Setup & Configuration Omnissa Horizon

document version 5.2

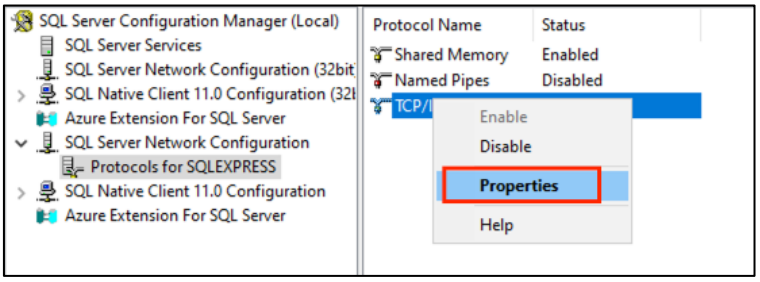
Content

1. Prepare Horizon Environment

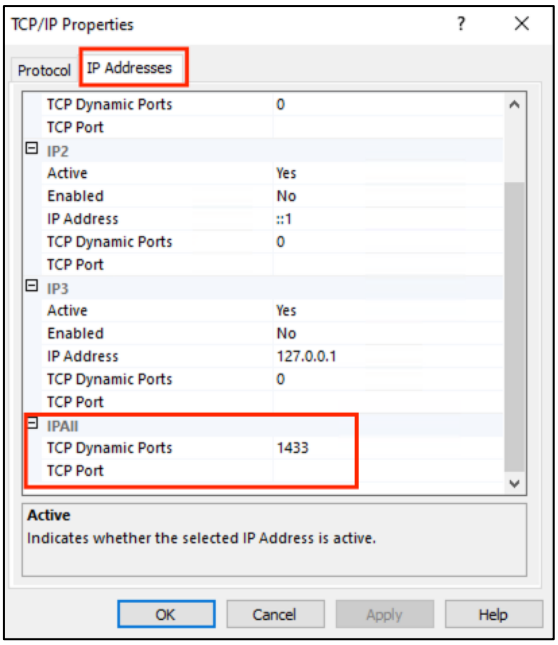
1.1 Create DB for Horizon Events

You need a database for recording of the Horizon Events. This must be a MS SQL, Oracle or PostgreSQL database. For testing and PoC purpose you can use a MS SQL Express version also.

- SQL Server Authentication is mandatory!
- Verify that port 1433 is opened for incoming requests in firewall of the SQL server
- In case you want to use MS SQL Express, you had to set the appropriate port, after you created the database
    - Start →SQL Server Configuration Manager, and switch to →SQL Server Network Configuration →Protocols for SQLEXPRESS
    - Select →TCP/IP, click on →Enable. After that, click to →Properties:

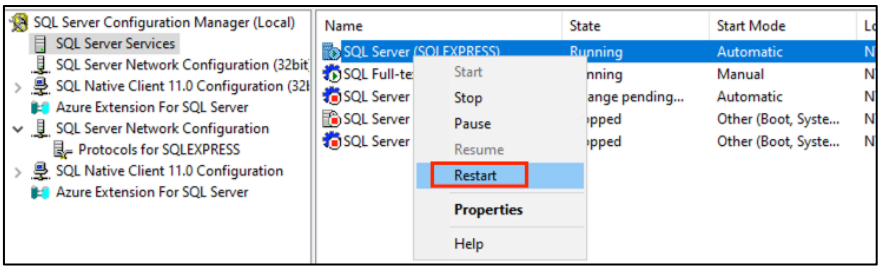


    - Go to the tab “IP Addresses” and scroll down to “IPAll”. You can see the given “TCP Dynamic Ports” and set it to the default value “1433”:



    - Click →Apply, then →OK

- Finally, you have to restart the “SQL Server (SQLEXPRESS)” Service:



1.2 Create vCenter Server Account for Horizon

For communication between Horizon and vCenter, you should create a dedicated role with needed privileges. Adding a dedicated user (AD-User or SSO-User) ensure that only minimum permissions are assigned.

- Privileges Required for the vCenter Server User With Instant Clones, see here

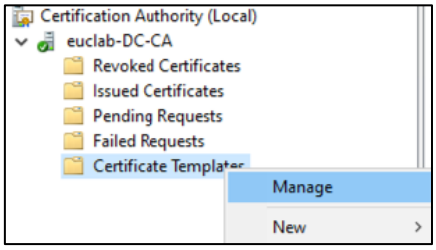
1.3 Create Domain Account for Horizon

For every domain which will be used for provisioning machines, a domain account has to be configured. Needed AD-permissions are documented here (Create a User Account for Instant-Clone Operations).

1.4 Create a Certificate Template for Horizon Connection Server

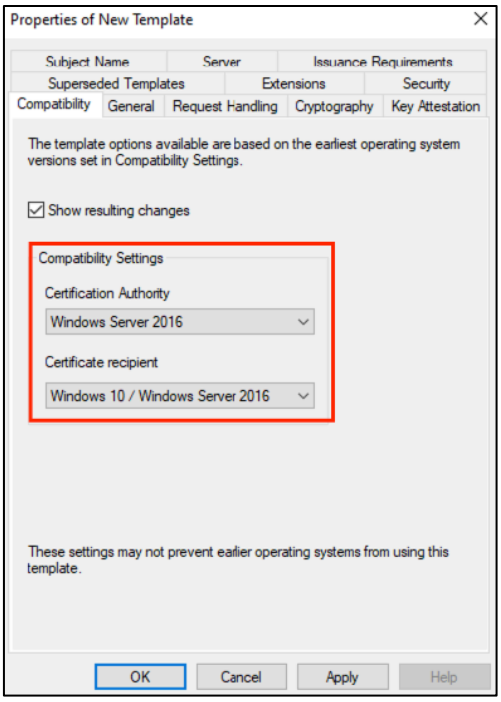
It is recommended to have a dedicated certificate template for Hoizon connection servers as described here.

- On your CA Server, start →Certification Authority Console
- Select →Certificate Templates, and click →Manage to open the “Certificate Templates Console”:

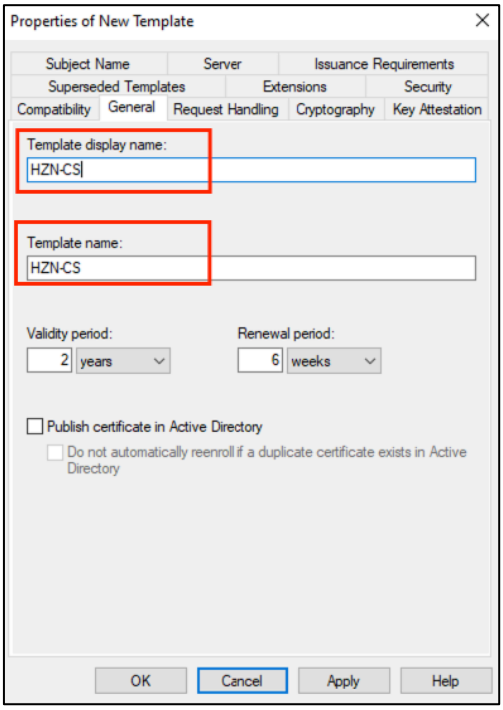


- Select the “Web Server” Template, and click on →Duplicate Template – the properties of the new template pop up

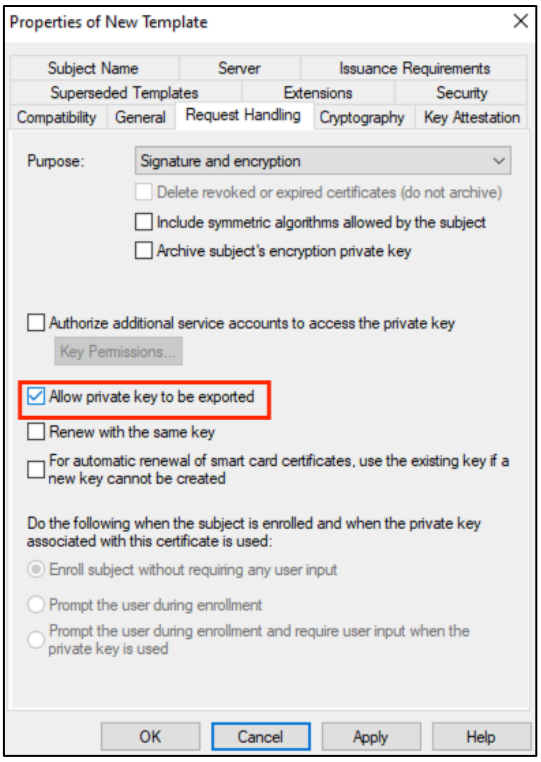
- Under tab →Compatibility set the compatibility settings



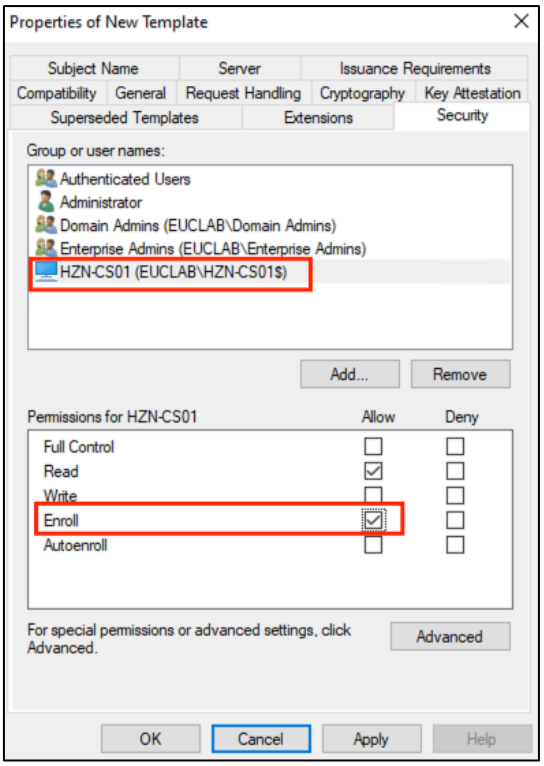
- Under tab →General, set a template display name



- Under tab →Request Handling, “Allow private key to exported”



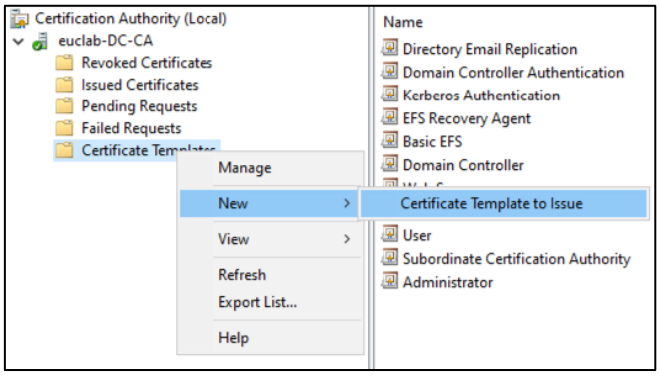
- Under tab →Security add the permission “Enroll” for domain users, or in minimum for the affected domain computers (which are used for Horizon connection servers)



- Submit and click →OK

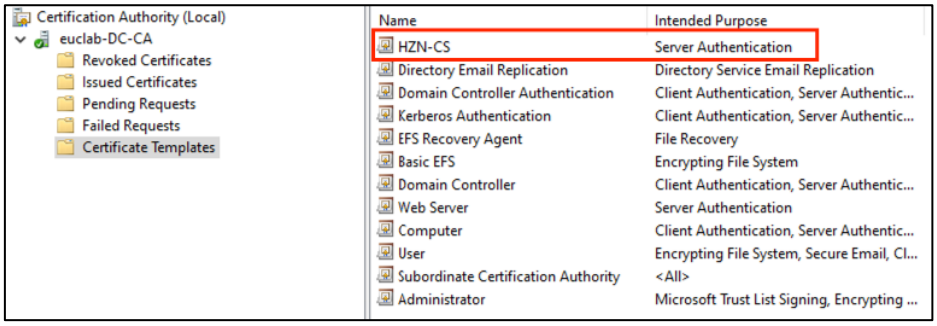
- Close the “Certific<ate Templates Console” Window

- In the CA, right-click on →Certificate Templates, then →New →Certificate Templates to Issue



  - Select the previously created Template, and click →OK.

- Now you should see the new Template



1.5 Add Horizon ADMX Templates to GPO

Horizon offers multiple GPO templates. These have to be applied into the existing environment, as described here (Add a Horizon 8 ADMX Template File to a GPO).

- Copy the .admx files to the %systemroot%\PolicyDefinitions folder on your Active Directory server.
- Copy the language resource (.adml) files from subfolder en-US (or different language folder) to the appropriate subfolder in %systemroot%\PolicyDefinitions\ on your Active Directory server.

1.6 AV exclusion list for Horizon

Depending from the AV solution at customer site, consider to set an executable exclusion list for

- Horizon Connection Server

Folder Path	EXE Files
C:\Program Files\Omnissa\Horizon\Server\bin	ws_ConnectionServer.exe ws_dctservice.exe ws_MessageBusService.exe ws_scripthost.exe

	wsnm.exe ws_tomcatservice.exe ws_tunnelservice.exe securitygateway.exe ws_dctservice.exe ws_crlservice.exe

- Horizon Agent

Folder Path	EXE Files
C:\Program Files\Omnissa\Horizon\Agent\bin	wsnm.exe wsnm_jms.exe ws_scripthost.exe SecurityGateway.exe tsdrvdisvc.dll
C:\Program Files\Omnissa\Horizon\Agent\Blast	VMBlastS.exe VMBlastW.exe
C:\Program Files (x86)\Common Files\Omnissa\USB\	omnissa-usbarbitrator64.exe
C:\Program Files\Common Files\Omnissa\ScannerRedirection\	Scanner.exe

- App Volumes Agent

Folder Path	EXE Files
C:\Program Files\Omnissa\AppVolumes\Agent\	svservice.exe

- DEM Agent

Folder Path	EXE Files
C:\Program Files\Omnissa\DEM\	FlexEngine.exe FlexService.exe Flex+ Self-Support.exe

See the complete overview here, URL

Also see here: Antivirus Considerations in a Horizon Environment

2. Setup Omnissa Horizon Standard Server

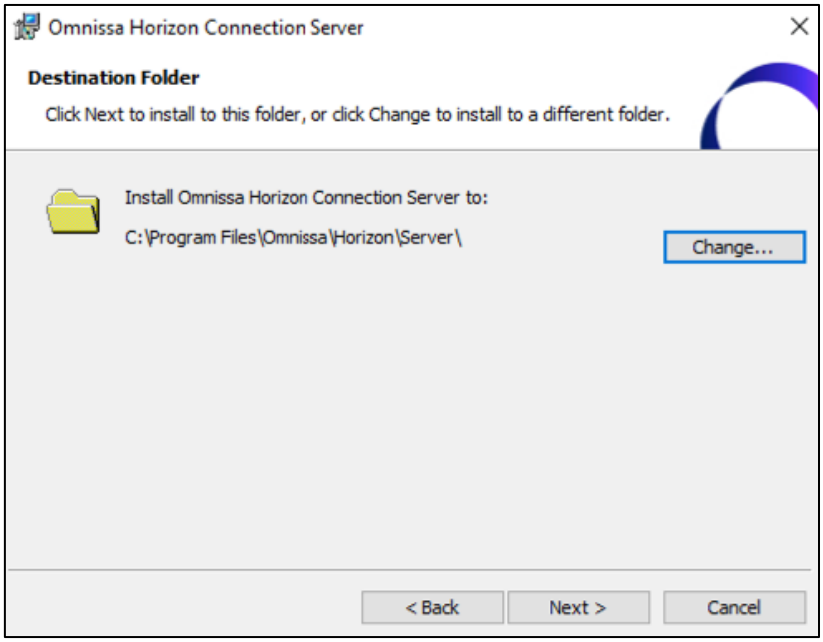
Version 2503 (8.15)

2.1 Initial Setup

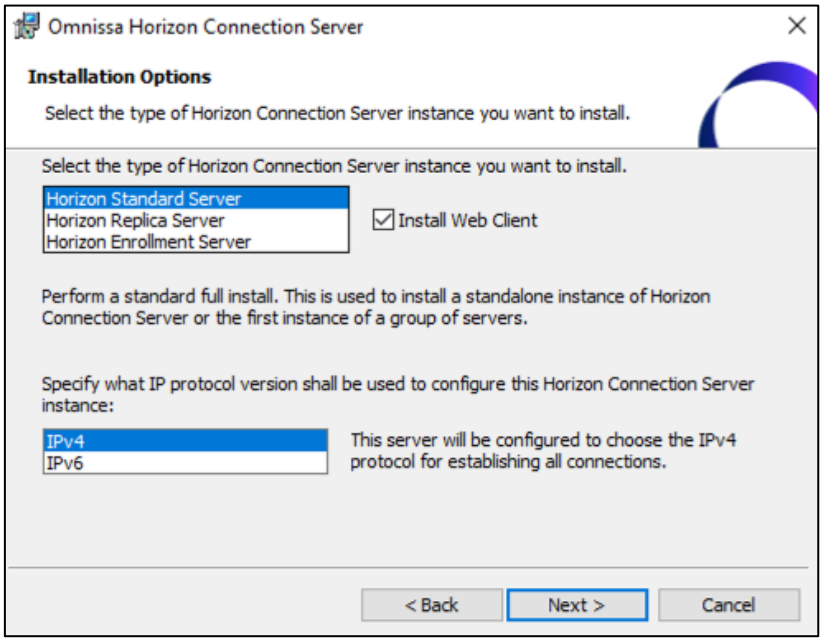
- Requirements: Windows Server 2016 or higher

- Setup MS-Updates, VMware Tools
- Horizon Connection Server must be meber of AD, and configured with a static IP

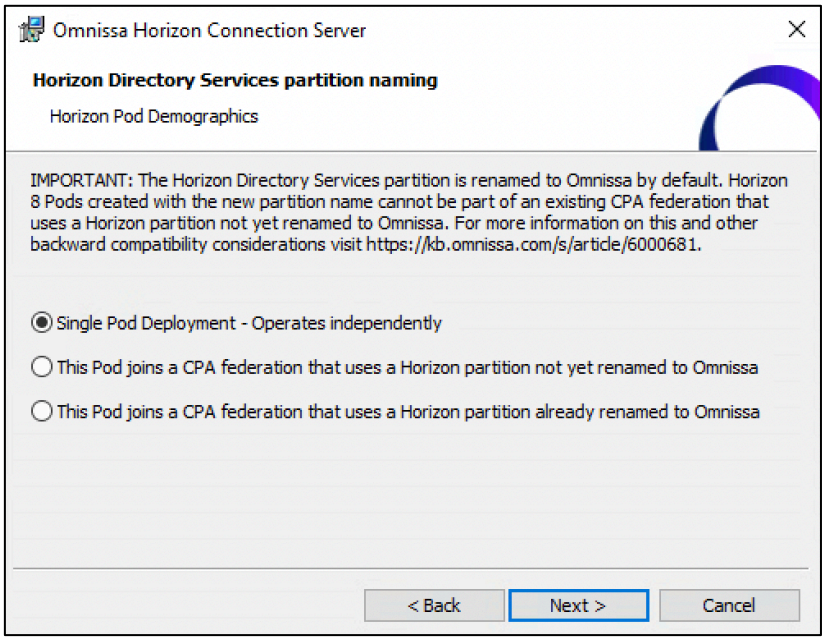
- Execute installation:



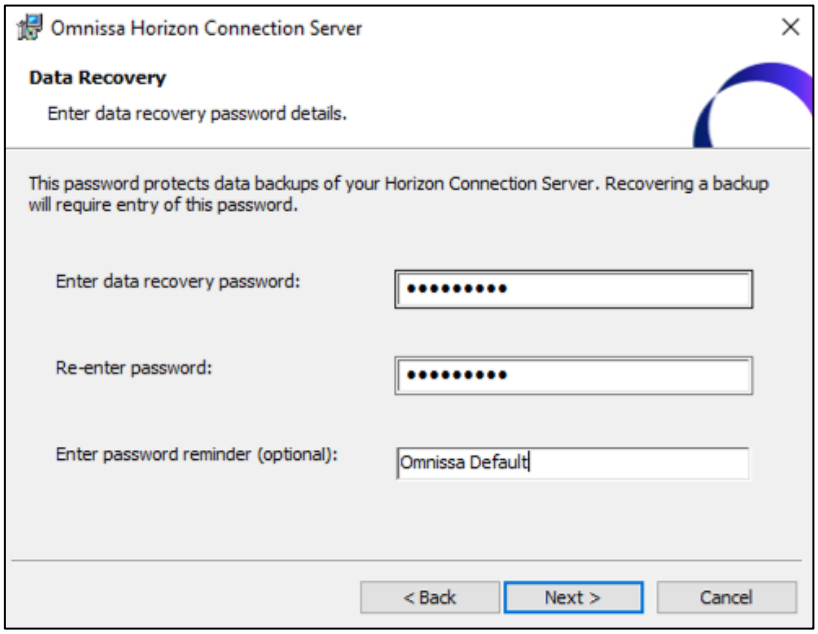
- Setup Horizon Standard Server:



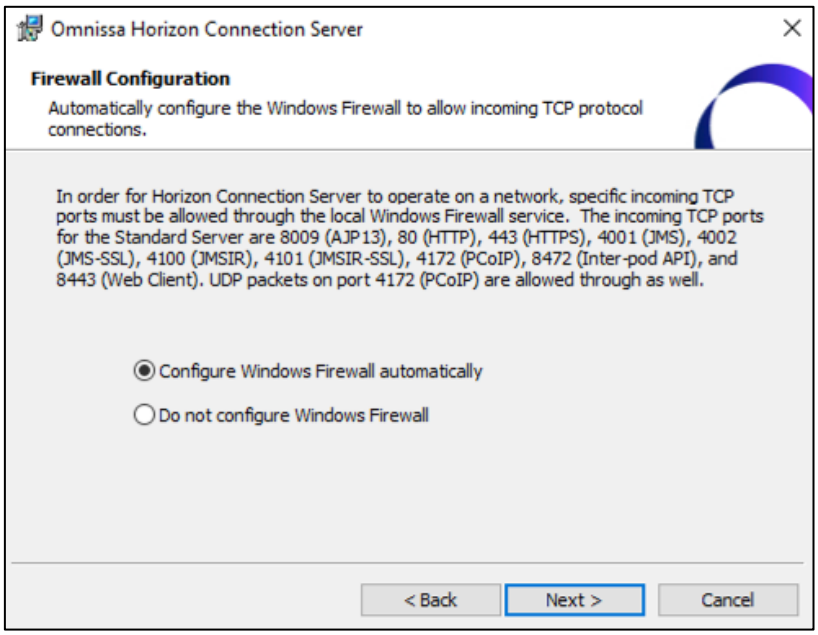
- Horizon Directory Services partition naming:



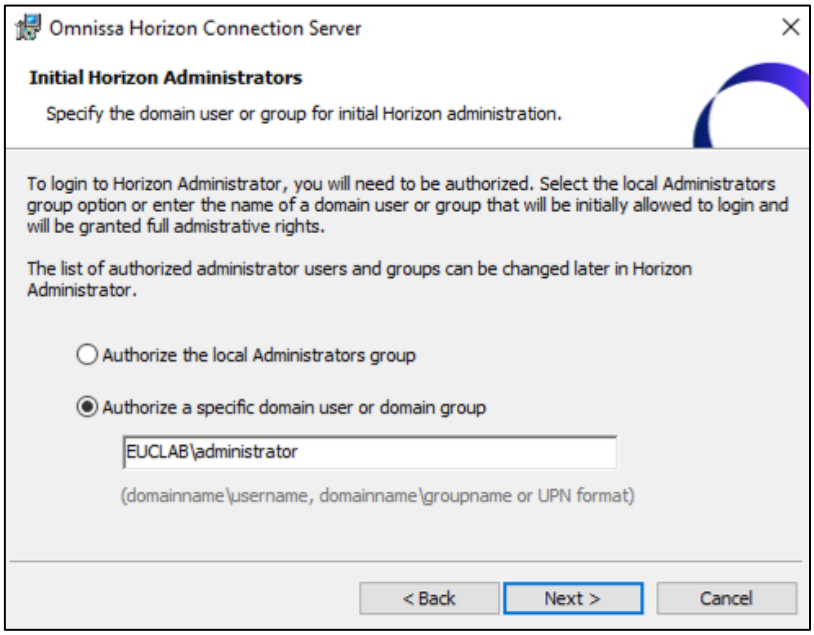
- Set password for data recovery:



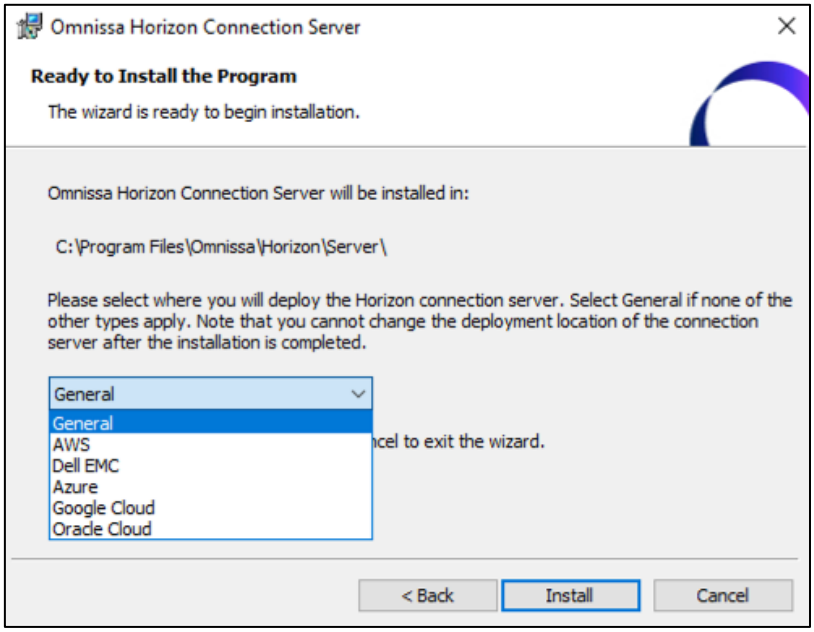
- Configure firewall automatically:



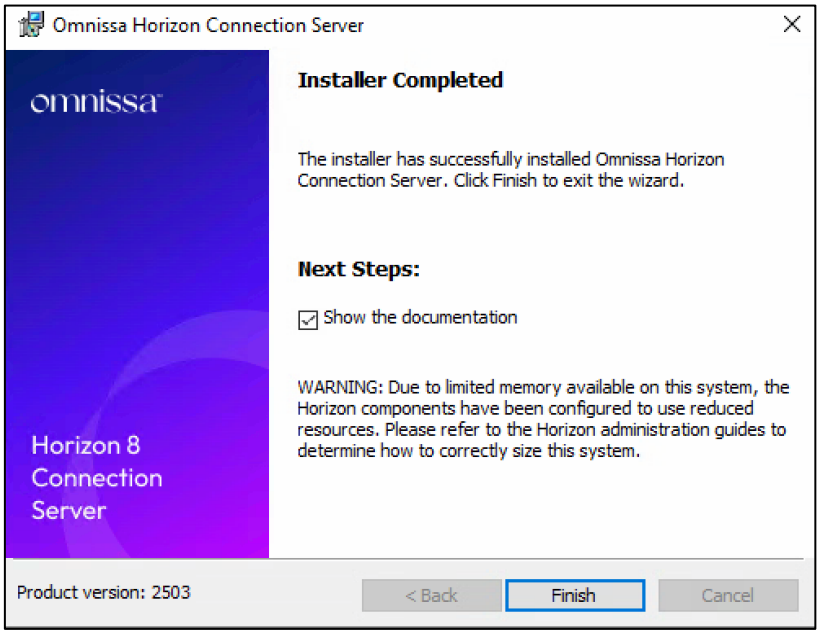
- Specify the authorzed user or group for Horizon Console:



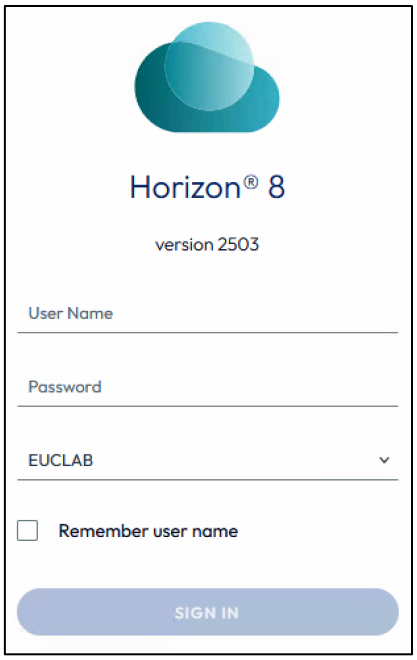
- For on-premises, select “General”:



- Finish installation



- Now you can logon to the Horizon Administrator Console: *https://connectionserver.domain/admin*



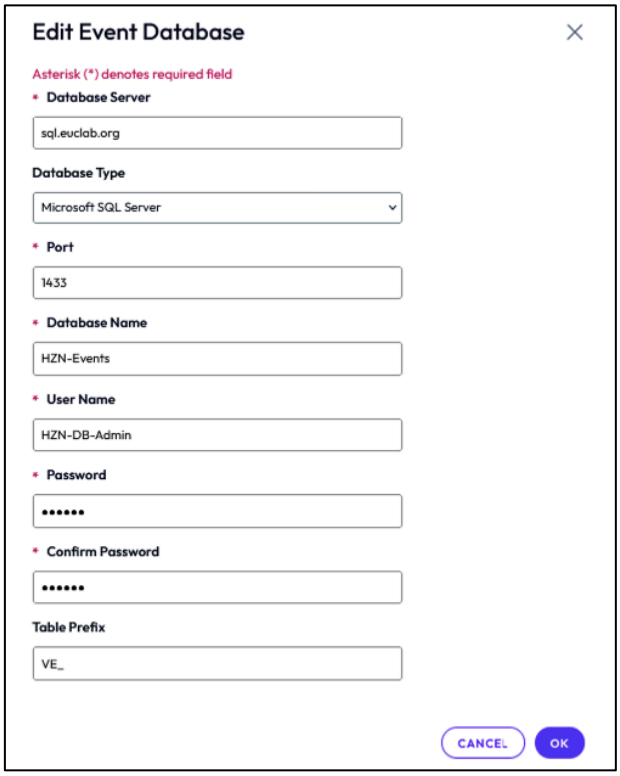
2.2 Initial Configuration Horizon Console

2.2.1 License Key

- Enter license key in Horizon Console under →Settings →Product Licensing and Usage, or configure subscription per Horizon Edge Gateway.

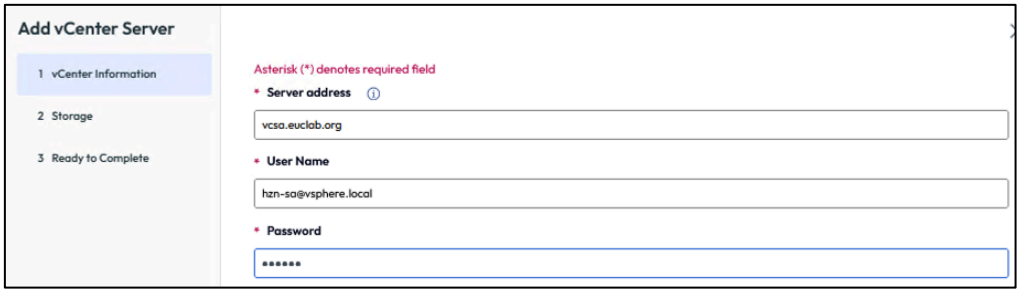
2.2.2 Event DB

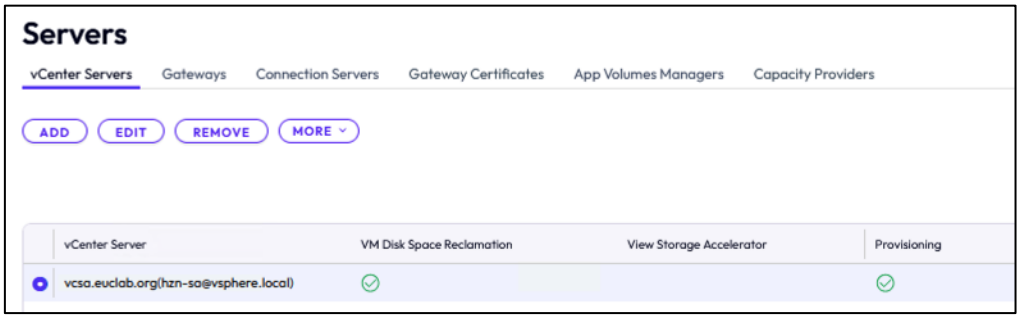
- Configure Horizon Event Database under →Settings →Event Configuration:



2.2.3 Add vCenter Server

- Add vCenter Server for provisioning desktops (or RDSH farms) – use the previously created vCenter Server Accouont for Horizon:

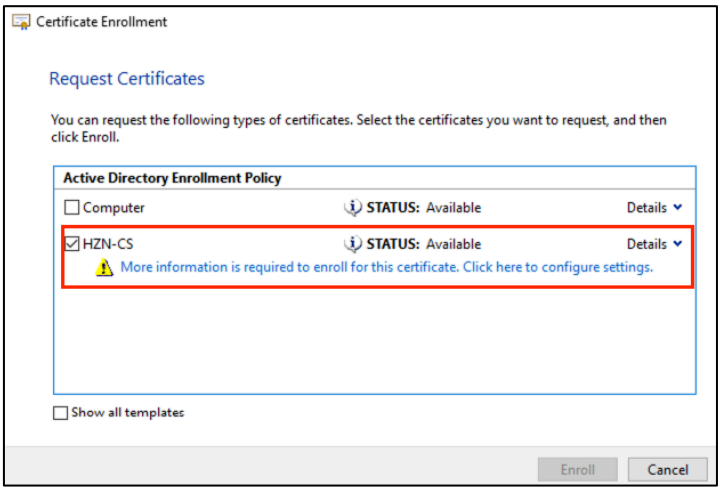




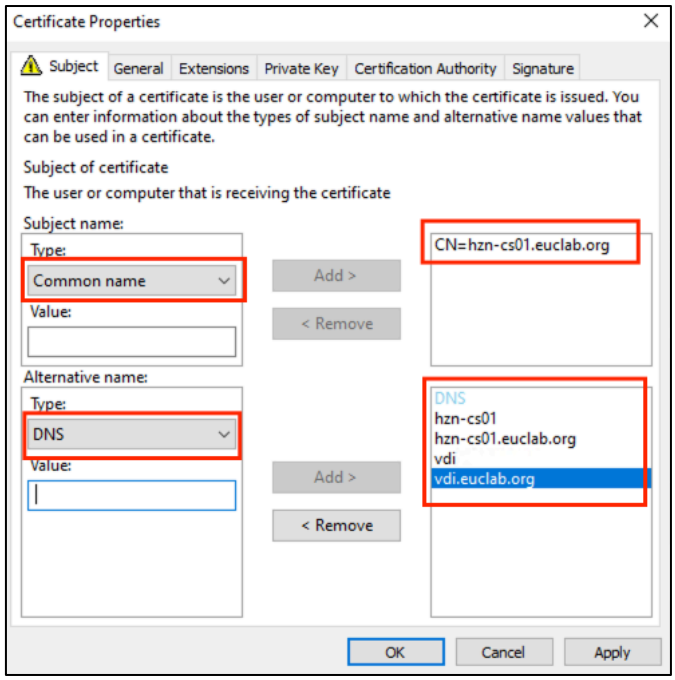
2.2.4 Request certificate

- For every Connection Server, request a valid (SAN-)certificate, based on the certificate template for Horizon

- In the MMC, add the certificate snap-in and request a new certificate (under →Personal →Certificates)

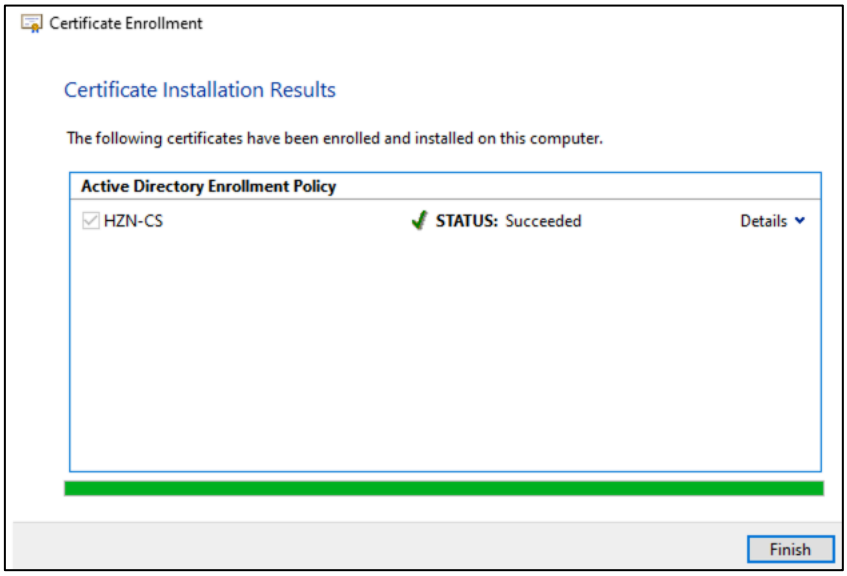


- Click on the “More information is required” link to edit the certificate properties
- Use the FQDN from the connection server as common name, and enter every alternative name as DNS (shortnames, Load Balancer FQDNs etc.)

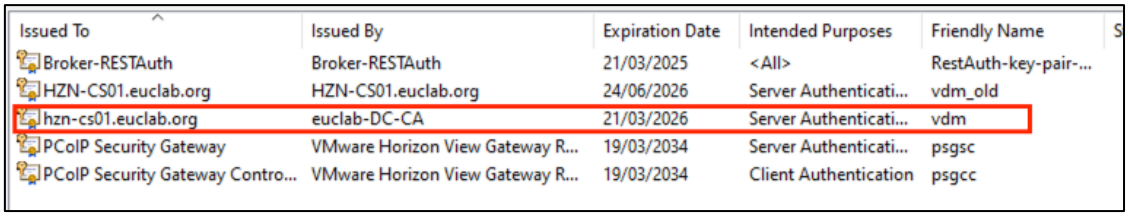


- Submit with →OK

- Click →Enroll, finished



- The default self-signed certificate still has a friendly name “vdm”. This has to be renamed, and the previously requested certificate has to reflect the friendly name “vdm”.



Issued To	Issued By	Expiration Date	Intended Purposes	Friendly Name
Broker-RESTAuth	Broker-RESTAuth	21/03/2025	<All>	RestAuth-key-pair-...
HZN-CS01.euclab.org	HZN-CS01.euclab.org	24/06/2026	Server Authenticati...	vdm_old
hzn-cs01.euclab.org	euclab-DC-CA	21/03/2026	Server Authenticati...	vdm
PCoIP Security Gateway	VMware Horizon View Gateway R...	19/03/2034	Server Authenticati...	psgsc
PCoIP Security Gateway Contro...	VMware Horizon View Gateway R...	19/03/2034	Client Authentication	psgcc

- Restart “VMware Horizon View Connection Server” Service to take changes effect.

2.2.5 Locked.properties

For security reasons, the connection server only allows connections from clients which use the address from the connection itself. See also here (Cross-Origin Resource Sharing (CORS) with Horizon 8 and loadbalanced HTML5 access) .Connections using (short)names or IP addresses of a load balancer, alias or similar will fail. For that purpose, these URLs have to be recognized in a file called locked.properties

- Go to → C:\Program Files\Omnissa\Horizon\Server\sslgateway\conf
  Create (if not exists) a file “locked.properties” and edit this as following:

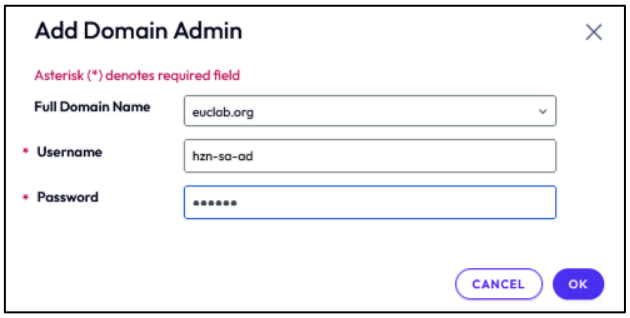
```
checkOrigin=false (optional)
enableCORS=false (optional)
balancedHost=FQDN Load Balancer
portalHost.1=FQDN of a valid URL
portalHost.2=FQDN of a valid URL
portalHost.n=FQDN of a valid URL
```

- Restart “Omnissa Horizon Connection Server” Service to take changes effect.

2.2.6 Add Domain Accounts

For every domain which will be used for provisioning machines, a domain account has to be configured. Needed AD-permissions are documented here (Create a User Account for Instant-Clone Operations).

- Go to →Settings →Domains
- Add needed domain admin accounts



2.2.7 Optional configuration

Some initial configuration are recommended, but not mandatory.

- Configure or add roles and permissions for relevant user groups only
  - Create a role within Horizon Console with privilege “Colect Operation Logs” for Troubleshooting.
- Consider Global Settings to edit
  - Horizon Console Settings (timeout, automatic refresh etc.)
  - Client Settings (forcibly disconnect users, send domain list etc.)
- Consider to edit the connection server settings
  - Are secure tunnel needed for HTTPS or Blast gateway?
  - Should backup scheduling be modified?

3. Setup Horizon Edge Gateway

Version 2506.1

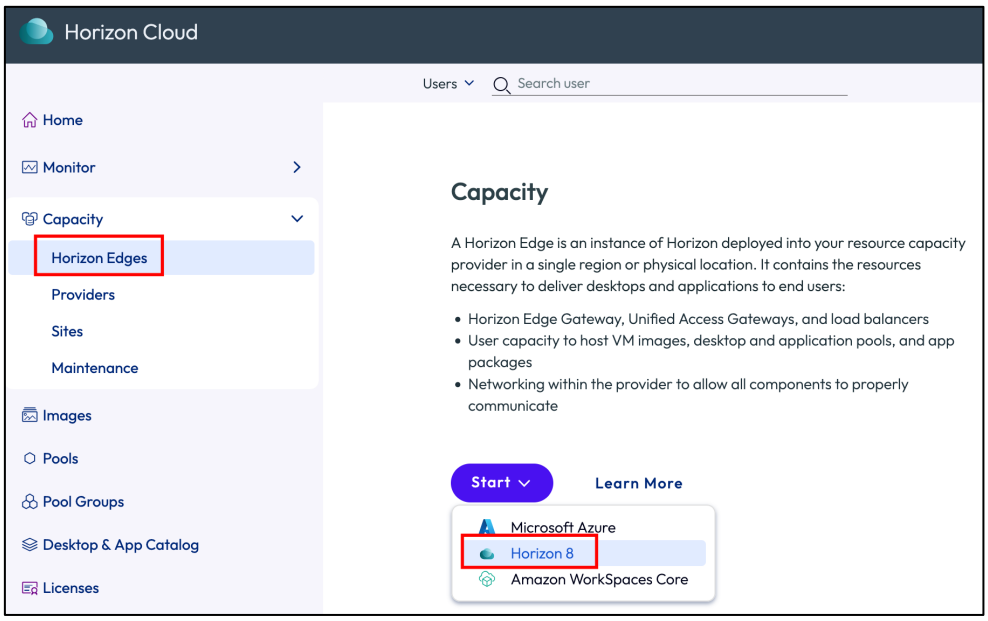
3.1 Requirements

- Follow the documentation about needed DNS, ports, and protocols needed for the Horizon Edge Gateway – see URL
- Additional URLs must be reachable from local deployment, as described here
- DNS record (forward and reverse DNS) for the Edge Gateway in the local AD

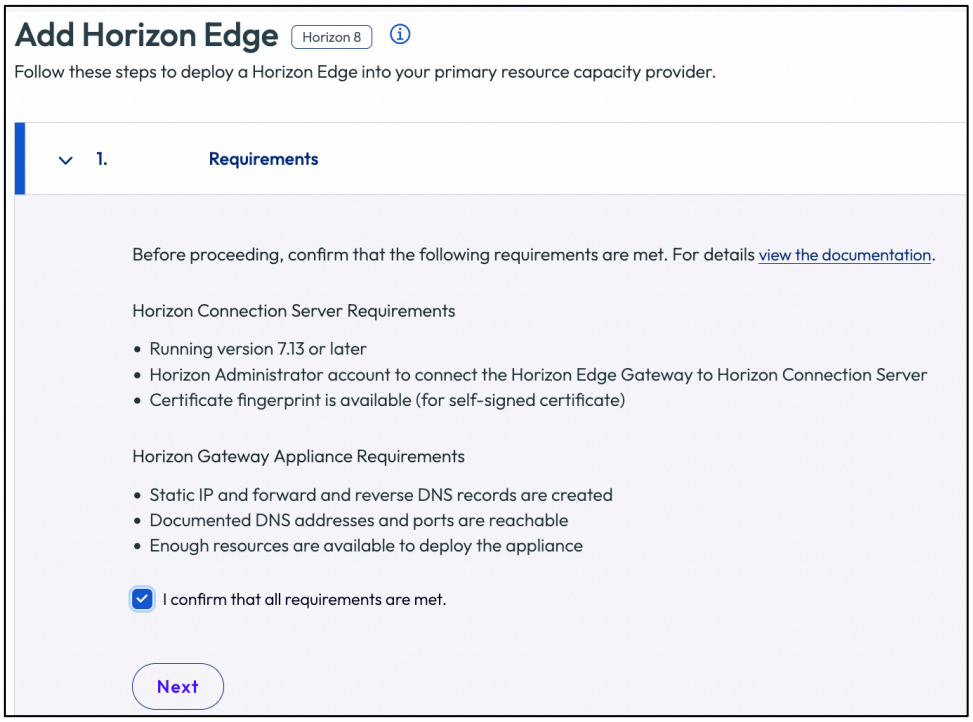
- static ip address
- (optional) define an AD service account with permission to the role “Horizon Cloud Service” – this is needed for the communication between Edge Gateway and Connection Server

3.2 Deployment Horizon Edge Gateway

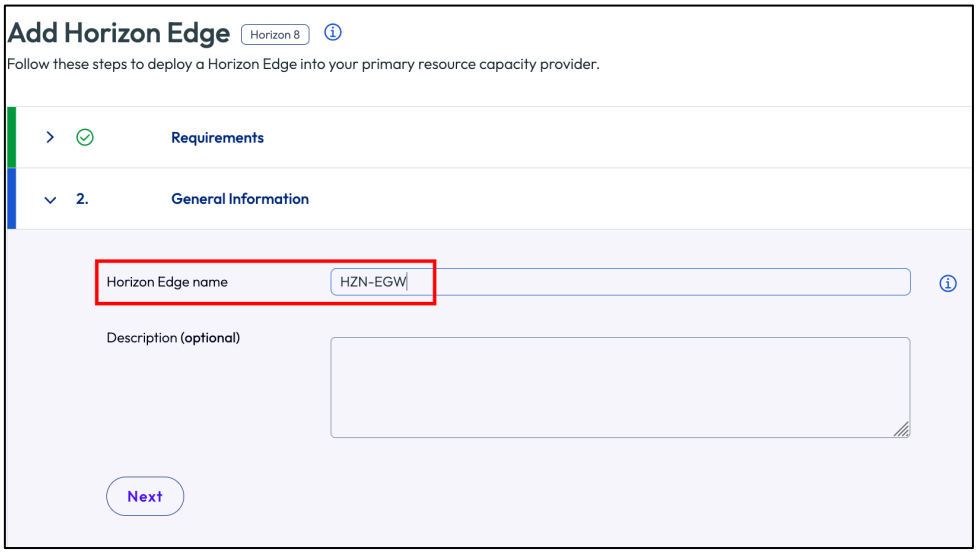
- Login to the Horizon Universal Console (URL – if needed switch to your organization) and go to →Capacity →Horizon Edges →Start →Horizon 8:



- Confirm Requirements and click →Next

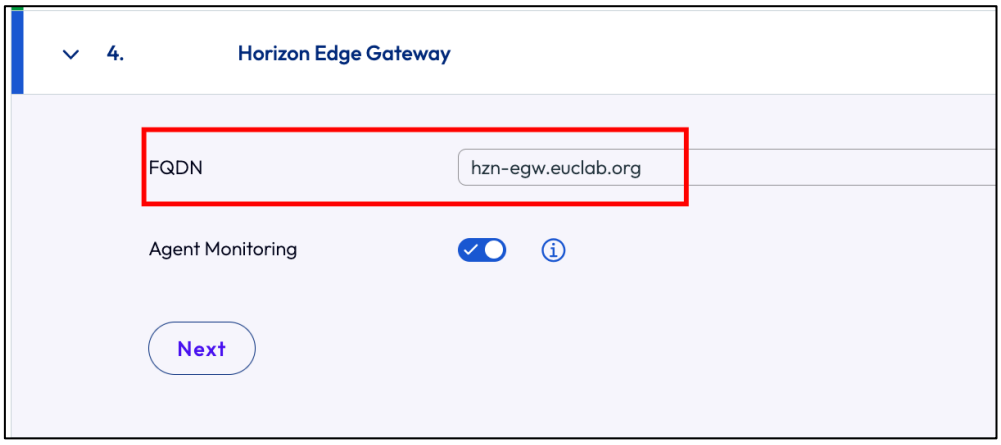


- Set the Name for the Edge Gateway and click →Next

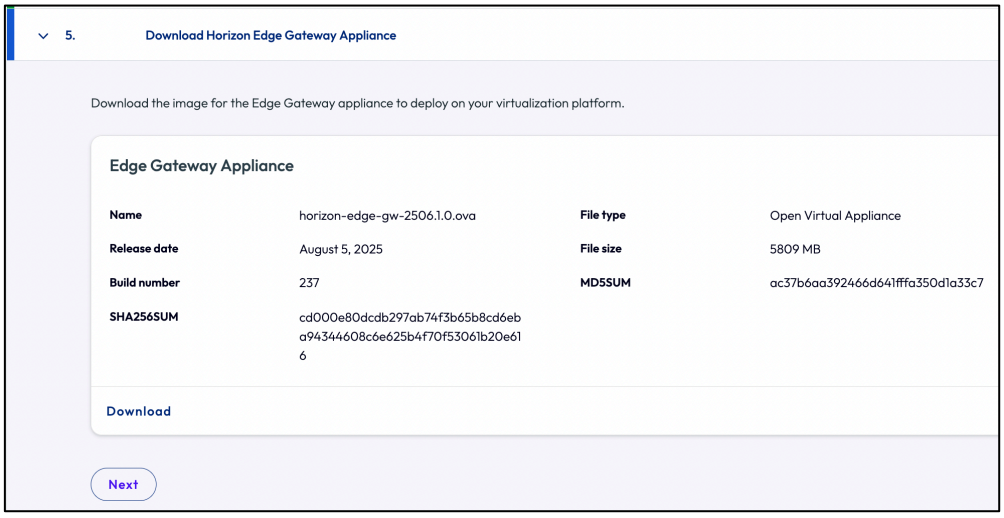


- Select Capacity Type and enter Location, and click →Next

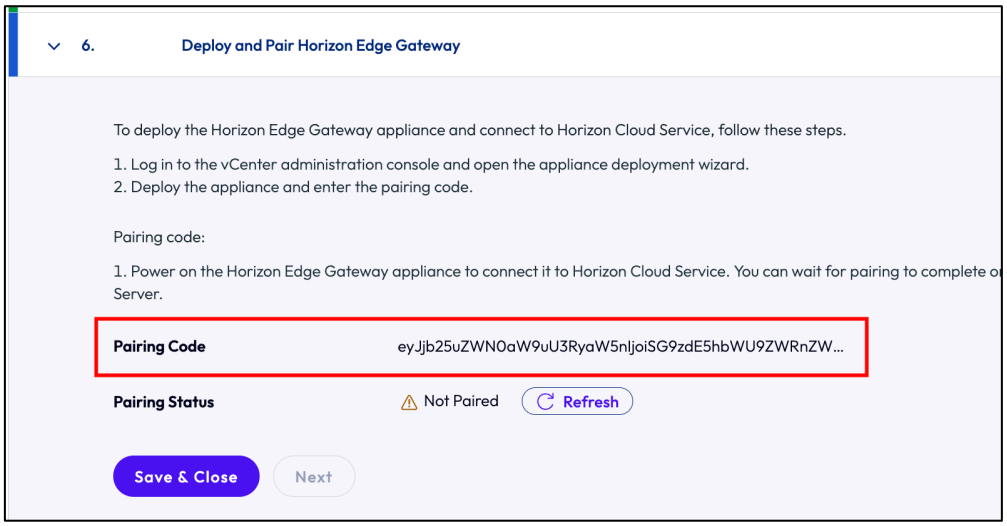
- Provide the FQDN of the Edge Gateway, and click →Next



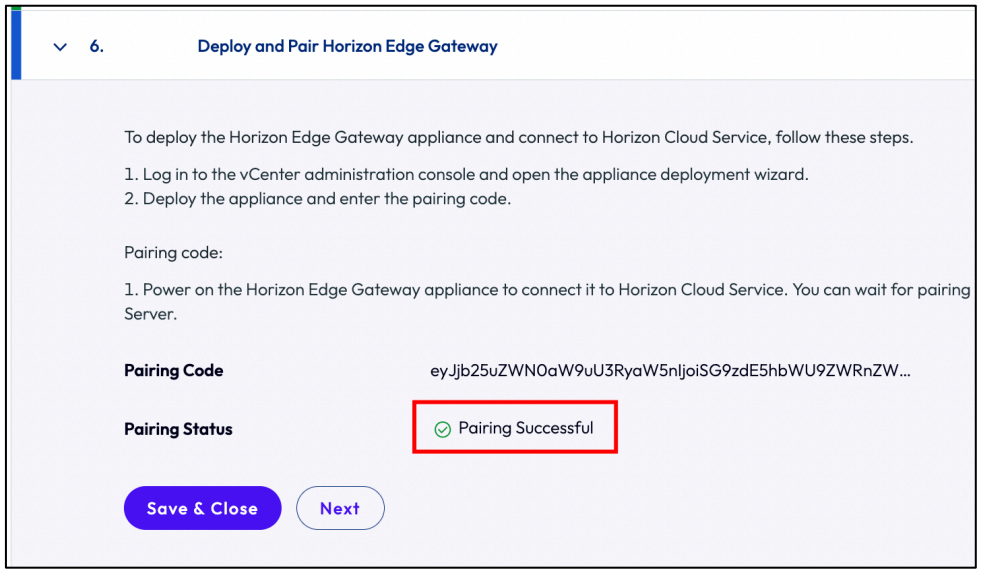
- If not done already, download the actual OVA image, and click →Next



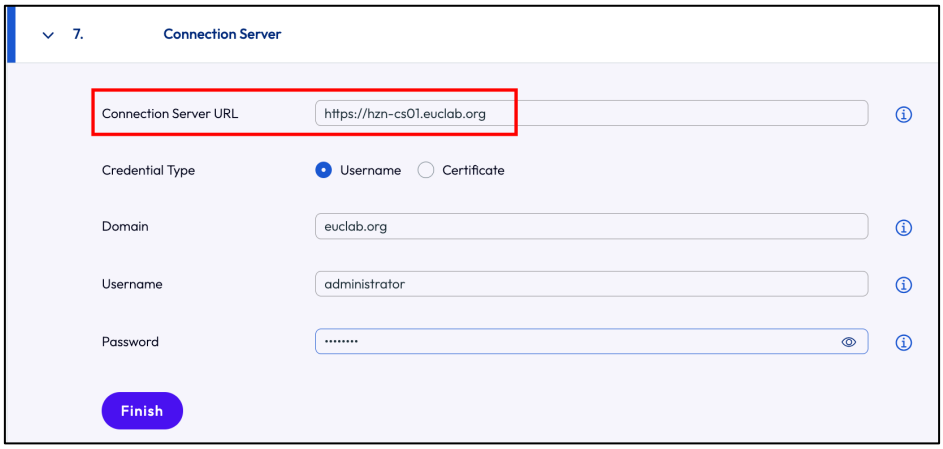
- Deploy the Edge Gateway in your SDDC. You need the pairing code during deployment.



