ALTEON VA FOR AZURE
GETTING STARTED GUIDE

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@author Vincent Rijmen <vincent.rijmen@esat.kuleuven.ac.be>
@author Antoon Bosselaers <antoon.bosselaers@esat.kuleuven.ac.be>
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CHAPTER 1 – PREFACE

This guide describes the getting-started process of the Alteon Virtual Appliance (VA) platform for the Microsoft Azure cloud.

Microsoft Azure is a cloud computing platform and infrastructure created by Microsoft for building, deploying, and managing applications and services through a global network of Microsoft-managed data centers.

It eliminates the need to invest up front in hardware and enables organizations to develop and deploy applications faster. Organizations use the Azure cloud to launch virtual machine instances as needed, configure security and networking, and manage storage.

For detailed information regarding the Azure cloud, refer to the Microsoft Azure documentation at https://azure.microsoft.com.

Who Should Use This Book

This guide is intended for network administrators maintaining applications in the Microsoft Azure cloud. It assumes familiarity with Microsoft Azure services, as well as general inter-networking technologies and concepts.

Related Documentation

Alteon Application Switches have the following related documentation, which is required to regularly manage the Azure Alteon VA, in addition to the specifics pertaining to Alteon's integration into the Azure cloud:

- Alteon Application Switch Operating System Command Reference
- Alteon Web Based Management Application Guide
- Alteon Command Line Interface Application Guide
- Alteon Application Switch Troubleshooting Guide

Prerequisites

- Knowledge of Microsoft Azure and deploying VMs on the Microsoft Azure cloud.
- Knowledge of Alteon Application Switch operating system.
- An existing Microsoft Azure account.

The Alteon VA Platform on Microsoft Azure

Alteon VA for Microsoft Azure cloud allows running your enterprise applications while tapping into Microsoft Azure computing resources and providing a common application delivery platform for your applications. Leveraging the common Alteon operating system across Microsoft Azure cloud and the enterprise datacenter, enables faster application development cycles and improved economies for disaster recovery and seasonal application capacity scalability requirements. The figures below show a reference Alteon VA deployment on Microsoft Azure cloud in a single and in a multiple IP address mode.
As shown in the figure above, the Alteon VA instance on Microsoft Azure cloud hosts a single IP address (1.1.1.100) for management, VIP and the PIP. For simplicity, and in order to avoid additional configuration, it is mandatory to configure a PIP when operating the Alteon VA on Azure.

Figure 1: Alteon VA configured to run in a single IP address mode

As shown in the figure above, the Alteon VA instance on Microsoft Azure cloud hosts a single IP address (1.1.1.100) for management, VIP and the PIP. For simplicity, and in order to avoid additional configuration, it is mandatory to configure a PIP when operating the Alteon VA on Azure.

Figure 2: Alteon VA configured to run in a multiple IP address mode
As shown in the figure above, the Alteon VA instance running on Microsoft Azure cloud is connected to two networks 1.1.2.0/24 as the management network and 1.1.1.0/24 as the data network. A different IP address is configured for the management interface, PIP and VIPs.

It is mandatory to configure a PIP when operating the Alteon VA on Azure.
CHAPTER 2 – DEPLOYING ALTEON VA ON THE AZURE CLOUD

This section describes deploying Alteon VA on the Azure cloud, for standard or a high availability deployment mode, using the Alteon Solution Template which can be found in the Azure marketplace under Radware Alteon Deployment.

Notes

- Alteon VA running on the Azure cloud, runs by default in a single IP address mode. This is very useful when using the Alteon to manage a single service.

- Using the Alteon Solution Template, you can configure the service you want to manage (real servers, port, SLB metrics) from the solution template with no need for any additional configuration through the Alteon UI. The management interface, as well as the PIP, VIP, real server groups and virtual services, are automatically configured in the background.

- Azure cloud requires that just new or empty resource groups can be used through the solution template. If you need to use an existing resource group, deploy the Alteon BYOL offer in the marketplace.

