### smartsheet ENGAGE / Advanced Tips and Tricks for the Smartsheet API



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#SmartsheetENGAGE

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## **Advanced Use of the Smartsheet API**

Moving beyond basic API calls

The Smartsheet API is...

- **Secure** share data, not sensitive info
- **Automated** trigger and respond to events
- **Scalable** reliably meet your needs at high volume

### **Overview**

What are we actually covering?

We'll discuss what a topic is and how Smartsheet does it.

- **Secure –** share data, not sensitive info
  - Smartsheet OAuth Flow
- **Automated –** trigger and respond to events
  - Smartsheet **webhooks**
- **Scalable –** reliably meet your needs at high volume
  - Strategies for **building at a larger scale**



### **Security and the API**

Creating a Smartsheet OAuth Flow



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Start Date Due Date

## **OAuth 2.0**

Connecting apps without sharing sensitive data

### What is it?

- Open authorization protocol
- Allows apps to share information without exchanging sensitive data
- Widely supported

### When do I need it?

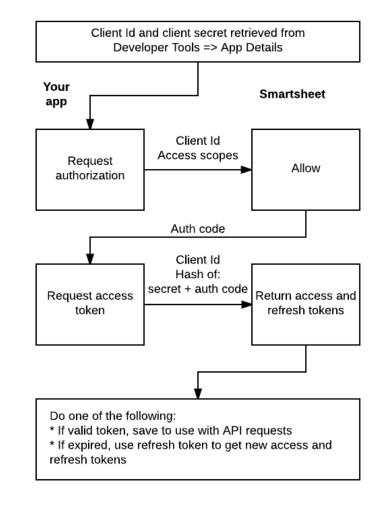
- When building "third-party" integrations
- You want other users to share *their* Smartsheet data
  - Attribution of changes
  - Security (roles and permissions)
  - Not passing around a token



## **OAuth Flow**

Smartsheet's 3-legged OAuth Flow

- Request an Authorization Code.
- User gives consent and Smartsheet sends
   Authorization Code.
- Authorization code (and app secret) is used to request an Access Token.





1.) Sign up for a Smartsheet Developer Account

Option A – Create new developer sandbox account

Visit page  $\rightarrow$  register  $\rightarrow$  build stuff

#### **Developer Registration**

View Edit Delete Revisions

Developer Sandbox Account

Register for a Smartsheet Developer account if you would like to accomplish any of the following.

- 1. Create a Sandbox Smartsheet account to keep your developer data separate from your production data. NOTE: make sure to use a different email address than the one used for your production Smartsheet account.
- 2. Build third party applications with Smartsheet using OAuth 2.

No need to register if you already have a Smartsheet account, and just need to generate an Access Token all Smartsheet users have access to the API by generating an Access Token in the API Access available in the Personal Settings option of the Account menu.

Email Address

By clicking below, I agree to the Smartsheet Developer Agreement. Our Privacy Policy describes how we process your personal data.

Register Developer Account

https://developers.smartsheet.com/register

Option B – Activate 'Developer Tools' on existing account

Request access from <u>Smartsheet</u> <u>support</u>.





2.) Create a new application

#### Click Account $\rightarrow$ Developer Tools $\rightarrow$ Create New App.

	🛿 Help 🕌 Notifications 🎆	× Developer Tools	Create New App		×
×	Account Admin Personal Settings Apps & Integrations Developer Tools	Please see the <u>Developer Portal</u> for more information on how to use Developer Tools. Developer Profile Edit Developer Profile Name - company or individual: Taylor Krusen Website (optional): Email: taylor.krusen@smartsheet.com	App name: App description: App URL: () App contact/support: App redirect URL:		
	Personal Colors & Logo My Smartsheet Contacts Sign In to Skype for Business Sign Out taylor.krusen@smartsheet.com	Developer Profile Page:     https://app.smartsheet.com/b/developer/r/dE/vjcaRSUM       Developer profile page is a public page that anyone can access to learn more about you and your applications.       Manage Apps     Create New App       Sample oAuth Flow     view/edit       Formatting test app     view/edit	Publish App? @ Logo: @	Upload	
		Close		Cancel	Save



