



CTX-Azure User Guide

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Versions

Document Revisions

The following revisions have been made to this document

Date	Revision	Notes
27/09/2018	1.0	First Release

Module Versions

The following revisions have been made to this document

Date	Revision	Notes
27/09/2018	1.0	<p>Creation of:</p> <ul style="list-style-type: none">• Azure-Create-Network-Interface• Azure-Create-Public-IP• Azure-Create-Resource-Group• Azure-Create-Subnet• Azure-Create-Virtual-Network• Azure-Create-VM-From-Template• Azure-Deallocate-AvailabilitySet-VMs• Azure-Deallocate-VM• Azure-Delete-VM• Azure-Get-Authentication-Token• Azure-Get-AvailabilitySet-VMs• Azure-Get-User-Membership• Azure-Get-Users• Azure-Get-VM-Details• Azure-Get-VM-Name-and-Resource-Group• Azure-Get-VM-Status• Azure-HTTP-Error-Handling• Azure-Restart-VM• Azure-Start-AvailabilitySet-VMs• Azure-Start-VM

Preface

About this Manual

This document is a user guide for the CTX-Azure module.

Audience

The audience for this document is those wanting to understand how to use CTX-Azure module.

Related Material

Document
CTX-Azure - Deployment Plan
CTX-Azure.studiopkg

Abbreviations used in this Document

AAD	Azure Active Directory
HTTP	HyperText Transfer Protocol
REST	Representational State Transfer
API	Application Programming Interface
VM	Virtual Machine
URL	Universal Resource Location
IAM	Identity and Access Management
IP	Internet Protocol
ID	Identification

Requirements

The Cortex subtasks require the following:

- Azure Account Subscription
- Azure Active Directory Application with necessary authorisations

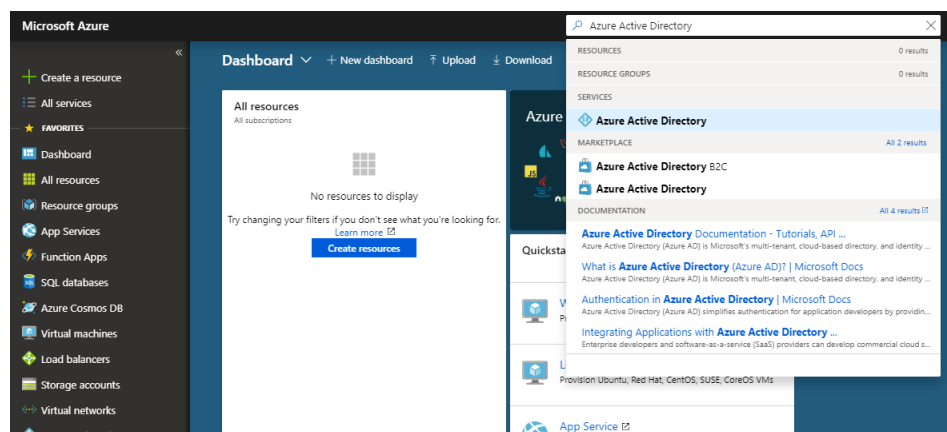
Integration

Integration with Third-Party Systems

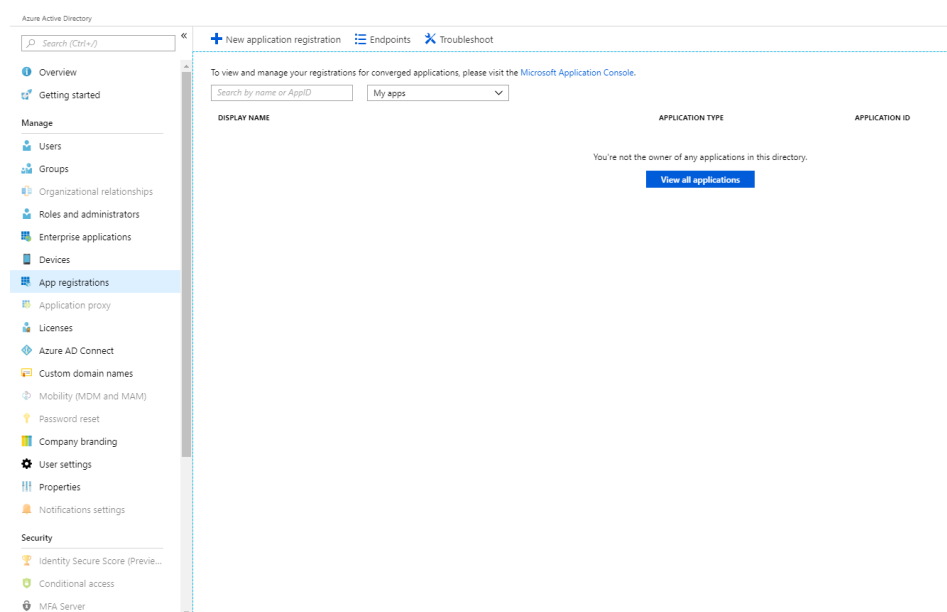
Creating Azure Active Directory Application

