Eluvio Content Fabric V2 Spec

2022

0 Definitions

Node A server which stores and serves parts.

Provider An individual or organization which owns, secures, and operates nodes.

Tenant An individual or organization which owns content.

Content A piece of data which is owned by a tenant.

Space A group of providers, provider nodes, and tenants, where providers agree to run nodes which store content owned by a tenant according to a common set of rules.

Part A part is a sequence of bytes stored in the space, referenced by its hash.

Content Object Version A collection of parts created by a tenant, referenced by its hash.

Content Object A collection of versions.

Library A 'folder' of content objects owned by a tenant with a permission structure that determines who within a tenancy is able to create/modify/delete content objects and content object versions.

KMS A tenant-owned server which holds keys for encrypting/decrypting content which the tenant stores in the space.

Blockchain A distributed ledger responsible for orchestrating cooperation between providers, the exchange of value between providers and tenants, and governance that determines the rules of a space.

The following entities are defined by fixed length identifiers as follows:

Entity	Identifier	Type
Node	$\texttt{ID}_{\texttt{node}}$	Fixed length byte string
Space	$\texttt{ID}_{\texttt{space}}$	Fixed length byte string
Content Object	$\texttt{ID}_{\texttt{conq}}$	Fixed length byte string
Content Object Version	$\texttt{ID}_{\texttt{version}}$	Fixed length byte string
KMS	$\texttt{ID}_{\texttt{kms}}$	Fixed length byte string
Library	$\texttt{ID}_{\texttt{lib}}$	Fixed length byte string

1 Space

The space functions as the top level governance structure of the fabric that orchestrates how providers cooperate to serve tenant data.

Spaces are identified by a fixed length $\texttt{ID}_{\texttt{space}}$.

1.1 Space rules

Provider Bond An amount, $\texttt{BOND}_{\texttt{prov}}$, of currency each provider must lock up in order to participate within the space. Funds can be slashed from here if a provider misbehaves.

2 Provider

A provider is a logical group of nodes within a space, and a permission structure for keys. When a provider is created, it is bootstrapped with an admin key $k_{\texttt{admin}}$ that has total control of the provider.

2.1 Permissions

Provider keys have the following permission levels, from most to least privileged

1. $\texttt{PERM}_{\texttt{root}}$ can do everything
2. $\texttt{PERM}_{\texttt{admin}}$ can add/remove nodes, bill tenants
3. $\texttt{PERM}_{\texttt{node}}$ can co-author versions with tenants

2.2 Blockchain actions

Create Provider$(k_{\texttt{origin}} = k_{\texttt{admin}}, \texttt{ID}_{\texttt{space}}, \texttt{ID}_{\texttt{prov}})$ Creates the provider

- TODO: check governance to see whether origin can create a provider
- Creates $\texttt{ID}_{\texttt{prov}}$ and sets its space to $\texttt{ID}_{\texttt{space}}$
- Sets $k_{\texttt{admin}}$ as the creator of $\texttt{ID}_{\texttt{prov}}$
- Sets $k_{\texttt{admin}}$ as a key for $\texttt{ID}_{\texttt{prov}}$ with level $\texttt{PERM}_{\texttt{root}}$
- Bonds $\texttt{BOND}_{\texttt{prov}}$ from $k_{\texttt{admin}}$ to the space under $\texttt{ID}_{\texttt{prov}}$

Add Node$(k_{\texttt{origin}}, \texttt{ID}_{\texttt{prov}}, \texttt{ID}_{\texttt{node}}, k_{\texttt{node}}, \texttt{LOC}_{\texttt{node}})$ adds a node

- Checks that $k_{\texttt{origin}}$ has permission $\texttt{PERM}_{\texttt{admin}}$ or above for $\texttt{ID}_{\texttt{prov}}$.
- Creates a node $\texttt{ID}_{\texttt{node}}$ with locator $\texttt{LOC}_{\texttt{node}}$
- Registers $k_{\texttt{node}}$ to $\texttt{ID}_{\texttt{prov}}$ with permission level $\texttt{PERM}_{\texttt{node}}$ [1]

[1] Should this error if the key already exists within the permissions scheme?