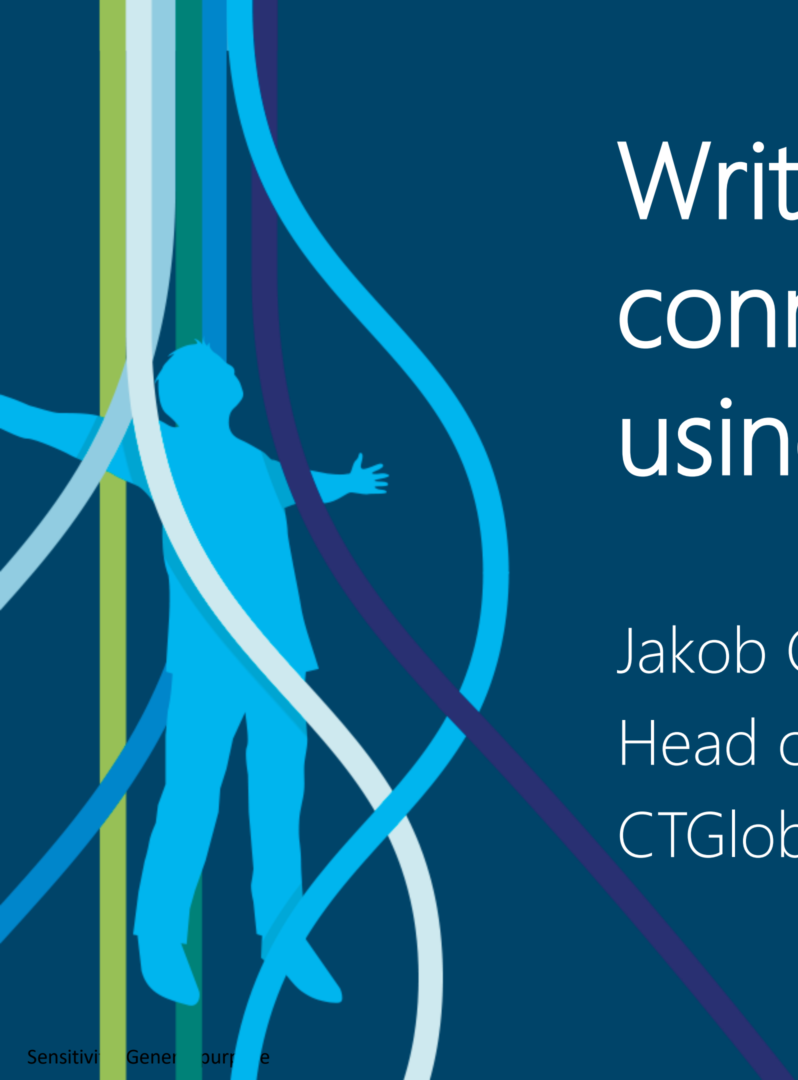


Writing custom Office 365 connectors in PowerShell using Graph API

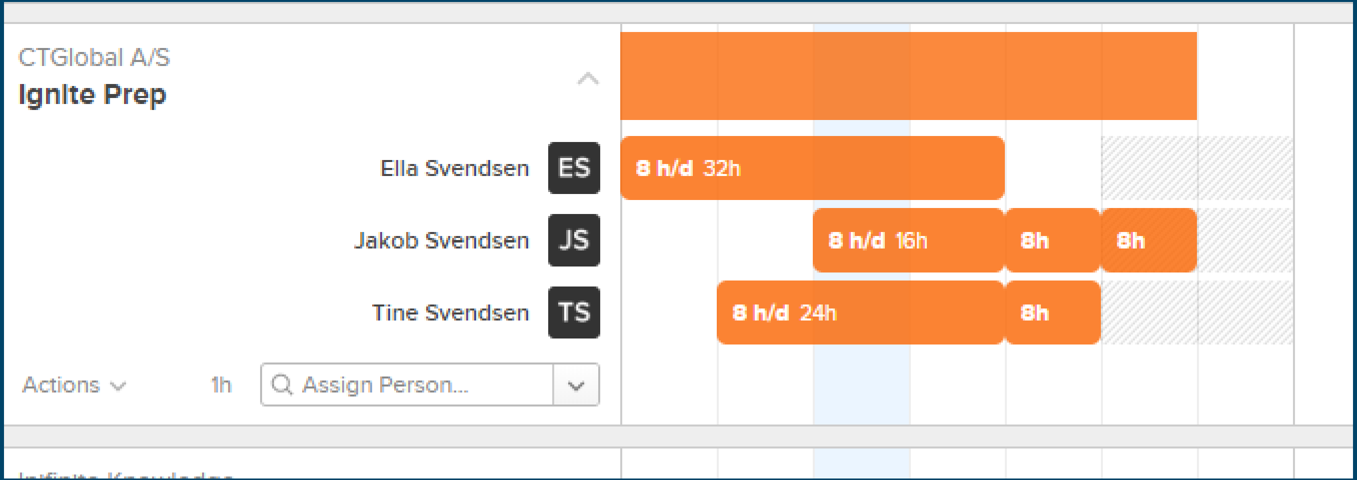
Jakob Gottlieb Svendsen
Head of Development / Microsoft MVP
CTGlobal A/S

