Enhancing SPFx Projects: Harnessing Live Data Integration

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Picture time!!!

Client-side data interaction: **REST APIs**

REpresentational **S**tate **T**ransfer
Application **P**rogramming **I**nterface

Method

- GET
- POST
- PUT
- PATCH
- DELETE
- OPTIONS
- HEAD

Request URI

Host | Endpoint | Parameters | Query (ODATA)

https://mydomain.sharepoint.com/sites/targetsite/_api/lists
?mode=1&$select=Title

Headers

Authentication, Content Type, Application Type, Language

Body

```
{
   "Title": "New List",
   "Description": "This is my new list for stuff"
}
```

OData Query Operators

```
https://mydomain.sharepoint.com/sites/site/_api
/web/lists/getbytitle('Speaking%20Events')/items
    ?$select=Id,Title,Session,SessionDate
    &$filter=SessionDate gt DateTime'2024-01-01T00:00:00'
    &$orderby=SessionDate
    &$top=10
```

CRUD with SharePoint Data in SPFx

CRUD Operations with SPFx & SharePoint REST API

Reading items

Creating items

Updating items

Deleting items

Consuming REST APIs in SPFx

- **Common requirement in SPFx project is to display or interact with data external to the web part**
  - Data in SharePoint lists & libraries
  - Data accessible via Microsoft Graph REST API
  - Data accessible in external 3rd Party APIs – anonymous & secured

- **SharePoint Framework provides APIs for all situations when you need to work with data sources external to the web part**
  - `HttpClient`: for calling 3rd party REST APIs
  - `SPHttpClient`: for calling the SharePoint REST APIs in current tenant
  - `MSGraphClient`: for calling the Microsoft Graph in the same tenant as the SharePoint Online tenant
  - `AADHttpClient`: for 3rd party REST APIs secured with Azure Active Directory

- **Most scenarios require no extra clients / libraries are required**

Accessing the SharePoint REST API

https://*mydomain*.sharepoint.com/sites/*targetsite*/_api/...

- **Must include an `Authorization` header containing an OAuth bearer token**

- **Other headers used to control how the REST API is used**
  - OData v3 or v4 (default = v4)
  - Amount & type of metadata returned
  - Type of operation to perform (in the case of updates: merge / update)
  - Match versions

SharePoint Framework & REST API

- **SPFx implements calls to SharePoint REST API via the `SPHttpClient`**
- **Available from the existing context:**
  - `this.context.spHttpClient.get()` & `this.context.spHttpClient.post()`
- **Based on the existing `HttpClient` API**
- **Handles the authentication & default config setting:**
  - Authorization HTTP header
  - OData v4
  - Minimal metadata returned

Reading List Items with the REST API & SPFx

```
private _getEvents(): Promise<ISpeakingEvent[]> {

    const _url: string = this.context.pageContext.web.absoluteUrl
        + `/getbytitle('Speaking%20Events')/items`
            + `?$select=Id,Title,Session,SessionDate`
            + `&$filter=SessionDate gt DateTime'2024-01-01T00:00:00'`
            + `&$orderby=SessionDate%20asc`;

    return this.context.spHttpClient.get(endpoint, SPHttpClient.configurations.v1)
        .then (response: HttpClientResponse => {
            return response.json();
        })
        .then(jsonResponse => {
            return jsonResponse.value;
        }) as Promise<ISpeakingEvent[]>;
}
```

Write Operations with SPFx & REST API

- Use the `SPHttpClient.post()` method to write to the SharePoint REST API

- Some operations require additional HTTP headers:
  - `X-HTTP-Method`: specify `MERGE` or `DELETE` in update & delete operations
  - `IF-MATCH`: specify version of the item on the server to be updated / deleted

- Create operation require specific data in the payload body
  - `@odata.type`: specify the type of data being written to the list when creating

Creating List Items with the REST API

- Must specify the type of data as the `@odata.type` property in the payload that is being created
  - Lists can support multiple content types