3.) Enter details about application

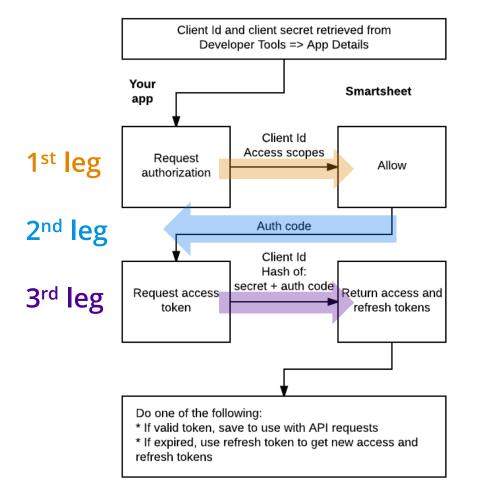
Create New App		×	Inform users about your
App name:			application when they consent to
App description:			share Smartsheet data.
App URL:  App contact/support:			
App redirect URL:			Smartsheet sends important
Publish App? 😗 🗌	Upload		data to your <b>App redirect URL</b> .
			The App redirect URL <i>must</i> be a domain you control.
	Cancel Save		



4.) Record sensitive info for use in OAuth Flow

App Profile		×
App name:	Engage Demo App	
App description:	This is a placeholder App to show attendees what an application looks like from Smartsheet Developer Tools	
App URL: 👔	https://google.com	The <b>App client id</b> and
App contact/support:	demo@engage.com	App secret are used
App redirect URL:	http://localhost:3000/callback	App Secret are used
Publish App?		to create the OAuth
Logo: 🌒	Upload Remove	Flow.
App profile page: 🌒	https://app.smartsheet.com/b/apps/U4FvVevIOHo	
App client id:	obssfv9h3cj5gifgj31	
App secret:	733nlc1y0l6r8o6avus Regenerate Secret	
Delete	Cancel Save	





### **3-legged OAuth Flow** Step by step walkthrough

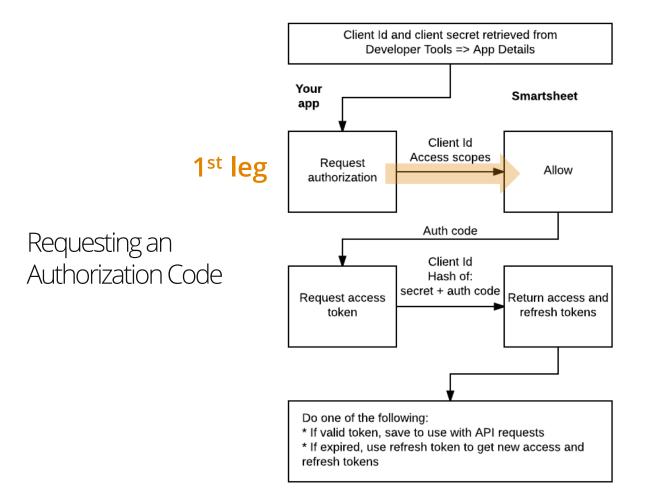
This graphic and more

detailed instructions on

OAuth Flow are available in

the API documentation.