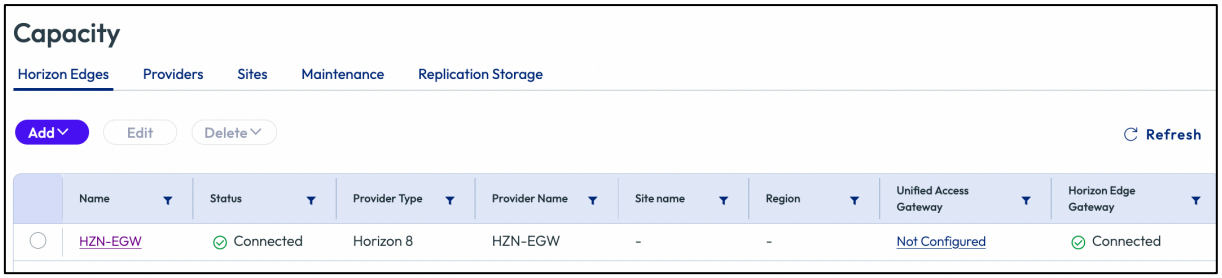
  - You have to enter static network informationen during the OVF deployment (please use FQDN for hostname). After booting up the deployed appliance, the pairing status should switch to “Paired” (can take some time). Click →Next



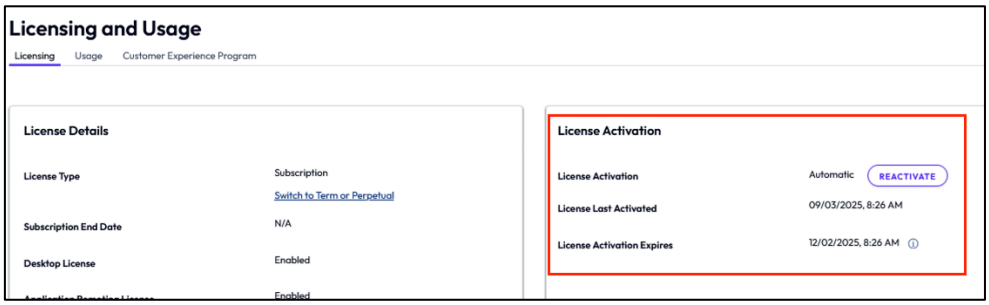
- In the last step, you have to enter the information about one of the connection server of the POD. Click →Finish, you have to check and confirm the certificate.



- Now you can see the successful deployed Edge Gateway



- Additionally, you can check the license type in the Horizon Console of the connection server



- Note – you can still switch between subscription and perpetual/term license indeed. In case of switching (back from perpetual/term to subscription), it can take up to 24 hours, until this will be reflected in the UI of the Horizon Console.

3.3 Further options for Edge GW

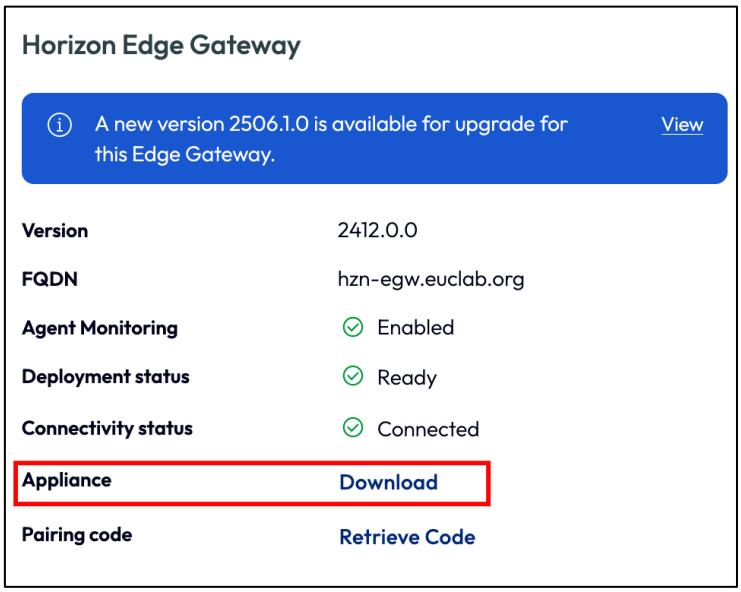
- Enable SSH Access for Horizon Edge, see here
    - Divergent from Doc, use this command in the VM console: `/opt/horizon/bin/configure-adapter.py --sshEnable`
    - Type `vi /etc/ssh/sshd_config`
    - Change the line `PermitRootLogin no` to `PermitRootLogin yes`

    - Restart the sshd daemon by running the command `systemctl restart sshd`
- Set customized NTP per CLI
    - `systemctl status systemd-timesyncd`
    - `vi /etc/systemd/timesyncd.conf` and add time servers under [Time]
    - `systemctl restart systemd-timesyncd`
    - `systemctl status systemd-timesyncd`
- If needed, Troubleshooting Horizon 8 Edge Connectivity Issues (92056), see KB-article

3.4 Update Horizon Edge Gateway

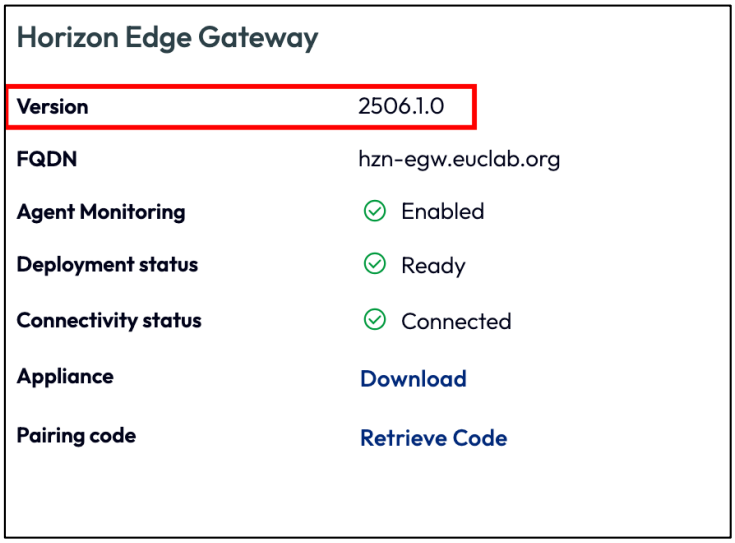
New version: 2506.1

- Download latest version via Horizon Cloud Portal



- Shutdown and rename existing Edge Gateway

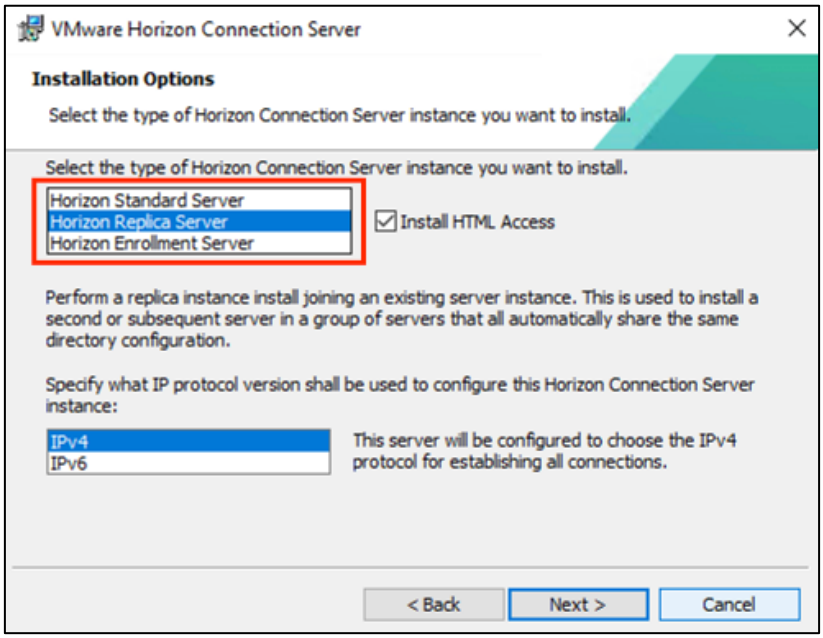
- Deploy new Edge Gateway as usual (see previous chapter), and verify it in Horizon Cloud



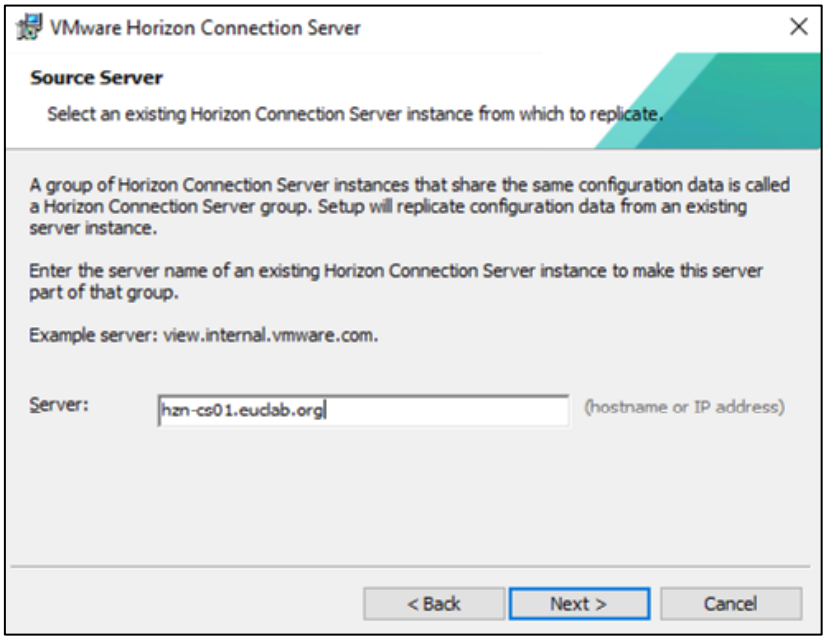
4. Setup VMware Horizon Replica Server

- Requirements: Windows Server 2016 or higher
- Setup MS-Updates, VMware Tools
- Horizon Connection Server must be meber of AD, and configured with a static IP

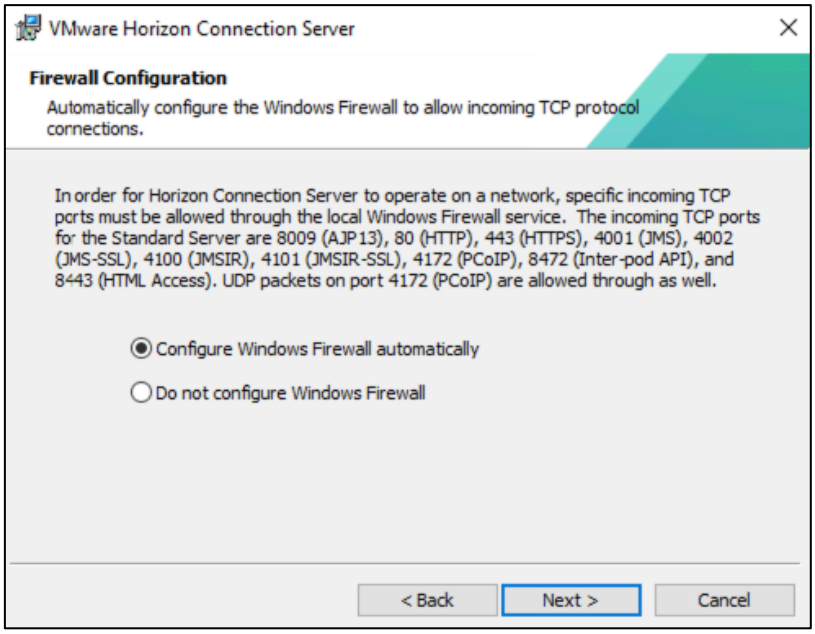
- Execute installation in the same way as the Horizon Standard Server, but choose Replica Server as Installation Option:



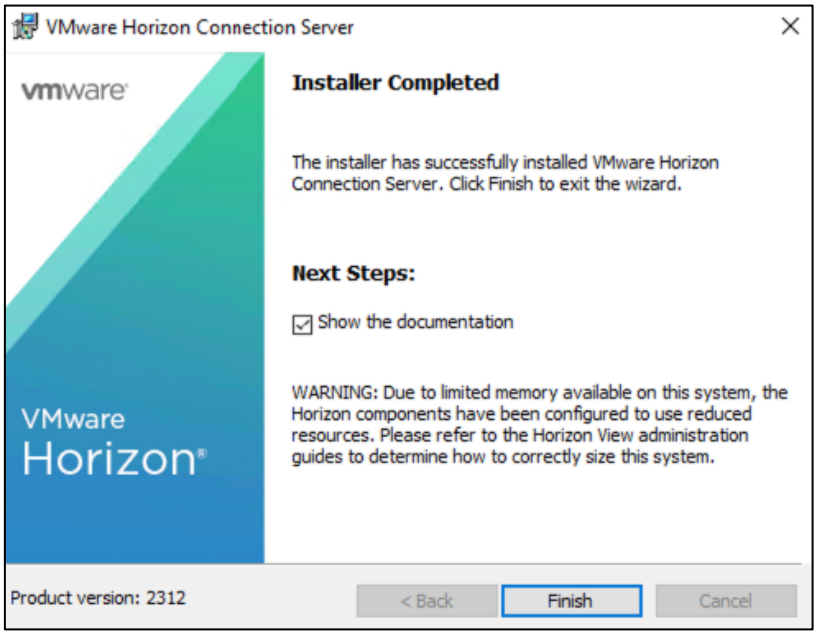
- Enter the FQDN of an existing Connection Server:



- Configure firewall automatically and click →Next →Install:



- Finish installation



- Next step: Request Certificate fort he added replica server

5. Setup TrueSSO

Reference – URL

With the True SSO (single sign-on) feature, after users log in to Omnissa Workspace ONE Access using a smart card or RSA SecurID or RADIUS authentication, or a third-party identity provider using an Unified Access Gateway appliance, users are not required to also enter Active Directory credentials in order to use a virtual desktop or published desktop or application.

If a user authenticates by using Active Directory credentials, the True SSO feature is not necessary, but you can configure True SSO to be used even in this case, so that the AD credentials that the user provides are ignored and True SSO is used.

The following steps are needed to implement TrueSSO:

1. Set Up an Enterprise Certificate Authority
2. Create Certificate Templates Used with True SSO
3. Install and Set Up an Enrollment Server
4. Pair Connection and Enrollment Server
5. Configure SAML Authentication to Work with True SSO
6. Configure Horizon Connection Server for True SSO

5.1 Set Up an Enterprise Certificate Authority

You need an enterprise CA. Best practise ist to implement a sub CA, optional installed on the same system like the Horizon enrollment server, or on a dedicated server system.

Short introduction:

Enabling non-persistent certificate processing can help reduce the CA database growth rate and frequency of database management tasks. Enabling this setting does not prevent the CA from storing issued certificates and it does not prevent general certificate revocation checking.

By default, when you enable non-persistent certificate processing, all issued certificates are still stored in the database. Use this to configure the CA for specific templates for which the CA does not store a copy of issued certificates. Therefore, for this setting to have any affect, you must also configure this setting on the individual certificate template. All out of the box templates have this setting disabled, which means that even if the CA is configured to allow volatile requests it will still store a copy of issued certificates.

TrueSSO requests a new certificate for every new connection. If all of these certificates are kept, eventually the CA will run out of disk space and you will see a degradation of CA performance.

The only practical reason why you need to keep the certificates in the CA database is to allow the administrator to revoke a specific certificate. **Since you can configure a short certificate lifetime for certificates used with True SSO there is no practical requirement to be able to revoke individual certificates used by True SSO.**

True SSO certificates only need to be valid long enough for the logon to complete. The Microsoft Certificate Management console allows you to configure a short one hour life time for a certificate.

If you enable this setting, and you do not change other certificate templates to request that they not be stored in the CA database, only those certificates that True SSO uses are kept out of the CA database.

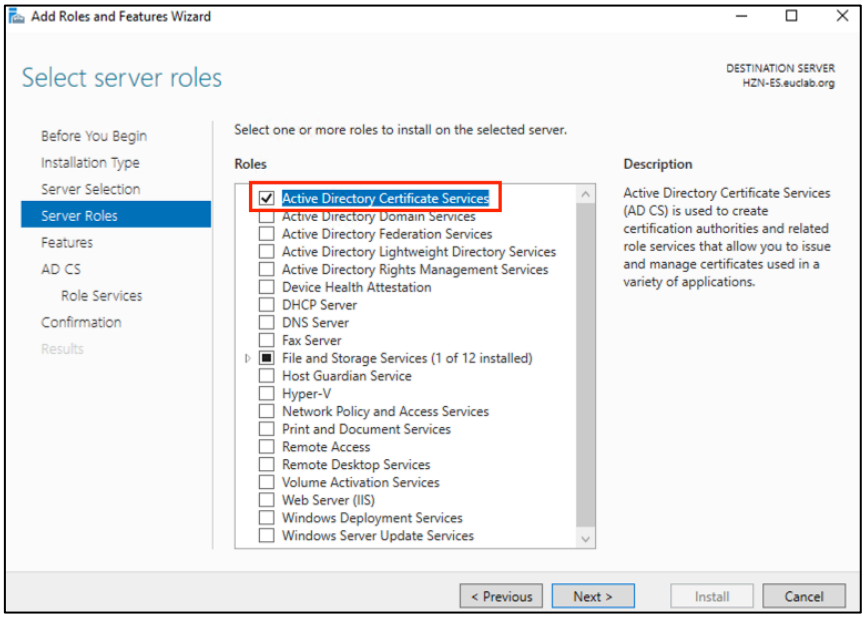
If you have an existing CA, and do not want to enable this setting for the CA, you can set up additional dedicated CAs exclusively for True SSO and on which you enable the True SSO Certificate template. You can enable the DBFLAGS_ENABLEVOLATILEREQUESTS setting on these CAs. You can then use the existing CA to issue all other certificates including the Enrollment Certificate required by Horizon Enrollment Server[1].

5.1.1 Create Sub-CA

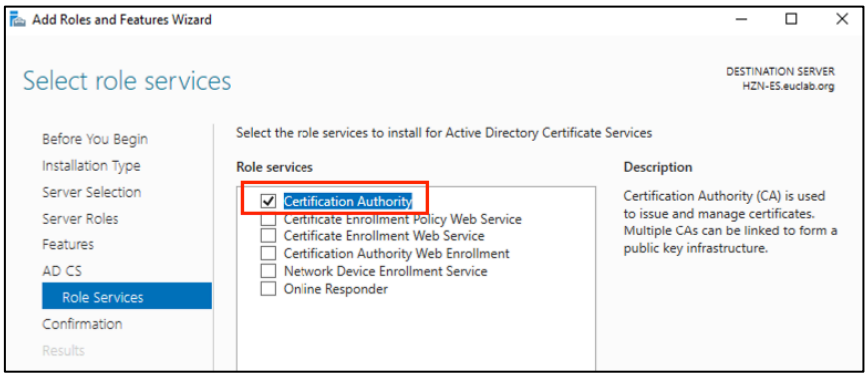
In this example, we create a sub CA on the same host which will be used as Enrollment Server.

[1] Quelle: https://kb.omnissa.com/s/article/2149312

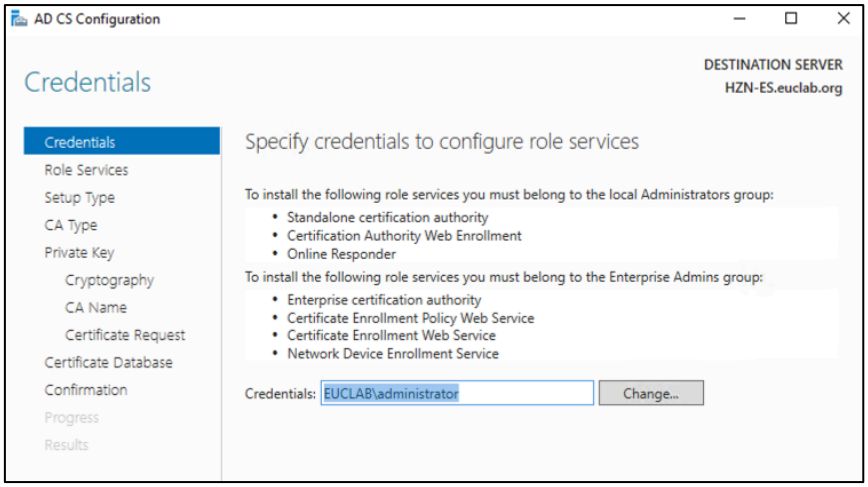
- Add AD CS role and click →Next



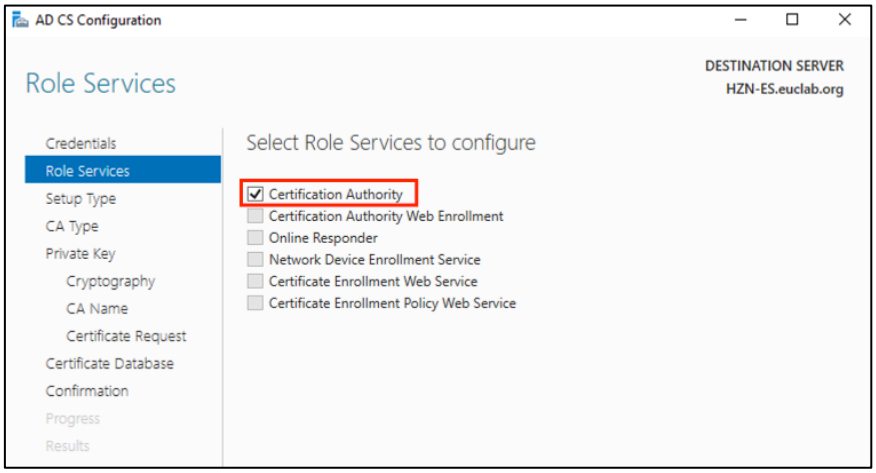
- For the role services, keep the Certificate Authority only, and click →Next, then →Install:



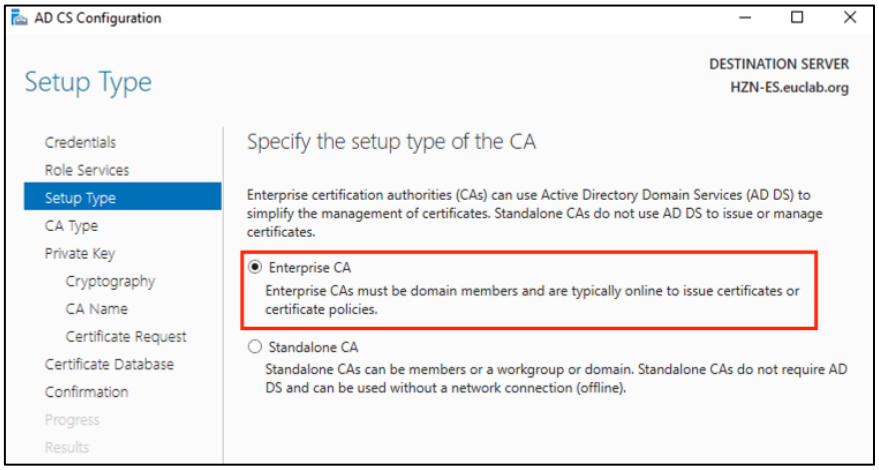
- After installation, proceed with the configuration. Specify credentials to configure role services, and click →Next:



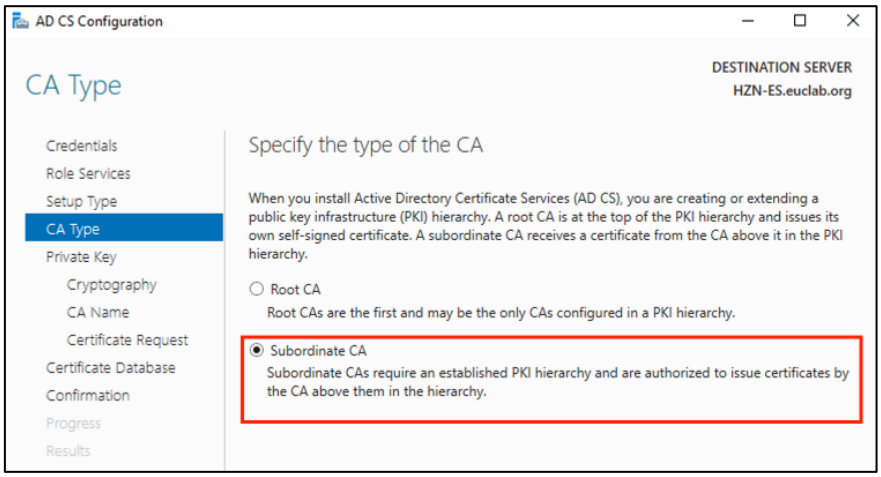
- Select the “Certificate Authority” to configure, and click →Next:



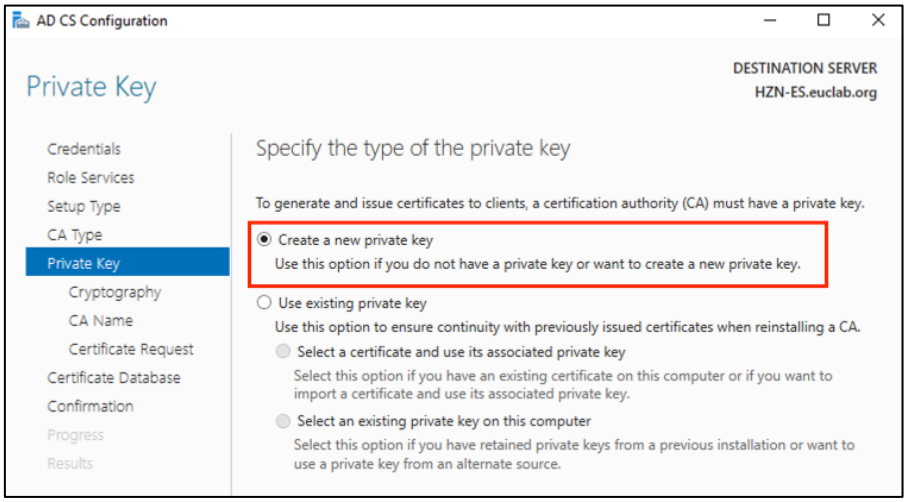
- Chosse “Enterprise CA”, and click →Next:



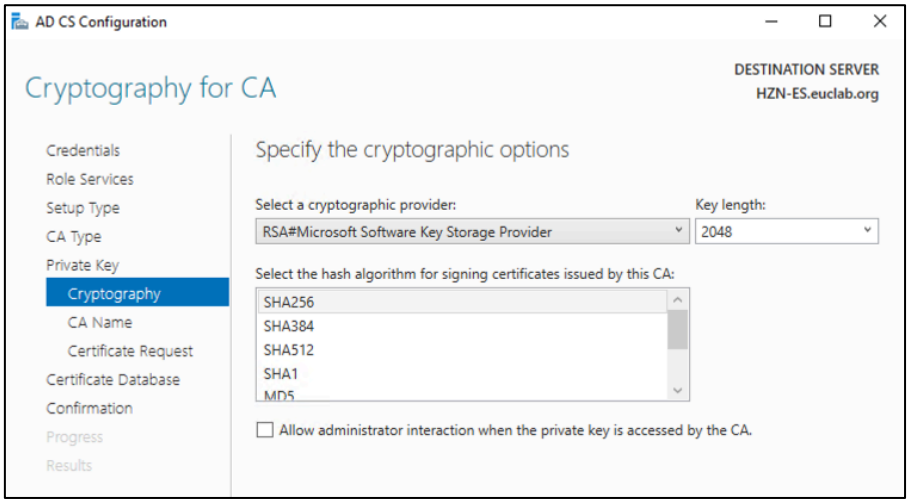
- Choose “Subordinate CA”, and click →Next:

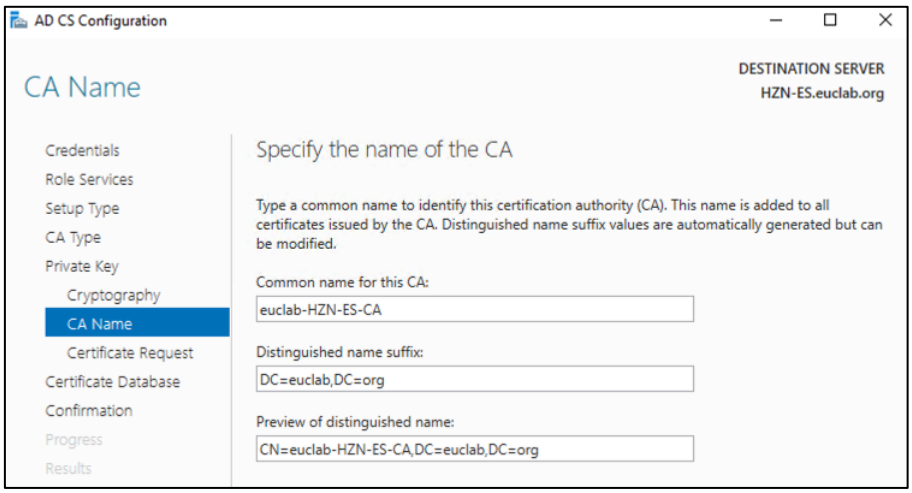


- Choose “Create a new private key”, and click →Next:

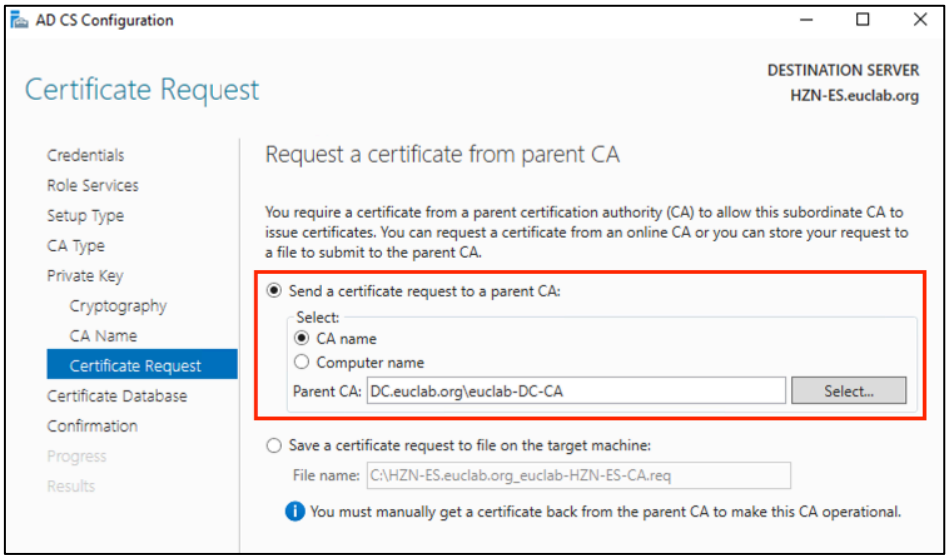


- Keep the default settings for the next two steps:

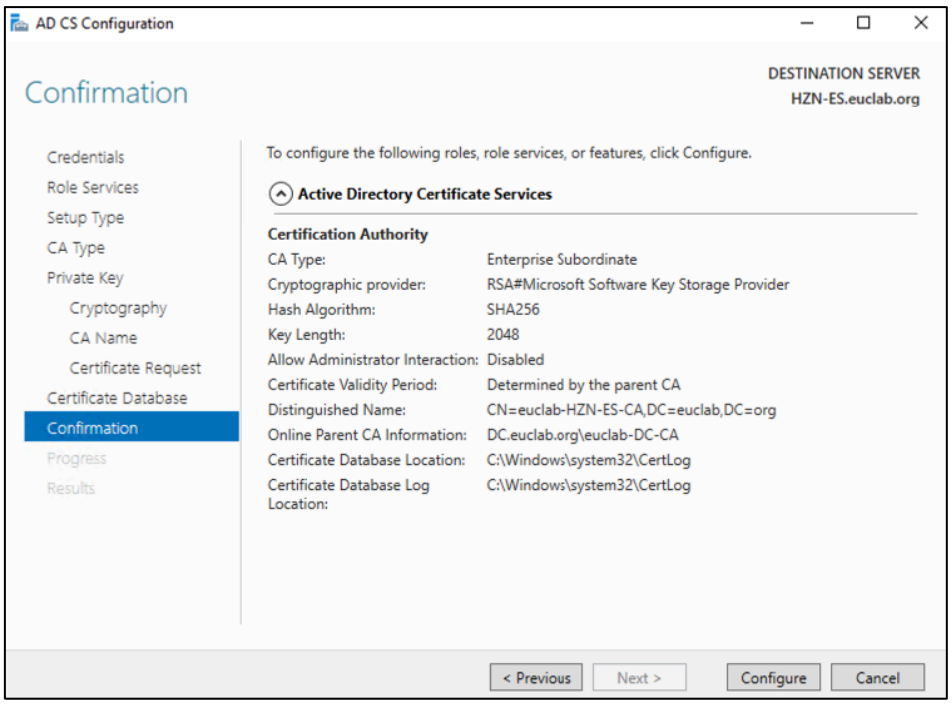




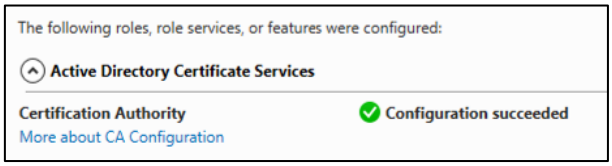
- To allow this Seb CA to issue certificates, you require a certificate from the parent CA. You can send this request to the parent CA directly. Click →Next:



- Keep the rest as default, and click →Configure:



- It should finish after some seconds:



5.1.2 Enable non-persistent certificate processing

- Execute the following command to configure the CA for non-persistent certificate processing
  `certutil -setreg DBFlags +DBFLAGS_ENABLEVOLATILEREQUESTS`

```
C:\Users\administrator.VEUC>certutil -setreg DBFlags +DBFLAGS_ENABLEVOLATILEREQUESTS
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CertSvc\Configuration\DBFlags:

Old Value:
  DBFlags REG_DWORD = b0 (176)
    DBFLAGS_MAXCACHESIZEX100 -- 10 (16)
    DBFLAGS_CHECKPOINTDEPTH60MB -- 20 (32)
    DBFLAGS_LOGBUFFERSHUGE -- 80 (128)

New Value:
  DBFlags REG_DWORD = 8b0 (2224)
    DBFLAGS_MAXCACHESIZEX100 -- 10 (16)
    DBFLAGS_CHECKPOINTDEPTH60MB -- 20 (32)
    DBFLAGS_LOGBUFFERSHUGE -- 80 (128)
    DBFLAGS_ENABLEVOLATILEREQUESTS -- 800 (2048)
CertUtil: -setreg command completed successfully.
The CertSvc service may need to be restarted for changes to take effect.

C:\Users\administrator.VEUC>
```

- Enter the following command to prevent a service interruption if the root CA CRL is allowed to expire:
  `certutil -setreg ca\CRLFlags +CRLF_REVCHECK_IGNORE_OFFLINE`

```
C:\Users\administrator.VEUC>certutil -setreg ca\CRLFlags +CRLF_REVCHECK_IGNORE_OFFLINE
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CertSvc\Configuration\vEUC-HZN-ES1-CA\CRLFlags:

Old Value:
  CRLFlags REG_DWORD = 2
    CRLF_DELETE_EXPIRED_CRLS -- 2

New Value:
  CRLFlags REG_DWORD = a (10)
    CRLF_DELETE_EXPIRED_CRLS -- 2
    CRLF_REVCHECK_IGNORE_OFFLINE -- 8
CertUtil: -setreg command completed successfully.
The CertSvc service may need to be restarted for changes to take effect.

C:\Users\administrator.VEUC>
```

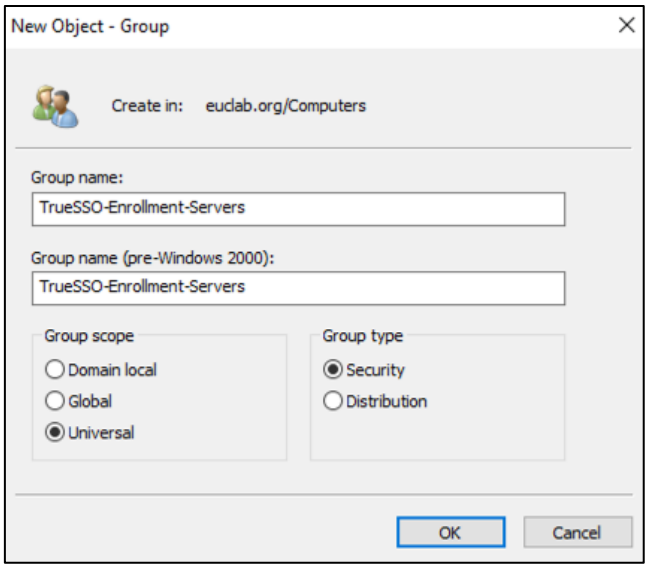
  - Enabling `CRLF_REVCHECK_IGNORE_OFFLINE` setting will depend on the PKI architecture and is not a strict requirement for True SSO. In the unlikely event that the root CRL is inaccessible, set this to avoid revocation check failures.

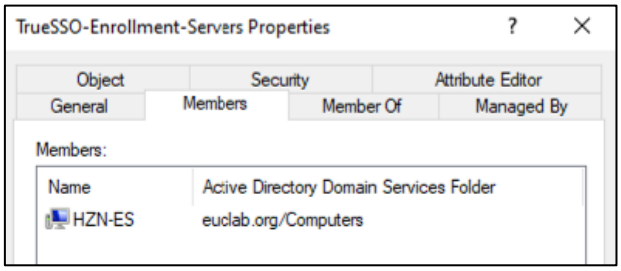
- Enter the following commands to restart the service:
  `sc stop certsvc`
  `sc start certsvc`

5.2 (optional) Add Security Group for Enrollment Servers

Create a Security group in the domain (and forest) for the enrollment servers, and add the related computer accounts. This group can be added to the certificate template for TrueSSO later.

- At the domain controller, add a new Universal Group

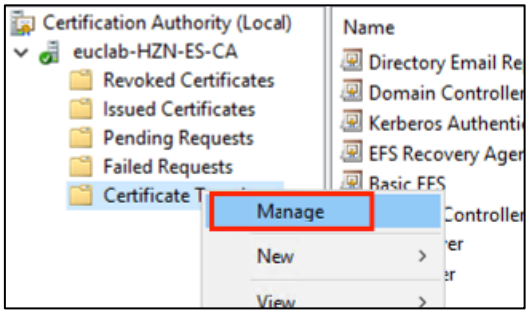




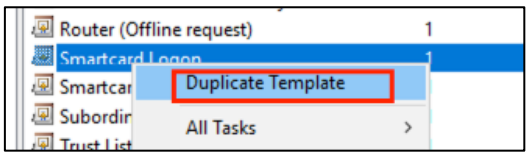
5.3 Create Certificate Template used with True SSO

You must create a certificate template that can be used for issuing short-lived certificates, and you must specify which computers in the domain can request this type of certificate.