- Pattern: request the type in a pre-request via the list's `ListItemEntityTypeFullName` property

Get List Entity Type

```
private _getItemEntityType(): Promise<string> {

    const _url: string = this.context.pageContext.web.absoluteUrl
        + `/_api/web/lists/getbytitle('Speaking%20Events')`
        + `?$select=ListItemEntityTypeFullName`;

    return this.context.spHttpClient.get(_url,SPHttpClient.configurations.v1)
        .then(response: SPHttpClientResponse => {
            return response.json();
        })
        .then(jsonResponse => {
            return jsonResponse.ListItemEntityTypeFullName;
        }) as Promise<string>;
}
```

Creating List Items with the REST API & SPFx

```
private _addNewEvent(): Promise<SPHttpClientResponse> {

    const _url: string = this.context.pageContext.web.absoluteUrl
        + `/_api/web/lists/getbytitle('Speaking%20Events')/items`;

    return this._getItemEntityType()
        .then(spEntityType: string => {
            const request: any = {};
            request.body = JSON.stringify({
                '@odata.type': spEntityType,
                Title: 'New Item'
            });

            return this.context.spHttpClient.post(_url,SPHttpClient.configurations.v1,
                request);
        })
}
```

Updating List Items with the REST API

- **Should specify the type of operation to perform**
  - SPHttpClient only contains `post()` method; not `put()` or `patch()`
  - Default behavior is to set properties to supplied values, BUT omitted properties are set to `null`
  - Override behavior using the `MERGE` method in header, using `X-HTTP-Method` header

- **Specify the version of the item to update**
  - When updating items, can specify “only update the item on the server if it is version X”
  - Ensures you aren’t overwriting someone else’s changes unknowingly
  - Enforced with the `IF-MATCH` header & `etag`’s

Updating List Items with REST API & SPFx

```
private _updateEvent(): Promise<SPHttpClientResponse> {
     // first, get the item to update
     return this.context.spHttpClient.get(
          // .. code to get item from SP REST API
     })
    .then((event: ISpeakingEvent) => {
          // update item
          event.Session = 'UPDATED Event';
          // build request object
          const request: any = {};
          request.headers = {
               'X-HTTP-Method': 'MERGE',
               'IF-MATCH': (event as any)['@odata.etag']
          };
          request.body = JSON.stringify(event);

          const _url: string = this.context.pageContext.web.absoluteUrl
                         + `/_api/web/lists/getbytitle('Speaking%20Events')/items(${event.Id})`

          return this.context.spHttpClient.post(endpoint, SPHttpClient.configurations.v1, request);
    });
}
```

Deleting List Items with the REST API

- **Should specify the type of operation to perform**
  - SPHttpClient only contains `post()` method; not `delete()`
  - Override behavior using the `DELETE` method in header, using the `X-HTTP-Method` header

- **Specify the version of the item to delete**
  - When updating items, can specify “only update the item on the server if it is version X”
  - Enforced with the `IF-MATCH` header & `etag`’s
  - Decide: does it matter if the version is different?
  - If not, use `IF-MATCH = '*'`

Deleting List Items with REST API & SPFx

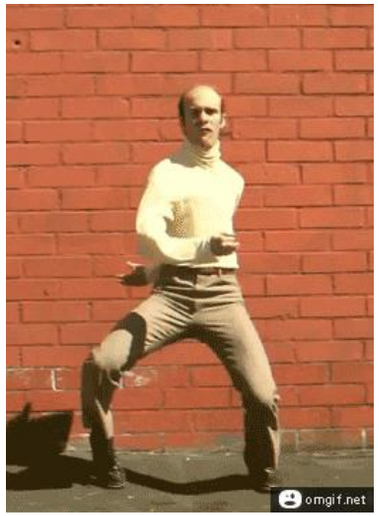
```
private _deleteEvent(): Promise<SPHttpClientResponse> {
     // first, get the item to delete
     return this.context.spHttpClient.get(
          // .. code to get item from SP REST API
     })
    .then((event: ISpeakingEvent) => {
      // delete it
      const request: any = {};
      request.headers = {
        'X-HTTP-Method': 'DELETE',
        'IF-MATCH': '*'
      };

      const _url: string = this.context.pageContext.web.absoluteUrl
                              + `/_api/web/lists/getbytitle('Speaking%20Events')/items(${event.Id})`

      return this.context.spHttpClient.post(_url, SPHttpClient.configurations.v1, request);
    });
}
```

