Service | Innovation | Value

Standard Operation Procedure (SOP)

Azure LZ Reporting Tool

Chief Technology Officer Branch (CTO)
Cloud Product Management and Service Directorate (CPMSD)
Azure Landing Zone

Version: 1

Date: November, 2019

Doc ID: <aaa-nnn>

Shared Services Canada
Services partagés Canada

Canada

DOCUMENT HISTORY AND REFERENCES

Document History

Version	Date yyyy-mm-dd	Description of Change	Author(s)
1.0	*2020-04-24*	*Document Creation*	*CTO-CPM&SD–R&D*
1.1	*2020-06-15*	*Final Draft*	*CTO-CPM&SD–R&D*

Table of Contents

1. INTRODUCTION 4

1.1 PURPOSE 4

1.2 DOCUMENT LIFECYCLE AND INTENDED AUDIENCE 4

2. AZURE LZ REPORTING TOOL 5

2.1. GRAPHICAL USER INTERFACE (GUI) DESIGN 5

2.2. IMAGES 5

2.3. IMAGE ENCODING (BASE64) 6

2.4. POWERSHELL SCRIPT CODE 9

2.4.1 Script Basics 9

2.5. CONVERTING THE POWERSHELL SCRIPT TO EXE 11

1. Introduction

1.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to document the process used to create and package the Azure Landing Zone (LZ) Reporting Tool.

1.2 Document Lifecycle and Intended Audience

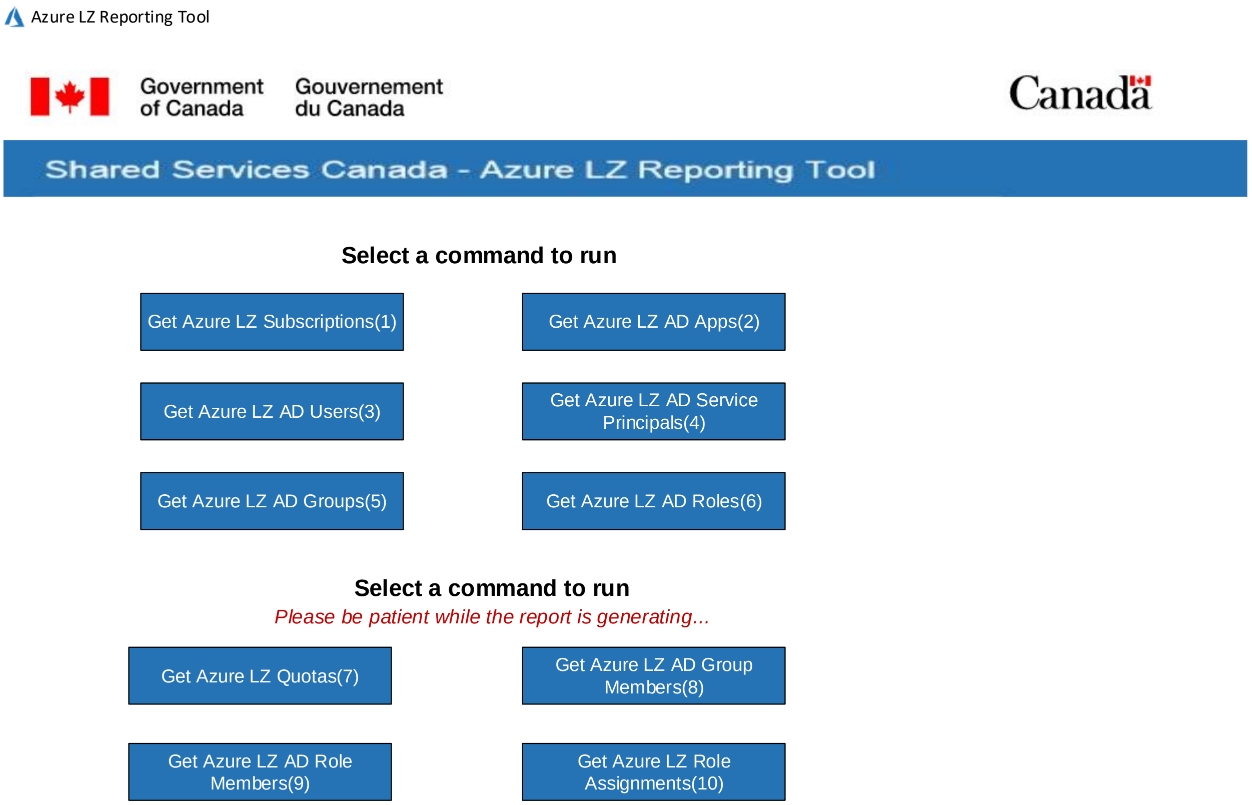
The intended audience of this document is currently limited to Azure LZ Cloud Services administrators however, this tool may be later repurposed for other public cloud solutions such as AWS or for on-premise products as Azure Stack.

This Standard Operation Procedure document will be reviewed and updated as needed.

2. Azure LZ Reporting Tool

2.1. Graphical User Interface (GUI) Design

The following is a Microsoft Visio drawing of the proposed graphical user interface.


Azure LZ Reporting Tool
Government of Canada
Gouvernement du Canada
Canada
Shared Services Canada - Azure LZ Reporting Tool
Select a command to run
Get Azure LZ Subscriptions(1)
Get Azure LZ AD Apps(2)
Get Azure LZ AD Users(3)
Get Azure LZ AD Service Principals(4)
Get Azure LZ AD Groups(5)
Get Azure LZ AD Roles(6)
Select a command to run
Get Azure LZ Quotas(7)
Get Azure LZ AD Group Members(8)
Get Azure LZ AD Role Members(9)
Get Azure LZ Role Assignments(10)

Please be patient while the report is generating...

2.2. Images

The following images were used in the GUI.