There is a need to create an Azure Active Directory with the necessary rights to ensure full functionality of the CTX-Azure subtasks. This application will be used to make API calls to and make changes within Azure.

To create an Azure Active Directory Application, navigate to Azure Active Directory.



Then click 'App registrations' from the navigation panel.



From here, click 'New application registration' and fill out the 'Name' and 'Sign-on URL'. There is a need to ensure that 'Application type' is set to 'Web app/API'. The 'Sign-on URL' can take any value; a suggested value is 'http://localhost'. This is what should be shown once the application has been created.

Azure-API

Registered app

Settings

Manifest

Delete

Display name

Azure-API

Application type

Web app / API

Home page

<http://localhost>

Application ID

283259e0-d28b-49fb-9416-908eb120-3501-4321-9345

Object ID

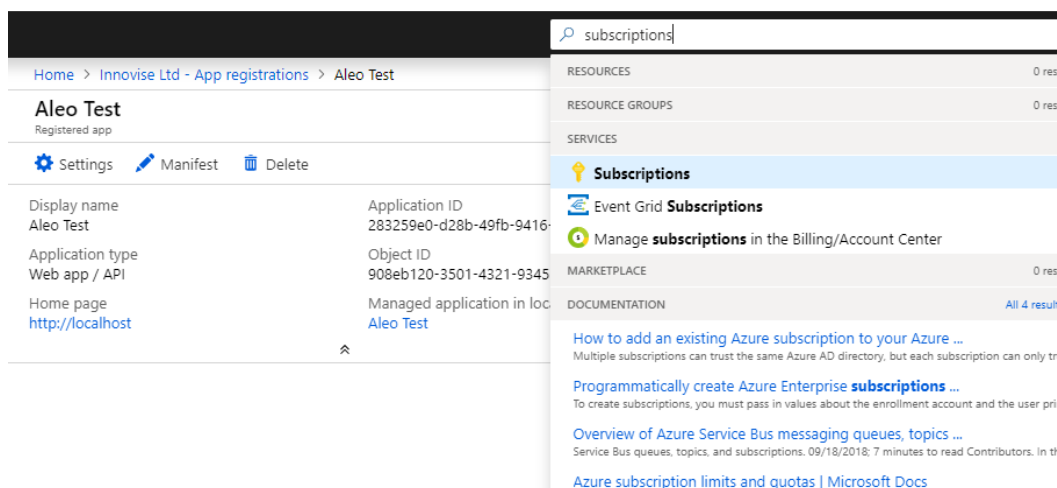
908eb120-3501-4321-9345

Managed application in local directory

Azure-API

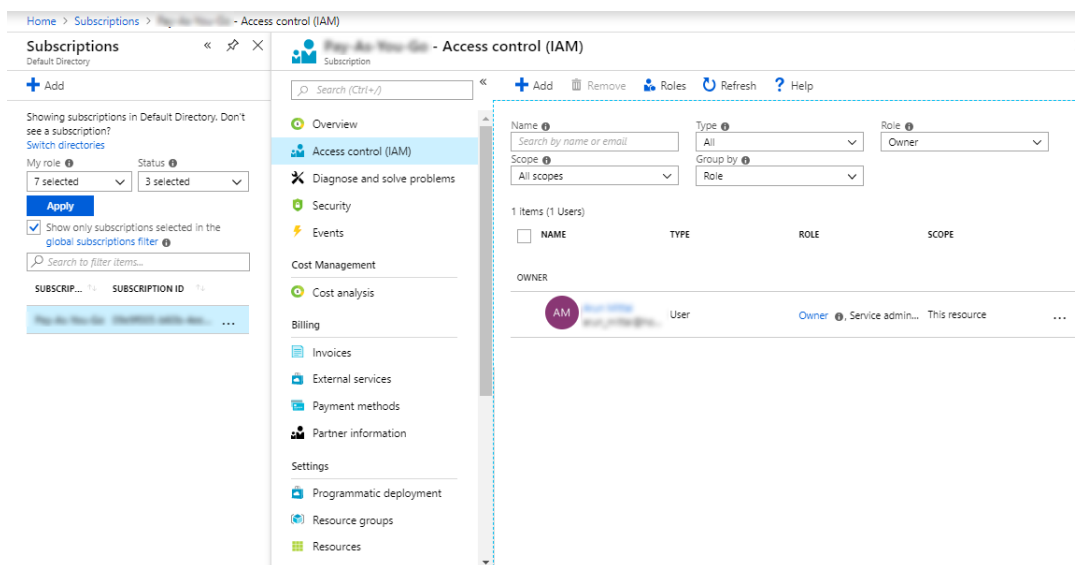
Configuring Azure Active Directory Application Access Control

There is need to give the Azure Active Directory Application necessary rights, so it can make the requested changes. To do this, navigate to subscriptions as shown in the Figure below.



From here select a subscription that will be used for the Azure subtask and navigate to 'Access Control (IAM)'.

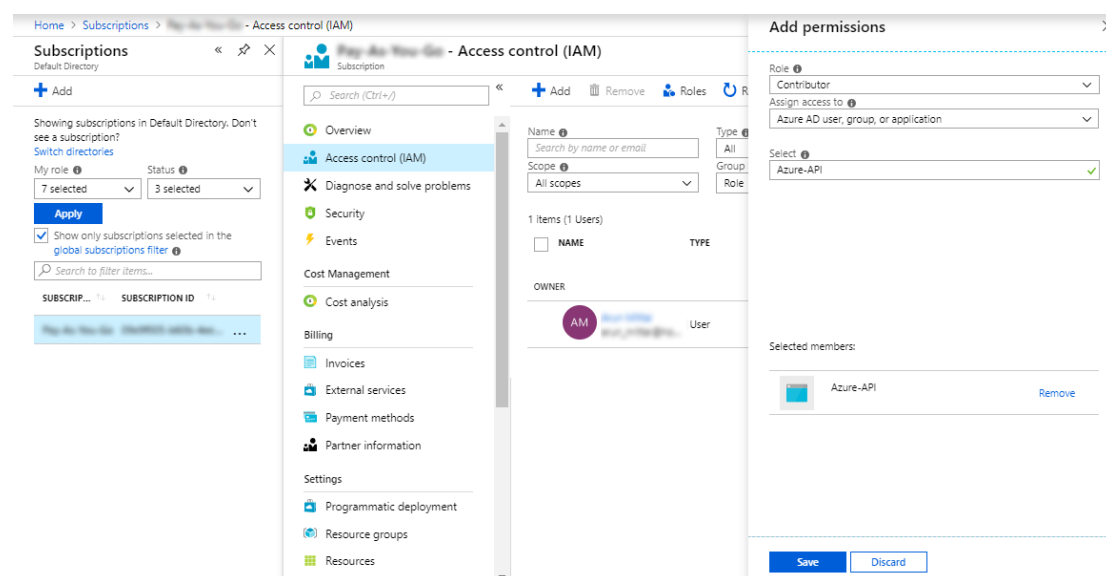
NOTE: If a subscription does not appear here, you will need to set one up. This is a prerequisite for using Azure.