- Radware recommends using the Alteon Deployment application to deploy the platform. See Appendix A for the procedure to deploy using the Radware Alteon VA-ADC and Security Services (BYOL).

Deploying Alteon VA

In order to deploy the Alteon VA on the Azure cloud, you first need to log in to the Microsoft Azure portal at https://portal.azure.com/.
To deploy Alteon VA on the Azure cloud

1. Once logged in to your Azure account, access the marketplace and search for the Alteon VA in the Azure marketplace by entering "Radware" or "Alteon" in the search box, and click **Enter**.

2. In order to deploy the Alteon VA using a solution template, select the **Radware Alteon VA - deployment**.
3. Click **Get it Now**.

4. Click **Continue** to accept the Azure terms of use.
5. Click **Create**.

The *Create Virtual Machine Wizard* opens and takes you through the required operations.
Configure the basic settings (the Azure Instance parameters):

6. Enter the Virtual machine prefix name

Enter your Credentials. These parameters are mandatory when creating a virtual machine on the Microsoft Azure cloud. The VM credentials are used to access the virtual machines created on Azure. Since Alteon prevents access to the virtual machine in any manner other than the Alteon VA user interface (Web interface or CLI), you will not be able to access the VM running the Alteon VA using these credentials.

7. Enter your Alteon User Name.

8. Select the Authentication type (password or SSH public key), and enter your password or SSH public key.

9. Select your relevant subscription from the subscriptions options.

10. Define the Resource group that the VM running the Alteon VA will be associated with. You should select the option to create a new group.

11. Select the Azure data center location to where you want the Alteon VA to be deployed.
12. Click **OK**.

Now you can configure the VM settings:

13. Select the Solution Deployment mode: **Stand Alone** or **High Availability**.

14. Select the Storage account.

15. Change the default settings (Virtual Machine size, public IP address) if required, and the host name prefix.

The minimum requirements of the Alteon VA, depending on the deployment use case, are detailed in the following table:
### Configuration

<table>
<thead>
<tr>
<th>Configuration</th>
<th>vCPU</th>
<th>GB RAM</th>
<th>GB Disk Space</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alteon VA (without IP reputation)</td>
<td>1</td>
<td>2 (for L4 SLB) 3 (for L7 SLB)</td>
<td>14</td>
<td>When configuring more than 1 vCPU, one is allocated for the MP and the rest for the SPs. Alteon VA with 2 GB RAM supports the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Real servers - 1024</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Health checks - 4096</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Content rules - 150</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Filters - 75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HTTP modification rules - 1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Data classes - 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L4 session tables entries: 128K</td>
</tr>
<tr>
<td>Alteon VA with IP reputation enabled</td>
<td>1</td>
<td>4</td>
<td>18</td>
<td>When configuring more than 1 vCPU, one is allocated for the MP and the rest for the SPs.</td>
</tr>
<tr>
<td>Alteon VA with FastView (FV) *</td>
<td>3</td>
<td>7 (3 for Alteon and 4 for FV)</td>
<td>22</td>
<td>When activating FastView on VMware, an additional disk should be created with this disk size in addition to the deployed disk. The minimum disk size will therefore be 32 GB (22+10).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>When configuring FastView with more than 4 GB RAM, the minimum disk size should be 10 GB + 3 times the FastView RAM size.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For example, if the VA is configured to have 4 GB RAM for Alteon and 8 GB RAM for FastView, the minimum disk size should be 34 GB – 10 GB for Alteon and 24 GB (3 x 8) for FastView.</td>
</tr>
<tr>
<td>Alteon VA with AppWall (AW) *</td>
<td>2</td>
<td>7 (3 for Alteon and 4 for AW)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Alteon VA with AppWall and FastView *</td>
<td>4</td>
<td>11 (3 for Alteon, 4 for FV, and 4 for AW)</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

* For enabling IP reputation, you should add 1 GB to the RAM size and 4 GB to the disk size.
16. Click **OK**.