Azure.ico

Canada.jpg

SSC.jpg

Shared Services Canada - Azure LZ Reporting Tool

goc.jpg

2.3. Image Encoding (base64)

The images pictured in the Azure LZ Reporting Tool GUI have been encoded to base64 format to facilitate their packaging when using the PS2EXE-GUI tool.

To encode an image in base64 use the ConvertToBase64String.ps1 script.

Example:

```
[Convert]::ToBase64String((Get-Content "C:\Projects\azure-lz-iac-
dev\Tools\Azure_LZ_Reporting_Tool\images\Canada.jpg" -Encoding Byte))
```

```
/9j/4AAQSkZJRgABAQEAYABgAAD/4RDuRXhpZgAATU0AKgAAAAgABAE7AAIAAAAMAAAISodpAAQAAAABAAAI
VpydAAEAAAAYAAAQzuocAACAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAE
x1YyBTdC1KZWFuAAAFkAMAAgAAABQAABCkkAQAAgAAABQAABC4kpEAAgAAAAM1MAAAkpIAAgAAAAM1MAAA6h
wABwAACAwAAAiYAAAAABzqAAAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAMjAyMDowNDoyMiAxNTow
NjoyMQAyMDIwOjA0OjIyIDE1OjA2OjIxAAAATAB1AGMAIABTAHQALQBKAGUAYQBuAAAA/+ELHmh0dHA6Ly9u
cy5hZG9iZS5jb20veGFwLzEuMC8APD94cGFja2V0IGJlZ2luPSfvu78nIGlkPSdXNU0wTXBDZWhpSHpyZVN6
TlRjemtjOWQnPz4NCjx4OnhtcG1ldGEgeG1sbnM6eD0iYWRvYmU6bnM6bWV0YS8iPjxyZGY6UkRGIHhtbG5z
OnJkZj0iaHR0cDovL3d3dy53My5vcmcvMTk
5OS8wMi8yMi1yZGYtc3ludGF4LW5zIyI+PHJkZjpEZXNjcmlwdGlvbiByZGY6YWJvdXQ9InV1aWQ6ZmFmNWJ
kZDUtYmEzZC0xMWRhLWFkMzEtZDMzZDc1MTgyZjFiIiB4bWxuczpkYz0iaHR0cDovL3B1cmwub3JnL2RjL2V
sZW1lbnRzLzEuMS8iLz48cmRmOkRlc2NyaXB0aW9uIHJkZjphYm91dD0idXVpZDpmYWY1YmRkNS1iYTNkLTE
xZGEtYWQzMS1kMzNkNzUxODJmMWIiIHhtbG
5zOnhtcD0iaHR0cDovL25zLmFkb2JlLmNvbS94YXAvMS4wLyI+PHhtcDpDcmVhdGVEYXRlPjIwMjAtMDQtMj
JUMTU6MDY6MjEuNDk5PC94bXA6Q3JlYXRlRGF0ZT48L3JkZjpEZXNjcmlwdGlvbj48cmRmOkRlc2NyaXB0aW
9uIHJkZjphYm91dD0idXVpZDpmYWY1YmRkNS1iYTNkLTExZGEtYWQzMS1kMzNkNzUxODJmMWIiIHhtbG5zOm
RjPSJodHRwOi8vcHVybC5vcmcvZGMvZWxlb
WVudHMvMS4xLyI+PGRjOmNyZWF0b3I+PHJkZjpTZXEgeG1sbnM6cmRmPSJodHRwOi8vd3d3LnczLm9yZy8xO
Tk5LzAyLzIyLXJkZi1zeW50YXgtbnMjIj48cmRmOmxpPkx1YyBTdC1KZWFuPC9yZGY6bGk+PC9yZGY6U2VxP
g0KCQkJPC9kYzpjcmVhdG9yPjwvcmRmOkRlc2NyaXB0aW9uPjwvcmRmOlJERj48L3g6eG1wbWV0YT4NCiAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICA
```

```
gICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAKICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
AgICAgCiAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgI
CAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAg
ICAgICAgICAgICAgICAgICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICA
gICAgICAgICAgICAgICAgICAgPD94cGFja2V0IGVuZD0ndyc/Pv/bAEMABwUFBgUEBwYFBggHBwgKEQsKCQk
KFQ8QDBEYFRoZGBUYFxseJyEbHSUdFxgiLiIlKCkrLCsaIC8zLyoyJyorKv/bAEMBBwgICgkKFAsLFCocGBw
qKioqKioqKioqKioqKioqKioqKioqKioqKi
oqKioqKioqKioqKioqKioqKioqKioqKv/AABEIAC0AiAMBIgACEQEDEQH/xAAfAAABBQEBAQEBAQAAAAAAAA
AAAQIDBAUGBwgJCgv/xAC1EAACAQMDAgQDBQUEBAAAAX0BAgMABBEFEiExQQYTUWEHInEUMoGRoQgjQrHBFV
LR8CQzYnKCCQoWFxgZGiUmJygpKjQ1Njc4OTpDREVGR0hJSlNUVVZXWFlaY2RlZmdoaWpzdHV2d3h5eoOEhY
aHiImKkpOUlZaXmJmaoqOkpaanqKmqsrO0t
ba3uLm6wsPExcbHyMnK0tPU1dbX2Nna4eLj5OXm5+jp6vHy8/T19vf4+fr/xAAfAQADAQEBAQEBAQEBAAAAA
AAAAQIDBAUGBwgJCgv/xAC1EQACAQIEBAMEBwUEBAABAncAAQIDEQQFITEGEkFRB2FxEyIygQgUQpGhscEJI
