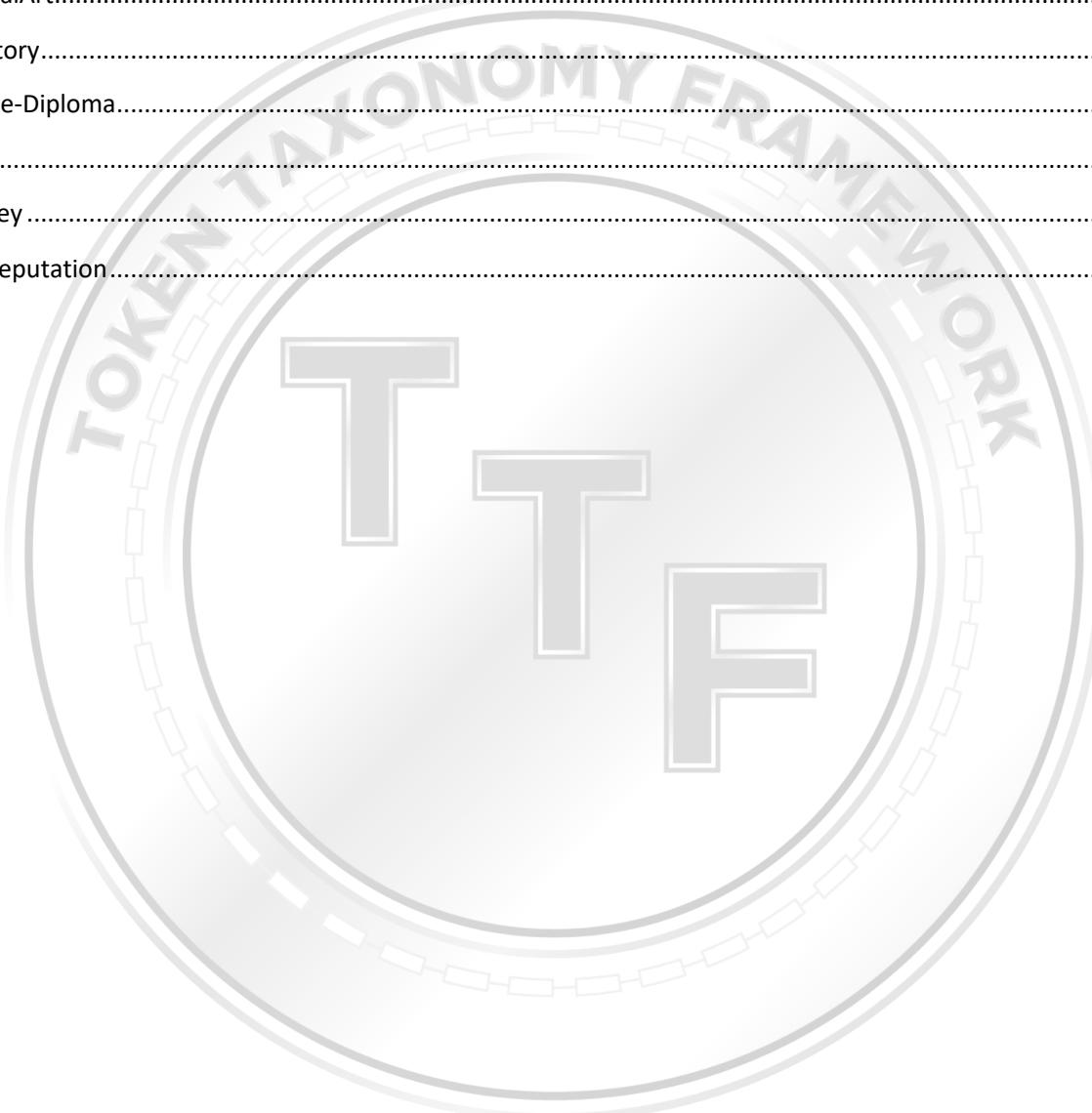

TOKEN TAXONOMY FRAMEWORK

| | |
|------------------------------------|----|
| Token Taxonomy Framework | 1 |
| Base Tokens | 4 |
| Fractional Non-Fungible Token..... | 5 |
| Whole Non-Fungible Token | 8 |
| Singleton | 11 |
| Fractional Fungible..... | 14 |
| Unique Fractional Fungible..... | 17 |
| Unique Whole Fungible | 20 |
| Whole Fungible..... | 23 |
| Behaviors | 26 |
| Holdable..... | 27 |
| Overdraftable..... | 33 |
| Transferable..... | 36 |
| Mintable..... | 40 |
| Subdividable..... | 44 |
| Delegable | 48 |
| Roles | 52 |
| Encumberable..... | 59 |
| Logable..... | 67 |
| Compliant..... | 73 |
| Burnable..... | 78 |
| Singleton | 82 |
| Attestable | 85 |
| Non-transferable..... | 89 |
| Pausable..... | 92 |

| | |
|---------------------------------------|-----|
| Non-Subdividable..... | 96 |
| Behavior Groups | 100 |
| Supply Control | 101 |
| Property Sets | 109 |
| File..... | 110 |
| SKU..... | 116 |
| Template Formulas | 122 |
| $tN\{s,t\}$ | 123 |
| $[tF\{\sim d,t,g,SC\}+phSKU]$ | 127 |
| $tF\{\sim d,\sim t,g,SC\}$ | 131 |
| $tN\{\sim d,t,b,g\}$ | 135 |
| $tF\{d,t,g,h,c,SC\}$ | 139 |
| $tN\{\sim d,t,g,SC\}$ | 143 |
| $tF\{\sim d,t,g,SC\}$ | 147 |
| $tN\{s,\sim t,a\}$ | 151 |
| $[tN\{\sim d,t,s,e,b\}+phFile]$ | 155 |
| $tN\{\sim t,\sim d,b,s,r,l\}$ | 159 |
| $tF\{d,t,b\}$ | 164 |
| Template Definitions..... | 168 |
| EEA-Penalty..... | 169 |
| Document | 180 |
| Loyalty..... | 187 |
| ReservedTicket..... | 202 |
| EEA-Reward | 210 |
| OriginalArt..... | 225 |
| Inventory..... | 232 |
| License-Diploma..... | 247 |
| Log..... | 254 |
| Emoney | 269 |
| EEA-Reputation | 290 |
| Token Specifications | 302 |

| | |
|----------------------|-----|
| EEA-Penalty..... | 303 |
| Document | 334 |
| Loyalty..... | 361 |
| ReservedTicket..... | 399 |
| EEA-Reward | 416 |
| OriginalArt..... | 454 |
| Inventory..... | 470 |
| License-Diploma..... | 508 |
| Log..... | 526 |
| Emoney | 580 |
| EEA-Reputation..... | 628 |



BASE TOKENS



FRACTIONAL NON-FUNGIBLE TOKEN

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Fractional Non-Fungible Token |
| Id: | 8314a797-df3c-409b-835c-0e80af92714f |
| Visual: | &tau_N{<i>d</i>} |
| Tooling: | tN{d} |
| Version: | 1.0 |

Definition

Every non-fungible token is unique and some will need to allow for fractional ownership. A non-fungible token is not interchangeable with other tokens of the same class as they typically have different values. A property title is a good example of a non-fungible token where the value of different real estate titles is not equal and freely exchanging them is a bad idea. Some Non-fungible tokens will need to be represented with their own class, meaning it will share no common properties with other tokens from the same template. Other non-fungible tokens can exist within the same class and have some shared property values while also having unique property values between instances.

Example

Membership, Time Share vacation property.

Analogies

| Name | Description |
|------------|--|
| Time Share | The physical property title is split between multiple owners who each own a percentage of the title. |

Comments

Fractional 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 |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|--------------|-------------------------------|--------------|
| Control | fractional-non-fungible.proto | |
| Uml | fractional-non-fungible.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: | Intrinsic |
| Token Unit: | Fractional |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |

WHOLE NON-FUNGIBLE TOKEN

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Whole Non-Fungible Token |
| Id: | 3c05a856-c901-4c30-917e-df9feed1c8de |
| Visual: | &tau_N{<i>~d</i>} |
| Tooling: | tN{~d} |
| Version: | 1.0 |

Definition

Every non-fungible token is unique. A non-fungible token is not interchangeable with other tokens of the same class but have some shared properties while also having unique property values between instances. These tokens are whole tokens and can have quantities greater than 1 and also could support variable supply.

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 |

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 |
|--------------|-----------|--------------|
| | | |

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: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |

SINGLETON

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Singleton |
| Id: | 53101d87-3c93-4d8b-ab39-1e629406d062 |
| Visual: | &tau_N<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.

Analogy

| 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 | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| 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: | Intrinsic |
| Token Unit: | Singleton |
| Symbol: | |
| Owner: | |
| Quantity: | 1 |
| Decimals: | 0 |
| Constructor Name: | |

FRACTIONAL FUNGIBLE

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Fractional Fungible |
| Id: | 89ca6daf-5585-469e-abd1-19bc44e7a012 |
| Visual: | τ_F{<i>d</i>} |
| Tooling: | tF{d} |
| Version: | 1.0 |

Definition

Fractional Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. Similar to physical cash money, a crypto currency is an example of a fungible token that is sub-dividable.

Example

Fiat currency is the most widely understood example of a fractional fungible item. A fractional fungible is sub-dividable, so you can 'make change'.

Analogy

| Name | Description |
|---------------------------------------|--|
| Physical Money or Cash | Cash, or fiat money, is freely accepted between parties and can have varying denominations. Money has a face value, on a coin or bill, and can be summed together to represent higher value. It can be subdivided, making change, and consolidated from many smaller denominations to larger ones and still have the same value. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------------------|--------------|
| Type | | |
| Control | fractional-fungible.proto | |
| Uml | fractional-fungible.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: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Fractional |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |



UNIQUE FRACTIONAL FUNGIBLE

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Unique Fractional Fungible |
| Id: | 3e05130c-969a-4dfc-abe6-c83fad98a4ec |
| Visual: | τ_{F'}{<i>d</i>} |
| Tooling: | tF'{d} |
| Version: | 1.0 |

Definition

Unique, fractional fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. Similar to physical cash money, a cryptocurrency is an example of a fungible token that is sub-divisible. Because this token is unique, it will have its own identity and can have unique properties like a serial number.

Example

Fiat currency is the most widely understood example of a fractional fungible item. A fractional fungible is subdividable, so you can 'make change'.

Analogies

| Name | Description |
|------------------------|--|
| Physical Money or Cash | Cash, or fiat money, is freely accepted between parties and can have varying denominations. Money has a face value, on a coin or bill, and can be summed together to represent higher value. It can be subdivided, making change, and consolidated from many smaller denominations to larger ones and still have the |

| | |
|---------------------------------------|--|
| | same value. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|-----------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|----------------|---------------------------|--------------|
| Control | fractional-fungible.proto | |
| Uml | fractional-fungible.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: | Fungible |
| Representation Type: | Unique |
| Value Type: | Intrinsic |
| Token Unit: | Fractional |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |

UNIQUE WHOLE FUNGIBLE

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Unique Whole Fungible |
| Id: | 2d291501-4cca-43cf-8330-e2440e58d7df |
| Visual: | τ_{F'}{<i>^d</i>} |
| Tooling: | tF'{^d} |
| Version: | 1.0 |

Definition

Unique, Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'. Because this token is unique, it will have its own identity and can have unique properties like a serial number.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|--------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |
| Uml | whole-fungible.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: | Fungible |
| Representation Type: | Unique |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |



WHOLE FUNGIBLE

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacdf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|--------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |
| Uml | whole-fungible.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: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | |



BEHAVIORS



HOLDABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Holdable |
| Id: | 9d137226-b7b0-4d3e-9e82-4d27d4227fba |
| Visual: | <i>h</i> |
| Tooling: | h |
| 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. A hold specifies a payer, a payee, a maximum amount, a notary and an expiration time. When the hold is created, the specified token balance from the payer is put on hold. A held balance cannot be transferred until the hold is either executed or released. The hold can only be executed (partially or the full amount) by the notary, which triggers the transfer of the tokens from the payer to the payee. If a hold is released, either by the notary at any time, or by anyone after the expiration, no transfer is carried out and the amount is available again for the payer. This behavior is Delegable. If the token definition is Delegable, HoldFrom will be available.

Example

When checking in a hotel, the hotel will put a hold on the guest's account to ensure that enough balance is available to pay for the room before handing over the keys.

Analogies

| Name | Description |
|--------|---|
| Escrow | Holds are similar to escrows in that are firm and lead to final settlement. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|---------------------------------------|
| Behavior | t | Holds require transfers to be allowed |

Incompatible With

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

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| If the token is Delegable, HoldFrom should be enabled. | g | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|-------------------------|------------------|---|
| SourceCode | Standard Implementation | EthereumSolidity | https://github.com/loBuilders/holdable-token/blob/master/contracts/Holdable.sol |

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Hold

Id: 6cc942c8-afa4-4bab-9737-27a0b7b24a5b

Description: Request the create a hold on behalf of the owner of the token in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request

Control Message: HoldRequest

Description: The request

Parameters

| Name | Value |
|------------------|--|
| OperationId | An unique ID to identify the hold |
| To | AccountId to transfer ownership of token(s) to after the hold is executed. |
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

Response

Control Message: HoldResponse

Description: The response

Parameters

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

HoldFrom

Id: 67f2d012-5b2d-46bc-8ee7-befdf90f66d8

Description: Request to create a hold on behalf of the party or account provided in the From field in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request

Control Message: HoldFromRequest

Description: The request

Parameters

| Name | Value |
|-------------------------|--|
| OperationId | An unique ID to identify the hold |
| From | AccountId on which behalf the hold should be created. |
| To | AccountId to transfer ownership of token(s) to after the hold is executed. |
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

Response

Control Message: HoldFromResponse

Description: The response

Parameters

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

ExecuteHold

Id: 4946eea9-c59e-4192-9115-2ba57821936c

Description: Request to execute a hold. Execute means that the specified value is transferred the owner of the token in favor of to the party or account provided in the To field of the Hold / HoldFrom request. If the specified value is less than the hold value the remaining amount is available again to the owner of the tokens. Only the account specified in the Notary field of the Hold / HoldFrom request can make a successful request.

Request

Control Message: ExecuteHoldRequest

Description: The request

Parameters

| Name | Value |
|--------------------|-------------------------------------|
| OperationId | An unique ID to identify the hold |
| Quantity | Number of tokens to be put on hold. |

Response

Control Message: ExecuteHoldResponse

Description: The response

Parameters

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

ReleaseHold

Id: d07c8a5a-be40-479c-aa0d-7ac80b7ca9b3

Description: Request to release a hold. Release means that the transfer is not executed and the held amount is available again for the owner of the token. Until a hold has expired it can only be released by the notary or the party or account provided in the To field of the Hold / HoldFrom request. After it has expired it can be released by any account.

Request

Control Message: ReleaseHoldRequest

Description: The request

Parameters

| Name | Value |
|-------------|-----------------------------------|
| OperationId | An unique ID to identify the hold |

Response

Control Message: ReleaseHoldResponse

Description: The response

Parameters

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

Properties

OVERDRAFTABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Overdraftable |
| Id: | ac172597-8759-456a-b63b-0f5804c2c8aa |
| Visual: | <i>o</i> |
| Tooling: | o |
| Version: | 1.0 |

Definition

Overdraftable, to grant an overdraft credit limit to a wallet owner, who can then make transfers or create holds without the required (positive) balance. Available balances of these type of tokens can therefore become negative, and they can accrue interest over time that is chargeable by the issuing institution

Example

Analogies

| Name | Description |
|----------|-------------|
| Example1 | |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Highly recommended that Role restrictions be applied to Spawnable invocations, and should probably be internal only able to be invoked by the token itself. | r | [] |

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Spawn

Id: 3c4b2066-ce9a-4da8-829f-d4bd9e4f4bc9

Description: This invocation can be internal or hidden and would depend on the token itself to contain the overdraft to details. A request to overdraft a the creation of a certain number of tagged tokens to an account.

Request

Control Message: SpawnToRequest

Description: The request to Attest an attestation.

Parameters

| Name | Value |
|------------------|---|
| AccountId | The account to overdraft to, spawning targets and amounts should be provided in the token implementation. |

Response

Control Message: SpawnToResponse

Description: The response from the AttestRequest.

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the overdraft requestor. |

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 | a4fa4ca8-6af8-452b-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 | [] |

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 | | |
|-----------------|---------------------------|--|--|

Behavior Details

Is External: False

Constructor:

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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 subdivisible 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

Control Message: TransferFromRequest

Description: The request

Parameters

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

Response

Control Message: TransferFromResponse

Description: The 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

MINTABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

| | | | |
|-----------------------|---------------------|-------------|--|
| Implementation | Implementation 1 | ChaincodeGo | |
|-----------------------|---------------------|-------------|--|

Resource Map

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

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request

Control Message: MintRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response

Control Message: MintResponse

Description: The response

Parameters

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

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|------------------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

SUBDIVIDABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Subdividable |
| Id: | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Visual: | <i>d</i> |
| Tooling: | d |
| Version: | 1.0 |

Definition

An ability for the token to be subdivided from a single whole token into fractions, which are represented as decimal places. Any value greater than 0 will indicate how many fractions are possible where the smallest fraction is also the smallest ownable unit of the token.

Example

Sub-dividable is common for crypto-currencies or tokens of fiat currency. For example, the US Dollar is sub-dividable to 2 decimal places, where a value like .42 is possible. Bitcoin, is sub-dividable up to 8 decimal places.

Analogy

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

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

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Properties

Name: Decimals

Value Description: Set to a number greater than Zero, allowing subdivision

Template Value: 0

Invocations

GetDecimals

Id: 01f7ef04-1215-45f1-b118-12b4a76db9ad

Description: Return the value

Request

Control Message: GetDecimalsRequest

Description:

Parameters

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

Response

Control Message: GetDecimalsResponse

Description: Return number of decimal places

Parameters

| Name | Value |
|----------|---------|
| Decimals | integer |

Properties



DELEGABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogy

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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 | | |
|--|-------------|--|--|

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

ROLES

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------|--------------|
| Type | | |
| Control | roles.proto | |
| Uml | roles.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 | | |
|--|-------------|--|--|

Behavior Details

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

Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request

Control Message: IsInRole

Description: The request

Parameters

| Name | Value |
|------------------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: The response

Parameters

| Name | Value |
|-----------------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value:

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if |

| | |
|-----------------------|---|
| | there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

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

| | |
|--------------|----------------|
| Added | True or False. |
|--------------|----------------|

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|---------------|----------------|
| InRole | True or False. |

Properties



ENCUMBERABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Encumberable |
| Id: | dc8d5961-59e8-4a10-8b38-d9e99394d251 |
| Visual: | <i>e</i> |
| Tooling: | e |
| Version: | 1.0 |

Definition

A token class that implements this behavior will have restrictions preventing certain behaviors like transferable, burnable, etc. from working while it is encumbered. The encumbering party should make a request to encumber, the owner should be notified about the request, and accept the request, which will finalize the encumbrance and send the EncumberResponse message to the requestor.

