expressed as a constant (typically to represent a physical constraint, such as a choke point) or as a variable constraint using a function (typical for management constraints). Where the orders originating downstream of the constraint are above the current threshold, the orders are reduced.	Maximum order constraint - SRG
Minimum Flow Requirement		Used to maintain a specified minimum flow at a point in the network. Where the orders originating downstream of the Minimum Flow Node are less than the minimum, additional orders are placed in order to meet the threshold. Minimum flows can be specified as a monthly pattern, a time series, or a function.	Minimum Flow Requirement - SRG
Off-allocation		Used to determine how much off-allocation flow is available in the river (at the node), as well as how to share this between the downstream water users that have licence shares. Off-allocation flows are those that are in excess of regulated requirements.	Off Allocation SRG
Parallel Arcs		Used to specify costs on a particular supply path, in order to influence the distribution decisions in NetLP mode.	NetLP - SRG NetLP (SRG)
Splitter		Used where the network divides into two, such as major anabranches. Splitters can represent control structures, in which case the water going down each of the links is a management decision, or uncontrolled branches, where the water going down each links is a function of upstream flow alone.	Splitter Node (SRG) Controlled Splitter Node (SRG)
Storage		Used to hold water at a point in the network. Storage Nodes are used for various types of water bodies, including major reservoirs (on river and off river), weir pools and urban lakes. Storage Nodes can capture much of the operating details of regulating water bodies, such as release structures and operating rules, as well as physical properties such as surface area relationships for evaporation, rainfall and groundwater.	Storage node - SRG
Supply Point		Are points in the stream network where water demands are represented for the purposes of either extraction (for consumptive use) or for in-stream use. Supply Points are coupled to a single Water User Node, which calculates the actual demand, noting that a single Water User Node can make use of multiple Supply Point Nodes in order to place demands in multiple parts of the system.	Supply point node - SRG

Transfer Ownership		Used to reassign the ownership of water instream at a point in the network, such as reassigning an owners water when the water flows past the last opportunity that the original owner had to extract the water.	Ownership at nodes and links - SRG
Water User		Represents the actual demands (consumptive or non-consumptive) in the system. Water Users can model demands by way of several alternative demand models (see summary list after "Wetland Hydraulic Connector" below), and then seek to have these demands met either by localised storage, or from one or more Supply Points. The demands can be distributed between these sources, either by a set of user specified rules, or by way of a Resource Assessment System.	Water user node SRG
Wetland Hydraulic Connector		Used to connect an off stream wetland node (represented using a Storage Node) to a main channel. The Wetland Hydraulic Connector is placed on the main channel and is connected to an off stream Wetland Storage Node using lateral connections.	Wetland Hydraulic Connector - SRG
Time Series Demand		This node is provided to enable modellers to input a time series of demands. It is potentially useful when calibrating a Source model where a staged approach is used, for example where it is desired to calibrate storage behaviour using recorded historical outflows and inflows. It can be used when modelling both unregulated and regulated river systems.	Time series demand model - SRG
Monthly Pattern Demand		The monthly demand node is suitable for representing demands when these can be assumed to follow a fixed monthly pattern. A typical application might be to represent the demand pattern for a town water supply; another application might be to represent the demand pattern for irrigated paddy rice in a wet tropical environment. It can be used when modelling both unregulated and regulated river systems.	Monthly pattern demand model SRG
PRIDE Demand		Program for Regional Irrigation Demand Estimation (PRIDE) is a crop demand model that uses a combination of climate data, crop culture information and knowledge of traditional farming practices to estimate irrigation demands. PRIDE has traditionally been used to estimate private diverter and irrigation area demands across Victoria for use in REALM and has been incorporated into Source within the water user node.	PRIDE Demand model - SRG
IQQM Crop Model		The IQQM crop model operates on a daily basis. It generates demands based on modelled soil moisture deficit for each irrigated crop as well as fallow land, and extracting water to meet these demands via the Water User and Supply Point nodes. The model can be applied in both regulated and unregulated systems.	IQQM Crop Model SRG
Irrigator		The Irrigator demand model (NGenIrr) was developed by Melbourne University, as part of the eWater CRC, by combining the best functionality from the existing models into an improved demand model. A key focus was on keeping the model as simple and parsimonious as possible, while not compromising on key functional requirements. Irrigator operates on a daily basis generating demands and extracting water to meet these demands via the Water User and Supply Point nodes. The model can be applied in both regulated and unregulated systems. Irrigator allows crop based planting decisions which better aligns with economic modelling.	Irrigator Demand Model - SRG

Pipe Junction		The pipe junction node is used to transfer water from one place to another, such as pump water from downstream storage to upstream water user.	Pipe Junction - SRG