DEMO TIME!

Put on your dancing shoes and let’s have some fun!







Calling Anonymous REST APIs

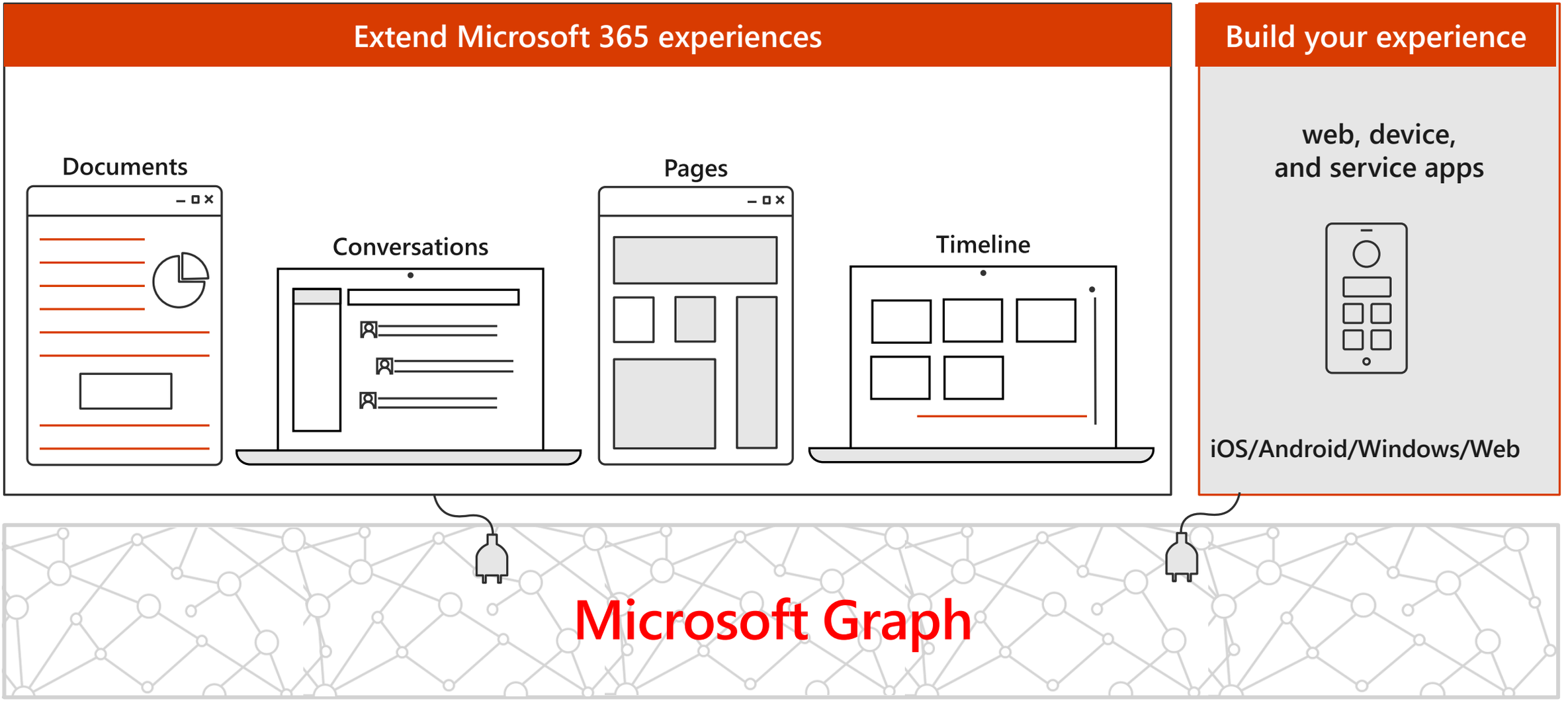
```
private _getCatData: Promise<any> {

    const _url: string = `https://cat-fact.herokuapp.com/facts`,

    return this.context.httpClient.get(_url,HttpClient.configurations.v1)
        .then((response: HttpClientResponse) => {
            return response.json();
        })
        .then(jsonResponse => {
            return jsonResponse;
        }) as Promise<any>;
}
```

