

Develop SharePoint solutions with Azure Functions and CSOM

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About the Speaker

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What is this
Azure Function
you speak of?

How does
Azure Function
Work

Session
Ingredients -
High Level

Demo 1 –
Runtime
Experience

Deconstructing
Demo 1

Exploring other
Ideas of Azure
Functions with
SharePoint

Demo 2 –
SharePoint Site
Provisioning
Azure Function

Q&A



Why do this session? Why does this matter? What Problem does it solve?

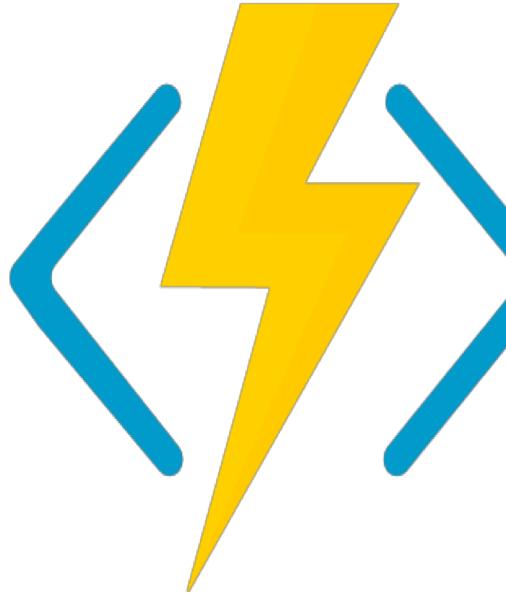
TL;DR;

So, this is a leave behind /hand out.... If you were not present when I delivered this session this will help frame why I feel this topic is important.

- SharePoint Farm solutions are in the past & even if you have an On Premises environment, you should be writing solutions that are portable i.e. can work both On Prem & In the Cloud – Azure Functions give you that
- There are other options other than writing code to run in the Web Browser aka JavaScript that are available to back end developers [like myself] who for whatever reason or another don't want to keep up with the cool kids 😊 -- Azure Functions give you that
- Azure Functions are multi faceted. What does that mean? I can use “THE SAME” Azure Function that I write for my SharePoint solution for my Web Solution, for my Mobile Solution, for whatever else... do you know why? Its event driven. I look out for an interaction, I respond to it. Input/Output



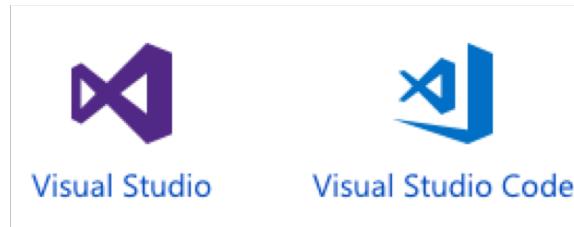
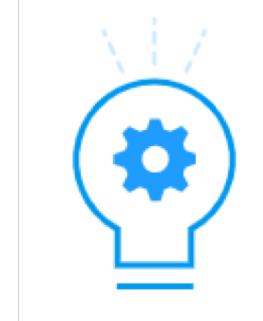
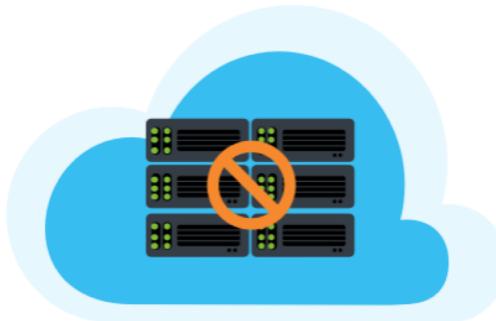
What is an Azure Function? How do you define it?



- Azure Functions is a *serverless* compute service that enables you to run code on-demand without having to explicitly provision or manage infrastructure. Use Azure Functions to run a script or piece of code in response to a variety of events. <https://docs.microsoft.com/en-us/azure/azure-functions>
- **Serverless** is the abstraction of servers, it is computing in a cloud execution model where you dynamically manage resources and runtime execution rather than on premises capacity



What is an Azure Function? How do you define it?