Experts Live Europe

Agenda

- Intro to scenario
- Using & Extending Graph
- Connectors in Azure Functions (PowerShell)

Setting the context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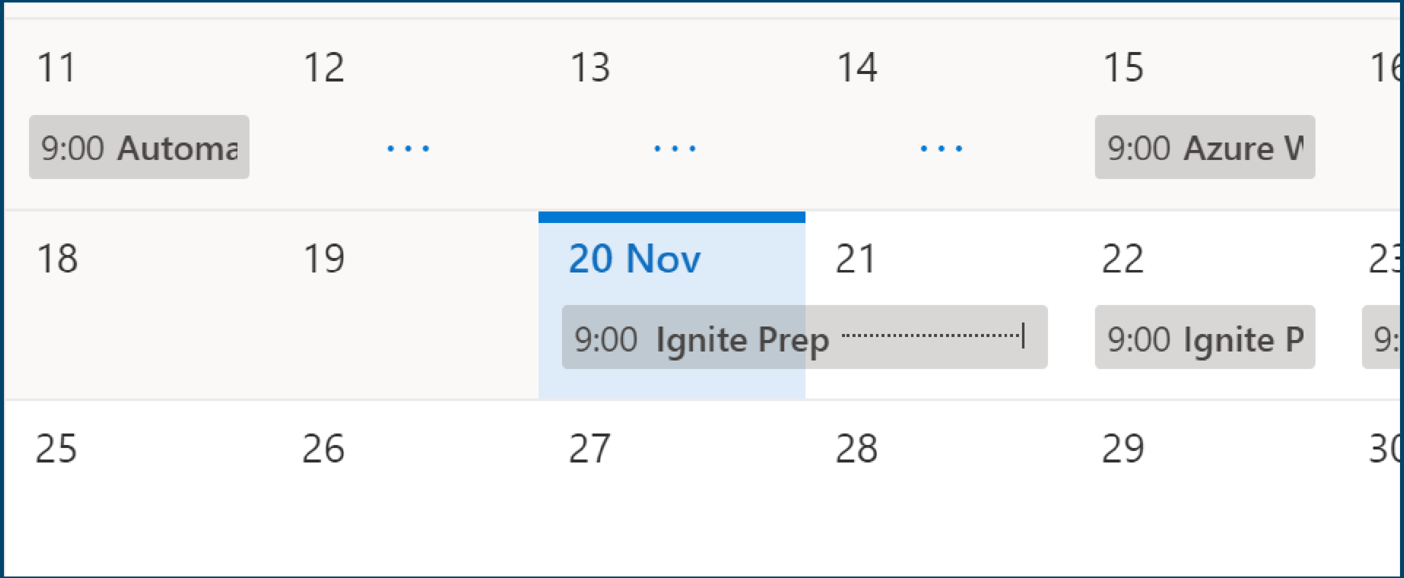
Ignite Prep

Ella Svendsen	ES	8 h/d 32h
Jakob Svendsen	JS	8 h/d 16h · 8h · 8h
Tine Svendsen	TS	8 h/d 24h · 8h

Forecast
www.forecastapp.com
Time Management

Sensitivity: General purpose

Setting the context



Outlook Calendar
www.office.com

Official Graph API Module

- Very early
- Very promising!
- Could be used but not ready ATM
- Commands for each purpose (User/Event/File etc.)
- Lots is missing (get-usercalendarview cmdlet fail)

https://github.com/microsoftgraph/msgraph-sdk-powershell

My Graph API Module

- Recently updated to not require auth dlls!
- Windows PowerShell and PowerShell compatible (Core)
- Very Basic
- Authentication
- Any Query – Invoke-GraphQuery