- On the server with Sub CA installed, open the →Certification Authority
- On the left, select →Certificate Template →Manage

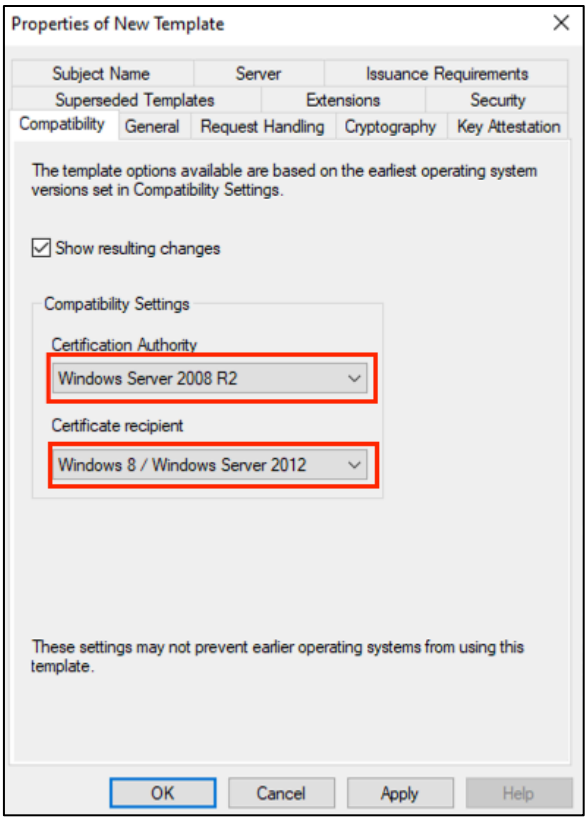


- Look for the →Smartcard Logon, and click →Duplicate Template

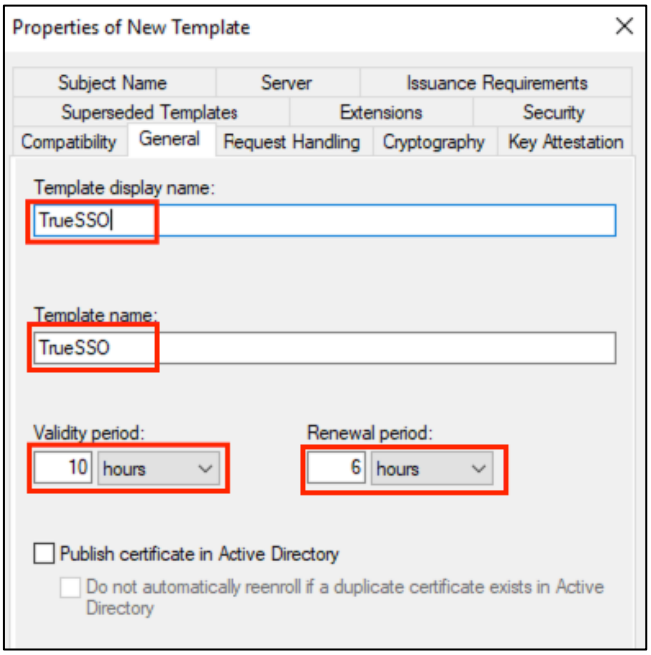


- Make the following changes

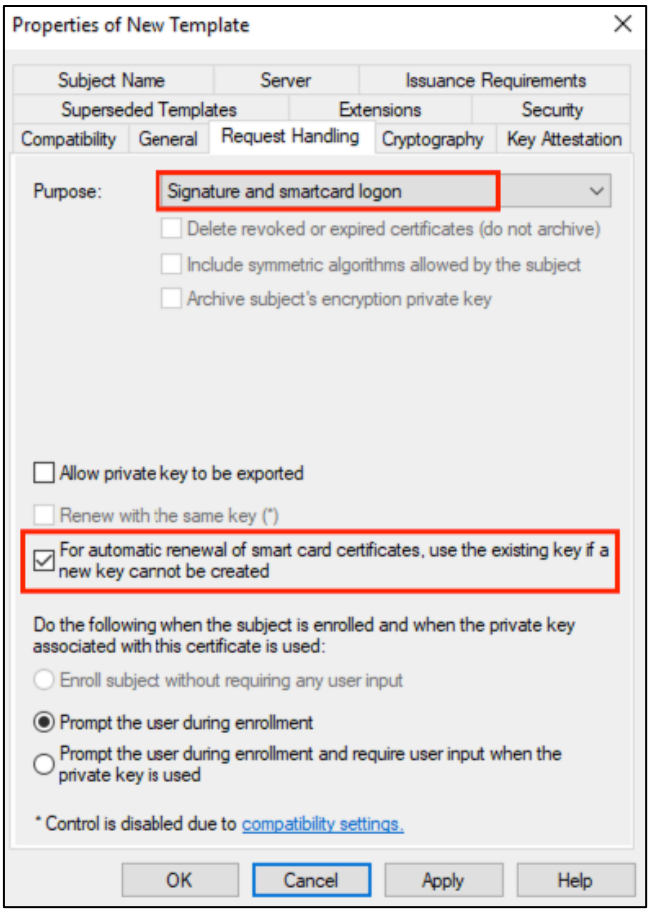
- **Compatibility** – select appropriate CA and certificate recipient



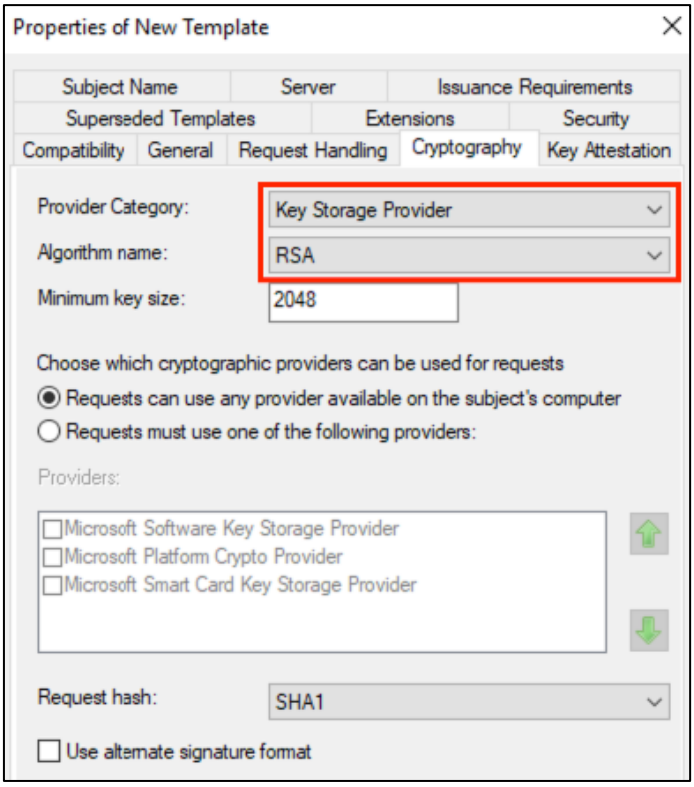
- **General** – the default maximum lifetime of a user ticket is 10 hours, so it should be configured similar. The renewal perios should reflect 50%-75% of the validity period.



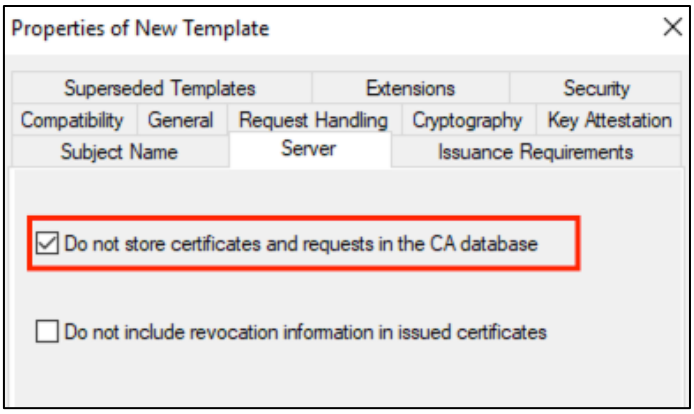
- **Request Handling**



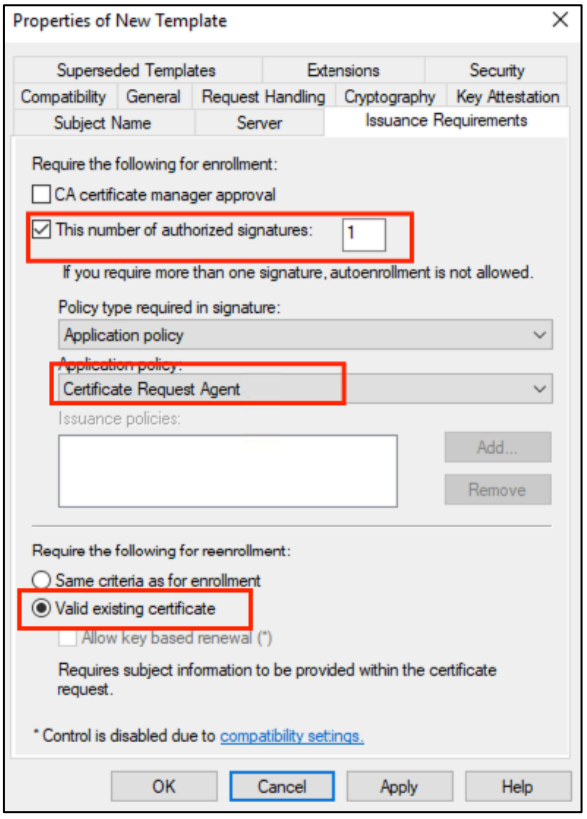
- **Cryptography**



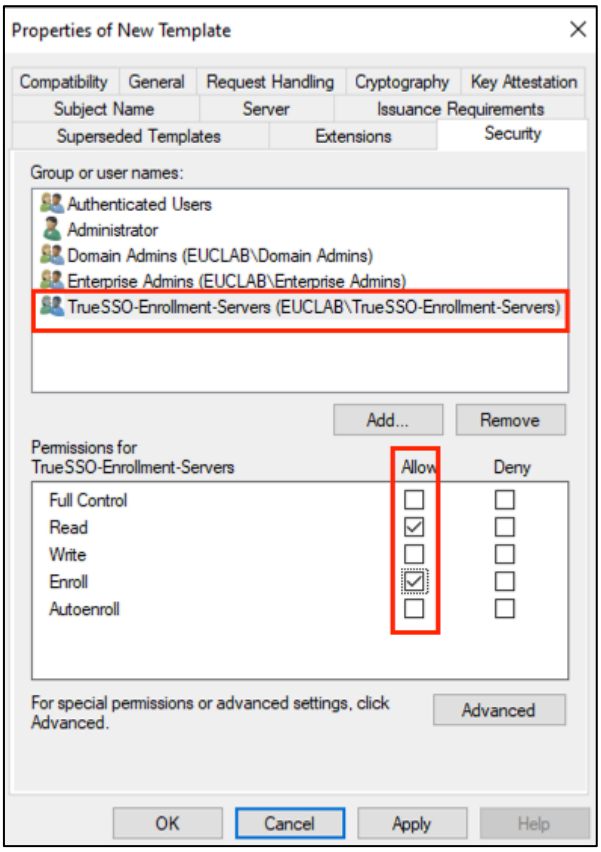
- **Server**



- **Issuance Requirements**



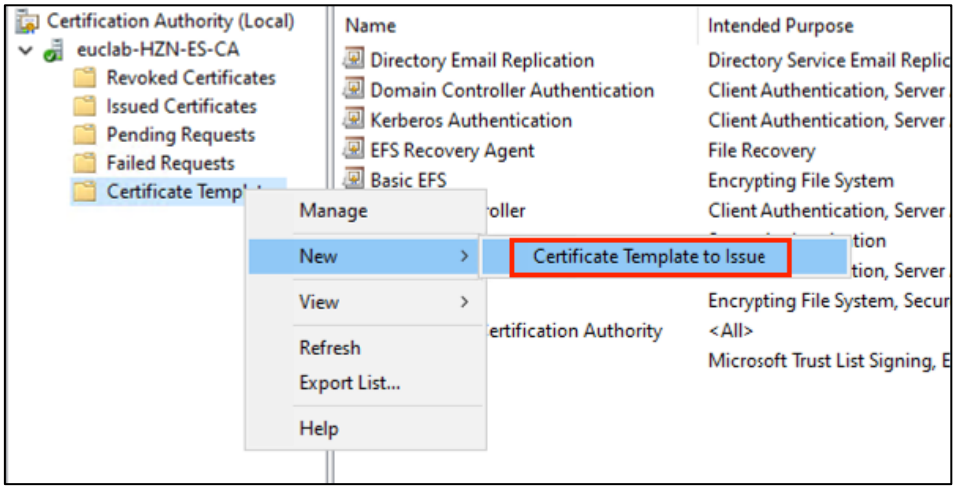
- **Security** – add the security group for the enrollment servers you created before, or select every enrollment server alternatively



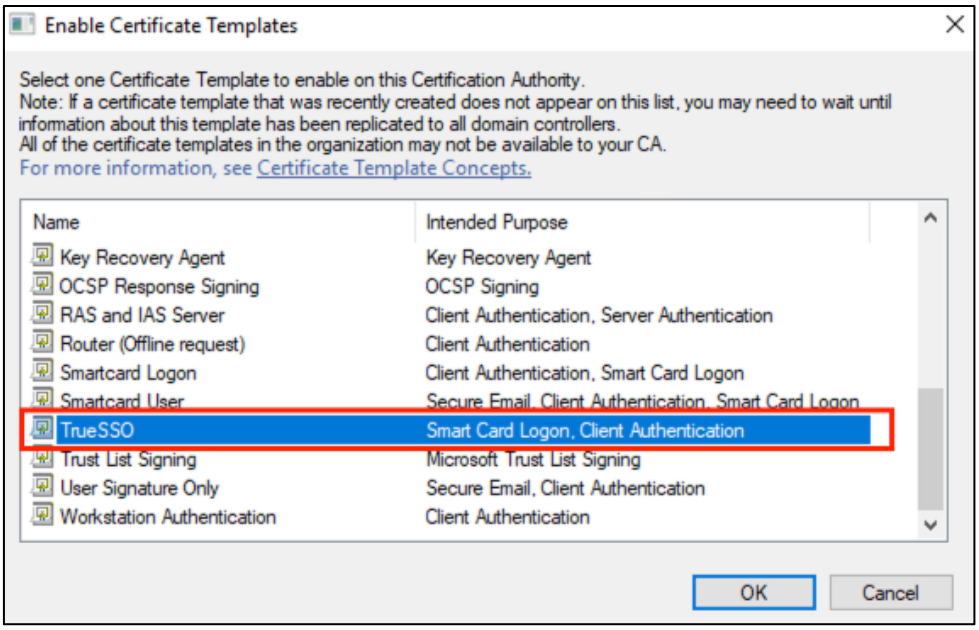
- Submit with →OK

- Close the Certificate Template Console

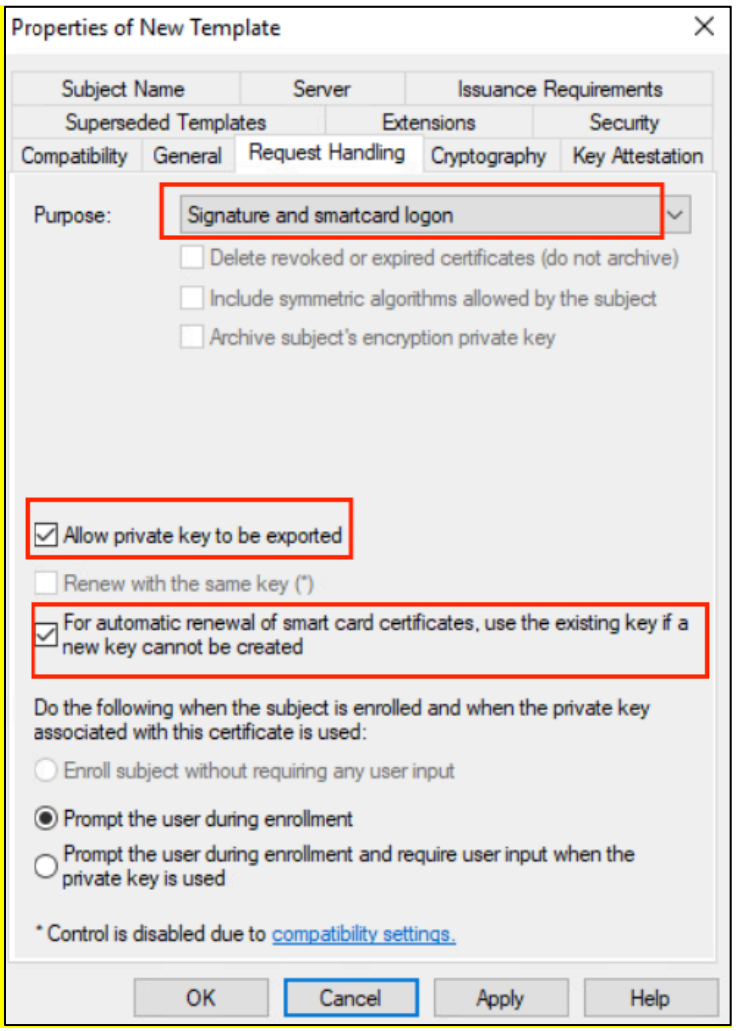
- Right-klick to →Certificate Templates →New →Certificate Template to Issue – this step has to be done on every (Sub-)CA, which is involved to issue user certificates on the template created earlier.



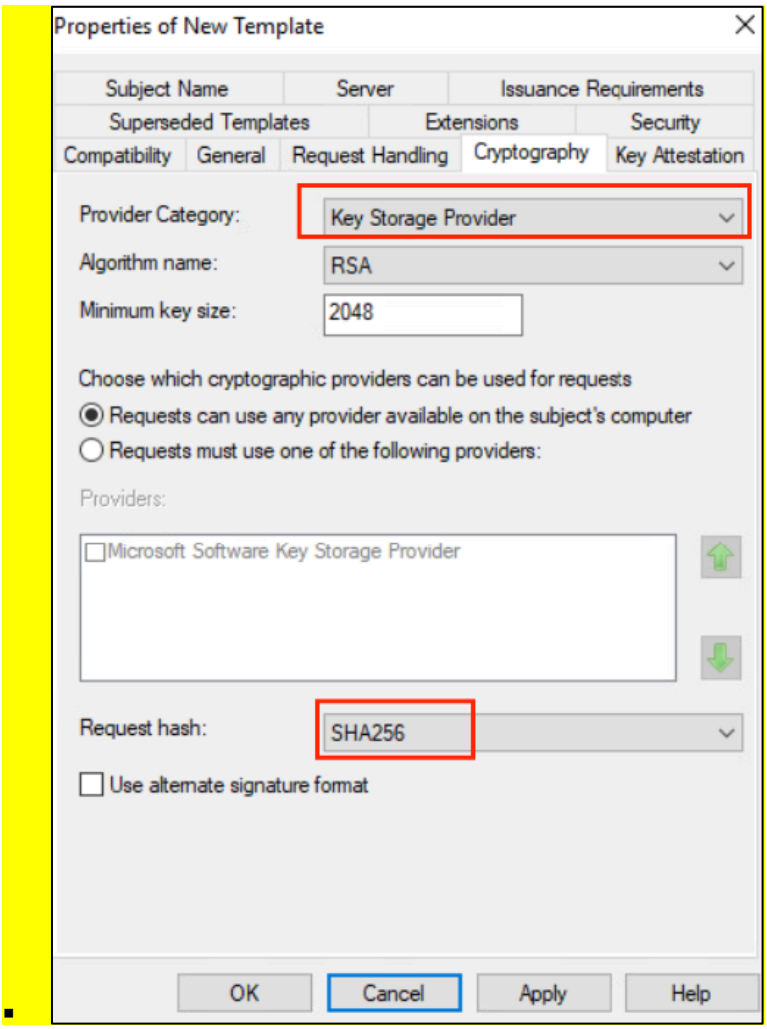
- Select the TrueSSO Template created earlier



-
- **Request Handling**
  - Purpose: Signature and smartcard logon
  - Set checkbox “Allow private key to be exported”
  - Set checkbox “For automatic renewal of smartcard certificates […]”



- **Cryptography**
  - Provider Category: Key Storage Provider
  - Algorithm name: RSA
  - Minimum key size: 2048
  - Request hash: SHA256



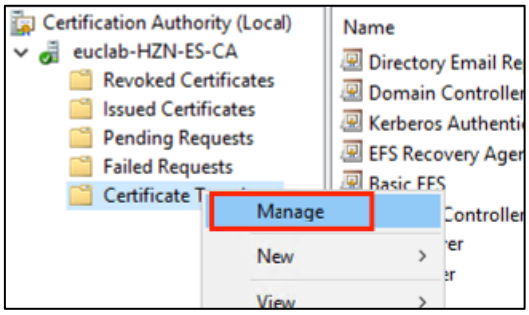
- Certificate Template Console schließen.

- Im Kontext-Menü →Certificate Templates auf →Certificate Template to issue gehen und "True SSO" auswählen.

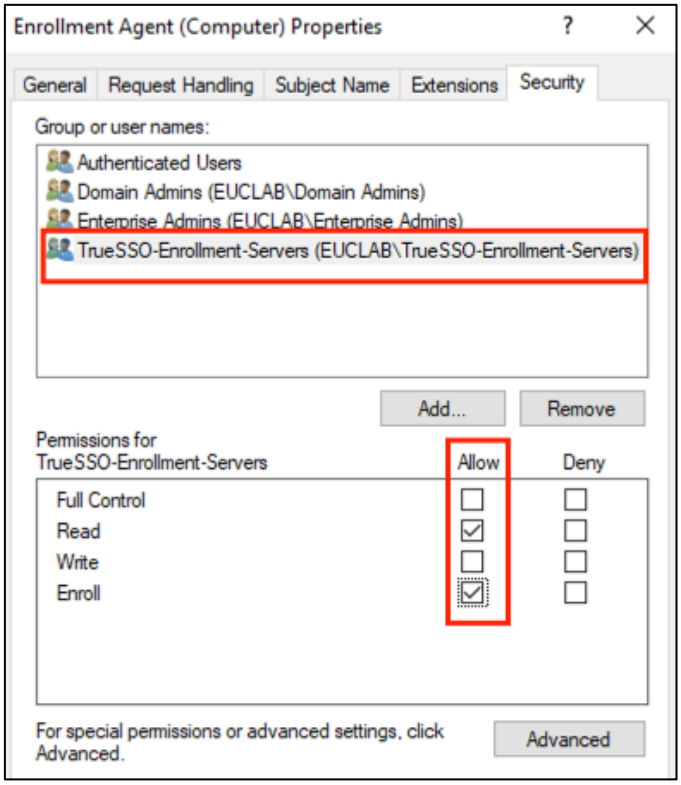
5.3.1 Create Certificate Template for Enrollment Server

You have to configure the Enrollment Agent Computer on the machine you are using for the CA. This step is required for all certificate authorities that issue certificates based on this template.

- On the server with (Sub-CA) installed, start CA snapin, and right-click →Certificate Templates, then select →Manage

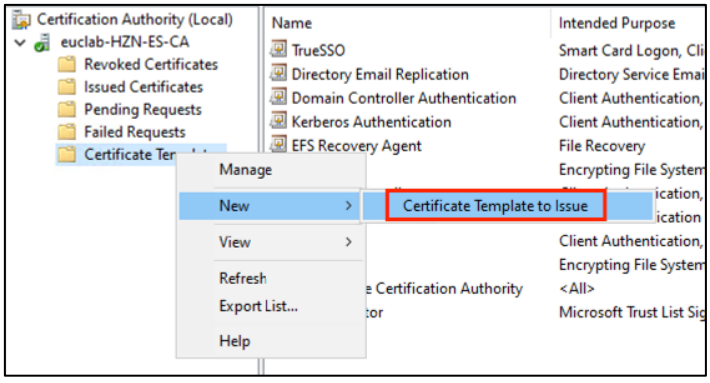


- Select the Template "Enrollment Agent (Computer) and go to →Properties
- In the →Security Tab, add the (previously created) security group for the Enrollment servers (alternatively every single Enrollment server), and add permission to Read and Enroll. Click →OK.

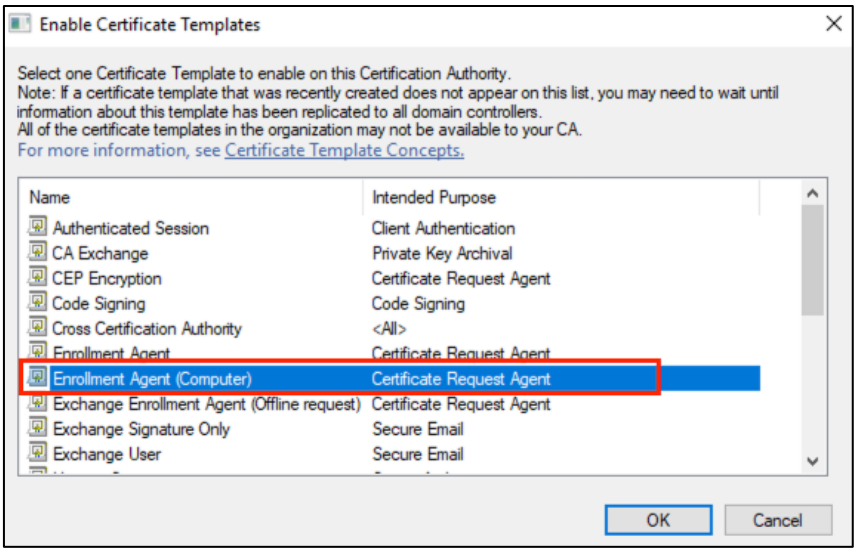


- Close Certificate Template Console

- Right-click on Certificate Template →New →Certificate Template to Issue



- Select “Enrollment Agent (Computer)” and click OK.



5.4 Install and set up Enrollment Server

The enrollment server enables a “pure” TrueSSO and supports external logins to Horizon with options apart from the classic one (domain AD username and password). The enrollment server requests short-lived certificates on behalf of the users you specify. These short-term certificates are the mechanism True SSO uses for authentication to avoid prompting users for Active Directory credentials.

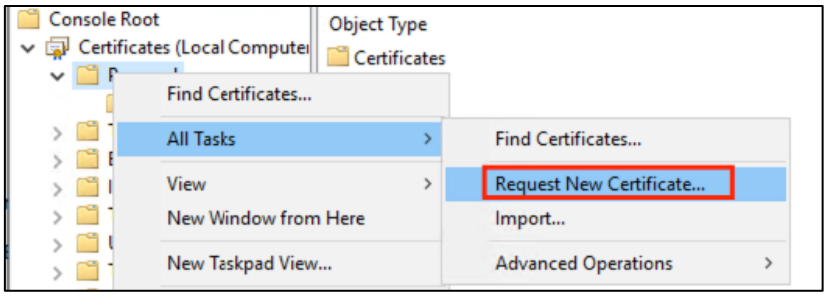
- Requirements
  - Prepared Windows Server OS
  - No other Horizon role installed (like connection server, agent etc.)
  - Domain-joined, static IPv4-address

5.4.1 Enrollment Agent (Computer) Certificate

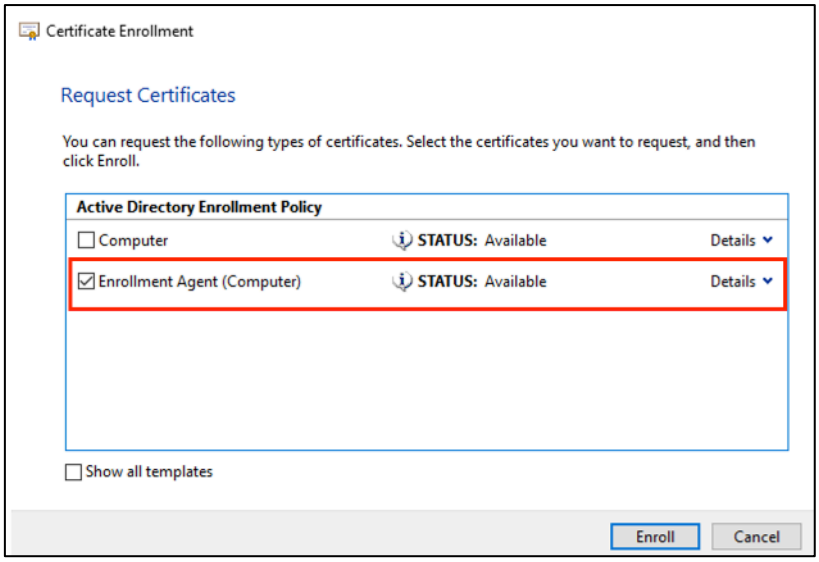
On the enrollment server you need the “Enrollment Agent (Computer)” certificate to authorize the enrollment server to generate certificates on behalf of users.

- Start MMC and add the snap-in “Certificates”, select Computer account

- Right-click the →Personal-folder, and go to →All Tasks →Request New Certificate



- In the →Request Certificates dialog, select the →Enrollment Agent (Computer), and click →Enroll.

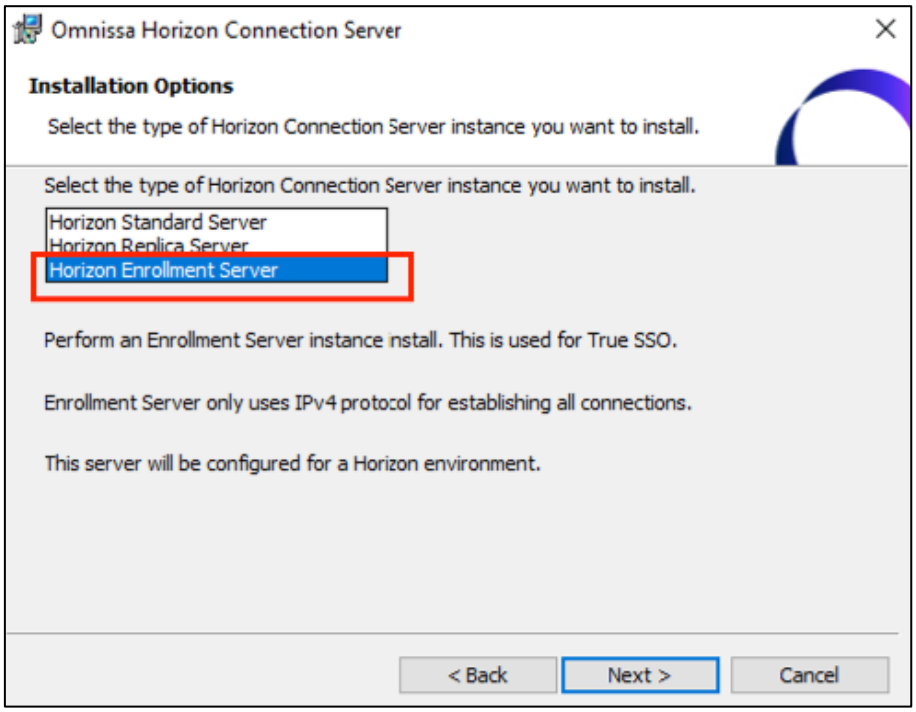


- You can close the MMC now.

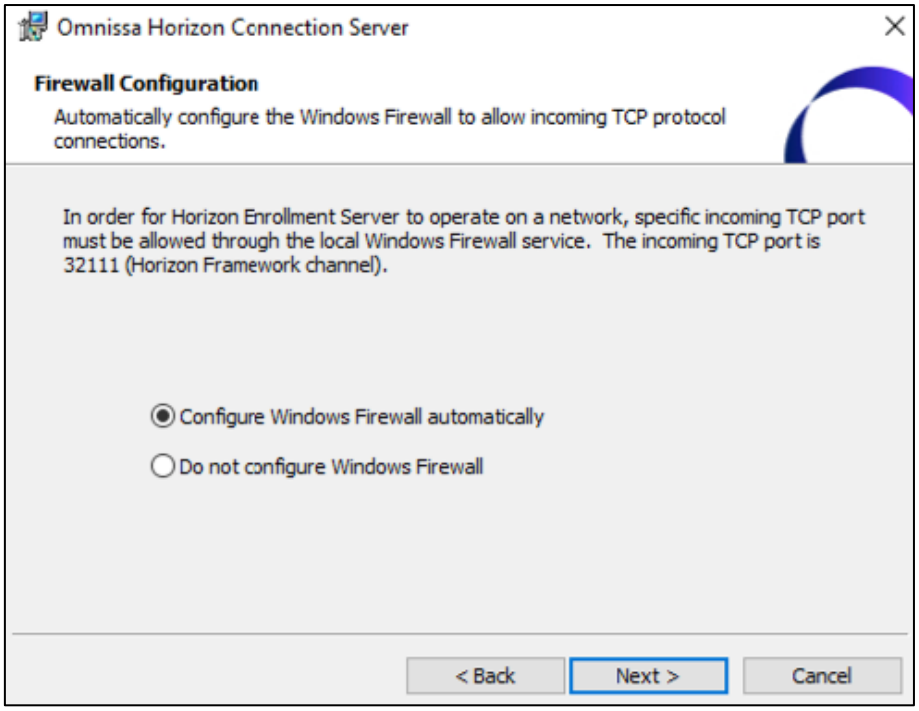
5.4.2 Setup Enrollment Server

Version 2503.1

- Execute the installer, and click →Next until you are asked for the Installation Options. Select „Horizon Enrollment Server“, and click →Next:



- Keep Firewall settings to configure automatically, and click →Next, then →Install:



- After finishing setup, reboot the server.

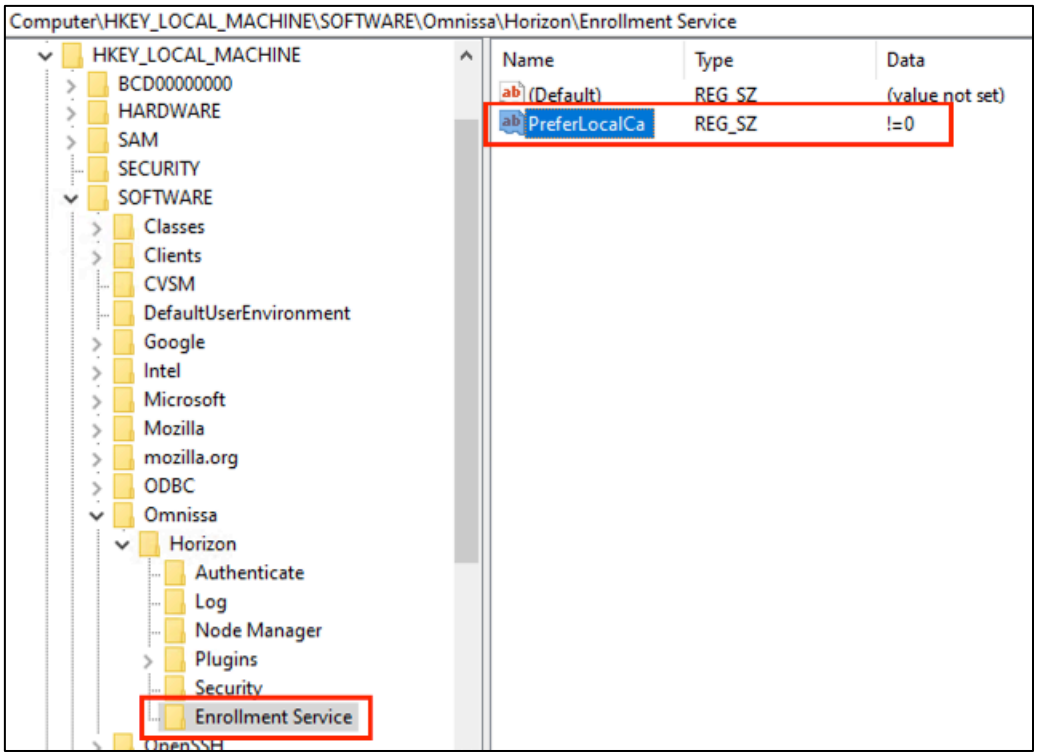
If you installed the enrollment server on the same machine that hosts an enterprise CA, configure the enrollment server to prefer using the local CA (see next sub-chapter). Optionally, if you install and set up more than one enrollment server, configure connection servers to enable load balancing between

the enrollment servers (see sub-chapter after next one).

5.4.3 Configure Enrollment Server to prefer local CA

Reference – URL

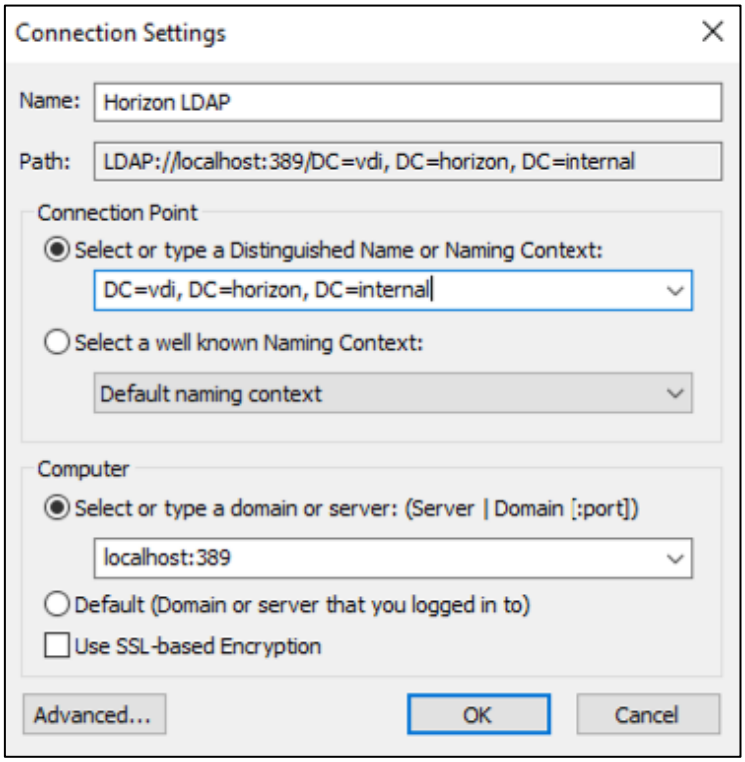
- On the enrollment server create the following registry key: `HKLM\SOFTWARE\Omnissa\Horizon\Enrollment Service`
- Add the following key from type “REG_SZ”: `PreferLocalCA`
- Enter this value for value TRUE, so the enrollment server will send request to the local CA preferred – only in case it fails, the server will send these to alternate CAs: `!=0`



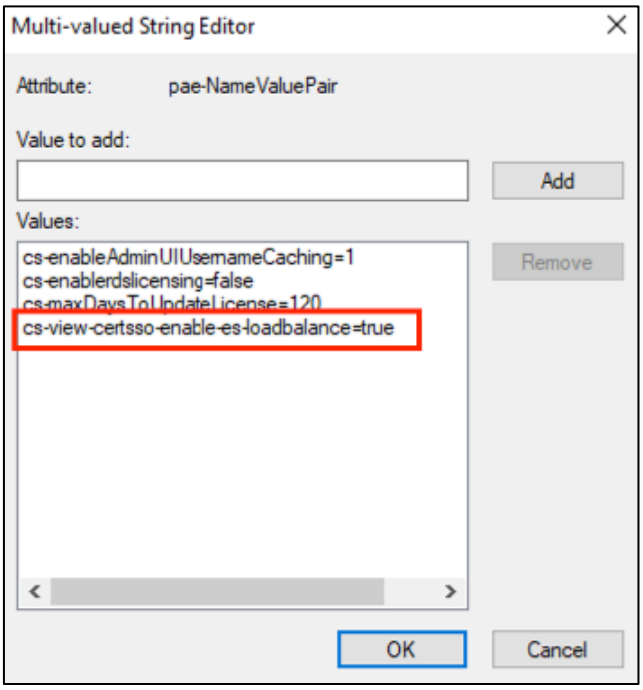
5.4.4 Configure Connection Servers to enable LB between Enrollment Servers

Reference – URL

- On one Connection Server, start the ADSI Edit tool



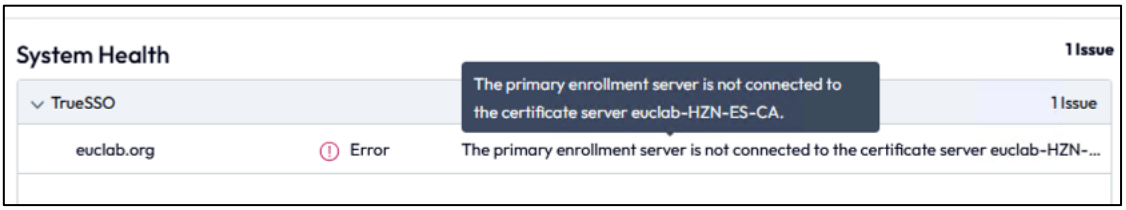
- Expand OU=Properties, select OU=Global, and double-click CN=Common
- Edit the value **pae-NameValuePair**, and add the following value:
  - `cs-view-certsso-enable-es-loadbalance=true`



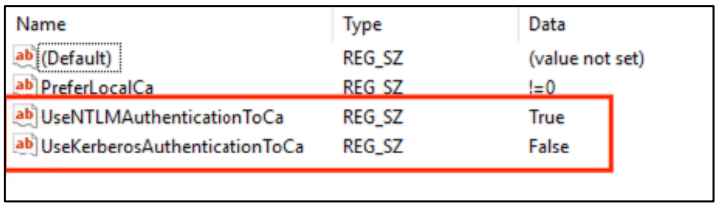
  - Submit with →OK.

5.4.5 TrueSSO – Enrollment Server unable to connect to CA

When Enrollment Server and CA are co-hosted on a single VM, you can experience an issue with TrueSSO and Enrollment Server not being able to connect to Certificate Authority, like this[2]:



This is as expected, and we have to force the Enrollment Server service to use NTLM when authenticating to the CA service by adding those registry values:

- `HKEY_LOCAL_MACHINE\SOFTWARE\Omnissa\Horizon\Enrollment Service\UseNTLMAuthenticationToCa => TRUE`
- `HKEY_LOCAL_MACHINE\SOFTWARE\Omnissa\Horizon\Enrollment Service \UseKerberosAuthenticationToCa => FALSE`
- 

Name	Type	Data
(Default)	REG_SZ	(value not set)
PreferLocalCa	REG_SZ	!=0
UseNTLMAuthenticationToCa	REG_SZ	True
UseKerberosAuthenticationToCa	REG_SZ	False

5.4.6 Validate TrueSSO with Diagnostic Tool

There is a tool called “TrueSSO ES Diagnostic Tool”, you can use to verify that TrueSSO is working as expected and configured. The tool is commandine-based, and can be downloaded here.

- Execute with /ListEnvironment:

```
C:\INSTALL\TrueSSO ES Diagnostic Tool>es_diag.exe /ListEnvironment
Execute EnrollmentDiags::ListEnvironment:
Connect to the Enrollment Service: localhost
Successfully connected to the Enrollment Server
===============
ES Computer Name    : HZN-ES.euclab.org
ES ApiVersion       : 1.0
---------------
Domain
Domain Name         : euclab.org
Forest Name         : euclab.org
Domain State        : Ready
---------------
1 Domains
---------------
Forest
Forest Name         : euclab.org
Directory State     : OK
TimeSince Last Sync: 3 sec
Enroll Cert Status  : Valid
  Cert Valid To     : 2027-11-12,09:12:26
---------------
```

[2] https://kb.omnissa.com/s/article/90682

- Verify that certificates can be requested successfully:

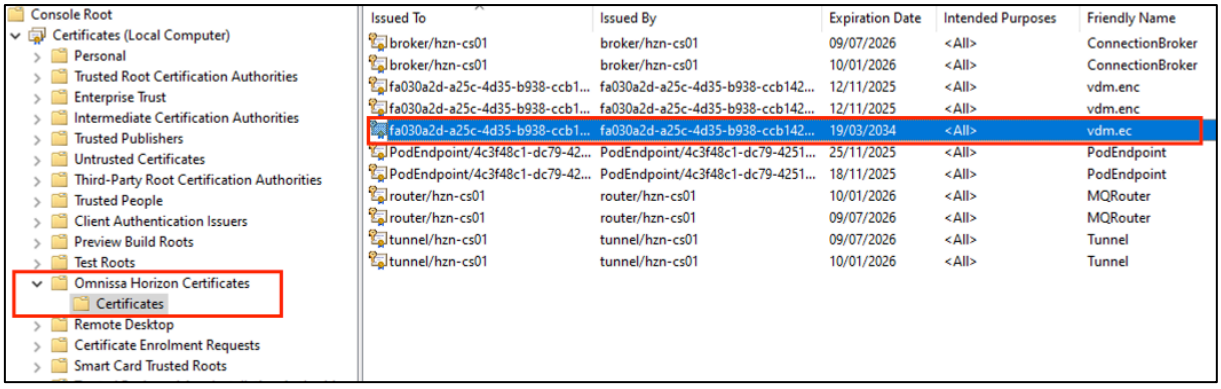
```
C:\INSTALL\TrueSSO ES Diagnostic Tool>es_diag.exe /enrollmenttest /domain:euclab.org /requester:euclab\administrator /te
mplate:TrueSSO /caserver:euclab-HZN-ES-CA
Execute EnrollmentDiags::EnrollmentTest:
Connect to the Enrollment Service: localhost
Successfully connected to the Enrollment Server
Configure the enrollment service for the selected domain
Wait up to 30 seconds for the Active Directory to be read
Send Cert-Request(s) to the enrollment service:
Successfully requested a Certificate

Requested : 1, Issued: 1, Failed: 0, Retry: 0
Total Time: 0.285 sec to generate 1 certificates.
Throughput: 3 certificates/second.
Average   : 0.285 sec to generate a certificate.

Subject   : Administrator
UPN       : administrator@euclab.org
SerialNo  : 44:00:00:00:0A:95:7B:71:17:1D:F0:B5:87:00:00:00:00:00:0A
UTC Time  : 2025-11-13,12:26:33
Valid From: 2025-11-13,12:16:33
Valid To  : 2025-11-13,22:16:33
Validity  : Certificate is valid

C:\INSTALL\TrueSSO ES Diagnostic Tool>
```

5.5 Pair Connection und Enrollment Server

To enable trust between Enrollment Server and Connection Server, you need to export the Omnissa Horizon Certificate from the Connection Servers. The certificate is replicated between all Connection Servers through Horizon LDAP already, so we need to export this from one connection server only. The exported certificate is called a client certificate, because the connection server is a client of the Enrollment Service provided by the enrollment server.

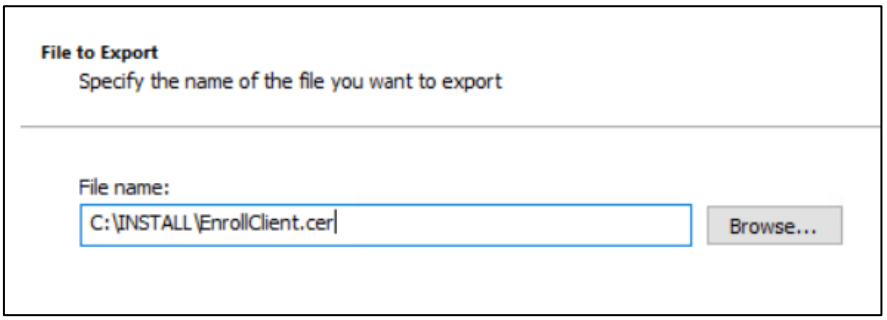
5.5.1 Export the Enrollment Service Client Certificate

- On one of the the connection server, start the MMC and add the snap-in “Certificates” (Computer account)
- On the left, go to →Omnissa Horizon Certificates →Certificates, and select on the right the certificate with the friendly name “vdm.ec”



- Export this certificate

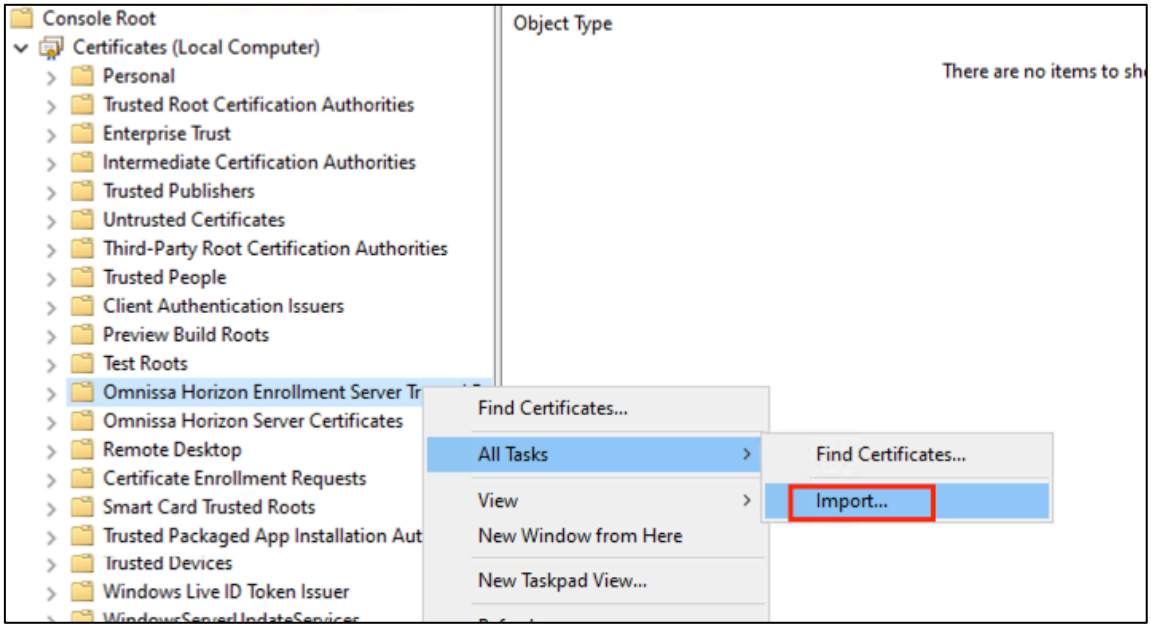
  - Name it “EnrollClient.cer” (i.e.):



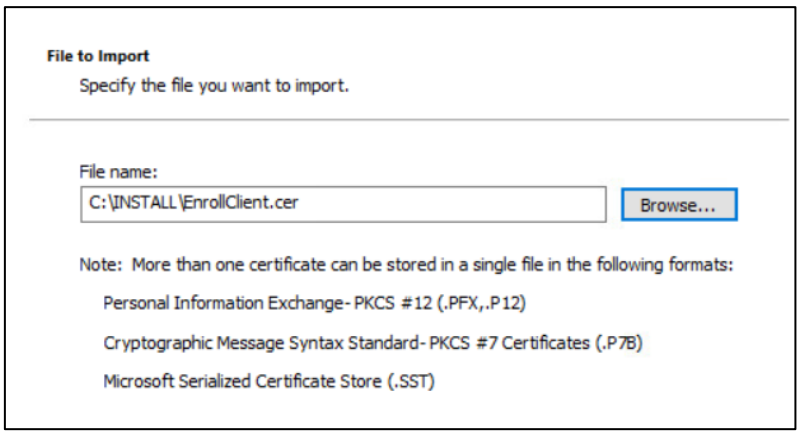
- Copy the cer file to the Enrollment Server.

5.5.2 Import the Enrollment Service Client Certificate on the Enrollment Server

- Start MMC on the Enrollment Server
- On the left, right-click to →Omnissa Horizon Enrollment Server Trusted Roots →All Tasks →Import

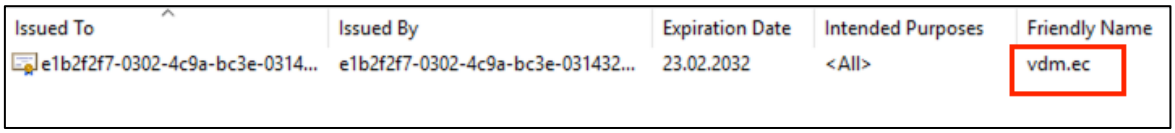


- Select the previously copied cer file:



- Accept the default settings and click →Finish:

- After successful import, change the friendly name to “vdm.ec” (not mandatory, but recommended):



5.6 Configure SAML Authentication to work with TrueSSO

With the True SSO feature, users can log in to Omnissa Workspace ONE Access using smart card, RADIUS, or RSA SecurID authentication, and they will no longer be prompted for Active Directory credentials, even when they launch a remote desktop or application for the first time.

