Mumfie DFS

Transport Protocol Description, version 0.2

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Overview

The MDFS protocol is inspired by the HTTP protocol in the sense that each transaction consists in a Request and a Response. However the Response is not always necessary. Furthermore the MDFS protocols structure is similar to HTTP structure where one have a header and content. This is replaced in MDFSP with a header and an optional file.

One message consists of 1 or 2 parts, Header and an optional File

- Header
    a. HeaderOverhead is 4 bytes which represents an Integer and describes how many bytes in total the header consists of.
    b. The header itself is in JSON format, encoded with UTF-8 and contains all the information necessary for a transaction.
- File
    a. FileOverhead is 8 bytes which represents a long and describes how many bytes in total the file sent consists of, in short how many bytes to expect.
    b. The raw-data of the file.

Header content description

From

- Is a String
- Is mandatory for all messages
- Contains the DNS address from which the message was sent.

To

- Is a String
- Is mandatory for all messages
- Contains the DNS address of the recipiant

Stage

- Is a String
- Is mandatory for all messages
- Describes the state of the transaction
- Values: Request, Response or Info

Type

- Is a String
- Is mandatory for all messages
- Describes the type of the transaction
- Values: File, Meta-Data or Info

Mode

- Is a String
- Is mandatory for all messages
- Describes the mode of the transaction
- Values: Write, Read, Remove, Edit, Info or Cascade

Error

- Is a String
- Only occurs when Stage = Response
- It indicates that something went or was wrong in Request generating the Response
- Value: indicates what went wrong

User

- Is a String
- Mandatory for client communications with the NameNode
- Value: is the username of the client trying to retrieve information from NameNode

Pass

- Is a String
- Mandatory for client communications with the NameNode

- Value: is the clear text password of the client trying to retrieve information from NameNode

Metadata

- Is a JSON Object
- Mandatory in client communication with NameNode, DataNode
- Mandatory in NameNode communication with Client
- Mandatory in DataNode communication with Client

Metadata->path

- Is a String
- Mandatory for all cases that Metadata exists
- Value: Contains the logical path to file in MDFS

Metadata->type

- Is a String
- Represents if Metadata->path is pointing to a file or a dir
- Values: dir or file

Metadata->size

- Is a long
- Represents the size of a file Metadata->path is pointing to
- Values: positive long

Metadata->permission

- Is a short
- Represents the octal permissions of the file Metadata->path is pointing to
- Values: rangeing from 000 - 777

Metadata->owner

- Is a String
- Represents the owner of the file Metadata->path is pointing to
- Values: any user in MDFS

Metadata->group

- Is a String
- Represents the group of the file Metadata->path is pointing to
- Values: any group of MDFS

Metadata->created

- Is a String
- Represents when the file Metadata->path is pointing too was created
- Values: Any date in the format yyyy-MM-dd HH:mm:ss

Metadata->lastEdited

- Is a String

- Represents when the file Metadata->path is pointing too was last edited
- Values: Any date in the format yyyy-MM-dd HH:mm:ss

Metadata->lastTouched

- Is a String
- Represents when the file Metadata->path is pointing too was last used
- Values: Any date in the format yyyy-MM-dd HH:mm:ss

Metadata->Location

- Is a JSON Object
- Represents the location in which the file that Metadata->path points to can be found

Metadata->Location->ratio

- Is a Integer
- Represents on how many locations the file, that Metadata->path points too, should exists
- Values: range 1-any.

Metadata->Location->name

- Is a String
- Represents the logical uniq name for a file on the local FS of a DataNode
- Values: ten integer between 0-99 connected by '-' and ends with a long
    - ex. 12-34-15-63-23-55-55-34-3423513561

Metadata->Location->hosts

- Is a JSON Array that contains Strings
- Each element represents the DataNode on which a file is currently stored
- Element Values: datanodeDNSaddress:port
    - ex. "datanode.example.com:3210"

Metadata->Childern

- Is a JSON Array that contains JSON Object in the form of Metadata
- Each element represents a child in the file structure of the dir that Metadata->path points too

Info

- Is a JSON Object
- Holds general information

Info->removed

- Is a String
- Exists when in a Response to a request to remove a File
- Values: Successful

Info->written

- Is a String

- Exists when in a Response to a request to write a File to a DataNode
- Values: Successful

Info->datanodes

- Is a JSON Array that contains Strings
- Each element represents the DataNodes that are available to write too
- Element Values: datanodeDNSaddress:port
    - ex. “datanode.example.com:3210”

The JSON-Header example overview:

```
Notation:
/ = xor
```

```
{
"From": "test.example.se",
"To": "test1.example.se",
"Stage": "Request" / "Response" / "Info",
"Type": "File" / "Meta-Data" / "Info",
"Mode": "Write" / "Read" / "Remove" / "Edit" / "Info" / "Cascade" ,

"Error": "Error message",

"User": "test",
"Pass": "test",

"Meta-data":{
               "path": "/raz/data/info.txt",
               "type": "dir" / "file"
               "size": 2024,
               "permission": 764,
               "owner": "raz",
               "group": "raz",
               "created": "2011-09-10 13:27:02",
               "lastEdited": "2011-09-11 11:09:00",
               "lastToutched": "2011-09-13 16:17:34",
               "Location":{
                              "ratio": 2,
                       "name": "1184614648.v3247",
                       "hosts": ["datanod1.island.liu.se:13210"],
             }
               "Children": [{path: "..."}, {path: "..."}]
             },



"Info": {
               "removed": "successful",
               "written": "successful",
               "datanodes" : ["datanod1.island.liu.se:13210"]
        },

}
```