Example

For example, a property title's owner may have obtained a loan from a bank to purchase the property. The loan represents a contract between the owner of the property and the bank, this loan encumbers the property title preventing the owner from being able to sell the property, transferable, to another party until the loan is paid off. Paying off the loan will remove the encumber, which will allow transferable to be invoked.

Analogy

| Name | Description |
|------|---|
| Loan | A token can represent an asset that the owner took out a loan to obtain. If so, the token will need to be encumbered by the loan contract preventing the owner from selling the asset until the loan is repaid. |

Comments

The token definition should have a Encumbered property or structure that may allow only one encumber or allow multiple.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|--------------------|--------------|
| Type | | |
| Control | encumberable.proto | |
| Uml | encumberable.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 | | |

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

EncumberRequest

Id: bdc69e47-8320-4f54-8a03-0f54c376e113

Description: A Request by a party or account, perhaps a contract or another token, to encumber the token.

Request

Control Message: EncumberRequest

Description: The request

Parameters

| Name | Value |
|------------------|--|
| Name of Encumber | Name of the institution requesting the encumber. |
| Identifier | A public key or address for the requestor. |
| Signature | A digital signature or attestation, optional. |

Response

Control Message: EncumberResponse

Description: The response

Parameters

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

| | |
|---------------------|--|
| Confirmation | A confirmation response from the token for the encumber request. |
|---------------------|--|

AcceptEncumberRequest

Id: efd8bb57-4904-481e-976d-8a20a33df602

Description: A Request by a party or account, perhaps a contract or another token, to encumber the token. Once accepted, the token should add a new entry into the Encumbrances property.

Request

Control Message: AcceptEncumberRequest

Description: The request

Parameters

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

Response

Control Message: AcceptEncumberResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response returned to the owner of their acceptance. |

RemoveEncumberRequest

Id: 4532c466-bb6d-482a-b2cc-5285ba1f8259

Description: A Request by encumbrancer, perhaps a contract or another token, to remove their encumber or lien from the token. Which should remove any restrictions from behaviors if there are no more encumbers. Only the owner of the encumber can remove their encumber.

Request

Control Message: RemoveEncumberRequest

Description: The request

Parameters

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

Response

Control Message: RemoveEncumberResponse

Description: The response

Parameters

| Name | Value |
|---------------------|---|
| Confirmation | A confirmation receipt or denial be returned to the RemoveEncumber requestor. |

Properties

Name: Encumbrances

Value Description: List of Encumbered

Template Value:

Invocations

GetEncumbrancesRequest

Id: 9e39bf6a-74dc-4ca1-a709-5db247aaa31b

Description: The property value.

Request

Control Message: GetEncumbrancesRequest

Description:

Parameters

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

Response

Control Message: GetEncumbrancesResponse

Description: Return value

Parameters

| Name | Value |
|--------------|--------------------|
| Encumbrances | List of Encumbered |

Properties



Name: *Encumbered*

Value Description: True or False

Template Value:

Invocations

GetEncumberedRequest

Id: f35cdfee-d2f4-4a01-bf9b-33774b5df241

Description: The property value.

Request

Control Message: GetEncumberedRequest

Description:

Parameters

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

Response

Control Message: GetEncumberedResponse

Description: Return value

Parameters

| Name | Value |
|------------|---------------|
| Encumbered | True or False |

Properties



LOGABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Logable |
| Id: | 9c8c2373-cf3c-4743-932a-03fee6a192fe |
| Visual: | <i>I</i> |
| Tooling: | I |
| Version: | 1.0 |

Definition

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

Example

You may want to record certain actions like validations or external uses of a token or asset into a token log.

Analogies

| Name | Description |
|-----------|---|
| Media Use | You may create a token for a video or song and want to log each time it is played |

| | |
|------------------|---|
| | or viewed. |
| Audit Log | You may want to create a token for auditing external events, like a access control log that record what user access some resource. Access to the resource can be blocked if the log token is unable to record the access. |

Dependencies

| Artifact Type | Symbol | Description |
|--------------------|--------|--|
| PropertySet | phLog | Logable requires the log property-set for its data structure. The invocations in this behavior control the property set. |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|----------------|---------------|--------------|
| Control | logable.proto | |
| Uml | logable.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 | | |

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

CreateEntrySeries

Id: dc7e0ec1-32f7-4930-9a8d-a9a29dc6c5c6

Description: A request create a series of log entries.

Request

Control Message: CreateEntrySeriesRequest

Description: When invoked, a seriesId should be generated.

Parameters

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

Response

Control Message: CreateEntrySeriesResponse

Description: Return the generated seriesId

Parameters

| Name | Value |
|-----------------|---|
| SeriesId | A response containing a unique SeriesId that should be set for each entry's RecordEntryRequest message in the series. |

RecordEntry

Id: 0f0f0983-1b14-479d-bcb6-18be7e19b313

Description: A request to record an log entry.

Request

Control Message: RecordEntryRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---|
| SeriesId | The seriesId for the event. If blank a common series could be used like all zeros or a 1. |
| Entry | Data to be logged like bytes or a string . |

Response

Control Message: RecordEntryResponse

Description: The response

Parameters

| Name | Value |
|---------------------|---|
| Confirmation | A confirmation of recording the entry including |

GetEntry

Id: 00e91598-b162-47d7-8636-baac251e98e7

Description: A request to retrieve a specific Entry by its unique identifier.

Request

Control Message: GetEntryRequest

Description: Fetch a log entry by its entryId only.

Parameters

| Name | Value |
|------------|----------------------------------|
| Identifier | Id of the Log Entry to retrieve. |

Response

Control Message: GetEntryResponse

Description: The matching entry response

Parameters

| Name | Value |
|-------|--|
| Entry | A response containing the specific log entry if found. |

GetLastEntry

Id: 589c478d-8852-4237-b559-6414e54ecbb2

Description: A request to retrieve the last log entry needing no parameters.

Request

Control Message: GetLastEntryRequest

Description: The request

Parameters

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

Response

Control Message: GetLastEntryResponse

Description: The response

Parameters

| Name | Value |
|-------|--|
| Entry | Response containing the last log entry if it exists. |

GetEntrySeries

Id: 7af943cc-03ec-49c1-bcd6-450ac624d8d3

Description: A request retrieve all the log entries for a particular series by SeriesId.

Request

Control Message: GetEntrySeriesRequest

Description: The request

Parameters

| Name | Value |
|----------|--------------------------------|
| SeriesId | Id for the series to retrieve. |

Response

Control Message: GetEntrySeriesResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Entries | A response containing a list of all the log entries for the requested SeriesId, if found. |

Properties

COMPLIANT

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Compliant |
| Id: | 03dd1c48-dfdb-4ec1-86c8-69c3abac76b7 |
| Visual: | <i>c</i> |
| Tooling: | c |
| Version: | 1.0 |

Definition

A regulated token needs to comply with several legal requirements, especially KYC and AML. If the necessary checks have to be made off-chain the token transfer becomes centralized. Further the transfer in this case takes longer to complete as it can not be done in one transaction, but requires a second confirmation step. A compliant token fulfills all legal requirements on-chain without interaction from an off-chain entity

Example

When doing a bank transfer the transaction is checked by the involved banks according to legal requirements. A compliant token can

Analogies

| Name | Description |
|------|-------------|
| | |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

CheckTransferAllowed

Id: 3f591127-0508-445b-b449-4adc3d8d90e9

Description: Checks if the transfer request is allowed to be executed with the given parameters.

Request

Control Message: CheckTransferAllowedRequest

Description: The request

Parameters

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

Response

Control Message: CheckTransferAllowedResponse

Description: The response

Parameters

| Name | Value |
|---------------|---|
| Result | A boolean value whereas true means the transfer is allowed and false means it is not. |

CheckMintAllowed

Id: 0323b374-71af-48f6-93ff-2a63366267db

Description: Checks if the mint request is allowed to be executed with the given parameters.

Request

Control Message: CheckMintAllowedRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of tokens to transfer. |

Response

Control Message: CheckMintAllowedResponse

Description: The response

Parameters

| Name | Value |
|--------|--|
| Result | A boolean value whereas true means the minting request is allowed and false means it is not. |

CheckBurnAllowed

Id: 8edffc4d-d14e-4a98-8c96-338835d5534c

Description: Checks if the burn request is allowed to be executed with the given parameters.

Request

Control Message: CheckBurnAllowedRequest

Description: The request

Parameters

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

Response

Control Message: CheckMintAllowedResponse

Description: The response

Parameters

| Name | Value |
|--------|---|
| Result | A boolean value whereas true means the burn request is allowed and false means it is not. |

Properties



BURNABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request

Control Message: BurnRequest

Description: The request to Burn or Retire tokens.

Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response

Control Message: BurnResponse

Description: The response from the request to burn.

Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or error may be returned to the invoker based |

on the outcome of the burn request

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request

Control Message: BurnFromRequest

Description: The request to Burn or Retire tokens.

Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response

Control Message: BurnFromResponse

Description: The response from the request to burn.

Parameters

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

Properties

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

Analogy

| 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 | | |

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Properties



ATTESTABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Attestable |
| Id: | 189b1589-a93a-4aa6-8d9d-0d9237ab5b42 |
| Visual: | <i>a</i> |
| Tooling: | a |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support a basic attestation request returning a true or false and if true it will return a cryptographic proof the requester may store for future validations. Attestable will accept a simple ownership query to validate that an account is the owner of the token or a attestation proof and validate it.

Example

Certain tokens will want to prove something like ownership or validation of an issued proof from the token for applications wanting to check attestations.

Analogy

| Name | Description |
|---------|---|
| Diploma | Check to see if an account is the owner or holder of a diploma token. This can be done by the Account Id or a stored attestation issued by the Diploma Token. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Attest

Id: f404f43f-c922-475d-9a0c-b4a0bdca6029

Description: A request to validate a rule or attestation.

Request

Control Message: AttestRequest

Description: The request to Attest an attestation.

Parameters

| Name | Value |
|-------------|--------------------------------------|
| Attestation | Value of the attestation to validate |

Response

Control Message: AttestResponse

Description: The response from the AttestRequest.

Parameters

| Name | Value |
|--------------|------------------------|
| Confirmation | A true or false result |

AttestByAccount

Id: c573dc98-d669-4e24-a06d-70a7c1d29078

Description: A request to validate a rule or attestation.

Request

Control Message: AttestByAccountRequest

Description: The request to Attest by an account id.

Parameters

| Name | Value |
|-----------|------------------------------------|
| AccountId | The Id of the account to validate. |

Response

Control Message: AttestByAccountResponse

Description: The response from the AttestByAccountRequest, if true can include a Attestation for the caller to use in subsequent attestation checks.

Parameters

| Name | Value |
|---------------------|---|
| Confirmation | A true or false result |
| Attestation | A cryptographic signature that can be validated with AttestRequest. |

Properties

NON-TRANSFERABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6af8-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |
| Version: | 1.0 |

Definition

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogy

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

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

Behavior Details

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Properties



PAUSABLE

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Pausable |
| Id: | 0fb5abae-c99e-4f34-90cf-62b6f3351b74 |
| Visual: | <i>p</i> |
| Tooling: | p |
| Version: | 1.0 |

Definition

Pausable is an influencing behavior that can be applied to other behaviors in the Token. Pausable will have an applies toA token class that implements this behavior will halt trades and free all transfers, handy if there is a bug found in the token implementation.

Example

There may be a run or a crash in the market that may require the halting of trades for this token. This is like the big red button.

Analogies

| Name | Description |
|-------------|---|
| Bug in Code | You may discover a bug in your token implementation that requires you to halt the trading until you can fix the code. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Roles can influence who or what role can pause and resume a token. | r | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Pausable.sol |

Implementation Map

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

Resource Map

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

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Invocations

Pause

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request to pause behavior invocations that Pausable applies to.

Request

Control Message: PauseRequest

Description: The request

Parameters

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

Response

Control Message: PauseResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the pause requestor. |

Resume

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Resume normal operations.

Request

Control Message: ResumeRequest

Description: The request

Parameters

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

Response

Control Message: ResumeResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

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.

Analogy

| 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 | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| 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 | | |

Behavior Details

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

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 |

Properties



BEHAVIOR GROUPS



SUPPLY CONTROL

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogies

| Name | Description |
|--------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior Group Details

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|---------------------|--------------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|---------------------|--------------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|--------------|
| Is External: | False |
|---------------------|--------------|

Constructor:

Applies To

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account.

Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

| | |
|---------------------|--|
| Confirmation | A confirmation receipt or error may be returned to the invoker based on the outcome of the MintTo request. |
|---------------------|--|

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

PROPERTY SETS



FILE

| | |
|----------|--------------------------------------|
| Type: | PropertySet |
| Name: | File |
| Id: | 79d40648-02ba-4055-b700-01dce32196ec |
| Visual: | φ <i>File</i> |
| Tooling: | phFile |
| Version: | 1.0 |

Definition

A token class that implements this property set will have a file property or field with a Read/Query and Set control

Example

Storing an authentic reference for a file, hash type, hash, uri path, etc. Can be used to detect file tampering when compared with the file from storage.

Analogy

| Name | Description |
|--------------|--|
| Cold Storage | Placing a digital copy of an agreement, receipt, etc. in digital storage and store its tamper detection information and location in a token on the blockchain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Roles should be used to control what accounts can set the File Property. | r | [] |

Artifact Files

| Content | File Name | File Content |
|---------|------------|--------------|
| Type | | |
| Control | file.proto | |
| Uml | file.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 | | |

Property Set

Properties

Name: File

Value Description: Contains the file for the token.

Template Value:

Invocations

GetFile

Id:

Description: Request the value of the File property

Request

Control Message: GetFileRequest

Description: The request

Parameters

| Name | Value |
|-------------|--|
| File | File object or variables for the property proto. |

Response

Control Message: GetFileResponse

Description: The response

Parameters

| Name | Value |
|-------------|----------------------------------|
| File | Returning the value of the File. |

SetFile

Id:

Description: Set the Value of the File Property, note if Roles should be applied to the Setter.

Request

Control Message: SetFileRequest

Description: The request

Parameters

| Name | Value |
|------|--------------------------|
| File | The File property proto. |

Response

Control Message: SetFileResponse

Description: The response

Parameters

| Name | Value |
|--------------|---|
| Confirmation | Returning the value of the set request. |

Properties





SKU

| | |
|----------|--------------------------------------|
| Type: | PropertySet |
| Name: | SKU |
| Id: | ee696ca3-393a-44e3-a4a8-01a39042f1dd |
| Visual: | φ <i>SKU</i> |
| Tooling: | phSKU |
| Version: | 1.0 |

Definition

A token class that implements this property set will have a SKU property or field with a Read/Query and Set control

Example

Analogies

| Name | Description |
|--------|---|
| Retail | SKU number for the item being inventoried which will apply to all tokens in this class. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles should be used to control what accounts can set the SKU Property. | r | [] |

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |
| Control | sku.proto | |
| Uml | sku.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 | | |

Property Set

Properties

Name: SKU

Value Description: Contains the SKU for the token.

Template Value:

Invocations

GetSKU

Id:

Description: Request the value of the SKU property

Request

Control Message: GetSKURequest

Description: The request

Parameters

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

Response

Control Message: GetSKUResponse

Description: The response

Parameters

| Name | Value |
|------|---------------------------------|
| SKU | Returning the value of the SKU. |

SetSKU

Id:

Description: Set the Value of the Property, note if Roles should be applied to the Setter.

Request

Control Message: SetSKURequest

Description: The request

Parameters

| Name | Value |
|-----------------------|----------------------------------|
| New Value of Property | The data to set the property to. |

Response

Control Message: SetSKUResponse

Description: The response

Parameters

| Name | Value |
|--------------|---|
| Confirmation | Returning the value of the set request. |

Properties





TEMPLATE FORMULAS



TN{S,T}

| | |
|----------|--------------------------------------|
| Type: | TemplateFormula |
| Name: | tN{s,t} |
| Id: | 89ff775c-27f1-494e-b31c-f3fb3a9527ac |
| Visual: | τ_N{<i>s,t</i>} |
| Tooling: | tN{s,t} |
| Version: | 1.0 |

Definition

A singleton is a non-subdividable whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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

This token could be used to represent an original work of art like a painting.

Analogies

| Name | Description |
|----------|---|
| Painting | A token representing ownership of an original, single piece of art like a painting. |

Dependencies

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

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 | tN{s,t}.proto | |
| Uml | tN{s,t}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

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

Behaviors

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

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

| | |
|-------|----------|
| Type: | Behavior |
|-------|----------|

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



[TF{~D,T,G,SC}+PHSKU]

| Type: | TemplateFormula |
|----------|--|
| Name: | [tF{~d,t,g,SC}+phSKU] |
| Id: | 8ea3e82d-7bdb-482a-90e4-274af08e8bd3 |
| Visual: | [τ_F{<i>~d,t,g,SC</i>}+φSKU] |
| Tooling: | [tF{~d,t,g,SC}+phSKU] |
| Version: | 1.0 |

Definition

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdivisible behavior = 0. This token has the SKU PropertySet added to add specific SKU information to the Token Class. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Example

Inventory tokens to represent items in a SKU are a common use of this type of token. Representing inventory using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Tracing ownership or the token and its removal from circulation when it is used.

Analogies

| Name | Description |
|---------------|---|
| Barrel of Oil | A producer can create a token for each barrel of oil, where the SKU represents the type of barrel it is. These barrels can change ownership and be burned when the barrel is refined or consumed in some way. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|------------------|--------------|
| Type | | |
| Control | tF{~d,t,b}.proto | |
| Uml | tF{~d,t,b}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|----------|-------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Behaviors

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

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

| | |
|-------|----------|
| Type: | Behavior |
|-------|----------|

| | |
|-----------------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Behavior Groups

| | |
|-----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Property Sets

| | |
|-----------------|--------------------------------------|
| Type: | PropertySet |
| Name: | SKU |
| Id: | ee696ca3-393a-44e3-a4a8-01a39042f1dd |
| Visual: | φ<i>SKU</i> |
| Tooling: | phSKU |
| Version: | 1.0 |

Child Tokens

TF{~D,~T,G,SC}

| Type: | TemplateFormula |
|----------|--------------------------------------|
| Name: | tF{~d,~t,g,SC} |
| Id: | b7346906-3949-44de-9b28-435e32983fd0 |
| Visual: | τ_F{<i>~d,~t,SC</i>} |
| Tooling: | tF{~d,~t,SC} |
| Version: | 1.0 |

Definition

This is a Non-Transferable Whole Fungible Token with Variable Supply, where an initial supply can set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdividable behavior = 0.

Example

Loyalty points are a common use of this type of token. Representing a loyalty point using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Redemption of these is easy for users to understand using whole numbers. New points can be minted or issued based on customer activity and points can be removed or burned when they are redeemed.