https://www.powershellgallery.com/packages/MicrosoftGraphAPI/

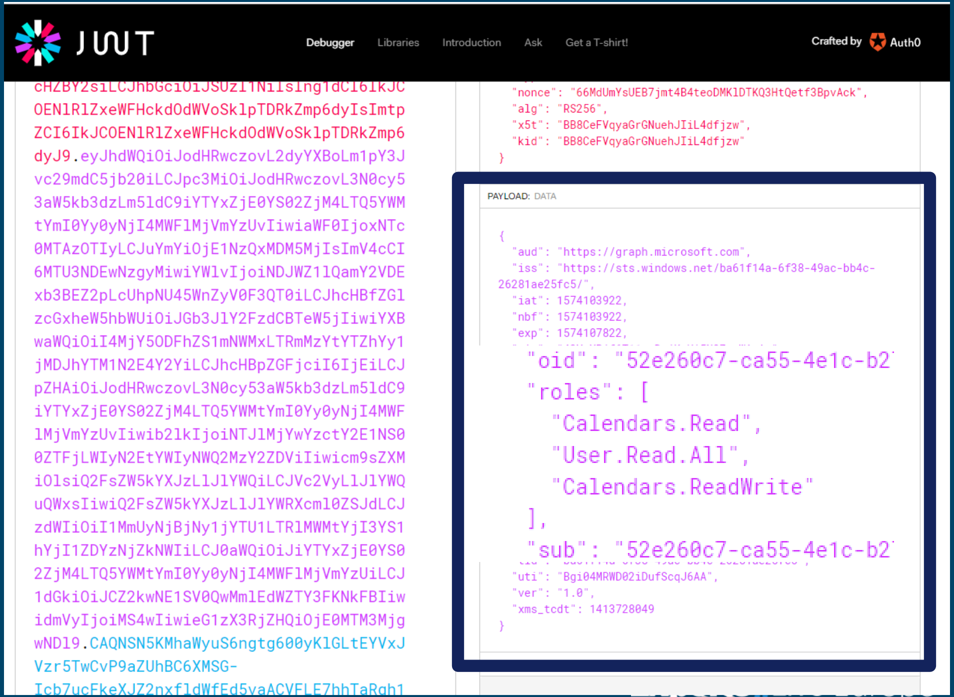
Permissions

- Delegate
  - User
  - Cannot access all other users
- Application
  - Need certificate or client secret
  - All can be read

https://docs.microsoft.com/en-us/graph/permissions-reference

Troubleshoot Access tokens

- Decode using JWT.IO



```
cHZBY2siLCJhbGciOiJSUzI1NiIsIng1dCI6IkJC
OENlRlZxeWFHckdOdWVoSklpTDRkZmp6dyIsImtp
ZCI6IkJCOENlRlZxeWFHckdOdWVoSklpTDRkZmp6
dyJ9.eyJhdWQiOiJodHRwczovL2dyYXBoLm1pY3J
vc29mdC5jb20iLCJpc3MiOiJodHRwczovL3N0cy5
3aW5kb3dzLm5ldC9iYTYxZjE0YS02ZjM4LTQ5YWM
tYmI0Yy0yNjI4MWFlMjVmYzUvIiwiaWF0IjoxNTc
0MTAzOTIyLCJuYmYiOjE1NzQxMDM5MjIsImV4cCI
6MTU3NDEwNzgyMiwiYWlvIjoiNDJWZ1lQamY2VDE
xb3BEZ2pLcUhpNU45WnZyV0F3QT0iLCJhcHBfZGl
zcGxheW5hbWUiOiJGb3JlY2FzdCBTeW5jIiwiYXB
waWQiOiI4MjY5ODFhZS1mNWMxLTRmMzYtYTZhYy1
jMDJhYTM1N2E4Y2YiLCJhcHBpZGFjciI6IjEiLCJ
pZHAiOiJodHRwczovL3N0cy53aW5kb3dzLm5ldC9
iYTYxZjE0YS02ZjM4LTQ5YWMtYmI0Yy0yNjI4MWF
lMjVmYzUvIiwib2lkIjoiNTJlMjYwYzctY2E1NS0
0ZTFjLWIyN2EtYWIyNWQ2MzY2ZDViIiwicm9sZXM
iOlsiQ2FsZW5kYXJzLlJlYWQiLCJVc2VyLlJlYWQ
uQWxsIiwiQ2FsZW5kYXJzLlJlYWRXcml0ZSJdLCJ
zdWIiOiI1MmUyNjBjNy1jYTU1LTRlMWMtYjI3YS1
hYjI1ZDYzNjZkNWIiLCJ0aWQiOiJiYTYxZjE0YS0
2ZjM4LTQ5YWMtYmI0Yy0yNjI4MWFlMjVmYzUiLCJ
1dGkiOiJCZ2kwNE1SV0QwMmlEdWZTY3FKNkFBIiw
idmVyIjoiMS4wIiwieG1zX3RjZHQiOjE0MTM3Mjg
wNDl9.CAQNSN5KMhaWyuS6ngtg600yKlGLtEYVxJ
Vzr5TwCvP9aZUhBC6XMSG-
Icb7ucFkeXJZ2nxfldWfEd5vaACVFLE7hhTaRgh1
```

```
  "nonce": "66MdUmYsUEB7jmt4B4teoDMKlDTKQ3HtQetf3BpvAck",
  "alg": "RS256",
  "x5t": "BB8CeFVqyaGrGNuehJIiL4dfjzw",
  "kid": "BB8CeFVqyaGrGNuehJIiL4dfjzw"
}
```

