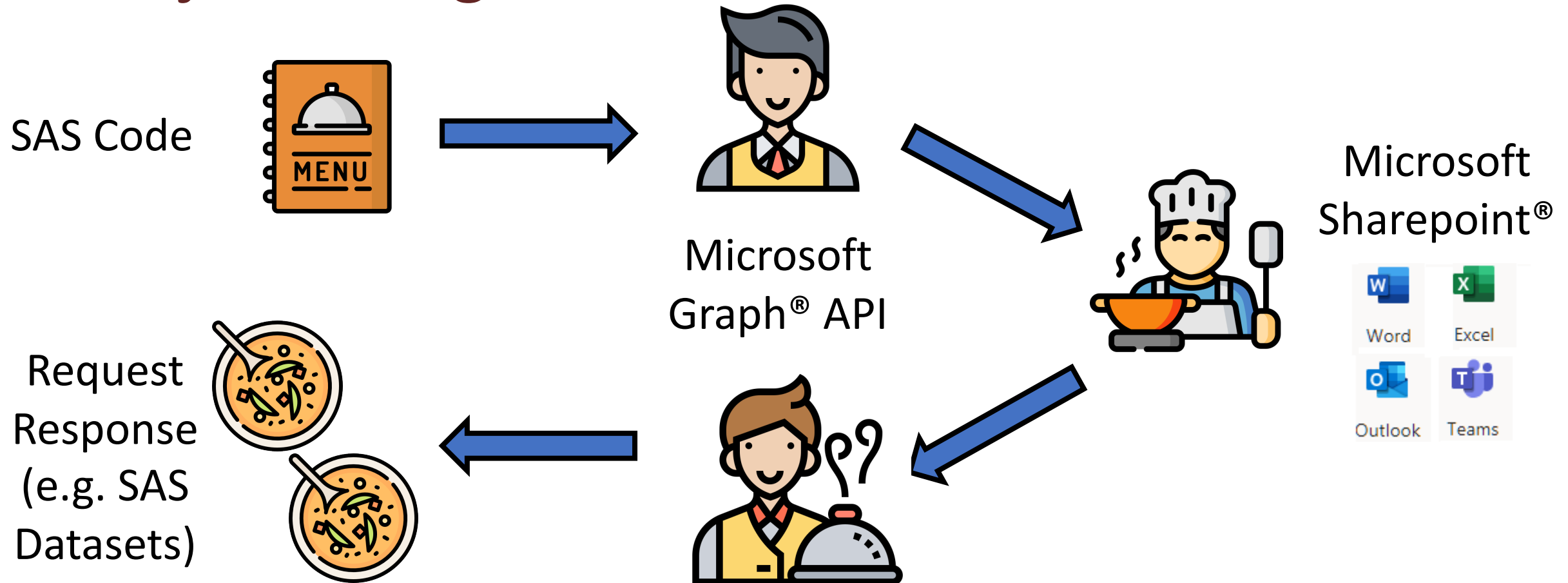




Efficient Implementation and Applications of PROC HTTP in Analysis and Reporting

Simon Todd

Project Background



PROC HTTP

```
proc http
```

```
    url="https://clinicaltrialsapi.cancer.gov/v1/terms?  
        term=metastatic&term_type=official_title"
```

```
    method="GET"
```

```
    out=outfile;
```

```
run;
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Method Verb Examples:

- PUT
- POST
- PATCH
- CREATE

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```
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```

```
%* Set up libname for JSON file output *;
```

```
libname nciterms json fileref=outfile;
```

PROC HTTP

```
proc http
```

```
url=https://graph.microsoft.com/v1.0/{resources}/{action}  
{query}
```

```
method="GET"
```

```
oauth_bearer="&access_token"
```

```
out=outfile;
```

```
run;
```

PROC HTTP

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```
run;
```

```
&SYS_PROCHTTP_STATUS_CODE
```

```
&SYS_PROCHTTP_STATUS_PHRASE
```

Utility Access Macros

- %get_token
 - Acquire access token
- %refresh_token
 - Uses Refresh token to update access token in case of expiry
- %process_token_file
 - Set token values to macro variables

Locating and Importing a file

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid.>

- ID values used to build full URL

<https://graph.microsoft.com/v1.0/groups>

- Return all groups user has access to
- 'GET' method

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[https://graph.microsoft.com/v1.0/groups?\\$filter=displayname eq 'Example Project'&\\$select=DisplayName,ID](https://graph.microsoft.com/v1.0/groups?$filter=displayname eq 'Example Project'&$select=DisplayName,ID)

- Query strings – OData System Query Options
- Prevent 'overfetching'

Locating and Importing a file

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid.>

- ID values used to build full URL

<https://graph.microsoft.com/v1.0/groups/Ab321C789d/drive/items/M09s6sa5/content>

- 'Content' action parameter
- 'GET' method

File Import Application

- Validation Tracker – Titles and Footnotes

	A	B	C	D	E
1	Output Type	Output Number	Title	Production Program Name	Footnote 1
2	Table	11.1.1	Patient disposition (All patients)	ds200.sas	[a] Informed consent received.
3	Table	11.1.2	Important protocol deviations (Full analysis set)	dv200.sas	[a] Important deviations before the start of treatment and during treatment.
4	Table	11.1.3	Analysis sets	ds201.sas	PK=Pharmacokinetics.

- Automation of key locations:
 - SAS_EXECFILENAME
 - SAS_EXECFILEPATH
- Instant update timing
- Files not locked when open for manual edit

File Export Process

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/root:/example.xlsx:/content>

- 'PUT' method
- 'Content' action parameter
- Relative path URL ':'
- SAS Datasets exported to work library as xlsx
- Only works for files <4MB
 - '413 – Payload Too Large'
 - FSIZE function

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File Export Application

- Raw data issue reports
- Can be shared automatically with non-organisation team members

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./invite>

- 'Invite' action parameter
- 'POST' method
- Read/Write access control
- '423 – Locked'

File Export Application

- Raw data issue reports
- Can be shared automatically with non-organisation team members

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./invite>

- 'Invite' action parameter
- 'POST' method
- Read/Write access control
- '423 – Locked'

Workbook manipulation

<https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/createSession>

- Retrieve and edit specific cell content
- Not restricted by sheets open for editing
- 'PersistChanges' header
- 'POST' method
- 'CreateSession' action parameter
- Session ID key value for subsequent requests
 - 'RefreshSession' action parameter

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[https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/worksheets/&sheetname./range\(address='A1'\)](https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/worksheets/&sheetname./range(address='A1'))

- Sheet name or ID required for URL
- 'Range(address='A1:B2')' action parameter
- 'PATCH' method
- Value for cell update as input

Workbook manipulation

[https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/worksheets/&sheetname./range\(address='A1'\)](https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/worksheets/&sheetname./range(address='A1'))

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Workbook manipulation application

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- Log and compare summaries
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[https://graph.microsoft.com/v1.0/groups/
&groupid./drive/items/&fileid./workbook/
functions/match](https://graph.microsoft.com/v1.0/groups/&groupid./drive/items/&fileid./workbook/functions/match)

Conclusion

- Minor manual setup
- Huge potential for automation of processes
- Access token security considerations
- Alternative API and cloud storage providers

Questions

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