- No provisioning of Servers
- Fully managed compute platform that's scalable and secure
- Microservices approach to development, scalable and modular
- Triggers (event managing) and Bindings (integration)
- Develop within Azure IDE, Visual Studio, or VS Code



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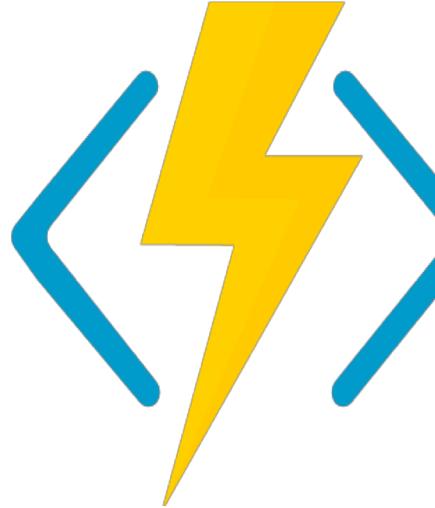
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What is an Azure Function? How do you define it?



- Write in the language you know: You know C#, do C#, you know JavaScript do your JavaScript, & more F#, Python, PHP, etc
- Consumption model or App Service Plan model
- Use your own libraries i.e. NuGet, NPM, or upload your own DLL
- Backed by OAuth providers such as AAD, and other Social IDP
- Integrate with other SaaS, Develop simply in the Azure IDE or use full SDLC with CI/CD DevOps



What is an Azure Function? How do you define it?

 HTTP trigger <p>A function that will be run whenever it receives an HTTP request, responding based on data in the body or query string</p> <p>C# F# JavaScript</p>	 Timer trigger <p>A function that will be run on a specified schedule</p> <p>C# F# JavaScript</p>	 Queue trigger <p>A function that will be run whenever a message is added to a specified Azure Storage queue</p> <p>C# F# JavaScript</p>
 Service Bus Queue trigger <p>A function that will be run whenever a message is added to a specified Service Bus queue</p> <p>C# F# JavaScript</p>	 Service Bus Topic trigger <p>A function that will be run whenever a message is added to the specified Service Bus Topic</p> <p>C# F# JavaScript</p>	 Blob trigger <p>A function that will be run whenever a blob is added to a specified container</p> <p>C# F# JavaScript</p>
 Event Hub trigger <p>A function that will be run whenever an event hub receives a new event</p> <p>C# F# JavaScript</p>	 Cosmos DB trigger <p>A function that will be run whenever documents change in a document collection</p> <p>C# JavaScript</p>	 IoT Hub (Event Hub) <p>A function that will be run whenever an IoT Hub delivers a new message for Event Hub-compatible endpoints</p> <p>C# F# JavaScript</p>



What is an Azure Function? How do you define it?

Scheduled mail
A function that will periodically send emails

C#

SendGrid
A function that sends a confirmation e-mail when a new item is added to a particular queue

C# F# JavaScript

Face locator
A function that processes images and outputs the bounding rectangle of faces using Cognitive Services

C# F# JavaScript

Image resizer
A function that creates resized images whenever a blob is added to a specified container

C# F#

SAS Token Generator
A function that generates a SAS token for a given Azure Storage container and blob name

C#

Manual trigger
A function that is triggered manually via the portal "Run" button

C# F# JavaScript

External table
A function that will be run whenever data is added to an external table store

C# F#

Application Insights scheduled digest
A function that sends a daily Application Insights telemetry report via email

C#

External file trigger
A function that will be run whenever a file is added to an external file store

C# F# JavaScript

Event Grid trigger
A function that will be run whenever an event grid receives a new event

C# JavaScript

Serverless Community Library (Preview)
Not finding what you're looking for? Check out the Azure Serverless Community Library!