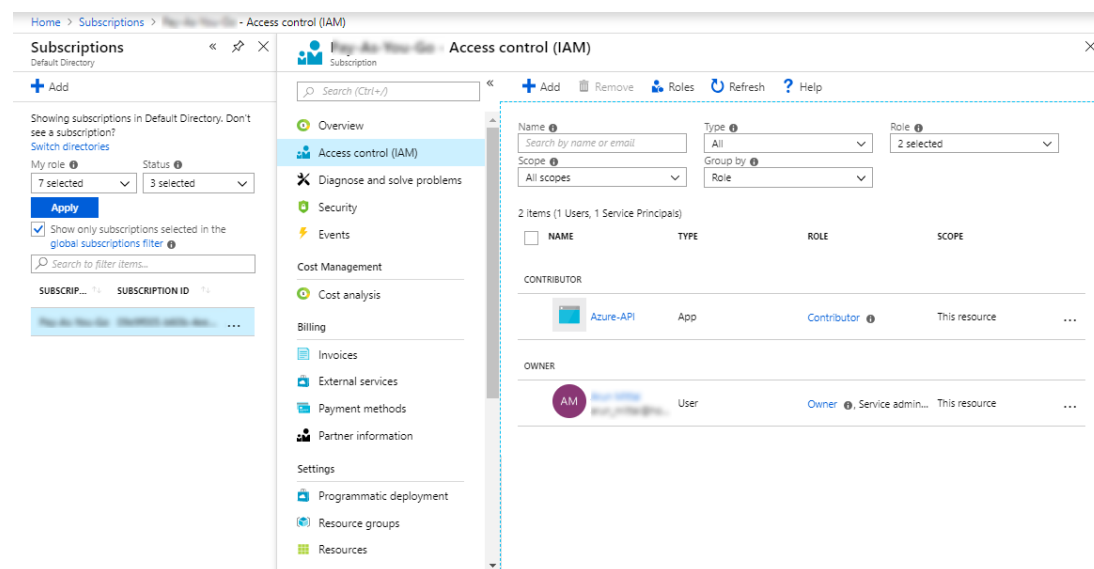
Click Add to add the Azure Active Directory Application and configure as follows:

- Role: “Contributor”
- Assign access to: “Azure AD user, group or application”
- Select: “<name-of-azure-active-directory-application>”

An example is shown below.



Click save and ensure that Azure Active Directory Application appears under “Access Control (IAM)”.



Determining Parameters Used to Make REST API Calls

There are four parameters that need to be determined to make calls to Azure using a REST API:

- Subscription ID
- Tenant ID (a.k.a. Directory ID)
- Client ID (a.k.a. Application ID)
- Client Secret

Subscription ID

The subscription ID determined by navigating to 'Subscriptions'. The subscription ID can be copied from here, see Figure below.

[Home](#) > [Subscriptions](#)

Subscriptions

Default Directory

[+ Add](#)

Showing subscriptions in Default Directory. Don't see a subscription? [Switch directories](#)

My role ⓘ
7 selected

Status ⓘ
3 selected

[Apply](#)

☒ Show only subscriptions selected in the [global subscriptions filter](#) ⓘ

SUBSCRIPTION	My Role	SUBSCRIPTION ID	My Role	CURRENT COST	STATUS
Play the New Year	Account admin	00000000-0000-0000-0000-000000000000	Account admin	£0.00	Active

Tenant ID

The tenant ID is determined by navigating to 'Azure Active Directory'. From here click 'Properties' and 'Tenant ID' as listed as the 'Directory ID'.

Home > Default Directory - Properties

Default Directory - Properties

Azure Active Directory

Enterprise applications

Devices

App registrations

Application proxy

Licenses

Azure AD Connect

Custom domain names

Mobility (MDM and MAM)

Password reset

Company branding

User settings

Properties

Notifications settings

Security

Save Discard

* Name

Default DirectoryFrom ✓

Country or region

United Kingdom

Location

EU Model Clause compliant datacenters

Notification language

English ▼

Global admin can manage Azure Subscriptions and Management Groups

Yes

No

Directory ID

xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx

Technical contact

...

Global privacy contact

...

Privacy statement URL

...




Client ID

The Client ID is determined by navigating to 'Azure Active Directory'. From here click 'App registrations' and then the name of the 'Azure Active Directory Application' that was created previously.

