## Local Storage

A local storage (LS) is used to represent a work done by a user and then uploaded on the blockchain. Physically speaking it represents a study on a specific zone (inside a specific region). These elements have an ownership, rating and other details used to describe the work done.

An example of this would be a study done on […].

The following diagram represents a Local Storage in its structure.

OWNER\*

Status

Rating\*\*

Description

Local Storage

Other data

OWNER\* - This represents the owner of the storage, in Solidity this is implemented via a variable type named, *address*. It points to an Individual Account on the network. This value is set in the initial deployment of the contract and cannot be changed later on.

We assign an owner for each storage in order to avoid double-copies and to grant special Read/Write access to the contract. This assures that nobody else except the author of the work will be able to access sensitive information inside the storage (i.e. status, description or if it’s for sale, price).

Rating\*\* - This is the reputation of the work stored in this storage across the Global Storage in which it is saved.

Not only does this work as an incentive for users to upload a better work, but also a way to categorize any (geo) scientific based on their peer-reviews. Ratings are manipulated via user votes and a specific “Filtering Algorithm” used to restrict or grant specific access on a work based on its reviews.

Description - This is a generalized description of the work or study done in that area. It is used not only for users to recognize and create a general idea on what the material uploaded consists of but also for indexing and finding data uploaded in a certain region.

Status - This parameter indicated whether this storage is available anymore. It can be either set to True (if available) or False (otherwise).

Other data - In this field we can add additional information regarding the material uploaded. On the DGIS platform we use this space in order to assign a value (of Ether) which must be submitted in order to access the material.

We need to take into consideration that the material itself is not uploaded on the chain; instead we upload only its metadata. This allows us to take control over the work itself and edit it if need be.

## Individual Accounts

Every user is registered to the network as a “Streamer”, in this structure we store information regarding the user’s work uploaded as well as his/her reputation across the chain.

In the next diagram we present the structure of an Individual Account (Streamer).

Reputation\*\*

Uploaded Storages

OWNER\*

Individual Account

OWNER\* - In this case this address points to a wallet public address. It serves the same purpose of the field inside the LS element.

Reputation\*\* - This represents the user reputation across the network, set automatically by the Filtering Algorithm based on reviews of his/her studies.

Uploaded Storages - This is used to index every LS owned by this user. It is not publically accessible (although it might as well be), LSs can be found via a Global Storage.

The idea behind this is that material uploaded by a single user is connected altogether and also used to create a general “image” of the user in the chian. This image represents the reputation and privileges of the user across the Global Storage. Thus not only linking work-done to its author but also detailing and filtering any invalid or out-of-date study. Users with a negative reputation are restricted from selling (if selling is implemented) as well as publishing additional work on the network.

## Global Storages

Global Storages (GS) are used to identify, index and store global data regarding works published on the network. These are used in order to classify materials based on their Geographical location, as such each Country (or another specific zone) will have its own GS representation on the network.

Additionally GS are used to grant access to individuals wishing to contribute with their own work done in that specific region. Thus allowing users to register into this storage and have a *limited* writing access on it.

 Global Storages are designed in the following way:

User-generated Data

ID\*

Global Storage

ID\* - This is used to identify each Global from one another. Information regarding its public key (address) and name (i.e. Texas, USA) is stored in the off-chain part. There’s a check on the off-chain part to determine if the given ID has been taken or not so there are no GS with the same ID. However users can freely initiate Globals of their own, in which case there’s no particular check to whether the given ID is already in use, this is of no concern whatsoever as we use IDs only to index Globals on the off chain source so users can search through them, but the actual connection is done by using the address of each GS.

So if user A initiates a new Global (which is not indexed and cannot be found via an implemented search engine), user B can still access it as long as A gives B the GS address.

User-generated Data - This is a collection of ratings and accounts registered on the Global in order to generate enough information to be used within the Filtering Algorithm.

Such data consist of a list of registered accounts (Streamers), a list of Local Storages uploaded by the user and so forth.

Each GS has its own data, therefore its own set of rules which either grants or restricts certain privileges for users. Therefore in a hypothetical situation we have:

* User A
* Global G
* Global S

User A can publish material on G but cannot do it on S as it doesn’t meet the necessary requirements to do so (user-generated data on S is different, therefore leading to different rules). Although this is not always the case it is of a certain importance to mention it, so you can create a better understanding of how every element has its own attributes and is free from a centralized controller. Special cases can arise in which A can publish in both G and S.

Before moving on to the off-chain elements it is of vital importance that you are able to realize the similarities that this system and an economic market has. We allow users to upload content wherever they want as long as they’re capable of meeting the specific requirements that “market” has. By taking into account that some of these studies or works can be sold each GS is regulated by the Filtering Algorithm which prevents monopoles and sets competitive statuses for everyone joining it.

Following this logic, if User A wants to gain revenue from a study then it must ensure that the work being uploaded is valid and correct, therefore it will be cut out of the network and his/hers privileges on that Global will lower. Moreover if User A’s reputation is being decreased this will affect his/hers capability to interact with other Globals, thus cutting down A’s personal “market share”.

So at this moment we have a networking made out of three on-chain elements like so:

Individual Account (Streamer)

Local Storages

Global Storage

At this point the Streamer has access to each LS inside the Global Storage, however it cannot edit or access sensitive data as long as it does not have ownership of that LS.