Analogy

| Name | Description |
|----------------|---|
| Earned Credits | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets, but cannot transfer the points to another party. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|--------------------|--------------|
| Type | | |
| Control | tF{~d,~t,SC}.proto | |
| Uml | tF{~d,~t,SC}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| Type: | Base |
|-------|------|
| | |

| | |
|-----------------|-------------------------------------|
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Behaviors

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

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Non-transferable |
| Id: | a4fa4ca8-6afd-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |
| Version: | 1.0 |

Behavior Groups

| | |
|----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |

Tooling: SC

Version: 1.0

Property Sets

Child Tokens



TN{~D,T,B,G}

| | |
|----------|--------------------------------------|
| Type: | TemplateFormula |
| Name: | tN{~d,t,b,g} |
| Id: | 82b5d1c9-d457-447b-9069-59ca3d2abf04 |
| Visual: | &tau_N<i>{~d,t,b,g}</i> |
| Tooling: | tN{~d,t,b,g} |
| Version: | 1.0 |

Definition

This is a Fixed Supply Non-Fungible where the total supply is set at creation using the Quantity property of the Base token. The tokens in this class will be of the same series, sharing those properties, but also have unique values like serial number. It is Whole by setting the Decimals property on the subdivisible behavior = 0. A token instance can be burned.

Example

This token can be used to represent a limited edition item where only a certain quantity is issued, but each issue has a set of shared and unique properties within the class.

Analogies

| Name | Description |
|-----------------|---|
| Collectors Item | Limited edition Dungeon Master's Guide. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|--------------------|--------------|
| Type | | |
| Control | tN{~d,t,b,g}.proto | |
| Uml | tN{~d,t,b,g}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|-------|--------------------------|
| Type: | Base |
| Name: | Whole Non-Fungible Token |

Id: 3c05a856-c901-4c30-917e-df9feed1c8de

Visual: &tau_N{<i>~d</i>}

Tooling: tN{~d}

Version: 1.0

Behaviors

Type: Behavior

Name: Non-Subdividable

Id: d5807a8e-879b-4885-95fa-f09ba2a22172

Visual: <i>~d</i>

Tooling: ~d

Version: 1.0

Type: Behavior

Name: Transferable

Id: af119e58-6d84-4ca6-9656-75e8d312f038

Visual: <i>t</i>

Tooling: t

Version: 1.0

Type: Behavior

Name: Burnable

Id: 803297a1-c0f9-4898-9d44-29c9d41cca97

Visual: <i>b</i>

Tooling: b

Version: 1.0

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |



TF{D,T,G,H,C,SC}

| Type: | TemplateFormula |
|----------|--|
| Name: | tF{d,t,g,h,c,SC} |
| Id: | a46301ea-5791-4a21-aa20-e3b6aeb53343 |
| Visual: | τ_F{<i>d,t,g,h,c,SC</i>} |
| Tooling: | tF{d,t,g,h,c,SC} |
| Version: | 1.0 |

Definition

This is a Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is fractional by setting the Decimals property on the subdivisible behavior. A token instance can be burned or minted. Before executing transfer, burn or mint operation check if they are within the compliance regulations. A token can be put on hold to ensure future transfer.

Example

Enables the issuance of regulated electronic money and its practical usage in real financial applications.

Analogies

| Name | Description |
|------|-------------|
| | |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| Control | tF{d,t,g,h,c,SC}.proto | |
| Uml | tF{d,t,g,h,c,SC}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|-------|---------------------|
| Type: | Base |
| Name: | Fractional Fungible |

Id: 89ca6daf-5585-469e-abd1-19bc44e7a012

Visual: τ_F{<i>d</i>}

Tooling: tF{d}

Version: 1.0

Behaviors

Type: Behavior

Name: Subdividable

Id: 6e3501dc-5800-4c71-b59e-ad11418a998c

Visual: <i>d</i>

Tooling: d

Version: 1.0

Type: Behavior

Name: Transferable

Id: af119e58-6d84-4ca6-9656-75e8d312f038

Visual: <i>t</i>

Tooling: t

Version: 1.0

Type: Behavior

Name: Delegable

Id: a3d02076-6009-4a65-9ed4-2deffe5291e1

Visual: <i>g</i>

Tooling: g

Version: 1.0

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Holdable |
| Id: | 9d137226-b7b0-4d3e-9e82-4d27d4227fba |
| Visual: | <i>h</i> |
| Tooling: | h |
| Version: | 1.0 |

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Compliant |
| Id: | 03dd1c48-dfdb-4ec1-86c8-69c3abac76b7 |
| Visual: | <i>c</i> |
| Tooling: | c |
| Version: | 1.0 |

Behavior Groups

| | |
|-----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Property Sets

Child Tokens

TN{~D,T,G,SC}

| Type: | TemplateFormula |
|----------|--------------------------------------|
| Name: | tN{~d,t,g,SC} |
| Id: | 38ead4b1-1f94-4bc3-8b1f-2d0dda0c72bb |
| Visual: | &tau_N<i>{~d,t,g,SC}</i> |
| Tooling: | tN{~d,t,g,SC} |
| Version: | 1.0 |

Definition

This is a Variable Supply Whole Non-Fungible where the total supply can vary.

The tokens in this class will be of the same series, sharing those properties, but also have unique values like seat number. It is Whole by setting the Decimals property on the subdividable behavior = 0. A token instance can be burned.

Example

This token can be used to represent a unique item in a shared context, like a reserved seat at a concert.

Analogies

| Name | Description |
|------------------|--|
| Reserved Seating | All tokens in the class share the venue, date and time for the event, but have a unique seat number. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------------|--------------|
| Type | | |
| Control | tN{~d,t,g,SC}.proto | |
| Uml | tN{~d,t,g,SC}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|-------|--------------------------|
| Type: | Base |
| Name: | Whole Non-Fungible Token |

Id: 3c05a856-c901-4c30-917e-df9feed1c8de

Visual: &tau_N{<i>~d</i>}

Tooling: tN{~d}

Version: 1.0

Behaviors

Type: Behavior

Name: Non-Subdividable

Id: d5807a8e-879b-4885-95fa-f09ba2a22172

Visual: <i>~d</i>

Tooling: ~d

Version: 1.0

Type: Behavior

Name: Transferable

Id: af119e58-6d84-4ca6-9656-75e8d312f038

Visual: <i>t</i>

Tooling: t

Version: 1.0

Type: Behavior

Name: Delegable

Id: a3d02076-6009-4a65-9ed4-2deffe5291e1

Visual: <i>g</i>

Tooling: g

Version: 1.0

Behavior Groups

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Property Sets

Child Tokens

TF{~D,T,G,SC}

| Type: | TemplateFormula |
|----------|--------------------------------------|
| Name: | tF{~d,t,g,SC} |
| Id: | 5ee615b1-56da-4783-b129-d2dea21dadef |
| Visual: | τ_F{<i>~d,t,g,SC</i>} |
| Tooling: | tF{~d,t,g,SC} |
| Version: | 1.0 |

Definition

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdivisible behavior = 0.

Example

Loyalty points are a common use of this type of token. Representing a loyalty point using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Redemption of these is easy for users to understand using whole numbers. New points can be minted or issued based on customer activity and points can be removed or burned when they are redeemed. This formula supports transferable points as well. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Analogy

| Name | Description |
|----------------|--|
| Airline Points | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------------|--------------|
| Type | | |
| Control | tF{~d,t,g,SC}.proto | |
| Uml | tF{~d,t,g,SC}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|----------|-------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Behaviors

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

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

| | |
|-------|----------|
| Type: | Behavior |
|-------|----------|

| | |
|-----------------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Behavior Groups

| | |
|-----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Property Sets

Child Tokens

TN{S,~T,A}

| Type: | TemplateFormula |
|----------|--------------------------------------|
| Name: | tN{s,~t,a} |
| Id: | 6fa235c7-d9d7-4fa2-b2b3-0e8e6838b770 |
| Visual: | τ_N{<i>s,~t,a</i>} |
| Tooling: | tN{s,~t,a} |
| Version: | 1.0 |

Definition

A singleton is a non-subdividable whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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 non-transferable and attestable.

Example

A educational diploma issued to a student, is not valid to transfer to someone else.

Analogies

| Name | Description |
|---------------|---|
| Certification | A person may obtain some certification to prove that they attended and passed some set of requirements. |
| License | A business may obtain license from the government to prove that they are registered and recognized. |

Dependencies

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

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 | File Name | File Content |
|---------|----------------|--------------|
| Type | | |
| Control | tN{s,~t}.proto | |
| Uml | tN{s,~t}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

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

Behaviors

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

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

| | |
|-------|----------|
| Type: | Behavior |
|-------|----------|

| | |
|-----------------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6af8-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |
| Version: | 1.0 |

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Attestable |
| Id: | 189b1589-a93a-4aa6-8d9d-0d9237ab5b42 |
| Visual: | <i>a</i> |
| Tooling: | a |
| Version: | 1.0 |

Behavior Groups

Property Sets

Child Tokens

[TN{~D,T,S,E,B}+PHFILE]

| | |
|----------|--|
| Type: | TemplateFormula |
| Name: | [tN{~d,t,s,e,b}+phFile] |
| Id: | 4c2730f5-dc5f-4949-87e3-71f3a6e6cae9 |
| Visual: | [τ_N<i>~d,t,s,e,b</i>]φFile] |
| Tooling: | [tN{~d,t,s,e,b}+phFile] |
| Version: | 1.0 |

Definition

Used to represent a document that may be a scanned or PDF printed document. It records the document hash to check for tampering, a file path to fetch the file from storage as well as the ability to be encumbered. Implements the File property-set.

Example

For example: you may choose to create an invoice token from an invoice document. You can then allow another token or contract representing a loan or proof of financing to encumber the document establishing a link between the two.

Analogy

| Name | Description |
|------------------|---|
| Scanned Document | A scanned copy of a certificate, like a diploma or industry certification |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------------------------|--------------|
| Type | | |
| Control | [tN{~d,t,s,e,b}+phFile].proto | |
| Uml | [tN{~d,t,s,e,b}+phFile].md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|-------|-----------|
| Type: | Base |
| Name: | Singleton |

Id: 53101d87-3c93-4d8b-ab39-1e629406d062

Visual: &tau_N{<i>s</i>}

Tooling: tN{s}

Version: 1.0

Behaviors

Type: Behavior

Name: Transferable

Id: af119e58-6d84-4ca6-9656-75e8d312f038

Visual: <i>t</i>

Tooling: t

Version: 1.0

Type: Behavior

Name: Encumberable

Id: dc8d5961-59e8-4a10-8b38-d9e99394d251

Visual: <i>e</i>

Tooling: e

Version: 1.0

Type: Behavior

Name: Burnable

Id: 803297a1-c0f9-4898-9d44-29c9d41cca97

Visual: <i>b</i>

Tooling: b

Version: 1.0

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

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

Behavior Groups

Property Sets

| | |
|-----------------|--------------------------------------|
| Type: | PropertySet |
| Name: | File |
| Id: | 79d40648-02ba-4055-b700-01dce32196ec |
| Visual: | φ<i>File</i> |
| Tooling: | phFile |
| Version: | 1.0 |

Child Tokens

TN{~T,~D,B,S,R,L}

| | |
|----------|---|
| Type: | TemplateFormula |
| Name: | tN{~t,~d,b,s,r,l} |
| Id: | d4bdee60-55ae-4f00-9e06-2bc9e79ecf9e |
| Visual: | τ_N{<i>~t,~d,b,s,r,l</i>} |
| Tooling: | tN{~t,~d,b,s,r,l} |
| Version: | 1.0 |

Definition

Log, is a non-fungible token that serves as a trusted log that is used to record event data for some shared process, application or other type of context specific log data that is of interest to multiple parties. This token is owned by some shared source and viewable by parties that are members of a LogViewer role.

Example

This token is useful when the owner of the token must record periodic data that multiple parties may want to monitor or audit.

Analogies

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | d | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Behavior | m | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------------------|--------------|
| Type | | |
| Control | tN{~t,~d,b,s,r,l}.proto | |
| Uml | tN{~t,~d,b,s,r,l}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Whole Non-Fungible Token |
| Id: | 3c05a856-c901-4c30-917e-df9feed1c8de |
| Visual: | &tau_N{<i>~d</i>} |
| Tooling: | tN{~d} |
| Version: | 1.0 |

Behaviors

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

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

| | |
|-------|----------|
| Type: | Behavior |
|-------|----------|

| | |
|-----------------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6af8-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |
| Version: | 1.0 |

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

| | |
|-----------------|--------------------------------------|
| Type: | Behavior |
| Name: | Logable |
| Id: | 9c8c2373-cf3c-4743-932a-03fee6a192fe |
| Visual: | <i>l</i> |
| Tooling: | l |

Behavior Groups

Property Sets

Child Tokens



TF{D,T,B}

| | |
|----------|--------------------------------------|
| Type: | TemplateFormula |
| Name: | tF{d,t,b} |
| Id: | 41cf2071-68c3-4808-b217-ccdf99cb0543 |
| Visual: | τ_F{<i>d,t,b</i>} |
| Tooling: | tF{d,t,b} |
| Version: | 1.0 |

Definition

This is a Fixed Supply Fungible where the total supply is set at creation using the Quantity property of the Base token. It is fractional by setting the Decimals property on the subdivisible behavior. A token instance can be burned.

Example

Typically used to represent an Initial Coin offering with a fixed supply.

Analogies

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|-------------|-----------------|--------------|
| Type | | |
| Control | tF{d,t,b}.proto | |
| Uml | tF{d,t,b}.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Formula

Template Type: SingleToken

Base Token

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Fractional Fungible |
| Id: | 89ca6daf-5585-469e-abd1-19bc44e7a012 |
| Visual: | τ_F{<i>d</i>} |
| Tooling: | tF{d} |

Version: 1.0

Behaviors

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Subdividable |
| Id: | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Visual: | <i>d</i> |
| Tooling: | d |
| Version: | 1.0 |

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

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Behavior Groups

Property Sets

Child Tokens



TEMPLATE DEFINITIONS



EEA-PENALTY

| Type: | TokenTemplate |
|----------|--------------------------------------|
| Name: | EEA-Penalty |
| Id: | 3c66db06-3bd6-42bd-904b-e7a42e71d457 |
| Visual: | τ_F{<i>~d,>~t,SC</i>} |
| Tooling: | tF{~d,~t,SC} |
| Version: | 1.0 |

Definition

The EEA Penalty token has a zero or negative balance, is non-transferable and burned after redeemed, reducing the organization's Reward token balance 1 to 1. EEA Penalty Tokens must be redeemed before an organization can redeem their EEA Reward Tokens.

Example

Since EEA Tokens are issued initially as potential in a Grant contract based on a set commitment for an organization, the EEA Penalty Token serves as a dis-incentive for members signing up for a commitment and not actually following through.

Analogies

| Name | Description |
|----------------|---|
| Earned Credits | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets, but cannot transfer the points to another party. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------------|--------------|
| Type | | |
| Control | EEA-Penalty.proto | |
| Uml | EEA-Penalty.md | |

Code Map

| Map Type | Name | Platform | Location |
|------------|------------------------------|------------------|---|
| SourceCode | Solidity Penalty Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/PenaltyToken.sol |

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tF{~d,~t,g,SC}

Name: tF{~d,~t,g,SC}

Id: b7346906-3949-44de-9b28-435e32983fd0

Reference Notes: EEA-Penalty

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To
Invocations
Influence Bindings
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 |

Properties

Behavior Reference: Non-transferable

Reference Notes: Non-transferable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Groups

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|---------------------|-------|
| Is External: | False |
|---------------------|-------|

Constructor:

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|-------|
| Is External: | False |
|---------------------|-------|

Constructor:

Applies To

| | |
|--------------|----------|
| Type: | Behavior |
|--------------|----------|

| | |
|--------------|----------|
| Name: | Mintable |
|--------------|----------|

| | |
|-----------------|--------------------------------------|
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

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

| | |
|----------|------------|
| IsInRole | True/False |
|----------|------------|

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------|----------------------------------|
| RoleName | Value is always set to 'Minters' |

| | |
|-----------------------|---|
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |
|-----------------------|---|

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|---------------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens

DOCUMENT

| | |
|----------|---|
| Type: | TokenTemplate |
| Name: | Document |
| Id: | ce4b7adc-4741-4bf0-b03d-0af8c4c92746 |
| Visual: | [τ_N<i>~d,t,s,e,b</i>]+φFile] |
| Tooling: | [tN{~d,t,s,e,b}+phFile] |
| Version: | 1.0 |

Definition

Used to represent a document that may be a scanned or PDF printed document. It records the document hash to check for tampering, a file path to fetch the file from storage as well as the ability to be encumbered. Implements the File property-set.

Example

For example: you may choose to create an invoice token from an invoice document. You can then allow another token or contract representing a loan or proof of financing to encumber the document establishing a link between the two.

Analogy

| Name | Description |
|------------------|---|
| Scanned Document | A scanned copy of a certificate, like a diploma or industry certification |

Dependencies

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

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 | Document.proto | |
| Uml | Document.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: [tN{~d,t,s,e,b}+phFile]

Name: [tN{~d,t,s,e,b}+phFile]

Id: 4c2730f5-dc5f-4949-87e3-71f3a6e6cae9

Reference Notes:

Base Details

| | |
|-------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 1 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Singleton

Reference Notes: singleton

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

Applies To
Invocations
Influence Bindings
Properties

Behavior Reference: Non-Subdividable

Reference Notes: non-subdividable

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

Applies To
Invocations
Influence Bindings
Properties

Name: Decimals

Value Description: Set to Zero, not allowing any subdivision

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 |

Properties

Behavior Reference: Transferable

Reference Notes: transferable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Burnable

Reference Notes: burnable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Encumberable

Reference Notes: encumberable

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

Applies To
Invocations
Influence Bindings
Properties

Behavior Groups

Property Sets

Name: File

Id: 79d40648-02ba-4055-b700-01dce32196ec

Reference Notes: file

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Properties

Child Tokens



LOYALTY

| | |
|----------|--------------------------------------|
| Type: | TokenTemplate |
| Name: | Loyalty |
| Id: | 7e8c1210-7378-47a2-9734-41de48c2c2d6 |
| Visual: | τ_F{<i>~d,t,g,SC</i>} |
| Tooling: | tF{~d,t,g,SC} |
| Version: | 1.0 |

Definition

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdivisible behavior = 0.

