The trading process instance must reference the

Multi-Time-Frame

process definition of the Jason trading bot in the Masters data mine.

Backtesting Session

Foundations->Node->Backtesting Session->Definition

A backtesting session is a trading mode by which the trading bot instance reads historic market data in a user-defined datetime range, applies the rules defined in the associated trading system, and generates a trading simulation.

Foundations->Node->Backtesting Session->Content

A backtesting session node must reference a trading system to gain access to the trading logic to be applied during the session. Other considerations framing the session come from the set of parameters attached to it.

Paper Trading Session

Foundations->Node->Paper Trading Session->Definition

A paper trading session is a trading mode by which the trading bot instance reads a live market data feed, applies the rules defined in the associated trading system, and generates a trading simulation.

Foundations->Node->Paper Trading Session->Content

A paper trading session node must reference a trading system to gain access to the trading logic to be applied during the session. Other considerations framing the session come from the set of parameters attached to it.

Forward Testing Session

Foundations->Node->Forward Testing Session->Definition

A forward testing session is a trading mode by which the trading bot instance performs live trading with a user-defined fraction of the available capital.

Foundations->Node->Forward Testing Session->Content

A forward testing session node must reference a trading system to gain access to the trading logic to be applied during the session. Other considerations framing the session come from the set of parameters attached to it.

Foundations->Concept->Reusable Snippets->Important for Live Sessions

Important: Running a live session requires the setup of a key reference at the

Task

. It also requires a live data feed, meaning that the corresponding

Sensor Bot Instance

, along with all indicators used by the referenced

Trading System

, must be up and running. Finally, a live session also requires at least 48 hours of historic market data.

Bear in mind that the

Trading System

may require even more historic market data to properly analyze the market depending on the

indicators used.

Live Trading Session

Foundations->Node->Live Trading Session->Definition

A live trading session is a trading mode by which the trading bot instance reads a live market data feed, applies the rules as defined in the associated trading system, places the corresponding orders at the associated exchange, and stores the defined data products.

Foundations->Node->Live Trading Session->Content

A live trading session node must reference a trading system to gain access to the trading logic to be applied during the session. Other considerations framing the session come from the set of parameters attached to it.

Foundations->Concept->Reusable Snippets->Important for Live Sessions

Important: Running a live session requires the setup of a key reference at the

Task

. It also requires a live data feed, meaning that the corresponding

Sensor Bot Instance

, along with all indicators used by the referenced

Trading System

, must be up and running. Finally, a live session also requires at least 48 hours of historic market data.

Bear in mind that the

Trading System

may require even more historic market data to properly analyze the market depending on the indicators used.

Execution Started Event

Foundations->Node->Execution Started Event->Definition

The execution started event is the event that triggers the execution of a process. It usually references the execution finished event of another process on which the process depends on.

Foundations->Node->Execution Started Event->Content

These references determine when a process is due for another run. By listening to the execution finished event of the process it depends on, it may wake up just in time to process the new batch of data the dependency has just delivered.

Bots form a sort of multi-branched execution sequence with an indeterminate number of dependencies. Every time the bot further down the tree of dependencies finishes a cycle, it triggers the execution of multiple bots listening to its execution finished event.

In the context of a trading process instance running a trading session on the network hierarchy, the execution started event may be used to force the trading process to run only after the last indicator bot dependency finishes its job. This guarantees that all dependencies are up to date and that the trading bot will evaluate the information corresponding to the same candles for all indicators used by the trading system.

Not setting up this event on a trading session may result in eventual data inconsistencies, as—in theory—the trading bot may run with some indicators up to date and some slightly delayed.

Trading Session References

Summary: A

Trading Session

must reference the

Trading System

whose rules are to be implemented during the session, and the

Trading Engine

hierarchy that shall keep track of the runtime data produced by the

Trading Bot

.

Trading System Reference

Foundations->Node->Trading System Reference->Definition

A trading engine reference determines which trading system shall be evaluated by the trading bot to run the trading session.

Foundations->Node->Trading System Reference->Content

In other words, the trading system reference lets the process instance know which trading rules to process for the given session.

Trading Engine Reference

Foundations->Node->Trading Engine Reference->Definition

A trading engine reference determines which trading engine the trading bot shall use to structure the data it processes while running the trading session.

Foundations->Node->Trading Engine Reference->Content

In other words, the trading engine reference lets the process instance know which data structure to use to store information related to the trading session. This means that a workspace may have more than one trading engine.

Trading Session Parameters

Summary: Parameters control the behavior of trading sessions and improve the quality of simulations.

Foundations->Node->Trading Parameters->Definition

Parameters are properties of trading sessions, defined by users, to determine their behavior and improve the quality of simulations.