17. For a **High Availability** or **GSLB** deployment, enter the **Active Directory** credentials. You can skip this step and enter it later through the Alteon configuration.

**Note:** For a Stand Alone deployment, these parameters are not required.
18. Click **OK**.

19. Enter the SLB settings: The number of real servers and their IP addresses.

   **Note:** Up to 10 real servers can be defined at this place. If more real servers are required, you can define them using the Alteon configuration procedure. See [Configuring Real Servers](#), below.

20. If required, you can change the service port and the SLB metrics.
21. Click **OK**.

22. Review the summary of your settings and click **OK**.

23. Click **Purchase** in order to launch the Alteon VA.

24. Click **OK**.

The Alteon VA deployment template will create the Alteon VA on Azure cloud and configure the Alteon to load balance the servers according to the service and SLB metrics you selected.

If you deployed an High Availability environment two instances of Alteon VA will be launched and already configured in an HA environment, and fully operational with no need for further configuration in the Alteon VA.
Notes

- When configuring the Alteon VA using the solution template, the security group is automatically configured to include the management protocols (SSH-port 20, https-port 8443), and the services that are load-balanced (e.g. port 80 for http).

- If you are configuring the Alteon VA to run in High Availability (HA) mode you should enable the high availability advertisement ports for UDP, port 2090 as inbound and port 2091 as outbound.

- If you are using the Local License Server within your virtual network, you should set the security group rules for the ports that it communicates with the Alteon. If you use the system defaults, the security rules should be: inbound http port 7070.

Static VM IP Address

Since the Alteon VA license is generated based on the VM MAC or IP addresses, generating the license based on the VM IP address and having the IP address being static, prevents the license from becoming outdated.

For the static configuration, this is done automatically during the solution template deployment.

Note: Once the virtual machine is running you will be charged the Microsoft Azure fee for the virtual machine and for the Alteon VA (if you did not launched the BYOL image).
Alteon VA for Azure can be accessed through the following user interfaces:

- **Web Interface, page 25**
- **CLI Interface, page 25**

### Web Interface

Alteon VA, when running on Microsoft Azure, is configured to have its management controlled through the data path. This is due to the fact that any instance on Microsoft Azure is provided with a single IP address per network interface.

In order to enable load-balancing HTTPS traffic and management access, the HTTPS port for management access is changed to 8443.

To access the Alteon web interface, open your browser and enter the Alteon VA instance IP address with port 8443.

For example, if the Alteon VM IP address is 1.1.1.1, enter `https://1.1.1.1:8443`

To log in, enter the default username and password: **admin, admin**

**Note:** If you do not intend to load balance HTTPS traffic, you can change the HTTPS port for management purposes to the standard HTTPS port 443 through the Web interface at: `Configuration>System>Management Access>Management Protocols` or through the CLI command: `/c/sys/access/https/port`.

### CLI Interface

To connect to Alteon VA through the command line interface (CLI), connect to Alteon VA port 22 using any terminal emulator supporting SSH (such as PUTTY).

Enter the default username and password: **admin, admin**

The CLI main menu is displayed.

It is strongly recommend you change the password on your first login.

### Cloud Init

You can deploy a pre-configured Alteon VA using the cloud-init feature.

Refer to the *Alteon VA Installation Guide* for details of the Alteon VA cloud-init support.
CHAPTER 4 – CONFIGURING ALTEON VA ON THE AZURE CLOUD

Since using the configuration template you configure the Alteon VA for basic load balancing, you need to access this chapter only for advanced settings of the Alteon VA (such as for configuring more than 10 real servers, other SLB metrics, or L7 SLB)

This chapter describes how to configure your Alteon VA on the Microsoft Azure cloud.

Configuring Alteon VA to Run in Single/Multiple IP Address Mode

Alteon VA when running on Microsoft Azure cloud can be configured either in a single IP address mode or in a multiple IP addresses mode (the common mode of work of an ordinary Alteon device). If you are using Alteon VA to manage a single service (single VIP) it is recommend to run in a single IP address mode. When running in the Azure cloud, the Alteon VA is configured by default to run in a single IP address mode.

