Bill-of-Lading

## Contributors

|  |  |
| --- | --- |
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### Taxonomy Formula: [tN{~d,t,c,SC}+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: | Whole | There can be many instances of this token, but they cannot be divided. |
| Value Type: | Reference | This token is a receipt or title to a material item, property or right. The token represents a reference to the value, can be owned or used digitally via its token. Sometimes referred to as a digital twin. |
| Representation Type: | Common | This token is simply represented as a balance or quantity attributed to an owner address where all the balances are recorded on the same balance sheet, like a bank account. All instances can easily share common properties and locating them is simple. |
| Supply: | Fixed | This token may issue an initial quantity upon creation, tokens cannot be removed or added to the supply. |

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. It is Whole by setting the Decimals property on the dividable behavior = 0. A token instance can be burned.

### Example

Non-divisible, transferable bills of lading for shipping with supply controls (minting, burning, and roles).

### Analogies

|  |  |
| --- | --- |
| Name | Description |
| Bill-of-Lading | Non-divisible, transferable bills of lading for shipping with supply controls (minting, burning, and roles). |

# Bill-of-Lading is:

* Indivisible
* Compliant
* Burnable
* Roles
* Transferable
* Mintable

### It includes the following Property Sets:

* File

# Bill-of-Lading Details

## Whole Non-Fungible Token

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

## Definition

Every non-fungible token is unique, but the class of a non-fungible token may be of the same type. A class of non-fungible tokens can be used to represent many tokens that share the same properties, but have different values for them. Meaning a non-fungible token is not interchangeable with other tokens of the same class but can have some shared properties and values while also having unique property values between token instances in the class. 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. |
| An Artists Collection | An artist may want to represent all their art in a single class of non-fungible tokens, where each token represents a unique piece of art what shared information about the artist between art works, but unique properties between tokens 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: | Reference |
| Token Unit: | Whole |
| Symbol: |  |
| Owner: |  |
| Quantity: | 100 |
| Decimals: | 0 |
| Constructor Name: | Constructor |

## Behaviors

## Specification Behavior

# Indivisible

### Taxonomy Symbol: ~d

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

### Example

Indivisible is common for items where division 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 divide. |

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

## 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 | indivisible.proto |  |
| Uml | indivisible.md |  |

## Code Map

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

## Implementation Map

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

## Resource Map

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

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

## Indivisible 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 |

## 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.

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

## 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 | 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 |

|  |  |
| --- | --- |
| 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. |

## 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. |

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

## 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 BurnFrom invocations. | r | [ ] |
| 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 | [ ] |
| If CO2 is present, an check to see if the adjustment window has expired must be made to ensure that burning or retiring is allowed. | phCO2 | [ ] |

## 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 |

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

## 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. |
| Burners | A role called 'Burners' for a token can have accounts in the role. The BurnFrom behavior invocation will be bound to the role check to ensure only account in the 'Burners' 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.

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

## 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 | Open Zeppelin - Roles | EthereumSolidity | https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/access/Roles.sol |

## Implementation Map

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

## Resource Map

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

|  |  |
| --- | --- |
| 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. |

## 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 |

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

## Dependencies

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

## Incompatible With

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

## 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 Transfer and TransferFrom invocations in situations where the recipient has to meet certain criteria (e.g. Beneficiaries). | r | [ ] |
| If the token is Delegable, TransferFrom should be enabled. | g | [ ] |
| If Compliance is present, a CheckTransferAllowed request has to be made and verified before a Transfer request or a TransferFrom request. | c | [ ] |
| If issuable is present, an AcceptTokenRequest from the token issuer, in response to a RequestTokens, has to be made and verified before a Transfer request. | i | [ ] |
| If offsetable is present, an check on if the token has been offset must be made and if it has, transfer should be denied. | off | [ ] |

## Artifact Files

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

## Code Map

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

## Implementation Map

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

## Resource Map

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

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

## Transferable responds to these Invocations

Binding Is Influenced by Compliant's Invocation CheckTransferAllowedCompliant's Invocation CheckTransferAllowed Intercepts this behavior's invocation.'

#### CheckTransferAllowed

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

Description: Check to see if the account has been whitelisted and KYC'd, by the custodian.

##### Request Message:

CheckTransferAllowedRequest

Description: Checking the whitelist.

###### 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. |

#### 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 dividable 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 dividable 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. |

## 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 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 be 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. |

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

## 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 Type | File Name | File Content |
| 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 |  |  |

|  |  |
| --- | --- |
| 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. |

## 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.

## Specification Property Set

## File

|  |  |
| --- | --- |
| Type: | PropertySet |
| Name: | File |
| Id: | 79d40648-02ba-4055-b700-01dce32196ec |
| Visual: | &phi;<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.

## Analogies

|  |  |
| --- | --- |
| 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 Type | File Name | File Content |
| 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 Representation Type | Description |
| Unique | Token instances can have unique or different values for this property set in the class. |

## Properties

### Property Name: File

Property Value Description: Contains the file for the token.

Template Value is set to:

## File responds to these Invocations