## **Request Authorization Code**

### Leg #1: Smartsheet OAuth Flow

### The initial request requires three parameters:

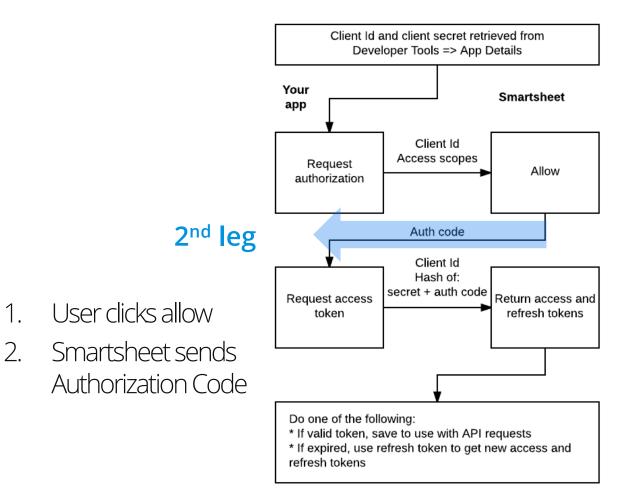
- 1. App client id
  - From the 'App Profile' page of Smartsheet
- 2. Access scopes
  - Define the level of access granted to a user
  - I.E. WRITE\_SHEETS, ADMIN\_WEBHOOKS, READ\_CONTACTS
- 3. Response type set to code
  - Automatically added by SDKs
- State (optional)
  - Arbitrary string that is returned to the app. Helps add custom logic to OAuth Flow

### A properly formatted request looks like this:

https://app.smartsheet.com/b/authorize?

response\_type=code&client\_id=<your\_client\_id>&scope=<your\_access\_scopes>&state=<some\_string>





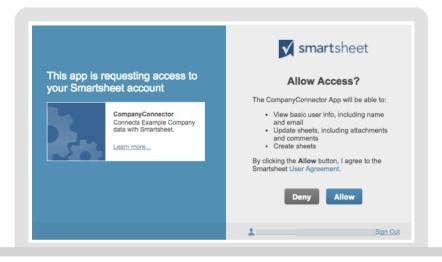
1.



### **Grant Access** $\rightarrow$ **Receive Authorization**

**Gode**Smartsheet OAuth Flow

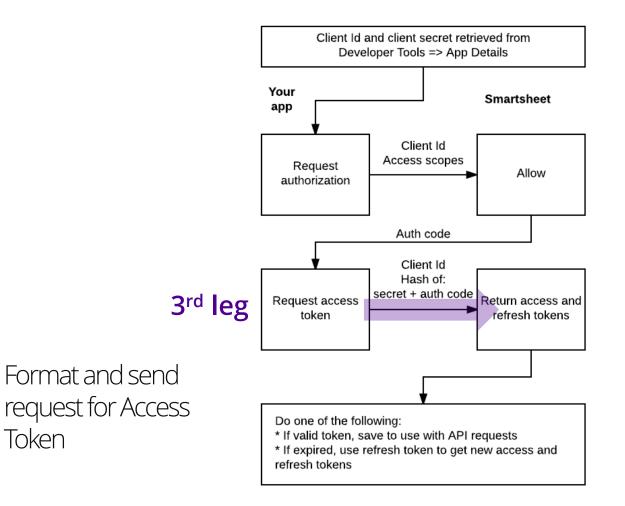
User clicks Allow—consenting to share Smartsheet data.



### Smartsheet sends Authorization Code

- Smartsheet sends Authorization
   Code to application's App redirect
   URL as a query parameter.
- The Authorization Code must be captured for use in the final request.







# Format Access Token Request

### Leg #3: Smartsheet OAuth Flow

The final POST request to the /token endpoint must contain a usergenerated Hash.

The Hash is an SHA-256 hash of the App secret concatenated with a pipe and authorization code.

An example of a user-generated Hash in Node.js



App profile page: 📵		https://app.smartsheet.com/b/apps/U4FvVevIOHo					
_	App client id:	obssfv9h3cj5gifgj31					
Г	App secret:	733nlc1y0l6r8o6avus	Regenerate Secret				



## **Request Access Token**

Leg #3: Smartsheet OAuth Flow

#### •••

```
const options = {
   queryParameters: {
      client_id: config.APP_CLIENT_ID,
      code: authCode,
      hash: generated_hash
   }
};
smartsheet.tokens.getAccessToken(options, processToken)
   .then((token) => {
      return res
        .status(200)
        .json(token);
   });
```