- Verify that SSO is enabled in Horizon Console under →Settings →Global Settings
- Verify that Omnissa Access is installed and configured.
- Verify that the root certificate for the signing CA for the SAML server certificate is installed on the connection server host.
- Configure the SAML Authenticator in Horizon, following the guidance from this chapter: Configure SAML Authentication in Horizon for Omnissa Access Integration
    - Enable TrueSSO Trigger Mode in the SAML Authenticator

If you need to extend the expiration period of the Connection Server metadata so that remote sessions are not terminated after only 24 hours, you can follow this URL.

5.7 Configure Horizon Connection Server for TrueSSO

This procedure is required to be performed on only one connection server in a POD to enable or disable TrueSSO.

- Execute cmd as administrator
- Add enrollment server to the global list
    - `vdmUtil --authAs admin-role-user --authDomain domain-name --authPassword admin-user-password --truesso --environment --add --enrollmentServer enroll-server-fqdn`
    - `vdmUtil --authAs administrator --authDomain euclab.org --authPassword ##### --truesso --environment --add --enrollmentServer HZN-ES.euclab.org`

```
C:\Users\administrator>vdmUtil --authAs administrator --authDomain euclab.org --authPassword [redacted]
--truesso --environment --add --enrollmentServer HZN-ES.euclab.org
Enrollment server(s) added to the environment

C:\Users\administrator>
```

- Verify the correct listing of the enrollment server

- vdmUtil --authAs admin-role-user --authDomain domain-name --authPassword admin-user-password --truesso --environment --list --enrollmentServer enroll-server-fqdn --domain domain-fqdn
- vdmUtil --authAs administrator --authDomain euclab.org --authPassword ##### --truesso --environment --list --enrollmentServer HZN-ES.euclab.org --domain euclab.org

```
C:\Users\administrator>vdmUtil --authAs administrator --authDomain euclab.org --authPassword [redacted]
--truesso --environment --list --enrollmentServer HZN-ES.euclab.org --domain euclab.org
True SSO environment info
Enrollment server: hzn-es.euclab.org
Domain: euclab.org
Forest:
        Name: euclab.org
        Enrollment CertState: VALID
        Template(s):
                Name: TrueSSO
                Minimum key length: 2048
                Hash algorithm: SHA1
        Certificate Authority(s):
                Name: euclab-DC-CA
                Name: euclab-HZN-ES-CA

C:\Users\administrator>
```

- Create a TrueSSO connector and enable the connector
  - vdmUtil --authAs admin-role-user --authDomain domain-name --authPassword admin-user-password --truesso --create --connector --domain domain-fqdn --template TrueSSO-template-name --primaryEnrollmentServer enroll-server-fqdn --certificateServer ca-common-name --mode enabled
    - *TrueSSO-template-name* is the name of the template shown in the output for the previous command, and *ca-common-name* is the common name of the enterprise certificate authority shown in that output.
  - vdmUtil --authAs administrator --authDomain euclab.org --authPassword ##### --truesso --create --connector --domain euclab.org --template TrueSSO --primaryEnrollmentServer HZN-ES.euclab.org --certificateServer euclab-HZN-ES-CA --mode enabled

```
C:\Users\administrator>vdmUtil --authAs administrator --authDomain euclab.org --authPassword [redacted]
--truesso --create --connector --domain euclab.org --template TrueSSO --primaryEnrollmentServer HZN-ES
.euclab.org --certificateServer euclab-HZN-ES-CA --mode enabled
Connector created
Domain: euclab.org
Mode: ENABLED

C:\Users\administrator>
```

- Discover which SAML authenticators are available – these are configured previously in Horizon Console
  - vdmUtil --authAs admin-role-user --authDomain domain-name --authPassword admin-user-password --truesso --list --authenticator
  - vdmUtil --authAs administrator --authDomain euclab.org --authPassword ##### --truesso --list –authenticator

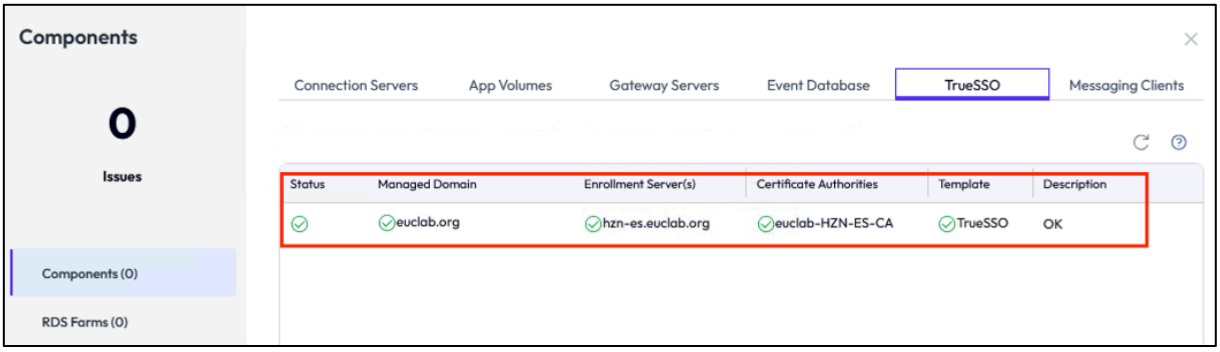
```
C:\Users\administrator>vdmUtil --authAs administrator --authDomain euclab.org --authPassword [redacted]
--truesso --list --authenticator
Authenticator(s) found: 2
Name: SAML EUCLAB
True SSO mode: ENABLE_IF_NO_PASSWORD
Name: MS Entra ID
True SSO mode: DISABLED

C:\Users\administrator>
```

- Enable the authenticator to use TrueSSO mode
  - `vdmUtil --authAs admin-role-user --authDomain domain-name --authPassword admin-user-password --truesso --authenticator --edit --name authenticator-fqdn --truessoMode {ENABLED|ALWAYS}`
    - For --truessoMode, use ENABLED if you want True SSO to be used only if no password was supplied when the user logged in to Omnissa Access. In this case if a password was used and cached, the system will use the password. Set --truessoMode to ALWAYS if you want True SSO to be used even if a password was supplied when the user logged in to Omnissa Access.
  - `vdmUtil --authAs administrator --authDomain euclab.org --authPassword ##### --truesso --authenticator --edit --name "SAML EUCLAB" --truessoMode ALWAYS`

```
C:\Users\administrator>vdmUtil --authAs administrator --authDomain euclab.org --authPassword [redacted]
--truesso --authenticator --edit --name "SAML EUCLAB" --truessoMode ALWAYS
Authenticator updated
Name: SAML EUCLAB
True SSO mode: ENABLE_ALWAYS

C:\Users\administrator>
```

The True SSO connector is enabled on a pool or cluster for the domain specified. To disable True SSO at the pool level, run `vdmUtil --certsso --edit --connector <domain> --mode disabled`. To disable true SSO for an individual virtual machine, you can use GPO (vdm_agent.adm).

Finally, you should see that TrueSSO is implemented, by viewing the Horizon System Health Dashboard, go to →View and validate the status of TrueSSO:

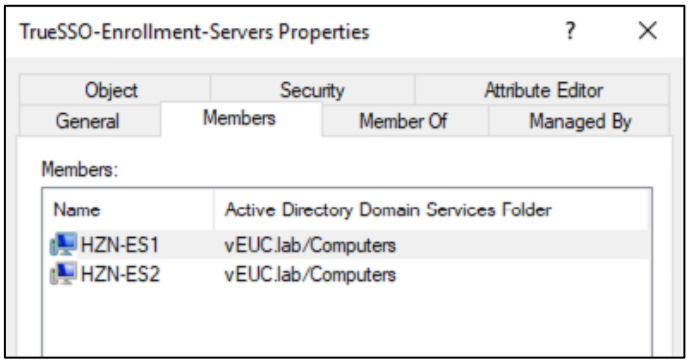


5.8 Setup additional Enrollment Server and enable HA

You can add a second Enrollment Server for configuring HA and load distribution.

Preparation on the CA:

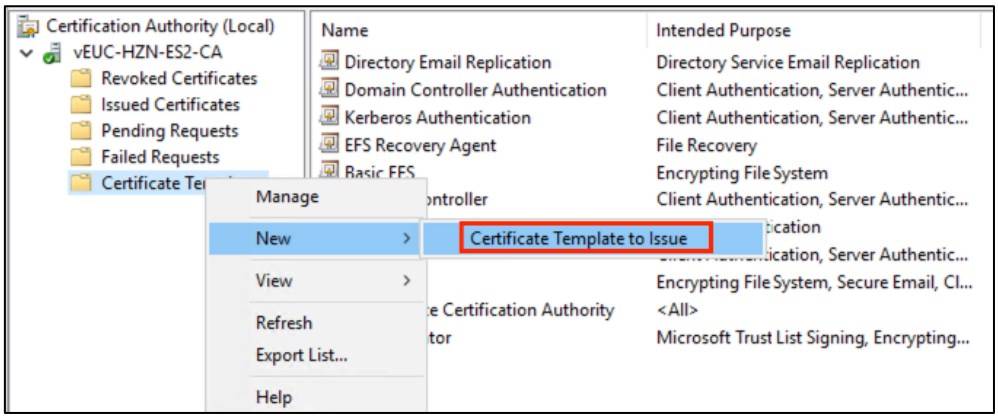
- Add the newly prepared Windows Server to the Security Group, as created in before.



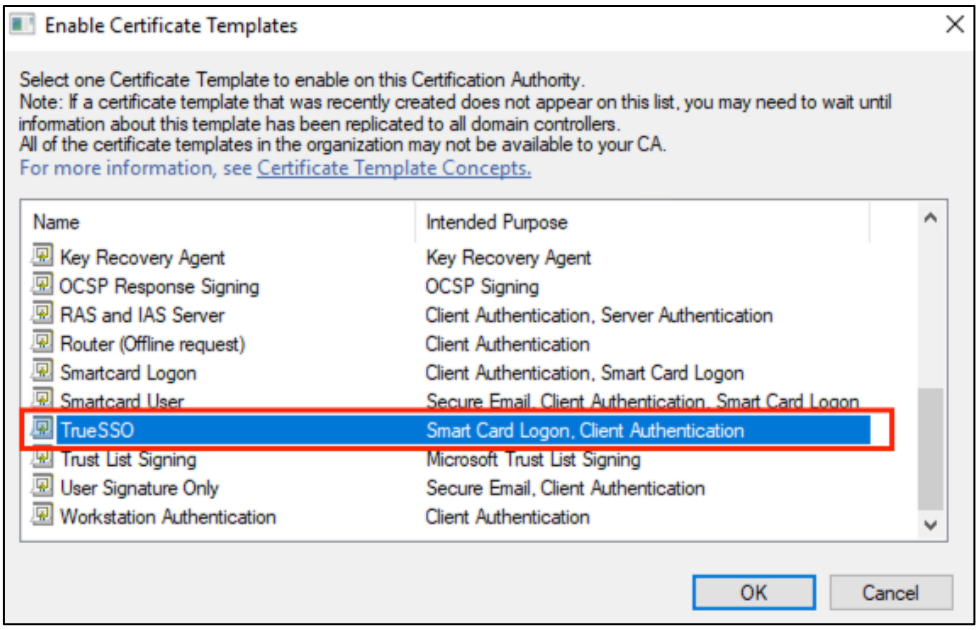
- You can use an existing (Sub-)CA, or create a dedicate one, co-installed, as described here.

On the new designated Enrollment Server with co-installed CA:

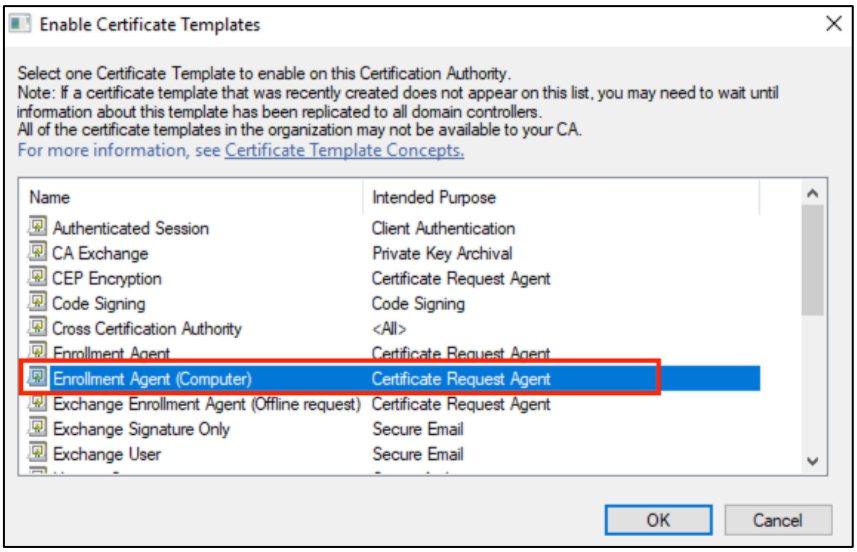
- The certificate template for TrueSSO already exists, but we need to issue this template for a new Enrollment Server



- Select TrueSSO template



- Further, we need to issue a new certificate template for the Enrollment Agent (Computer)
  - Select Enrollment Agent (Computer)



- You need to request the “Enrollment Agent (Computer)” certificate to authorize the enrollment server to generate certificates on behalf of users, as described in here.
- Setup **Enrollment Server**, as described in here.
  - Be aware about using local CA and load balancing for the Connection Servers.
- Start the pairing process between Connection Server and the newly installed Enrollment Server, as described in here.
- Configure the Connection Server for TrueSSO with the newly installed Enrollment Server, similar as described in here.

- Add the new Enrollment Server to the global list:
  `vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword ##### --truesso --environment --add --enrollmentServer HZN-ES2.vEUC.lab`

```
C:\Users\administrator.VEUC>vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword [redacted] --truesso --envir
onment --add --enrollmentServer HZN-ES2.vEUC.lab
Enrollment server(s) added to the environment
```

- Verify the correct listing of the new Enrollment Server:
  `vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword ##### --truesso --environment --list --enrollmentServer HZN-ES2.vEUC.lab --domain vEUC.lab`

```
C:\Users\administrator.VEUC>vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword [redacted]-truesso --envir
onment --list --enrollmentServer HZN-ES2.vEUC.lab --domain vEUC.lab
True SSO environment info
Enrollment server: hzn-es2.veuc.lab
Domain: veuc.lab
Forest:
        Name: vEUC.lab
        Enrollment CertState: NOT_VALID
        Template(s):
                Name: TrueSSO
                Minimum key length: 2048
                Hash algorithm: SHA1
        Certificate Authority(s):
                Name: vEUC-HZN-ES1-CA
                Name: vEUC-HZN-ES2-CA
                Name: vEUC-VEUC-DC-CA

C:\Users\administrator.VEUC>
```

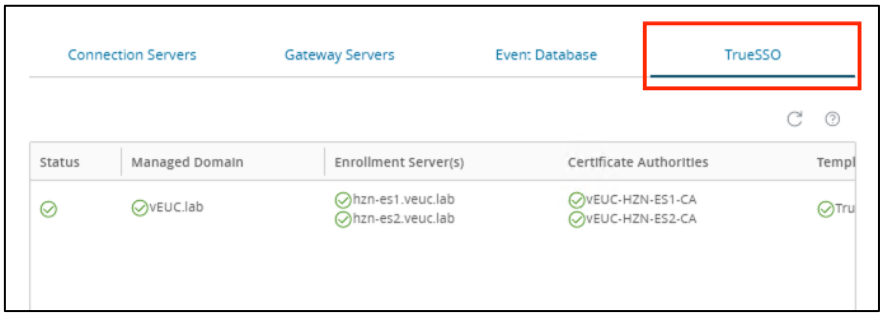
- **Edit the existing connector**:
  `vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword ##### --truesso --edit --connector --domain vEUC.lab --template TrueSSO --secondaryEnrollmentServer HZN-ES2.vEUC.lab --certificateServer vEUC-HZN-ES1-CA,vEUC-HZN-ES2-CA --mode enabled`

```
C:\Users\administrator.VEUC>vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword [redacted] --truesso --edit
--connector --domain vEUC.lab --template TrueSSO --secondaryEnrollmentServer HZN-ES2.vEUC.lab --certificateServer vEUC-H
ZN-ES1-CA,vEUC-HZN-ES2-CA --mode enabled
Connector updated
Domain: vEUC.lab
Mode: ENABLED

C:\Users\administrator.VEUC>
```

- Check settings:
  `vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword ##### --truesso --list --connector --domain vEUC.lab`

```
C:\Users\administrator.VEUC>vdmUtil --authAs administrator --authDomain vEUC.lab --authPassword [redacted] --truesso --list
--connector --domain vEUC.lab
Connector found
Domain: vEUC.lab
Primary Enrollment Server: hzn-es1.veuc.lab
Secondary Enrollment Server: hzn-es2.veuc.lab
Template Name: TrueSSO
Mode: ENABLED
Certificate Authority Server(s):
        vEUC-HZN-ES1-CA
        vEUC-HZN-ES2-CA


C:\Users\administrator.VEUC>
```

- You should now see the newly added Enrollment Server and the CA in the dashboard of the Horizon Console:



- Enable load balancing for the Enrollment Servers, of not done already (see here).

5.9 Additional resources for TrueSSO

- VMware Horizon 7 True SSO: Setting Up In a Lab
  https://blogs.vmware.com/euc/2016/04/true-sso-setting-up-in-a-lab.html
- VMware Horizon TrueSSO – Configuration for High Availability and Redundancy
  https://askaresh.com/2018/04/13/vmware-horizon-truesso-configuration-for-high-availability-and-redundancy/
- VMware Horizon True SSO with UAG SAML
  https://www.carlstalhood.com/vmware-horizon-true-sso-uag-saml/
- VMware Horizon 7 True SSO: Advanced Features
  https://blogs.vmware.com/euc/2017/02/horizon-7-sso-advanced-features.html
- VMware Horizon True SSO configuration
  https://nolabnoparty.com/en/vmware-horizon-true-sso-configuration-pt-1/
  https://nolabnoparty.com/en/vmware-horizon-true-sso-configuration-pt-2/
- Enabling and Troubleshooting Omnissa Horizon True SSO
  https://darrylmiles.blog/2023/08/12/enabling-and-troubleshooting-vmware-horizon-true-sso/

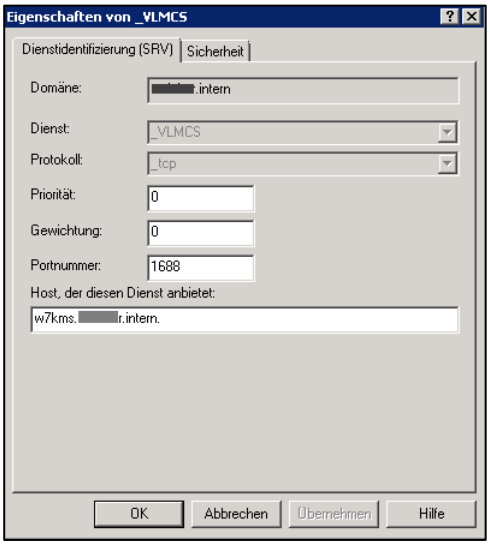
6. Key Management Server (KMS) einrichten

Je nach KMS-Kategorie wird der sog. KMS-Host auf einer Windows 7- bzw. auf einer Windows 2008 R2 Maschine eingerichtet. Die Kommunikation zwischen KMS-Host und KMS-Client findet später über TCP Port 1688 statt.
Für eine automatische Aktivierung der KMS-Clients müssen bei Windows 7 mind. 25 Systeme (virtuell/physisch) bzw. bei Windows 2008 R2 mind. 5 Systeme vorhanden sein.

- Installieren des KMS-Schlüssels auf dem KMS-Host per Konsole:
  cscript c:\windows\system32\slmgr.vbs /ipk <KMS-Schlüssel>

- Aktivieren des KMS-Schlüssels bei Microsoft
  cscript c:\windows\system32\slmgr.vbs /ato

- Im DNS sollte automatisch ein entsprechender Eintrag angelegt werden, zu prüfen mit dem Befehl
  nslookup –type=srv _vlmcs._tcp.<Domäne>



7. Netzwerklastenausgleich-Manager konfigurieren

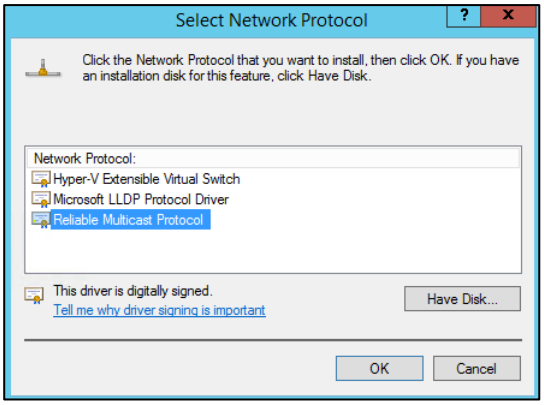
Damit ein Anwender in seinem View-Client nicht beide Adressen (View Connection Server bzw. View Replica Server) vorhalten muss, eignet sich hierfür der MS-eigene Netzwerklastenausgleich. Somit muss der End-Anwender lediglich **eine** Adresse haben, um sich mit einem der Connection Server verbinden zu können.

- Im AD wird ein neuer DNS-Eintrag „demoview.iso.local“ vorgenommen, dazu die IP-Adresse statisch hinterlegt.
- Auf beiden Connection-Servern wird der MS-eigene Netzwerklastenausgleich-Manager konfiguriert (Feature NLB):
  Netzwerklastenausgleich-Cluster „demoview.iso.local“, bestehend aus
  -demoviewsrv.iso.local
  -demoviewreplica.iso.local
- Somit kann sich der View-Client nun immer mit „demoview.iso.local“ verbinden, unabhängig davon, welcher View Connection Server gerade verfügbar ist.

- Ausgangslage:
  - Ein View Connection Server: demoviewsrv.iso.local
  - Ein View Replica Server: demoviewreplica.iso.local

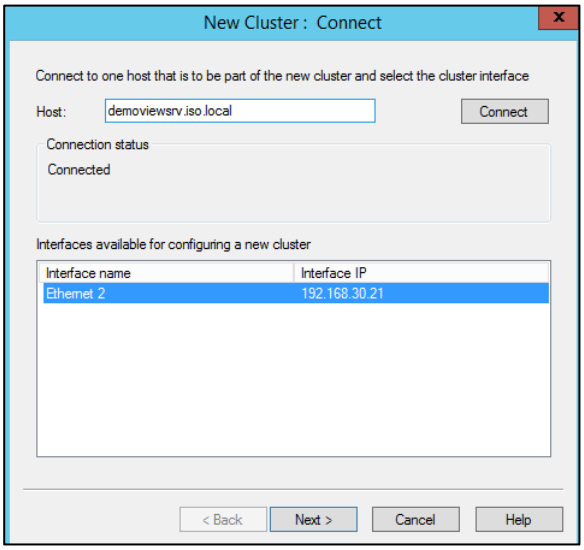
- Einrichten eines neuen Host-Eintrags im DNS-Manager
  - demoview.iso.local

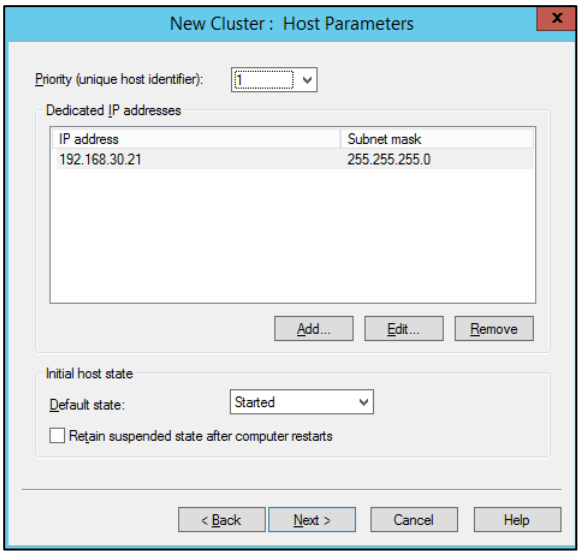
- In den LAN-Eigenschaften **beider** Connection Server das „Reliable Multicast-Protokoll“ installieren:



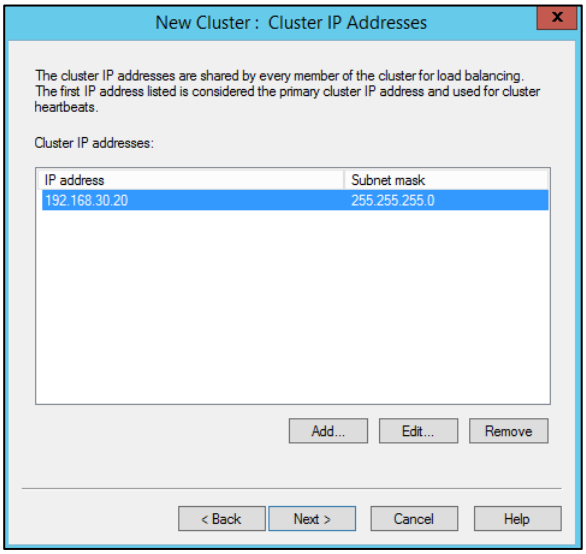
- Installieren des Netzwerklastenausgleich-Manager (NLB) über die →Verwaltung → Server-Manager, oder alternativ über „*servermanagercmd.exe –install nlb*“ auf beiden Connection Servern
- Auf einem der beiden Connection-Server einen Netzwerklastenausgleich-Cluster hinzufügen:

  Eingabe des ersten Cluster-Knotens

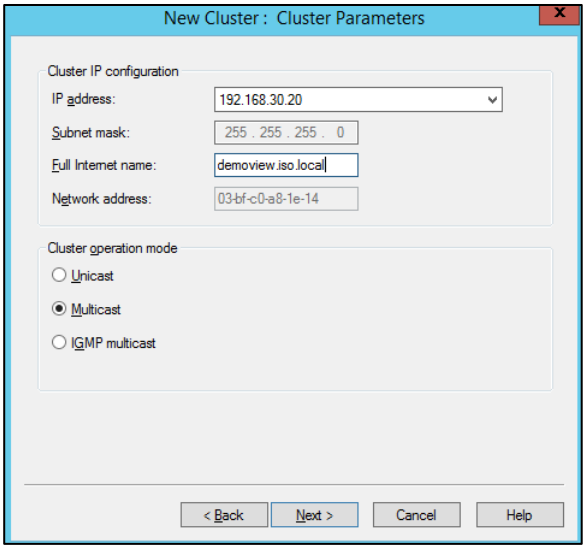




Eingabe der Cluster-IP-Adresse

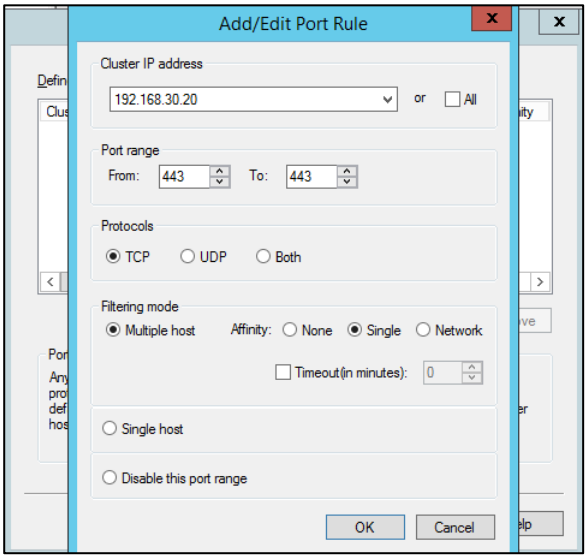


→ Als Clusterausführungsmodus „Multicast“ wählen (zwecks VMotion-Kompatibilität)



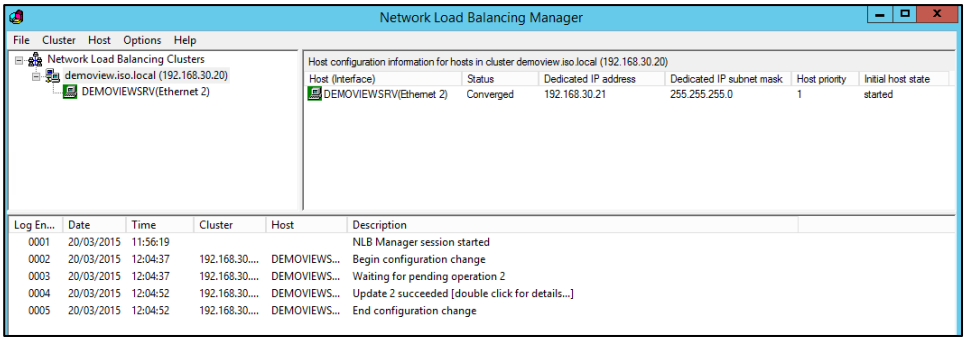
Entfernen der vorhandenen Standard-Portregel,

Hinzufügen einer Portregel, welche lediglich auf eingehenden TCP-Verkehr auf Port 443 hört

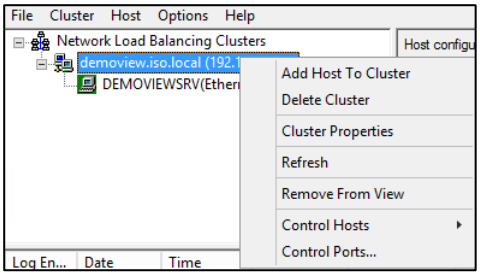


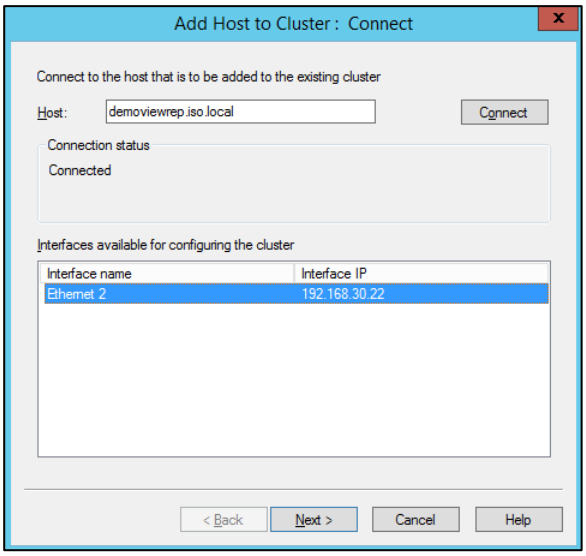
Vorgang abschließen.

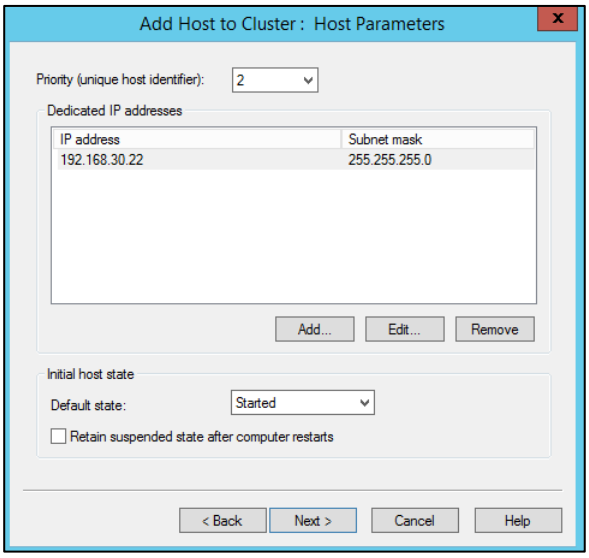
- So siehts dann in etwa aus:



- Weiteren Host (view45replica.iso.local) zum Cluster hinzufügen (ggf. vom zweiten Host machen):

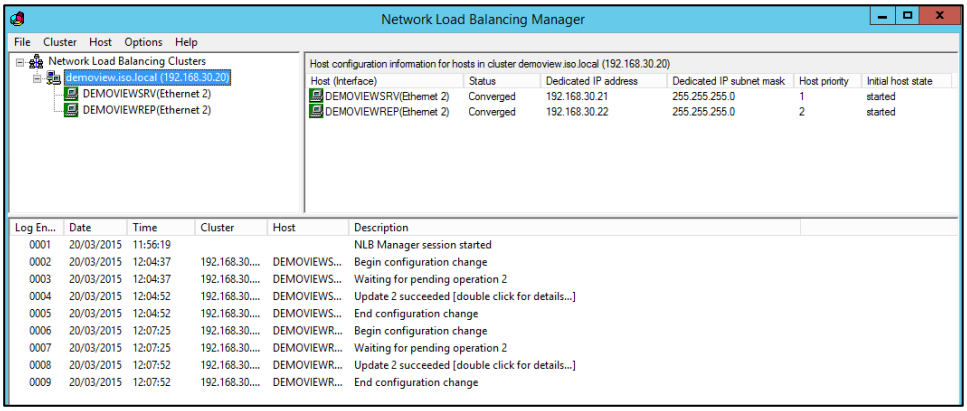






Vorgang abschließen.

- Nach kurzer Wartezeit sieht es dann so aus:



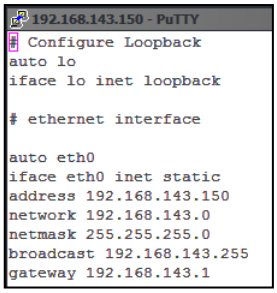
8. Einrichten eines Load Balancers

8.1 Einrichten eines Hercules Load Balancers (VMware Virtual Appliance)

Alternativ zum Netzwerklastenausgleich à la Microsoft kann auch eine Virtual Appliance namens Hercules zum Einsatz kommen. Diese verteilt eingehende Anfragen an die entsprechenden Connection bzw. Replica-Server.

- Importieren der entsprechenden ovf-Datei
- Start und Login in das Linux-Sytstem (User: root, Passwort: root)
- Editieren des LAN-Interfaces:

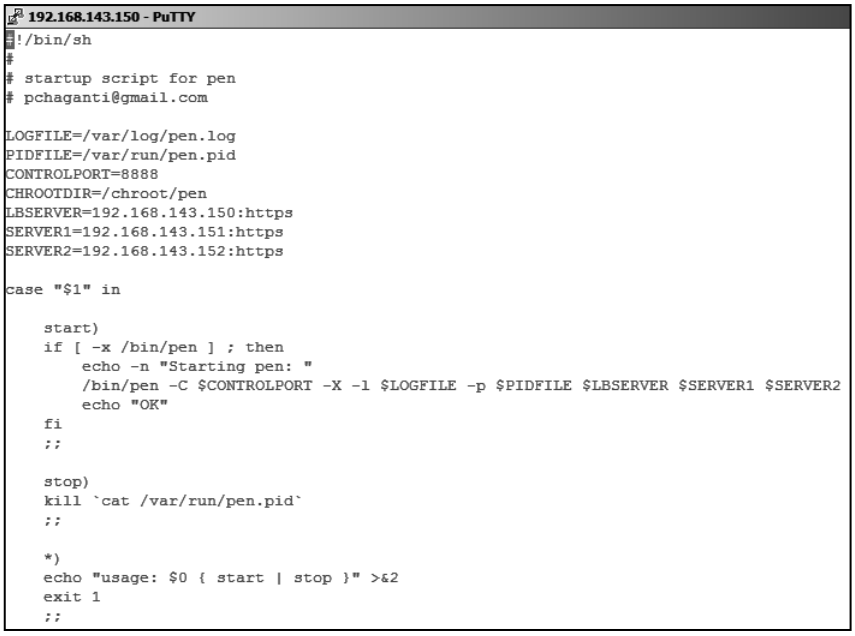
vi /etc/network/interfaces



Mit ZZ (YY) komme ich aus dem vi wieder heraus.

- Eintragen der beiden Cluster-Knoten:

vi /etc/init.d/pen



Es sind auch mehr als zwei Knoten (SERVER1 & SERVER2) denkbar.

- Neustart der VA – Fertig.

8.2 Einrichten eines PEN Load Balancers auf einem Ubuntu Linux

Wer die OpenSource Variante PEN lieber auf einem anderen Linux einrichten möchte, kann dieses zum Beispiel über Ubuntu machen.

- Einrichten einer Ubuntu-VM (hier mit Ubuntu 14.04.2 LTS)
- Konfigurieren einer statischen IP-Adresse
- Setup der VMware-Tools (siehe VMware KB-Artikel 1022525)
    - Mounten der VMware-CD an die VM
    - Extrahieren der VMwareToolsxxxx.tar.gz in einen Ordner
    - Zum Ordner vmware-tools-distrib navigieren und
    - *sudo ./vmware-install.pl –d* ausführen
    - Neustart der VM
- Download der aktuellen PEN-Version (http://siag.nu/pub/pen/) und in einen Ordner extrahieren
- *sudo apt-get install pen* ausführen
- Für den Autostart von PEN muss die Datei /etc/rc.local editiert werden:

```
# By default this script does nothing.
pen 443 192.168.30.21 192.168.30.22
exit 0
~
```

  →Hier wird Load Balancing über https mit den beiden IPs 192.168.30.21 und 192.168.30.22 konfiguriert.
- Nun ist die Konfiguration auch Neustart-resistent. Ggf. kontrollieren mit „*ps aux | grep pen*“.

- Bei Bedarf kann der pen service auch regelmäßig neu gestartet werden:
    - GNOME für die grafische Verwaltung installieren:
      sudo apt-get install gnome
      sudo apt install gksu
    - GNOME ausführen: gksudo gnome-schedule
    - Editieren der /etc/crontab – hier werden tabellarisch jene Befehle (systemweit) gespeichert, die zu bestimmten Uhrzeiten ausgeführt werden sollen.
      sudo vi /etc/crontab
    - Einrichten eines Mailversands postfix:
      sudo apt-get install postfix

8.3 Einrichten eines HAProxys auf einem Debian System

Der HAproxy ist ein TCP/HTTP Load Balancer und als freie Software unter www.haproxy.org zum Download verfügbar. Diesen habe ich einmal auf einem Debian-System installiert. Dazu existiert eine dedizierte Anleitung.

9. Setup Location-Based Printing

Voraussetzung

- VMware Integrated Printing Feature im Horizon Agent
- Setup entsprechender Druckertreiber in der Master-VM
- Translation Rules für jeden location-based Drucker
- https://www.carlstalhood.com/category/vmware-horizon/vmware-horizon-8/ ?

https://docs.vmware.com/en/VMware-Horizon/2106/horizon-remote-desktop-features/GUID-F599DFBC-1713-44C1-BDD8-F7F54FA58D51.html

Install LBP

- Download Horizon GPO Bundle
- installutil.exe C:\vmware-print-lbpsettingui.dll
    - InstallUtil.exe is usually in the Microsoft.NET directory, for example, C:\Windows\Microsoft.NET\Framework64\v4.0.30319
- GPO: →Computer Configuration →Software Settings →LBP UI

Configure LBP

- The group policy setting is a name translation table that maps printers to remote desktops
- Translation Rules can base on
    - client system's IP address
    - client name
    - client MAC address
    - user's name
    - user’s group
- You can specify one translation rule, or a combination of several translation rules, for a specific printer.

Oder per DEM:

https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/techpaper/vmware-horizon-view-virtual-printing-location-redirection.pdf

10. Setup VMware Unified Access Gateway

10.1 Requirements

Benötigte Ports von Draußen zur externen IP des UAGs:

- TCP and UDP 443 (includes Blast Extreme)
- TCP and UDP 4172. UDP 4172 must be opened in both directions. (PCoIP)
- TCP and UDP 8443 (for HTML Blast)

Benötigte Ports von der internen IP des UAGs nach Drinnen:

- TCP 443 to internal Connection Servers (through a load balancer)
- TCP and UDP 4172 (PCoIP) to all internal Horizon View Agents. UDP 4172 must be opened in both directions.
- TCP 32111 (USB Redirection) to all internal Horizon View Agents.
- TCP and UDP 22443 (Blast Extreme) to all internal Horizon View Agents.
- TCP 9427 (MMR and CDR) to all internal Horizon View Agents.

Benötigte Ports für die interne Kommunikation zwischen UAG und den Desktops:

- TCP 9443 (REST API)
- TCP 80/443 (Edge Gateway)

10.2 Deployment per PS-Script

- Prepare a Windows client computer with VMware OVF Tool (Download URL)
  - `Set-ExecutionPolicy unrestricted`
- If you get an error like this “”.ps1 is not digitally signed. The script will not execute on the system.” You have to execute hits command:
  - `Set-ExecutionPolicy -Scope Process -ExecutionPolicy Bypass`

- Customize ini file for setup, example:

```
[General]
name=HZN-UAG1
source=C:\INSTALL\UAG2209.1\euc-unified-access-gateway-22.09.1.0-20812260_OVF10.ova
target=vi://administrator@vsphere.local:PASSWORD@vEUC-VCSA/vEUC-DC/host/vEUC-Cluster/veuc-esxi01.veuc.lab

ds=VDI-Pool
diskMode=thick

netInternet=dvpg-VM-extern
netManagementNetwork=dvpg-VM-Network
netBackendNetwork=dvpg-VM-Network

deploymentOption=twonic
#ip0 is public NIC
ip0=172.16.0.11
netmask0=255.255.255.0
#ip1 is Backend NIC
ip1=192.168.0.36
netmask1=255.255.255.0

dns=192.168.0.10
defaultGateway=192.168.0.253
ntpServers=192.168.0.253

uagName=HZN-UAG1
honorCipherOrder=true

[Horizon]
proxyDestinationUrl=https://192.168.0.209
```

- Execute powershell command:
  - `.\uagdeploy.ps1 .\setup-HZN-UAG1.ini`
  - (optional) `.\uagdeploy.ps1 .\setup-HZN-UAG1.ini 'root-password' 'admin-password' no` (no stands for participation with CEIP)

- Caution: does an UAG with the same name already exists, the script will delete this before deployment of the new one.

10.3 Configuration UAG

- Login to UAG console as root
  - set timezone
  - (optional) configure root password expiration (default is 365 days)
    - `chage -l root`
    - `chage -M 99999 root`
- Login to UI per URL https://<FQDN or IP>:9443 as admin
  - configure Horizon Edge settings
  - Upload needed certificate
  - Export config file as JSON and INI
- Enable SSH for UAG

- Open console window, login as root and enter
- `vi /etc/ssh/sshd_config`
- set the line "`PermitRootLogin`" to `yes` and save the file
- Restart SSH Service via `service sshd restart`

10.4 Troubleshooting UAG

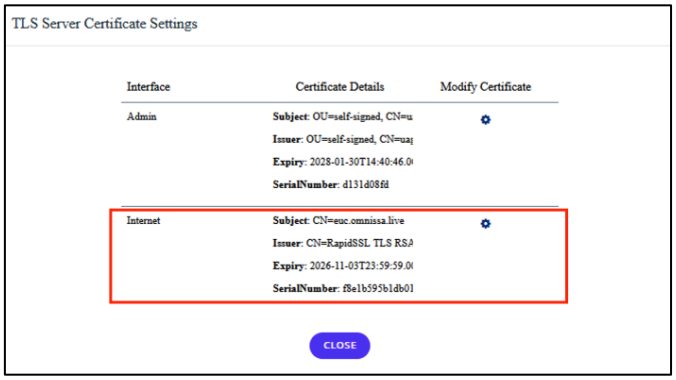
Test port connection between UAG and Connection Server/LB etc:

curl -v telnet://target-computer:443

10.5 Create public certificate for external access

You can create a CSR for UAG, and set the certificate in the UAG UI

- UAG - Generate CSR and Private Key using uagcertutil Command, see here
- Add the public certificate in the UI under →TLS Server Certificate Settings for the Internet interface



11. Upgrade from earlier Horizon versions

11.1 Update to Horizon 2503 (8.15)

For Term licensing, ensure that you have a valid license key available for Horizon 2412 or higher. For subscription, there is no action needed.

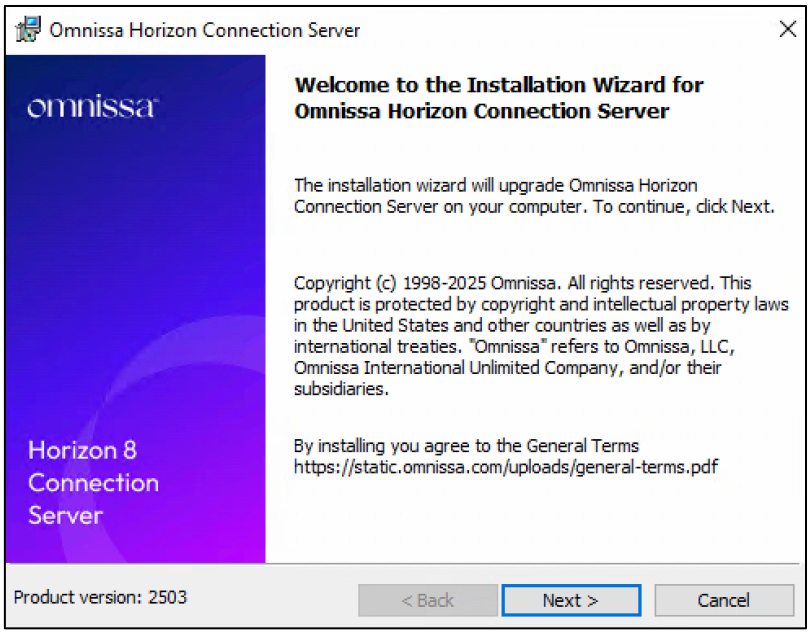
With Horizon 2503, the application partition names in both local and global AD LDS instances have been updated, to reflect the Omnissa naming[3].

So after updating to Horzon 2503, the Horizon Connection Server application partition names will be updated with a PS-script.

Connection Servers can be updated and kept with the legacy partition name, but they cannot be part of a CPA federation with Connection Servers installed with the new partition name (or vice versa).

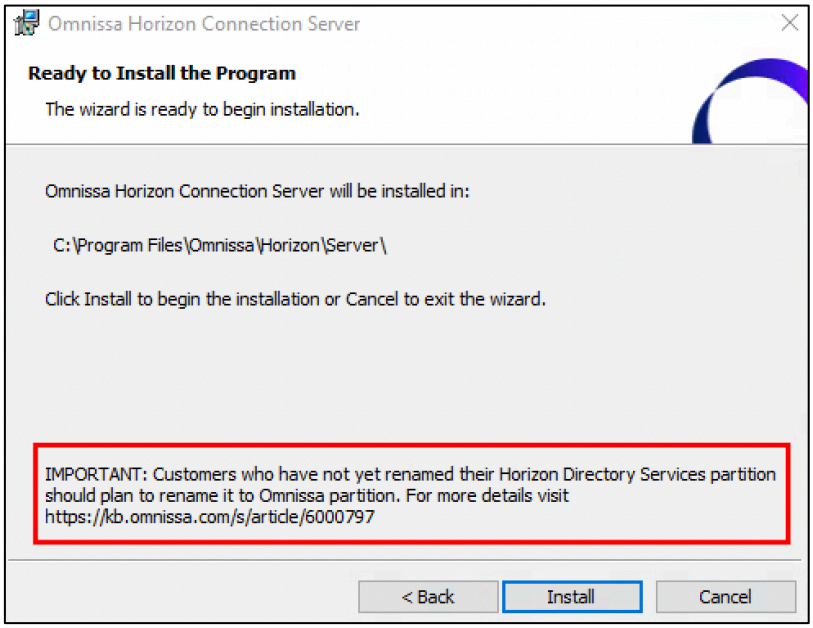
11.1.1 Update Horizon 2503

- Executing update process

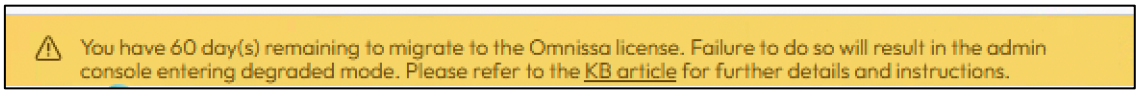


[3] https://kb.omnissa.com/s/article/6000797

- Recognize the new program folder



- After finishig the update, you see an alert in the Horizon Console, that the new Omnissa license key has to be configured (for Term licensing only).



Different from update to 2412, the locked.properties file will be kept automatically, and moved to the new folder structure (C:\Program Files\Omnissa\Horizon\Server\sslgateway\conf\locked.properties).

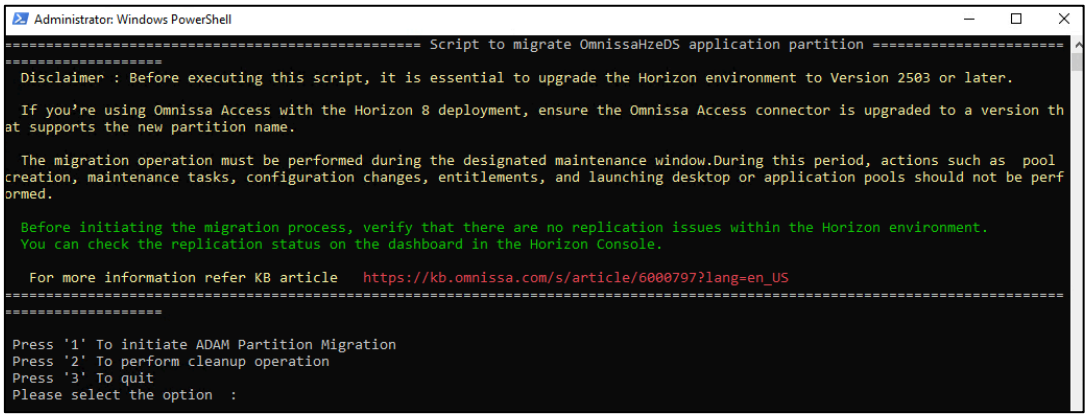
11.1.2 Update application partition names

A maintenance window is needed for the update of the application partition names. The PS-script “OmnissaHorizonPartitionMigration-v1” needs to be executed on one Connection Server per POD. This script updates the local, but as well the global AD LDS instance.