Example

Loyalty points are a common use of this type of token. Representing a loyalty point using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Redemption of these is easy for users to understand using whole numbers. New points can be minted or issued based on customer activity and points can be removed or burned when they are redeemed. This formula supports transferable points as well. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Analogy

| Name | Description |
|----------------|--|
| Airline Points | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tF{~d,t,g,SC}

Name: tF{~d,t,g,SC}

Id: 5ee615b1-56da-4783-b129-d2dea21dadef

Reference Notes: Loyalty

Base Details

| | |
|-------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To

Invocations

Influence Bindings

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 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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

Control Message: TransferFromRequest

Description: The request

Parameters

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Reference: Delegable

Reference Notes: Delegable

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

Applies To

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|--------------|---|
| Confirmation | A confirmation response from the owner approving the allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Influence Bindings

Properties

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Behavior Groups

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties
Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|--------------------------------------|
| Is External: | False |
| Constructor: | |
| Applies To | |
| Type: | Behavior |
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens



RESERVEDTICKET

| | |
|----------|--------------------------------------|
| Type: | TokenTemplate |
| Name: | ReservedTicket |
| Id: | 8dab45c9-cf5d-4752-b4dd-d2192a22886a |
| Visual: | &tau_N<i>{~d,t,g,SC}</i> |
| Tooling: | tN{~d,t,g,SC} |
| Version: | 1.0 |

Definition

This is a Variable Supply Whole Non-Fungible where the total supply can vary. The tokens in this class will be of the same series, sharing those properties, but also have unique values like seat number. It is Whole by setting the Decimals property on the subdividable behavior = 0. A token instance can be burned.

Example

This token can be used to represent a unique item in a shared context, like a reserved seat at a concert.

Analogy

| Name | Description |
|------------------|--|
| Reserved Seating | All tokens in the class share the venue, date and time for the event, but have a unique seat number. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tN{~d,t,g,SC}

Name: tN{~d,t,g,SC}

Id: 38ead4b1-1f94-4bc3-8b1f-2d0ddaa0c72bb

Reference Notes: ReservedTicket

Base Details

| | |
|-------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To
Invocations
Influence Bindings
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 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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

Control Message: TransferFromRequest

Description: The request

Parameters

| Name | Value |
|------|---------------------------------------|
| From | AccountId to transfer ownership from. |

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Reference: Delegable

Reference Notes: Delegable

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

Applies To

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |
| Type: | Behavior |

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

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Influence Bindings

Properties

Behavior Groups

Property Sets

Child Tokens

EEA-REWARD

| Type: | TokenTemplate |
|----------|--------------------------------------|
| Name: | EEA-Reward |
| Id: | 3b557279-5400-472e-a68e-feb818930276 |
| Visual: | τ_F{<i>~d,t,g,SC</i>} |
| Tooling: | tF{~d,t,g,SC} |
| Version: | 1.0 |

Definition

The EEA Reward Token is used to incentivize participation of EEA member organizations and their employees in EEA SIGs and TWGs. Tokens are minted from 'Grants' for participation in EEA activities such as working group calls, deliverables or F2F meetings. The EEA Reward Token Grant is a contract between the EEA SIG or TWG's chairman, the participating organization and it's contributing individuals and details the potential reward that can be earned by following through with the commitment that the grant represents. A contracted commitment to perform and contribute towards an activity by an organization will reflect the relative impact and detail the potential reward in the grant. These tokens are minted by the grant contract during a vest event and are transferable to other EEA Member Organizations. These tokens can be redeemed towards the purchase of swag from the EEA swag pool or towards a bounty defined in the grant.

Example

The tokens are used to incentivize participation of EEA member organizations and their employees in EEA SIGs and TWGs. Tokens are issued for participation in EEA activities such as working group calls, deliverables or F2F meetings. The more commitment that is required by a member organization to perform an activity, the higher the reward. If a member organization commits to something and does not deliver on the the commitment,tokens are taken away from the organization's balance.

Analogies

| Name | Description |
|----------------|--|
| Airline Points | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|------------------|--------------|
| Type | | |
| Control | EEA-Reward.proto | |
| Uml | EEA-Reward.md | |

Code Map

| Map Type | Name | Platform | Location |
|------------|-----------------------|------------------|---|
| SourceCode | Solidity Reward Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/RewardToken.sol |

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tF{~d,t,g,SC}

Name: tF{~d,t,g,SC}

Id: 5ee615b1-56da-4783-b129-d2dea21dadef

Reference Notes: EEA-Reward

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To
Invocations
Influence Bindings
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 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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 subdivisible 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

Control Message: TransferFromRequest

Description: The request

Parameters

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Reference: Delegable

Reference Notes: Delegable

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

Applies To

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Influence Bindings

Properties

Behavior Groups

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties
Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|--------------------------------------|
| Is External: | False |
| Constructor: | |
| Applies To | |
| Type: | Behavior |
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens



ORIGINALART

| | |
|----------|--------------------------------------|
| Type: | TokenTemplate |
| Name: | OriginalArt |
| Id: | 129a78b5-f9a7-4908-8ece-e9e015dd8301 |
| Visual: | τ_N{<i>s,t</i>} |
| Tooling: | tN{s,t} |
| Version: | 1.0 |

Definition

A singleton is a non-subdividable whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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

This token could be used to represent an original work of art like a painting.

Analogies

| Name | Description |
|----------|---|
| Painting | A token representing ownership of an original, single piece of art like a painting. |

Dependencies

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

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 | OriginalArt.proto | |
| Uml | OriginalArt.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tN{s,t}

Name: tN{s,t}

Id: 89ff775c-27f1-494e-b31c-f3fb3a9527ac

Reference Notes: OriginalArt

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Singleton

Reference Notes: Singleton

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

Applies To
Invocations
Influence Bindings
Properties

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To
Invocations
Influence Bindings
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 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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 subdivisible 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

Control Message: TransferFromRequest

Description: The request

Parameters

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Groups

Property Sets

Child Tokens



INVENTORY

| Type: | TokenTemplate |
|----------|--|
| Name: | Inventory |
| Id: | 4354e308-0cca-4e7c-93d3-b83a47a7c2d2 |
| Visual: | [τ_F{<i>~d,t,g,SC</i>}+φSKU] |
| Tooling: | [tF{~d,t,g,SC}+phSKU] |
| Version: | 1.0 |

Definition

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdivisible behavior = 0. This token has the SKU PropertySet added to add specific SKU information to the Token Class. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Example

Inventory tokens to represent items in a SKU are a common use of this type of token. Representing inventory using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Tracing ownership or the token and its removal from circulation when it is used.

Analogies

| Name | Description |
|---------------|---|
| Barrel of Oil | A producer can create a token for each barrel of oil, where the SKU represents the type of barrel it is. These barrels can change ownership and be burned when the barrel is refined or consumed in some way. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: [tF{~d,t,g,SC}+phSKU]

Name: [tF{~d,t,g,SC}+phSKU]

Id: 8ea3e82d-7bdb-482a-90e4-274af08e8bd3

Reference Notes: Inventory

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To

Invocations

Influence Bindings

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 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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

Control Message: TransferFromRequest

Description: The request

Parameters

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Reference: Delegable

Reference Notes: Delegable

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

Applies To

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |
| Type: | Behavior |
| Name: | Transferable |
| Id: | af119e58-6d84-4ca6-9656-75e8d312f038 |
| Visual: | <i>t</i> |
| Tooling: | t |
| Version: | 1.0 |

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Influence Bindings

Properties

Behavior Groups

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|--------------|-------|
| Is External: | False |
|--------------|-------|

Constructor:

Applies To
Invocations
Influence Bindings
Properties
Behavior
Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

Is External: False

Constructor:

Applies To
Invocations
Influence Bindings
Properties
Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

Is External: False

Constructor:

Applies To

Type: Behavior

| | |
|-----------------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|------------------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens

LICENSE-DIPLOMA

| | |
|----------|--------------------------------------|
| Type: | TokenTemplate |
| Name: | License-Diploma |
| Id: | 49b6535a-430d-487b-8442-cf3457836ecc |
| Visual: | τ_N{<i>s,>t,a</i>} |
| Tooling: | tN{s,>t,a} |
| Version: | 1.0 |

Definition

A singleton is a non-subdividable whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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 non-transferable and attestable.

Example

A educational diploma issued to a student, is not valid to transfer to someone else.

Analogies

| Name | Description |
|---------------|---|
| Certification | A person may obtain some certification to prove that they attended and passed some set of requirements. |
| License | A business may obtain license from the government to prove that they are registered and recognized. |

Dependencies

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

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 | File Name | File Content |
|---------|-----------------------|--------------|
| Type | | |
| Control | License-Diploma.proto | |
| Uml | License-Diploma.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tN{s,~t,a}

Name: tN{s,~t,a}

Id: 6fa235c7-d9d7-4fa2-b2b3-0e8e6838b770

Reference Notes: License-Diploma

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Singleton

Reference Notes: Singleton

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To

Invocations

Influence Bindings

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 |

Properties

Behavior Reference: Non-transferable

Reference Notes: Non-transferable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Attestable

Reference Notes: Attestable

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

Applies To

Invocations

Attest

Id: f404f43f-c922-475d-9a0c-b4a0bdca6029

Description: A request to validate a rule or attestation.

Request

Control Message: AttestRequest

Description: The request to Attest an attestation.

Parameters

| Name | Value |
|-------------|--------------------------------------|
| Attestation | Value of the attestation to validate |

Response

Control Message: AttestResponse

Description: The response from the AttestRequest.

Parameters

| Name | Value |
|--------------|------------------------|
| Confirmation | A true or false result |

AttestByAccount

Id: c573dc98-d669-4e24-a06d-70a7c1d29078

Description: A request to validate a rule or attestation.

Request

Control Message: AttestByAccountRequest

Description: The request to Attest by an account id.

Parameters

| Name | Value |
|-----------|------------------------------------|
| AccountId | The Id of the account to validate. |

Response

Control Message: AttestByAccountResponse

Description: The response from the AttestByAccountRequest, if true can include a Attestation for the caller to use in subsequent attestation checks.

Parameters

| Name | Value |
|---------------------|---|
| Confirmation | A true or false result |
| Attestation | A cryptographic signature that can be validated with AttestRequest. |

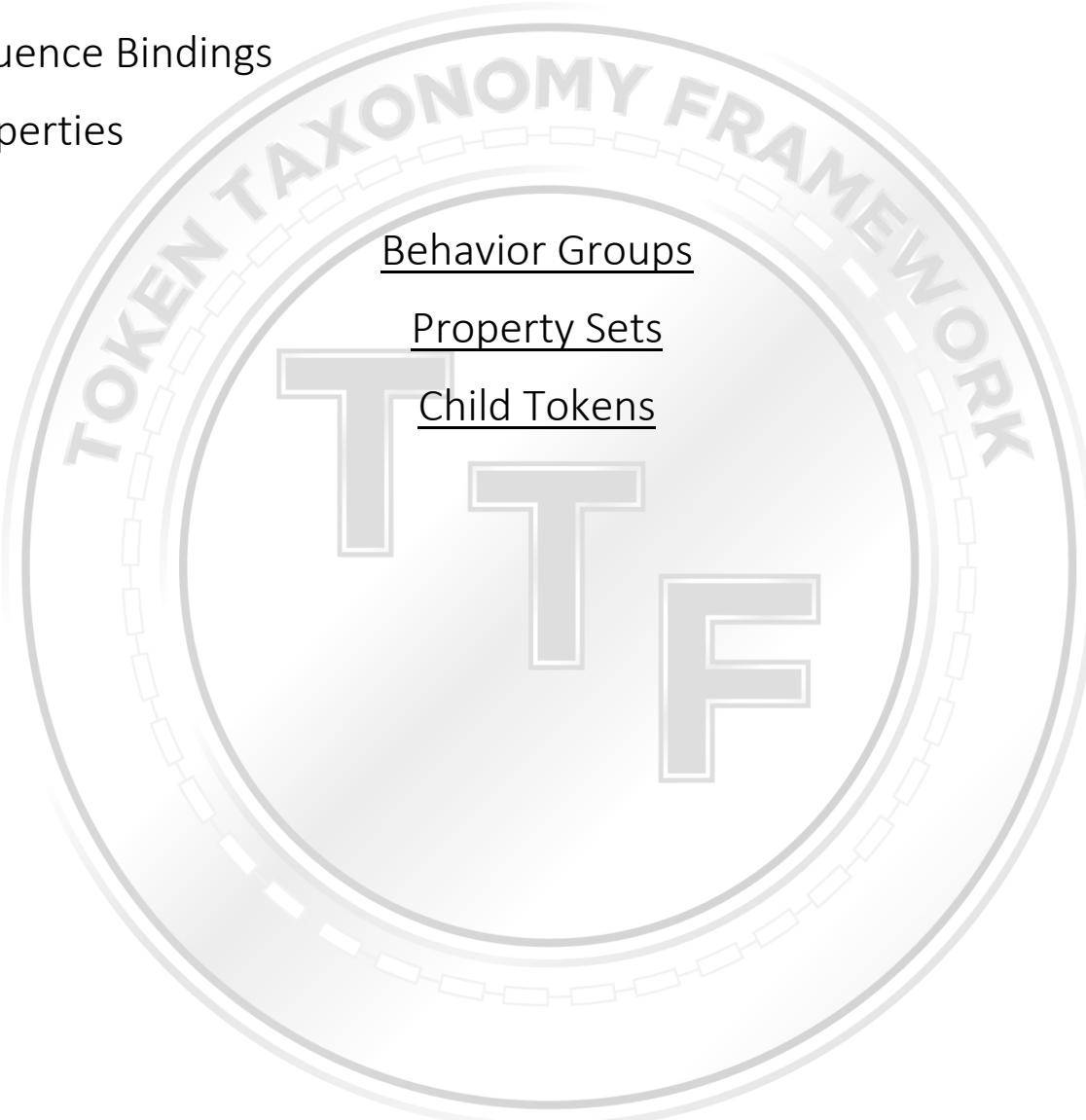
Influence Bindings

Properties

Behavior Groups

Property Sets

Child Tokens



LOG

| | |
|----------|---|
| Type: | TokenTemplate |
| Name: | Log |
| Id: | a96403a4-a8b8-42b7-bda5-0ee1e2693b56 |
| Visual: | τ_N{<i>~t,~d,b,s,r,l</i>} |
| Tooling: | tN{~t,~d,b,s,r,l} |
| Version: | 1.0 |

Definition

Log, is a non-fungible token that serves as a trusted log that is used to record event data for some shared process, application or other type of context specific log data that is of interest to multiple parties. This token is owned by some shared source that can submit new log entries as the owner and viewable by parties that are members of a LogViewer role.

Example

This token is useful when the owner of the token must record periodic data that multiple parties may want to monitor or audit.

Analogies

| Name | Description |
|-----------|--|
| Log table | A Table containing multiple rows, where each row is a log entry. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | d | 6e3501dc-5800-4c71-b59e-ad11418a998c |
| Behavior | m | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tN{~t,~d,b,s,r,l}

Name: tN{~t,~d,b,s,r,l}

Id: d4bdee60-55ae-4f00-9e06-2bc9e79ecf9e

Reference Notes:

Base Details

| | |
|-------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 1 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Singleton

Reference Notes: singleton

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Non-Subdividable

Reference Notes: non-subdividable

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

Applies To

Invocations

Influence Bindings

Properties

Name: Decimals

Value Description: Set to Zero, not allowing any subdivision

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 |

Properties

Behavior Reference: Non-transferable

Reference Notes: non-transferable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Burnable

Reference Notes: burnable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Reference: Roles

Reference Notes: roles

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

Applies To

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Logable |
| Id: | 9c8c2373-cf3c-4743-932a-03fee6a192fe |
| Visual: | <i> </i> |
| Tooling: | I |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: 9c8c2373-cf3c-4743-932a-03fee6a192fe

Influenced Name: Logable

Influenced Invocation Id: 00e91598-b162-47d7-8636-baac251e98e7

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request

Control Message: IsInRole

Description: Check that the account is in the 'LogViewer' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: The response

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

GetEntry

Id: 00e91598-b162-47d7-8636-baac251e98e7

A request to retrieve a specific Entry by its unique identifier.

Request

Control Message: GetEntryRequest

Description: Fetch a log entry by its entryId only.

Parameters

| Name | Value |
|------------|----------------------------------|
| Identifier | Id of the Log Entry to retrieve. |

Response

Control Message: GetEntryResponse

Description: The matching entry response

Parameters

| Name | Value |
|-------|--|
| Entry | A response containing the specific log entry if found. |

Influenced Id: 9c8c2373-cf3c-4743-932a-03fee6a192fe

Influenced Name: Logable

Influenced Invocation Id: 589c478d-8852-4237-b559-6414e54ecbb2

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request

Control Message: IsInRole

Description: Check that the account is in the 'LogViewer' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: The response

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

GetLastEntry

Id: 589c478d-8852-4237-b559-6414e54ecbb2

A request to retrieve the last log entry needing no parameters.

Request

Control Message: GetLastEntryRequest

Description: The request

Parameters

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

Response

Control Message: GetLastEntryResponse

Description: The response

Parameters

| Name | Value |
|-------|--|
| Entry | Response containing the last log entry if it exists. |

Influenced Id: 9c8c2373-cf3c-4743-932a-03fee6a192fe

Influenced Name: Logable

Influenced Invocation Id: 7af943cc-03ec-49c1-bed6-450ac624d8d3

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request

Control Message: IsInRole

Description: Check that the account is in the 'LogViewer' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: The response

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

GetEntrySeries

Id: 7af943cc-03ec-49c1-bed6-450ac624d8d3

A request retrieve all the log entries for a particular series by SeriesId.

Request

Control Message: GetEntrySeriesRequest

Description: The request

Parameters

| Name | Value |
|----------|--------------------------------|
| SeriesId | Id for the series to retrieve. |

Response

Control Message: GetEntrySeriesResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Entries | A response containing a list of all the log entries for the requested SeriesId, if found. |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: LogViewer

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

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

| | |
|----------------|---|
| Members | Returning the list of accounts in the role. |
|----------------|---|

AddRoleMember

Id:

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id:

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id:

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Behavior Reference: Logable

Reference Notes: logable

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

Applies To

Invocations

CreateEntrySeries

Id:

Description: A request create a series of log entries.

Request

Control Message: CreateEntrySeriesRequest

Description: The request

Parameters

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

Response

Control Message: CreateEntrySeriesResponse

Description: The response

Parameters

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

| | |
|-----------------|---|
| SeriesId | A response containing a unique SeriesId that should be set for each entry's RecordEntryRequest message in the series. |
|-----------------|---|

Influence Bindings

Properties

Behavior Groups

Property Sets

Child Tokens



EMONEY

| | |
|----------|--|
| Type: | TokenTemplate |
| Name: | Emoney |
| Id: | 6fb84412-79c1-4b46-ae29-68b1e5710086 |
| Visual: | τ_F{<i>d,t,g,h,c,SC</i>} |
| Tooling: | tF{d,t,g,h,c,SC} |
| Version: | 1.0 |

Definition

The Emoney Token enables the issuance of regulated electronic money on blockchain networks, and its practical usage in real financial applications.

Example

Financial institutions work today with electronic systems which hold account balances in databases on core banking systems. In order for an institution to be allowed to maintain records of client balances segregated and available for clients, such institution must be regulated under a known legal framework and must possess a license to do so. Maintaining a license under regulatory supervision entails ensuring compliance (i.e. performing KYC on all clients and ensuring good AML practices before allowing transactions) and demonstrating technical and operational solvency through periodic audits, so clients depositing funds with the institution can rest assured that their money is safe.