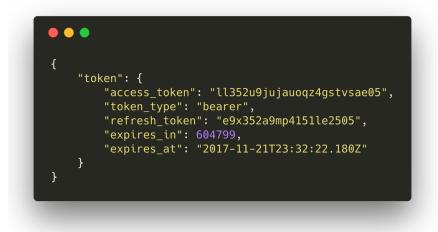
The request contains three parameters:

- Client id
- Authorization code
- Hash from previous step



## **Success! Access Token Received**

Smartsheet sent back an Access Token



- Save the entire token object
- The access token is valid for ~ 7 days
- The refresh token can renew the access token without completing another full OAuth Flow

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## Webhooks

Connecting the web with event notifications

### What and why?

- Remove complexity and overhead of polling for changes
- Receive valuable information when it happens
- Event callbacks sent via HTTP POST to your callback URL
- No standard, no protocol... just a useful design pattern

### How can I use them?

- Link together separate tools or services
- Respond to events with custom code
- Automate tasks
- "Glue" everything together



# **Smartsheet for JIRA**

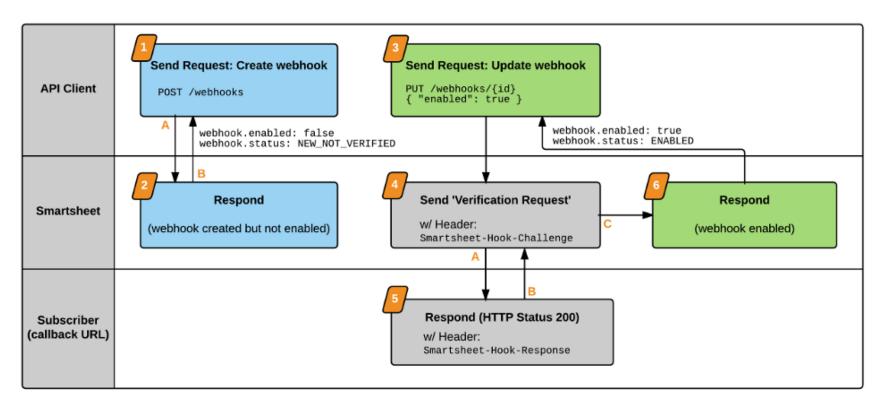
### Webhooks in action

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- Webhooks are used on *both* sides to trigger a workflow when something changes
- Application takes action after receiving the webhook event
- Data is kept in sync automatically across two systems in real time as people work



### **How does Smartsheet Create Webhooks?**





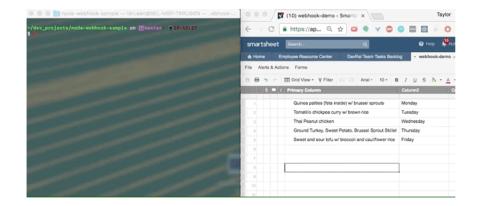
## **Webhook in Action**

Consuming webhook data from Smartsheet

Implementation differs based on programming language.

Event data is 'thin'... tells you where rather than what.

You need to query the sheet to determine changes to data.



Demo uses our <u>sample node.js webhook</u> (available on Github).



## **Smartsheet Webhooks**

Automatically respond to Smartsheet events

#### Overview

- Subscribe to event-notifications by creating and registering a webhook.
- Smartsheet sends data via POST when changes occur in monitored sheet.
- 3. Your application receives and processes the event data.

#### Constraints

- Can only listen for changes on a sheet
- Webhooks fire on all changes to a sheet

#### Plain English

- Cell changed in sheet\_b, send webhook to https://YourApp.com/abc
- Row added to sheet\_w, send webhook to https://YourApp.com/def



### **Working at Scale**

### Using the Smartsheet API at higher volumes

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# **Using the API at Higher Volumes**

Considerations and strategies

- Important concepts for working at scale
  - Making calls efficiently
  - Using a system for logging
  - Planning for rate limits
- Making use of Smartsheet SDKs
  - Languages: Java, C#, Python, JavaScript (node.js), Ruby
  - Benefits of using an SDK



# **Making API Calls Efficiently**

Using bulk operations

Many endpoints support bulk operations—allowing you to create, update, or delete multiple objects in a single request.