After execution, the Omnissa Horizon Connection Server service has to be stopped on all Connection Servers within a POD. Only once the service on all servers is in the stopped state can it be started again, to reflect the changes.

- Open Powershell as Administrator
- Set Execution Policy to “RemoteSigned”

- Execute the PS-Script “OmnissaHorizonPartitionMigration-v2” – depending from the size of the environment, the first execution can take between some minutes and hald an hour.

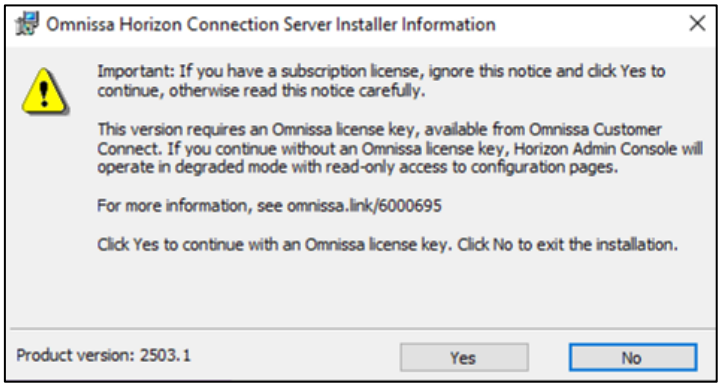


- After finishing the script, stop Omnissa Horizon Connection Server service on all Connection Servers in the affected POD.
- Only when Services are stopped, they can be started again.
- If you have additional PODs, repeat the procedure accordingly.

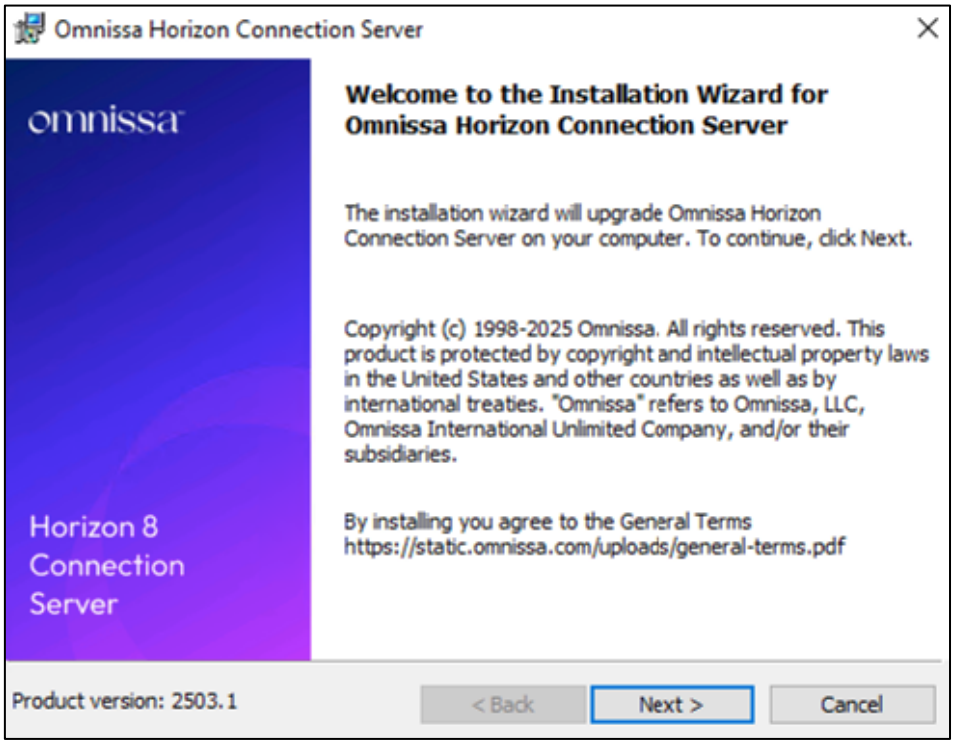
As from now on, the new partition name “DC=vdi,DC=horizon,DC=internal” for local AD LDS application partition, and “DC=vdiglobal,DC=horizon,DC=internal” for global AD LDS replication is active. The PS-Script also can be used to cleanup the old partition name. This should be considered after a waiting time the environment runs stable and without any issues.

11.1.3 Update to Horizon 2503.1

- Check the kind of license (subscription vs. term), before proceed



- Click Next and (finally) finish

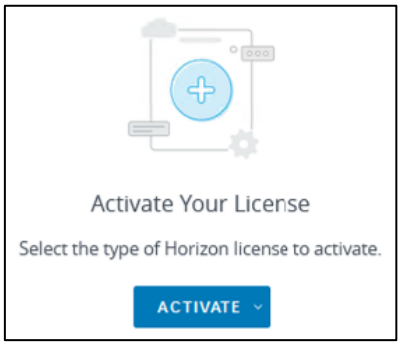


11.2 Update to Horizon 2412 (8.14)

- For Term licensing, ensure that you have a valid license key available for Horizon 2412. For subscription, there is no action needed.
- Before updating to 2412, make a copy of the locked.properties file – after the update this has to placed again.
    - See C:\Program Files\VMware\VMware View\Server\sslgateway\conf\locked.properties in the existing installation
    - Copy it to C:\Program Files\Omnissa\Horizon\Server\sslgateway\conf\locked.properties
- In Horizon 2412 is a known bug, that lets get the connection server into degraded mode after 60 days – see this KB for a workaround.

11.3 Update to Horizon 2406 (8.13)

- After updating the first connection server, you have to re-activate the license. So prepare to have the license key available after upgrade directly.



11.4 Update from Horizon 7 to Horizon 8

11.4.1 Given Environment

- Multiple Horizon 7.13.x Connection Servers on a supportet OS (for Horizon 7 and Horizon 8) within a Horizon POD

11.4.2 Preparation[4]

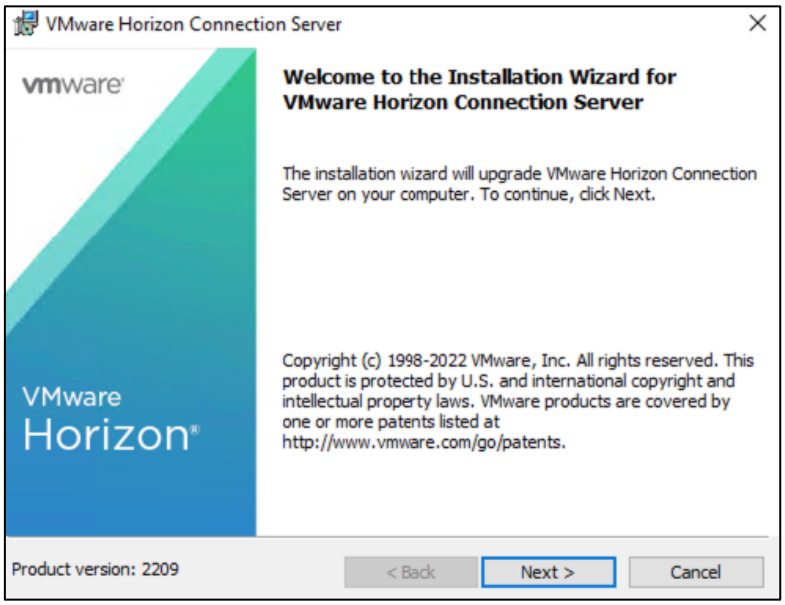
- Verify that none of the following features are still in use
  - Composer Linked Clones
  - Persistent Disks
  - Persona Management
- Update Horizon Client to Version 8.x
- Verify Health Status in Horizon Console Dashboard
- Check successful replication to other replica servers
  - `repadmin.exe /showrepl localhost:389 DC=vdi,DC=vmware,DC=int`
- Document global settings in Horizon Console
- Verify that Horizon 8 license is available
- Check for C:\Program Files\VMware\VMware View\Server\sslgateway\conf\locked.properties
- Disable provisioning for affected vCenter Server
- Create actual backup from one Connection Server for the View LDAP configuration per Horizon Console
  - Default folder: C:\ProgramData\VMware\VDM\backups
  - Verify that you have the data recovery password

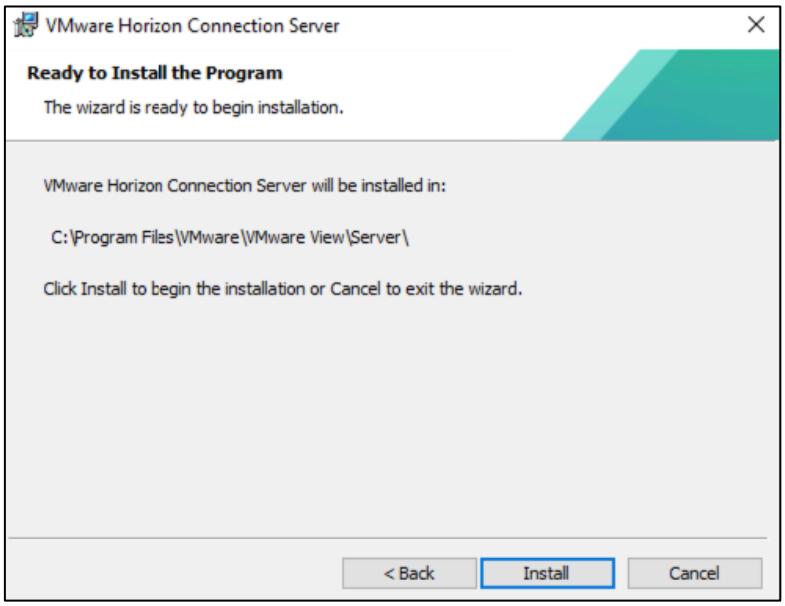
[4] Followed by VMware Horizon 8 Upgrade Overview

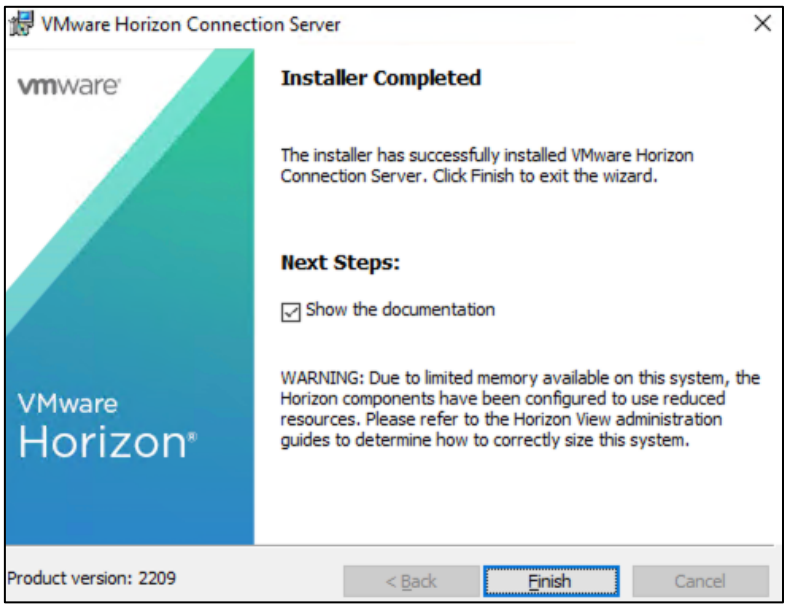
- (optional) create backup from one Connection Server per vdmexport.exe
  - `vdmexport.exe -f HorizonExport.LDF`
- Take an online snapshot from the one Connection Server which was used before for creating the LDAP backup

11.4.3 Upgrade to Horizon 8

- Disable the Connection Server which will be upgraded first (in Horizon Console)
- Run the installer for Horizon 8 setup (VMware-Horizon-Connection-Server-x86_64-8.7.0-20649599.exe)







- Verify that **VMware Horizon View Connection Server** Service is started after the upgrade
- Login to the Horizon Console from upgraded Connection Server and enter a valid Horizon 8 license key.
- Enable the upgraded Connection Server in Horizon Console.
- Verify that login to the upgraded Connection Server is successful

- Repeat the upgrade for each replicated Connection Server within the POD, and run the Horizon 8 installer
    - Verify that login to the upgraded Connection Server is successful after the upgrade
- Verify Health Status in Horizon Console Dashboard
- Verify that vCenter Server icon is green in Horizon Console
    - If not, check for an invalid certificate, and accept the thumbprint of the untrusted certificate
- Enable Provisioning for vCenter Servers

- Copy actual GPO-Templates (admx files) to folder C:\Windows\PolicyDefinitions on a domain controller, additional the adml files to folder C:\Windows\PolicyDefinitions\en-US.

11.4.4 Cleanup Tasks

- Take a backup of the newly upgraded Horizon LDAP database (per vdmexport, or per Horizon Console)
- Consolidate snapshots which are taken before the upgrade

11.4.5 Troubleshooting options

- Create a Replicated Group After Reverting Connection Server to a Snapshot
    - See URL
- Maybe you will see a warning message in the dashboard for the upgraded connection servers like “unrecognized request detected”
    - This is a known issue in Horizon 2209, as described in KB90398
    - Warning message can be ignored, and will disappear after a while (minutes)

12. Common Tasks and Day-2-Operations

12.1 Auto Upgrade of Horizon Agents

Following types of desktop agents can be updated automatically - since Horizon 2506 Horizon-, App Volumes- and DEM-agents can be updated with this method:

- An automated desktop pool using full clones
- A manual desktop pool
- Manual RDSH farms

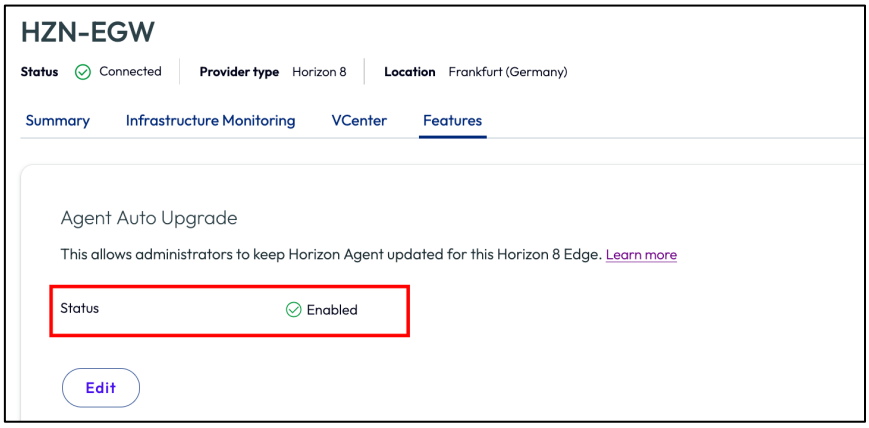
So instant clone desktops are NOT supported.

Generally, this feature is available for Horizon subscription (Edge Gateway needed), but also for Term licensing (“Edgeless”). See “Auto Upgrade of Horizon Agents and other Supported Agents”

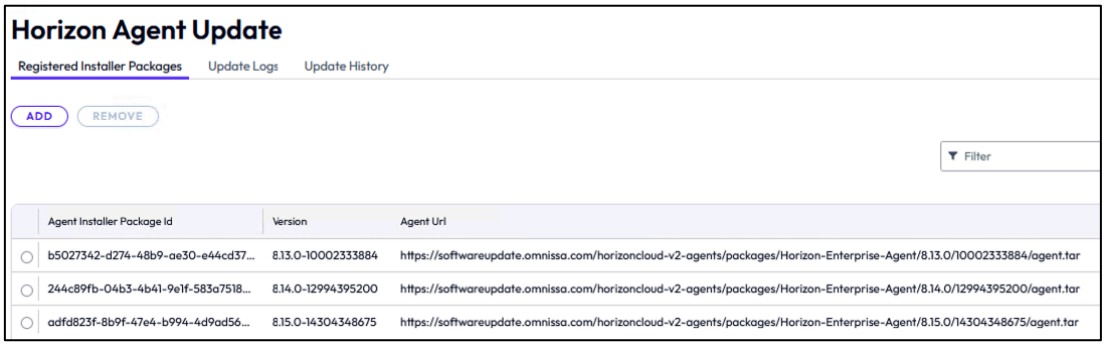
12.1.1 Preparation for Horizon Subscription

- Login to Horizon Cloud Console →Horizon Edges →Select the affected Edge and click on →Features

- Edit **Agent Auto Upgrade** and set Status to **Enabled**

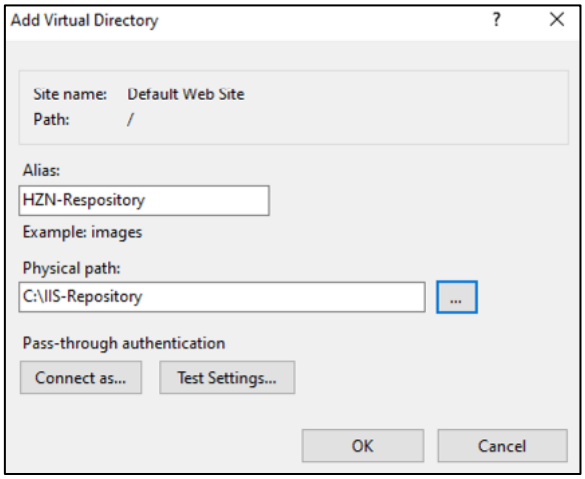


- In Horizon Console, after some moments, you should see the installer packages, which are added automatically



12.1.2 Preparation for Horizon Term licencing

- Create and install a web server, like MS Internet Information Services (IIS) (server role)
- Add a folder to the web server, and add needed installer files for agents (exe and json)
- Open Web Server Management, and configure a virtual directory (here MS IIS)



  - For MS IIS, enable Direct Browsing, further select “Require SSL” to allow https

- Edit the json file from the Agent installer, and insert the thumbprint from the Web Server certificate as “checksum” in the file (as otherwise the server certificate for metadata file URL is not trusted).
- In the Horizon Console, under →Horizon Agents, add the URL for the json file as following: `https://FQDN-WebServer/Virtual Directory/Omnissa-Horizon-Agent-x86_64-xxxx-8.xx-xxxxx.exe-metadata.json`
- The installer package(s) are listed now:

12.2 Horizon Group Policies

12.2.1 Common GPO Settings for Desktop and RDSH Server VMs

Configures common settings per GPO

- Computer Configuration > Policies > Administrative Templates > System > Group Policy
  - Configure user Group Policy loopback processing mode = Enabled (Mode: Replace) - **loopback replace ensures that only user settings for the VM’s OU are applied to the session**.
  - Configure Logon Script Delay = Disabled
- Computer Configuration > Policies > Administrative Templates > System > Logon
  - Show first sign-in animation = Disabled
  - Always wait for the network at computer startup and logon = Enabled
- User Configuration > Policies > Administrative Templates > Start Menu and Taskbar
  - Remove and prevent access to the Shut Down, Restart, Sleep and Hibernate commands = Enabled
  - Add Logoff to the Start Menu = Enabled

12.2.2 Cleanup-Tasks Horizon

- Delete orphaned cp-replica or cp-template entries
  - See Instant-Clone Maintenance Utilities, URL

- Located under C:\Program Files\Omnissa\Horizon\Server\tools\bin

12.2.3 RDSH Server OU-Level Settings

Configure RDS-specific values per GPO

- Computer Configuration > Policies > Administrative Templates > Windows Components > Remote Desktop Services > Remote Desktop Session Host > Licensing
  - Use the specified Remote Desktop license server = Enabled
  - Hide notifications about RD Licensing problems that affect the RD Session Host Server = Enabled
  - Set the Remote Desktop license mode = Enabled
- Computer Configuration > Policies > Administrative Templates > System > User Profiles
  - Delete cached copies of roaming profiles = Enabled

12.3 Preparation RDSH Systems

12.3.1 Prepare RDSH Golden Image for remote access

- Add Domain Users to the local group Remote Desktops Users on the RDSH golden image

12.4 Omnissa Horizon As Built Report

There are some scripts available to create a simple but comprehensive Report about an existing Horizon POD environment.

See Source and Documentation here:

https://github.com/AsBuiltReport/AsBuiltReport.VMware.Horizon/tree/dev

12.4.1 Requirements

Use Powershell:

- VMware PowerCLI 13.2
  `Install-Module -Name VMware.PowerCLI -RequiredVersion 13.2.0.22746353`[5]
  - VMware removed the "VMware.VimAutomation.HorizonView" in latest versions, so newer versions are not compatible.

[5] https://www.powershellgallery.com/packages/VMware.PowerCLI/13.2.0.22746353

- AsBuiltReport.VMware.Horizon Module
  `Install-module AsBuiltReport.VMware.Horizon`

12.4.2 Generating Report

Use Powershell:

- Generate a Horizon As Built Report for Horizon Connection Server ‘hzn-cs01.euclab.org’ using specified credentials. Export report to HTML & DOCX formats. Use default report style. Append timestamp to report filename. Save reports to 'C:\INSTALL'

  ```
  New-AsBuiltReport -Report VMware.Horizon -Target 'hzn-cs01.euclab.org' -Username 'administrator@euclab.org' -Password 'VMware1!' -Format Html,Word -OutputFolderPath 'C:\INSTALL' -Timestamp
  ```

Other examples can be found here.

12.5 Omnissa Horizon Accelerator – Horizon 8

The „Omnissa Horizon Accelerator – Horizon 8“ is a daily health check script. The script is a comprehensive PowerShell automation tool designed to perform daily health checks for VMware vCenter and Horizon environments. It generates detailed HTML reports covering infrastructure health, performance metrics, and operational status.

Prerequisites

- Installed VMware PowerCLI Module
  - See readme.md file from Accelerator tool
- (optional) installed Send-MailKitMessage Module (if you want to send the report automatically)
- Installed Horizon Powershell Module
  - See https://developer.omnissa.com/horizon-powercli/ for further instructions
  - See https://github.com/euc-oss/euc-samples/tree/main/Horizon-Samples/Omnissa.Horizon.Helper

The executable “Horizon8.exe” connects with vCenter and Horizon, and offers status for the following items:

- vCenter
  - Datastore utilization and connection status

    - host compute utilization
    - VMHost alerts, VM alerts, vCenter alerts
- Horizon
    - View Web client response
    - Health status connection server
    - Horizon Event DB status
    - Horizon license information
    - Horizon vCenter
    - Horizon UAG web client response
    - UAG certificate expiry

12.6 Replace vCenter Machine SSL certificate

Follow this approach "**vCert - Scripted vCenter expired certificate replacement**"

https://knowledge.broadcom.com/external/article/385107/vcert-scripted-vcenter-expired-certific.html

Connect to vCenter Server via WinSCP

Run WinSCP and define the new session with these instructions:

- File protocol: SFTP
- Host name: The vCenter or ESXi FQDN or IP address.
- Port number: 22
- User name: root
- Password: <the root account password>
    - Click Advanced
    - Select SFTP
    - In SFTP server, replace the default with this: shell /usr/libexec/sftp-server
      This option is better than changing the bash of vCenter as it will not bring risks on changing the vCenter Photon OS settings.
      With this option, WinSCP will not return the error:
      "Received too large (1433299822 B) SFTP packet. Max supported packet size is 1024000 B. The error is typically caused by message printed from startup script (like .profile). The message may start with "Unkn". Cannot initialize SFTP protocol. Is the host running an SFTP server?"

- Click Login.

Source: https://knowledge.broadcom.com/external/article/403632/how-to-upload-or-download-files-to-or-fr.html

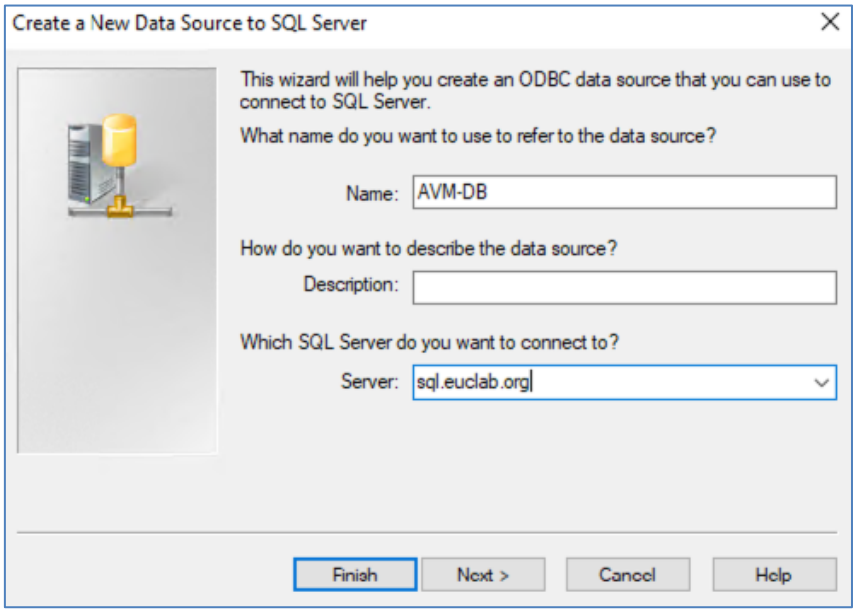
For Custom CA-signed certificate (via https://<CA-FQDN>/certsrv), use DER encoded format.

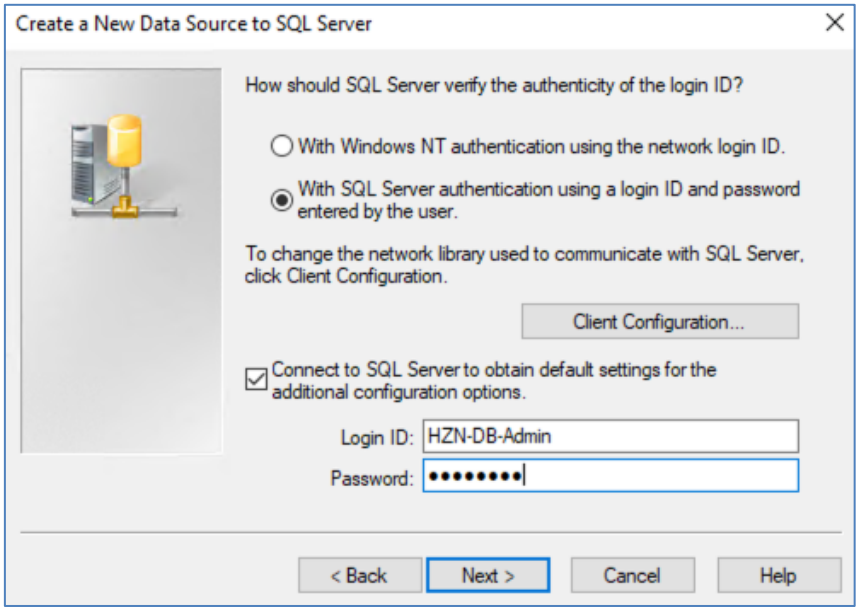
13. Setup und Update Omnissa AppVolumes

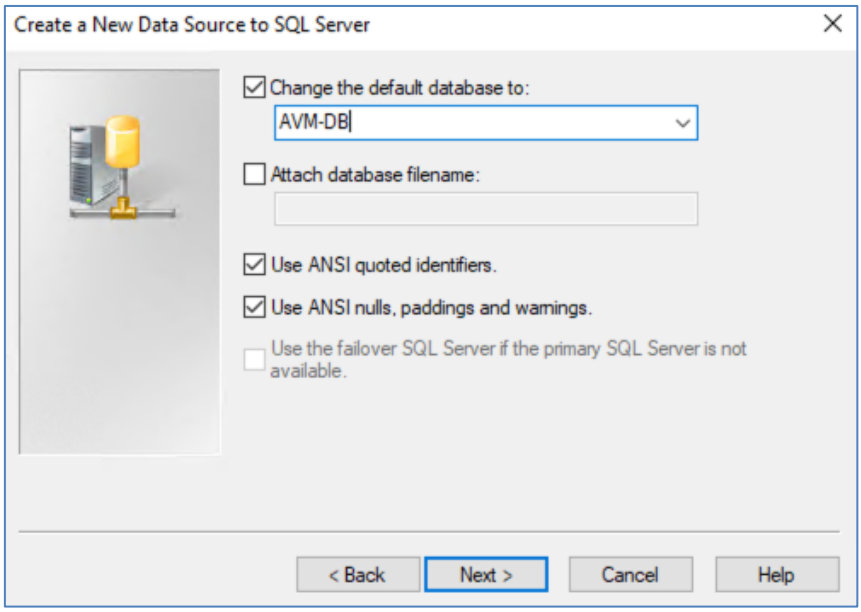
Version 2312.2

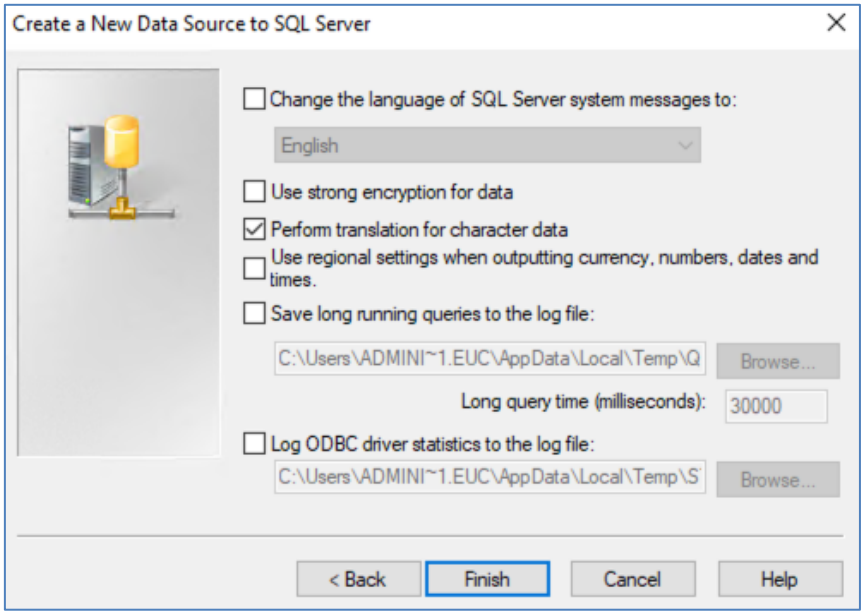
13.1 Requirements App Volumes

- For the first App Volumes Manager, create a SQL DB for App Volumes
- Create ODBC (64-bit) connection on the desired App Volumes Server




Create a New Data Source to SQL Server
How should SQL Server verify the authenticity of the login ID?
With Windows NT authentication using the network login ID.
With SQL Server authentication using a login ID and password entered by the user.
To change the network library used to communicate with SQL Server, click Client Configuration.
Client Configuration...
Connect to SQL Server to obtain default settings for the additional configuration options.
Login ID: HZN-DB-Admin
Password: ••••••••
< Back
Next >
Cancel
Help

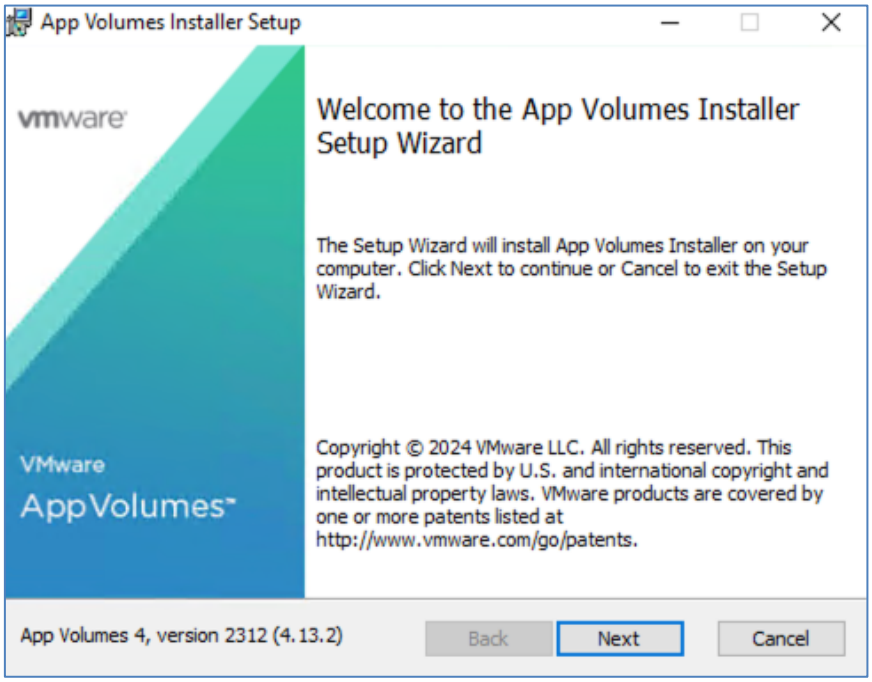

Create a New Data Source to SQL Server
Change the default database to:
AVM-DB
Attach database filename:
Use ANSI quoted identifiers.
Use ANSI nulls, paddings and warnings.
Use the failover SQL Server if the primary SQL Server is not available.
< Back
Next >
Cancel
Help



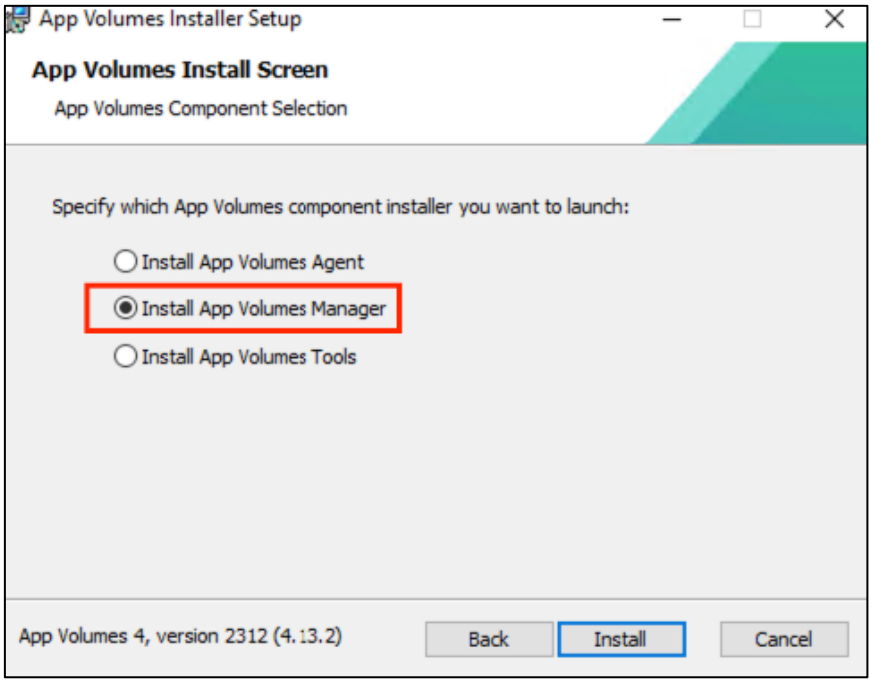
- Create a Service Account for communication between App Volumes and AD (consider to choose a dedicated account per App Volumes instance!), with sufficient permissions, as described here. In summary, these permissions are needed:
    - Has read access to the Active Directory domain
    - Administrator privileges are not required
    - Has a password that does not expire

13.2 Setup App Volumes

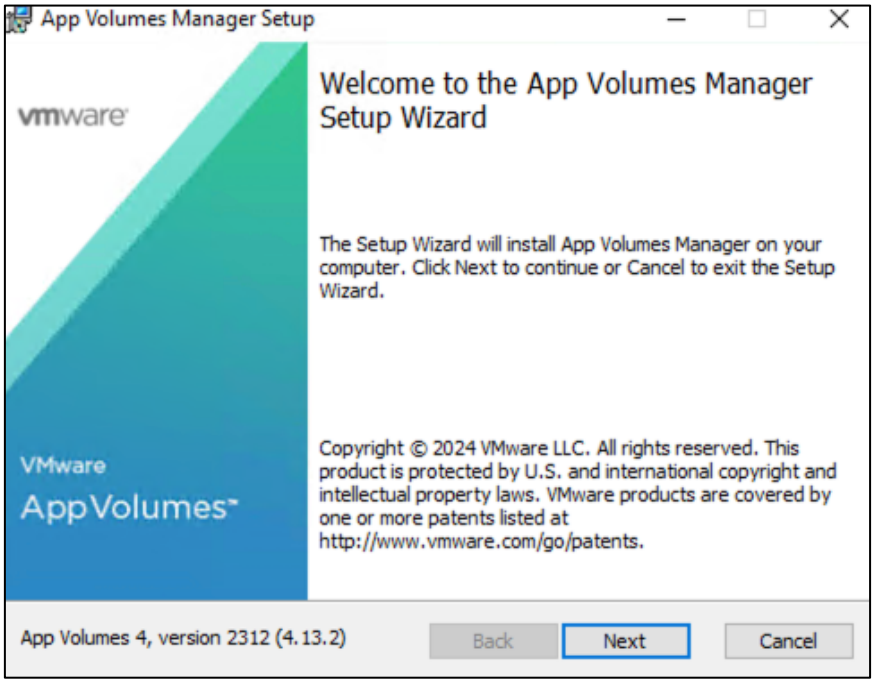
- Execute setup process, and click →Next:



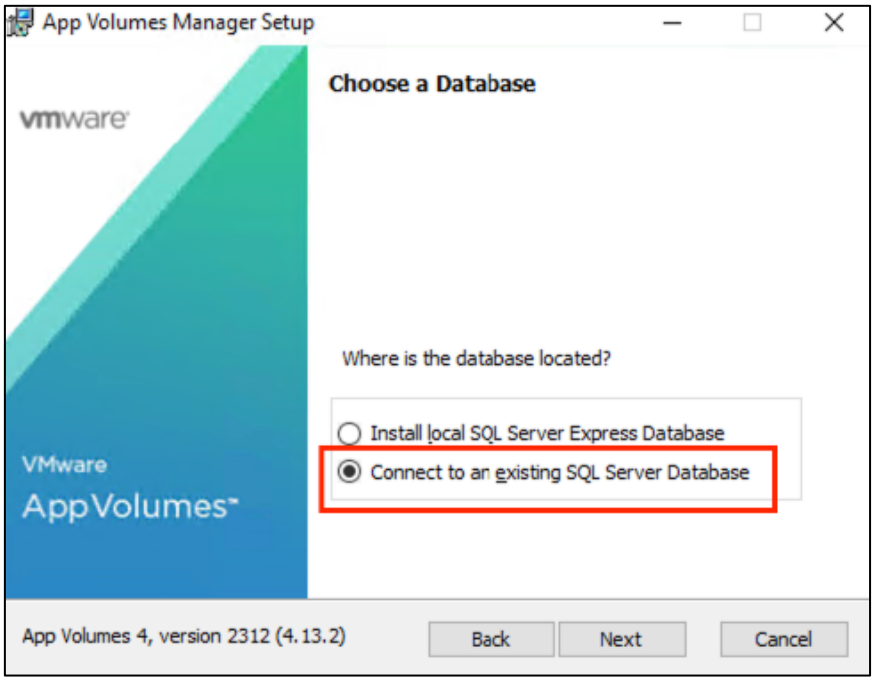
- Select App Volumes Manager, and click →Install:



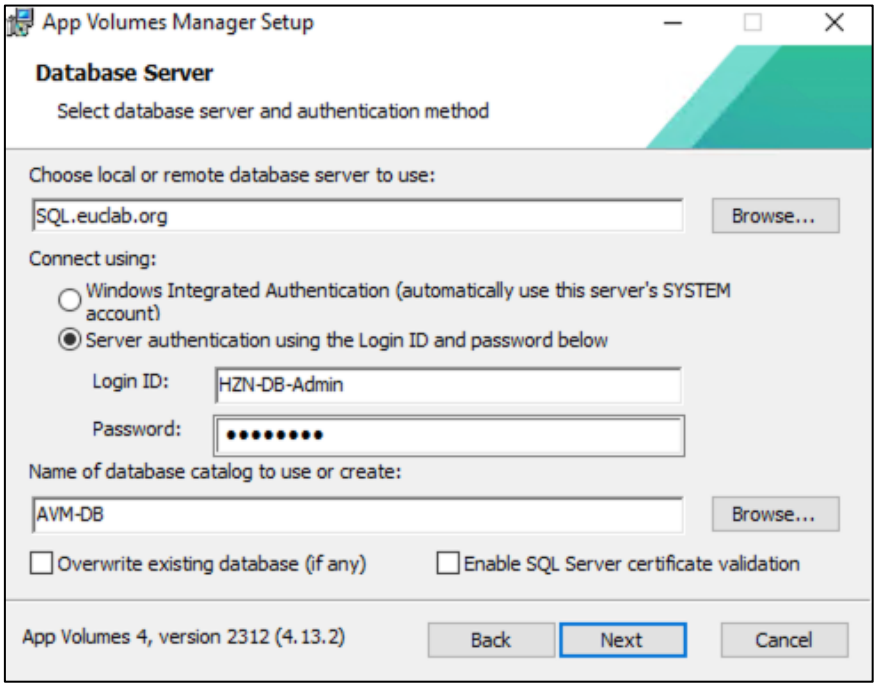
- After a few seconds, click →Next:



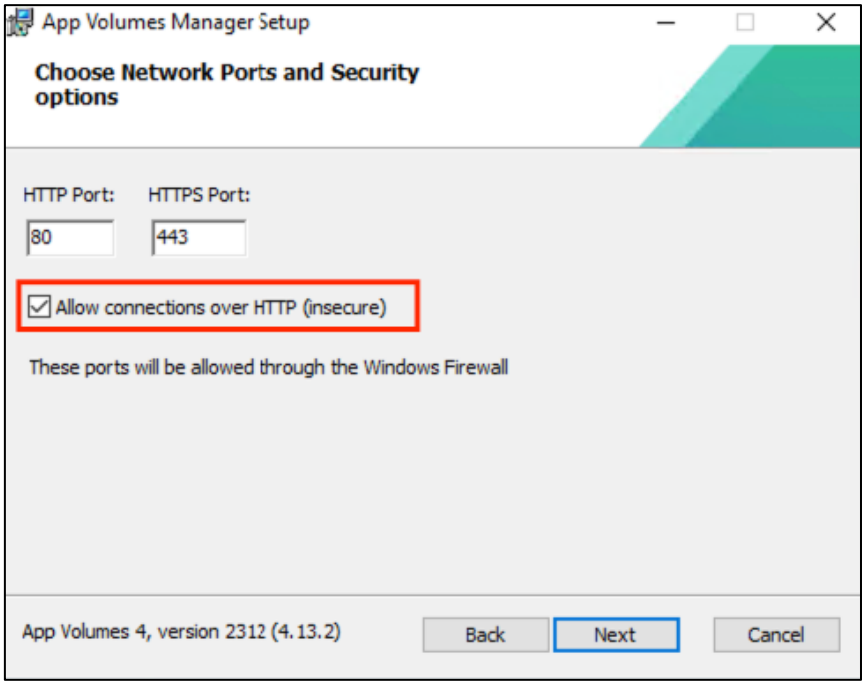
- Select to connect to an existing SQL Server Database:



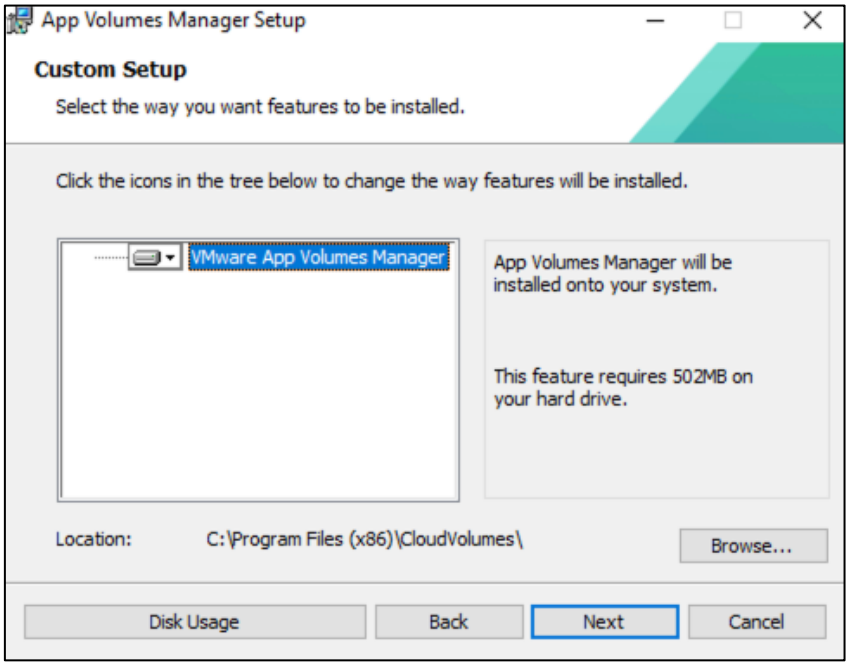
- Enter appropriate information, and deselect SQL Server certificate validation:



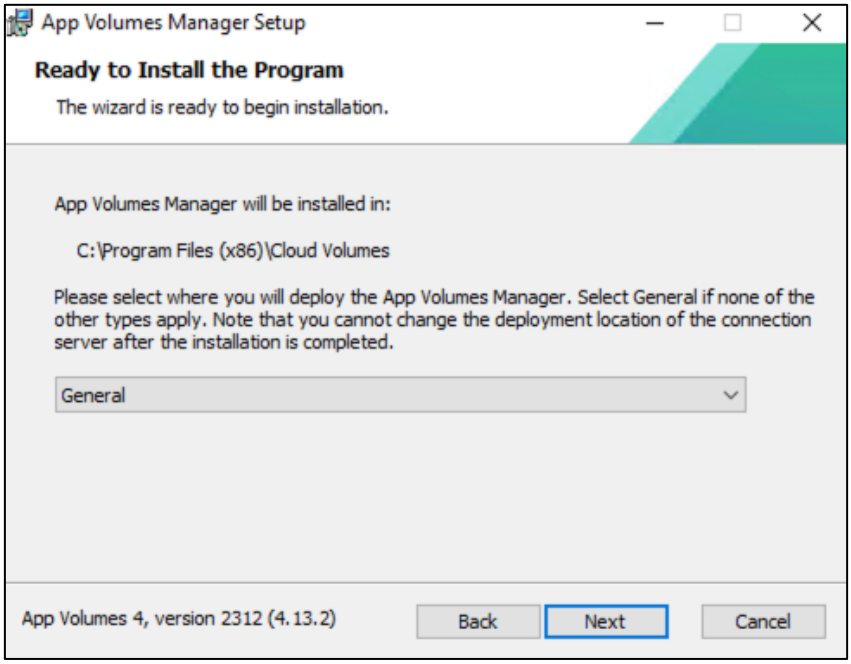
- Edit port options, if needed, and consider to allow connections over HTTP:



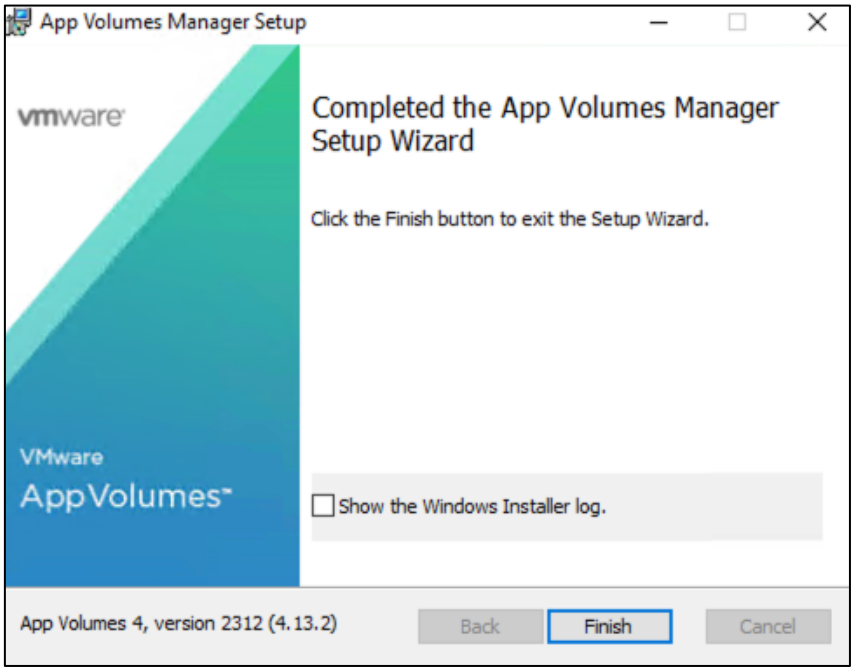
- Confirm the default setup path:



- For on-prem installation, choose “General” as setup type, and start installation:

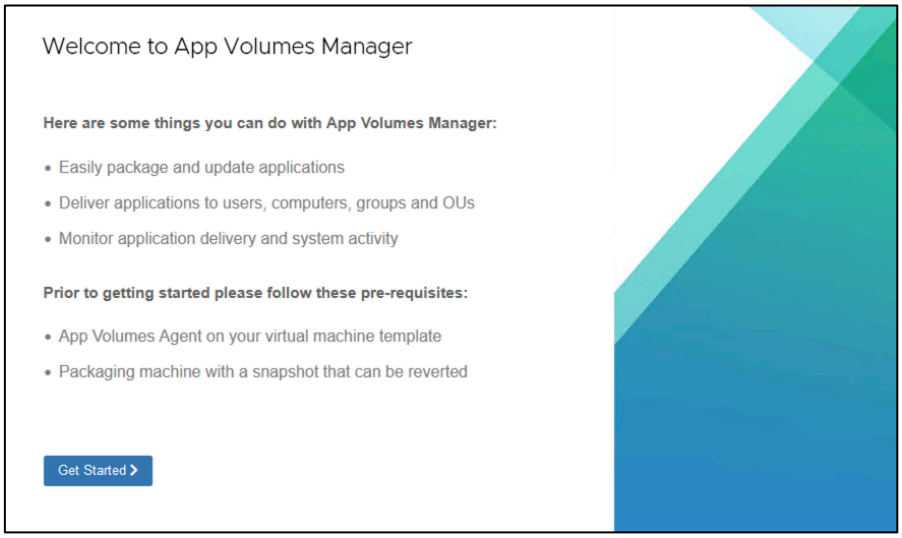


- Finished after some minutes

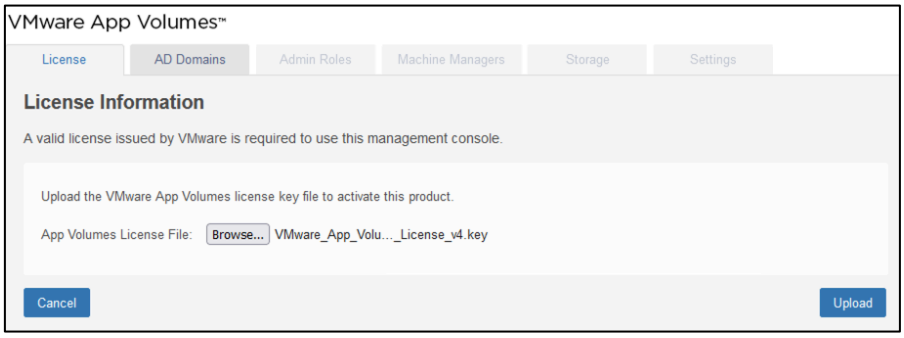


13.3 Initial configuration App Volumes Manager

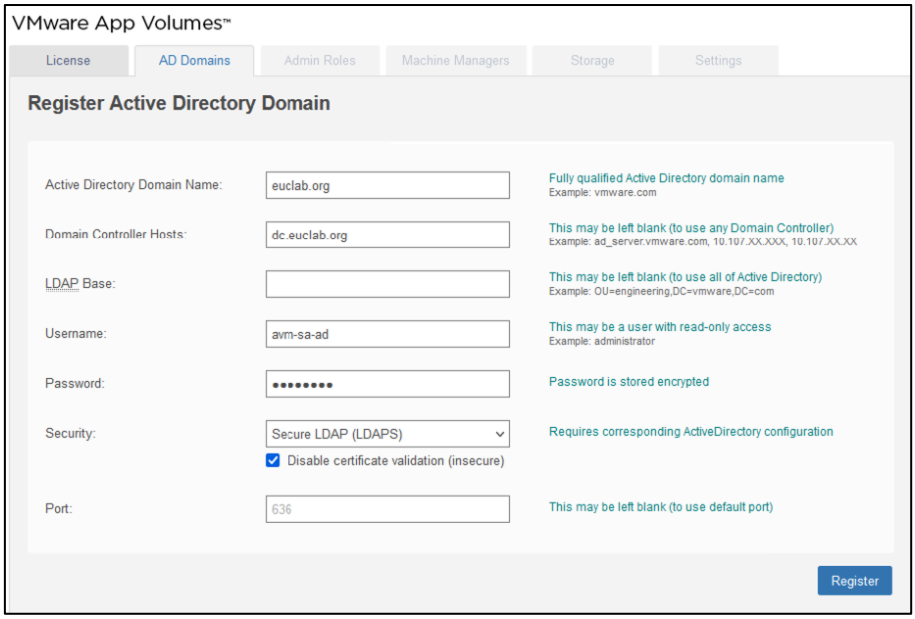
- Open App Volumes Mabager UI: https://FQDN – you will see the “Get Started” page. Click on →Get Started:



- Edit the license information, and upload the license file from the setup:

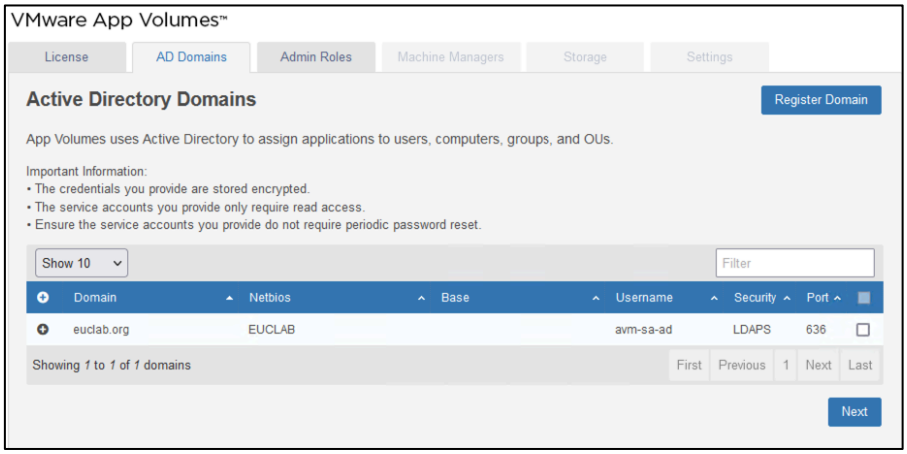


- Register AD Domain:

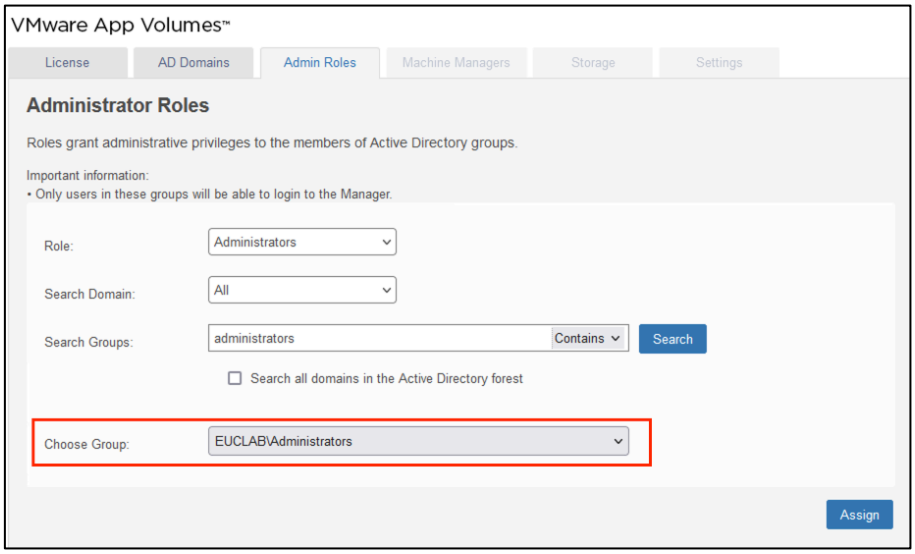


  - Consider to disable certificate validation – you can edit this later.

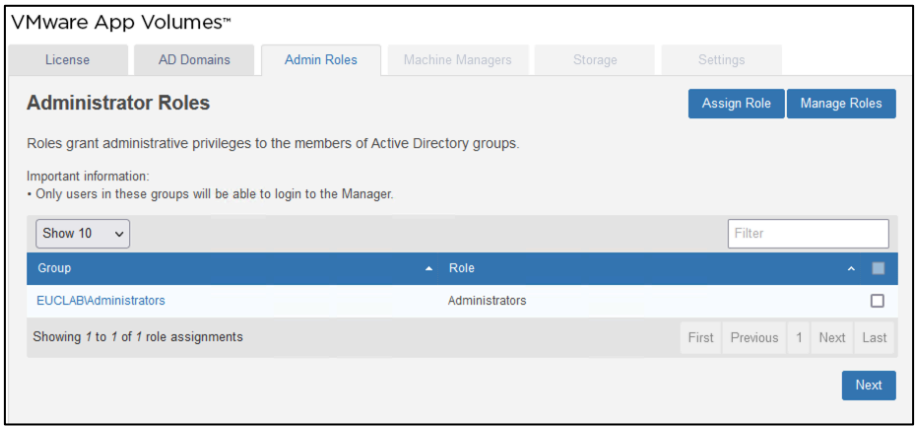
- Click →Next:



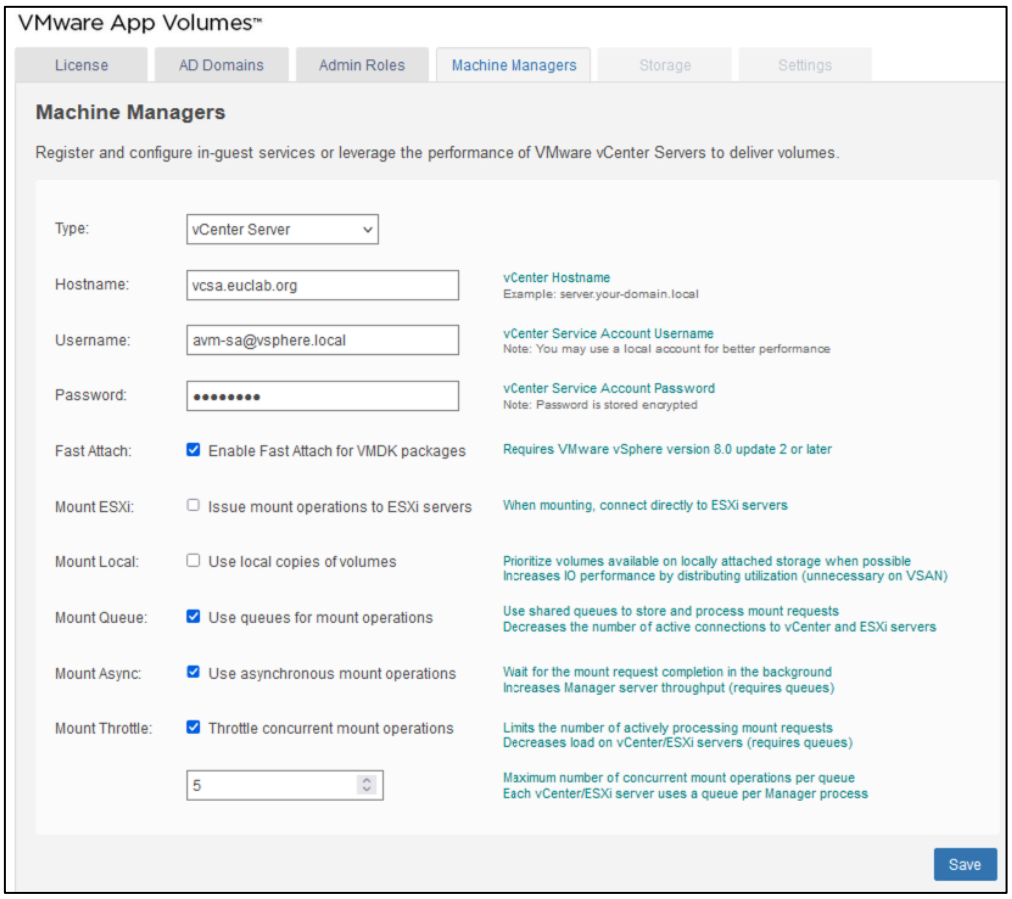
- Assign administrative role to the appropriate AD group:



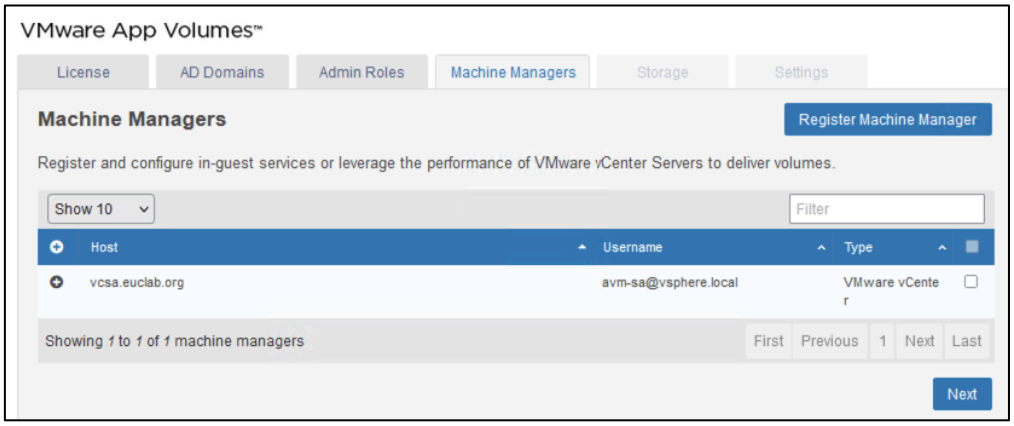
- You can manage and assign additional roles later. Click →Next:



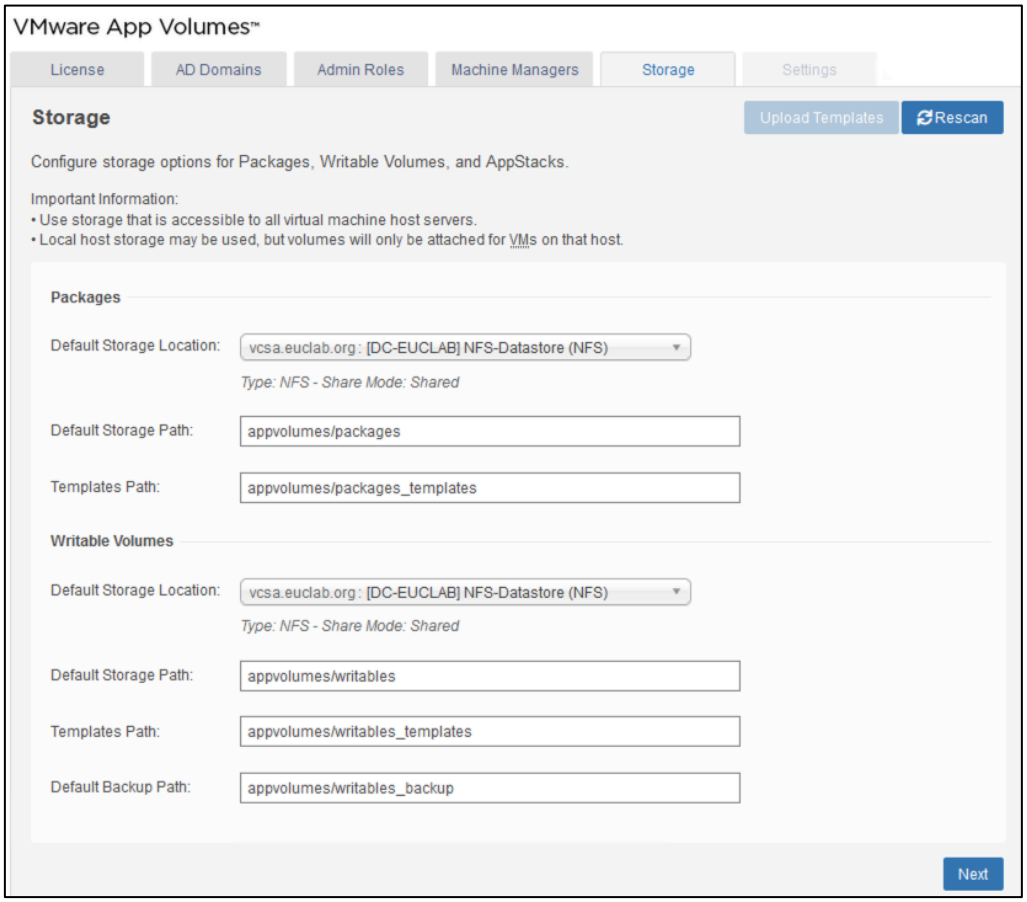
- Register the “Machine Manager” (vCenter Server). You should create a dedicated user and role in vSphere, as described here.


VMware App Volumes™
License
AD Domains
Admin Roles
Machine Managers
Storage
Settings
Machine Managers
Register and configure in-guest services or leverage the performance of VMware vCenter Servers to deliver volumes.
Type:
vCenter Server
Hostname:
vcsa.euclab.org
vCenter Hostname
Example: server.your-domain.local
Username:
avm-sa@vsphere.local
vCenter Service Account Username
Note: You may use a local account for better performance
Password:
vCenter Service Account Password
Note: Password is stored encrypted
Fast Attach:
Enable Fast Attach for VMDK packages
Requires VMware vSphere version 8.0 update 2 or later
Mount ESXi:
Issue mount operations to ESXi servers
When mounting, connect directly to ESXi servers
Mount Local:
Use local copies of volumes
Prioritize volumes available on locally attached storage when possible
Increases IO performance by distributing utilization (unnecessary on VSAN)
Mount Queue:
Use queues for mount operations
Use shared queues to store and process mount requests
Decreases the number of active connections to vCenter and ESXi servers
Mount Async:
Use asynchronous mount operations
Wait for the mount request completion in the background
Increases Manager server throughput (requires queues)
Mount Throttle:
Throttle concurrent mount operations
Limits the number of actively processing mount requests
Decreases load on vCenter/ESXi servers (requires queues)
5
Maximum number of concurrent mount operations per queue
Each vCenter/ESXi server uses a queue per Manager process
Save

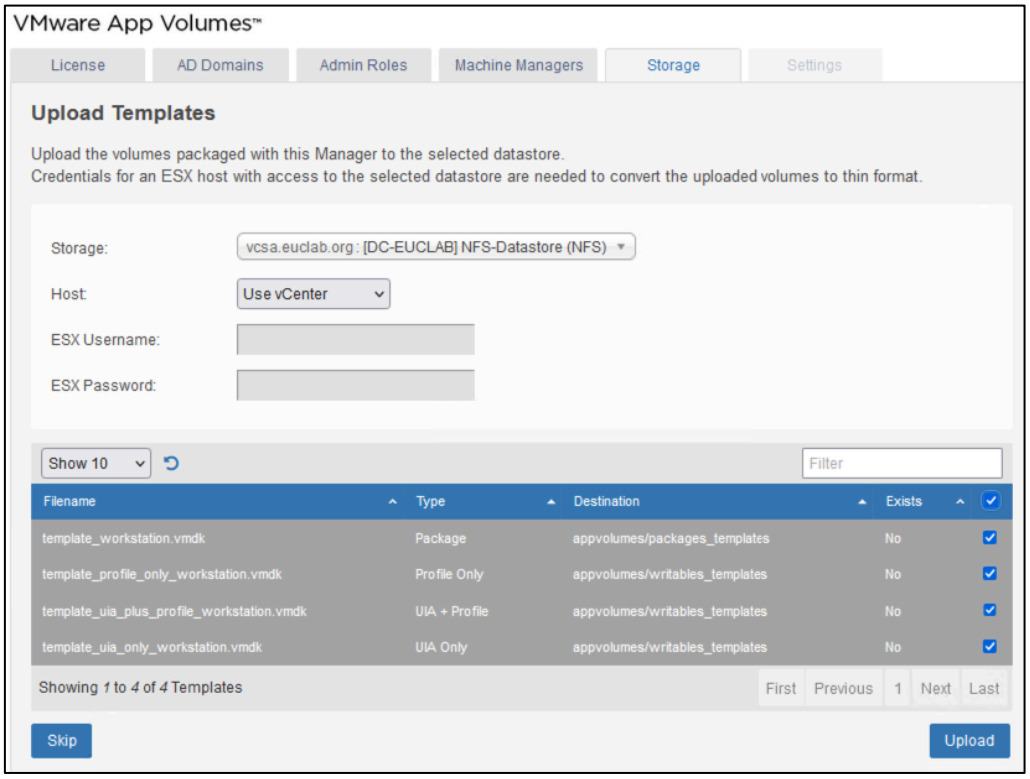
- Click Next:


VMware App Volumes™
License
AD Domains
Admin Roles
Machine Managers
Storage
Settings
Machine Managers
Register Machine Manager
Register and configure in-guest services or leverage the performance of VMware vCenter Servers to deliver volumes.
Show 10
Filter
Host
Username
Type
vcsa.euclab.org
avm-sa@vsphere.local
VMware vCenter
Showing 1 to 1 of 1 machine managers
First
Previous
1
Next
Last
Next

- Select an appropriate datastore for packages and writables:



- Upload the templates, and confirm the default settings to finish the wizzard:



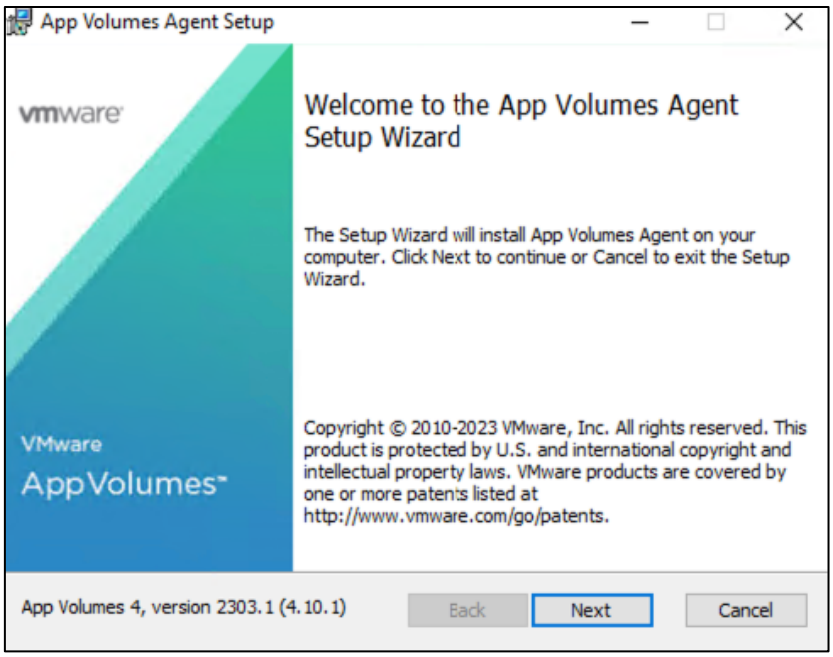
13.4 Preparation Provisioning VM

Try to keep the provisioning VM (more or less) identical as the golden master for Horizon pools (or RDSH farms), see References

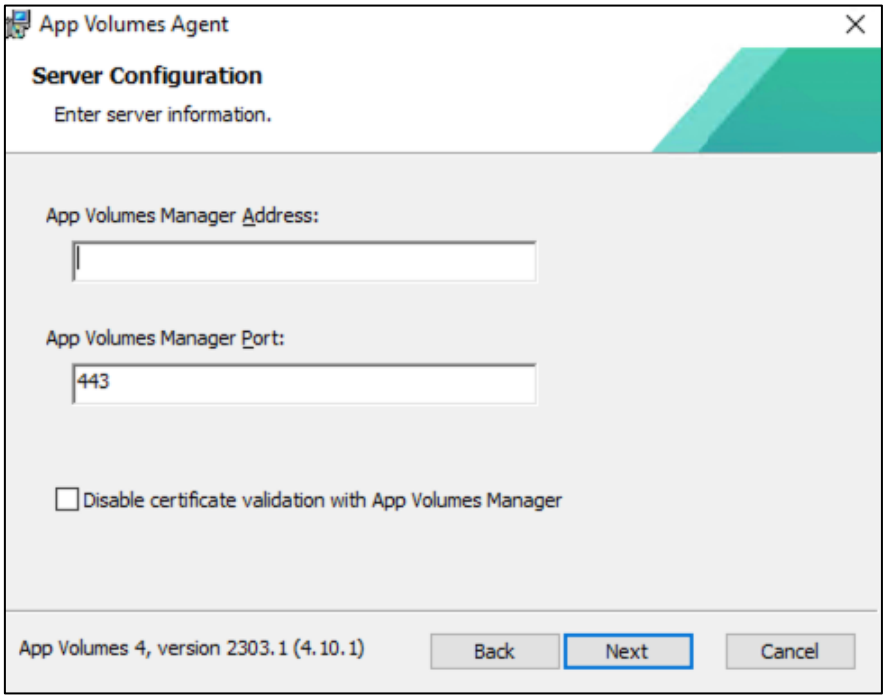
- Domain joined in the same AD as the target computers
- No Horizon Agent installed
- OS optimized

Setup App Volumes Agent

- Execute Installation file

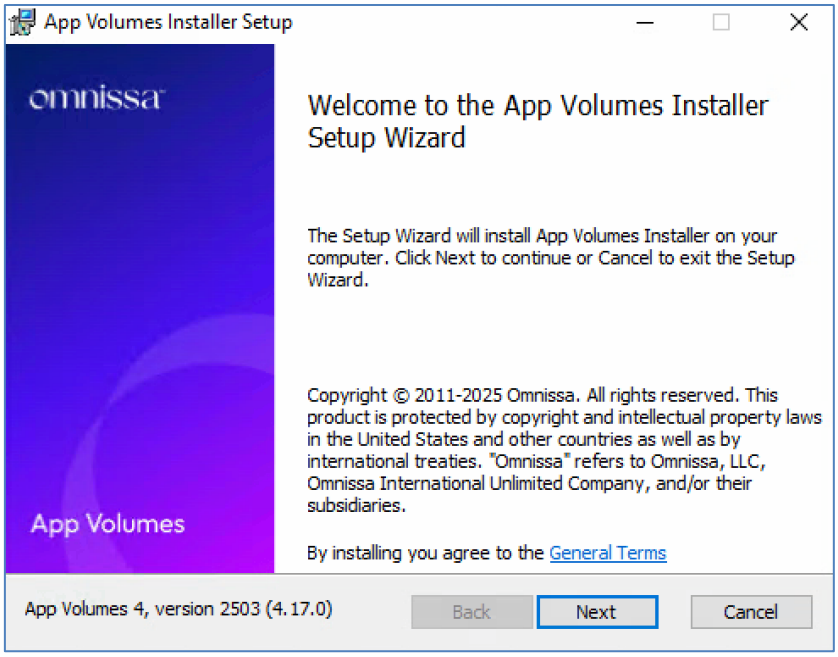


- Enter FQDN from App Volumes Manager (or from LB)

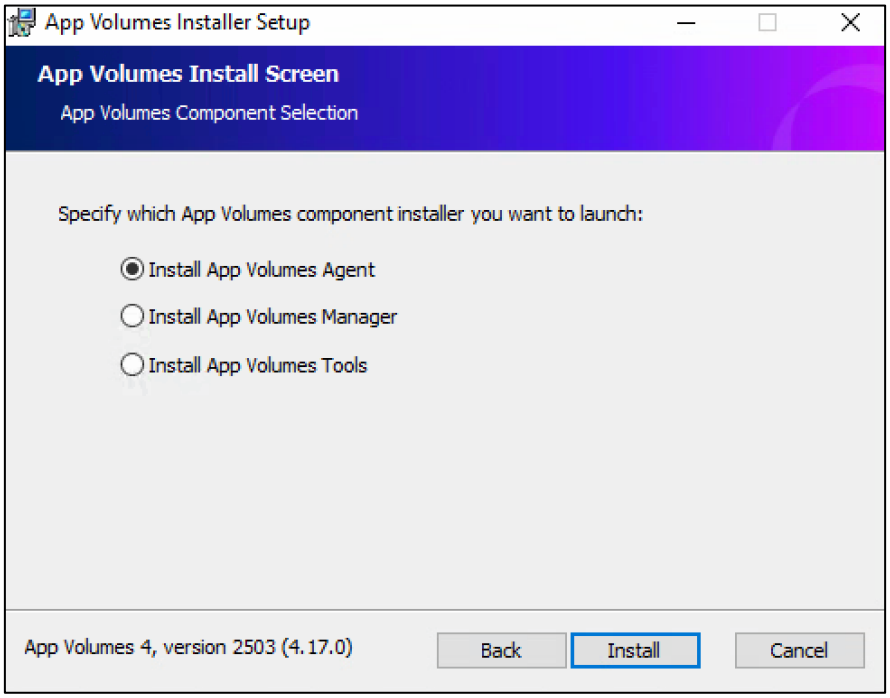


13.5 Setup App Volumes Agent

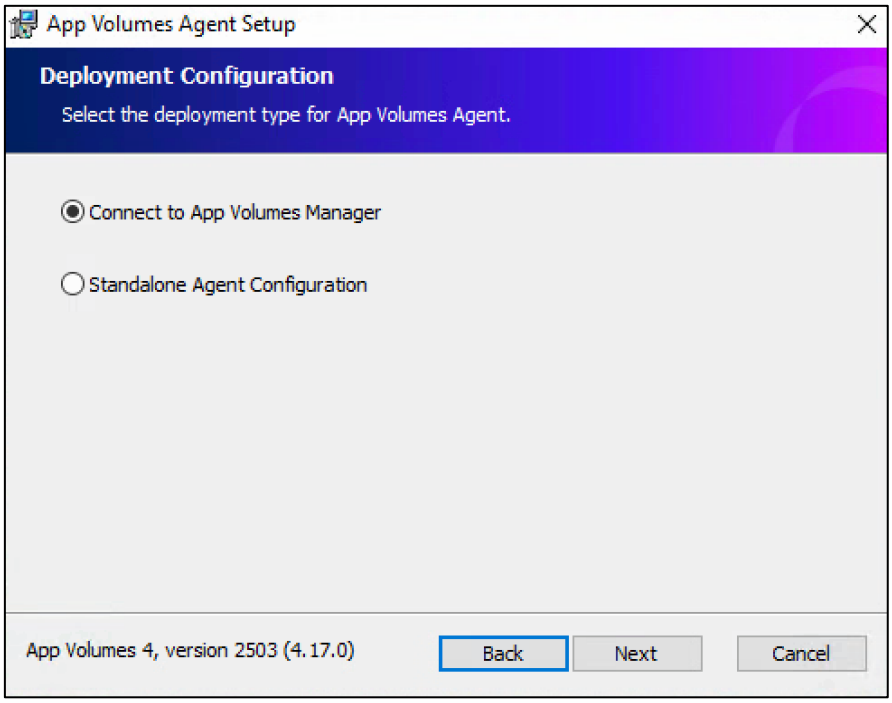
- Execute installation file



- Select App Volumes Agent

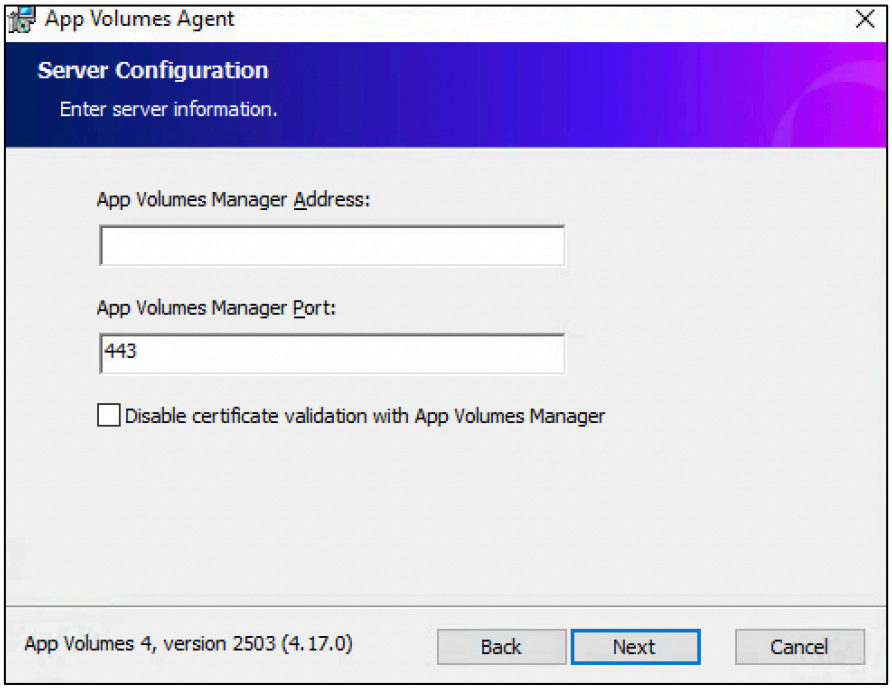


- Connect to App Volumes Manager

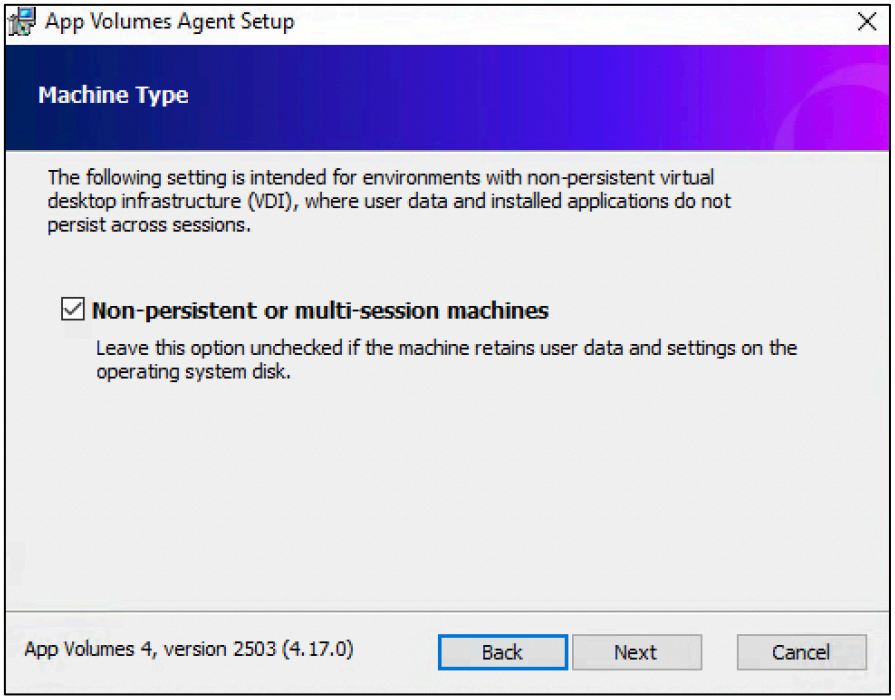


  - Standalone Configuration is needed, if you intend to setup the Agent on a Windows endpoint directly (not virtual).

- Enter FQDN from App Volumes Manager (or from LB)



- Select the type of machine for app delivery (default non-persistent enabled)



- Reboot VM.

13.6 Update VMware AppVolumes (2.x)

- Das Update ist mit Downtime von AppVolumes verbunden!

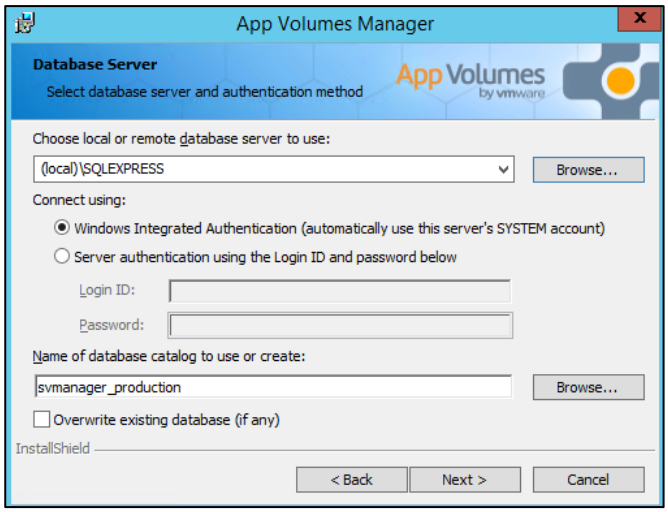
- Unassign aller Volumes (Detach aller Volumes)
- Backup der SQL-DB des AppVolumes-Managers.
  I.d.R. ist auf dem Windows-System eine MS SQL-Express-Instanz installiert. Ggf. das SQL Server Management Studio installieren, um die DB („svmanager_production“) mit Bordmitteln zu sichern.
- Snapshot der VM des App Volumes Managers

- Ein direktes Update ist ab der Version 2.12 möglich über die Installationsroutine

  - Existiert eine ältere Version, muss diese erst deinstalliert(!) werden über die Systemsteuerung
  - Darauf achten NICHT die SQL Express Instanz zu deinstallieren

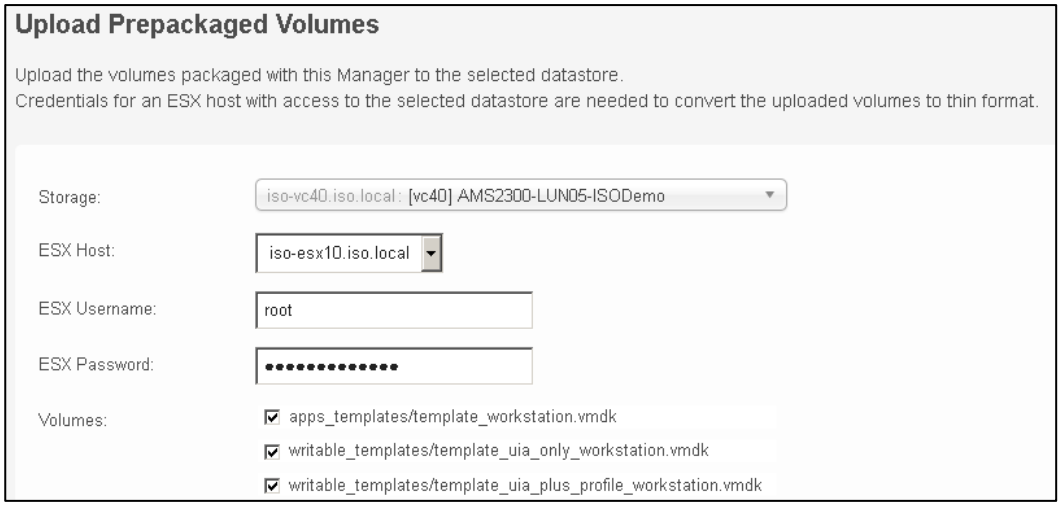
- Aufruf der Installationsroutine des neuen App Volumes Manager

- Auswahl der vorhandenen MS SQL Express Datenbank



- Nach erfolgter Installation über das Web-Portal einloggen: *https://fqdn-app-volumes-manager/login*
  - Wechseln zu →Configuration →Machine Managers
    - Für jeden hier hinterlegten Host in die →Details gehen und das Zertifikat akzeptieren

- Upgrade der App Volumes Templates
  - Im App Volumes Manager wechseln zu →Configuration →Storage
  - Klick auf →Upload Prepackaged Volumes

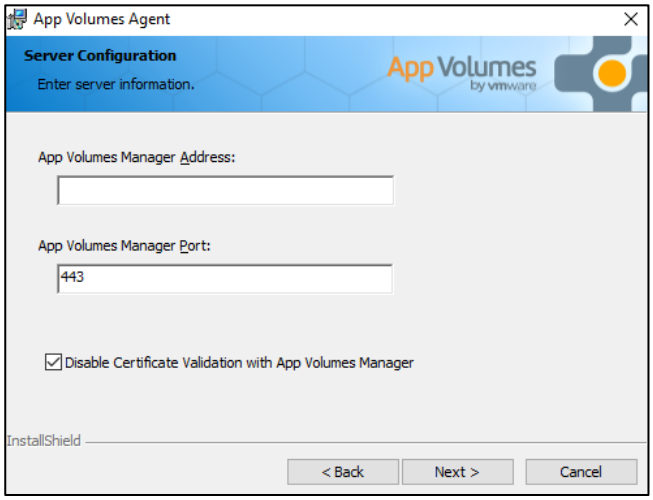


  - Mit Klick auf →Upload bestätigen.

- Ab hier kann der Betrieb ggf. wieder aufgenommen werden (heisst die unter der Vorgänger-Version erstellten AppStacks können weiterhin genutzt werden).
  Dazu müssen die Volumes wieder „aasigned“ werden.
  Empfohlen wird jedoch nun das Update des App Volumes Agent.

- Update App Volumes Agent
  - Auf den sog. „Target VMs“ (Parent VMs, Master VMs) muss der alte App Volumes Agent deinstalliert, anschließend der aktuelle installiert werden. Dabei bitte den

Haken setzen bei „Disable Certificate Validation with App Volumes Manager“:



- Falls die Target VM nach der Installation des aktuellen Agenten eine Fehlermeldung produziert („Unable to contact App Volumes Manager. Virtualization is disabled“) kann das an einem falschen Port liegen, über welchen der Agent versucht den Manager zu erreichen. Default ist Port 443. Ebenso kann es aber auch sein, dass Manager und Agent nicht identisch konfiguriert sind bzgl. der SSL-Kommunikation. Siehe auch VMware KB-Artikel 2148178.
  - Falls beim **Manager** während der Installation ausschließlich HTTPS konfiguriert wurde, kann HTTP auch nachträglich konfiguriert werden: https://docs.vmware.com/en/VMware-App-Volumes/2.12/com.vmware.appvolumes.user.doc/GUID-3CE54D86-5EFF-40CD-B0CC-47066CE2E768.html
    - Eine funktionierende nginx.conf (HTTP und HTTPS)

      nginx.conf
  - Ebenso kann beim **Agenten** der Port sowie die SSL-Validierung nachträglich geändert werden per Registry: https://docs.vmware.com/en/VMware-App-Volumes/2.12/com.vmware.appvolumes.user.doc/GUID-794F658B-9332-4340-92CB-BEFA760DDA01.html

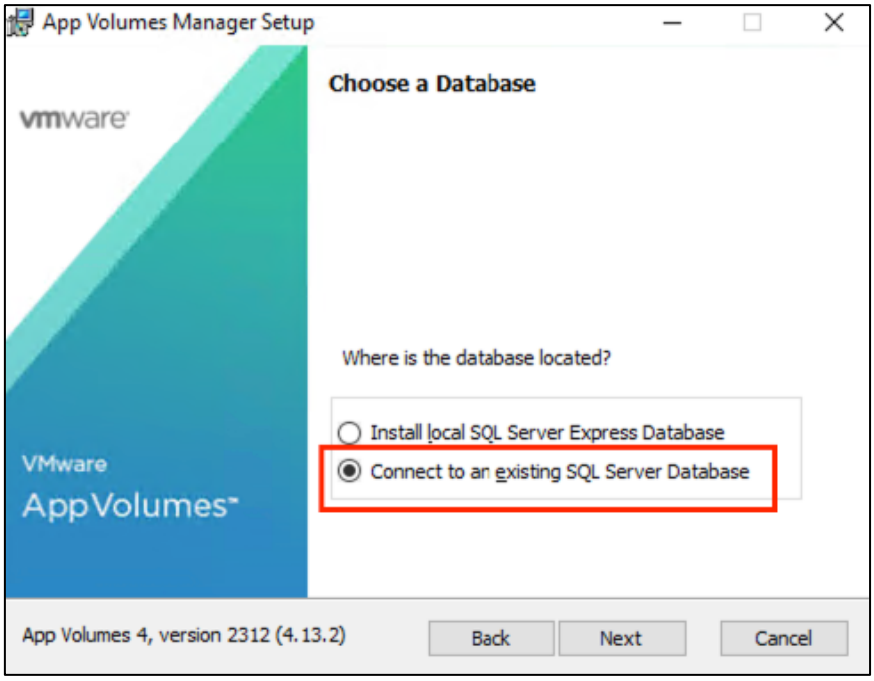
- Nacharbeiten
  - Neu-Erstellen (Recompose) der Desktop-Pools
  - Re-Assign der Volumes
  - Konsolidieren des Snapshots des App Volumes Managers

13.7 Post-Tasks AppVolumes

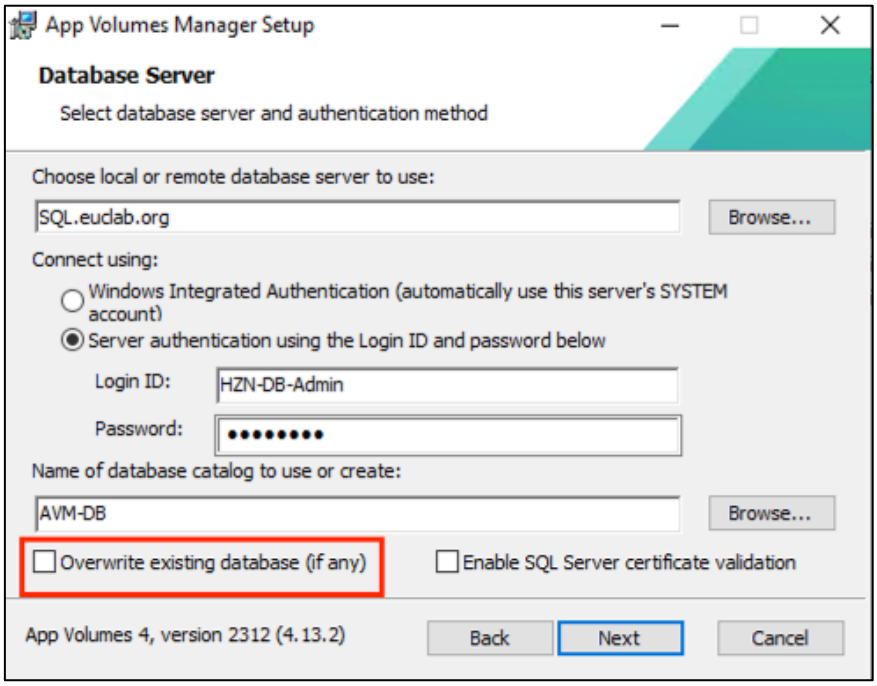
13.7.1 Add additional App Volumes Manager

You can add additional App Volumes Manager to the same instance for HA and workload distribution purpose.