Analogies

| Name | Description |
|------|-------------|
| | |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tF{d,t,g,h,c,SC}

Name: tF{d,t,g,h,c,SC}

Id: a46301ea-5791-4a21-aa20-e3b6aeb53343

Reference Notes: Emoney

Base Details

| | |
|-------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 2 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Subdividable

Reference Notes: Subdividable

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

Applies To
Invocations
Influence Bindings
Properties

Name: Decimals

Value Description: Set to Two, mirroring the decimals used in most fiat currencies

Template Value: 2

Invocations

GetDecimals

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

Description: Should return 2

Request

Control Message: GetDecimalsRequest

Description:

Parameters

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

Response

Control Message: GetDecimalsResponse

Description: Return 2

Parameters

| Name | Value |
|----------|-------|
| Decimals | 2 |

Properties

Behavior Reference: Transferable

Reference Notes: Transferable

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

Applies To

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

Control Message: TransferRequest

Description: The request

Parameters

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

Response

Control Message: TransferResponse

Description: The 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

Control Message: TransferFromRequest

Description: The request

Parameters

| Name | Value |
|------|---------------------------------------|
| From | AccountId to transfer ownership from. |

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

Response

Control Message: TransferFromResponse

Description: The 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. |

Influence Bindings

Properties

Behavior Reference: Delegable

Reference Notes: Delegable

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

Applies To

Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: AllowanceResponse

Description: The response

Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request

Control Message: AllowanceRequest

Description: The request

Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response

Control Message: ApproveResponse

Description: The response

Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Influence Bindings

Properties

Behavior Reference: Holdable

Reference Notes: Holdable

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

Applies To

Invocations

Hold

Id: 6cc942c8-afa4-4bab-9737-27a0b7b24a5b

Description: Request the create a hold on behalf of the owner of the token in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request

Control Message: HoldRequest

Description: The request

Parameters

| Name | Value |
|--------------------|--|
| OperationId | An unique ID to identify the hold |
| To | AccountId to transfer ownership of token(s) to after the hold is |

| | |
|-------------------------|--|
| | executed. |
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

Response

Control Message: Hold Response

Description: The response

Parameters

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

HoldFrom

Id: 67f2d012-5b2d-46bc-8ee7-befdf90f66d8

Description: Request to create a hold on behalf of the party or account provided in the From field in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request

Control Message: TransferFromRequest

Description: The request

Parameters

| Name | Value |
|--------------------|--|
| OperationId | An unique ID to identify the hold |
| From | AccountId on which behalf the hold should be created. |
| To | AccountId to transfer ownership of token(s) to after the hold is executed. |

| | |
|-------------------------|--|
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

Response

Control Message: TransferFromResponse

Description: The response

Parameters

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

ExecuteHold

Id: 4946eea9-c59e-4192-9115-2ba57821936c

Description: Request to execute a hold. Execute means that the specified value is transferred the owner of the token in favor of to the party or account provided in the To field of the Hold / HoldFrom request. If the specified value is less than the hold value the remaining amount is available again to the owner of the tokens. Only the account specified in the Notary field of the Hold / HoldFrom request can make a successful request.

Request

Control Message: ExecuteHoldRequest

Description: The request

Parameters

| Name | Value |
|--------------------|-------------------------------------|
| OperationId | An unique ID to identify the hold |
| Quantity | Number of tokens to be put on hold. |

Response

Control Message: ExecuteHoldResponse

Description: The response

Parameters

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

ReleaseHold

Id: d07c8a5a-be40-479c-aa0d-7ac80b7ca9b3

Description: Request to release a hold. Release means that the transfer is not executed and the held amount is available again for the owner of the token. Until a hold has expired it can only be released by the notary or the party or account provided in the To field of the Hold / HoldFrom request. After it has expired it can be released by any account.

Request

Control Message: ReleaseHoldRequest

Description: The request

Parameters

| Name | Value |
|--------------------|-----------------------------------|
| OperationId | An unique ID to identify the hold |

Response

Control Message: ReleaseHoldResponse

Description: The response

Parameters

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

Influence Bindings

Properties

Behavior Reference: Compliant

Reference Notes: Compliant

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

Applies To

Invocations

CheckTransferAllowed

Id: 3f591127-0508-445b-b449-4adc3d8d90e9

Description: Checks if the transfer request is allowed to be executed with the given parameters.

Request

Control Message: CheckTransferAllowedRequest

Description: The request

Parameters

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

Response

Control Message: CheckTransferAllowedResponse

Description: The response

Parameters

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

| | |
|---------------|---|
| Result | A boolean value whereas true means the transfer is allowed and false means it is not. |
|---------------|---|

CheckMintAllowed

Id: 0323b374-71af-48f6-93ff-2a63366267db

Description: Checks if the mint request is allowed to be executed with the given parameters.

Request

Control Message: CheckMintAllowedRequest

Description: The request

Parameters

| Name | Value |
|------------------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of tokens to transfer. |

Response

Control Message: CheckMintAllowedResponse

Description: The response

Parameters

| Name | Value |
|---------------|--|
| Result | A boolean value whereas true means the minting request is allowed and false means it is not. |

CheckBurnAllowed

Id: 8edffc4d-d14e-4a98-8c96-338835d5534c

Description: Checks if the burn request is allowed to be executed with the given parameters.

Request

Control Message: CheckBurnAllowedRequest

Description: The request

Parameters

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

Response

Control Message: CheckMintAllowedResponse

Description: The response

Parameters

| Name | Value |
|---------------|---|
| Result | A boolean value whereas true means the burn request is allowed and false means it is not. |

Influence Bindings

Properties

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Behavior Groups

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties
Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|--------------------------------------|
| Is External: | False |
| Constructor: | |
| Applies To | |
| Type: | Behavior |
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens



EEA-REPUTATION

| Type: | TokenTemplate |
|----------|--------------------------------------|
| Name: | EEA-Reputation |
| Id: | 2057e98c-b319-4e99-a28a-aac39242541c |
| Visual: | τ_F{<i>~d,>~t,SC</i>} |
| Tooling: | tF{~d,~t,SC} |
| Version: | 1.0 |

Definition

EEA Reputation Tokens are issued, upon vesting, to an organization's contributors establishing an individual's reputation. The token grant should be adjusted when commitments are met or before vesting indicating the split of reputation tokens by percentage to the contributors listed in the grant. The reputation split between contributors is finalized when the grant vests. Both Reward and Penalty tokens are matched 1-1 towards Reputation with the ability to improve or damage an individual's reputation. An individual's reputation cannot be negative so penalties will subtract 1-1 until exhausted or the account balance reaches 0. The reputation score of an organization is the sum of their contributor's balances. These tokens are lifetime tokens and are not transferable for any member that has earned them. EEA Reputation tokens are minted and burned but are not redeemable.

Example

For example, if an organization collects 10,000 tokens during its annual membership cycle, they can redeem the EEA Rewards tokens for say \$10,000 credit to its membership, or continue to accumulate. In addition, if the organization's lifetime membership EEA Reputation tokens total was 100,000 at the beginning of the membership cycle, it would be 110,000 at the end of the cycle in this example. In addition, 10,000 points would be split across the organization's employees who earned them.

Analogies

| Name | Description |
|-----------------------|---|
| Earned Credits | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets, but cannot transfer the points to another party. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | EEA-Reputation.proto | |
| Uml | EEA-Reputation.md | |

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------------------|------------------|---|
| SourceCode | Solidity Reputation Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/ReputationToken.sol |

Implementation Map

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

Resource Map

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

Template Definition

Template Formula Reference: tF{~d,~t,g,SC}

Name: tF{~d,~t,g,SC}

Id: b7346906-3949-44de-9b28-435e32983fd0

Reference Notes: EEA-Reputation

Base Details

| | |
|--------------------------|-------------|
| Token Name: | |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Behavior Reference: Non-Subdividable

Reference Notes: Non-Subdividable

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

Applies To
Invocations
Influence Bindings
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 |

Properties

Behavior Reference: Non-transferable

Reference Notes: Non-transferable

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

Applies To

Invocations

Influence Bindings

Properties

Behavior Groups

Name: Supply Control

Id: 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56

Reference Notes: Supply Control

Reference Values

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

Code Map

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

Implementation Map

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

Resource Map

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

Behavior

Behavior Reference: Mintable

Reference Notes: Mintable in SupplyControl will be bound to the Roles behavior to determine if the requesting minter is allowed to invoke the behavior.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Applies To

Invocations

Influence Bindings

Properties

Behavior

Behavior Reference: Burnable

Reference Notes: Burnable is not modified from the referenced behavior.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Applies To
Invocations
Influence Bindings
Properties
Behavior

Behavior Reference: Roles

Reference Notes: Roles support requires that a role or group called 'Minters' be created that allows for account to be added. These accounts will be allowed to invoke MintTo.

| | |
|---------------------|--------------------------------------|
| Is External: | False |
| Constructor: | |
| Applies To | |
| Type: | Behavior |
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Invocations

Influence Bindings

Influenced Id: f9224e90-3cab-45bf-b5dc-0175121e2ead

Influenced Name: Mintable

Influenced Invocation Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Influence Type: Intercept

Influencing Invocation:

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Check to see if the account is in the Role called 'Minters'

Request

Control Message: IsInRole

Description: Checking the 'Minters' role.

Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response

Control Message: True/False

Description: Respond true if the account is in the 'Minters' role.

Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Influenced Invocation:

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request

Control Message: MintToRequest

Description: The request

Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response

Control Message: MintToResponse

Description: The response

Parameters

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

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Property Sets

Child Tokens



TOKEN SPECIFICATIONS



EEA-PENALTY

Taxonomy Formula: tF{~d,~t,SC}

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|----------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

The EEA Penalty token has a zero or negative balance, is non-transferable and burned after redeemed, reducing the organization's Reward token balance 1 to 1. EEA Penalty Tokens must be redeemed before an organization can redeem their EEA Reward Tokens.

Example

Since EEA Tokens are issued initially as potential in a Grant contract based on a set commitment for an organization, the EEA Penalty Token serves as a dis-incentive for members signing up for a commitment and not actually following through.

Analogy

| Name | Description |
|-----------------------|---|
| Earned Credits | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets, but cannot transfer the points to another party. |

EEA-Penalty is:

- Non-Subdivisible
- Non-transferable
- Burnable
- Roles
- Mintable

EEA-Penalty Details

Whole Fungible

| | |
|----------|-------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>^d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogies

| Name | Description |
|---------------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|-----------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|----------------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |
| Uml | whole-fungible.md | |

Code Map

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

| | | | |
|-------------------|------------------------------|------------------|---|
| SourceCode | Solidity Penalty Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/PenaltyToken.sol |
|-------------------|------------------------------|------------------|---|

Implementation Map

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

Resource Map

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

Base Details

| | |
|-----------------------------|-------------|
| Token Name: | |
| Token Type: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Non-Subdivisible

| Type: | Behavior |
|--------------|--------------------------------------|
| Name: | Non-Subdivisible |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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-Subdivisible

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-divisible 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 |
|----------|-------|
| Decimals | 0 |

Response

Control Message: GetDecimalsResponse

Description: Return 0

Parameters

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

Properties

Non-transferable

| Type: | Behavior |
|---------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6af8-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |

Tooling: ~t

Version: 1.0

Definition

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogy

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

| | | |
|----------------|------------------------|--|
| Control | non-transferable.proto | |
| Uml | non-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

Non-transferable

Taxonomy Symbol: $\sim t$

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogies

| Name | Description |
|------|-------------|
| | |

| | |
|-----------------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Is External: True

Constructor:

Non-transferable responds to these Invocations

Properties

Burnable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|------|-------------|
|------|-------------|

| | |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Is External: False

Constructor:

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Roles

| Type: | Behavior |
|--------------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |

| | |
|-----------------|----------|
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|--------------|-------------|--------------|
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions

within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

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

| | |
|----------------|---|
| Members | Returning the list of accounts in the role. |
|----------------|---|

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|-------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |

| | |
|-----------------|----------|
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but it's delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogy

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

| | | |
|--|---|-----|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|--------------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |
| Is External: | False |
| Constructor: | |

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogies

| Name | Description |
|--------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Control | | |
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.

DOCUMENT

Taxonomy Formula: [tN{~d,t,s,e,b}+phFile]

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: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

Used to represent a document that may be a scanned or PDF printed document. It records the document hash to check for tampering, a file path to fetch the file from storage as well as the ability to be encumbered. Implements the File property-set.

Example

For example: you may choose to create an invoice token from an invoice document. You can then allow another token or contract representing a loan or proof of financing to encumber the document establishing a link between the two.

Analogies

| Name | Description |
|------------------|---|
| Scanned Document | A scanned copy of a certificate, like a diploma or industry certification |

Document is:

- Singleton
- Non-Subdividable
- Transferable
- Burnable
- Encumberable

Document Details

Singleton

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Singleton |
| Id: | 53101d87-3c93-4d8b-ab39-1e629406d062 |
| Visual: | &tau_N{<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: | Intrinsic |
| Token Unit: | Singleton |
| Symbol: | |
| Owner: | |
| Quantity: | 1 |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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 | File Name | File Content |
|----------------|------------------------|--------------|
| Type | | |
| Control | non-subdivisible.proto | |

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-Subdivisible

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.

Analogy

| 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

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 |

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

Analogy

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~t | a4fa4ca8-6af8-452b-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 | [] |

Artifact Files

| Content | File Name | File Content |
|---------|--------------------|--------------|
| Type | | |
| 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

Burnable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

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

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).

Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Encumberable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Encumberable |
| Id: | dc8d5961-59e8-4a10-8b38-d9e99394d251 |
| Visual: | <i>e</i> |
| Tooling: | e |
| Version: | 1.0 |

Definition

A token class that implements this behavior will have restrictions preventing certain behaviors like transferable, burnable, etc. from working while it is encumbered. The encumbering party should make a request to encumber, the owner should be notified about the request, and accept the request, which will

finalize the encumbrance and send the EncumberResponse message to the requestor.

Example

For example, a property title's owner may have obtained a loan from a bank to purchase the property. The loan represents a contract between the owner of the property and the bank, this loan encumbers the property title preventing the owner from being able to sell the property, transferable, to another party until the loan is paid off. Paying off the loan will remove the encumber, which will allow transferable to be invoked.

Analogy

| Name | Description |
|------|---|
| Loan | A token can represent an asset that the owner took out a loan to obtain. If so, the token will need to be encumbered by the loan contract preventing the owner from selling the asset until the loan is repaid. |

Comments

The token definition should have an Encumbered property or structure that may allow only one encumber or allow multiple.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

| | | |
|----------------|--------------------|--|
| Control | encumberable.proto | |
| Uml | encumberable.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

Encumberable

Taxonomy Symbol: e

A token class that implements this behavior will have restrictions preventing certain behaviors like transferable, burnable, etc. from working while it is encumbered. The encumbering party should make a request to encumber, the owner should be notified about the request, and accept the request, which will finalize the encumbrance and send the EncumberResponse message to the requestor.

Example

For example, a property title's owner may have obtained a loan from a bank to purchase the property. The loan represents a contract between the owner of the property and the bank, this loan encumbers the property title preventing the owner from being able to sell the property, transferable, to another party until the loan is paid off. Paying off the loan will remove the encumber, which will allow transferable to be invoked.

Analogies

| Name | Description |
|-------------|---|
| Loan | A token can represent an asset that the owner took out a loan to obtain. If so, the token will need to be encumbered by the loan contract preventing the owner from selling the asset until the loan is repaid. |

Comments

The token definition should have a Encumbered property or structure that may allow only one encumber or allow multiple.

Is External: True

Constructor:

Encumberable responds to these Invocations

EncumberRequest

Id: bdc69e47-8320-4f54-8a03-0f54c376e113

Description: A Request by a party or account, perhaps a contract or another token, to encumber the token.

Request Message:

EncumberRequest

Description: The request

Request Parameters

| Name | Value |
|-------------------------|--|
| Name of Encumber | Name of the institution requesting the encumber. |
| Identifier | A public key or address for the requestor. |
| Signature | A digital signature or attestation, optional. |

Response Message

EncumberResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response from the token for the encumber request. |

AcceptEncumberRequest

Id: efd8bb57-4904-481e-976d-8a20a33df602

Description: A Request by a party or account, perhaps a contract or another token, to encumber the token. Once accepted, the token should add a new entry into the Encumbrances property.

Request Message:

AcceptEncumberRequest

Description: The request

Request Parameters

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

Response Message

AcceptEncumberResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response returned to the owner of their acceptance. |

RemoveEncumberRequest

Id: 4532c466-bb6d-482a-b2cc-5285ba1f8259

Description: A Request by encumbrancer, perhaps a contract or another token, to remove their encumber or lien from the token. Which should remove any restrictions from behaviors if there are no more encumbers. Only the owner of the encumber can remove their encumber.

Request Message:

RemoveEncumberRequest

Description: The request

Request Parameters

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

Response Message

RemoveEncumberResponse

Description: The response

Response Parameters

| Name | Value |
|---------------------|---|
| Confirmation | A confirmation receipt or denial be returned to the RemoveEncumber requestor. |

Properties

Name: Encumbrances

Value Description: List of Encumbered

Template Value:

Invocations

GetEncumbrancesRequest

Id: 9e39bf6a-74dc-4ca1-a709-5db247aaa31b

Description: The property value.

Request

Control Message: GetEncumbrancesRequest

Description:

Parameters

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

Response

Control Message: GetEncumbrancesResponse

Description: Return value

Parameters

| Name | Value |
|--------------|--------------------|
| Encumbrances | List of Encumbered |

Properties

Name: Encumbered

Value Description: True or False

Template Value:

Invocations

GetEncumberedRequest

Id: f35cdfee-d2f4-4a01-bf9b-33774b5df241

Description: The property value.

Request

Control Message: GetEncumberedRequest

Description:

Parameters

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

Response

Control Message: GetEncumberedResponse

Description: Return value

Parameters

| Name | Value |
|------------|---------------|
| Encumbered | True or False |

Properties



LOYALTY

Taxonomy Formula: tF{~d,t,g,SC}

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|-----------------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdividable behavior = 0.