Foundations->Node->Trading Parameters->Content

The behavior of parameters may vary depending on the type of session.

Each testing session has its own set of parameters. This allows you to configure different trading sessions with different parameters, and go back and forth between them as required. For instance, you may have different backtesting sessions with different date ranges, different exchange fees or different slippage settings to account for different possible scenarios.

Foundations->Concept->Reusable Snippets->Note for Hierarchy Tables

Note: This page discusses the top-level information about the section of the hierarchy represented in the below table. Click on any of the nodes to get the details, including particulars on their configuration, when applicable.

Trading Parameters

Session Base Asset

Session Quoted Asset

Time Range

Time Frame

Slippage

Fee Structure

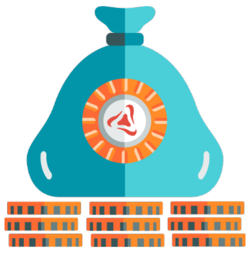
Snapshots

Heartbeats

User Defined Parameters

Session Base Asset

Foundations->Node->Session Base Asset->Definition



The base asset is the asset whose price is determined by the market. It is usually the first asset in the pair, as listed by the exchange.

Foundations->Node->Session Base Asset->Content

Among other things, the parameter allows defining an initial balance of the corresponding asset, which may be used for trading with the corresponding trading system and trading session. Please see the configuration.

Session Quoted Asset

Foundations->Node->Session Quoted Asset->Definition

The quoted asset is the asset on which the price of the base asset is denominated in the market. It is usually the second asset in the pair, as listed by the exchange.

Foundations->Node->Session Quoted Asset->Content

The parameter allows defining an initial balance for the corresponding asset, which may be used for trading with the corresponding trading system and trading session.

Note: Notice that the initial balance may be defined on either or both assets in the market.

Time Range

Foundations->Node->Time Range->Definition

The time range parameter determines the period of time on which the trading session is run.

Foundations->Node->Time Range->Content

The parameter offers precise control over the duration, starting and ending points of the session. Several options are available, and there are differences in how backtesting and the rest of the types of trading sessions function in this regard.

Time Frame

Foundations->Node->Time Frame->Definition

The time frame determines the collection of candles to be analyzed during a backtesting session, and the frequency with which the trading bot runs on paper trading, forward testing, and live trading sessions.

Foundations->Node->Time Frame->Content

In Live Sessions

In the context of live sessions, that is, paper trading, forward testing, and live trading, you may want to run the session on the 01-min time frame so that the trading bot reacts fast when the price tags the take profit or stop loss targets.

Important: Remember that Superalgos does not place stop or take profit orders at the time of entering the position. Instead, the trading bot checks the current price upon each execution

Cycle

and determines whether

Managed Stop Loss

or

Managed Take Profit

targets have been hit or not. If targets are hit, the

Close Stage

opens and orders are placed on the next cycle, which happens to be on the next candle.

If for whatever reason you don't need to minimize the potential for slippage when hitting stop or take profit targets, you may choose whatever time frame you like, taking into account the explanations below.

In Backtesting Sessions

In the context of backtesting sessions, what time frame you decide to run the session depends on the trading system being tested. If the trading system makes decisions based on the 1-hour candle and above, then 01-hs may be the best choice. However, if decisions are influenced by sub-hour candles then you should match the time frame accordingly.

In other words, in backtesting sessions, you should match the time frame to the smallest period on which the trading system makes decisions.

Important: The above, however, is only partially correct. Setting the time frame to match the

decision-making criteria of the

Trading System

is desirable to save time in backtests. You save time because the smallest reasonable collection of

candles is evaluated. However, the time-saving may come at the cost of precision!

Remember what was said about stop loss and take profit orders earlier: they do not exist in Superalgos. When a target is hit, orders are placed in the following

Cycle

, which happens to be on the next candle!

Let's take a minute to reflect on the implications of the above! If targets are hit on one candle

---

and orders are placed on the next candle, there is the potential for huge

---

Slippage

---

if the session is run on higher time frames! This is the cost in precision mentioned earlier.

The above explanation seems to point in the following direction: if you want backtesting simulations to be comparable to live sessions run on the 01-min time frame, then you should run the backtesting session on the 01-min time frame as well. There is, however, a workaround.

Workaround

You may use the

Simulated Exchange Events

structure of nodes to arbitrarily define the exit rate of the position.

