Communications Protocol

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Abstract

This document defines the communication protocol used by the clients and servers in the collaborative spreadsheet. The protocol is designed to enable multiple users (clients) to edit a spreadsheet simultaneously in such a way that all changes are reflected in real-time for all clients. This protocol defines the behavior of the server and clients and the messages that are exchanged.

Contents

1   Introduction

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2   Common Client-Server interactions

2.1   Connecting to the Server

The client will open a TCP connection to the server on port 2112 after the connection has been opened, the server will start accepting messages formatted as JSON strings. This connection may be closed and reopened at the clients' discretion.

2.2   Managing Spreadsheets

The protocol defines four basic commands that manipulate spreadsheets as a unit: *create*, *delete*, *rename* and *list_spreadsheet*. Every spreadsheet is identified by an *id* and associated with a *name* that need not be unique. The *name* is primarily for display purposes, while the spreadsheet *id* is used to identify it in all operations pertaining to a specific spreadsheet.

2.2.1   Creating a new spreadsheet

To create a new spreadsheet the client will use the *create* command, which accepts the name of the spreadsheet to create, and responds with the *id* of the newly created spreadsheet. The newly created spreadsheet will persist on the server until it is deleted. See create for a description of the *create* command.

2.2.2   Deleting a spreadsheet

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2.2.3   Renaming a spreadsheet

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2.2.4 Listing all spreadsheets

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2.3 Accessing a spreadsheet

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2.4 Editing a spreadsheet

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3 Commands

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Command	Description
create	Creates a new spreadsheet
delete	Deletes a spreadsheet
rename	Renames a spreadsheet
get_name	Gets the name of a spreadsheet
list_spreadsheets	Lists all spreadsheets
open	Subscribes the client to updates
close	Unsubscribes the client to updates
get_history	Gets the edit history of a spreadsheet
get_spreadsheet	Gets the contents of a spreadsheet
push	Pushes edits to be applied to the spreadsheet
undo	Undoes the most recent edit of a spreadsheet

3.1 Create

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Listing 1: create command message

```
{
    "command": "create",
    "name": "sheet1"
}
```

Listing 2: create result (ok) message

```
{
    "result": "create",
    "ok": true,
    "id": 1
}
```

Listing 3: create result (error) message

```
{
    "result": "create",
    "ok": false,
    "error": "failed to create a new spreadsheet"
}
```

3.2 Delete

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Listing 4: delete command message

```
{
    "command": "delete",
    "id": 1
}
```

Listing 5: delete result (ok) message

```
{
    "result": "delete",
    "ok": true,
}
```

Listing 6: delete result (error) message

```json
{
    "result": "delete",
    "ok": false,
    "error": "failed to delete the spreadsheet"
}
```

3.3 Rename

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Listing 7: rename command message

```json
{
    "command": "rename",
    "id": 1,
    "name": "sheet1-old"
}
```

Listing 8: rename result (ok) message

```json
{
    "result": "rename",
    "ok": true
}
```

Listing 9: rename result (error) message

```json
{
    "result": "rename",
    "ok": false,
    "error": "failed to rename the spreadsheet"
}
```

3.4 Get Name

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Listing 10: get_name command message

```json
{
    "command": "get_name",
    "id": 1
}
```

Listing 11: get_name result (ok) message

```
{
    "result": "get_name",
    "ok": "true",
    "name": "sheet1"
}
```

Listing 12: get_name result (error) message

```
{
    "result": "get_name",
    "ok": false,
    "error": "Spreadsheet does not exist"
}
```

3.5 List

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Listing 13: list command message

```
{
    "command": "list"
}
```

Listing 14: list result (ok) message

```
{
    "result": "list",
    "ok": true,
    "spreadsheets": [
        1, 2, 3, 4
    ]
}
```

Listing 15: list result (error) message

```
{
    "result": "list",
    "ok": false,
    "error": "failed to read spreadsheets"
}
```

3.6 Open

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Listing 16: open command message

```
{
    "command": "open",
    "id": 1
}
```

Listing 17: open result (ok) message

```
{
    "result": "open",
    "ok": true,
    "spreadsheet": {
        "A1": "foo",
        "A2": "bar"
    }
}
```

Listing 18: open result (error) message

```
{
    "result": "open",
    "ok": false,
    "error": "Spreadsheet does not exist"
}
```

3.7 Close

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Listing 19: close command message

```
{
    "command": "close",
    "id": 1
}
```

Listing 20: close result (ok) message

```
{
    "result": "close",
    "ok": true
}
```

Listing 21: close result (error) message

```
{
    "result": "close",
    "ok": false,
```

```
        "error": "Spreadsheet is not open"
}
```

3.8   Get History

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est laborum.

Listing 22: get_history command message

```
{
    "command": "get_history",
    "id": 1
}
```

Listing 23: get_history result (ok) message

```
{
    "command": "get_history",
    "ok": true,
    "edits": [
        {
            "A1": 1,
            "B1": "=A1"
        },
        {
            "A2": "bar"
        }
    ]
}
```

Listing 24: get_history result (error) message

```
{
    "result": "get_history",
    "ok": false,
    "error": "Spreadsheet does not exist"
}
```

3.9   Get Spreadsheet

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est laborum.

Listing 25: get_spreadsheet command message

```
{
```

```
    "command": "get_spreadsheet",
    "id": 1
}
```

Listing 26: get_spreadsheet result (ok) message

```
{
    "result": "get_spreadsheet",
    "ok": true,
    "spreadsheet": {
        "A1": "foo",
        "A2": "bar"
    }
}
```

Listing 27: get_spreadsheet result (error) message

```
{
    "result": "get_spreadsheet",
    "ok": false,
    "error": "Spreadsheet does not exist"
}
```

3.10 Undo

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Listing 28: undo command message

```
{
    "command": "undo",
    "id": 1
}
```

Listing 29: undo result (ok) message

```
{
    "result": "undo",
    "ok": true
}
```

Listing 30: undo result (error) message

```
{
    "result": "undo",
    "ok": false,
    "error": "Spreadsheet does not exist"
}
```

3.11 Push

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Listing 31: push command message

```
{
    "command": "push",
    "id": 1,
    "edits": [
        {
            "A1": "=A2",
            "A2": 1
        },
        {
            "A2": "=A1",
            "A1": 1
        }
    ]
}
```

Listing 32: push result (ok) message

```
{
    "result": "push",
    "ok": true
}
```

Listing 33: push result (error) message

```
{
    "result": "push",
    "ok": false,
    "error": "Edits cause a circular dependency"
}
```