Home > Default Directory - App registrations > Azure-API

Azure-API

Registered app

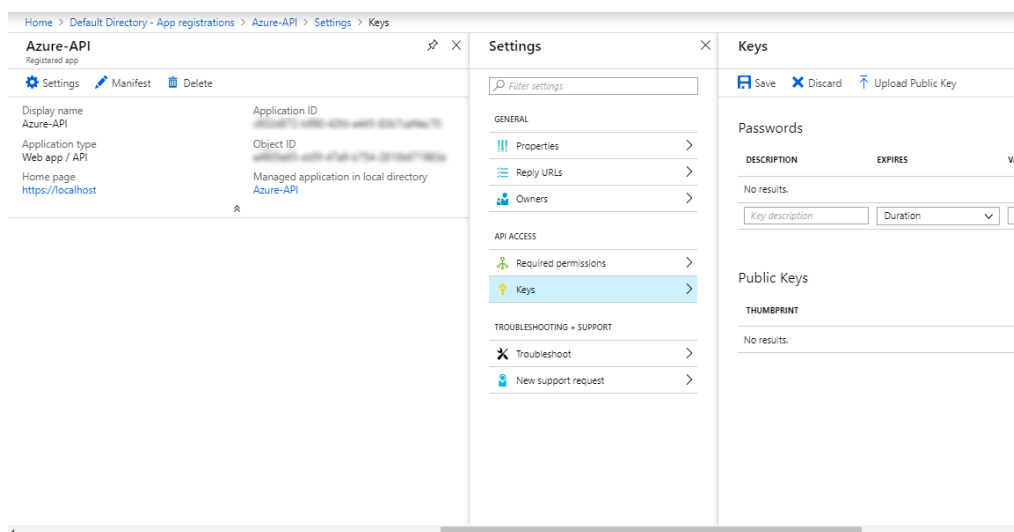
 Settings
  Manifest
  Delete

Display name	Application ID
Azure-API	00000000-0000-0000-0000-000000000000
Application type	Object ID
Web app / API	00000000-0000-0000-0000-000000000000
Home page	Managed application in local directory
https://localhost	Azure-API

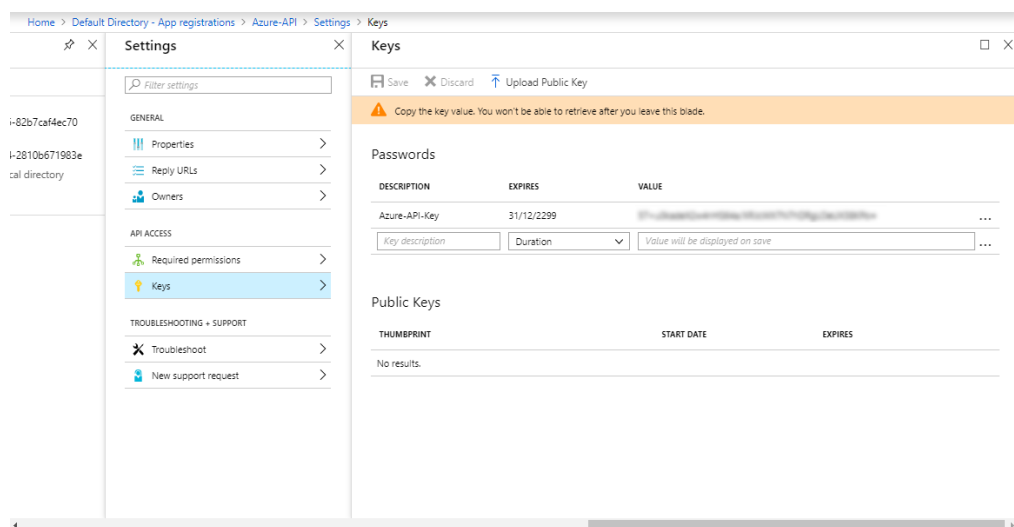
The 'Application ID' is the 'Client ID'.

Client Secret

Navigate to the Azure Active Directory Application. Click 'Settings' then 'Keys'.



A new key needs to be created by specifying a 'Description' and selecting when the key 'Expires'. Then click save. It is paramount that you don't navigate away from this page until you have copied the key as you cannot view it later.