For example, you may use the following formula in the

Simulated Actual Rate

node as well as in the

Target Rate

of the

Close Stage

:

```
targetRate()

function targetRate() {
    switch (tradingEngine.tradingCurrent.position.exitType.value) {
        case 'No Exit': {
            return tradingEngine.tradingCurrent.tradingEpisode.candle.close.value
            break
        }
        case 'Take Profit': {
            return
tradingEngine.tradingCurrent.position.takeProfit.finalValue.value
            break
        }
        case 'Stop Loss': {
            return tradingEngine.tradingCurrent.position.stopLoss.finalValue.value
            break
        }
    }
}
```

The formula sets the Simulated Actual Rate to be the last known `takeProfit` rate if the exit was triggered by hitting of the Managed Take Profit, or the last known `stopLoss` in case it was the Managed Stop Loss target.

Why the Time Frame Matters

Running trading sessions of any given trading system on different time frames may produce different results. This is because the behavior of a trading session may vary depending on how well the time frame matches the logic of the strategy.

The trading bot evaluates closed candles only. At any given point in time, the current candle in each time frame is the candle that closed last.

For example, let's say it's 11 hours, 39 minutes and 30 seconds of June 11th, 2020. This is how the system determines which is the current candle:

- **1-minute candle:** it is the one that closed at 11:38:59.999.
- **5-minute candle:** it is the one that closed at 11:34:59.999.
- **30-minute candle:** it is the one that closed at 11:29:59.999.
- **1-hour candle:** it is the one that closed at 10:59:59.999.
- **2-hour candle:** it is the one that closed at 09:59:59.999.
- **6-hour candle:** it is the one that closed at 05:59:59.999.
- **24-hour candle:** it is the one that closed at 23:59:59.999 of June 10th!

Let's say the trading system implements conditions that evaluate 30-minute and 1-hour candles.

If a session is run at the 30-minutes time frame, all 30-minutes candles are evaluated. Also, all 1-hour candles are evaluated twice.

However, if the session is run at the 1-hour time frame, only one out of two 30-minute candles are evaluated.

And if the session is run at the 2-hour time frame, only one out of four 30-minute candles and one out of two 1-hour candles are evaluated.

This means that running the session (for this particular trading system) at the 30-minute time frame has higher probabilities of conditions evaluating 30-minute candles to be `true` during the session.

In other words, when running the session on time frames higher than the time frame on which decisions are made, chances are the bot will eventually skip candles on which conditions would have evaluated true, potentially skipping trading opportunities.

The above is `true` for all types of trading sessions.

Slippage

Foundations->Node->Slippage->Definition

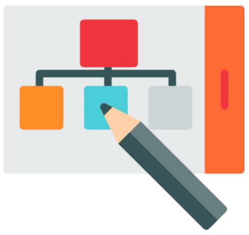
The slippage is an assumption on the difference between the simulated rate and the actual fill rate of a market order, most relevant in the context of backtesting and paper-trading sessions. The parameter is a tool to make simulations more realistic.

Foundations->Node->Slippage->Content

In the context of forward testing and live trading sessions, slippage does not affect the actual transactions. However, the parameter is taken into account when creating the live trading simulation until the actual order fill values are obtained from the exchange.

Fee Structure

Foundations->Node->Fee Structure->Definition



The fee structure is a parameter fundamental to the calculation of fees, both in testing and live trading sessions.

Foundations->Node->Fee Structure->Content

Exchange fees are a crucial part of trading. A strategy may work like a charm when you leave fees out of the equation but would lead you to bankruptcy in a live trading situation.

Exchanges don't usually report the amount charged in fees on each transaction, thus, the system calculates fees and subtract them from balances. Learn more about the handling of fees.

Important: The accuracy of the internal account-keeping depends on this parameter. Make sure you obtain the correct fee structure from the exchange corresponding to the tier of your account.

Snapshots

Foundations->Node->Snapshots->Definition

Snapshots

are CSV files output by the trading bot listing every trade in a backtesting session. The snapshots parameter determines whether snapshots shall be produced, and how.

Foundations->Node->Snapshots->Content

Learn more about snapshots and check the configuration file to control if and how snapshots are produced.

Heartbeats

Foundations->Node->Heartbeats->Definition

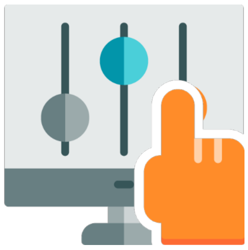
During a trading session, the backend communicates with the frontend via heartbeats to inform the frontend about the status of the session. The parameter controls what information is made available to the user through the frontend.

Foundations->Node->Heartbeats->Content

This parameter affects how you see the progress of the trading session below the trading bot instance node on the design space.

User Defined Parameters

Foundations->Node->User Defined Parameters->Definition



Users may define parameters to be used within the trading system during the trading session.