When working in a single IP address mode, the system automatically configures itself to direct the management traffic to the management process. Virtual services and PIPs will also be automatically assigned the virtual machine IP address, with no further need to configure it.

To configure the Alteon VA to run in a multiple IP address mode you should perform the following actions:

1. Shut down the VM running the Alteon VA.
2. Through the Azure dashboard, attach additional network interfaces as required to the Alteon VA.
3. Reboot the VM.
4. Configure the Alteon VA to run in a multiple IP address mode. This is done by disabling the single IP address mode using the CLI command /c/sys/singleip dis. After pressing Enter you will be prompted to reboot the Alteon VA.

When the Alteon VA is not configured to work in a Single IP address mode but just a single network interface is attached to the VM running the Alteon VA, on every login to the system you will receive a notification message in the Web UI and will be prompted on the CLI to switch to Single IP address mode.

To configure Alteon VA to run in Single IP Address mode, access the Alteon VA CLI and enter the command: /c/sys/singleip ena

Enabling GSLB and HA Mode in the Microsoft Azure Cloud

Alteon VA supports GSLB and HA mode in the Microsoft Azure cloud.

Alteon in the Azure cloud can be configured to work in standard HA mode with a pair of master and backup VA platforms. With one configured as master and the second as backup, they both have a private IP address for internal, Azure access. Should the master Alteon VA fail, the backup takes over, replacing the failed platform and becoming the master.

Each Alteon VA should also be configured with a static public IP address for access from clients that are outside the Azure cloud, or for accessing the Alteon for management purposes from outside the Azure cloud network.
The primary IP address must be configured to be attached to the public IP address of the master VA of the Alteon VA HA pair and will act as the floating IP address.

When there is a failure in the master, and a failover to the backup occurs, the public IP addresses are swapped so that the primary IP (the floating IP address), is now attached to the backup (now new master) platform to support the failover.

You can enter the CLI command `info/sys/azureip` to displays the Azure VM public IP information.

If GSLB is configured, the NIC resource name and public IP address are presented. If HA is configured the public IP address, the NIC resource name, the peer public IP address, and the peer NIC resource name are presented.

Enter the CLI command `cfg/sys/azure` to open the Azure setup menu to configure the Azure-related parameters.

In order for the Alteon VA to work in GSLB or HA mode, you must verify that the Azure Credentials are configured in order to enable access to the Azure portal to take control of the "floating IP address".

Azure credentials include the following fields: subscription ID, client ID, client secret, and tenant ID. (You can find ou these parameters from the Azure administrator in your organization if you do not know them.)

The Azure credentials are configured in the Web UI at: Configuration > System > Azure Credentials and Resource.

To retrieve the credentials, See Generating and Retrieving Alteon VA credentials on the Azure Portal, page 39.

Alteon VA running on the Azure cloud only supports the Switch HA mode.
Since the Azure cloud does not have the provisions to support floating IPs, which is essential in an HA environment, you cannot have two instances with the same IP address, where just one of them will be actually active. Alteon must therefore transfer the public IP addresses among the VMs.

Every Alteon VA running on Azure has its public IP address.

When Alteon VA operates in HA mode on Azure, upon failover the backup Alteon VA takes ownership on the Master Alteon public IP that is exposed to the outside world. (This public IP acts as a floating IP address.)

Since the IP addresses tend to change between reboot of the VM, you should configure both the public and private IP addresses to be static. By default, the deployment template configures these IP addresses as static.

In order to enable to transfer the master public IP address to the backup, Alteon should have access to the Azure account.