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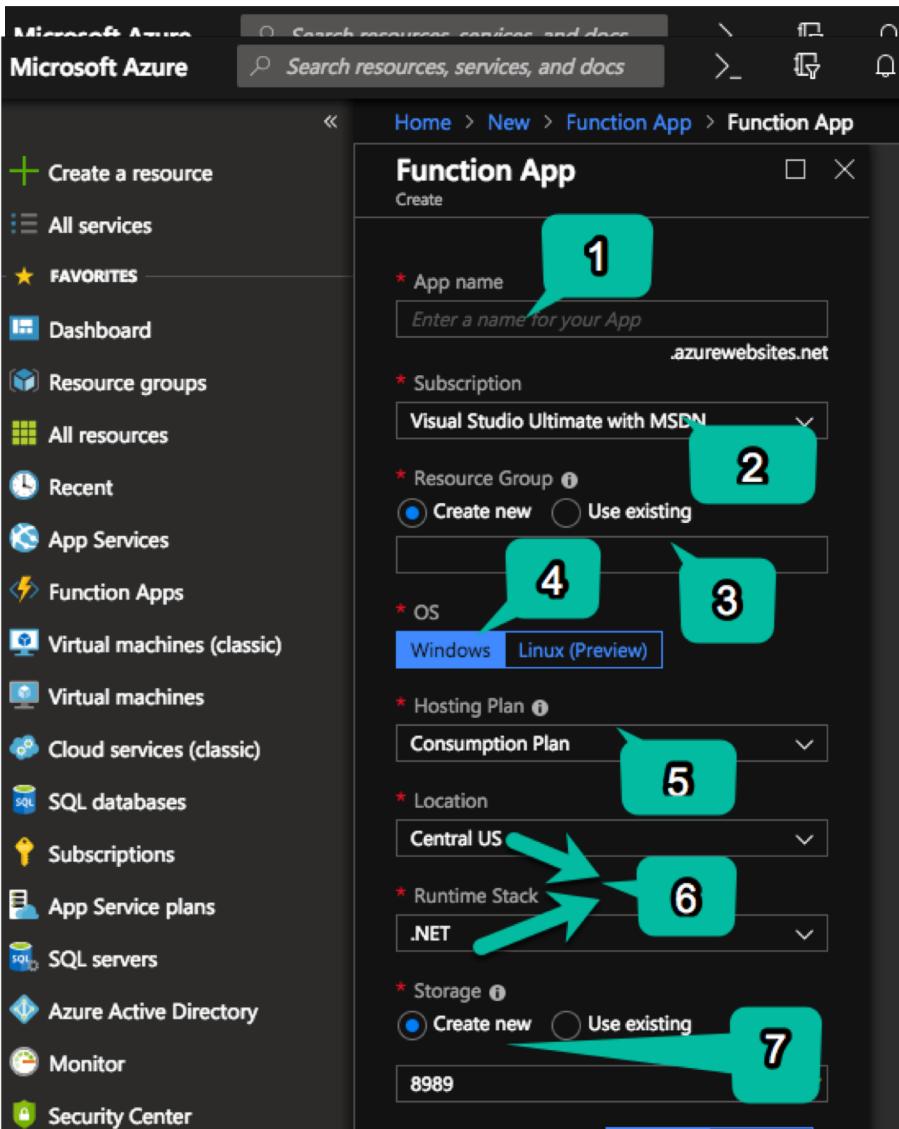
What do you need to do this



1. Set up and create your Azure Function
2. Create a Certificate that you will use for the Authentication in Azure AD. This is the broker that will identify the Azure Function with SharePoint Online
3. Stub out your Azure Function App to get the full URI
4. Register your Application [the Azure Function] in Azure AD
5. Grant the permission to your Application to work within your SharePoint (or other Azure backed workloads) environment
6. Finish Code your solution however you would like to, in the Azure Function IDE, VS, VSCode etc.



What do you need to do this



1. Provide a unique name which will become your endpoint URI for your function
2. Choose the subscription you want to use
3. Choose or create a Resource Group
4. I haven't done a Linux OS one yet TBH I now have
5. This is the choice between FREE & azure will do its best to stay awake & responsive "or" you allocate resource you will pay for & it will be performant and ready
6. Standard stuff
7. The function is backed by a storage account so choose one or create one. I typically will have a resource group already set up with storage so I keep everything easy to find and named similar but unique