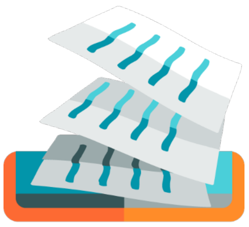
Foundations->Node->User Defined Parameters->Content

Parameters defined in the configuration file of these node become available to trading systems using the following path: `sessionParameters.userDefinedParameters.config.parameterName`

These parameters may be useful, for example, when you wish to use a constant multiple times across several nodes in the definition of a strategy. Instead of feeding a constant value to all formulas involved, you may feed the parameter instead. This gives you the added benefit of being able to change the value of such a constant in a single point.

Data Storage Section

Summary: The data storage structure of nodes within the network hierarchy controls where and how the bots you run store the data they produce.



The data storage hierarchy holds references to all the data bots have produced.

Think of this hierarchy like a treasure chest. Inside this chest is kept all the valuable datasets generated within this workspace in one convenient place so that it can be used across the system by other bots, trading systems, etc.

The main types of data held under this hierarchy are:

- Learning Mines Data
- Trading Mines Data
- Data Mines Data
- Portfolio Mines Data

As you look down the hierarchy you will see that data is organized according Mine Type, Project, Exchange, and Market. This helps to keep the vast array of data used within Superalgos accessibly and understandable. The nodes under this hierarchy that hold specific sets of data are:

-

- Bot Products
- Trading Session Reference
- Learning Session Reference
- Portfolio Session Reference

Data Mines Data Section

Summary: The Data Mines Data section of the hierarchy controls where and how the sensor and indicator bots store the data they produce.

Foundations->Node->Data Mines Data->Definition

Session independent data refers to data generated by sensors and indicators, not related to trading sessions.

Foundations->Node->Data Mines Data->Content

As explained in the sorting of tasks page, data mines data is sorted by exchange, market, and the corresponding data mine, sensor or indicator bot, and bot product. That is, most of the nodes in this section of the hierarchy play an organizational role.

Many of them require references to the nodes that delimit the context for which the data is applicable. For example, the market data products node must reference one of the installed markets, in particular, the market on which the data mining operation is run. These references help other entities understand the context to which the data belongs to.

Whenever you create data mining tasks manually from within the Network hierarchy (as opposed to using the install market function under the exchange markets node of the

Crypto Ecosystem

hierarchy

Foundations->Concept->Reusable Snippets->Note for Hierarchy Tables

Note: This page discusses the top-level information about the section of the hierarchy represented in the below table. Click on any of the nodes to get the details, including particulars on their configuration, when applicable.

- Data Mines Data
  - Project Data Products
    - Exchange Data Products
      - Market Data Products

Project Data Products

Foundations->Node->Project Data Products->Definition

The

Project Data Products

node is an organizational device grouping all

Bot Products

corresponding to the same

Project

.

Exchange Data Products

Foundations->Node->Exchange Data Products->Definition

The exchange data products node organizes data mines data by exchange. That is, each exchange installed in the system has an exchange data products node grouping all market data products nodes corresponding to the said exchange.

Foundations->Node->Exchange Data Products->Content

The exchange data products node must reference the exchange of choice. This reference constraints the rest of the definitions to the context of the said exchange.

When representing an exchange featured in the system's icons library, the standard exchange data tasks icon is replaced by the exchange's logo.

Market Data Products

Foundations->Node->Market Data Products->Definition

A market data products node represents the group of data products generated in a specific market.

Foundations->Node->Market Data Products->Content

The market data products node must reference a market defined in the

Crypto Ecosystem

hierarchy.

This node may spawn individual data products or may deploy data products in bulk organized by data mine and by bots. See the data products node for the details.

Trading Mines Data Section

Summary: The

Trading Mines Data

section of the hierarchy controls where and how the

Trading Bot

stores the data produced.

Foundations->Node->Trading Mines Data->Definition

Trading Mines Data

refers to data that is generated as a consequence of running a trading session, that is, data the trading bot instance generates while running backtesting, paper trading, forward testing, or live trading sessions.

Foundations->Node->Trading Mines Data->Content

Trading

mines data is sorted by exchange, market, the corresponding trading session, and the corresponding trading mine, trading bot, and bot product. That is, most of the nodes in this section of the hierarchy play an organizational role.

Many of them require references to the nodes that delimit the context for which the data is applicable. For example, the exchange trading products node must reference one of the installed exchanges, in particular, the exchange on which the trading operation is run. These references help other entities understand the context to which the data belongs to.

