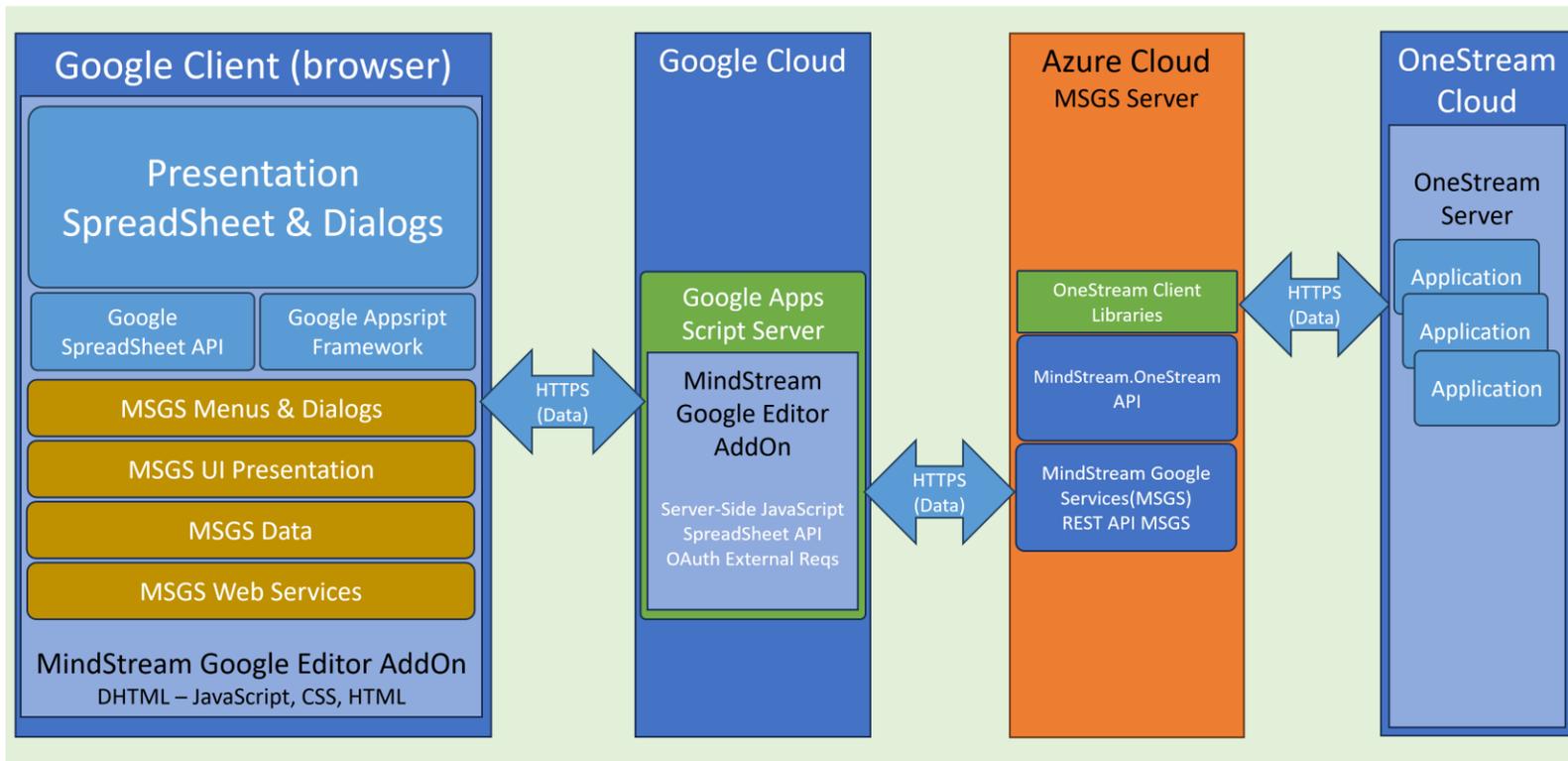


# Sheets™ for OneStream and MindStream Google Services Architecture

# Architecture Diagram

## MindStream Services for Google Workspace Architecture – OneStream



# Description

## Google Workspace Editor Add On

Sheets™ for OneStream is a browser-based Google Workspace Editor Add On available in the Google Workspace Marketplace. It is available for installation in a Chrome compliant browser. Google Workspace enterprise subscribers are able to deploy Sheets™ for OneStream as zero deployment to approved users.

## MindStream Google Services (MSGS)

MSGS is deployed on a secure Azure cloud server. It is the web services layer used to broker user requests to the OneStream server from the Sheets™ for OneStream client and to marshal responses from OneStream server to the browser client.

## Stateless Operation

The MSGS web services server works on the principle of stateless server operation. This means that the server:

- Does not store user information
- Does not store data or metadata
- Does not maintain an open session with OneStream between requests. On every request from the client, the server logs in to OneStream, requests or submits data, then logs out. The information from OneStream is in memory on the MSGS server just long enough to be marshalled into a format useable by the Sheets™ for OneStream client. Following transmission, the objects marshalling the data go out of scope and are cleared from memory.

When a user authenticates with OneStream through a third party authentication service such as Okta, the authentication happens at the SSO provider. The provider issues a token and this is kept on the client for use in requests to the server. The Authentication Provider is responsible for authentication, session management, and communication of session validity to OneStream. Sheets™ for OneStream and MSGS server are only aware of the token provided.