Calling the Microsoft Graph

Overview of the Microsoft Graph

SPFx's MSGraphClient

Microsoft 365 Platform



SharePoint Framework Includes a Microsoft Graph Client

- **`MSGraphClient`**: SharePoint Framework's Microsoft Graph Client
- Abstracts the token acquisition from the SharePoint Framework's support for Azure AD
- Wraps the Microsoft Graph JavaScript SDK and initializes it with one line that returns a promise

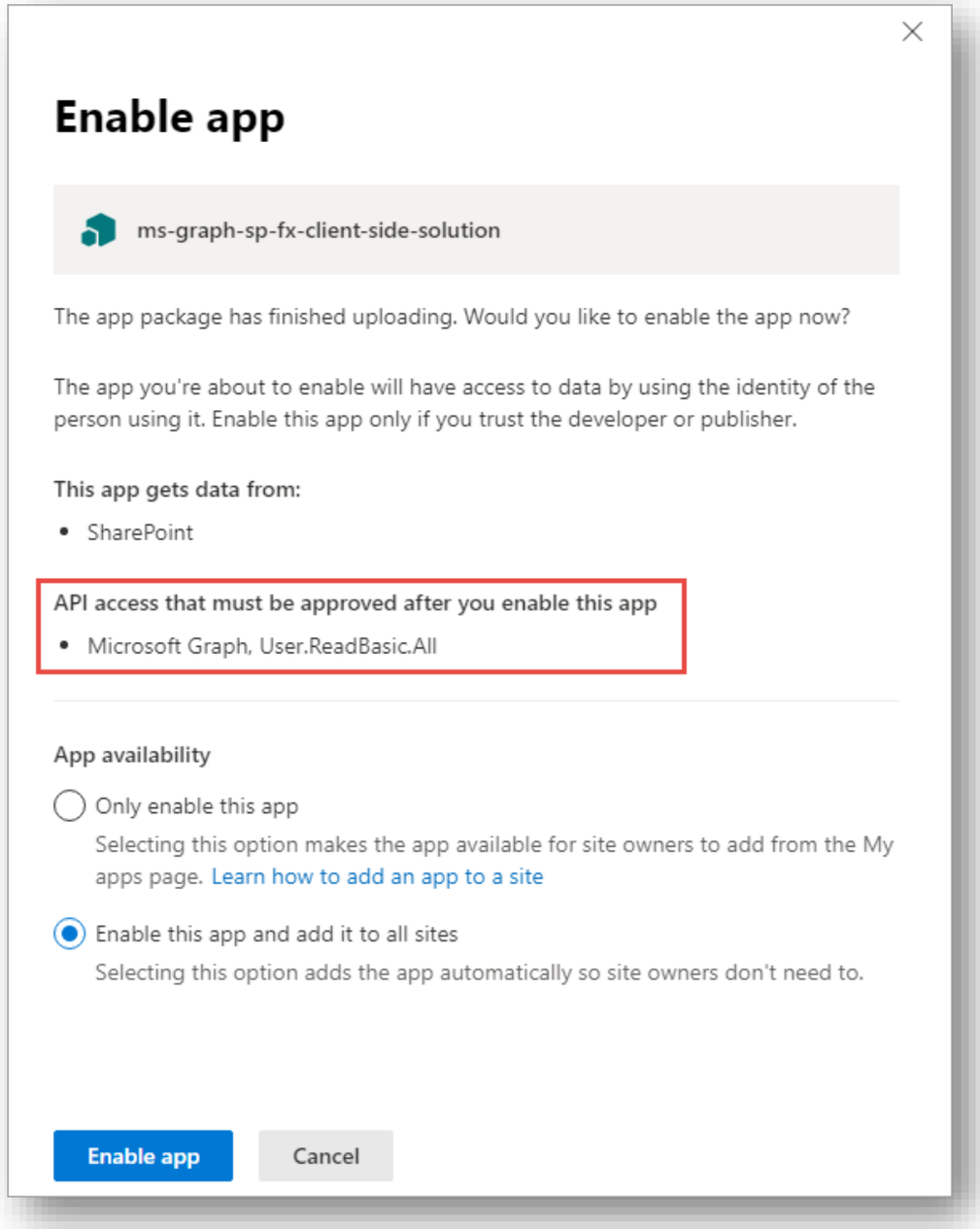
```
import { MSGraphClientV3 } from '@microsoft/sp-http';
// . . .
const graphClient: MSGraphClientV3 = await this.context.msGraphClientFactory.getClient('3');

// use client here
const myEmail: string = await graphClient.api('/me')
        .get((error: GraphError, user: MicrosoftGraph.User) => {
                return user.mail
        });
```