zNS8BVictEKFiQ04SXxFxgZGiYnKCkqNTY3ODk6Q0RFRkdISUpTVFVWV1hZWmNkZWZnaGlqc3R1dnd4eXqCg
4SFhoeIiYqSk5SVlpeYmZqio6Slpqeoqaqy
s7S1tre4ubrCw8TFxsfIycrS09TV1tfY2dri4+Tl5ufo6ery8/T19vf4+fr/2gAMAwEAAhEDEQA/APpGsbxL
4u0Hwhp/23xJqkFhCc7BIcvIfREGWY+wBqbxJr1r4Y8M6jrd/kwWFu0zKDy+Bwo9ycAe5r5x+Ctve/Fj4t6j
4x8Xt9sGlIrwwt/q4pHJ8pVX+6oVjj1wTz1APc4/Hss9mt7aeD/Es9my7lmW2iUkcnIjaUSHp/c7j1pugfFP
wp4m1q3OnR7+SXUJlkZrZ4HjeAx43LIGAKn
n8cGuwrzjXPA6wfHHwv4x0q1IM32i01No4yRj7PIY5GI6cjYSeuUHWgD0eiql3q+m2EojvtQtbaQjIWaZUJ/
AmrEU0c8SywSLJGwyrowII9iKAH0VDPeW1s0a3NxFC0jBUEjhS5PQDPU1Fdatp1lMIry/tbeQjISWZUJH0Jo
At0UisGUMpBBGQQetVLrWNMsZvJvdRtLeXGdk06o2PoTQBcopqOskavGyujDIZTkEUrMFUsxAAGSSelAHO+N
fGlt4G0WTV9TOzUbuxiA82Wyjjfy8nA3BnU
8nvjHqaw9N+MnhvU/A8fimKDUI7GS9Nl5ckK+YJApbkBiMYHXNaXxBuLPUfhP4sNvPDcoukXZJjcOAwiYjp7
j9K8O+HHh3VfE37O8dnodr9quI/ELysnmKmFEOCcsQOrCsq0pRptw3O/LqVCti6dPEOOG9Xe2nqfRVt4j0u4
0zTr57lLeLUwv2VZ2CM5YZC4z1rMvfiBo9h4wi8NTrdfb5XjRSsYKZcAjnPv6VxV54Hsb+w8PQal4iXR9Qsb
aOG7thdplWVflIG7hgTjI/ve3JqPgTW2+Lm
m6tp9iZNHtXtQLhrhCdkaKCSC249PTmuaVWukrR6r/gntUMDlUpyUq2OZu22qfuq+zuu2++h65RRRXcfLHmv
7QizN8Ddd8jkA25kGOSvnx9PO/DNcR+yZs/4RnxDjbv+2RZ9cbDj+v617lrmj2niHQb7SNRUta3ODQSgHBww
xkHsR1B9a+bvhjPd/Az4qX/AIb8af6LpWrgJBqLjbC7IT5cm7oFIcg/3SRnAGaAPqCimo6yxrJGyujAFWU5B
B7g1xHjDWrzUb5dI8LM9xc6YTqGoGBjhfKU
vFbMR/FJIEyufuBs8EZAM/4e/CiDwdLrmpeJr6DXtR1OYvJeXMI+WIZ4JbPXJLduAO1edfBnUo9O/aC8VeHv
Dl4r+HJBcTQ28T7oVZZFwU7cZK5HUY64FS/AvSR8TJ9W8VePb6XXLq3uxFDY3UhaGE4Db/K+7jnCjGBtPGel
P4a39lc/taeJJLJO8iSO5ih2Y2tsZBhccY+Q49hQBQ/aa0Oz0zx34e1LR4lsr/UA5mmhG3dIjrtkOP4vm69T
gele9TfDXwrc+HZdIvNItbpZ4tk11PEHuJX
xjzWkPzF887s5zXif7UlxD/wlfhAeamY1ld/m+6vmJyf++T+VfScs0cEDzTOqRRqXZ2OAqgZJoA8H/ZY1nUd
Q8Ha3pVxdO0FhPH9l3/N5PmK2QM9srnHTJPrXY/Dj4S2ngnT9Wm8SXNtr2o6jM0lxe3MAP7sD7p3k9eWP19s
15V+zdqs2meCPH1xpqCfUbS2S5t7fBJkZY5Sox3ywA49fetv4DaQvxEt9S8XeOtRm167hvDBDZ3kheGDCq/m
eWfl6thRjA2nHPQAr/AXVfsvxo8YeGtFvfO
8OILm4s4kctEmy4VVKckY2uRkfewDUkeqXXxn+Pl74e1KaVfCmgGV3sEYot0Y3CZkx13Oc4PRRjgkmqfwa1C
zvf2oPGNxZyRm3nhvBbshG2RRcxYK+xAz9KTwbG3wx/ag1Sx1geRYeIBMtjcEARuJJBJHg/UGPj+IOAei/F3
wLpH/Crtau9DO+DSr6xspJEnsIhCxiC/vIm2AbkZNwKnjv2rn/ANnazuNQ+A+qWVldtZXNxd3UUVOgyYHaJA
HA9QSD+Fd78XtXttG+EXiSa7dVE9hLaxgnl
nlUxqB6/ez9Aa8i+EHiK8OT9mXxPe+H8Sapp1zNIq4BMeUj/eY7gDc3/ATQB6R4H+FmheBfAN3p/iY2GpPdM
8uo3tzEqq4bjBZuQoHqepJ4zXCfsv6zdyXHifQxfSXel2Mkb2e9iQgLODtzOBCqcf4mtH4G+G9P1zwf/wAJ1
4zvDrmpTTSv5upSmVLJY2I4DcK3BbPYEYxWB+zFfQ3njTxpPG4AuNkyKTglTJIc/wDjw/OgD6RooBDAEHIPI
I7OUAFUNZOLSvEOntY65p9tqFqxyYriMOAf
UZ6H3HNX6KAOHtPg94NsGK2NnfWOBOTaw6rdJCTnOdgkx+HT2rrNL0nT9EO9LHR7KCytY/uwwRhFz3OB3Pc9
TVyigDm3+HvhR9Xn1NdFt4ru5BFw8BaIT5671UhXz33A5p114A8K3ep2uovolrFe2ihYLm2BgkjAGAA0ZBwB
xj04roqKAOV1T4ZeDNbuludW8P2l3KqLGjSbjsQcBQM4AHoK1x4b0j/hHxobWSSaYE2fZZCXTb/dwSePbpWn
RQBgaP4F8LeH74Xuh6DYafc7Svm20IjYg9R
kdvaq3/CtvCC6lcX8WhwQT3X/AB8CBniSfrnfGpCtnJzkHOa6iigDmrn4d+FLnWIdV/sWC3v4FCR3NozW7hQ
NuMxlcjbxz246Vd1jwloHiDSYtM1nSLS7s4ABDE8QxCAMDYRyvAxxitiigDmP+FdeF2tGtbrT5L2AxvEqX15
NciJWUqwj8x28vgkZXFJ4Y+G3hLwbLLJ4a0dLJ5k2SETSSb19DvY56muoooA5m2+HPhKzuJ5bXQraFbht8OC
bhBIfUw52H/vmpJPAPhZ9ck1gaLbxX8yFJp
oMxecp6q4UgODgZDA571OVFAAAFAAGAOAB2ooooA//2Q=="
```

