Natural-Gemstone

## Contributors

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### Taxonomy Formula: tN{s,t}

# Token Specification Summary

## Token Classification

|  |  |  |
| --- | --- | --- |
| Template Type: | SingleToken | This token has no sub or child tokens. |
| Token Type: | NonFungible | This token is not interchangeable with other tokens of the same type as they have different values. |
| Token Unit: | Singleton | There is only one instance of this token and it cannot be subdivided. |
| Value Type: | Reference | This token is a receipt or title to a material item, property or right. The token represents a reference to the value, can be owned or used digitally via its token. Sometimes referred to as a digital twin. |
| Representation Type: | Common | This token is simply represented as a balance or quantity attributed to an owner address where all the balances are recorded on the same balance sheet, like a bank account. All instances can easily share common properties and locating them is simple. |

Natural Gemstones are physically mined from the Earth and are not lab grown (manufactured). Each Natural Gemstone is whole and one of a kind and therefore considered to be a singleton as well as a non-sub-dividable whole token with a quantity of 1. A Natural Gemstone can now be represented digitally in this capacity allowing for only one single owner to possess this token at a time. A singleton implies non-sub-dividable, so the decimal value for the base token should be 0 and a total Quantity be 1, both are established upon creation. This singleton is transferable.

### Example

Natural Gemstones are a good use of this type of token. This tokens value type is a direct reference to a Natural Gemstone. Natural Gemstones are whole and one of a kind making each a singleton and transferable. There are several different types of Natural Gemstones such as Natural Diamonds, Natural Rubies, Natural Sapphires, and Natural Emeralds. Natural Gemstones are physically mined from the Earth and are not lab grown (manufactured). There are various traits gemologists use in order to differentiate and value every Natural Gemstone individually. Some example traits include: Composition (ex. Diamonds are to carbon vs. Rubies are to corundum), Carat Weight, Cut (shape of the stone and dimensions which impact a stones brilliance), Color (color intensity), and Clarity. These varying traits define the differences between each type of Natural Gemstone making each of them unique (Singleton). Natural Gemstones, such as Diamonds, can be recut and re-polished changing its physical characteristics. Although the corresponding token definition and formula remain the same.

### Analogies

|  |  |
| --- | --- |
| Name | Description |
| Diamond | A token representing ownership of a Natural Gemstone, like a Natural Diamond. |

# Natural-Gemstone is:

* Singleton
* Non-Subdividable
* Transferable

# Natural-Gemstone Details

## Singleton

|  |  |
| --- | --- |
| Type: | Base |
| Name: | Singleton |
| Id: | 53101d87-3c93-4d8b-ab39-1e629406d062 |
| Visual: | &tau<sub>N</sub>{<i>s</i>} |
| Tooling: | tN{s} |
| Version: | 1.0 |

## Definition

A restriction on the token in that there can only be 1 whole token in the class and is not subdividable. This behavior is only available to non-fungible base types. By definition, a Singleton cannot be mintable.

## Example

CryptoKitties, Art, Reserved Seat for an event.

## Analogies

|  |  |
| --- | --- |
| Name | Description |
| Property Title | The physical property title, land for example, have the identical look and feel from the paper, colors and seal. The difference between them are the values like property address, plot numbers, etc. These values make the title unique. There are some properties on a class of titles that are the same, like the county or jurisdiction the property is in. For titles that have some shared values and unique values, it may make more sense to define them in the same class. |
| Art | The valuable painting or other unique piece of art may not share any property values with other paintings, unless the artist is extremely prolific in generating tens of thousands of pieces of art, it would make sense to define each piece of art as its own class. Meaning there would be only a single piece of art represented by the token class. If the art cannot be sub-divided, meaning there can be no fractional owners, this token class can be a singleton if the quantity in the class is set to 1. A singleton has only one instance in the class, essentially meaning the class is the instance, and not be sub-dividable and no new tokens can be minted in the class. |

## Comments

Non-fungible tokens require additional thought about how these tokens may or may not be grouped together in the same class.

## Dependencies

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Description |
| Base | t | Base Token Definition |
| Behavior | ~d | non-subdividable |

## Incompatible With

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Id |
| Behavior | d | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Behavior | m | f9224e90-3cab-45bf-b5dc-0175121e2ead |

## Influenced By

|  |  |  |
| --- | --- | --- |
| Description | Symbol | Applies To |

## Artifact Files

|  |  |  |
| --- | --- | --- |
| Content Type | File Name | File Content |
| Control | singleton.proto |  |
| Uml | singleton.md |  |

## Code Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |

## Implementation Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |

## Resource Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Location | Description |

# Base Details

|  |  |
| --- | --- |
| Token Name: |  |
| Token Type: | NonFungible |
| Representation Type: | Common |
| Value Type: | Reference |
| Token Unit: | Singleton |
| Symbol: |  |
| Owner: |  |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

## Behaviors

## Singleton

|  |  |
| --- | --- |
| Type: | Behavior |
| Name: | Singleton |
| Id: | c1189d7a-e142-4504-bf26-44c35b76c9d6 |
| Visual: | <i>s</i> |
| Tooling: | s |
| Version: | 1.0 |

## Definition

A restriction on the token in that there can only be 1 whole token in the class and is not subdividable. This behavior is only available to non-fungible base types. By definition, a Singleton cannot be mintable.

