

# ISSUANCE

## Contributors

Name	Organization
Daniel Feichtinger	Digital Asset

Taxonomy Formula:  $tF'\{\sim d,t,i\}$

## 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:	Unique	Token instances are unique having their own identities and can be individually traced. Each unique token can carry unique properties that cannot be changed in one place and their balances must be summed. These are like bank notes, paper bills and metal coins, they are interchangeable but have unique properties like a serial number.

*This is a Whole Fungible Token with Fixed Supply, where a central party, the issuer, is the only one able to create/transfer/destroy tokens. Other parties can inspect (only their own) wallets, but may not transfer tokens directly; to do this they need to request the issuer to perform the action using a 'RequestTokens'*

*message. The issuer creates this token with an initial quantity that is fixed, and belong to the issuer. The issuer can then Authorize a wallet to hold tokens up to a maximum allowed amount. After a wallet is Authorized, it can request tokens from the issuer, who must then Approve the request that will then delegate/invoke transferable to transfer the tokens from the issuer's account to the authorized wallet.*

## Example

Provide a business example...

## Analogies

Name	Description
Shares	TBA: An analogy of shares...

## Issuance is:

- Non-Subdividable
- Transferable
- Issuable

## Issuance Details

### Unique Whole Fungible

Type:	Base
Name:	Unique Whole Fungible
Id:	2d291501-4cca-43cf-8330-e2440e58d7df
Visual:	&tau;<sub>F</sub>{<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
<b>Loyalty Points</b>	Most credit card or retail loyalty point programs deal with whole numbers so that redeeming points is easy to understand for their customers.
<b>General Admission Movie Ticket</b>	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		

<b>Control</b>	whole-fungible.proto	
<b>Uml</b>	whole-fungible.md	

## Code Map

Map Type	Name	Platform	Location
SourceCode	Digital Asset Token Issuance	Daml	<a href="https://github.com/digital-asset/ex-models/blob/master/issuertoken/daml/Main.daml">https://github.com/digital-asset/ex-models/blob/master/issuertoken/daml/Main.daml</a>

## Implementation Map

Map Type	Name	Platform	Location
Implementation	Digital Asset Token Issuance	Daml	<a href="https://github.com/digital-asset/ex-models/tree/master/issuertoken">https://github.com/digital-asset/ex-models/tree/master/issuertoken</a>

## Resource Map

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

## Base Details

<b>Token Name:</b>	
<b>Token Type:</b>	Fungible
<b>Representation Type:</b>	Unique
<b>Value Type:</b>	Intrinsic
<b>Token Unit:</b>	Whole
<b>Symbol:</b>	
<b>Owner:</b>	
<b>Quantity:</b>	0

<b>Decimals:</b>	0
<b>Constructor Name:</b>	Constructor

## Behaviors

### Non-Subdividable

Type:	Behavior
<b>Name:</b>	Non-Subdividable
<b>Id:</b>	d5807a8e-879b-4885-95fa-f09ba2a22172
<b>Visual:</b>	<i>~d</i>
<b>Tooling:</b>	~d
<b>Version:</b>	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
<b>Non-Fractional</b>	It is not possible to own a fraction of this token.
<b>Barrel of Oil</b>	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	

Draft

## 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
<b>Non-Fractional</b>	It is not possible to own a fraction of this token.
<b>Barrel of Oil</b>	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

Draft

## 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	[ ]
If issuable is present, an AcceptTokenRequest from the token issuer, in response to a RequestTokens, has to be made and verified before a Transfer request.	i	[ ]

## Artifact Files

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

## Code Map

Map Type	Name	Platform	Location
SourceCode	Code 1	Daml	

Draft

## 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: False

Constructor:

## Transferable responds to these Invocations

*Transfer*

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

Description: Transfer is invoked directly by issuers or indirectly through AcceptTokenRequest and is hidden from external. A transfer request will invoke a transfer from the owner of the token to the wallet provided in the To field of the request. This request also includes a value in the Amount field of the request to transfer

more than one token of the class in a single request. The transfer will fail if the recipient's wallet amount exceeds the wallet limit.

### 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
<b>From</b>	AccountId to transfer ownership from.
<b>To</b>	AccountId to transfer ownership to.
<b>Quantity</b>	Number of tokens to transfer.