SPFx Solutions Declare Permission Requests

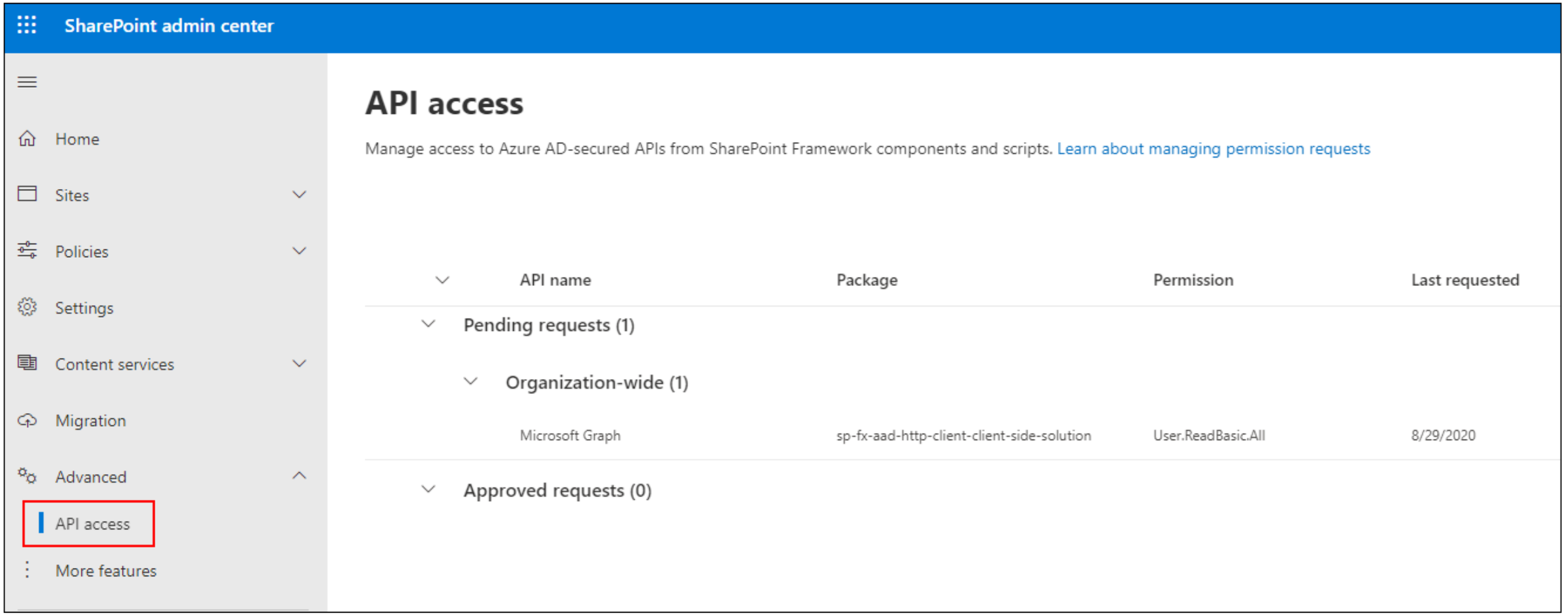
```
// package-solution.json
{
    "solution": {
        ...
        "webApiPermissionRequests": [
            {
                "resource": "Microsoft Graph",
                "scope": "User.ReadBasic.All"
            }
        ],
        ...
    },
    ...
}
```

