# BOND

## Contributors

| Name | Organization |
|------|--------------|
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## Taxonomy Formula: tF{~d,t,c}

## 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:** | Reference | This token is a receipt or title to a material item, property or right. The value is referenced and the token represents it and can be owned or used digitally via its token. |
| **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 Fixed Supply Whole 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 subdividable behavior. A token instance can be burned.*

## Example

Fixed denomination, fungible, transferable off-chain security.

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf621

## Analogies

| Name | Description |
|------|-------------|
| **Bond** | Fixed denomination, fungible, transferable off-chain security. |

## Comments

Note that the quantity for the base token will be the only tokens created. The first implementation of this token issued 100 tokens.

## Bond is:

- Non-Subdividable
- Compliant
- Transferable

## Bond Details

### Whole Fungible

| Type: | Base |
|-------|------|
| **Name:** | Whole Fungible |
| **Id:** | b1eacdf8-35d8-454a-b1af-92eb0b6f45d4 |
| **Visual:** | &tau;<sub>F</sub>{<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. Your 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 |
|----------|------|----------|----------|

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf623

## Implementation Map

| Map Type | Name | Platform | Location |
|---|---|---|---|
| **Implementation** | Banco Santander, first end-to-end blockchain bond. | EthereumSolidity | https://www.santander.com/csgs/Satellite/CFWCSancomQP01/en_GB/Corporate/Press-room/2019/09/12/Santander-launches-the-first-end-to-end-blockchain-bond.html |

## Resource Map

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

## Base Details

| Token Name: | |
|---|---|
| **Token Type:** | Fungible |
| **Representation Type:** | Common |
| **Value Type:** | Reference |
| **Token Unit:** | Whole |
| **Symbol:** | |
| **Owner:** | |
| **Quantity:** | 100 |
| **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.

## Analogies

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

## Dependencies

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

## Incompatible With

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

## Influenced By

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

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf625

## 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

<h1 style="text-align:center; color:blue;">Non-Subdividable</h1>

## 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

## 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 |
|---|---|---|

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf629

## 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 |
|---|---|---|---|

## 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

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf6210

| 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.

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf6211

## 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

## 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 |
|------|-------------|

Bond - f58bb0b08d30e4a311274ac737d5301f3b461d4551f6dab9013d2c968774bf6213

| Analogy 1 | transferable analogy 1 description |
|---|---|

## Dependencies

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

## Incompatible With

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

## Influenced By

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

## Artifact Files

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

## Code Map

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

## Implementation Map

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

## Resource Map

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

## Specification Behavior

# Transferable

## Taxonomy Symbol: t

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

## Example

## Analogies

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

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

# Transferable responds to these Invocations

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, KYC, 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 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

| 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