The following file contains an example of how the base64 encoded string is used inside the PowerShell script.

baseImage64_Encode_Example.ps1

2.4. PowerShell Script Code

The Azure Reporting Tool is entirely powered by a Windows PowerShell script. The form used in the GUI was created using the .NET Framework. The entire package (exe) was created using PS2EXE-GUI, downloadable here from Microsoft's TechNet Gallery. The instructions to package the PowerShell script can be found below.

2.4.1 Script Basics

The following describes in general terms the script's layout and configuration. The following snippets of code are only examples.

```
## Azure LZ Reporting Tool ##

# Connect to Azure
Connect-AzAccount

# Connect to Azure AD
Connect-AzureAD -AzureEnvironmentName "AzureCloud"


[void] [System.Reflection.Assembly]::LoadWithPartialName("System.Drawing")
[void] [System.Reflection.Assembly]::LoadWithPartialName("System.Windows.Forms")
[void] [System.Windows.Forms.Application]::EnableVisualStyles()


## Button Functions...
function FunctionName
{
...
}

# Main Form Controls...
$Form                   = New-Object system.Windows.Forms.Form
$Form.Size              = New-Object System.Drawing.Size(1000,800)
$Form.BackColor         = "#ffffff"
$form.MaximizeBox       = $false
$Form.StartPosition     = "CenterScreen"
$Form.FormBorderStyle   = 'Fixed3D'
$Form.Text              = "Azure LZ Reporting Tool"
$Form.ForeColor         = "#33333"

# Images...
$iconBase64 = "<base64 encoded string>"

$iconBytes                  = [Convert]::FromBase64String($iconBase64)
$stream                     = New-Object IO.MemoryStream($iconBytes, 0,
$iconBytes.Length)

$stream.Write($iconBytes, 0, $iconBytes.Length);

$iconImage                  = [System.Drawing.Image]::FromStream($stream, $true)
$Form.Icon                  = [System.Drawing.Icon]::FromHandle((New-Object
System.Drawing.Bitmap -Argument $stream).GetHIcon())

$PictureBox1 = New-Object system.Windows.Forms.PictureBox

$PictureBox1.width          = 220
$PictureBox1.height         = 52
$PictureBox1.location       = New-Object System.Drawing.Point(6,10)
$PictureBox1.Image          = $iconImage
$PictureBox1.SizeMode       = [System.Windows.Forms.PictureBoxSizeMode]::zoom

$Form.controls.AddRange(@($PictureBox1))

# Label 1
$Label1                      = New-Object System.Windows.Forms.Label
$Label1.Text                 = "Select a command to run"
$Label1.AutoSize             = $true
$Label1.Location             = New-Object System.Drawing.Size(300,160)
$Label1.Font                 = 'Arial,15,style=Bold';
```

```
# Azure Icon
# Image in base64 format
$iconBase64 = "<base64 encoded string>"

$iconBytes      = [Convert]::FromBase64String($iconBase64)
$stream         = New-Object IO.MemoryStream($iconBytes, 0, $iconBytes.Length)

$stream.Write($iconBytes, 0, $iconBytes.Length);

$iconImage      = [System.Drawing.Image]::FromStream($stream, $true)
$Form.Icon      = [System.Drawing.Icon]::FromHandle((New-Object
System.Drawing.Bitmap -Argument $stream).GetHIcon())
$form.Icon      = $iconImage


## Command Buttons...
$Button1                = New-Object System.Windows.Forms.Button
$Button1.Location       = New-Object System.Drawing.Size(80,200)
$Button1.Size           = New-Object System.Drawing.Size(300,50)
$Button1.BackColor      = "#2573b5"
$Button1.ForeColor      = "#ffffff"
$Button1.Text           = "Button Title"
$Font                   = New-Object
System.Drawing.Font("Arial",12,[System.Drawing.FontStyle]::Regular)
$Button1.Font           = $Font

$Button1.Add_Click({GetSubs})
$Form.Controls.Add($Button1)

# Label 2
$Label2                  = New-Object System.Windows.Forms.Label
$Label2.Text             = "Select a report to run."
$Label2.AutoSize         = $true
$Label2.Location         = New-Object System.Drawing.Size(300,460)
$Label2.Font             = 'Arial,15,style=Bold';

$Form.Controls.Add($Label2)

# Label 3
$Label3                  = New-Object System.Windows.Forms.Label
$Label3.Text             = "Please be patient while the report is generating..."
$Label3.AutoSize         = $true
$Label3.Location         = New-Object System.Drawing.Size(240,490)
$Label3.Font             = 'Arial,13,style=Italic';
$Label3.ForeColor        = '#FF0000'

$Form.Controls.Add($Label3)


## Report Buttons

## Button Functions...
function GetQuotas
{
...
}

# Report Buttons
$Button7                = New-Object System.Windows.Forms.Button
$Button7.Location       = New-Object System.Drawing.Size(80,520)
$Button7.Size           = New-Object System.Drawing.Size(300,50)
$Button7.BackColor      = "#2573b5"
$Button7.ForeColor      = "#ffffff"
$Button7.Text           = "Button Title"
$Font                   = New-Object
System.Drawing.Font("Arial",12,[System.Drawing.FontStyle]::Regular)
$Button7.Font           = $Font

$Button7.Add_Click({GetQuotas})
$Form.Controls.Add($Button7)


$Form.ShowDialog()
```