Example

Loyalty points are a common use of this type of token. Representing a loyalty point using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit. Redemption of these is easy for users to understand using whole numbers. New points can be minted or issued based on customer activity and points can be removed or burned when they are redeemed. This formula supports transferable points as

well. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Analogies

| Name | Description |
|----------------|--|
| Airline Points | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets. |

Loyalty is:

- Non-Subdividable
- Transferable
- Delegable
- Burnable
- Roles
- Mintable

Loyalty Details

Whole Fungible

| Type: | Base |
|----------|--------------------------------------|
| Name: | Whole Fungible |
| Id: | b1eacdf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|---------------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|-----------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|----------------|----------------------|--------------|
| Control | whole-fungible.proto | |
| Uml | whole-fungible.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: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Non-Subdivisible

| Type: | Behavior |
|--------------|--------------------------------------|
| Name: | Non-Subdivisible |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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-Subdivisible

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-divisible 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 |
|----------|-------|
| Decimals | 0 |

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

Analogy

| 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 | [] |

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

Delegable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogy

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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

Delegable

Taxonomy Symbol: g

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

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

Delegable responds to these Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

AllowanceResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

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

| | |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |
|-----------------|---------------------------------|

Response Message

ApproveResponse

Description: The response

Response Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

Burnable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

| Content | File Name | File Content |
|----------------|----------------|--------------|
| Type | | |
| Control | burnable.proto | |

| | | |
|-----|-------------|--|
| Uml | burnable.md | |
|-----|-------------|--|

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogy

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Is External: False

Constructor:

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

| | |
|---------------------|---|
| Confirmation | A confirmation receipt or error may be returned to the invoker based on the outcome of the burn request |
|---------------------|---|

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Roles

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|--------------|-------------|--------------|
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |

| | |
|-----------------------|---|
| AccountAddress | Address, name or identifier of the account to be checked. |
|-----------------------|---|

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogy

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Is External: False

Constructor:

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

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

| | |
|------------------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogy

| Name | Description |
|--------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content Type | File Name | File Content |
|--------------|----------------------|--------------|
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.



RESERVEDTICKET

Taxonomy Formula: tN{~d,t,g,SC}

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: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

This is a Variable Supply Whole Non-Fungible where the total supply can vary.

The tokens in this class will be of the same series, sharing those properties, but also have unique values like seat number. It is Whole by setting the Decimals property on the subdividable behavior = 0. A token instance can be burned.

Example

This token can be used to represent a unique item in a shared context, like a reserved seat at a concert.

Analogies

| Name | Description |
|------|-------------|
| | |

| | |
|-------------------------|--|
| Reserved Seating | All tokens in the class share the venue, date and time for the event, but have a unique seat number. |
|-------------------------|--|

ReservedTicket is:

- Non-Subdividable
- Transferable
- Delegable

ReservedTicket Details

Whole Non-Fungible Token

| | |
|-----------------|--------------------------------------|
| Type: | Base |
| Name: | Whole Non-Fungible Token |
| Id: | 3c05a856-c901-4c30-917e-df9feed1c8de |
| Visual: | &tau_N<{i>~d</i>}> |
| Tooling: | tN{~d} |
| Version: | 1.0 |

Definition

Every non-fungible token is unique. A non-fungible token is not interchangeable with other tokens of the same class but have some shared properties while also having unique property values between instances. These tokens are whole tokens and can have quantities greater than 1 and also could support variable supply.

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 |

Incompatible With

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

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

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: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Non-Subdivisible

| Type: | Behavior |
|--------------|--------------------------------------|
| Name: | Non-Subdivisible |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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-Subdivisible

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 |
|----------|-------|
| Decimals | 0 |

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

Analogy

| 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 | [] |

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

Delegable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogy

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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

Delegable

Taxonomy Symbol: g

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

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

Delegable responds to these Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

AllowanceResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

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

| | |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |
|-----------------|---------------------------------|

Response Message

ApproveResponse

Description: The response

Response Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

EEA-REWARD

Taxonomy Formula: tF{~d,t,g,SC}

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|----------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

The EEA Reward Token is used to incentivize participation of EEA member organizations and their employees in EEA SIGs and TWGs. Tokens are minted from 'Grants' for participation in EEA activities such as working group calls, deliverables or F2F meetings. The EEA Reward Token Grant is a contract between the EEA SIG or TWG's chairman, the participating organization and its contributing individuals and details the potential reward that can be earned by following through with the commitment that the grant represents. A contracted commitment to perform and contribute towards an activity by an organization will reflect the relative impact and detail the potential reward in the grant. These

tokens are minted by the grant contract during a vest event and are transferable to other EEA Member Organizations. These tokens can be redeemed towards the purchase of swag from the EEA swag pool or towards a bounty defined in the grant.

Example

The tokens are used to incentivize participation of EEA member organizations and their employees in EEA SIGs and TWGs. Tokens are issued for participation in EEA activities such as working group calls, deliverables or F2F meetings. The more commitment that is required by a member organization to perform an activity, the higher the reward. If a member organization commits to something and does not deliver on the commitment, tokens are taken away from the organization's balance.

Analogies

| Name | Description |
|----------------|--|
| Airline Points | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets. |

EEA-Reward is:

- Non-Subdivisible
- Transferable
- Delegable
- Burnable
- Roles
- Mintable

EEA-Reward Details

Whole Fungible

| Type: | Base |
|----------|-------------------------------------|
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|---------------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|-------------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |
| Uml | whole-fungible.md | |

Code Map

| Map Type | Name | Platform | Location |
|------------|-----------------------------|------------------|---|
| SourceCode | Solidity Reward Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/RewardToken.sol |

Implementation Map

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

Resource Map

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

Base Details

| | |
|-----------------------------|-----------|
| Token Name: | |
| Token Type: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |

| | |
|--------------------------|-------------|
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

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.

Analogy

| 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 | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| 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.

Analogy

| 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 | a4fa4ca8-6af8-452b-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 | [] |

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

Delegable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogy

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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

Delegable

Taxonomy Symbol: g

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

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

Delegable responds to these Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

AllowanceResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

ApproveResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

Burnable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogy

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and | c | [] |

verified before a Burn request or a BurnFrom request.

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token,

but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Is External: False

Constructor:

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

| | |
|---------------------|--|
| Confirmation | A confirmation receipt or error may be returned to the invoker based on the outcome of the burn from request |
|---------------------|--|

Properties

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|----------------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------|--------------|
| Type | | |
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|------------------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|-----------------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|---------------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

| | | | |
|-----------------------|------------------|-------------|--|
| Implementation | Implementation 1 | ChaincodeGo | |
|-----------------------|------------------|-------------|--|

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

| | |
|--------------|-------|
| Is External: | False |
|--------------|-------|

Constructor:

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|-----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogies

| Name | Description |
|---------------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content Type | File Name | File Content |
|--------------|----------------------|--------------|
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.



ORIGINALART

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: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

A singleton is a non-subdivisible whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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

This token could be used to represent an original work of art like a painting.

Analogies

| Name | Description |
|------|-------------|
| | |

| | |
|-----------------|---|
| Painting | A token representing ownership of an original, single piece of art like a painting. |
|-----------------|---|

OriginalArt is:

- Singleton
- Non-Subdividable
- Transferable

OriginalArt Details

Singleton

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Singleton |
| Id: | 53101d87-3c93-4d8b-ab39-1e629406d062 |
| Visual: | &tau_N{<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 | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

| | | |
|----------------|-----------------|--|
| 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: | Intrinsic |
| 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

Analogy

| 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 | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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 | File Name | File Content |
|----------------|------------------------|--------------|
| Type | | |
| Control | non-subdivisible.proto | |

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-Subdivisible

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.

Analogy

| 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: 2ca7fb2-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 |

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

Analogy

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~t | a4fa4ca8-6af8-452b-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 | [] |

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



INVENTORY

Taxonomy Formula: [tF{~d,t,g,SC}+phSKU]

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|----------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

This is a Whole Token with Variable Supply Fungible where an initial supply can be set at creation and then supply can be added and removed from the total based on need. It is Whole by setting the Decimals property on the subdivisible behavior = 0. This token has the SKU PropertySet added to add specific SKU information to the Token Class. This token is delegable, meaning the owner of a token(s) can allow another party to transfer or burn token instances on their behalf.

Example

Inventory tokens to represent items in a SKU are a common use of this type of token. Representing inventory using fractional amounts like `0.081231` does not make sense, so a point is just that a single whole unit.

Tracing ownership or the token and its removal from circulation when it is used.

Analogies

| Name | Description |
|---------------|---|
| Barrel of Oil | A producer can create a token for each barrel of oil, where the SKU represents the type of barrel it is. These barrels can change ownership and be burned when the barrel is refined or consumed in some way. |

Inventory is:

- Non-Subdivisible
- Transferable
- Delegable
- Burnable
- Roles
- Mintable

Inventory Details

Whole Fungible

| | |
|----------|-------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from

the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|---------------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |

| | | |
|-----|-------------------|--|
| Uml | whole-fungible.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: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

Non-Subdivisible

| 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-divisible 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.

Analogy

| 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-Subdivisible

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

Analogyies

| 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 | c | [] |

verified before a Transfer request or a TransferFrom request.

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

Delegable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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

Delegable

Taxonomy Symbol: g

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

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

Delegable responds to these Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

AllowanceResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

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

| | |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |
|-----------------|---------------------------------|

Response Message

ApproveResponse

Description: The response

Response Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

Burnable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

| Content | File Name | File Content |
|----------------|----------------|--------------|
| Type | | |
| Control | burnable.proto | |

| | | |
|-----|-------------|--|
| Uml | burnable.md | |
|-----|-------------|--|

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogy

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Is External: False

Constructor:

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

| | |
|---------------------|---|
| Confirmation | A confirmation receipt or error may be returned to the invoker based on the outcome of the burn request |
|---------------------|---|

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Roles

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content Type | File Name | File Content |
|--------------|-------------|--------------|
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|----------------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |

| | |
|-----------------------|---|
| AccountAddress | Address, name or identifier of the account to be checked. |
|-----------------------|---|

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogy

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Is External:

False

Constructor:

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

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

| | |
|------------------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|-----------------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogy

| Name | Description |
|--------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content | File Name | File Content |
|-------------|----------------------|--------------|
| Type | | |
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.



LICENSE-DIPLOMA

Taxonomy Formula: tN{s,~t,a}

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: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

A singleton is a non-subdivisible whole token with a quantity of 1. Generally used to represent digital or physical items where there will be a single owner. A singleton implies non-subdivisible, 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 non-transferable and attestable.

Example

A educational diploma issued to a student, is not valid to transfer to someone else.

Analogies

| Name | Description |
|------|-------------|
| | |

| | |
|----------------------|---|
| Certification | A person may obtain some certification to prove that they attended and passed some set of requirements. |
| License | A business may obtain license from the government to prove that they are registered and recognized. |

License-Diploma is:

- Singleton
- Non-Subdividable
- Non-transferable
- Attestable

License-Diploma Details

Singleton

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Singleton |
| Id: | 53101d87-3c93-4d8b-ab39-1e629406d062 |
| Visual: | &tau_N{<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: | Intrinsic |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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 | File Name | File Content |
|----------------|------------------------|--------------|
| Type | | |
| Control | non-subdivisible.proto | |

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-Subdivisible

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

Non-transferable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6afd-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |

Definition

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogy

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| Control | non-transferable.proto | |

| | | |
|-----|---------------------|--|
| Uml | non-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

Non-transferable

Taxonomy Symbol: ~t

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogies

| Name | Description |
|---------|--|
| Diploma | A diploma from an educational institution is not transferable to another party |

| | |
|-----------------------|--|
| | that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Is External: True

Constructor:

Non-transferable responds to these Invocations

Properties

Attestable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Attestable |
| Id: | 189b1589-a93a-4aa6-8d9d-0d9237ab5b42 |
| Visual: | <i>a</i> |
| Tooling: | a |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support a basic attestation request returning a true or false and if true it will return a cryptographic proof the requester may store for future validations. Attestable will accept a simple ownership query to validate that an account is the owner of the token or a attestation proof and validate it.

Example

Certain tokens will want to prove something like ownership or validation of an issued proof from the token for applications wanting to check attestations.

Analogy

| Name | Description |
|------|-------------|
| | |

| | |
|----------------|---|
| Diploma | Check to see if an account is the owner or holder of a diploma token. This can be done by the Account Id or a stored attestation issued by the Diploma Token. |
|----------------|---|

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

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

Artifact Files

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

Code Map

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

Implementation Map

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

Resource Map

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

Specification Behavior

Attestable

Taxonomy Symbol: a

A token class that implements this behavior will support a basic attestation request returning a true or false and if true it will return a cryptographic proof the requester may store for future validations. Attestable will accept a simple ownership query to validate that an account is the owner of the token or a attestation proof and validate it.

Example

Certain tokens will want to prove something like ownership or validation of an issued proof from the token for applications wanting to check attestations.

Analogies

| Name | Description |
|---------|---|
| Diploma | Check to see if an account is the owner or holder of a diploma token. This can be done by the Account Id or a stored attestation issued by the Diploma Token. |

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

Attestable responds to these Invocations

Attest

Id: f404f43f-c922-475d-9a0c-b4a0bdca6029

Description: A request to validate a rule or attestation.

Request Message:

AttestRequest

Description: The request to Attest an attestation.

Request Parameters

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

| | |
|--------------------|--------------------------------------|
| Attestation | Value of the attestation to validate |
|--------------------|--------------------------------------|

Response Message

AttestResponse

Description: The response from the AttestRequest.

Response Parameters

| Name | Value |
|---------------------|------------------------|
| Confirmation | A true or false result |

AttestByAccount

Id: c573dc98-d669-4e24-a06d-70a7c1d29078

Description: A request to validate a rule or attestation.

Request Message:

AttestByAccountRequest

Description: The request to Attest by an account id.

Request Parameters

| Name | Value |
|------------------|------------------------------------|
| AccountId | The Id of the account to validate. |

Response Message

AttestByAccountResponse

Description: The response from the AttestByAccountRequest, if true can include a Attestation for the caller to use in subsequent attestation checks.

Response Parameters

| Name | Value |
|---------------------|------------------------|
| Confirmation | A true or false result |

Attestation

A cryptographic signature that can be validated with AttestRequest.

Properties



LOG

Taxonomy Formula: tN{~t,~d,b,s,r,l}

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: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

Log, is a non-fungible token that serves as a trusted log that is used to record event data for some shared process, application or other type of context specific log data that is of interest to multiple parties. This token is owned by some shared source that can submit new log entries as the owner and viewable by parties that are members of a LogViewer role.

Example

This token is useful when the owner of the token must record periodic data that multiple parties may want to monitor or audit.

Analogies

| Name | Description |
|------------------|--|
| Log table | A Table containing multiple rows, where each row is a log entry. |

Log is:

- Singleton
- Non-Subdividable
- Non-transferable
- Burnable
- Roles
- Logable
- Logable
- Logable

Log Details

Whole Non-Fungible Token

| Type: | Base |
|-----------------|--------------------------------------|
| Name: | Whole Non-Fungible Token |
| Id: | 3c05a856-c901-4c30-917e-df9feed1c8de |
| Visual: | &tau_N<{<i>~d</i>}> |
| Tooling: | tN{~d} |
| Version: | 1.0 |

Definition

Every non-fungible token is unique. A non-fungible token is not interchangeable with other tokens of the same class but have some shared properties while also having unique property values between instances. These tokens are whole tokens and can have quantities greater than 1 and also could support variable supply.

Example

CryptoKitties, Art, Reserved Seat for an event.

Analogy

| 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 |

Incompatible With

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

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |

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: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 1 |
| 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

Analogy

| 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 | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| 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-subdivisible is common for items where subdivision does not make sense, like a property title, inventory item or invoice.

Analogy

| 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 | File Name | File Content |
|----------------|------------------------|--------------|
| Type | | |
| Control | non-subdivisible.proto | |

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-Subdivisible

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.

Analogy

| 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

Template Value: 0

Invocations

GetDecimals

Id: 2ca7fb2-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 |
|----------|-------|
| Decimals | 0 |

Response

Control Message: GetDecimalsResponse

Description: Return 0

Parameters

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

Properties

Non-transferable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6afd-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |

Definition

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogy

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| Control | non-transferable.proto | |

| | | |
|-----|---------------------|--|
| Uml | non-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

Non-transferable

Taxonomy Symbol: ~t

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogies

| Name | Description |
|---------|--|
| Diploma | A diploma from an educational institution is not transferable to another party |

| | |
|----------------|--|
| | that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Is External: True

Constructor:

Non-transferable responds to these Invocations

Properties

Burnable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|------|-------------|
| | |

| | |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|-----------|--------------|-----------------|---|
| SourceCod | Open Zeppeli | EthereumSolidit | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.s |

| | | | |
|---|---|---|----|
| e | n | y | ol |
|---|---|---|----|

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is |

| | |
|--|-----------|
| | redeemed. |
|--|-----------|

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

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Roles

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| | | |

| Type | | |
|---------|-------------|--|
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

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| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

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

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: LogViewer

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

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

| | |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id:

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id:

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id:

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Logable

| Type: | Behavior |
|-------|----------|
| Name: | Logable |

Id: 9c8c2373-cf3c-4743-932a-03fee6a192fe

Visual: <i>|</i>

Tooling: |

Version: 1.0

Definition

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

Example

You may want to record certain actions like validations or external uses of a token or asset into a token log.

Analogy

| Name | Description |
|------------------|---|
| Media Use | You may create a token for a video or song and want to log each time it is played or viewed. |
| Audit Log | You may want to create a token for auditing external events, like a access control log that record what user access some resource. Access to the resource can be blocked if the log token is unable to record the access. |

Dependencies

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

| | | |
|--------------------|-------|---|
| PropertySet | phLog | Logable requires the log property-set for its data structure. The invocations in this behavior control the property set. |
|--------------------|-------|---|

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
|---------------|--------|----|

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------|--------------|
| Type | | |
| Control | logable.proto | |
| Uml | logable.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

Logable

Taxonomy Symbol: |

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

Example

You may want to record certain actions like validations or external uses of a token or asset into a token log.

Analogies

| Name | Description |
|------------------|---|
| Media Use | You may create a token for a video or song and want to log each time it is played or viewed. |
| Audit Log | You may want to create a token for auditing external events, like a access control log that record what user access some resource. Access to the resource can be blocked if the log token is unable to record the access. |

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

Logable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntry

Id: 00e91598-b162-47d7-8636-baac251e98e7

Description: A request to retrieve a specific Entry by its unique identifier.

Request Message:

GetEntryRequest

Description: Fetch a log entry by its entryId only.

Request Parameters

| Name | Value |
|------------|----------------------------------|
| Identifier | Id of the Log Entry to retrieve. |

Response Message

GetEntryResponse

Description: The matching entry response

Response Parameters

| Name | Value |
|-------|--|
| Entry | A response containing the specific log entry if found. |

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetLastEntry

Id: 589c478d-8852-4237-b559-6414e54ecbb2

Description: A request to retrieve the last log entry needing no parameters.

Request Message:

GetLastEntryRequest

Description: The request

Request Parameters

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

Response Message

GetLastEntryResponse

Description: The response

Response Parameters

| Name | Value |
|-------|--|
| Entry | Response containing the last log entry if it exists. |

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntrySeries

Id: 7af943cc-03ec-49c1-bed6-450ac624d8d3

Description: A request retrieve all the log entries for a particular series by SeriesId.