#### Practically speaking

- Call UpdateRows once with an array of 30 row objects instead of individually on each row object.
- Call ShareWorkspace once on an array of user objects instead of calling it for each user.

#### Using bulk operations...

- Better performance
- Prevents save errors from overwhelming an endpoint (I.E. quickly updating 60 rows individually)
- > Keeps you from hitting the rate limit



## **Bulk Operations**

Understanding requests with multiple objects

By default, bulk operations are all or nothing; one invalid objects makes the whole request fail

You can modify this behavior with the query parameter allowPartialSuccess=true

- Valid objects are successful
- Returns array of failed items

#### Don't be fooled!

• A 200 success HTTP status is returned but the request didn't fully complete.





## **Key Concepts to Address**

Gain insight into your app and handle errors gracefully

### Logging

- Capture stack traces for future reference.
- Gain visibility into errors.
- Identify what happened *before* point of failure.
- Better understand the flow of information in your app.

### **Rate limits**

- Throttling occurs at 300 requests per minute. Smartsheet may change this.
- Some requests cost extra...
  - Cell history & adding a file attachment
     count as 10 API requests
  - Check the API docs!
- Plan for the worst.

Think about these at the beginning. A little planning will save a lot of pain.

## **About That Rate Limit...**

Help! I hit the rate limit

### What you get back

• Rejected request with 429 HTTP status code

Body: {
 "errorCode": 4003,
 "message": "Rate limit exceeded."
 }

### How you should handle it

• Wait and retry

This is a good reason to use the **Smartsheet SDK** for your respective language.



# What's an SDK Again?

Smartsheet has Software Development Kits (SDK)

### Languages

### Benefits

- Java
- C#
- Python
- JavaScript (Node.js)
- Ruby

- Native language object models
- Logging
- Rate limit retry / backoff
- Sample code
- Full reference documentation



### **SDKs are Awesome**

And come with nice things

SDK	Logging	Retry (rate limit)	Details			
JavaScript (Node.js)	Winston	Yes	<u>JavaScript SDK Docs</u>			
Python	Python library	Yes	Python SDK Docs*			
Ruby	Standard logger	Yes	Ruby SDK Docs			
C#	NLog project	Yes	C# SDK Docs — Advanced Topics			
Java	Console and SLF4J	Yes	Java SDK Docs — <u>Advanced Topics</u>			

### Java SDK and C# SDK Retry logic

The Java SDK <u>advanced topics docs</u> and C# SDK <u>advanced topics docs</u> have examples of how to override the default retry / timeout logic.

```
switch(error.getErrorCode()) {
    // The default shouldRetry, retries 4001, 4002, 4003, 4004 codes
    case 4001:
    case 4002:
    case 4003:
    case 4004:
    case 9999: // adding my fictional error code
        break;
    default:
        return false;
}
```

Error code	Meaning
4001	Smartsheet offline
4002	Server timeout
4003	Rate limit exceeded
4004	Unexpected error

#### ...Implement your own custom retries

- E.g. an authorization error triggering a token refresh.

# **Advanced Use of the Smartsheet API**

Learn the hard parts!

- The API can **securely** share Smartsheet data using an **OAuth Flow**.
- Learn about changes in Smartsheet **automatically** by using **webhooks**.
- For your application to **scale** well, it must **use calls efficiently**,

implement logging, and contain retry / backoff logic.

- Pro tip: logging and retry are built into the SDKs



## **Questions about the API?**

### **Smartsheet API docs**

### **Stack Overflow** ('smartsheet-api' tag)

https://www.smartsheet.com/gethelp



# **Smartsheet Developer Relations**



https://developers.smartsheet.com

devrel@smartsheet.com

@SmartsheetDev



### **Don't forget to:**

- Share your feedback in our survey in the ENGAGE app
- Stop by the Administration & Custom Solutions booth on the first floor
- Visit the Innovation Center for hands-on learning, support, services, swag, and more



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