## Example

## Analogies

|  |  |
| --- | --- |
| Name | Description |
| Analogy 1 | singleton analogy 1 description |

## Dependencies

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Description |
| Base | tN | Singleton must be have a non-fungible base. |
| Behavior | ~d | Singleton requires non-sub-dividable. |

## Incompatible With

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Id |
| Behavior | d | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Behavior | m | f9224e90-3cab-45bf-b5dc-0175121e2ead |

## Influenced By

|  |  |  |
| --- | --- | --- |
| Description | Symbol | Applies To |

## Artifact Files

|  |  |  |
| --- | --- | --- |
| Content Type | File Name | File Content |
| Control | singleton.proto |  |
| Uml | singleton.md |  |

## Code Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| SourceCode | Code 1 | Daml |  |

## Implementation Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| Implementation | Implementation 1 | ChaincodeGo |  |

## Resource Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Location | Description |
| Resource | Regulation Reference 1 |  |  |

## Specification Behavior

# Singleton

### Taxonomy Symbol: s

A restriction on the token in that there can only be 1 whole token in the class and is not subdividable. This behavior is only available to non-fungible base types. By definition, a Singleton cannot be mintable.

### Example

### Analogies

|  |  |
| --- | --- |
| Name | Description |
| Analogy 1 | singleton analogy 1 description |

|  |  |
| --- | --- |
| Is External: | True |
| Constructor: |  |

## Singleton responds to these Invocations

### Properties

## Non-Subdividable

|  |  |
| --- | --- |
| Type: | Behavior |
| Name: | Non-Subdividable |
| Id: | d5807a8e-879b-4885-95fa-f09ba2a22172 |
| Visual: | <i>~d</i> |
| Tooling: | ~d |
| Version: | 1.0 |

## Definition

An ability or restriction on the token where it cannot be subdivided from a single whole token into fractions. Sets the base token Decimals property to 0 which will make the token non-sub-dividable and a whole token is the smallest ownable unit of the token.

## Example

Non-subdividable is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

## Analogies

|  |  |
| --- | --- |
| Name | Description |
| Non-Fractional | It is not possible to own a fraction of this token. |
| Barrel of Oil | Barrels of Oil don't make sense to subdivide. |

## Dependencies

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Description |

## Incompatible With

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Id |
| Behavior | d | 6e3501dc-5800-4c71-b59e-ad11418a998c |

## Influenced By

|  |  |  |
| --- | --- | --- |
| Description | Symbol | Applies To |

## Artifact Files

|  |  |  |
| --- | --- | --- |
| Content Type | File Name | File Content |
| Control | non-subdividable.proto |  |
| Uml | non-subdividable.md |  |

## Code Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| SourceCode | Code 1 | Daml |  |

## Implementation Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| Implementation | Implementation 1 | ChaincodeGo |  |

## Resource Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Location | Description |
| Resource | Regulation Reference 1 |  |  |

## Specification Behavior

# Non-Subdividable

### Taxonomy Symbol: ~d

An ability or restriction on the token where it cannot be subdivided from a single whole token into fractions. Sets the base token Decimals property to 0 which will make the token non-sub-dividable and a whole token is the smallest ownable unit of the token.

### Example

Non-subdividable is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

### Analogies

|  |  |
| --- | --- |
| Name | Description |
| Non-Fractional | It is not possible to own a fraction of this token. |
| Barrel of Oil | Barrels of Oil don't make sense to subdivide. |

|  |  |
| --- | --- |
| Is External: | True |
| Constructor: |  |

## Non-Subdividable responds to these Invocations

### Properties

#### Name: Decimals

Value Description: Set to Zero, not allowing any subdivision, usually this is applied to the base token.