Making of the Cert

#From Kirk Evans Blog

<https://blogs.msdn.microsoft.com/kaevans/2016/08/12/using-powershell-with-certificates/>

```
$cert = New-SelfSignedCertificate -KeyExportPolicy Exportable `  
-Provider "Microsoft Strong Cryptographic Provider" `  
-Subject "CN=FabianSPOOfficeFiles" `  
-NotBefore (Get-Date) `  
-NotAfter (Get-Date).AddYears(2) `  
-CertStoreLocation "cert:\CurrentUser\My" `  
-KeyLength 2048
```

```
Export-Certificate -Type CERT -Cert $cert -FilePath "C:\1fabsCert\FabsWillyPrivateCertDemo1.cer"
```

```
$cred = Get-Credential
```

```
Export-PfxCertificate -Cert $cert -Password $cred.Password -FilePath "C:\1fabsCert\FabsWillyPrivateCertDemo1.pfx"
```



Read back information from the Cert

```
Export-Certificate -Type CERT -Cert $cert -FilePath "C:\1fabsCert\FabsWillyPrivateCertDemo1.cer"
$cred = Get-Credential
Export-PfxCertificate -Cert $cert -Password $cred.Password -FilePath "C:\1fabsCert\FabsWillyPrivateCertDemo1.pfx"

$fabswillycer = New-Object System.Security.Cryptography.X509Certificates.X509Certificate2
$fabswillycer.Import("C:\1fabsCert\FabsWillyPrivateCertDemo1.cer")
$bin = $fabswillycer.GetRawCertData()
echo $bin
$base64Value = [System.Convert]::ToBase64String($bin)
echo $base64Value
$bin = $fabswillycer.GetCertHash()
$base64Thumbprint = [System.Convert]::ToBase64String($bin)
echo $base64Thumbprint
$keyid = [System.Guid]::NewGuid().ToString()
echo $keyid
$startDate = $($fabswillycer.NotAfter.ToString("s"))
echo $startDate
```



Register your Application (the Azure Function App)

The screenshot illustrates the steps to register a new application in the Azure portal:

- Step 1:** In the left sidebar, under the "Azure Active Directory" section, the "App registrations" item is selected (indicated by a green speech bubble with the number 2).
- Step 2:** On the main page, the "New application registration" button is highlighted (indicated by a green speech bubble with the number 3).
- Step 3:** A modal window titled "Create" is open, showing the configuration for the new application:
 - Name:** DemoWareOne
 - Application type:** Web app / API
 - Sign-on URL:** kzS8e1Op7HoGf4bMLB0O0fqZChdrUiZLN ... (partial URL shown)

Set the Required Permissions on the App

Microsoft Azure Search resources, services, and docs > Home > JahMekYan Enterprises - App registrations > AzureFunctCsm1 > Settings > Required permissions

AzureFunctCsm1
Registered app

Settings Manifest Delete

Display name: AzureFunctCsm1
Application type: Web app / API
Home page: <https://ewebsites.net/api/a...>

Object ID: Application ID Object ID
Managed app: AzureFunctC

Required permissions

Add Grant permissions

API	APPLICATION PERMI...	DELEGATED PERMI...
Office 365 SharePoint Online	2	0
Windows Azure Active Directory	0	1

Enable Access
Office 365 SharePoint Online

Save Delete

APPLICATION PERMISSIONS

<input checked="" type="checkbox"/> Read user profiles	Yes
Read and write user profiles	Yes
Read and write managed metadata	Yes
Read managed metadata	Yes
Read and write items and lists in all site collections	Yes
Have full control of all site collections	Yes
Read items in all site collections	Yes
<input checked="" type="checkbox"/> Read and write items in all site collections	Yes

DELEGATED PERMISSIONS

Read user profiles	Yes
Read and write user profiles	Yes
Read and write user files	No
Read user files	No
Have full control of all site collections	Yes
Read and write items and lists in all site collections	No



csomfun - b_SubWebCreationUtil

Function Apps

 Search

All subscriptions

Function Apps

affspv1fabs

csomfun

Functions

a_DisplaySPOOfficeFiles

Integrate

Manage

Monitor

b_SubWebCreationUtil

Integrate

Manage

Monitor

Proxies

Slots (preview)