Request Message:

GetEntrySeriesRequest

Description: The request

Request Parameters

| Name | Value |
|----------|--------------------------------|
| SeriesId | Id for the series to retrieve. |

Response Message

GetEntrySeriesResponse

Description: The response

Response Parameters

| Name | Value |
|---------|---|
| Entries | A response containing a list of all the log entries for the requested SeriesId, if found. |

CreateEntrySeries

Id: dc7e0ec1-32f7-4930-9a8d-a9a29dc6c5c6

Description: A request create a series of log entries.

Request Message:

CreateEntrySeriesRequest

Description: When invoked, a seriesId should be generated.

Request Parameters

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

Response Message

CreateEntrySeriesResponse

Description: Return the generated seriesId

Response Parameters

| Name | Value |
|----------|---|
| SeriesId | A response containing a unique SeriesId that should be set for each entry's RecordEntryRequest message in the series. |

RecordEntry

Id: 0f0f0983-1b14-479d-bcb6-18be7e19b313

Description: A request to record an log entry.

Request Message:

RecordEntryRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---|
| SeriesId | The seriesId for the event. If blank a common series could be used like all zeros or a 1. |
| Entry | Data to be logged like bytes or a string . |

Response Message

RecordEntryResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|---|
| Confirmation | A confirmation of recording the entry including |

Properties

Logable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Logable |
| Id: | 9c8c2373-cf3c-4743-932a-03fee6a192fe |
| Visual: | <i>I</i> |
| Tooling: | I |
| Version: | 1.0 |

Definition

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

Example

You may want to record certain actions like validations or external uses of a token or asset into a token log.

Analogy

| Name | Description |
|-----------|---|
| Media Use | You may create a token for a video or song and want to log each time it is played or viewed. |
| Audit Log | You may want to create a token for auditing external events, like a access control log that record what user access some resource. Access to the resource can be blocked if the log token is unable to record the access. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|--|
| PropertySet | phLog | Logable requires the log property-set for its data structure. The invocations in this behavior control the property set. |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------|--------------|
| Type | | |
| Control | logable.proto | |
| Uml | logable.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

Logable

Taxonomy Symbol: |

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

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

Logable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntry

Id: 00e91598-b162-47d7-8636-baac251e98e7

Description: A request to retrieve a specific Entry by its unique identifier.

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GetEntryRequest

Description: Fetch a log entry by its entryId only.

Request Parameters

| Name | Value |
|------------|----------------------------------|
| Identifier | Id of the Log Entry to retrieve. |

Response Message

GetEntryResponse

Description: The matching entry response

Response Parameters

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|-------|--|
| Entry | A response containing the specific log entry if found. |

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|-----------|-----------------------------|
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Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
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| IsInRole | True/False |

GetLastEntry

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Description: A request to retrieve the last log entry needing no parameters.

Request Message:

GetLastEntryRequest

Description: The request

Request Parameters

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

Response Message

GetLastEntryResponse

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Response Parameters

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Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntrySeries

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Description: A request retrieve all the log entries for a particular series by SeriesId.

Request Message:

GetEntrySeriesRequest

Description: The request

Request Parameters

| Name | Value |
|----------|--------------------------------|
| SeriesId | Id for the series to retrieve. |

Response Message

GetEntrySeriesResponse

Description: The response

Response Parameters

| Name | Value |
|---------|---|
| Entries | A response containing a list of all the log entries for the requested SeriesId, if found. |

CreateEntrySeries

Id: dc7e0ec1-32f7-4930-9a8d-a9a29dc6c5c6

Description: A request create a series of log entries.

Request Message:

CreateEntrySeriesRequest

Description: When invoked, a seriesId should be generated.

Request Parameters

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

Response Message

CreateEntrySeriesResponse

Description: Return the generated seriesId

Response Parameters

| Name | Value |
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| SeriesId | A response containing a unique SeriesId that should be set for each entry's RecordEntryRequest message in the series. |

RecordEntry

Id: 0f0f0983-1b14-479d-bcb6-18be7e19b313

Description: A request to record an log entry.

Request Message:

RecordEntryRequest

Description: The request

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|----------|---|
| SeriesId | The seriesId for the event. If blank a common series could be used like all zeros or a 1. |
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RecordEntryResponse

Description: The response

Response Parameters

| Name | Value |
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Logable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Logable |
| Id: | 9c8c2373-cf3c-4743-932a-03fee6a192fe |
| Visual: | <i>I</i> |
| Tooling: | I |
| Version: | 1.0 |

Definition

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Analogy

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Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|--|
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Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|---------------|--------------|
| Type | | |
| Control | logable.proto | |
| Uml | logable.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

Logable

Taxonomy Symbol: |

A token class that implements this behavior will record log entries from its owner with a generic payload. These entries can be recorded stand alone and be given a unique identifier, EntryId, upon recording or these entries can be recorded in a series or group that will create a SeriesId and a EntryId, where all the entries will have a unique EntryId but have the same SeriesId. Log entries can be queried by their EntryId or you can request an entire series with the SeriesId. The last recorded entry can also be requested without an Id and you can also request entries from a starting point to a finish point. For example, you could request entries 100 through 125, which will return the entries starting at position 100 through 125 or the last entry recorded up to 125. To add entry query by any other property of the token, that property must be specifically defined and cannot be a property in the base token property list.

Example

You may want to record certain actions like validations or external uses of a token or asset into a token log.

Analogies

| Name | Description |
|-----------|---|
| Media Use | You may create a token for a video or song and want to log each time it is played or viewed. |
| Audit Log | You may want to create a token for auditing external events, like a access control log that record what user access some resource. Access to the resource can be blocked if the log token is unable to record the access. |

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

Logable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntry

Id: 00e91598-b162-47d7-8636-baac251e98e7

Description: A request to retrieve a specific Entry by its unique identifier.

Request Message:

GetEntryRequest

Description: Fetch a log entry by its entryId only.

Request Parameters

| Name | Value |
|------------|----------------------------------|
| Identifier | Id of the Log Entry to retrieve. |

Response Message

GetEntryResponse

Description: The matching entry response

Response Parameters

| Name | Value |
|-------|--|
| Entry | A response containing the specific log entry if found. |

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetLastEntry

Id: 589c478d-8852-4237-b559-6414e54ecbb2

Description: A request to retrieve the last log entry needing no parameters.

Request Message:

GetLastEntryRequest

Description: The request

Request Parameters

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

Response Message

GetLastEntryResponse

Description: The response

Response Parameters

| Name | Value |
|-------|--|
| Entry | Response containing the last log entry if it exists. |

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: Check that the account is in the 'LogViewer' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

GetEntrySeries

Id: 7af943cc-03ec-49c1-bed6-450ac624d8d3

Description: A request retrieve all the log entries for a particular series by SeriesId.

Request Message:

GetEntrySeriesRequest

Description: The request

Request Parameters

| Name | Value |
|----------|--------------------------------|
| SeriesId | Id for the series to retrieve. |

Response Message

GetEntrySeriesResponse

Description: The response

Response Parameters

| Name | Value |
|---------|---|
| Entries | A response containing a list of all the log entries for the requested SeriesId, if found. |

CreateEntrySeries

Id: dc7e0ec1-32f7-4930-9a8d-a9a29dc6c5c6

Description: A request create a series of log entries.

Request Message:

CreateEntrySeriesRequest

Description: When invoked, a seriesId should be generated.

Request Parameters

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

Response Message

CreateEntrySeriesResponse

Description: Return the generated seriesId

Response Parameters

| Name | Value |
|----------|---|
| SeriesId | A response containing a unique SeriesId that should be set for each entry's RecordEntryRequest message in the series. |

RecordEntry

Id: 0f0f0983-1b14-479d-bcb6-18be7e19b313

Description: A request to record an log entry.

Request Message:

RecordEntryRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---|
| SeriesId | The seriesId for the event. If blank a common series could be used like all zeros or a 1. |
| Entry | Data to be logged like bytes or a string . |

Response Message

RecordEntryResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|---|
| Confirmation | A confirmation of recording the entry including |

Properties

EMONEY

Taxonomy Formula: tF{d,t,g,h,c,SC}

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|----------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Fractional | This token can be sub-divided or split into smaller units or parts based on a certain number of decimal places. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

The Emoney Token enables the issuance of regulated electronic money on blockchain networks, and its practical usage in real financial applications.

Example

Financial institutions work today with electronic systems which hold account balances in databases on core banking systems. In order for an institution to be allowed to maintain records of client balances segregated and available for clients, such institution must be regulated under a known legal framework and must possess a license to do so. Maintaining a license under regulatory supervision entails ensuring compliance (i.e. performing KYC on all clients and ensuring good AML practices before allowing transactions) and

demonstrating technical and operational solvency through periodic audits, so clients depositing funds with the institution can rest assured that their money is safe.

Emoney is:

- Subdividable
- Transferable
- Delegable
- Holdable
- Compliant
- Burnable
- Roles
- Mintable

Emoney Details

Fractional Fungible

| | |
|----------|--------------------------------------|
| Type: | Base |
| Name: | Fractional Fungible |
| Id: | 89ca6daf-5585-469e-abd1-19bc44e7a012 |
| Visual: | τ_F{<i>d</i>} |
| Tooling: | tF{d} |
| Version: | 1.0 |

Definition

Fractional Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. Similar to physical cash money, a crypto currency is an example of a fungible token that is sub-dividable.

Example

Fiat currency is the most widely understood example of a fractional fungible item. A fractional fungible is subdividable, so you can 'make change'.

Analogies

| Name | Description |
|---------------------------------------|--|
| Physical Money or Cash | Cash, or fiat money, is freely accepted between parties and can have varying denominations. Money has a face value, on a coin or bill, and can be summed together to represent higher value. It can be subdivided, making change, and consolidated from many smaller denominations to larger ones and still have the same value. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|-----------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|----------------|---------------------------|--------------|
| Type | | |
| Control | fractional-fungible.proto | |
| Uml | fractional-fungible.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: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Fractional |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |
| Decimals: | 2 |
| Constructor Name: | Constructor |

Behaviors

Subdividable

| Type: | Behavior |
|--------------|--------------------------------------|
| Name: | Subdividable |
| Id: | 6e3501dc-5800-4c71-b59e-ad11418a998c |

| | |
|-----------------|----------|
| Visual: | <i>d</i> |
| Tooling: | d |
| Version: | 1.0 |

Definition

An ability for the token to be subdivided from a single whole token into fractions, which are represented as decimal places. Any value greater than 0 will indicate how many fractions are possible where the smallest fraction is also the smallest ownable unit of the token.

Example

Sub-dividable is common for crypto-currencies or tokens of fiat currency. For example, the US Dollar is sub-dividable to 2 decimal places, where a value like .42 is possible. Bitcoin, is sub-dividable up to 8 decimal places.

Analogy

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

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

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

Subdividable

Taxonomy Symbol: d

An ability for the token to be subdivided from a single whole token into fractions, which are represented as decimal places. Any value greater than 0 will indicate how many fractions are possible where the smallest fraction is also the smallest ownable unit of the token.

Example

Sub-dividable is common for crypto-currencies or tokens of fiat currency. For example, the US Dollar is sub-dividable to 2 decimal places, where a value like .42 is possible. Bitcoin, is sub-dividable up to 8 decimal places.

Analogies

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

Is External: True

Constructor:

Subdividable responds to these Invocations

Properties

Name: Decimals

Value Description: Set to Two, mirroring the decimals used in most fiat currencies

Template Value: 2

Invocations

GetDecimals

Id: 01f7ef04-1215-45f1-b118-12b4a76db9ad

Description: Return the value

Request

Control Message: GetDecimalsRequest

Description:

Parameters

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

Response

Control Message: GetDecimalsResponse

Description: Return number of decimal places

Parameters

| Name | Value |
|----------|---------|
| Decimals | integer |

GetDecimals

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

Description: Should return 2

Request

Control Message: GetDecimalsRequest

Description:

Parameters

| Name | Value |
|----------|---------|
| Decimals | integer |

Response

Control Message: GetDecimalsResponse

Description: Return 2

Parameters

| Name | Value |
|----------|-------|
| Decimals | 2 |

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

Analogy

| 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 | [] |

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

Delegable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Delegable |
| Id: | a3d02076-6009-4a65-9ed4-2deffe5291e1 |
| Visual: | <i>g</i> |
| Tooling: | g |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogy

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------------|--------------|
| Type | | |
| Control | delegable.proto | |
| Uml | delegable.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

Delegable

Taxonomy Symbol: g

A token class that implements this behavior will support the delegation of certain behaviors to another party or account to invoke them on the behalf of the owner. When applied to a token, behaviors that are Delegable will enable delegated request invocations. This is useful to provide another party to automatically be able to perform the behaviors that can be delegated without seeking permission up to a certain allowance.

Example

Analogies

| Name | Description |
|--------|--|
| Broker | You may allow a broker to transfer your tokens as a part of an investment strategy. Setting an allowance can cap the total number of tokens the broker is allowed to perform delegated behaviors, when exceeded a new allowance request will need to be granted. |

Comments

Applied to behaviors that are Delegable.

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

Delegable responds to these Invocations

Allowance

Id: 2e0fd8e5-2090-4c62-b094-232c32a78022

Description: A Request by a party or account to the owner of a token(s) to have the right to perform a delegated behavior on their behalf.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |

Response Message

AllowanceResponse

Description: The response

Response Parameters

| Name | Value |
|--------------|--|
| Confirmation | A confirmation receipt or denial be returned to the allowance requestor. |

Approve Allowance

Id: 6d5df99d-2f5e-4c7a-aea4-d2d54176abfd

Description: Same control message as the AllowanceRequest. This could allow for an AllowanceRequest to be forwarded to multiple parties needed to Approve and shield this from the requestor. When all Approvals are obtained, an AllowanceResponse could be sent.

Request Message:

AllowanceRequest

Description: The request

Request Parameters

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

| | |
|-----------------|---------------------------------|
| Quantity | Number of Tokens to be allowed. |
|-----------------|---------------------------------|

Response Message

ApproveResponse

Description: The response

Response Parameters

| Name | Value |
|---------------------|--|
| Confirmation | A confirmation response from the owner approving the an allowance request, indicating a allowance quantity the requestor has the option to invoke the Delegable behaviors on the token(s). |

Properties

Holdable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Holdable |
| Id: | 9d137226-b7b0-4d3e-9e82-4d27d4227fba |
| Visual: | <i>h</i> |
| Tooling: | h |
| 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. A hold specifies a payer, a payee, a maximum amount, a notary and an expiration time. When the hold is created, the specified token balance from the payer is put on hold. A held balance cannot be transferred until the hold is either executed or released. The hold can only be executed (partially or the full amount) by the notary, which triggers the transfer of the tokens from the payer to the payee. If a hold is released, either by the notary at any time, or by anyone after the

expiration, no transfer is carried out and the amount is available again for the payer. This behavior is Delegable. If the token definition is Delegable, HoldFrom will be available.

Example

When checking in a hotel, the hotel will put a hold on the guest's account to ensure that enough balance is available to pay for the room before handing over the keys.

Analogies

| Name | Description |
|--------|---|
| Escrow | Holds are similar to escrows in that are firm and lead to final settlement. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|---------------------------------------|
| Behavior | t | Holds require transfers to be allowed |

Incompatible With

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

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| If the token is Delegable, HoldFrom should be enabled. | g | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|-------------------------|------------------|---|
| SourceCode | Standard Implementation | EthereumSolidity | https://github.com/loBuilders/holdable-token/blob/master/contracts/Holdable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Holdable

Taxonomy Symbol: h

Every token instance has an owner. The Transferable behavior provides the owner the ability to transfer the ownership to another party or account. A hold specifies a payer, a payee, a maximum amount, a notary and an expiration time. When the hold is created, the specified token balance from the payer is put on hold. A held balance cannot be transferred until the hold is either executed or released. The hold can only be executed (partially or the full amount) by the notary, which triggers the transfer of the tokens from the payer to the payee. If a hold is released, either by the notary at any time, or by anyone after the expiration, no transfer is carried out and the amount is available again for the payer. This behavior is Delegable. If the token definition is Delegable, HoldFrom will be available.

Example

When checking in a hotel, the hotel will put a hold on the guest's account to ensure that enough balance is available to pay for the room before handing over the keys.

Analogies

| Name | Description |
|--------|---|
| Escrow | Holds are similar to escrows in that are firm and lead to final settlement. |

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

Holdable responds to these Invocations

Hold

Id: 6cc942c8-afa4-4bab-9737-27a0b7b24a5b

Description: Request the create a hold on behalf of the owner of the token in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request Message:

HoldRequest

Description: The request

Request Parameters

| Name | Value |
|------------------|--|
| OperationId | An unique ID to identify the hold |
| To | AccountId to transfer ownership of token(s) to after the hold is executed. |
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

Response Message

Hold Response

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 hold request. |

HoldFrom

Id: 67f2d012-5b2d-46bc-8ee7-befdf90f66d8

Description: Request to create a hold on behalf of the party or account provided in the From field in favor of to the party or account provided in the To field of the request. It specifies a notary who is responsible to either execute or release the hold.

Request Message:

TransferFromRequest

Description: The request

Request Parameters

| Name | Value |
|-------------------------|--|
| OperationId | An unique ID to identify the hold |
| From | AccountId on which behalf the hold should be created. |
| To | AccountId to transfer ownership of token(s) to after the hold is executed. |
| Notary | AccountId of the notary |
| Quantity | Number of tokens to be put on hold. |
| TimeToExpiration | The duration until the hold is expired. If it is '0' the hold must be perpetual. |

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 hold from request. |

ExecuteHold

Id: 4946eea9-c59e-4192-9115-2ba57821936c

Description: Request to execute a hold. Execute means that the specified value is transferred the owner of the token in favor of to the party or account provided in the To field of the Hold / HoldFrom request. If the specified value is less than the hold value the remaining amount is available again to the owner of the tokens. Only the account specified in the Notary field of the Hold / HoldFrom request can make a successful request.

Request Message:

ExecuteHoldRequest

Description: The request

Request Parameters

| Name | Value |
|--------------------|-------------------------------------|
| OperationId | An unique ID to identify the hold |
| Quantity | Number of tokens to be put on hold. |

Response Message

ExecuteHoldResponse

Description: The response

Response Parameters

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

ReleaseHold

Id: d07c8a5a-be40-479c-aa0d-7ac80b7ca9b3

Description: Request to release a hold. Release means that the transfer is not executed and the held amount is available again for the owner of the token. Until a hold has expired it can only be released by the notary or the party or account provided in the To field of the Hold / HoldFrom request. After it has expired it can be released by any account.