Add SharePoint Package to SharePoint App Catalog

- **Trust dialog**
  - Extra note in dialog notifies of additional step required
  - While application can be installed in SharePoint sites, it does not have the permissions granted that it needs to access Azure AD protected resources



Approve / Reject with SharePoint Online API Management Page



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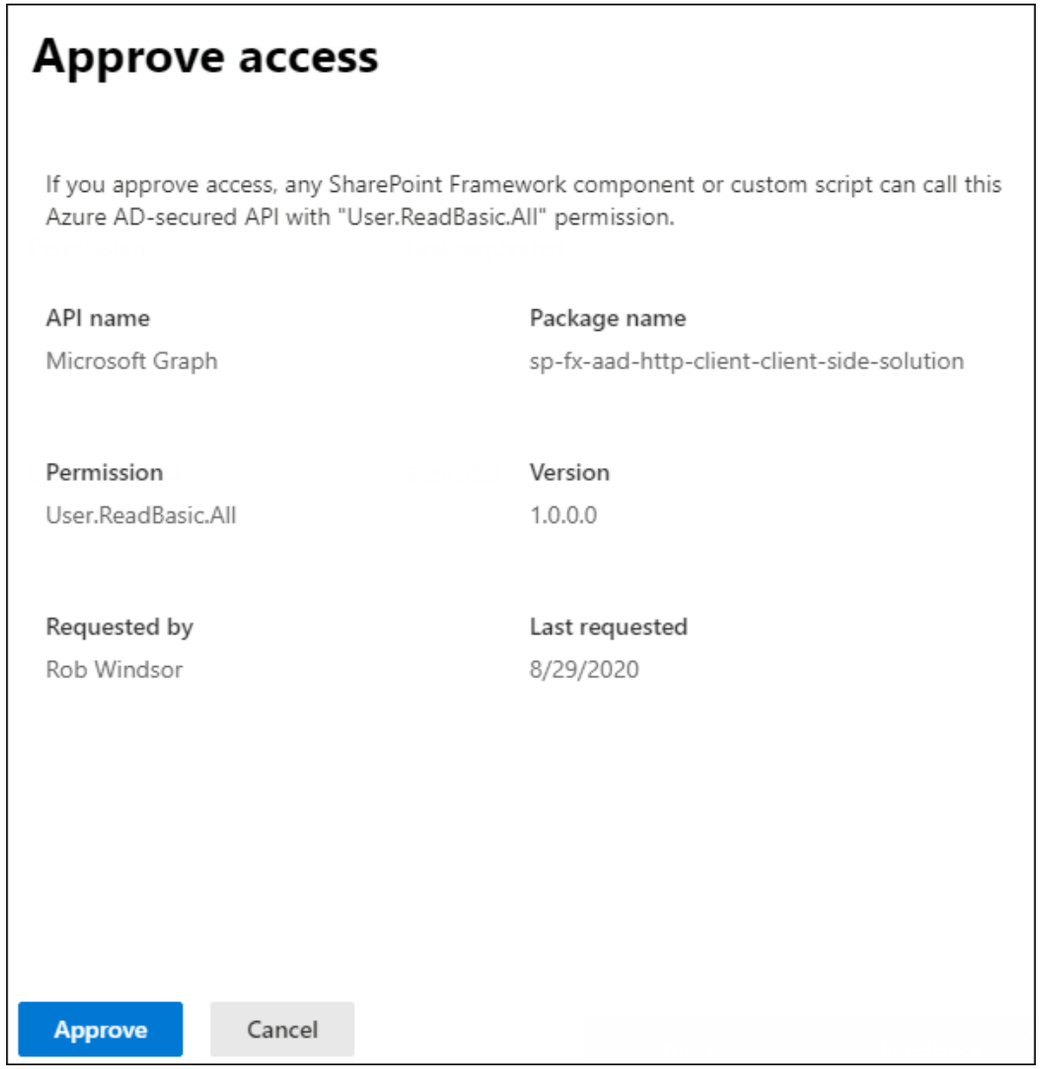