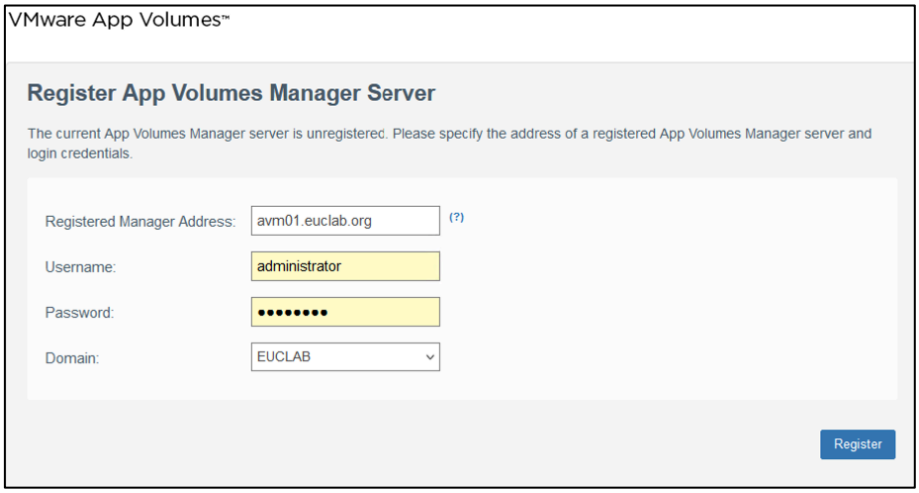
- Follow the instructions similar to installing the first App Volumes Manager, as described here.
- Similar, select to connect to an existing SQL Server Database:



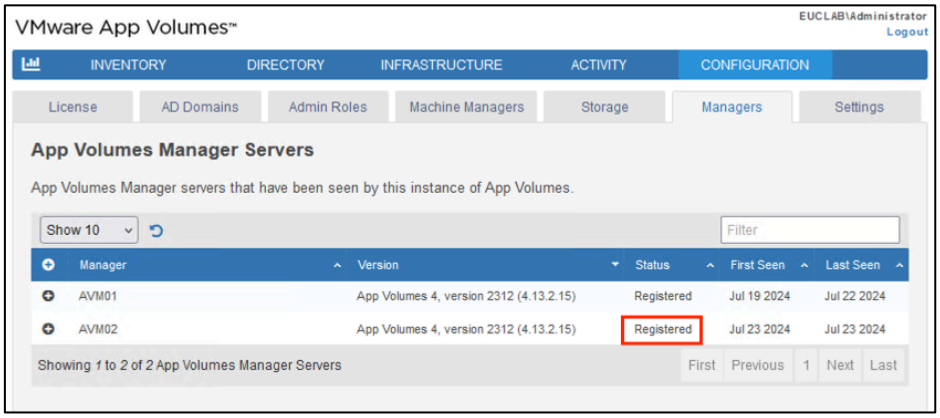
- Ensure that “Overwrite existing database” is NOT selected:



- Keep the rest as described already, and finish installation.
- Accessing the UI from the newly installed App Volumes Manager, is has to be registered with one of the existing Manager:



- Finally, this can be verified under →Configuration →Managers (at one of the managers):

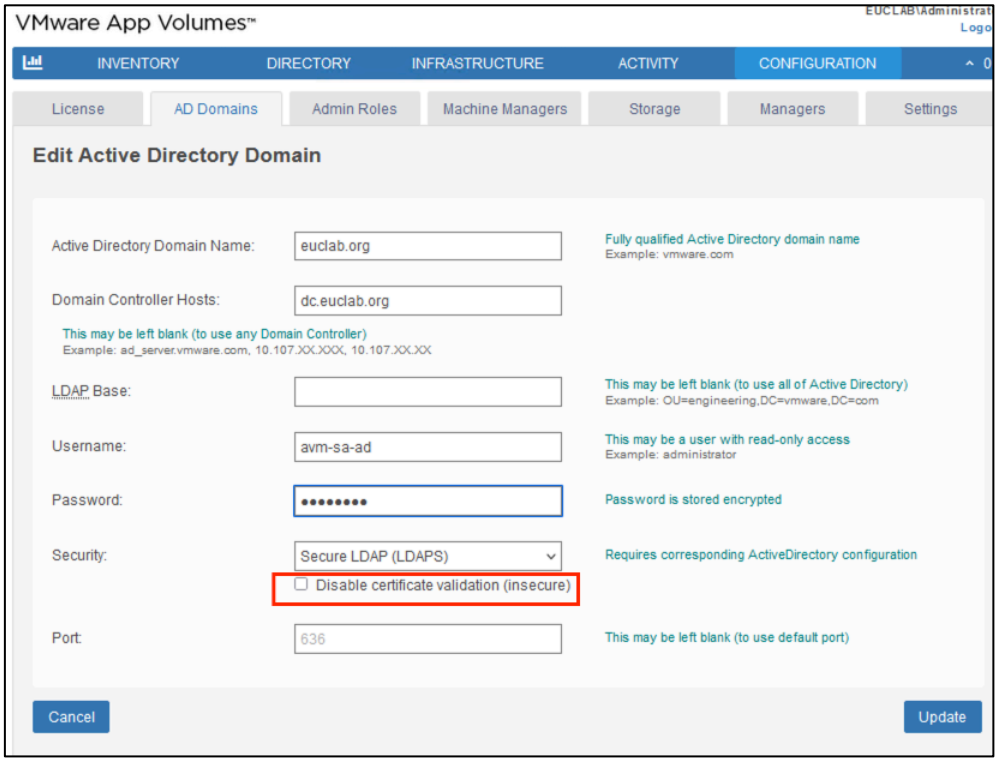


13.7.2 Configure SSL certificate validation for AD

For a secure communication between App Volumes and AD over LDAPS, you can enable certificate validation. You need the appropriate root certificate from your CA per App Volumes Manager, as described here (Configure CA Certificates in App Volumes Manager).

- On system, which holds the CA, execute this command to export the root certificate:
  `certutil -ca.cert adCA.cer`
  - This shows the root certificate, and exports it as cer file (the name caAD.cer is mandatory)
  - If needed, you can convert cer file to pem file with openssl:
    `openssl x509 -inform der -in adCA.cer -out adCA.pem`
- In App Volumes Manager, domain controller host names that are specified in the domain controller hosts field must match the certificate host names
- Copy the adCA.pem file to every App Volumes Manager into this directoy:
  C:\Program Files (x86)\Cloud Volumes\Manager\config

- Restart the App Volumes Manager service (for every affected AVM)
- In AVM console, edit the AD domain configuration, and enable certificate validation



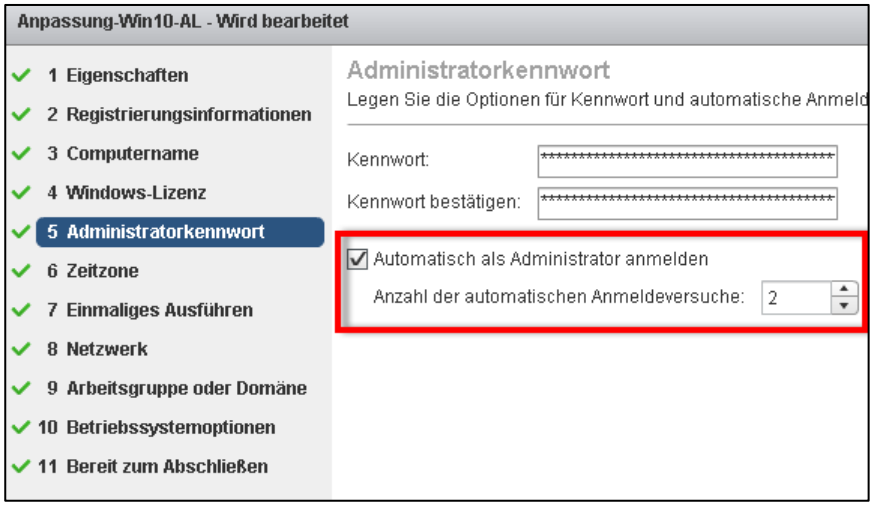
13.7.3 Anpassungen bei Horizon automatischen Pools

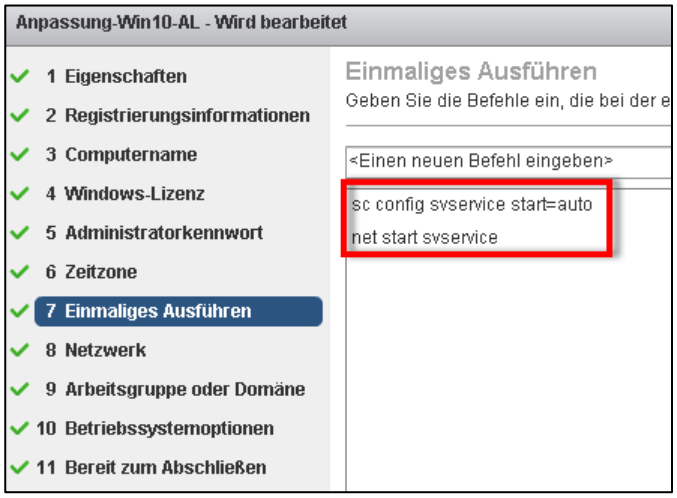
- In Zusammenhang mit automatisch provisionierten Desktops in Horizon View kann es ggf. zu „unliebsamen Überschneidungen“ kommen, wenn der App Volumes Agent bereits mit dem App Volumes Manager kommuniziert, obwohl die Anpassung eines neu provisionierten Desktops noch nicht abgeschlossen ist. Dieses Verhalten tritt vor allem auf, wenn in den Assignments der AppStacks Computerkonnten anstelle Benutzerkonten hinterlegt sind!

  Als Workaround empfiehlt sich, den App Volumes Agent Dienst in der Parent VM (alternativ Template) auf manuell zu stellen. In der Anpassung muss dann jeweils ein Skript ausgeführt werden, damit der App Volumes Agent nach erfolgter Anpassung des Desktops wieder auf automatisch gestartet werden kann.

  - Bei Quickprep:

- Bei Sysprep:



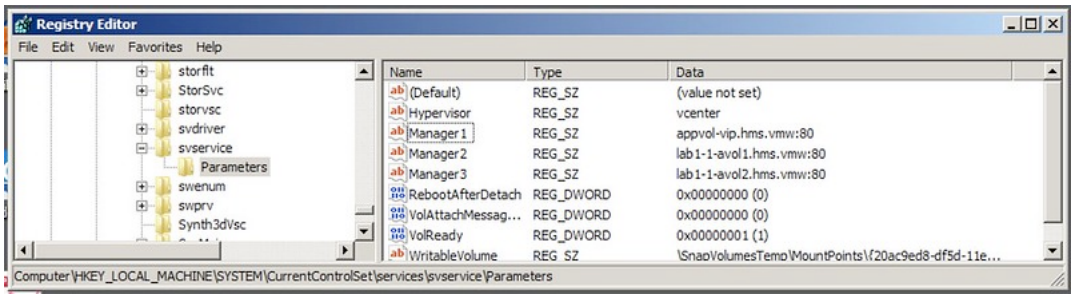


Nach erfolgter Fertigstellung muss der Desktop einmal durchgestartet werden (da der lokale Administrator angemeldet ist).

13.7.4 Dem App Volumes Agent weitere App Volumes Manager hinzufügen

Der App Volumes Agent kann mehr als nur einen App Volumes Manager abfragen, falls der bei der Installation angegebene nicht erreichbar ist. Dies geschieht per Registry-Eintrag:

HKLM\System\CurrentControlSet\services\svservice\parameters



13.7.5 Replace self-signed certificate

- For the App Volumes Manager, create a valid certificate, signed by your CA. Ensure that the private key is exportable. If the Agent uses a load balancer instead of the App Volume Manager, use the LB FQDN for the CN (common name), and all valid FQDNs as DNS.
- Extract the pfx file via openssl into a crt-file and the key-file
    - Extract the private key
      `openssl pkcs12 -in avm01-cert.pfx -nocerts -out avm01-cert-key.key`
        - You will be prompted for the import password, as well as for the passphrase passwort to create.
    - Extract the certificate
      `openssl pkcs12 -in avm01-cert.pfx -clcerts -out avm01-cert.crt`
        - You will be asked for the import password, as well as for the passphrase
    - Decrypt the private key
      `openssl rsa -in avm01-cert-key.key -out avm01-cert-decrypt.key`
- On the App Volumes Manager OS, copy the decrypted key file and the crt file into the folder “C:\Program Files (x86)\CloudVolumes\Manager\nginx\conf”
- Modify the nginx.conf in the same folder and edit the ssl_certificate as well as the ssl_certificate_key variables, reflecting the file names for your crt and key file

```
server {
    server_name  0.0.0.0;
    listen       3443 ssl;
    listen       [::]:3443 ssl;
    listen       443 ssl;
    listen       [::]:443 ssl;

    ssl_certificate      avm01-cert.crt;
    ssl_certificate_key  avm01-cert-decrypt.key;
    ssl_session_cache    builtin:1000;
    ssl_session_timeout  5m;
```

- Restart the App Volumes Manager service

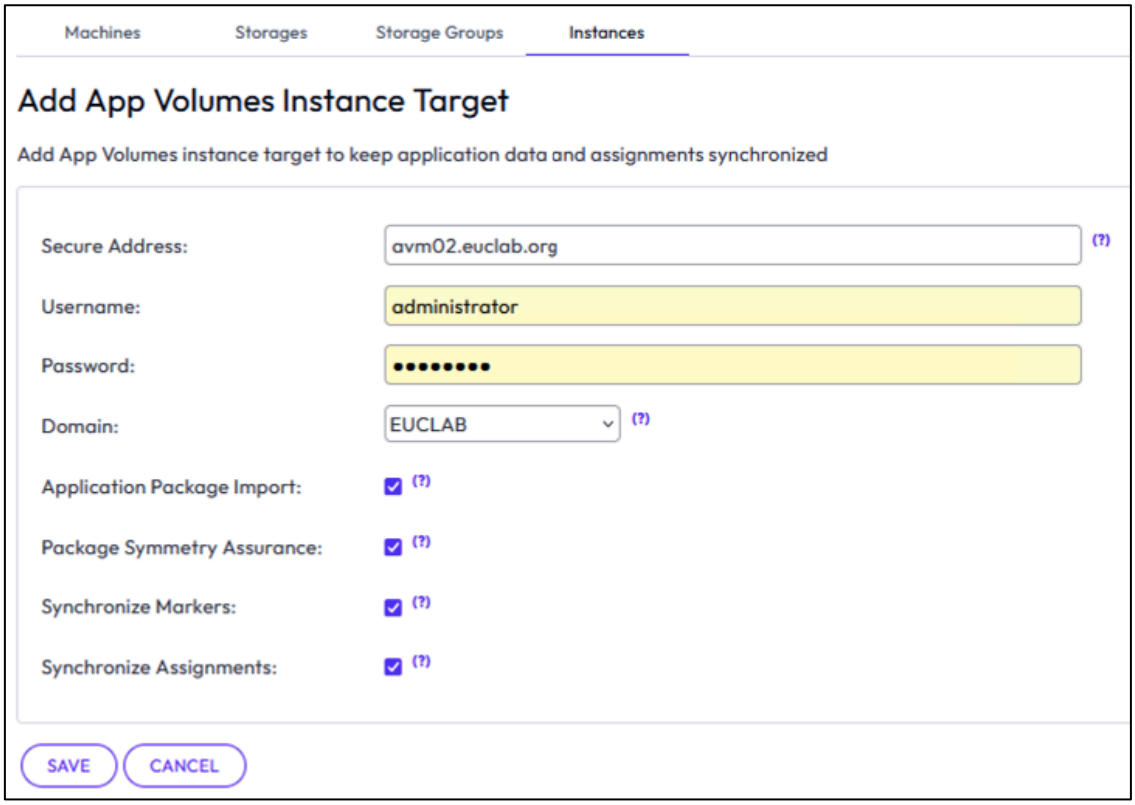
13.7.6 Establish a multi-instance architecture

Verion: 2503

To ensure replication of packages, markers and assignments between site, multi-instance architecture can be established. You can add multiple target instances to a given source instance.

13.7.6.1. Add instance target

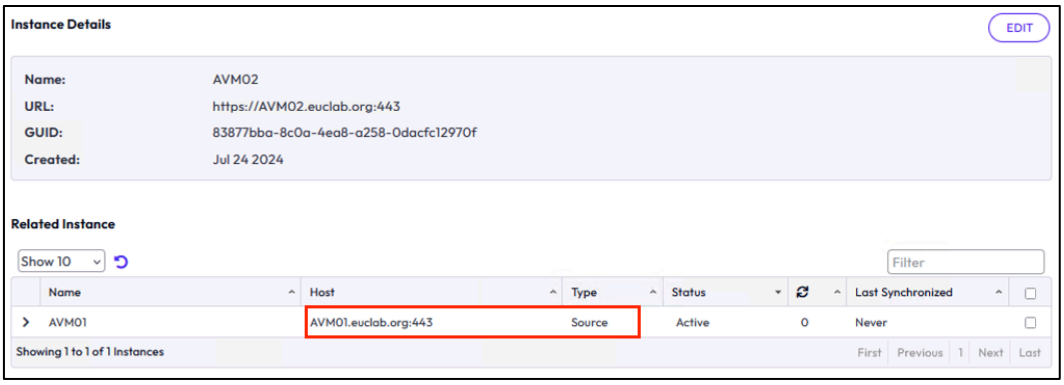
- On source App Volumes Manager, go to →Infrastructure →Instances, and click to “Add Target”:



  - Keep in mind, that synchronization between source and target is unidirectional. Synchronization takes place from Source to Target only.

- After adding the target, you can verify the configuration on both instances:
  - Source:

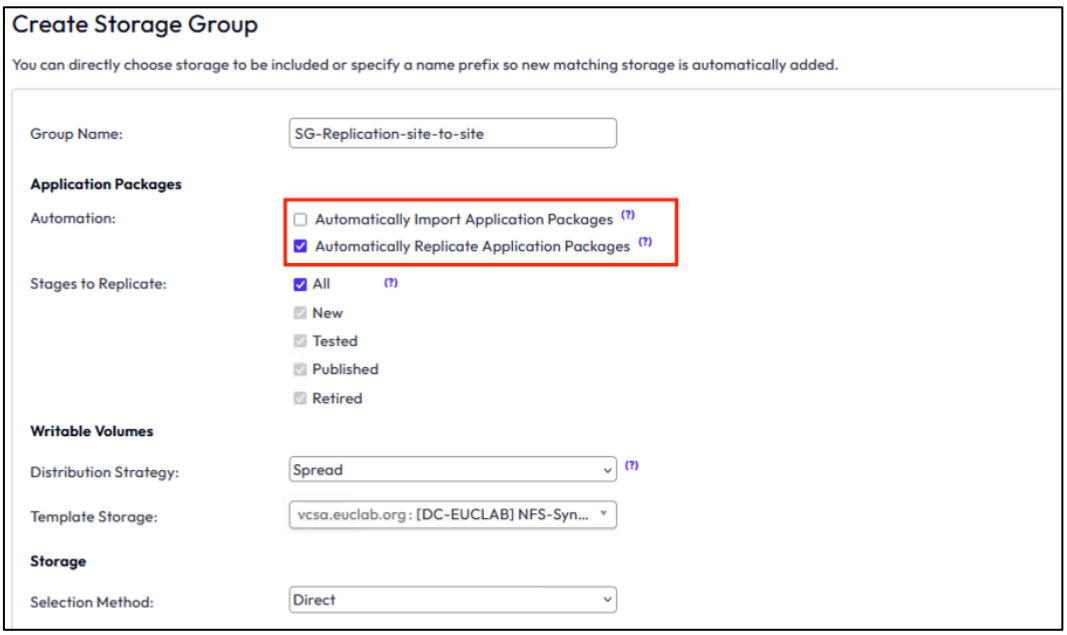
- Target:



13.7.6.2. Setup package replication

You need a shared NFS datastore to replicate packages between sites and App Volumes instances.

- Set the shared NFS datastore for replication as **non-attachable** under →Infrastructure →Storages, so packages can be replicated to and from this datastore, but prevents packages being mounted from this datastore. Repeat this step for all App Volumes instances.
- Mark the NFS datastore for replication as **read-only** for the target App Volumes instance
- Create a Storage Group under →Infrastructure →Storage Groups for the source as well as for the target App Volumes Manager
    - Select the “local default datastore” and the NFS datastore used for replication
    - **Do not select “Automatically Import Application Packages”!**
    - Select “Automatically Replicate Application Packages”



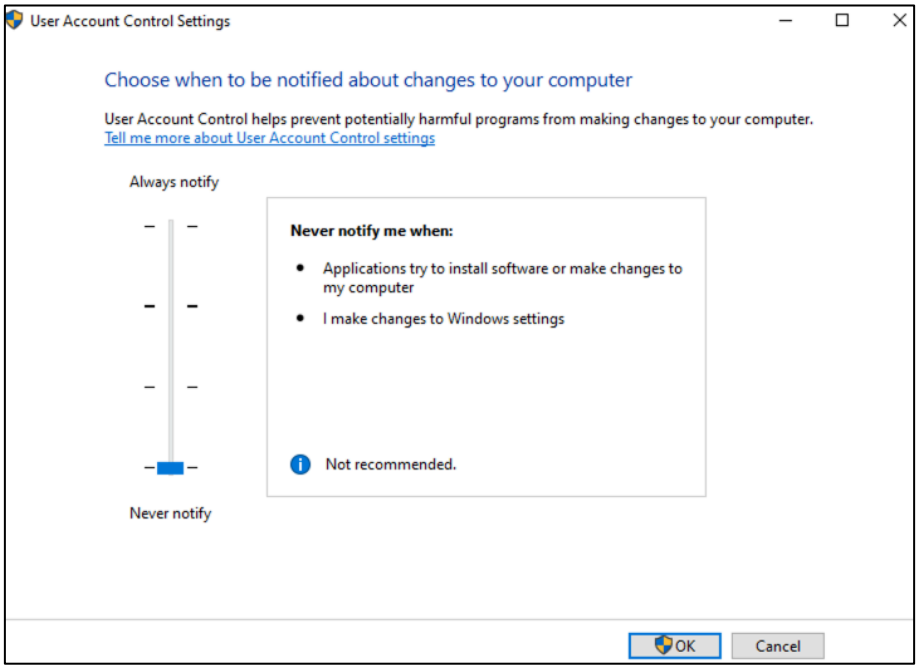
13.8 App Volumes Tools

13.8.1 Setup App Volumes Tools

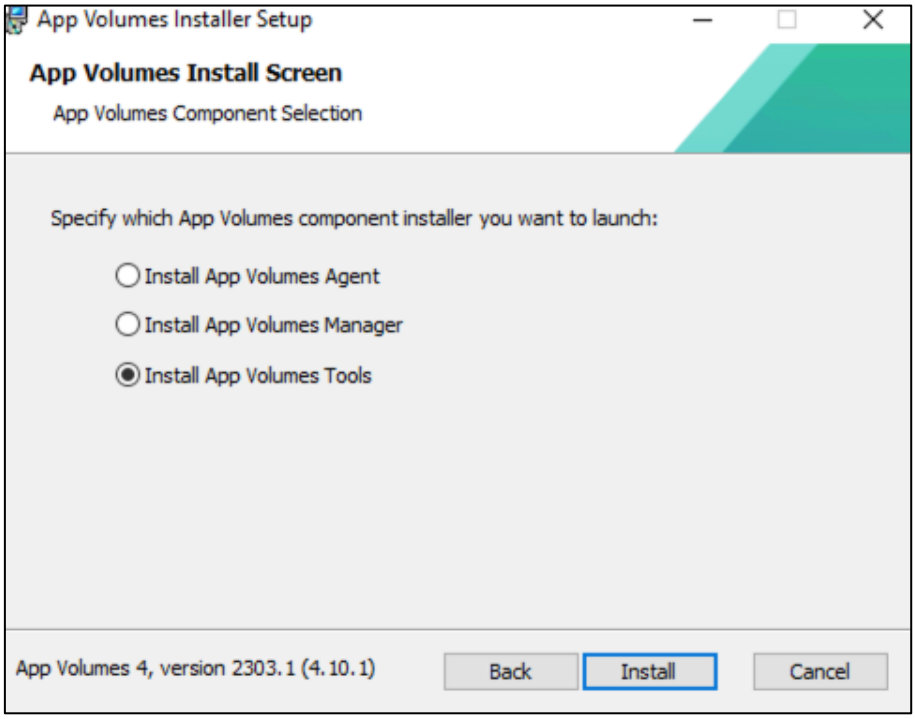
To use automation in conjunction with application package deployment, you can use the App Volumes Tools, released in version 2103.

You can install them on a clean Windows Desktop OS machine – verify that no other App Volumes component is installed.

- Execute VMware OS Optimization Tool
- Deactivate User Account Control (UAC):



- Execute the installation process, and choose the App Volumes Tools:



- Take an offline snapshot, you can revert after every capture process.

https://roderikdeblock.com/automate-the-complete-capturing-process-using-app-volumes-tools/

13.8.2 Capture an application

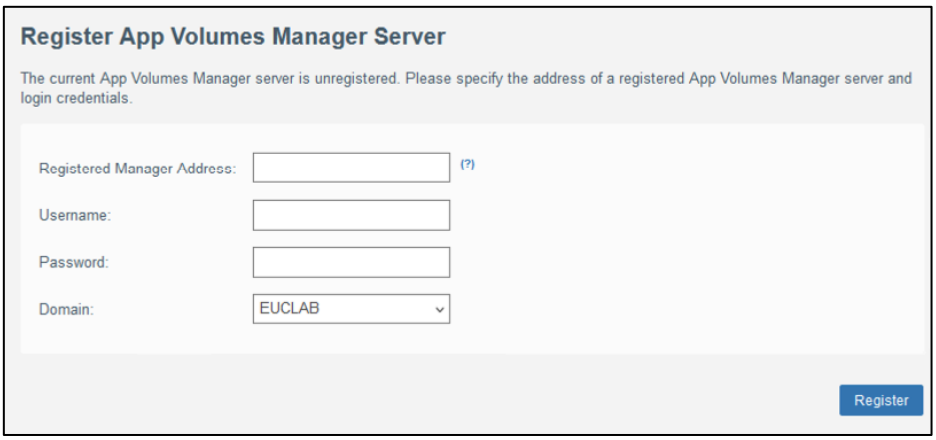
- Place the application you want to setup, into a local install folder

13.9 Troubleshooting App Volumes

13.9.1 Replacing/Restoring a single Manager with external SQL DB

In case of loss of a single App Volumes Manager with an external SQL DB (DB backup available), you can install a fresh App Volumes Manager, and connect this with the existing SQL DB.

During first login to the UI the wizzard asks for registration of App Volumes Manager – however, there is no additional manager who can execute this:



Workaroound:

- Stop App Volumes Manager Service
- Login to the SQL server, load the SQL server Management Studio and navigate to the table **dbo.manager_services**
- Delete the entry from the already registered App Volumes Manager
- Once the entry is deleted restart the AVM service and test accessing the AVM console again
- You have to check (or re-enter) license details, AD connectivity, vCenter connectivity

13.9.2 After update, Admin UI is failing

In some cases, after upgrading an App Volumes Manager, the Admin UI is failing (getting timeout). However, the upgrade finished successful, and the App Volumes Manager service is up and running.

- In svmanager_server.log, you find an antry like this:
    - `nginx: [emerg] unknown directive "ssl" in C:\Program Files (x86)\CloudVolumes\Manager\nginx/conf/nginx.conf:`
- After the update, check the nginx.conf file, located here:
  C:\Program Files (x86)\CloudVolumes\Manager\nginx\conf\
- Edit the nginx,conf
    - Change "listen 443;" to "listen 443 ssl;" in server configuration
    - Comment out "ssl on;" by keeping "#" at the stating of the line (#ssl on;)
- Restart of the App Volumes Manager service not needed, but recommended

13.9.3 Omnissa App Volumes order of operation

Detailed explanation about the order of operation for App Volumes Manager, as well as for the User logon: KB2143163

14. Setup Dynamic Environment Manager

We are using the AD mode.

14.1 Prepare Environment for DEM

14.1.1 Create File Shares

We need the following shares for DEM:

- DEM Configuration Share (i.e. \\FS\DEMconfig)
    - Share permissions – **Everyone** must have **Change** permissions
    - NTFS Security permissions
        - Administrators must have **Full Control** permissions applied to **This folder, subfolders and files**
        - End users must have **Read & execute** permissions applied to **This folder, subfolders and files**
        - (optional) If you want to use DEM also for computer environment settings, remote computer accounts must also have **Read & execute** permissions applied to **This folder, subfolders and files**
- DEM Profile Archives Share (i.e. \\FS\DEMprofiles) for storing personal (application-)settings
    - Share permissions - **Everyone** must have **Change** permissions
        - (optional) Helpdesk staff using the optional Helpdesk Support Tool must have **Full Control** permissions applied
    - NTFS Security permissions – for each user at his first login an own folder has to be created, and the user can use his own folder only
        - For Administrators and Helpdesk Staff, **Full Control** applied to **This folder, subfolders and files**
        - For End users: **Create folders / append data** applied to **This folder only**
        - (optional) If you want to use DEM also for computer environment settings, remote computer accounts must also have **Create folders / append data** permissions applied to **This folder only**
        - For **Creator Owner**: **Full Control** applied to **Subfolders and files only**
- (optional) DEM User Share (i.e. \\FS\userdata) for roaming user profile (partial or complete)

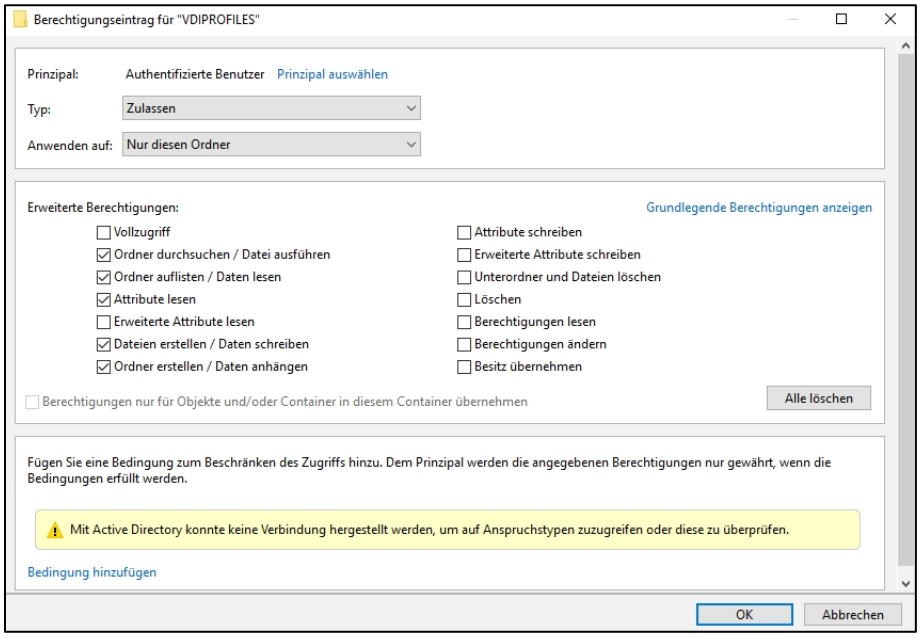
14.1.2 Import ADMX Templates for DEM

Add the DEM specific ADMX templates to the GPO environment

- Copy the .admx files to the %systemroot%\PolicyDefinitions folder on your Active Directory server.
- Copy the language resource (.adml) files from subfolder en-US (or different language folder) to the appropriate subfolder in %systemroot%\PolicyDefinitions\ on your Active Directory server.

14.2 File Shares anlegen

- \\FS\DEMConfig - Share für die DEM Konfiguration
  - NTFS Security Berechtigungen:
    - Administrators must have full permissions
    - End users must have Read and Execute permissions
  - Falls Computer-based ADMX Settings konfiguriert werden sollen, müssen “Domain Computers” Read Permission haben auf dem Config Share
- \\FS\DEMprofiles - Share für die user-spezifischen Applikationseinstellungen
  - For the share the **Everyone** group must have **Change** permissions applied
  - NTFS Security Berechtigungen:
    - For DEM Admins and Help Desk: Full control, applied to this folder, sub folders and files
    - For End Users: Create folders and append data, applied to this folder only AND read and execute to this folder only
    - For Creator owner: Full control, applied to sub folders and files only
- \\FS\DEMuserdata - Share für Profil-Umleitungen (optional)
  - NTFS Security Berechtigungen:
    - For authenticated users:

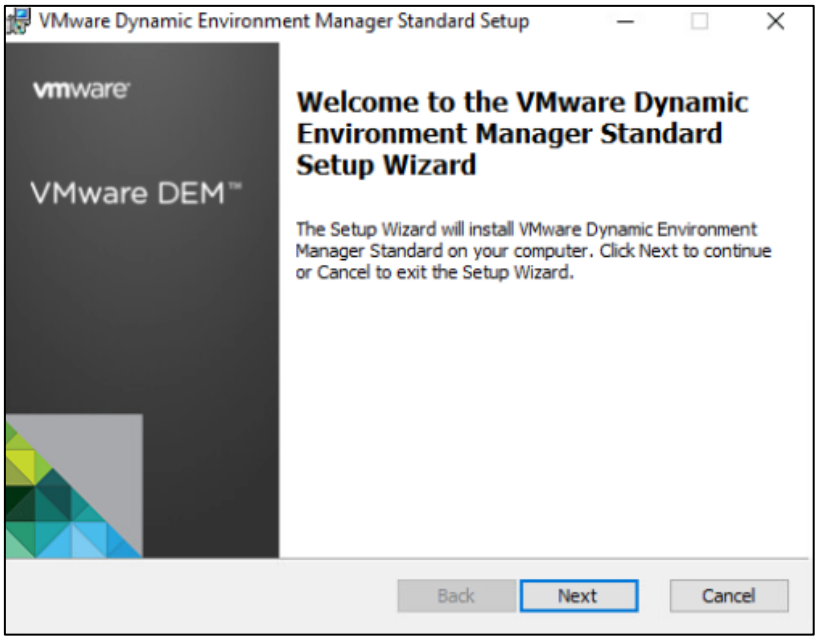


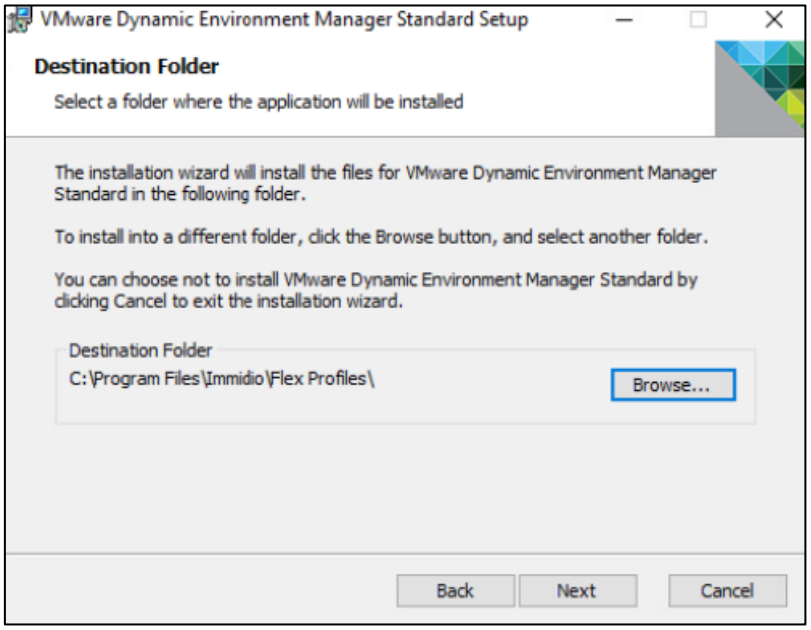
- For DEM Admins: Full control, applied to this folder, sub folders and files
- For End Users: Read and execute, Create Folders, to this folder only
- For Creator owner: Full control, applied to sub folders and files only

14.3 Setup DEM Management Console

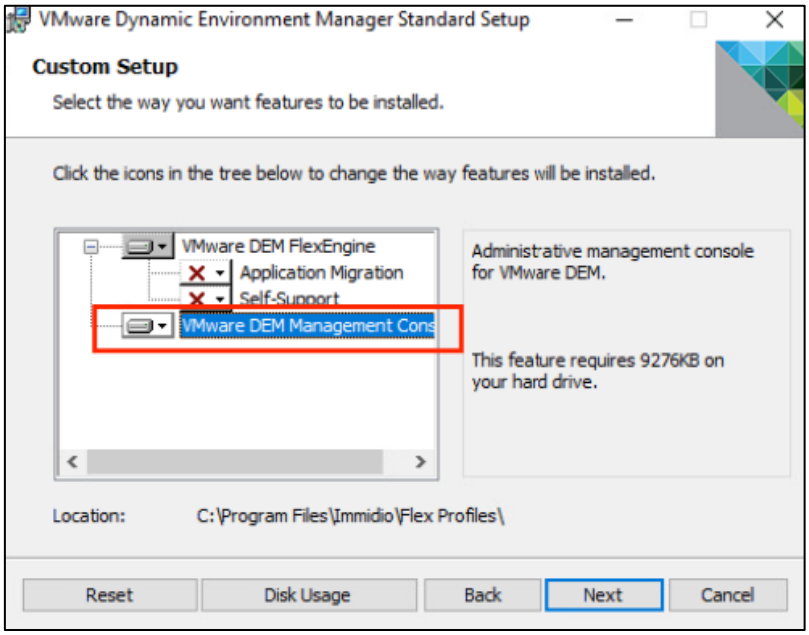
Version 2312.

- Execute setup:

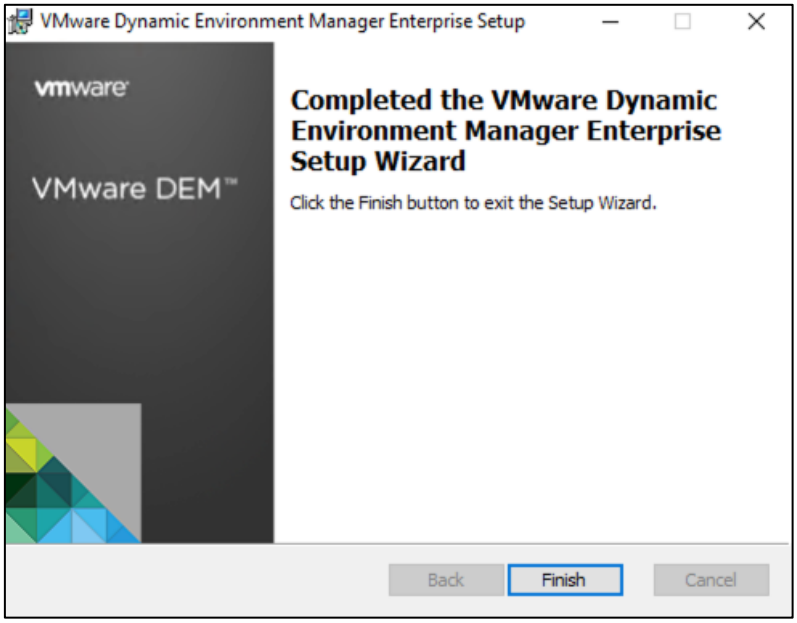




- Choose custom setup, then activate the DEM Management Console, and deactivate the DEM FlexEngine:



- Start setup, takes a few seconds only:

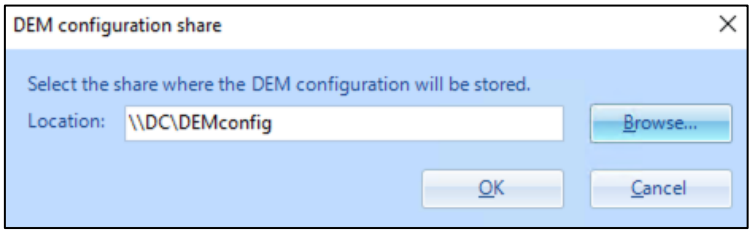


14.4 Initial DEM Configuration

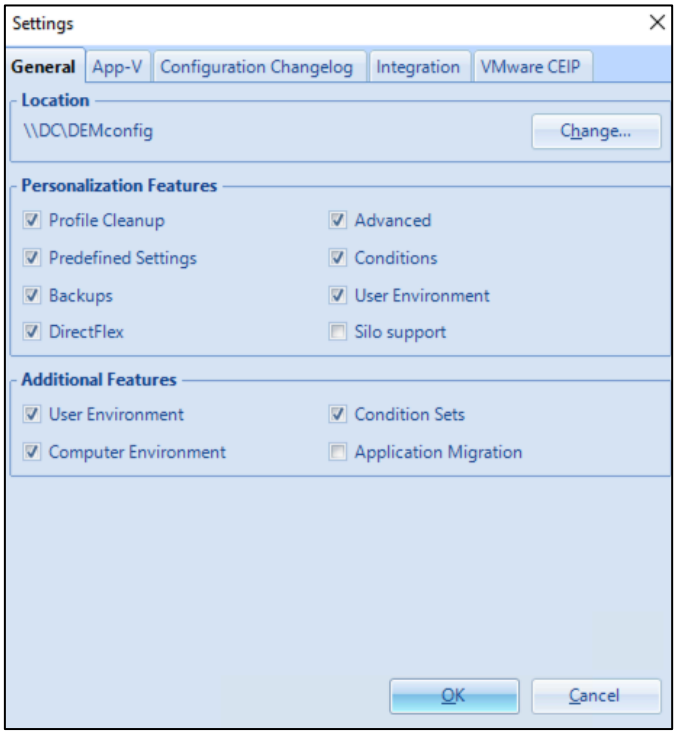
14.4.1 Initial configuration DEM Management Console

- Start DEM Management Console – at first start, you can (optional) activate Workspace ONE UEM inegration. This can be configured later.

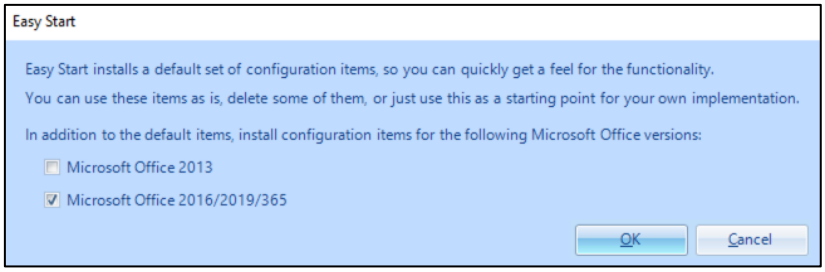
- Configure DEM configuration share



- Under →Configure →Settings, you should configure general DEM features



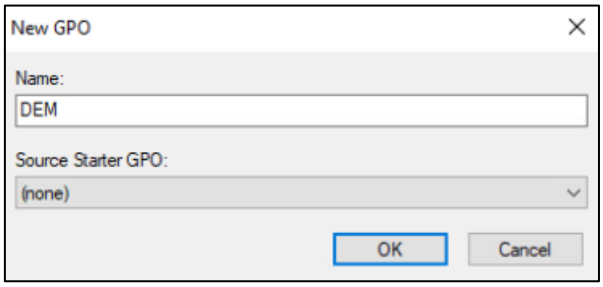
- By clicking to →Easy Start, you should choose an appropriate set of configuration items



14.4.2 Minimum required GPOs for DEM

Some requirements have to be configured in minimum.

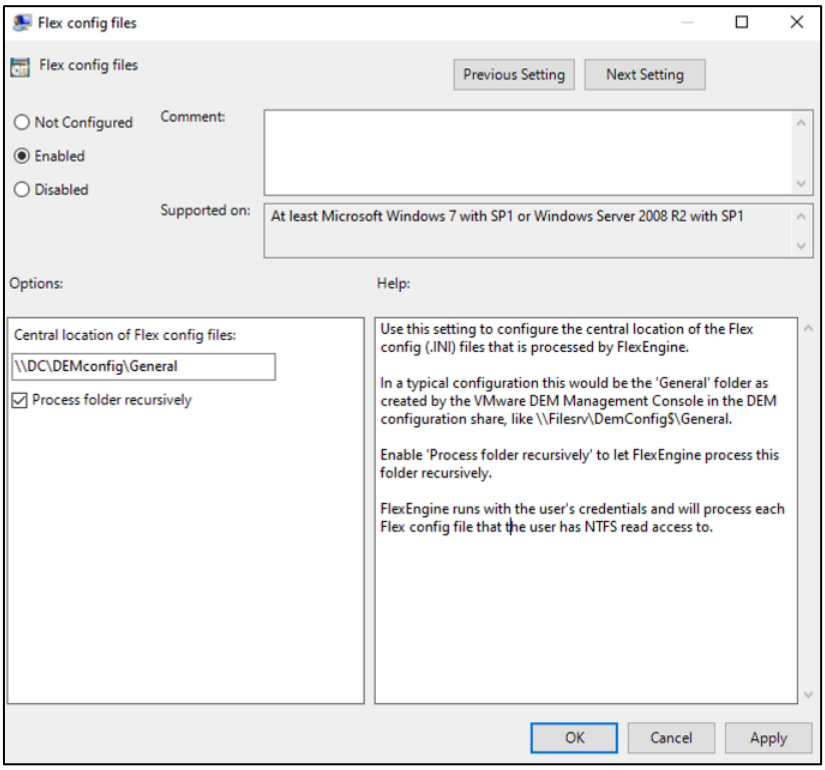
- Create a new GPO for DEM:



This GPO will be applied for the OU which is used by DEM-Users. That means here are User Configuration settings applied. Is there a need for Computer Configuration settings (i.e. RDSH farms), it is mandatory to enable loopback processing (described later).

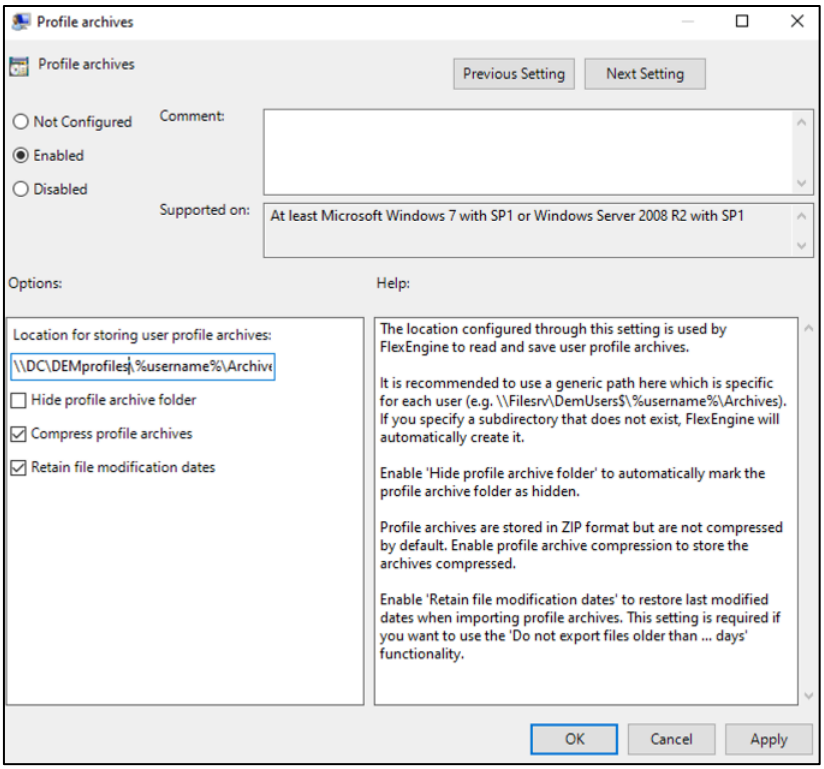
- Edit the new GPO and switch to →User Configuration →Policies →Administrative Templates →VMware DEM →FlexEngine

  - **Flex config files**



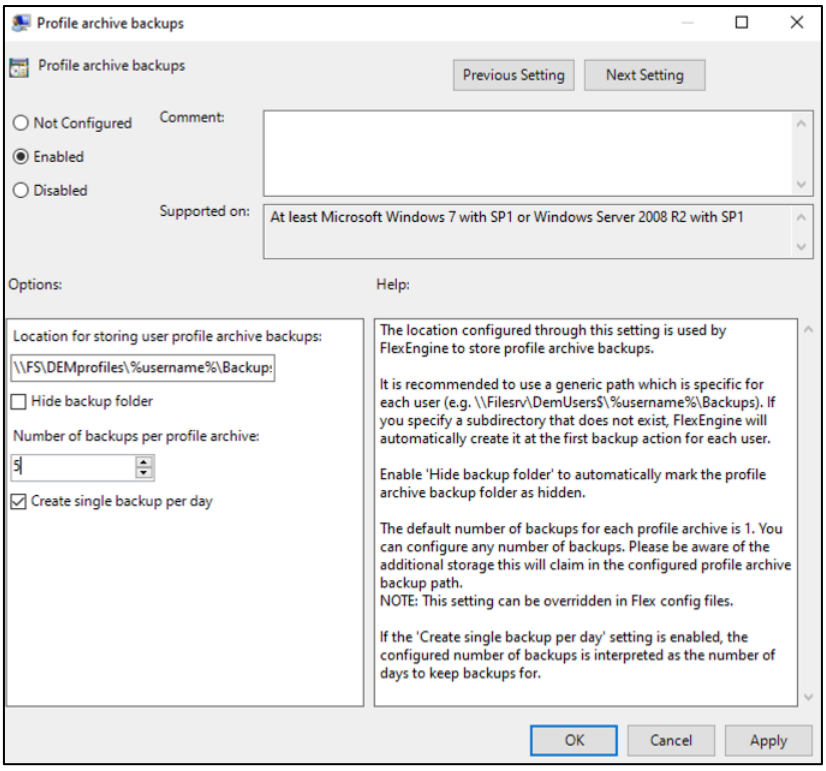
    - Enabled
    - Central location of Flex config files: \\FS\DEMConfig\General
    - Check mark for “Process folder recursively“

- **Profile archives**



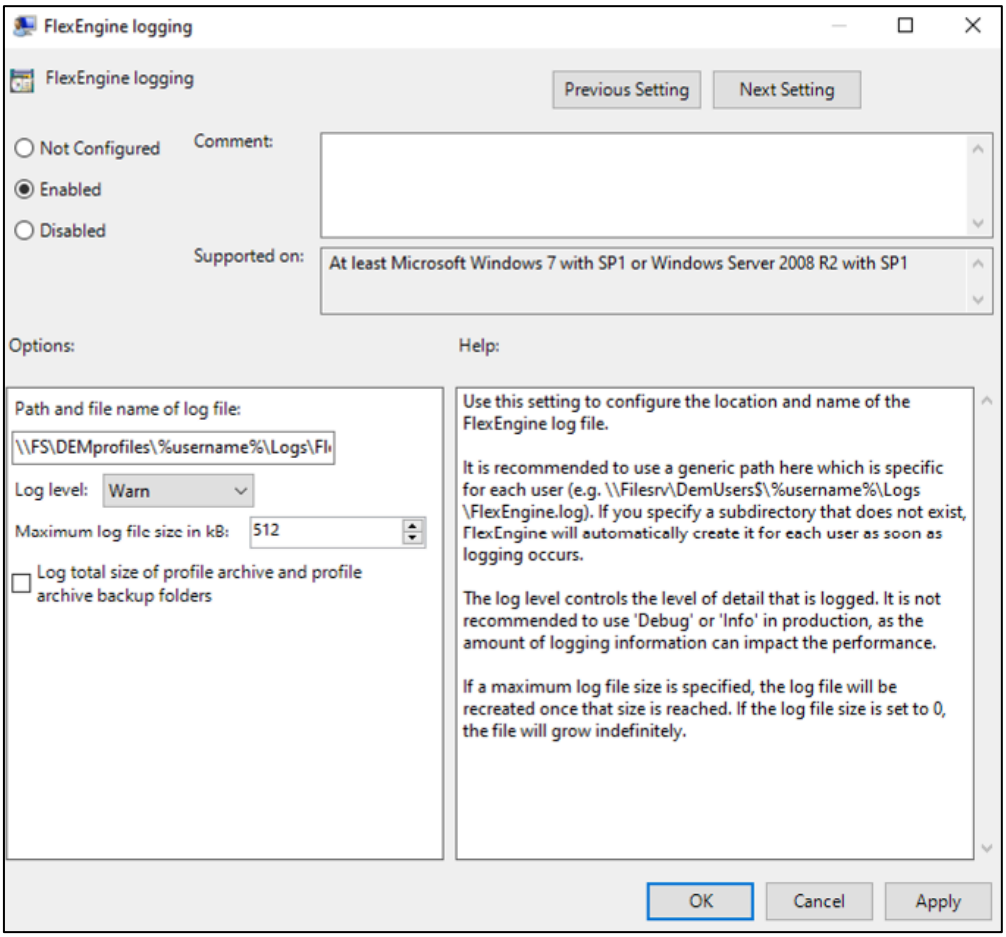
  - Enabled
  - Location for storing user profile archives: \\FS\DEMprofiles\%username%\archives
  - Check mark for “Compress profile archives“ and for „Retain file modification dates“

- **Profile archive backups**



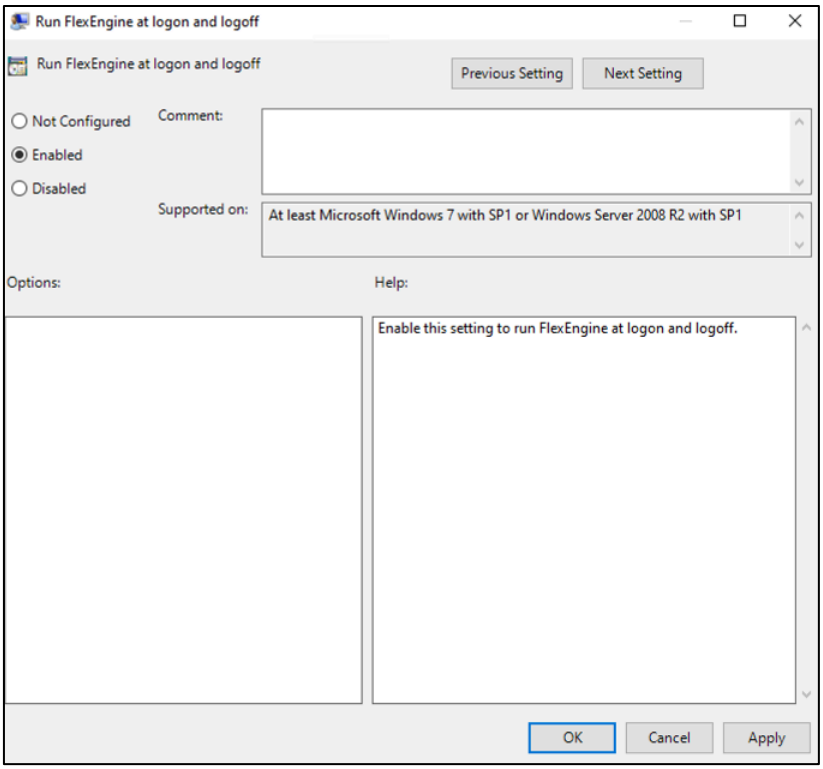
- Enabled
- Location for storing user profile archive backups:
  \\FS\DEMprofiles\%username%\backups
- Number of backups per profile archive
- Check mark for “Create single backup per day”

- **FlexEngine logging**



- Enabled
- Path and file name of log file:
  \\FS\DEMprofiles\%username%\Logs\FlexEngine.log
- Log level: Warn (Debug for PoC)
- Maximum log file size in kB: 512

- **Run FlexEngine at logon and logoff**



  - Enabled
  - T**his GPO is recommended to enable since DEM 2111.**
  - For DEM settings until 2106, see here.