fabhw

fabsFAIgnite2017K2

fabsfunctalpha

Save

Cancel

csomHelper.csx

```
1- using Microsoft.IdentityModel.Clients.ActiveDirectory;
2- using Microsoft.SharePoint.Client;
3- using System.Security.Cryptography.X509Certificates;
4-
5- public static class csomHelper {
6-
7-     private static string ClientId = "REDACTEDdc82469b62f7"; // Fill in name
8-     private static string Cert = "FabianWilliamsPrivateCert.pfx";
9-     private static string CertPassword = "REDACTED" // TODO: Explore more secure place for this
10-    private static string Authority = "https://login.windows.net/fabswilly.onmicrosoft.com/";
11-    private static string Resource = "https://fabswilly.sharepoint.com/";
12-
13-    public static ClientContext GetClientContext(string siteUrl)
14-    {
15-        var authenticationContext = new AuthenticationContext(Authority, false);
16-
17-        // TODO: Substitute your Azure function name for GetDocUrl2 below:
18-        var certPath = Path.Combine(Environment.GetEnvironmentVariable("HOME"), "site\\wwwroot\\shared\\");
19-        var cert = new X509Certificate2(System.IO.File.ReadAllBytes(certPath),
20-            CertPassword,
21-            X509KeyStorageFlags.Exportable |
22-            X509KeyStorageFlags.MachineKeySet |
23-            X509KeyStorageFlags.PersistKeySet);
24-
25-        string jsonC = null;
26-        var pl = JsonConvert.SerializeObject(authenticationContext);
27-        log.Info($"Serialized authentication context: {pl}");
28-
29-        //ClientResource
30-        try {
31-            // Get token
32-            using (var client = new HttpClient())
33-            {
34-                WebOperationContext.Current.ClientCredentials.ClientCertificate.Certificate = cert;
35-                WebOperationContext.Current.ClientCredentials.UserName.UserName = "REDACTED";
36-                WebOperationContext.Current.ClientCredentials.UserName.Password = "REDACTED";
37-            }
38-        }
39-        catch (Exception ex) {
40-            log.Error(ex.Message);
41-        }
42-
43-        var authenticationResult = await authenticationContext.AcquireTokenAsync(Resource, new ClientCredential("REDACTED", "REDACTED"));
44-        var token = authenticationResult.AccessToken;
45-
46-        var ctx = new ClientContext(siteUrl);
47-        ctx.ExecutingWebRequest += (s, e) =>
48-        {
49-            e.WebRequestExecutor.RequestHeaders["Authorization"] = "Bearer " + authenticationResult.AccessToken;
50-        };
51-
52-        return ctx;
53-    }
54-
```



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DEMO 1

Give Access to a SharePoint Online
Document based on Input from the
user

Demo 1 Leave Behind

The screenshot shows the Postman application interface. The top navigation bar includes 'Postman', 'File', 'Edit', 'View', 'Window', and 'Help'. The top right corner displays system icons and the date 'Thu Oct 18'. The main header says 'My Workspace' with a dropdown arrow. Below it, there are several status indicators and a 'No Environment' dropdown.

The left sidebar is titled 'Collections' and lists several items:

- AzureFunctions and CSOM (2 requests)
- CreateSharePointWeb (1 request)
- DocumentDB copy (16 requests)
- FabianPlayPen (1 request)
- FDA1 (9 requests)
- Postman Echo (21 requests)
- WithumPEAssurance (20 requests)

The central workspace shows a collection named 'Find SPO File via WOPI'. A POST request is selected with the URL https://csmofun.azurewebsites.net/api/a_DisplaySPOOfficeFile. The 'Body' tab is active, showing JSON input:

```
1 {  
2   "docLibandPath": "/Shared%20Documents/Leaves%20Behind/Leaves%20Behind%20-%20Fabian.xlsx",  
3   "siteUrl": "https://fabswilly.sharepoint.com"  
4 }
```

The 'Body' tab also includes tabs for 'Pretty', 'Raw', 'Preview', and 'JSON'. The status bar at the bottom right indicates 'Status: 200 OK' and 'Time: 4349 ms'.

Demo 1 Leave Behind

The screenshot shows a Microsoft Edge browser window with three tabs open. The active tab is titled 'App registrations - Microsoft Az' and has a URL starting with 'https://fabswilly.sharepoint.com/:x/r/_layouts/15/Doc.aspx?'. The other two tabs are titled 'Site Contents'.