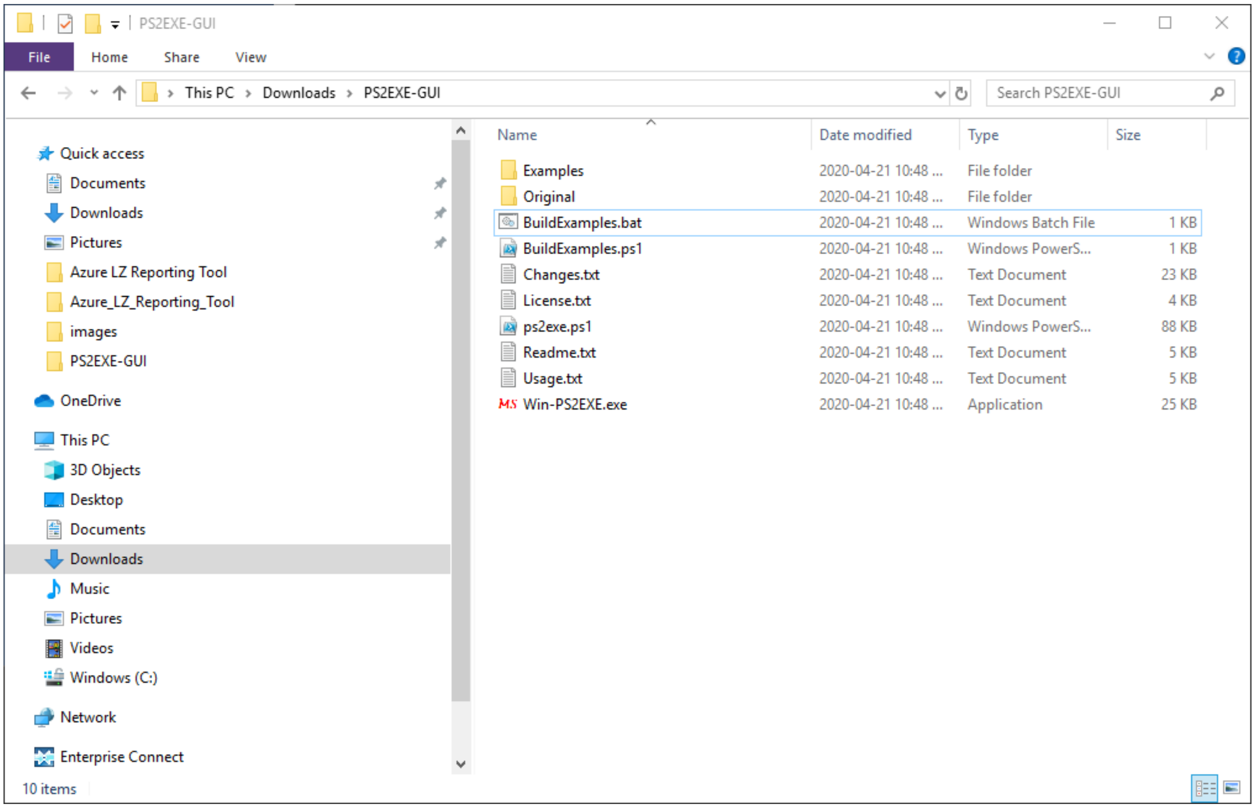
```
# Disconnect from Azure and Azure AD
Disconnect-AzAccount
Disconnect-AzureAD
```

2.5. Converting the PowerShell Script to EXE

The Azure Reporting Tool was developed in Windows PowerShell. The form used in the GUI was created using the .NET Framework.

PS2EXE-GUI was used to convert the PowerShell script into an executable file. PS2EXE-GUI can be downloaded here from Microsoft’s TechNet Gallery.