PAYLOAD: DATA

```
{
  "aud": "https://graph.microsoft.com",
  "iss": "https://sts.windows.net/ba61f14a-6f38-49ac-bb4c-
26281ae25fc5/",
  "iat": 1574103922,
  "nbf": 1574103922,
  "exp": 1574107822,
  "oid": "52e260c7-ca55-4e1c-b2
  "roles": [
    "Calendars.Read",
    "User.Read.All",
    "Calendars.ReadWrite"
  ],
  "sub": "52e260c7-ca55-4e1c-b2
  "uti": "Bgi04MRWD02iDufScqJ6AA",
  "ver": "1.0",
  "xms_tcdt": 1413728049
}
```

Demo – Auth tokens

Extend Graph API

- Name
  - Verified domain
    - Must be .com, .net, .gov, .edu, .org
  - Special Name
    - Auto generated
    - ext{8-char-random-alphanumeric}_{your-supplied-name}

https://docs.microsoft.com/en-us/graph/api/schemaextension-post-schemaextensions?view=graph-rest-beta&tabs=http

Experts Live Europe

Demo – Graph Custom Field

Odata

- Expand
- Select
- Filter
- Top

https://graph.microsoft.com/beta/me/calendar/calendarView?startDateTime={0:yyyy-MM-ddTHH:mm:ss.fffffff}&endDateTime={1:yyyy-MM-ddTHH:mm:ss.fffffff}&`$top=10000&`$filter=categories/any(c: c eq 'ForecastV2')&`$select=*,$propertyExtName" -f $start_datetime, $end_datetime ;

Odata

https://graph.microsoft.com/beta/

me/

calendar/calendarView?

startDateTime={0:yyyy-MM-ddTHH:mm:ss.fffffff}

&endDateTime={1:yyyy-MM-ddTHH:mm:ss.fffffff}

&$top=10000

&$filter=categories/any(c: c eq 'ForecastV2')&

$select=*,$propertyExtName

-f $start_datetime, $end_datetime

Demo – OData Expand

Azure Functions - PowerShell

- PowerShell Core
- Triggers
  - Timer Trigger
  - HTTP Trigger
  - More

Azure Functions – PS inputs

- Each trigger
- $TriggerMetaData
  - FunctionName

Authoring in VS Code

- Create Project
- Run! – Emulator Functions/Storage
- Deploy
- Sync Settings

https://docs.microsoft.com/en-us/azure/azure-functions/functions-create-first-function-powershell

Demo – Authoring

Modules From Gallery

- Add Dependencies in requirements.psd1

```
@{
    'Az' = '2.*'
    'AzTable' = '2.*'
}
```

Modules Locally

- Make a "Modules" folder
- Reference the module folder by full path:

```
$pwd\$($TriggerMetadata.FunctionName)\Modules

D:\home\site\wwwroot\<FunctionName>\Modules
```

Saving States

- Local Storage - %HOME%\data
  - Shared by instances
  - Easy to use
  - Is deleted on move to new compute host - On large rise of load
  - Stays on app service plan
- Azure Storage Account – Table Storage
  - Module: CTToolkit

Scale / Performance

- Minimize period
- Use last run as base for query
- CTToolkit!

https://www.powershellgallery.com/packages/CTToolkit/1.0.2

Demo – Saving States

Concurrency

- TimerTrigger is never parallel
- Other Triggers can be!
- Set $ENV:PSWorkerInProcConcurrencyUpperBound

https://docs.microsoft.com/en-us/azure/azure-functions/functions-reference-powershell#concurrency

Demo – The Connector

@JakobGSvendsen
JakobGSvendsen

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Thank you!