Whenever you create trading tasks manually from within the Network hierarchy (as opposed to using the install market function under the exchange markets node of the

Crypto Ecosystem

hierarchy

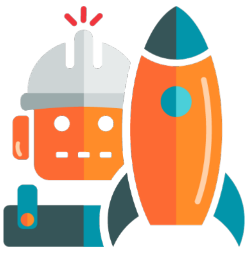
Foundations->Concept->Reusable Snippets->Note for Hierarchy Tables

Note: This page discusses the top-level information about the section of the hierarchy represented in the below table. Click on any of the nodes to get the details, including particulars on their configuration, when applicable.

- Trading Mines Data
  - Project Trading Products
    - Exchange Trading Products
      - Market Trading Products
        - Trading Session Reference

Project Trading Products

Foundations->Node->Project Trading Products->Definition



The

Project Trading Products

node is an organizational device grouping all

Bot Products

corresponding to the same project.

Exchange Trading Products

Foundations->Node->Exchange Trading Products->Definition

The exchange trading products node organizes trading mines data by exchange. That is, each exchange installed in the system has an exchange trading products node grouping all session references corresponding to the said exchange.

Foundations->Node->Exchange Trading Products->Content

The exchange trading products node must reference the exchange of choice. This reference constraints the rest of the definitions to the context of the said exchange.

When representing an exchange featured in the system's icons library, the standard exchange trading products icon is replaced by the exchange's logo.

Market Trading Products

Foundations->Node->Market Trading Products->Definition

A market trading products node features the group of data products generated by the referenced session in a specific market.

Foundations->Node->Market Trading Products->Content

The market trading products node must reference a market defined in the

Crypto Ecosystem

hierarchy.

This node may spawn individual data products or may deploy data products in bulk organized by trading mine and by trading bots. See the data products node for the details.

Trading Session Reference

Foundations->Node->Trading Session Reference->Definition

A trading session reference establishes which instance of a trading system will be the one that stores data in the current location.

Foundations->Node->Trading Session Reference->Content

A such, the trading session reference node must establish a reference with a trading session. Also, its offspring nodes determine precisely which data products are stored.

Data and Trading Mine Products

Summary: Both the

Data Mine Products

and

Trading Mine Products

sections under

Data Mines Data

and

Trading Mines Data

respectively have a very similar arrangement, and store data in the same type of nodes. We will review both sections side by side.

Foundations->Node->Data Mine Products->Definition

Data mine products are references established with data mines to facilitate establishing data product references with multiple products in the given data mine.

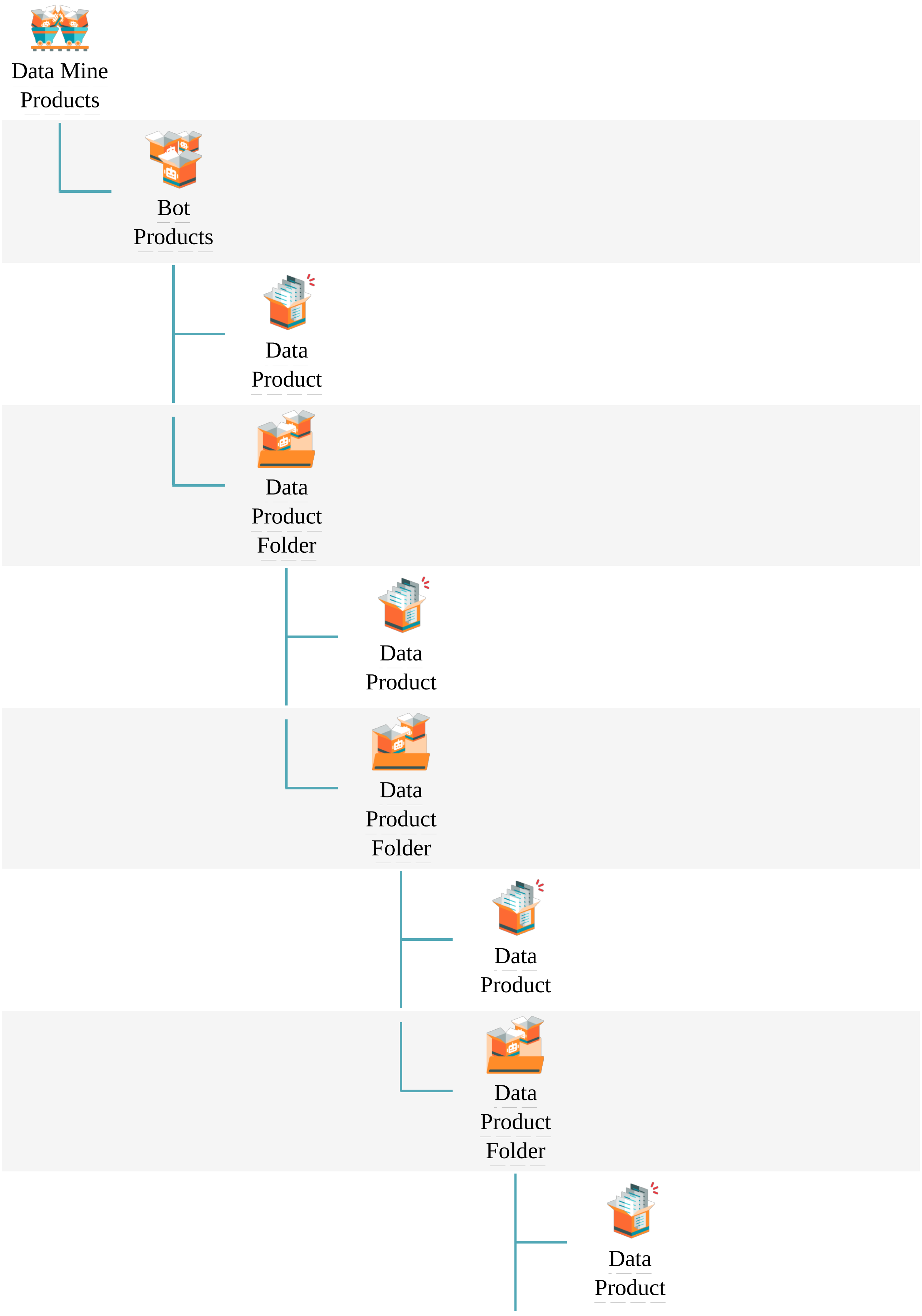
Foundations->Node->Data Mine Products->Content