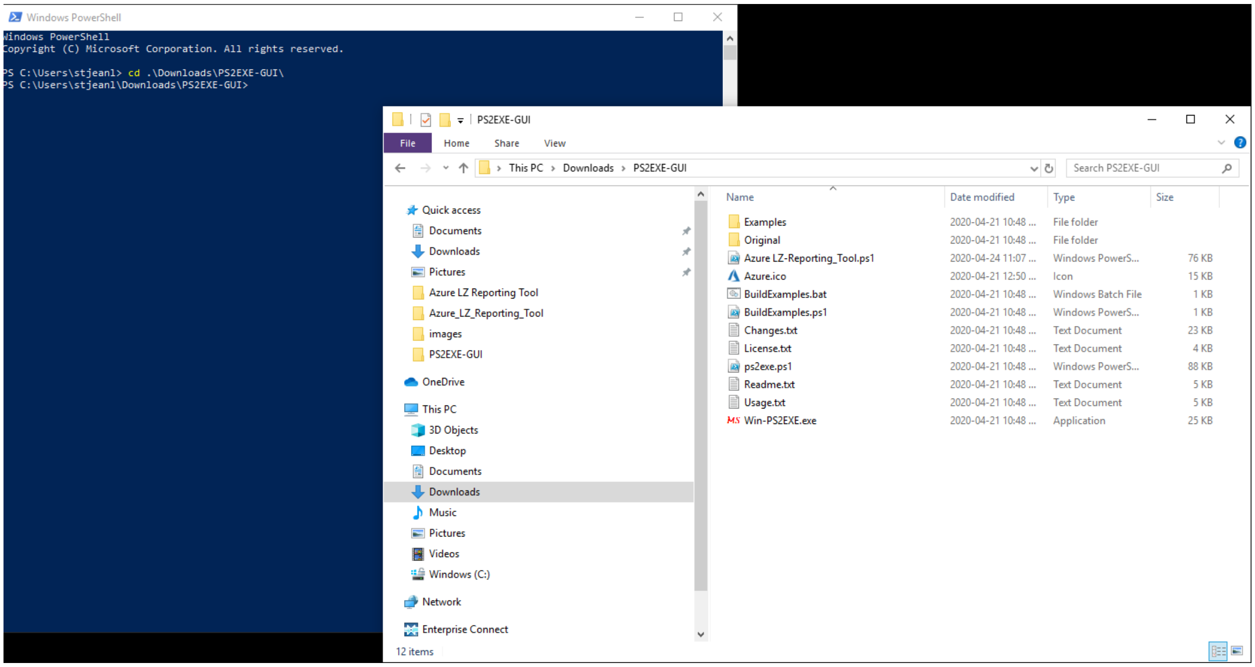
Download zip file and extract it’s content.



Name	Date modified	Type	Size
Examples	2020-04-21 10:48 ...	File folder	
Original	2020-04-21 10:48 ...	File folder	
BuildExamples.bat	2020-04-21 10:48 ...	Windows Batch File	1 KB
BuildExamples.ps1	2020-04-21 10:48 ...	Windows PowerS...	1 KB
Changes.txt	2020-04-21 10:48 ...	Text Document	23 KB
License.txt	2020-04-21 10:48 ...	Text Document	4 KB
ps2exe.ps1	2020-04-21 10:48 ...	Windows PowerS...	88 KB
Readme.txt	2020-04-21 10:48 ...	Text Document	5 KB
Usage.txt	2020-04-21 10:48 ...	Text Document	5 KB
Win-PS2EXE.exe	2020-04-21 10:48 ...	Application	25 KB

Download the Azure_LZ-Reporting_Tool.ps1 script and Azure icon Azure.ico into the PS2EXE-GUI directory.

Open a Windows PowerShell session and navigate to the location of the ps2exe.ps1 file.

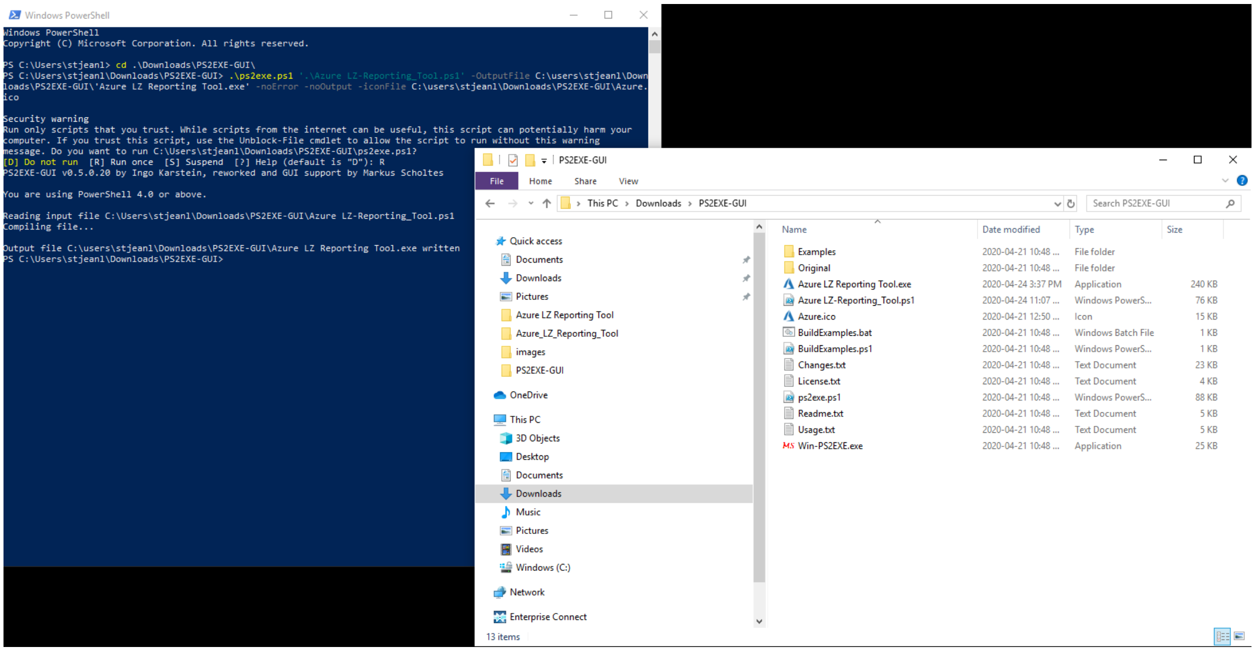


```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\stjeanl> cd .\Downloads\PS2EXE-GUI\
PS C:\Users\stjeanl\Downloads\PS2EXE-GUI>
```