Request Message:

ReleaseHoldRequest

Description: The request

Request Parameters

| Name | Value |
|-------------|-----------------------------------|
| OperationId | An unique ID to identify the hold |

Response Message

ReleaseHoldResponse

Description: The response

Response Parameters

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

Properties

Compliant

| Type: | Behavior |
|---------|--------------------------------------|
| Name: | Compliant |
| Id: | 03dd1c48-dfdb-4ec1-86c8-69c3abac76b7 |
| Visual: | <i>c</i> |

Tooling:

c

Version:

1.0

Definition

A regulated token needs to comply with several legal requirements, especially KYC and AML. If the necessary checks have to be made off-chain the token transfer becomes centralized. Further the transfer in this case takes longer to complete as it can not be done in one transaction, but requires a second confirmation step. A compliant token fulfills all legal requirements on-chain without interaction from an off-chain entity

Example

When doing a bank transfer the transaction is checked by the involved banks according to legal requirements. A compliant token can

Analogies

| Name | Description |
|------|-------------|
| | |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| Type | | |
| | | |

| | | |
|----------------|-----------------|--|
| Control | compliant.proto | |
| Uml | compliant.md | |

Code Map

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

Implementation Map

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

Resource Map

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

Specification Behavior

Compliant

Taxonomy Symbol: c

A regulated token needs to comply with several legal requirements, especially KYC and AML. If the necessary checks have to be made off-chain the token transfer becomes centralized. Further the transfer in this case takes longer to complete as it can not be done in one transaction, but requires a second confirmation step. A compliant token fulfills all legal requirements on-chain without interaction from an off-chain entity

Example

When doing a bank transfer the transaction is checked by the involved banks according to legal requirements. A compliant token can

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

Compliant responds to these Invocations

CheckTransferAllowed

Id: 3f591127-0508-445b-b449-4adc3d8d90e9

Description: Checks if the transfer request is allowed to be executed with the given parameters.

Request Message:

CheckTransferAllowedRequest

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

CheckTransferAllowedResponse

Description: The response

Response Parameters

| Name | Value |
|--------|---|
| Result | A boolean value whereas true means the transfer is allowed and false means it is not. |

CheckMintAllowed

Id: 0323b374-71af-48f6-93ff-2a63366267db

Description: Checks if the mint request is allowed to be executed with the given parameters.

Request Message:

CheckMintAllowedRequest

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of tokens to transfer. |

Response Message

CheckMintAllowedResponse

Description: The response

Response Parameters

| Name | Value |
|--------|--|
| Result | A boolean value whereas true means the minting request is allowed and false means it is not. |

CheckBurnAllowed

Id: 8edffc4d-d14e-4a98-8c96-338835d5534c

Description: Checks if the burn request is allowed to be executed with the given parameters.

Request Message:

CheckBurnAllowedRequest

Description: The request

Request Parameters

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

Response Message

CheckMintAllowedResponse

Description: The response

Response Parameters

| Name | Value |
|---------------|---|
| Result | A boolean value whereas true means the burn request is allowed and false means it is not. |

Properties

Burnable

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|--------------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should |

| | |
|---------------|--|
| | burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and verified before a Burn request or a BurnFrom request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|-------------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

| | |
|---------------------|-------|
| Is External: | False |
| Constructor: | |

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|-----------------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

Properties

Roles

| Type: | Behavior |
|-----------------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogy

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-----------|--------------|
| | | |

| Type | | |
|---------|-------------|--|
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

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

| | |
|-----------------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|----------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|-------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |

| | |
|-----------------|----------|
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but it's delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogy

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

| | | |
|--|---|-----|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|--------------|------------------|---|
| SourceCode | OpenZeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|--------------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |
| Is External: | False |
| Constructor: | |

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|----------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogies

| Name | Description |
|--------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content | File Name | File Content |
|---------|----------------------|--------------|
| Type | | |
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.

EEA-REPUTATION

Taxonomy Formula: tF{~d,~t,SC}

Token Specification Summary

Token Classification

| Template Type: | SingleToken | This token has no sub or child tokens. |
|-----------------------------|-------------|--|
| Token Type: | Fungible | Tokens have interchangeable value with one another, where any quantity of them has the same value as another equal quantity if they are in the same class or series. |
| Token Unit: | Whole | There can be many instances of this token, but they cannot be subdivided. |
| Value Type: | Intrinsic | This token is purely a digital token represents value directly, it represents no external physical form and cannot be a receipt or title for a material item or property. |
| 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. |

EEA Reputation Tokens are issued, upon vesting, to an organization's contributors establishing an individual's reputation. The token grant should be adjusted when commitments are met or before vesting indicating the split of reputation tokens by percentage to the contributors listed in the grant. The reputation split between contributors is finalized when the grant vests. Both Reward and Penalty tokens are matched 1-1 towards Reputation with the ability to improve or damage an individual's reputation. An individual's reputation cannot be negative so penalties will subtract 1-1 until exhausted or the account balance reaches 0. The reputation score of an organization is the sum of their

contributor's balances. These tokens are lifetime tokens and are not transferable for any member that has earned them. EEA Reputation tokens are minted and burned but are not redeemable.

Example

For example, if an organization collects 10,000 tokens during its annual membership cycle, they can redeem the EEA Rewards tokens for say \$10,000 credit to its membership, or continue to accumulate. In addition, if the organization's lifetime membership EEA Reputation tokens total was 100,000 at the beginning of the membership cycle, it would be 110,000 at the end of the cycle in this example. In addition, 10,000 points would be split across the organization's employees who earned them.

Analogies

| Name | Description |
|----------------|---|
| Earned Credits | A customer can earn a point/token for each mile travelled and then redeem these points/tokens for upgrades or new tickets, but cannot transfer the points to another party. |

EEA-Reputation is:

- Non-Subdividable
- Non-transferable
- Burnable
- Roles
- Mintable

EEA-Reputation Details

Whole Fungible

| | |
|----------|-------------------------------------|
| Type: | Base |
| Name: | Whole Fungible |
| Id: | b1eacf8-35d8-454a-b1af-92eb0b6f45d4 |
| Visual: | τ_F>{<i>~d</i>} |
| Tooling: | tF{~d} |
| Version: | 1.0 |

Definition

Whole Fungible tokens have interchangeable value with each other, where any owned sum of them from a class has the same value as another owned sum from the same class. A whole token cannot be sub-divided so it doesn't support the notion of 'making change'.

Example

An inventory item or SKU, where an item is treated as a whole because it makes no sense to own a fraction of a SKU or loyalty point.

Analogy

| Name | Description |
|---------------------------------------|--|
| Loyalty Points | Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers. |
| General Admission Movie Ticket | Purchasing a general admission ticket to a movie only allows for you to have a seat, but the seat that you actually get depends on factors like when you arrive. You're not likely to want to share a seat with another adult. |

Dependencies

| Artifact Type | Symbol | Description |
|---------------|--------|-----------------------|
| Base | t | Base Token Definition |

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | ~d | d5807a8e-879b-4885-95fa-f09ba2a22172 |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|-------------|----------------------|--------------|
| Type | | |
| Control | whole-fungible.proto | |
| Uml | whole-fungible.md | |

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------------------|------------------|---|
| SourceCode | Solidity Reputation Token | EthereumSolidity | https://github.com/EntEthAlliance/Trusted-Token/blob/develop/contracts/ReputationToken.sol |

Implementation Map

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

Resource Map

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

Base Details

| | |
|-----------------------------|-----------|
| Token Name: | |
| Token Type: | Fungible |
| Representation Type: | Common |
| Value Type: | Intrinsic |
| Token Unit: | Whole |
| Symbol: | |
| Owner: | |
| Quantity: | 0 |

| | |
|--------------------------|-------------|
| Decimals: | 0 |
| Constructor Name: | Constructor |

Behaviors

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-subdividable 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.

Analogy

| 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 | File Name | File Content |
|---------|------------------------|--------------|
| Type | | |
| 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.

Analogy

| 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

Non-transferable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Non-transferable |
| Id: | a4fa4ca8-6af8-452b-91f5-7103b6fee5e5 |
| Visual: | <i>~t</i> |
| Tooling: | ~t |
| Version: | 1.0 |

Definition

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogies

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | t | af119e58-6d84-4ca6-9656-75e8d312f038 |

Influenced By

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

Artifact Files

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

Non-transferable

Taxonomy Symbol: ~t

Every token instance has an owner. The Non-transferable behavior prevents the owner of a token from changing.

Example

A vote token, for a citizen in a public election would be non-transferable.

Analogies

| Name | Description |
|----------------|---|
| Diploma | A diploma from an educational institution is not transferable to another party that can claim to have earned the diploma. |
| Airline Ticket | Due to security restrictions at airports and airlines, tickets can only be used by the person they were issued to. |

Is External: True

Constructor:

Non-transferable responds to these Invocations

Properties

Burnable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Burnable |
| Id: | 803297a1-c0f9-4898-9d44-29c9d41cca97 |
| Visual: | <i>b</i> |
| Tooling: | b |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token, but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogy

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Delegable or not, will determine if the BurnFrom Control will be available in the implementation. | g | [] |
| If Compliance is present, a CheckBurnAllowed request has to be made and | c | [] |

verified before a Burn request or a BurnFrom request.

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Burnable.sol |

Implementation Map

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

Resource Map

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

Specification Behavior

Burnable

Taxonomy Symbol: b

A token class that implements this behavior will support the burning or decommissioning of token instances of the class. This does not delete a token,

but rather places it in a permanent non-use state. Burning is a one way operation and cannot be reversed. This behavior is Delegable. If the token definition is Delegable, BurnFrom will be available.

Example

When a token is used in a certain way, you may want to remove it from circulation or from being used again. Since the ledger doesn't allow for deletions, burning a token essentially 'deletes' the token from being used, but not from history.

Analogies

| Name | Description |
|-------------|---|
| Oil Barrels | If you mint a new token for each barrel of oil created, you may transfer ownership several times until the barrel is refined. The refining process should burn the barrel of oil to remove it from circulation. |
| Redeem | A token that is a coupon or single use ticket, should be burned when it is redeemed. |

Is External: False

Constructor:

Burnable responds to these Invocations

Burn

Id: f063dcaa-49f9-4c49-bf0f-2766301e1033

Description: A request to burn a token instance(s) in the class by the owner of the token instance(s).
Optional Quantity field in the request.

Request Message:

BurnRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnResponse

Description: The response from the request to burn.

Response Parameters

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

BurnFrom

Id: 49b53152-3360-426f-9e0a-24a0b4e7c881

Description: Requires Delegable. A request to burn token instance(s) in the class by a party or account that has allowance to do so. Requires a From and Quantity fields in the request.

Request Message:

BurnFromRequest

Description: The request to Burn or Retire tokens.

Request Parameters

| Name | Value |
|----------|--|
| From | AccountId from which tokens are burnt |
| Quantity | The number of tokens to burn, might not apply to the implementation. |

Response Message

BurnFromResponse

Description: The response from the request to burn.

Response Parameters

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

| | |
|---------------------|--|
| Confirmation | A confirmation receipt or error may be returned to the invoker based on the outcome of the burn from request |
|---------------------|--|

Properties

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Roles |
| Id: | c32726da-9787-4dd8-8de3-d07d1733d0f6 |
| Visual: | <i>r</i> |
| Tooling: | r |
| Version: | 1.0 |

Definition

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

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

Artifact Files

| Content | File Name | File Content |
|---------|-------------|--------------|
| Type | | |
| Control | roles.proto | |
| Uml | roles.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

Roles

Taxonomy Symbol: r

A token can have behaviors that the class will restrict invocations to a select set of parties or accounts that are members of a role or group. This is a generic behavior that can apply to a token many times to represent many role definitions within the template. This behavior will allow you to define what role(s) to create and what behavior(s) to apply the role to in the TemplateDefinition.

Example

Analogies

| Name | Description |
|---------|--|
| Minters | A role called 'Minters' for a token can have accounts in the role. The MintTo behavior invocation will be bound to the role check to ensure only account in the 'Minters' role are allowed to mint new instances in the class. |

Comments

Roles has a constructor control that creates roles and applies them to certain behaviors of the token at creation of the class from the template.

| | |
|--------------|-------|
| Is External: | False |
| Constructor: | |

Roles responds to these Invocations

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Internal invocation when the applied behavior is called to check if the requestor is a member of the role.

Request Message:

IsInRole

Description: The request

Request Parameters

| Name | Value |
|------------------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: The response

Response Parameters

| Name | Value |
|-----------------|------------|
| IsInRole | True/False |

Properties

Name: Role

Value Description: A group or list an account can be a member or be in.

Template Value: Minters

Invocations

GetRoleMembers

Id:

Description: Request the the list of member accounts in the role.

Request

Control Message: GetRoleMembersRequest

Description: The request

Parameters

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

Response

Control Message: GetRoleMembersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be added to the role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|--|
| RoleName | Name of the role you are adding a member to. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|--|
| RoleName | Name of the role you are checking membership of. Optional parameter if there is only one role. |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|---------------|----------------|
| InRole | True or False. |

GetMinters

Id:

Description: Request the the list of member accounts in the 'Minters' role.

Request

Control Message: GetMintersRequest

Description: The request

Parameters

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

Response

Control Message: GetMintersResponse

Description: The response

Parameters

| Name | Value |
|---------|---|
| Members | Returning the list of accounts in the 'Minters' role. |

AddRoleMember

Id: 600357f8-0499-47f8-87a5-eedf4ad034af

Description: Add a member to the group or role property.

Request

Control Message: AddRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|----------------|---|
| RoleName | Value is always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be added to the 'Minters' role. |

Response

Control Message: AddRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|-------|----------------|
| Added | True or False. |

RemoveRoleMember

Id: 97e160bb-6c60-4f1d-923b-813b07b89638

Description: Remove a member to the group or role property.

Request

Control Message: RemoveRoleMemberRequest

Description: The request

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always set to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be removed from the role. |

Response

Control Message: RemoveRoleMemberResponse

Description: The response

Parameters

| Name | Value |
|--------------|----------------|
| Added | True or False. |

IsInRole

Id: e42b1b16-074a-4d7d-b9f9-f69a2397a21b

Description: Check to see if an account is in the role.

Request

Control Message: IsInRoleRequest

Description: The request may be internal only and not exposed externally.

Parameters

| Name | Value |
|-----------------------|---|
| RoleName | Always be bound to 'Minters' |
| AccountAddress | Address, name or identifier of the account to be checked. |

Response

Control Message: IsInRoleRequestResponse

Description: The response

Parameters

| Name | Value |
|--------|----------------|
| InRole | True or False. |

Properties

Mintable

| Type: | Behavior |
|----------|--------------------------------------|
| Name: | Mintable |
| Id: | f9224e90-3cab-45bf-b5dc-0175121e2ead |
| Visual: | <i>m</i> |
| Tooling: | m |
| Version: | 1.0 |

Definition

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|----|
| | | |

Influenced By

| Description | Symbol | Applies To |
|--|--------|------------|
| Roles is common to implement to provide authorization checks for invoking the behavior. Highly Recommended that Role restrictions be applied to MintTo invocations. | r | [] |
| If Compliance is present, a CheckMintAllowed request has to be made and verified before a Mint request or a MintTo request. | c | [] |

Artifact Files

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

Code Map

| Map Type | Name | Platform | Location |
|------------|---------------|------------------|---|
| SourceCode | Open Zeppelin | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20Mintable.sol |

Implementation Map

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

| | | | |
|-----------------------|------------------|-------------|--|
| Implementation | Implementation 1 | ChaincodeGo | |
|-----------------------|------------------|-------------|--|

Resource Map

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

Specification Behavior

Mintable

Taxonomy Symbol: m

A token class that implements this behavior will support the minting or issuing of new token instances in the class. These new tokens can be minted and belong to the owner or minted to another account. This behavior may be invalidated by a restrictive behavior like Singleton, where only a single instance of the token can exist. Mintable is technically delegable, but its delegation should be controlled by a behavior like Roles.

Example

A consortium of oil producers needs to create tokens for each barrel of oil they are putting on the market to trade. There are separate classes of tokens for each grade of oil. Producers of barrels will need to have the ability to mint new tokens in order to facilitate the trading of them in the supply chain.

Analogies

| Name | Description |
|------|--|
| SKU | A token class can represent a particular item SKU, where the manufacturer of the item has the ability to mint or issue new inventory of the SKU into the supply chain. |

| | |
|--------------|-------|
| Is External: | False |
|--------------|-------|

Constructor:

Mintable responds to these Invocations

Binding Is Influenced by Roles's Invocation RoleCheckRoles's Invocation RoleCheck Intercepts this behavior's invocation.'

RoleCheck

Id: 00a665e3-1dda-441e-8262-5750435c153c

Description: Check to see if the account is in the Role called 'Minters'

Request Message:

IsInRole

Description: Checking the 'Minters' role.

Request Parameters

| Name | Value |
|-----------|-----------------------------|
| AccountId | AccountId of the requestor. |

Response Message

True/False

Description: Respond true if the account is in the 'Minters' role.

Response Parameters

| Name | Value |
|----------|------------|
| IsInRole | True/False |

MintTo

Id: 70499b23-a1dd-4c87-90d6-6e45400f28b5

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission to another party or account. Requires a To and Quantity fields in the request.

Request Message:

MintToRequest

Description: The request

Request Parameters

| Name | Value |
|-----------|-----------------------------------|
| ToAccount | Account Id to mint the tokens to. |
| Quantity | Number of new tokens to create. |

Response Message

MintToResponse

Description: The response

Response Parameters

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

Mint

Id: 3ddf15db-c919-4f72-a57b-d089931bc901

Description: A request to create new token instances in the class by the owner or a party or account in a role that is granted this permission. Minted tokens using this invocation will be owned by the owner or token pool account. Requires a Quantity field in the request.

Request Message:

MintRequest

Description: The request

Request Parameters

| Name | Value |
|----------|---------------------------------|
| Quantity | Number of new tokens to create. |

Response Message

MintResponse

Description: The response

Response Parameters

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

Properties

Supply Control

| | |
|-----------------|--------------------------------------|
| Type: | BehaviorGroup |
| Name: | Supply Control |
| Id: | 91cb89b6-a2ce-44ff-b3a0-f0cb3f117e56 |
| Visual: | <i>SC</i> |
| Tooling: | SC |
| Version: | 1.0 |

Definition

A token class that implements this behavior will provide controls to increase and decrease supply of tokens within the class. Additionally, it will include the ability to support a role, like Minters, that will be allowed to invoke the Mintable behavior. The owner can add accounts to the role and any account that is a member of the role will be able to mint tokens in the class.

Example

Analogies

| Name | Description |
|---------------------|--|
| Central Bank | Implementing monetary policy for this token. |

Comments

Define a Minters role and apply the role to the Mintable behavior.

Dependencies

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

Incompatible With

| Artifact Type | Symbol | Id |
|---------------|--------|--------------------------------------|
| Behavior | s | c1189d7a-e142-4504-bf26-44c35b76c9d6 |

Influenced By

| Description | Symbol | Applies To |
|---|--------|------------|
| Create a Minters Role and apply it to the Mintable behavior to provide authorization checks for invoking the behavior. | r | [] |

Artifact Files

| Content | File Name | File Content |
|-------------|----------------------|--------------|
| Type | | |
| Control | supply-control.proto | |
| Uml | supply-control.md | |

Code Map

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

Implementation Map

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

Resource Map

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

The behaviors belonging to this group are included in the Behaviors section of this specification.