For this purpose you must enter the Azure credentials to the Azure portals and active directory (described above), as well as additional information on the resources of the VMs running the Alteon, to both Alteon platforms:

1. The Azure NIC name of the Alteon instance you are configuring. (This is required in single IP address mode only. For multiple IP mode it is retrieved automatically.)
2. The NIC resource name of the peer Alteon instance. (You can find it under the Azure portal under you Alteon VM.)
3. The resource group of both of the Alteon platforms (master and backup).
4. The resource name of the public IP address of the master Alteon which will serves as the floating IP address.

The above parameters should be configured at: Configuration > Network > High Availability in the Azure tab.

After defining the Azure resources, the following is performed:

1. The primary public IP address is assigned to the Master Alteon VA VM resources and the secondary public IP address to the backup Alteon VM.
2. Data is synchronization with the peer. The peer will transpose the information between the peer and the VM NIC data.

For GSLB, just the primary NIC is considered, and the public IP is extracted from it.. This information will not be synchronized. It should be entered for every Alteon VA.

If a failover occurs, the backup Alteon master swaps the public IP resources of the two Alteon in order to take control.

Both peers should reside on the same resource group.
For example, for VM1 (Name - Alteon1, Public IP name - Alteon1-IP) and VM2 (Name - Alteon2, Public IP name - Alteon2-IP), where Alteon 1 is currently the master. In the event of a failover, the normal failover process is being processed. In addition, it swaps between the public IP of Alteon1 and of Alteon2.

It will remove Alteon1-IP resource from Alteon1 and remove Alteon2-IP resource from Alteon2. It will then swap the public IP addresses, attach Alteon1-IP resource to Alteon2 and attach Alteon2-IP resource to Alteon1.

Now you can configure the Alteon VA to work in HA or GSLB mode. Refer to the Alteon Application Guide.

**Note:** It takes up to 2 minutes for the public IP to transpose in case of failover

## Basic Load Balancing Configuration

Once you access the Web interface (as described above) you can configure your Alteon VA on the Azure cloud to load balance between servers, performing the following steps:

- Configure the real servers
- Configure the servers group
- Configure the virtual servers

The following sections provide a step-by-step guide to perform these configurations.

**Note:** For more enhanced capabilities, refer to the Alteon Application Guide.
Configuring the Real Servers

You need to first configure the real servers.

To configure the real server

1. In the Web interface, navigate to: **Configuration > Application Delivery > Real Servers**
2. Enter the real server ID.
3. Enter the real server IP address.
4. Click the checkbox to enable the real server.
5. Define the service ports and the additional parameters as required.
6. Press **Submit**.
7. Repeat all the above steps for all your real servers.
Configuring the Real Server Group

You can now configure the real server group.

**To configure the real server group**
1. In the Web interface, navigate to: Configuration > Application Delivery > Server Groups
2. Click + to create a new group.
3. Enter the group ID.
4. Enter the group description.
5. Mark the real servers in the Available area on the left and click the right arrow button to select them.
6. If there is a need to change the system defaults, modify any parameters as required.
7. Click Submit.

Define the Virtual Server

You can now configure the virtual servers.

**To configure the virtual server**
1. In the Web interface, navigate to: Configuration > Application Delivery > Virtual Servers
2. Click + to create a new virtual server.
3. Enable the Virtual Server by clicking Virtual server ID.
4. Enter the Virtual Server ID.
5. The virtual server IP address is automatically assigned to be the same as the virtual machine IP address.

6. In the Virtual Services tab, click + to add a real servers group.
7. Enter the service port.
8. From the group ID drop down list, select the real servers group.
9. If you need to change the system defaults, modify any parameters as required.
10. Click Submit.

11. Click Apply to apply all the above changes.
CHAPTER 5 – SPECIAL CONSIDERATION

Azure virtual machines are associated with a single IP address. As a result, there are some special considerations that should be taken into account when deploying Alteon VA on Azure.

Configuring Virtual Services

There is no limitation on load balancing more than one application as long as every application is using a different service port.

In case you need to load balance several applications using the same port (for example web application using port 80) you should:

- Configure one virtual service.
- Configure a real server group for every application.
- Assign a content class based on the application domain name, or URL to redirect the traffic to the appropriate service group. For further information on configuring content groups refer to the Alteon Application Guide.