## Response Message

TransferFromResponse

Description: The response

## Response Parameters

Name	Value
<b>Confirmation</b>	A confirmation receipt or error may be returned to the owner based on the outcome of the transfer from request.

## Properties

Type:	Behavior
<b>Name:</b>	Issuable
<b>Id:</b>	2068a5fb-90eb-4084-b5f4-1e74485e5c02
<b>Visual:</b>	<i>i</i>
<b>Tooling:</b>	i
<b>Version:</b>	1.0

## Definition

*This token has a controlling a central party, the issuer, is the only one able to create/transfer/destroy tokens. Other parties can inspect (only their own)*

*holdings, but may not transfer tokens; to do this they need to request the issuer to perform the action using a `RequestTokens` contract.*

## Example

A private issued stock which is not listed on any exchange may require the owner's permission to sell shares issued to the seller.

## Analogies

Name	Description
Private Issue Share	A private issue stock share...

## Dependencies

Artifact Type	Symbol	Description
Behavior	t	AcceptTokenRequest delegates to transferable in the issuance process.

## 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	[]

Draft

## Artifact Files

Content	File Name	File Content
Type		
Control	issuable.proto	
Uml	issuable.md	

## Code Map

Map Type	Name	Platform	Location
SourceCode	Digital Asset Token Issuance	Daml	<a href="https://github.com/digital-asset/ex-models/blob/master/issuertoken/daml/Main.daml">https://github.com/digital-asset/ex-models/blob/master/issuertoken/daml/Main.daml</a>

## Implementation Map

Map Type	Name	Platform	Location
Implementation	Digital Asset Token Issuance	Daml	<a href="https://github.com/digital-asset/ex-models/tree/master/issuertoken">https://github.com/digital-asset/ex-models/tree/master/issuertoken</a>

## Resource Map

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

## Specification Behavior

Issuable

### Taxonomy Symbol: i

*This token has a controlling a central party, the issuer, is the only one able to create/transfer/destroy tokens. Other parties can inspect (only their own) holdings, but may not transfer tokens; to do this they need to request the issuer to perform the action using a `RequestTokens` contract.*

## Example

A private issued stock which is not listed on any exchange may require the owner's permission to sell shares issued to the seller.

## Analogies

Name	Description
------	-------------

<b>Private Issue Share</b>	A private issue stock share...
----------------------------	--------------------------------

<b>Is External:</b>	True
<b>Constructor:</b>	

## Issuable responds to these Invocations

### *AuthorizeInvestor*

Id: e070f88f-6fa4-4749-b417-9ffaeae7f583

Description: A request to create a wallet limited to MaxTokens that can then request the issued tokens.

#### **Request Message:**

AuthorizeInvestorRequest

Description: The request

#### Request Parameters

Name	Value
AuthorizedAccountId	The account being authorized to request issued tokens.
MaxTokens	Maximum quantity of tokens the authorized account can request.

#### **Response Message**

AuthorizeInvestorResponse

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 authorization request.

### *RequestTokens*

Id: 2bf89c22-4bd4-4f1b-ad21-1bba37de13b3

Description: A request to receive issued tokens from the Issuer in response to an authorization.

### Request Message:

RequestTokensRequest

Description: The request

#### Request Parameters

Name	Value
Quantity	Number of issued tokens requested.

### Response Message

RequestTokensResponse

Description: The response

#### Response Parameters

Name	Value
RequestId	A confirmation receipt in the form of a RequestId that is used by the Issuer to Accept the request, correlating the request with the authorization.

### AcceptTokenRequest

Id: 6a5a549a-89d4-495c-b0da-02d2e4f8127b

Description: Once an AuthorizeInvestor is processed and the investor sends a RequestToken, this issuer of the token needs to AcceptTokenRequest to invoke the transfer method on the token.

### Request Message:

AcceptTokenRequest

Description: The request

#### Request Parameters

Name	Value
RequestId	RequestId from the TokenRequest.

<b>FromAccountId</b>	Account Id the TokenRequest came from.
<b>Quantity</b>	Number of new tokens to issue.

## Response Message

AcceptTokenResponse

Description: The response

### Response Parameters

Name	Value
<b>Confirmation</b>	A confirmation receipt or error may be returned to the invoker based on the outcome of accepting the request.

## Properties