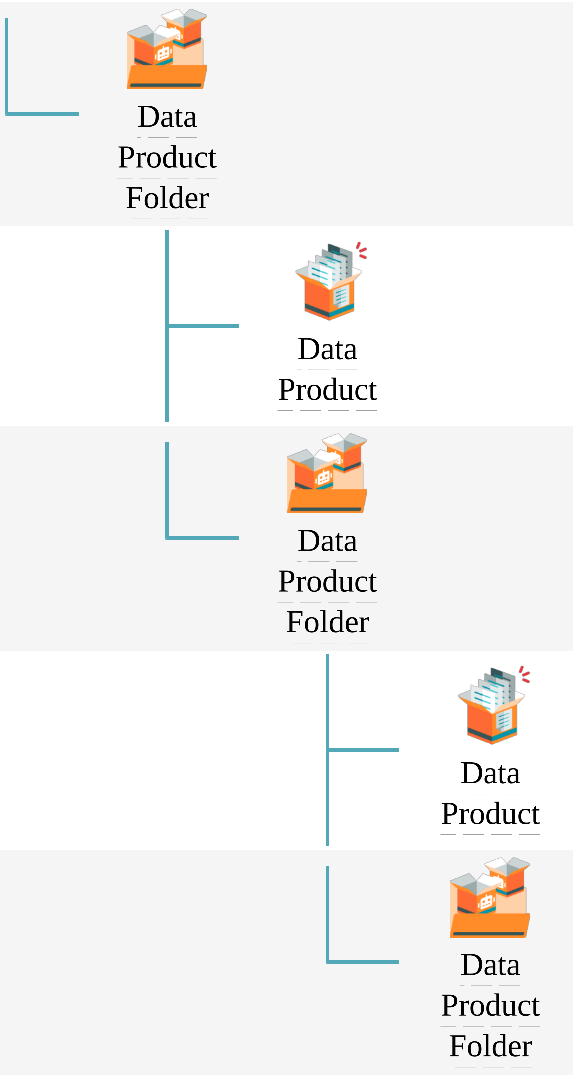
The node may be used as an organizational device, simply to arrange bot products. However, the smart use of the node involves automating the deployment of multiple data products.

The use of the data mine products node is optional, as data products may also exist outside of data mine products nodes.

Foundations->Concept->Reusable Snippets->Note for Hierarchy Tables

Note: This page discusses the top-level information about the section of the hierarchy represented in the below table. Click on any of the nodes to get the details, including particulars on their configuration, when applicable.


Data Mine Products
Bot Products
Data Product
Data Product Folder
Data Product
Data Product Folder
Data Product
Data Product Folder
Data Product



Foundations->Node->Trading Mine Products->Definition

Trading

mine products are references established with trading mines to facilitate establishing data product references with multiple products in the given mine.