HTTPS

In order to enable load-balancing HTTPS traffic and management access, the HTTPS port for management access is changed to 8443.

To access the Alteon web interface, enter the Alteon VA instance IP address with port 8443. For example, if the Alteon VM IP address is 1.1.1.1, enter https://1.1.1.1:8443

If you do not intend to load balance HTTPS traffic, you can change the HTTPS port for management purposes to the standard HTTPS port 443.

Reserved Ports

Alteon VA reserves some ports for internal usage.

You cannot load balance services running on the following ports: 123, 161, 3121, 2090, and 2091.

The following services use predefined ports and you cannot load balance services using the same ports as the services without changing the Alteon VA settings. If you do need to load balance services using these ports, you can change the ports that Alteon uses for these services through the user interface.

The following are the services and their predefined ports:

- HTTPS - port 8443 (to enable load balancing of HTTPS traffic)
- SSH - port 22
- Telnet - port 23
- DPM - port 3030

When you configure the Alteon to respond to health checks on specific ports (using the command: /cfg/sys/health) these ports cannot be used for load balancing services.
CHAPTER 6 – LIMITATION ON ALTEON VA SERVICES

The current release of the Alteon VA on Microsoft Azure cloud provides the same functionality as the Standard Alteon VA, such as: server load balancing, SSL offloading, Alteon NG capabilities such as AppWall - WAF (Web Application Firewall), FastView - WPO (Web Performance Optimization) and caching, and compression.

Non-Supported Features

The following features are not supported by this release on the Azure cloud.
- Traffic Steering

The following features are not supported when Alteon VA is configured to run in “single IP address” mode.
- APM
- Session mirroring
- AppWall (from version 32.2.0.0)

Limitations

The following are the known limitations for this release related to the Alteon VA on the Azure cloud. For the entire limitation list for any Alteon version, please refer to the relevant Alteon Installation Guide.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Bug ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Alteon VA in Azure Cloud boots by default with a single IP address even if the VM has more NICs. In order to switch to a multiple-IP addresses configuration, disable the singleip mode using the /c/sys/singleip command.</td>
<td>DE19291</td>
</tr>
<tr>
<td>2.</td>
<td>When running the Alteon VA on Azure, changing from single IP address mode to multiple IP address mode on a pair of Alteon’s running in HA mode, the public IP address of one of the Alteons might get detached from its virtual machine.</td>
<td>DE40936</td>
</tr>
<tr>
<td>3.</td>
<td>Session mirroring is not supported when pbind is enabled (when the Alteon is configured to run in a multiple IP address mode).</td>
<td>DE36033</td>
</tr>
<tr>
<td>4.</td>
<td>The management interface does not support a NIC with accelerated network configured.</td>
<td>DE53182</td>
</tr>
</tbody>
</table>
APPENDIX A – RETRIEVING AZURE CREDENTIALS

In order for the Alteon to support HA and GSLB on the Azure cloud, it must access the Azure portal in order to remove the IP addresses between the Alteon VA instances.

For Alteon to access the Azure portal and perform the required activities, you must provide/create the proper credentials.

For this purpose you must register Alteon on the Azure portal as an application and assign it the proper roles through the Azure Active Directory.

**Note:** For other options to register applications on Azure portal refer to [https://docs.microsoft.com/en-us/azure/active-directory/develop/active-directory-integrating-applications](https://docs.microsoft.com/en-us/azure/active-directory/develop/active-directory-integrating-applications)

Generating and Retrieving Alteon VA credentials on the Azure Portal

This section describes the process to retrieve the following Azure credentials, which further needs to be entered to the Alton VA through the WebUI or using CLI commands.

- Azure Subscription ID
- Azure Tenant ID
- Azure Client ID
- Azure Client Secret

Prerequisites

Prerequisites include:

- A user name and password for the Azure portal.
- Administrator authorization in Azure account in order to add access control (owner).