Template Value: 0

### Invocations

#### GetDecimals

Id: 2ca7fbb2-ce98-4dda-a6ae-e4ac2527bb33

Description: Should return 0

##### Request

Control Message: GetDecimalsRequest

Description:

###### Parameters

|  |  |
| --- | --- |
| Name | Value |

##### Response

Control Message: GetDecimalsResponse

Description: Return 0

###### Parameters

|  |  |
| --- | --- |
| Name | Value |
| Decimals | 0 |

#### GetDecimals

Id: 2ca7fbb2-ce98-4dda-a6ae-e4ac2527bb33

Description: Should return 0

##### Request

Control Message: GetDecimalsRequest

Description:

###### Parameters

|  |  |
| --- | --- |
| Name | Value |

##### Response

Control Message: GetDecimalsResponse

Description: Return 0

###### Parameters

|  |  |
| --- | --- |
| Name | Value |
| Decimals | 0 |

### Properties

## Transferable

|  |  |
| --- | --- |
| Type: | Behavior |
| Name: | Transferable |
| Id: | af119e58-6d84-4ca6-9656-75e8d312f038 |
| Visual: | <i>t</i> |
| Tooling: | t |
| Version: | 1.0 |

## Definition

Every token instance has an owner. The Transferable behavior provides the owner the ability to transfer the ownership to another party or account. This behavior is often inferred by other behaviors that might exist like Redeem, Sell, etc. This behavior is Delegable. If the token definition is Delegable, TransferFrom will be available.

## Example

## Analogies

|  |  |
| --- | --- |
| Name | Description |
| Analogy 1 | transferable analogy 1 description |

## Dependencies

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Description |

## Incompatible With

|  |  |  |
| --- | --- | --- |
| Artifact Type | Symbol | Id |
| Behavior | ~t | a4fa4ca8-6afd-452b-91f5-7103b6fee5e5 |

## Influenced By

|  |  |  |
| --- | --- | --- |
| Description | Symbol | Applies To |
| If the token is Delegable, TransferFrom should be enabled. | g | [ ] |
| If Compliance is present, a CheckTransferAllowed request has to be made and verified before a Transfer request or a TransferFrom request. | c | [ ] |
| If issuable is present, an AcceptTokenRequest from the token issuer, in response to a RequestTokens, has to be made and verified before a Transfer request. | i | [ ] |

## Artifact Files

|  |  |  |
| --- | --- | --- |
| Content Type | File Name | File Content |
| Control | transferable.proto |  |
| Uml | transferable.md |  |

## Code Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| SourceCode | Code 1 | Daml |  |

## Implementation Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Platform | Location |
| Implementation | Implementation 1 | ChaincodeGo |  |

## Resource Map

|  |  |  |  |
| --- | --- | --- | --- |
| Map Type | Name | Location | Description |
| Resource | Regulation Reference 1 |  |  |

## Specification Behavior

# Transferable

### Taxonomy Symbol: t

Every token instance has an owner. The Transferable behavior provides the owner the ability to transfer the ownership to another party or account. This behavior is often inferred by other behaviors that might exist like Redeem, Sell, etc. This behavior is Delegable. If the token definition is Delegable, TransferFrom will be available.

### Example

### Analogies

|  |  |
| --- | --- |
| Name | Description |
| Analogy 1 | transferable analogy 1 description |

|  |  |
| --- | --- |
| Is External: | True |
| Constructor: |  |

## Transferable responds to these Invocations

#### Transfer

Id: 5d4b8f10-7857-4a2f-9b8c-d61e367a6bcc

Description: >A transfer request will invoke a transfer from the owner of the token to the party or account provided in the To field of the request. For fungible or subdividable non-fungible tokens, this request may also include value in the Amount field of the request to transfer more than one token of the class in a single request.

##### Request Message:

TransferRequest

Description: The request

###### Request Parameters

|  |  |
| --- | --- |
| Name | Value |
| To | AccountId to transfer ownership to. |
| Quantity | Number of tokens to transfer. |

##### Response Message

TransferResponse

Description: The response

###### Response Parameters

|  |  |
| --- | --- |
| Name | Value |
| Confirmation | A confirmation receipt or error may be returned to the owner based on the outcome of the transfer request. |

#### TransferFrom

Id: 516b4e2f-4a14-4c4f-a6f2-1419d4af35c6

Description: >A transfer request will invoke a transfer from the owner of the token to the party or account provided in the To field of the request. For fungible or subdividable non-fungible tokens, this request may also include value in the Amount field of the request to transfer more than one token of the class in a single request.

##### Request Message:

TransferFromRequest

Description: The request

###### Request Parameters

|  |  |
| --- | --- |
| Name | Value |
| From | AccountId to transfer ownership from. |
| To | AccountId to transfer ownership to. |
| Quantity | Number of tokens to transfer. |

##### Response Message

TransferFromResponse

Description: The response

###### Response Parameters

|  |  |
| --- | --- |
| Name | Value |
| Confirmation | A confirmation receipt or error may be returned to the owner based on the outcome of the transfer from request. |

### Properties