Name	Date modified	Type	Size
Examples	2020-04-21 10:48 ...	File folder	
Original	2020-04-21 10:48 ...	File folder	
Azure LZ-Reporting_Tool.ps1	2020-04-24 11:07 ...	Windows PowerS...	76 KB
Azure.ico	2020-04-21 12:50 ...	Icon	15 KB
BuildExamples.bat	2020-04-21 10:48 ...	Windows Batch File	1 KB
BuildExamples.ps1	2020-04-21 10:48 ...	Windows PowerS...	1 KB
Changes.txt	2020-04-21 10:48 ...	Text Document	23 KB
License.txt	2020-04-21 10:48 ...	Text Document	4 KB
ps2exe.ps1	2020-04-21 10:48 ...	Windows PowerS...	88 KB
Readme.txt	2020-04-21 10:48 ...	Text Document	5 KB
Usage.txt	2020-04-21 10:48 ...	Text Document	5 KB
Win-PS2EXE.exe	2020-04-21 10:48 ...	Application	25 KB

Run the following command to convert the PowerShell script to an executable file.

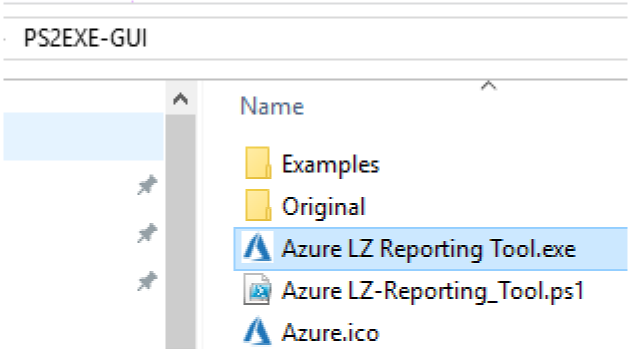
```
.\ps2exe.ps1 '.\Azure_LZ-Reporting_Tool.ps1' -OutputFile
C:\users\stjeanl\Downloads\PS2EXE-GUI\Azure_LZ-Reporting_Tool.exe -noError -noOutput
-iconFile C:\users\stjeanl\Downloads\PS2EXE-GUI\Azure.ico
```



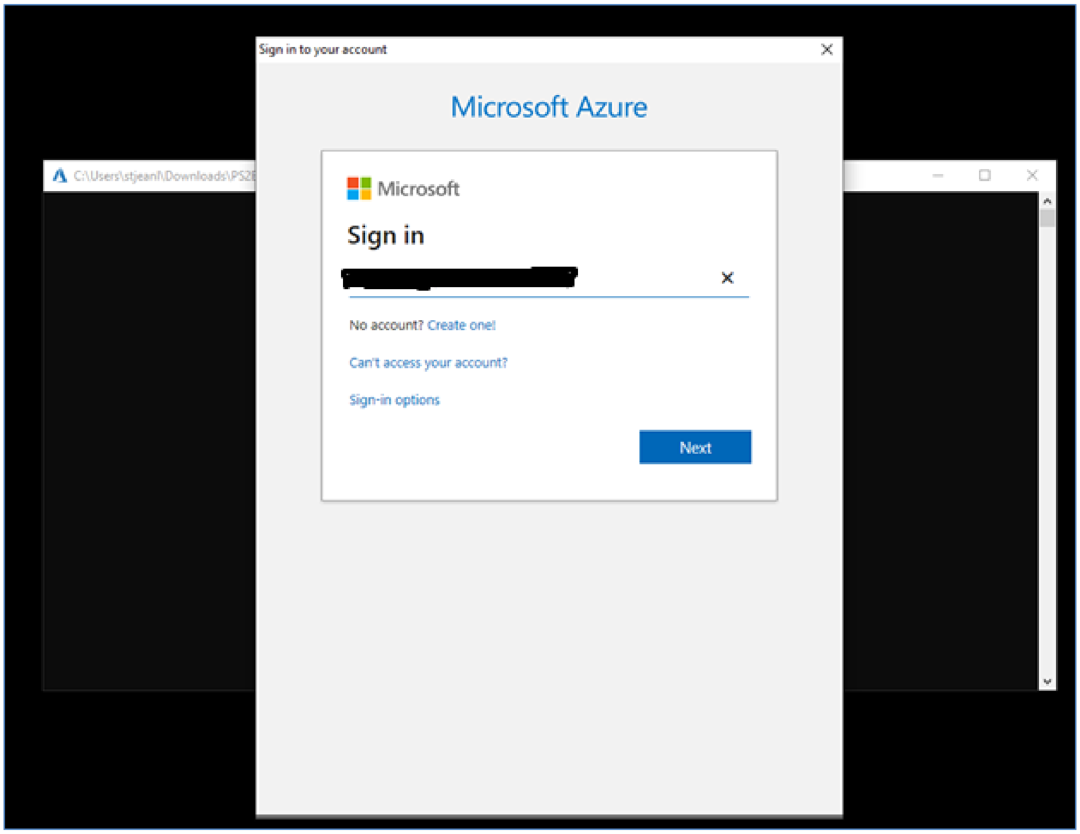
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\stjeanl> cd .\Downloads\PS2EXE-GUI\
PS C:\Users\stjeanl\Downloads\PS2EXE-GUI> .\ps2exe.ps1 '.\Azure LZ-Reporting_Tool.ps1' -OutputFile C:\users\stjeanl\Down
loads\PS2EXE-GUI\'Azure LZ Reporting Tool.exe' -noError -noOutput -iconFile C:\users\stjeanl\Downloads\PS2EXE-GUI\Azure.
ico

Security warning
Run only scripts that you trust. While scripts from the internet can be useful, this script can potentially harm your
computer. If you trust this script, use the Unblock-File cmdlet to allow the script to run without this warning
message. Do you want to run C:\Users\stjeanl\Downloads\PS2EXE-GUI\ps2exe.ps1?
[D] Do not run  [R] Run once  [S] Suspend  [?] Help (default is "D"): R
PS2EXE-GUI v0.5.0.20 by Ingo Karstein, reworked and GUI support by Markus Scholtes

You are using PowerShell 4.0 or above.