Foundations->Node->Trading Mine Products->Content

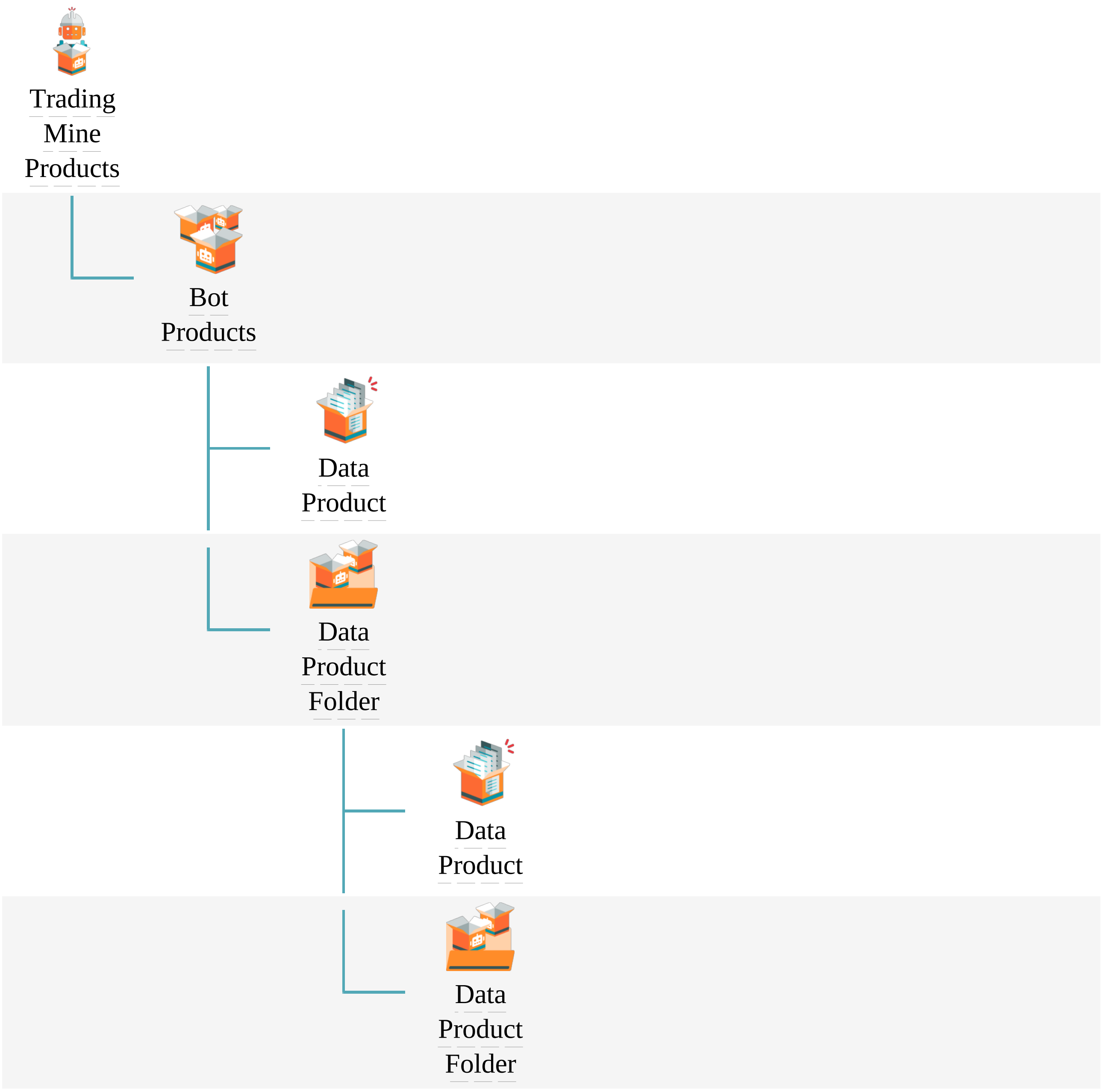
At this point, Superalgos ships with a single trading mine, featuring a single low frequency trading bot. However, developers may create their own trading bots or fork the existing one.