Integrating with Existing Infrastructure

None Required.

1 Azure-HTTP-Error-Handling

1.1 Overview

This subtask formats exceptions messages raised interacting with Azure as user friendly strings.

1.2 Inputs

Input Variables	Type	Description
AHEH_i_azure-error-raw	Text	Raw error, passed from the subtask which errored.

1.3 Outputs

Output Variables	Type	Description
AHEH_o_azure-error	Text	Error to be passed back.

2 Azure-Get-Authentication-Token

2.1 Overview

This subtask gets bearer token for a given account.

2.2 Inputs

Input Variables	Type	Description
AGAT_i_azure-client-id	Text	The client-id for the AAD application.
AGAT_i_azure-tenant-id	Text	ID of the AAD directory in which the AAD application was created.
AGAT_i_azure-client-secret	Text	Key for the ADD application.
AGAT_i_azure-resource (optional)	Text	Azure resource name.

2.3 Outputs

Output Variables	Type	Description
AGAT_o_azure-auth-token	Text	Azure bearer token.

3 Azure-Create-Resource-Group

3.1 Overview

This subtask will create a resource group in Microsoft Azure.

3.2 Inputs

Input Variables	Type	Description
ACRG_i_azure-bearer-token	Text	Azure bearer token.
ACRG_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACRG_i_azure-resource-group-name	Text	Name of the resource group to be created.
ACRG_i_azure-location	Text	Location where the resource group should be created.

3.3 Outputs

None.

4 Azure-Create-Virtual-Network

4.1 Overview

This subtask creates a virtual network in Microsoft Azure.

4.2 Inputs

Input Variables	Type	Description
ACVN_i_azure-bearer-token	Text	Azure bearer token.
ACVN_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACVN_i_azure-resource-group-name	Text	Name of the resource group where virtual network should be created.
ACVN_i_azure-location	Text	Location where the resource group is located.
ACVN_i_azure-virtual-network-name	Text	Name of the virtual network to be created.
ACVN_i_azure-address-space	Text	Address prefix.
ACVN_i_azure-subnet-name	Text	Name of subnet.

4.3 Outputs

None.

5 Azure-Create-Public-IP

5.1 Overview

This subtask creates a public IP in Microsoft Azure.

5.2 Inputs

Input Variables	Type	Description
ACPI_i_azure-bearer-token	Text	Azure bearer token.
ACPI_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACPI_i_azure-resource-group	Text	Name of the resource group where public IP should be created.
ACPI_i_azure-public-ip-address-name	Text	Name of the public.
ACPI_i_azure-public-ip-location	Text	Location where the public IP should be created.

5.3 Outputs

None.

6 Azure-Create-Subnet

6.1 Overview

This subtask creates a subnet in Microsoft Azure for a given virtual network.

6.2 Inputs

Input Variables	Type	Description
ACS_i_azure-bearer-token	Text	Azure bearer token.
ACS_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACS_i_azure-resource-group	Text	Name of the resource group where public IP should be created.
ACS_i_azure-virtual-network-name	Text	Name of the virtual network where the subnet will be created.
ACS_i_azure-subnet-name	Text	Name of subnet.
ACS_i_azure-address-prefix	Text	Address space of the subnet to be created, e.g. 10.0.0.0/16.

6.3 Outputs

None.

7 Azure-Create-Network-Interface

7.1 Overview

This subtask creates a network interface.

7.2 Inputs

Input Variables	Type	Description
ACNI_i_azure-bearer-token	Text	Azure bearer token.
ACNI_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACNI_i_azure-resource-group	Text	Name of the resource group where network interface should be created.
ACNI_i_azure-location	Text	Location where the resource group is located.
ACNI_i_azure-virtual-network-name	Text	Name of the virtual network name under which the network interface will be created.
ACNI_i_azure-public-ip-name	Text	Name of the public IP.
ACNI_i_azure-subnet-name	Text	Name of subnet.
ACNI_i_azure-network-interface-name	Text	Name of the network interface.

7.3 Outputs

None.

8 Azure-Create-VM-From-Template

8.1 Overview

This subtask creates a Virtual Machine from a Microsoft Azure template.