The browser title bar also displays 'Excel Online'.

The main content area shows a table comparing two migration tools:

A	B	C
1 Topic	Metalogix	Sharegate
2	Diagnostic Manager	Standard Migration
3	Content Matrix	Nintex Migration

The table has three columns labeled A, B, and C. Row 1 contains 'Topic' under A, 'Metalogix' under B, and 'Sharegate' under C. Row 2 contains an empty cell under A, 'Diagnostic Manager' under B, and 'Standard Migration' under C. Row 3 contains an empty cell under A, '**Content Matrix**' under B, and 'Nintex Migration' under C.



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Questions you may have

- What is csomHelper.csx and why do you need it?
 - Answer in session
- What are the use cases for a function like this?
 - Think mobile app or web app something where SPO is an external resource
- In this example I used querystring in the next i will use post body
 - Oversimplified??? Yes. But it illustrates the point of making CSOM Calls.. The next demo we will be creating a Web Site so that's a bit more meaningful & we will use a complex object



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What else can I do? What is available to me?

- Lets take a look in the portal for the Triggers and Bindings in ways I've used it before
- Lets take a look at Advanced Kudu Options and the other Areas I have not even touched yet



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Demo 2 – Leave behind

The screenshot shows the Postman application interface. The top navigation bar includes File, Edit, View, Window, Help, and a status bar showing 'Thu Oct 18 16 53 58'. The main area displays a collection titled 'Create SPO Site via AzFunct CSOM'. The left sidebar lists several collections: 'AzureFunctions and CSOM' (2 requests), 'CreateSharePointWeb' (1 request), 'DocumentDB copy' (16 requests), 'FabianPlayPen' (1 request), 'FDA1' (9 requests), 'Postman Echo' (21 requests), and 'WithumPEAssurance' (20 requests). The current request is a POST to https://csomfun.azurewebsites.net/api/b_SubWebCreationUtil?code=TI3ss.... The 'Body' tab is selected, showing a JSON payload:

```
1 {  
2   "scUrl" : "https://fabswilly.sharepoint.com",  
3   "title" : "PreSPSBMore Demo Code",  
4   "description" : "fabtester SPSBmore1 from Chrome Postman ",  
5   "url" : "prespsbmore1",  
6   "template" : "STS#0"  
7 }
```

The response section shows a status of 200 OK, time 9529 ms, and size 182 B. The response body is empty, indicated by a single digit '1'.

Demo 2 – Leave behind

The screenshot shows a SharePoint site named "JahMekYan Enterprises Team Site". The left navigation bar includes links for Home, Notebook, Documents, Pages, Site contents (which is selected), and Recycle bin. The main content area displays the "Site Contents" page for the "Subsites" tab. It lists two items:

Name	Description	Views	Created
PreSPSBMore Demo Code	fabtester SPSbmore1 from Chrome Postman		21 minutes ago
SPC 19 Pre Demo Code	fabtester1 from Chrome Postman		26 days ago

Two large green arrows point to the "Name" and "Description" columns of the first item, "PreSPSBMore Demo Code".

Demo 2 – Leave behind

S App registrations - Microsoft A X Site Contents X Site Contents X PreSPSBMore Demo Code - Ho X +

→ X Home https://fabswilly.sharepoint.com/prespsbmore1/SitePages/Home.aspx fabian@fabswilly ● ... 🔍 ☆

Office 365 SharePoint

WSE PAGE SHARE FOLLOW

Search this site

PreSPSBMore Demo Code

Get started with your site REMOVE THIS

- Share your site.
- Working on a deadline?
- Add lists, libraries, and other apps.
- What's your style?
- Your site. Your brand.

Newsfeed

Start a conversation

It's pretty quiet here. [Invite](#) more people to the site, or [start](#) a conversation.

Documents

New Upload Sync Share More

Find a file

Name

Drag files here to upload

DEMO 2

Auto Provisioning a SharePoint Site
using Azure Functions. Use Case is a
Tweet, a Slack Message, a MS Flow,
tons of reason you want outside
influence to manipulate internal
protected resources



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