Reading input file C:\Users\stjeanl\Downloads\PS2EXE-GUI\Azure LZ-Reporting_Tool.ps1
Compiling file...

Output file C:\users\stjeanl\Downloads\PS2EXE-GUI\Azure LZ Reporting Tool.exe written
PS C:\Users\stjeanl\Downloads\PS2EXE-GUI>
```

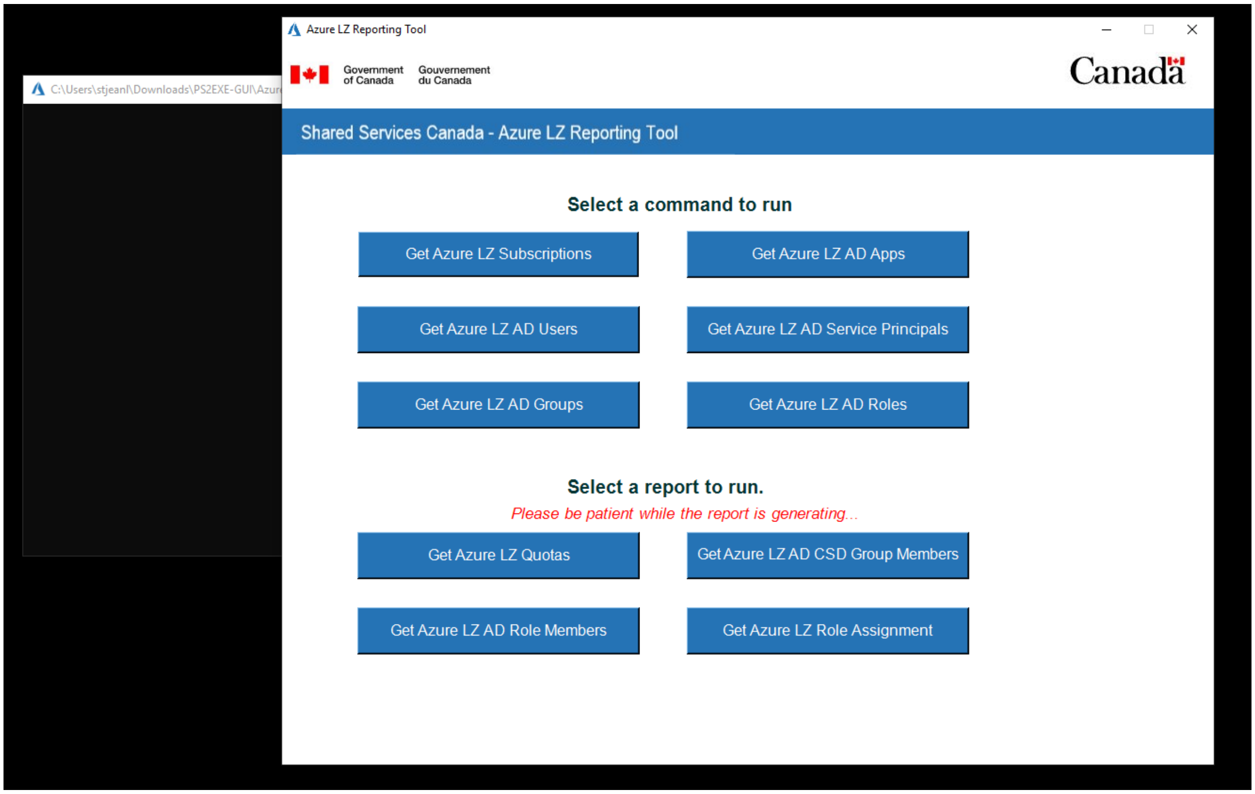
Name	Date modified	Type	Size
Examples	2020-04-21 10:48 ...	File folder	
Original	2020-04-21 10:48 ...	File folder	
Azure LZ Reporting Tool.exe	2020-04-24 3:37 PM	Application	240 KB
Azure LZ-Reporting_Tool.ps1	2020-04-24 11:07 ...	Windows PowerS...	76 KB
Azure.ico	2020-04-21 12:50 ...	Icon	15 KB
BuildExamples.bat	2020-04-21 10:48 ...	Windows Batch File	1 KB
BuildExamples.ps1	2020-04-21 10:48 ...	Windows PowerS...	1 KB
Changes.txt	2020-04-21 10:48 ...	Text Document	23 KB
License.txt	2020-04-21 10:48 ...	Text Document	4 KB
ps2exe.ps1	2020-04-21 10:48 ...	Windows PowerS...	88 KB
Readme.txt	2020-04-21 10:48 ...	Text Document	5 KB
Usage.txt	2020-04-21 10:48 ...	Text Document	5 KB
Win-PS2EXE.exe	2020-04-21 10:48 ...	Application	25 KB

Launch the Azure LZ Reporting Tool exe file



Note that you will be prompted to login twice, once to Azure and another to Azure AD.




C:\Users\stjeanl\Downloads\PS2EXE-GUI\Azur
Azure LZ Reporting Tool
Government of Canada
Gouvernement du Canada
Canada
Shared Services Canada - Azure LZ Reporting Tool
Select a command to run
Get Azure LZ Subscriptions
Get Azure LZ AD Apps
Get Azure LZ AD Users
Get Azure LZ AD Service Principals
Get Azure LZ AD Groups
Get Azure LZ AD Roles
Select a report to run.
Please be patient while the report is generating...
Get Azure LZ Quotas
Get Azure LZ AD CSD Group Members
Get Azure LZ AD Role Members
Get Azure LZ Role Assignment