8.2 Inputs

Input Variables	Type	Description
ACVFT_i_azure-bearer-token	Text	Azure bearer token.
ACVFT_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ACVFT_i_azure-resource-group	Text	Name of the resource group where the VM should be created.
ACVFT_i_azure-vm-name	Text	The name of the virtual machine.
ACVFT_i_azure-network-interface-name	Text	Name of the network interface.
ACVFT_i_azure-vm-location	Text	Location where the VM should be created.
ACVFT_i_azure-vm-size	Text	Size of the VM which needs to be created, e.g. "Standard_B1s".
ACVFT_i_azure-sku	Text	SKU of the VM image, e.g. "2016-Datacenter-Server-Core".
ACVFT_i_azure-offer	Text	Offer of the VM image, e.g. "WindowsServer".
ACVFT_i_azure-publisher	Text	Publisher of the VM image, e.g. "MicrosoftWindowsServer".
ACVFT_i_azure-storage-account-type	Text	Storage type, e.g. "Standard_LRS".
ACVFT_i_azure-vm-adminUsername	Text	Administrator username.
ACVFT_i_azure-vm-adminPassword	Text	Administrator password.

8.3 Outputs

None.

9 Azure-Get-VM-Details

9.1 Overview

This subtask changes the instance type of an instance in a region. If a VM name is specified, then only details of that VM are returned. If a VM is not passed and a resource group is passed into the subtask, then details of all the VMs in that group will be passed back. If resource group and VM name are not passed into the subtask then details of all VMs under that account will be returned.

9.2 Inputs

Input Variables	Type	Description
AGVD_i_azure-bearer-token	Text	Azure bearer token.
AGVD_i_azure-subscription-id	Text	Subscription ID for the Azure account.
AGVD_i_azure-resource-group (optional)	Text	Name of the resource group which VMs are a part of.
AGVD_i_azure-vm-name (optional)	Text	Name of the VM.

9.3 Outputs

Output Variables	Type	Description
AGVD_o_azure-vms	Text	A list of the VM(s) that were returned.

10 Azure-Get-VM-Name-And-Resource-Group

10.1 Overview

This subtask returns the VM name and resource group given a VM ID.

10.2 Inputs

Input Variables	Type	Description
AGVNARG_i_azure-bearer-token	Text	Azure bearer token.
AGVNARG_i_azure-subscription-id	Text	Subscription ID for the Azure account.
AGVNARG_i_azure-vm-id	Text	ID of the VM.

10.3 Outputs

Output	Type	Description
AGVNARG_o_azure-resource-group	Text	The name of the resource group.
AGVNARG_o_azure-vm-name	Text	The name of the virtual machine.

11 Azure-Get-VM-Status

11.1 Overview

This subtask gets the status of a given VM.

11.2 Inputs

Input Variables	Type	Description
AGVS_i_azure-bearer-token	Text	Azure bearer token.
AGVS_i_azure-subscription-id	Text	Subscription ID for the Azure account.
AGVS_i_azure-vm-name	Text	Name of the VM.
AGVS_i_azure-resource-group	Text	Resource group where the VM was created.

11.3 Outputs

Output Variables	Type	Description
AGVS_o_azure-vm-status	Text	One of the following statuses: <ol style="list-style-type: none">1. Deallocated2. Deallocating3. Running4. Starting5. Stopped6. Stopping7. Unknown9. Updating

12 Azure-Deallocate-VM

12.1 Overview

This subtask will deallocate a VM in Microsoft Azure.

12.2 Inputs

Input Variables	Type	Description
ADV_i_azure-bearer-token	Text	Azure bearer token.
ADV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ADV_i_azure-vm-name	Text	Name of the VM to deallocate.
ADV_i_azure-resource-group	Text	Resource group where the VM was created.

12.3 Outputs

None.

13 Azure-Start-VM

13.1 Overview

This subtask will start a VM in Microsoft Azure.

13.2 Inputs

Input Variables	Type	Description
ASV_i_azure-bearer-token	Text	Azure bearer token.
ASV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ASV_i_azure-vm-name	Text	Name of the VM to start.
ASV_i_azure-resource-group	Text	Resource group where the VM was created.