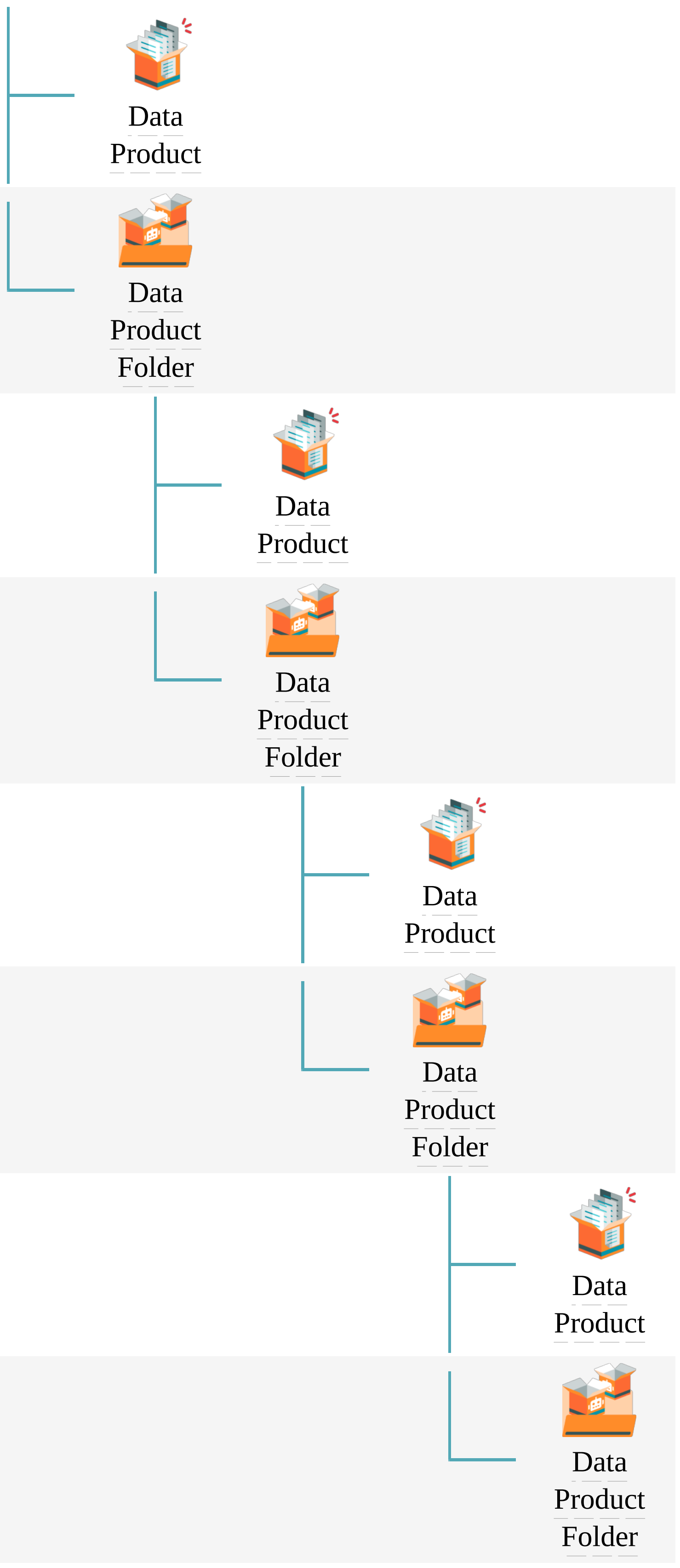
The node may be used as an organizational device, simply to arrange bot products. However, the smart use of the node involves automating the deployment of multiple data products.

The use of the trading mine products node is optional, as data products may also exist outside of trading mine products nodes.

Foundations->Concept->Reusable Snippets->Note for Hierarchy Tables

Note: This page discusses the top-level information about the section of the hierarchy represented in the below table. Click on any of the nodes to get the details, including particulars on their configuration, when applicable.





Bot Products

Data Product

Foundations->Node->Data Product->Definition

A data product represents the collection of datasets generated by the instance of a bot as defined in the corresponding data mine or trading mine.

Foundations->Node->Data Product->Content

Data products exist in the context of trading mines data and data mines data nodes. In the first case, a data product is the collection of datasets generated by an instance of a trading bot as defined in a trading mine, running a trading session. In the latter case, it is the collection of datasets generated by either a sensor bot or an indicator bot instance, as defined in a data mine, and running a data mining task.

A data product node must reference a product definition in the corresponding bot.

Important: Data products may only be stored on the same network node on which the task—data mining or trading—runs.

How to Safely Close Superalgos

Summary: The correct way to close Superalgos is to stop all tasks in the data-mining and trading operations, wait a few seconds until the tasks stop, and only then close the browser. Before closing the console, you must wait around a minute until there is no further activity.

The backend application runs independently from the frontend browser-based application. You may close the browser at any point without affecting your data-mining operation or the bots you may be running in your testing or production environments. Once you restart the browser and navigate to the correct URL, the frontend app reconnects with the backend and you regain control over the whole operation.

Important: If you wish to completely close Superalgos and stop all operations, there is a safe way to do this while preventing the corruption of files that may be processing at any point.

Start Here

1.

Close

all data-mining tasks. Select Stop All

Exchange Data Tasks

on the data mining node menu.

2.

Close

all tasks in the testing environment and the production environment. Select *Stop All*

Task

Managers in the testing and production environment nodes menus.

3. Wait a few seconds until all tasks are stopped and close the browser.

4. Wait for about one minute until all activity stops in the console, then close it.