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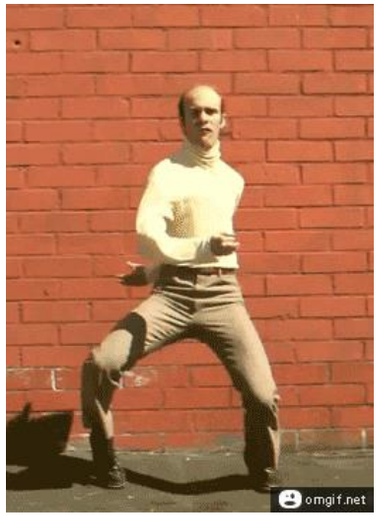


PNP Js library for data interaction

Overview of the PnPJs

Getting started

Getting Started with PnPJs

- PnPjs is a collection of fluent libraries for consuming SharePoint, Graph, and Office 365 REST APIs in a type-safe way.
- https://aka.ms/pnpjs
- Ideal for SPFx
- Great documentation
- Easy to set up and use

```
npm install @pnp/sp @pnp/graph --save
```

Getting Started with PnPJs

- Initialize by passing the context

```
import { spfi, SPFx } from "@pnp/sp";

//...

protected async onInit(): Promise<void> {
  await super.onInit();
  const sp = spfi().using(SPFx(this.context));
}

//...
```

Getting Started with PnPJs

- Import additional components vs All
  - Keep the bundle smaller
  - SharePoint

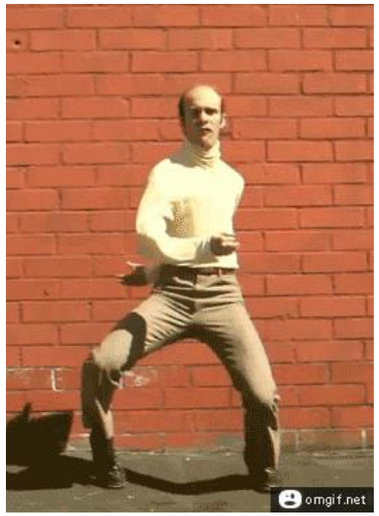
```
import { spfi, SPFx } from "@pnp/sp";
import "@pnp/sp/webs";
import "@pnp/sp/lists";
import "@pnp/sp/items";

// initialize
const sp = spfi (...)

// get all the items from a list
const items: any[] = await sp.web.lists.getByTitle("My List").items();
```

DEMO TIME!

Put on your dancing shoes and let’s have some fun!







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