13.3 Outputs

None.

14 Azure-Restart-VM

14.1 Overview

This subtask will re-start a VM in Microsoft Azure.

14.2 Inputs

Input Variables	Type	Description
ARV_i_azure-bearer-token	Text	Azure bearer token.
ARV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ARV_i_azure-vm-name	Text	Name of the VM to re-start.
ARV_i_azure-resource-group	Text	Resource group where the VM was created.

14.3 Outputs

None.

15 Azure-Delete-VM

15.1 Overview

This subtask will delete a VM in Microsoft Azure.

15.2 Inputs

Input Variables	Type	Description
ADM_i_azure-bearer-token	Text	Azure bearer token.
ADM_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ADM_i_azure-vm-name	Text	Name of the VM to delete.
ADM_i_azure-resource-group	Text	Resource group where the VM was created.

15.3 Outputs

None.

16 Azure-Get-Users

16.1 Overview

This subtask will retrieve a list of users in Microsoft Azure.

16.2 Inputs

Input Variables	Type	Description
AGU_i_azure-bearer-token	Text	Azure bearer token.

16.3 Outputs

Input Variables	Type	Description
AGU_o_azure-users	List	List containing users on Microsoft Azure.

17 Azure-Get-User-Membership

17.1 Overview

This subtask will retrieve a list of user membership in Microsoft Azure.

17.2 Inputs

Input Variables	Type	Description
AGUM_i_azure-bearer-token	Text	Azure bearer token.
AGUM_i_azure-user-principal-name	Text	The user principal name as in Azure Active Directory.

17.3 Outputs

Input Variables	Type	Description
AGUM_o_azure-user-membership	List	List containing users on Microsoft Azure.

18 Azure-Get-AvailabilitySet-VMs

18.1 Overview

This subtask will retrieve a list VMs in a given availability set.

18.2 Inputs

Input Variables	Type	Description
AGASV_i_azure-bearer-token	Text	Azure bearer token.
AGASV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
AGASV_i_azure-availset-name	Text	Name of the availability set.
AGASV_i_azure-resource-group	Text	Resource group where the VM was created.

18.3 Outputs

Input Variables	Type	Description
AGASV_o_azure-availset-VMs	List	Contains the names of the VMs belonging to the specified availability set.

19 Azure-Deallocate-AvailabilitySet-VMs

19.1 Overview

This subtask will deallocate VMs in a given availability set.

19.2 Inputs

Input Variables	Type	Description
ADAV_i_azure-bearer-token	Text	Azure bearer token.
ADAV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ADAV_i_azure-availset-name	Text	Name of the availability set.
ADAV_i_azure-resource-group	Text	Resource group where the VM was created.
ADAV_i_azure-max-retries	Integer	Number of retries that should be performed when deallocating VM.
ADAV_i_azure-wait-time	Integer	Amount of time to wait before checking a VM was deallocated.

19.3 Outputs

Input Variables	Type	Description
ADAV_o_azure-availset-VMs	List	contains structures with the VM name and the status e.g. <pre>[{ "NAME": "VM-1", "STATUS": "Deallocated" }, { "NAME": "VM-2", "STATUS": "Deallocated" }]</pre>

20 Azure-Start-AvailabilitySet-VMs

20.1 Overview

This subtask will start VMs in a given availability set.

20.2 Inputs

Input Variables	Type	Description
ASAV_i_azure-bearer-token	Text	Azure bearer token.
ASAV_i_azure-subscription-id	Text	Subscription ID for the Azure account.
ASAV_i_azure-availset-name	Text	Name of the availability set.
ASAV_i_azure-resource-group	Text	Resource group where the VM was created.
ASAV_i_azure-max-retries	Integer	Number of retries that should be performed when deallocating VM.
ASAV_i_azure-wait-time	Integer	Amount of time to wait before checking a VM was deallocated.

20.3 Outputs

Input Variables	Type	Description
ASAV_o_azure-availset-VMs	List	contains structures with the VM name and the status e.g. <pre>[{ "NAME": "VM-1", "STATUS": "Running" }, { "NAME": "VM-2", "STATUS": "Running" }]</pre>