## Communication

All communication between Sheets™ for OneStream client and MSGS server, and between MSGS server and OneStream server use standard HTTPS end-to-end encryption. Information sent between the Sheets™ for OneStream client and the MSGS server is also compressed prior to encrypted transmission.

## OAuth 2.0 Authorizations

Sheets™ for OneStream Google Workspace Marketplace solution is validated and approved by Google. These scopes are crucial for defining the boundaries of what a script or application can do within Google's ecosystem and ensure security and permission control over user data and services. The following OAuth authorizations are employed by Sheets™ for OneStream:

### **script.locale**

This scope allows a script to access the locale settings (language and region) of the Google Apps Script runtime environment. It enables scripts to customize behavior based on the user's language or regional preferences.

### **spreadsheets.currentonly**

Restricts access to operations to those that only affect the currently opened spreadsheet in Google Sheets. It ensures that API requests or script operations are limited to the context of the spreadsheet that the user has open.

### **script.container.ui**

Grants access to modify the user interface (UI) components within the container where the script is running. For instance, in the context of Google Workspace Add-ons or certain Apps Script projects, it allows scripts to manipulate UI elements like dialogs, sidebars, or menus.

### **script.external\_request**

Allows a script to make HTTPS requests to external services or APIs outside of the Google ecosystem. It's essential for scripts that need to interact with third-party APIs or fetch data from external sources.

## Technical Description

This section details the technical architecture of MindStream Services for Google Workspace (OneStream). The system integrates components from Google Workspace, Google Cloud, Azure Cloud, and OneStream Cloud to support data exchange and service operations through APIs and web services.

## System Components

### *Google Client (Browser)*

- **Presentation Layer:** Google Sheets and Dialogs serve as the user interface.
- **Google Spreadsheet API:** Handles read and write operations within Google Sheets.
- **Google Apps Script Framework:** Executes client-side and server-side scripts.
- **MindStream Google Editor AddOn:**
  - **MSGS Menus & Dialogs:** Provides menu options and modal dialogs.
  - **MSGS UI Presentation:** Manages the visual rendering of user interfaces.
  - **MSGS Data:** Handles data structures and local data processing.
  - **MSGS Web Services:** Communicates with external APIs via HTTPS.

### *Google Cloud*

- **Google Apps Script Server:**
  - Executes server-side JavaScript code.
  - Processes external HTTP requests using OAuth 2.0 for authorization.
  - Integrates with Google Spreadsheet API for data manipulation.

### *MSGS Application Server (Azure Cloud)*

- **OneStream Client Libraries:** Provides a library-based SDK and dependencies for connecting to applications on OneStream Server.
- **MindStream.OneStream API:** Abstracted API used to decouple proprietary OneStream libraries from Web Services end points. Defines and encapsulated standardized endpoints for interacting with OneStream server.

- **MindStream Google Services (MSGs) REST API:** Agnostic API layer acting as a broker from and to the Google Sheets client and the MindStream.Onestream API. Effectively, the REST API marshals requests to OneStream server from the Google Sheets client, and returns requested data from OneStream to the Google Sheets Client.

### *OneStream Cloud*

- **OneStream Server:**
  - Hosts multiple applications that process and return requested data.
  - Supports HTTPS communication with Azure Cloud.

### Data Flow

Data flow are stateless operations – Sessions opened to interact with OneStream server are close prior to responding the associated request from the Google Sheet Client. The following details the theory of operations

1. The user interacts with the Google Editor AddOn in Google Sheets.
2. Client-side scripts use the Google Spreadsheet API and Apps Script Framework for local operations and UI presentation.
3. For external communication, the Google Apps Script Server sends HTTPS requests to Azure Cloud.
4. The Azure Cloud MSGS Server processes the requests from the Google Client into OneStream client requests to OneStream server.
5. Responses are returned via HTTPS through Azure Cloud back to the Google Apps Script Server and ultimately displayed in Google Sheets.
6. All data are compressed using GZIP and/or Brotli technology for network efficiency.

### Security

- **Data Encryption:** All data exchanges use HTTPS with TLS 1.3 encryption.
- **Authentication:**
  - Google OAuth 2.0 is used for external requests.
  - API sessions with access tokens secure Azure and OneStream APIs.
- **Access Control:** Only authorized clients can access specific APIs, with permissions enforced by each platform.

## Performance and Scalability

- **Google Cloud:** Automatically scales server-side Apps Script execution.
- **Azure Cloud:** Supports load balancing and auto-scaling of the MSGS Server.
- **OneStream Cloud:** Designed for high availability and large-scale data processing.
- **Latency Considerations:** HTTPS calls are minimized where possible to reduce response times.

## Error Handling

- **Client Side:** Errors are captured using JavaScript try-catch blocks.
- **Server Side:**
  - Apps Script Server logs errors using the Logger service.
  - Azure Cloud APIs return HTTP status codes (4xx and 5xx) with detailed error messages.
  - OneStream Cloud logs and monitors application-level errors.

## Conclusion

This architecture provides a scalable, secure, and efficient integration between Google Workspace and OneStream Cloud. Each component is modular, technology agnostic, and communicates via HTTPS, ensuring interoperability and performance across platforms.