Tenant ID

Tenant represents your organization ID in the Azure active directory (AD).

You can retrieve your tenant ID by navigation to the Azure Active Directory, and click **Properties**. Insert the **Directory ID** in the Alteon **Tenant ID** field.
Note: For more details, see: https://docs.microsoft.com/en-us/azure/active-directory/develop/active-directory-howto-tenant

Subscription ID

You need to know the Subscription ID the Alteon VA will use, out of the one or more subscriptions your organization might have.

In order to view your organization subscription from your Azure portal, click Subscriptions, and from the subscriptions list copy the Subscription ID which you should enter to the subscription ID field in the Alteon Web UI or using the CLI command /cfg/sys/azure/subscrip.
Client ID

Client ID represents the application registered to the Azure portal. It should be created in the portal, and set to Alteon. After the application is created, it should be assigned the required privileges under every subscription it uses.

From the Azure portal, navigate to the Azure Active Directory as described in the Tenant ID section, and click App registrations and New application registration.

Assign the new application name (remember this name, as it will be used later on), and chose Web app / API as the application type.

Type http://localhost.local as the Sign-on URL and click Create.

Enter the application you created. Use the Application ID as the client ID field in Alteon WebUI or enter it in the CLI command /c/sys/azure/client.
Under required permissions, verify you have *Windows Azure Active Directory*, with **Sign in and read user profile** delegated permissions.

Click **Grant Permissions**, and click **Yes** to accept application grant permissions.

**Client Secret**

In the application you created, click **Keys**. After setting the *key description* and *key expiration time* you will be able to save it. Once saved, the *key value* will appear. Copy the key value and use it as the *client secret* in Alteon configuration.
Setting Application Role

Go to your subscriptions, as described above, click on the desired subscription, and navigate to Access control (IAM). Click Add to add the application you created previously.

Note: If the Add button isn’t available, it means your user is not privileged to add access control application. Contact your administrator.

Chose Contributor role, assign it to Azure AD, type the application name. Click on the result, and save.

Now your new application will appear with a Contributor role.
You can click on Contributor link, and see the permissions for each section.
Note that it is possible to create a user defined role via *PowerShell*, with specific privileges.

**Verifying the Configuration**

It is recommended to verify your configuration with a command line from any Linux machine with *wget* application version 1.15 or above (that supports PUT command—any Azure or AWS Ubuntu will probably will be good), and with proper DNS server configuration.

In order to do so, you will also need to have a resource group available under the subscription ID, and at least one network interface card in it.

It is recommended to navigate to [https://resources.azure.com/](https://resources.azure.com/) were you can easily explore all your resources.

The test below contains three stages: getting a token, reading NIC info, and updating NIC info.

**Getting a Token**

Construct the following command with your parameters, and paste it to your Linux machine

```
```

You should get a 200OK response, and a token file will be created at local directory in *json* format. Print the file created.

If you get an authentication error, one of the parameters is not configured properly.
Retrieving Azure Credentials

Copy the access token value. This is your token.

Read NIC Info

You will now need the resource group name, and the NIC resource name. Construct the following command:

```
wget -S --header="Authorization: Bearer <access_token>" https://management.core.windows.net/
```

You should get an HTTP 200OK response, with a new json format file.

Copy the file with a new file name `dataFile` for convenience.

If you get an error, like 404, it probably means that one of the resource names is wrong, or does not exist under the subscription ID, or the NIC is not part of the resource group.

If you get an HTTP 403 forbidden error, it probably means the application role is not set or doesn't have the correct privileges.

Updating the NIC Information

Construct a new command as follows:

```
```

You get the new access token value. This is your token.
Again you should get an HTTP 200OK response. This means you are able to update NIC information. If you get an HTTP 403 forbidden error, it probably means the application role is not set or doesn’t have the correct privileges.

Note: Application privileges might enable you to read NIC information at the previous phase, but not allow you to update. In this case, as well, the application role should be set correctly.
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