- If you need to manage **computer objects** in OUs, you need to switch to →Computer Configuration →Policies →Administrative Templates →System →Group Policy, and set **Configure user Group Policy loopback processing mode** to **"**Enabled"
- In case you want to implement DEM with computer environment settings, you should configure a registry setting to make the DEM configuration path available for the computer object.
  - See official documentation here.

14.4.3 Additional (optional) configuration

Depending from the use case, you can edit or add specific configuration options:

- **File Type Associations**
  - https://ivandemes.com/managing-file-type-associations-fta-natively-using-dynamic-environment-manager/
  - https://kb.vmware.com/s/article/83679

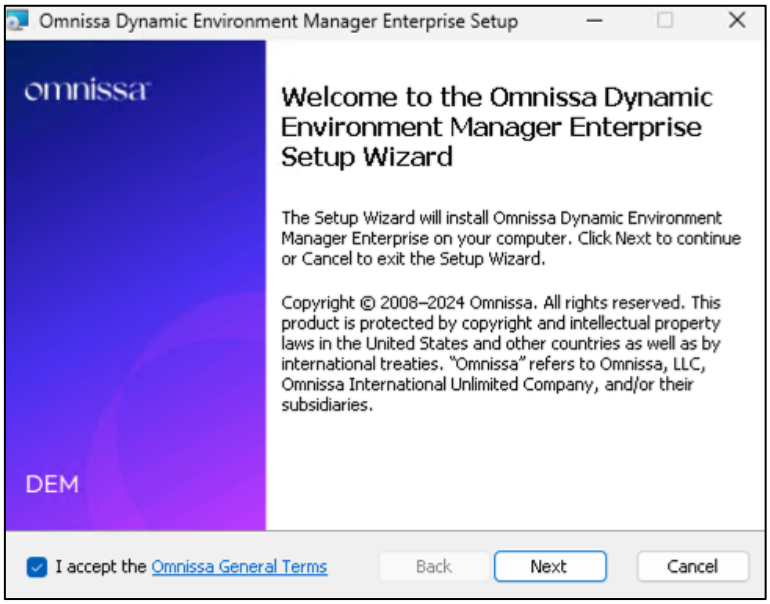
- **Available Application Templates**

- https://ivandemes.com/vmware-uem-9-5-introduces-the-vmware-marketplace-for-templates/
- https://www.ivandemes.com/uemtemplates/alluemtemplates.php
- https://communities.vmware.com/t5/Dynamic-Environment-Manager/tkb-p/3026

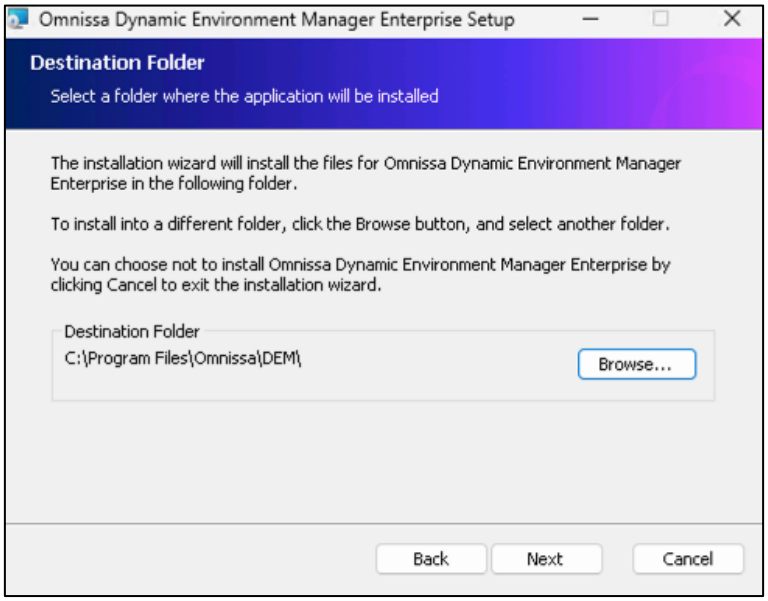
- **Predefined Settings**
  - http://vlenzker.net/2016/12/vmware-uem-predefined-settings-basic-concepts/

14.5 Setup DEM Agent

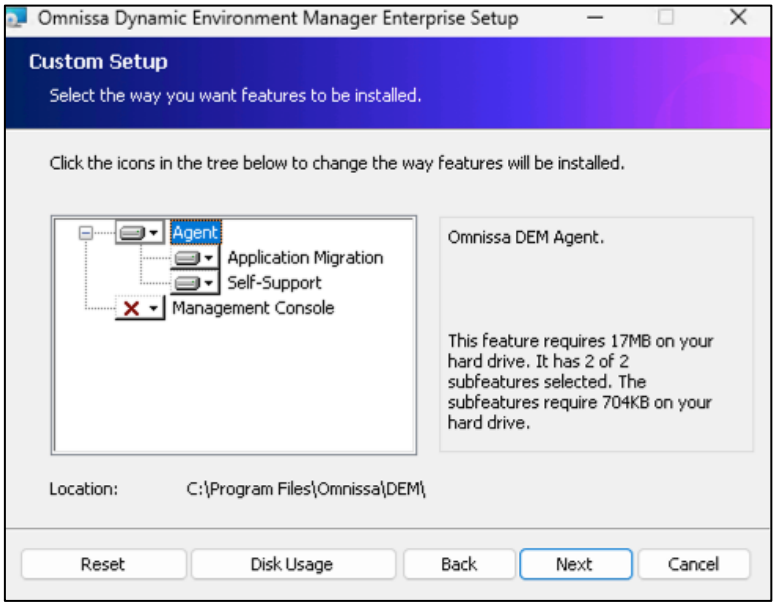
- Execute setup for DEM Agent:



- Select default destination folder

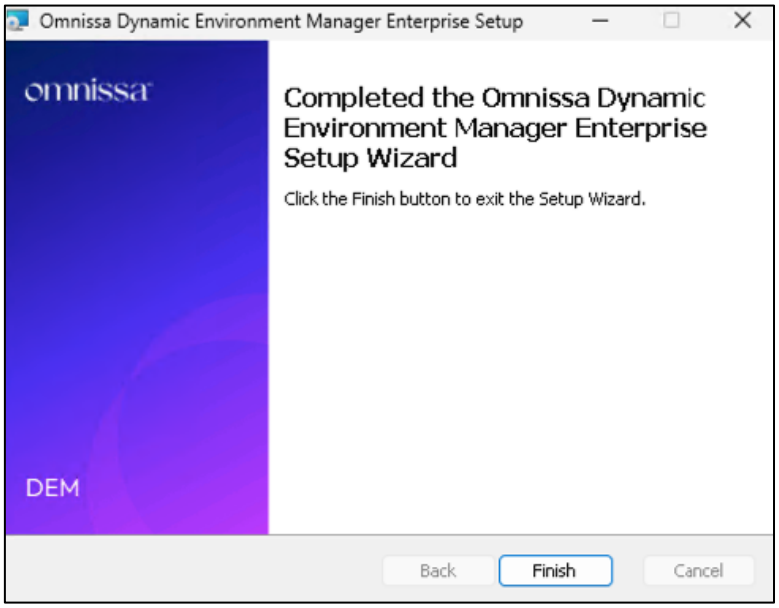


- Choose custom setup, and confirm DEM Agent



- Proceed with installation. As long as the Horizon agent is installed already on this machine, no specific DEM license is needed.

- Setup takes a few seconds only



14.6 DEM Application Profiler

Version 2506

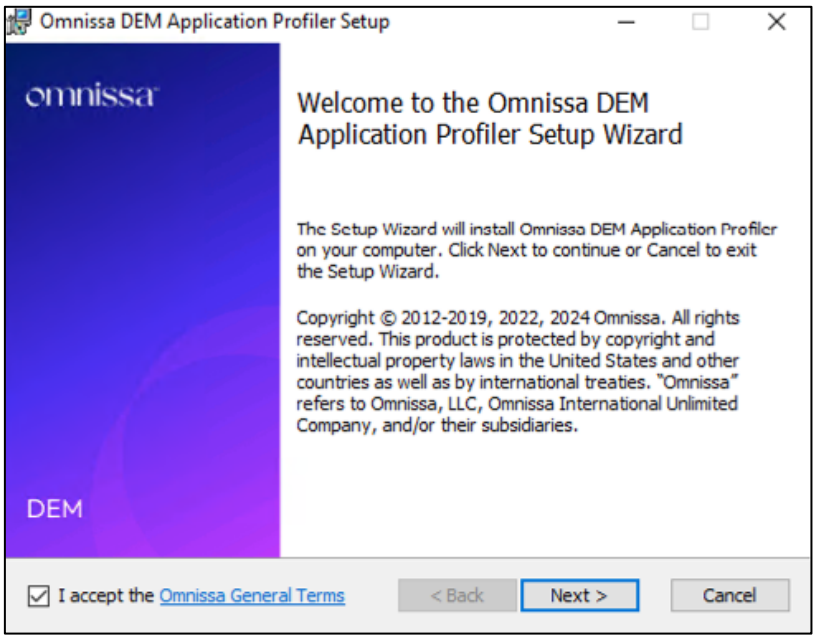
If you have to create profiles for applications which are not “known” by DEM (or a template isn’t present already), you can use the Application Profiler to create application profiles.

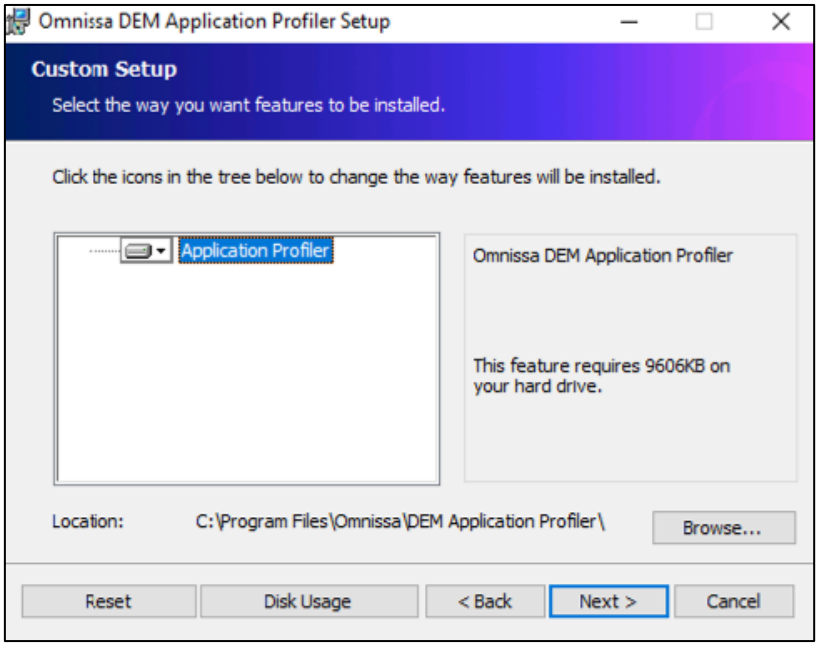
14.6.1 Requirements

- Use an OS which is similar (or identical) to the environment in which the applications wil take place (or the DEM agent will be deployed)
- Use a dedicated VM, without DEM Agent installed.

14.6.2 Setup Application Profiler

- Run the installer - VMware DEM Application Profiler xxxx 10.xx x64.msi (part of the download for DEM)



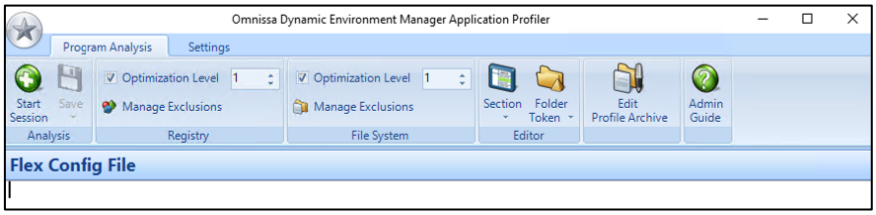


- Create a final snapshot you can revert to, after a new application was profiled.

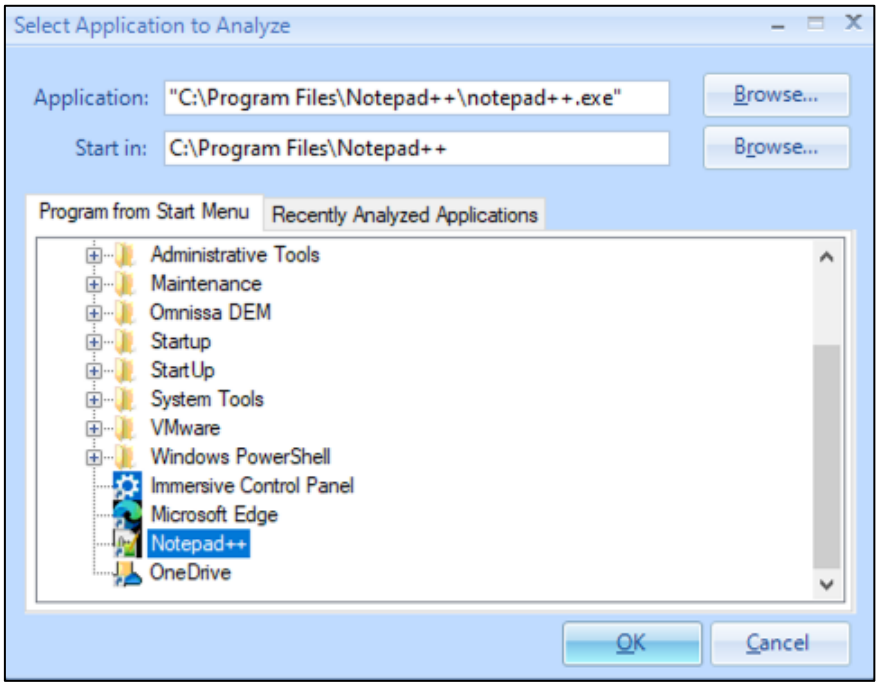
14.6.3 Using Application Profiler

- Consider to have a snapshot before installation and profiling, to keep a clean machine you can revert to.
- Install the application which should be profiled (i.e. FormatFactory, PDF24)

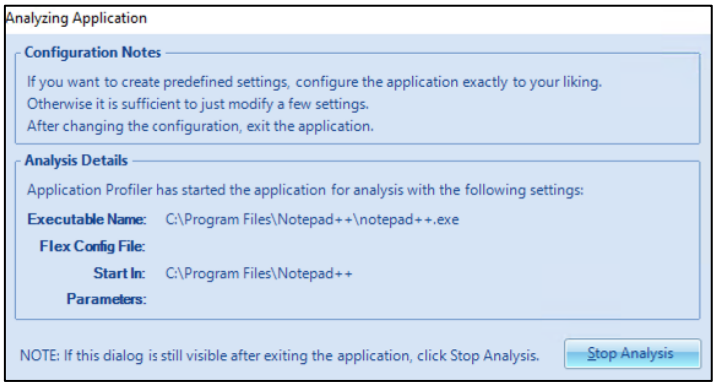
- Start Application Profiler



- Click →Start Session. Browse to the Application you want to profile

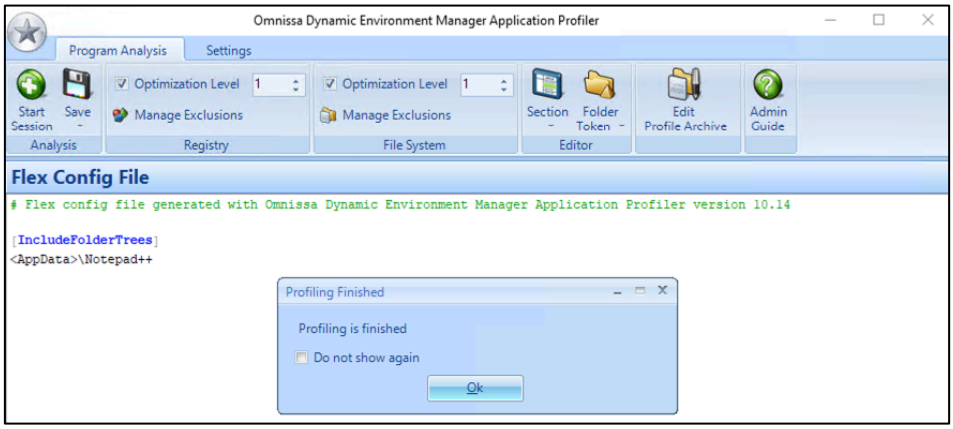


- The Analyzing Application window appears, and the application starts

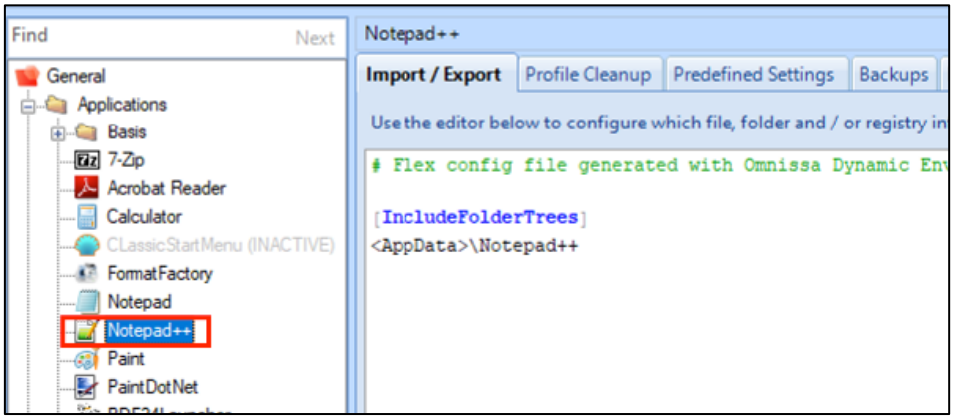


- Make the necessary changes within the application, then exit the application

- The Application Profiler UI shows the results of the analysis



- Click on →Save to save the Config File. You also can save config file with predefined settings (or predefined settings only).
- Copy the created files to the DEM Config Folder for Applications, after a tree refresh you will see it in UI



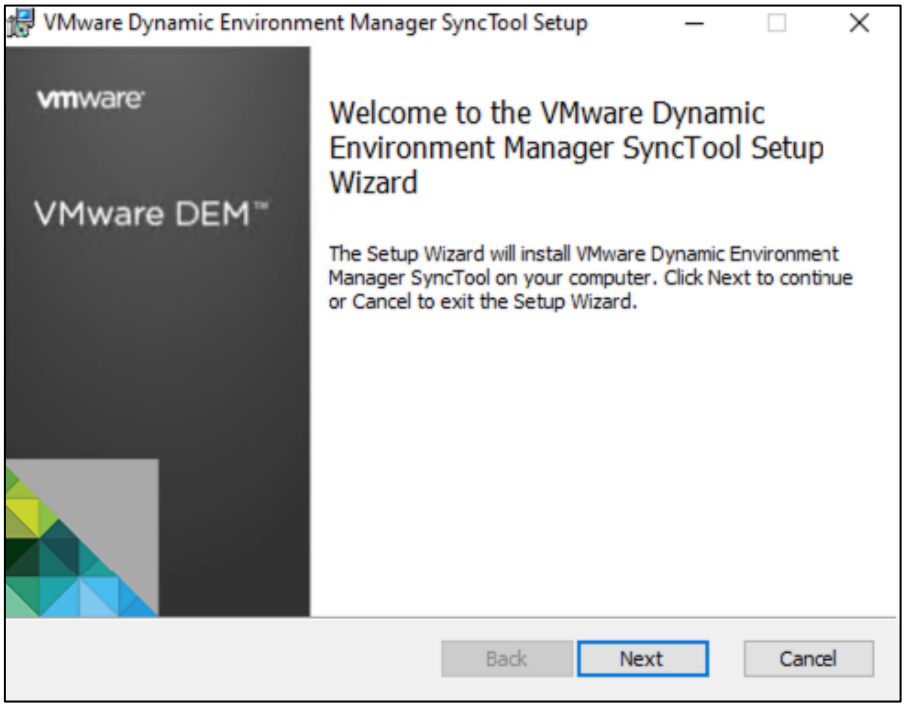
14.7 DEM Sync-Tool

In an existing DEM configuration, the Sync-Tool can be installed as an additional DEM feature on the same machine as the FlexEngine (DEM Agent).

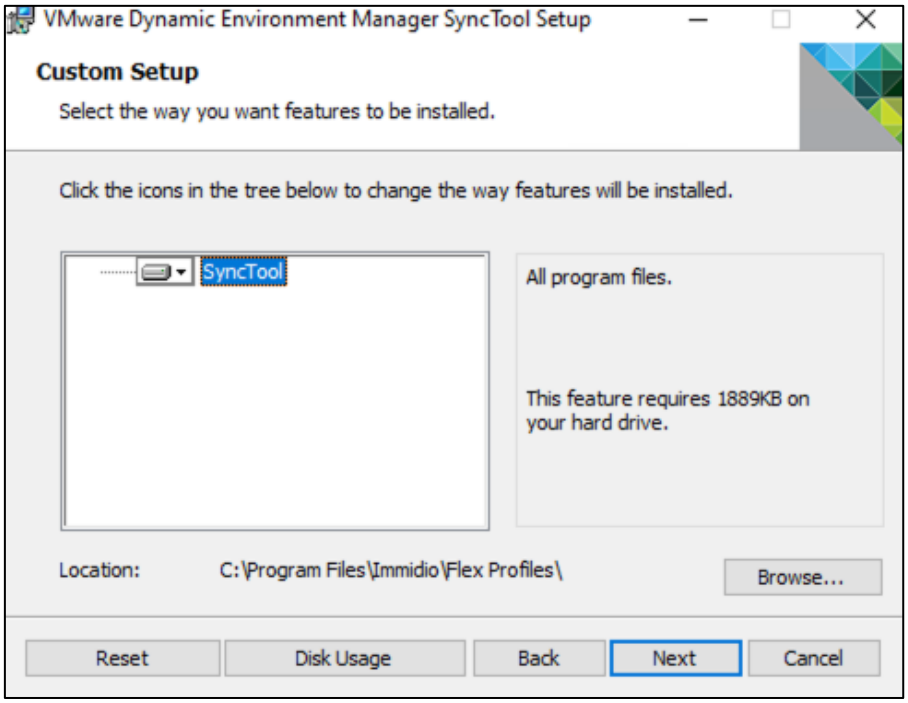
Syn-Tool offers to sync the DEM configuration itself, but also the User DEM-Profiles (Application Settings) for Offline-Usage.

14.7.1 Setup Sync-Tool

- Execute installer file



- Sync-Tool has to be installed in the same folder as the FlexEngine



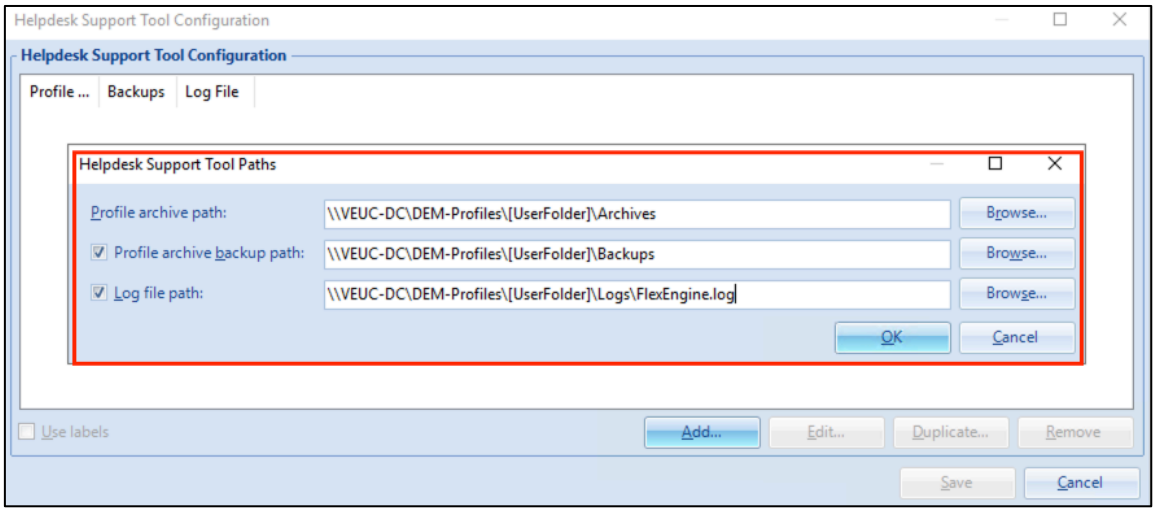
14.7.2 Configuring Sync-Tool

- Administrative Templates “VMware DEM.admx” and “VMware DEM SyncTool.admx” have to be copied in the PolicyDefinitions Folder (C:\Windows\PolicyDefinitions) on domain controller, if they do not exist already.
- You can use the existing GPO for DEM, or create a dedicated one for Sync-Tool. If Sync-Tool is not installed on the target VM (Golden Master), Sync-Tool GPO settings are ignored. So it can be used in parallel within one GPO.
- (optional) you have to set up a license file in DEM Management Console, if Horizon Agent is not in place on the machine the Sync tool is installed.

14.8 DEM Helpdesk Support Tool

14.8.1 Configuring Helpdesk Support Tool

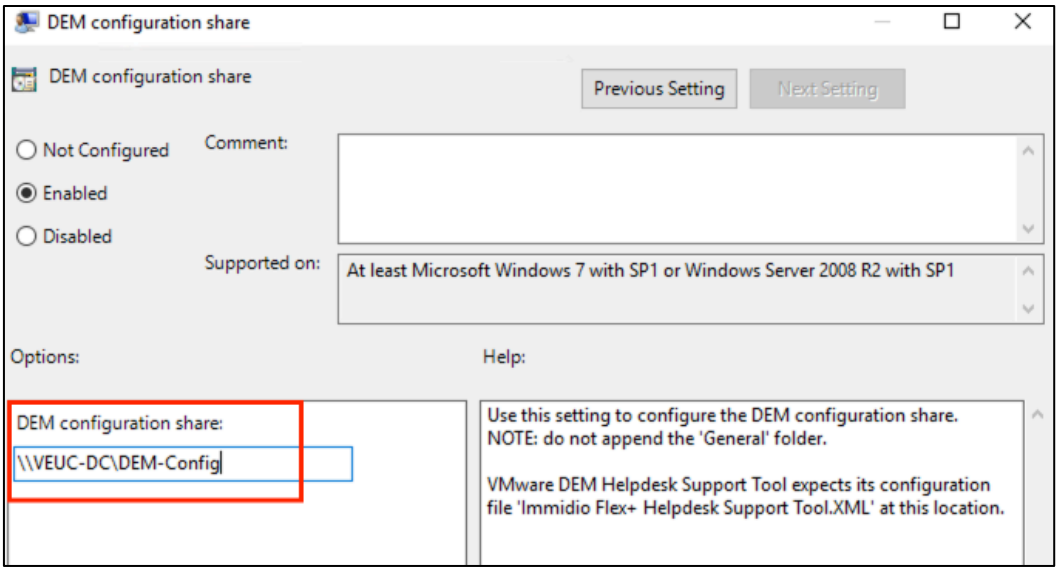
- Start DEM Management Console, and go to →Star →Configure Helpdesk Support Tool
- Click →Add and enter the profile archive path, the archive backup path and the log file path



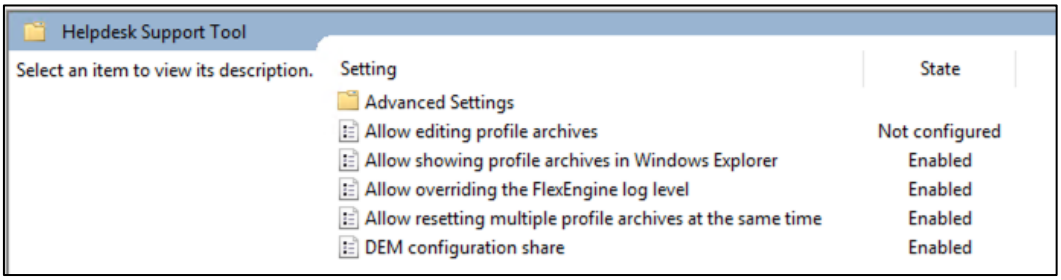
- In case of users which are distributed across different file servers, you can configure multiple UNC paths, using (creating) a Immidio Flex+ Helpdesk Support Tool.xml file. Also you can use multiple Labels to organize and manage different locations.
- After click on →OK, in the DEM-Config share the config file “Immidio Flex+ Helpdesk Support Tool.xml” will be created.

- Create dedicated GPO for Helpdesk Account(s), using administrative Template under →User Configuration\Administrative Templates\VMware DEM\Helpdesk Support Tool.

- DEM configuration share – the share to the previously created xml config file

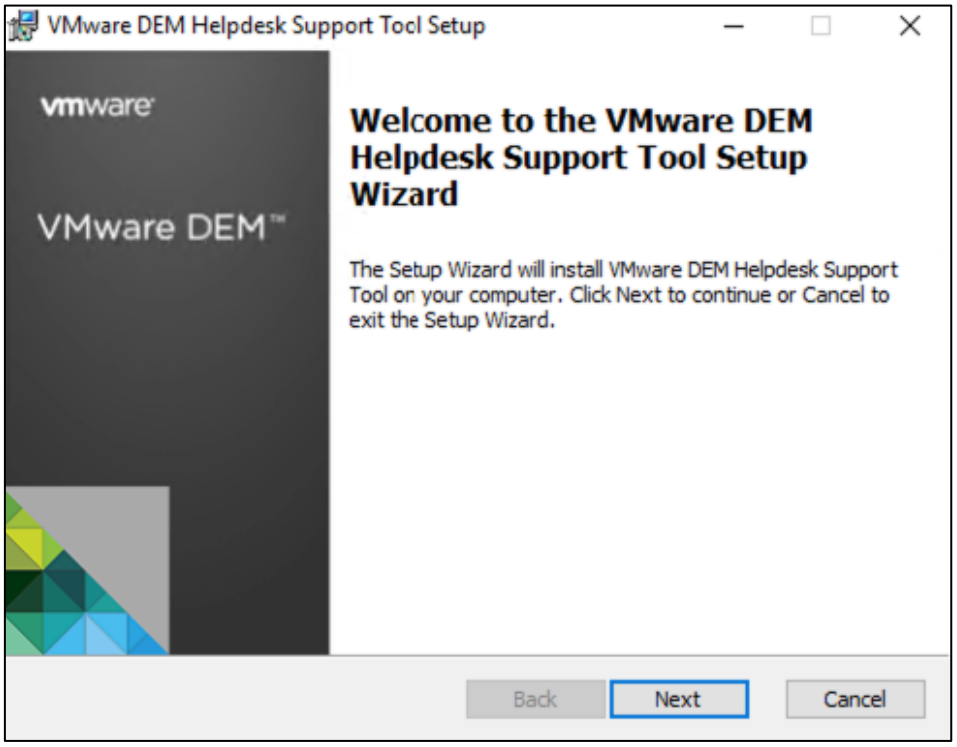


- As an example, you can configure these setting as default, see doc here:

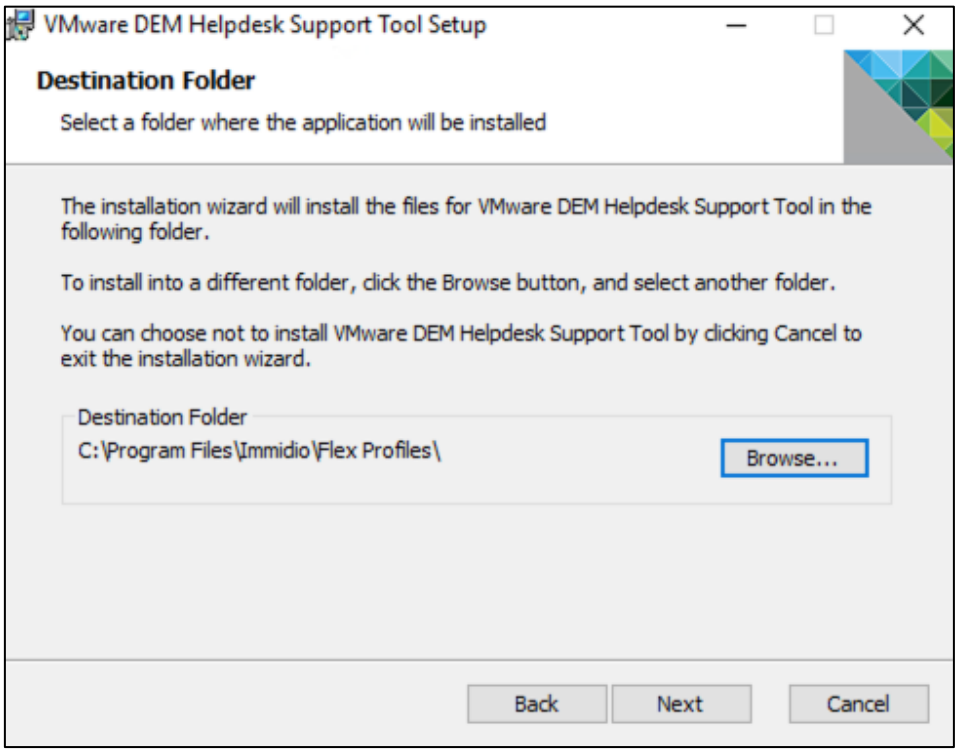


14.8.2 Setup Helpdesk Tool

- Execute the Helpdesk-Installer on a dedicated machine

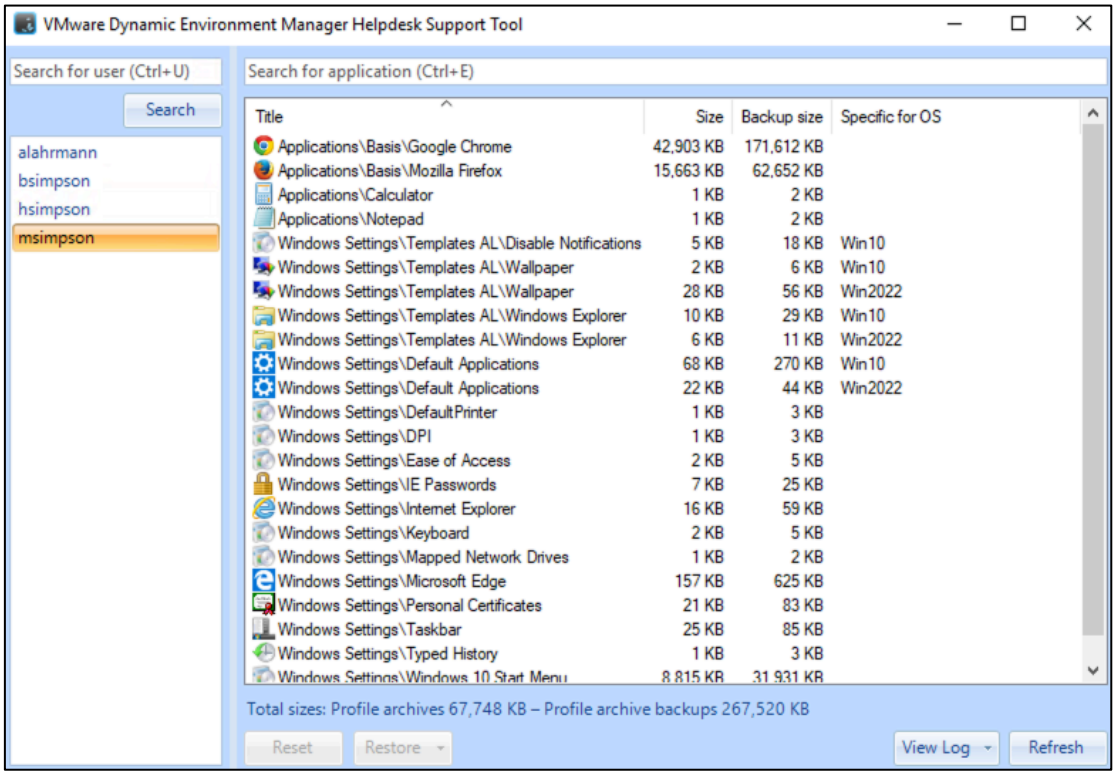


- Use default installation folder



14.8.3 Using Helpdesk Tool

- Start →Helpdesk Support Tool, and enter (partially) username in the search field



14.9 DEM – Appendix and Issues

14.9.1 MS Edge Settings

[IncludeRegistryTrees]
HKCU\Software\Microsoft\Edge

[IncludeFiles]
<LocalAppData>\Microsoft\Edge\User Data\First Run
<LocalAppData>\Microsoft\Edge\User Data\Local State
<AppData>\Microsoft\Edge\User Data\Default\profile.pb

[IncludeFolderTrees]
<LocalAppData>\Microsoft\Edge\User Data\Default

[ExcludeFolderTrees]
<LocalAppData>\Microsoft\Edge\User Data\Default\Cache
<LocalAppData>\Microsoft\Edge\User Data\Default\Code Cache
<LocalAppData>\Microsoft\Edge\User Data\Default\GPUCache
<LocalAppData>\Microsoft\Edge\User Data\Default\IndexedDB
<LocalAppData>\Microsoft\Edge\User Data\Default\Service Worker\CacheStorage

<LocalAppData>\Microsoft\Edge\User Data\Default\Service Worker\ScriptCache

14.9.2 Sonstiges

Roaming “nicht-typischer” Ordner auf LW C:

Import/Export

<C-Drive>\ProgramData\CSP client.components Windows\%username%\set\[EXPAND ENV VARS]

https://docs.vmware.com/en/VMware-Dynamic-Environment-Manager/2106/com.vmware.dynamic.environment.manager-adminguide/GUID-537E02E3-4814-42F9-8D0F-0418D76DD84D.html

14.9.3 Template for Windows Settings (Default)

Saved under \Documents\VMware Horizon\DEM\DEM-Windows-Settings-Templates.zip

Already present, but expanded:

- Personal Certificates
- Screensaver (if not disabled by OSOT)

Windows Common Setting (Expanded)

- DPI
- DefaultPrinter (divergent from default expansion)
- Keyboard
- Mapped Network Drives
- Mouse
- Taskbar
- Typed History – history for IE and Windows Explorer

Customized

- Cookies
- Credentials Manager - saves credentials for network drives
- Window Colors - Saves individual window colors

- Jump List - Saves preview for task list and startmenu for the recently used docs, files etc.
- Num Lock Status – saves num lock status
- Startup – roaming for startup folder
- VisualEffects
- Wallpaper
- Windows Explorer
- EdgeChromium
- Disable Notifications

15. Microsoft FSLogix

Version 25.09 (3.25.822.19044)

15.1 Preparation

- Configure a SMB-Share to store the FSLogix VHD(X) files for the users, and add needed permissions:

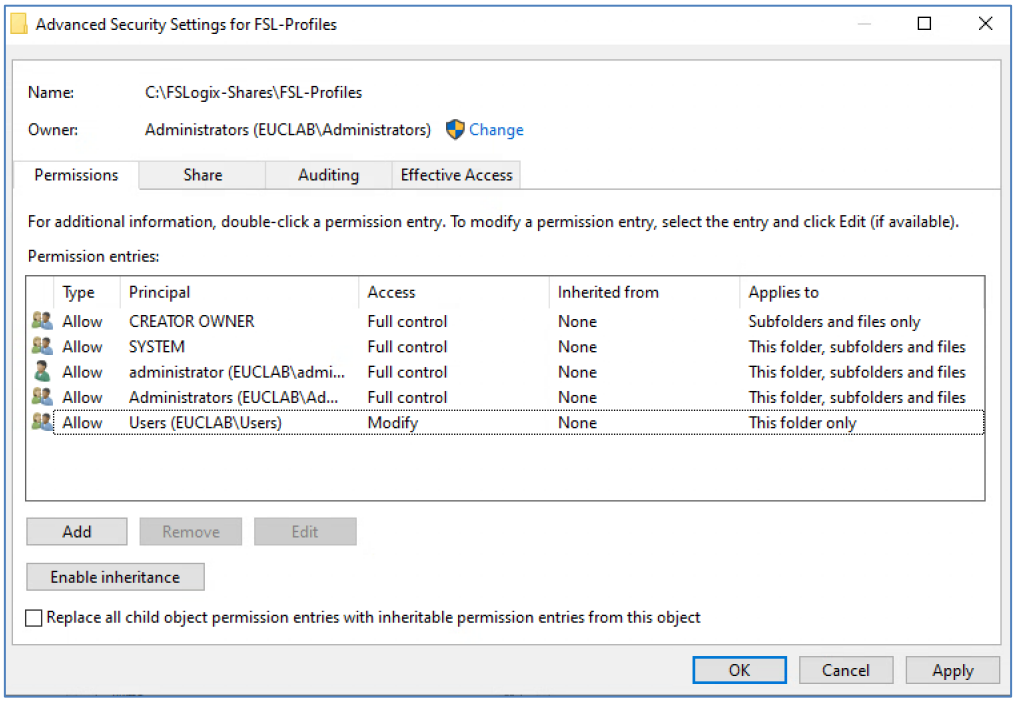


Tabelle 1: The table outlines the recommended ACL(s) to be configured.

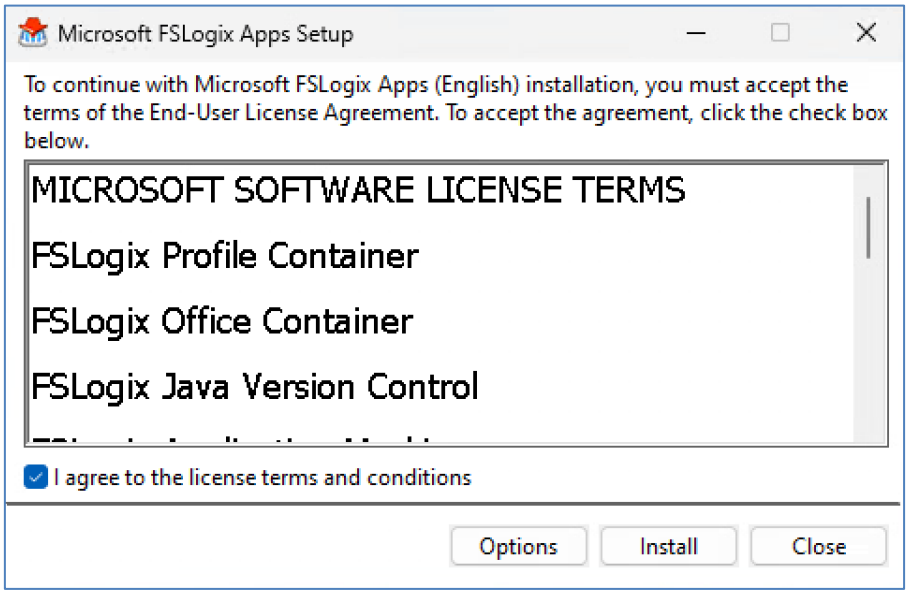
Principal	Access	Applies to	Description

CREATOR OWNER	Modify (Read / Write)	Subfolders and files only	Ensures the profile directory created by the user has the correct permissions only for that user.
EUCLAB\Domain Admins	Full Control	This folder, subfolders and files	Replace with your organizations group used for administrative purposes.
EUCLAB\Domain Users	Modify (Read / Write)	This folder only	Enables authorized users to create their profile directory. Replace with organizational users who need access to create profiles.

- Copy the GPO Templates into the appropriate folder
  - fslogix.admx to %systemroot%\policyDefinitions
  - fslogix.adml to %systemroot%\policyDefinitions\en-us

15.2 Setup FSLogix Agent

- Execute the FSLogixAppsSetup.exe



15.3 FSLogix GPO-Configuration

- FSLogix is managed via **Computer-GPO** under →Computer Configuration then →Administrative Templates then →FSLogix
- **Important**: Group Policy settings stored under HKEY_LOCAL_MACHINE\SOFTWARE\FSLogix are considered preferences and NOT policies. This means that if a Group Policy is either removed or the setting is changed to Not Configured, the registry setting will remain on the virtual machine.
  This primarily affects settings related to Apps, Logging and Profiles. ODFC settings are located under HKEY_LOCAL_MACHINE\SOFTWARE\Policies\FSLogix\ODFC and will correctly reset themselves under the above circumstances.
- FSLogix **profile** containers are a complete roaming profile solution for virtual environments. The profile container (single container), redirects the entire Windows user profile into a VHD stored on a storage provider.
  The profile container is inclusive of all the benefits and uses found in the ODFC container.
- FSLogix **ODFC containers** are a subset to the profile container and are used to redirect specific Microsoft 365 app data into a VHD stored on a storage provider.
  - Using the ODFC container in a single container configuration is recommended with third party roaming profile solutions.
  - Using the ODFC container in a dual container configuration isn't necessary or recommended.

15.4 Additional information

- During logoff of the user-session a VHD disk compaction is executed automatically, to decrease the size of the VHD(X) file
  - For that reason, the Windows server “Optimize Drives” (defragsvc) has to be set to automatic in the golden image, if modified previously by VMware OSOT.

16. Horizon Recording

Version 1.12.0, see documentation

16.1 Requirements

Horizon Recording Server

- MS Windows Server OS, static IP, Domain joined

- VM hardware: 4x vCPUs, 8GB RAM, dedicated HDD for recordings (if local)
- Local or shared NTFS for recordings
- TCP port 9443 for incoming requests has to be opened (for Web UI and Horizon Agent)

Horizon Agent

- Needs Windows 10 Build 1909 or higher (or Windows Server OS for RDSH Farms)

Omnissa Horizon 2106 or higher

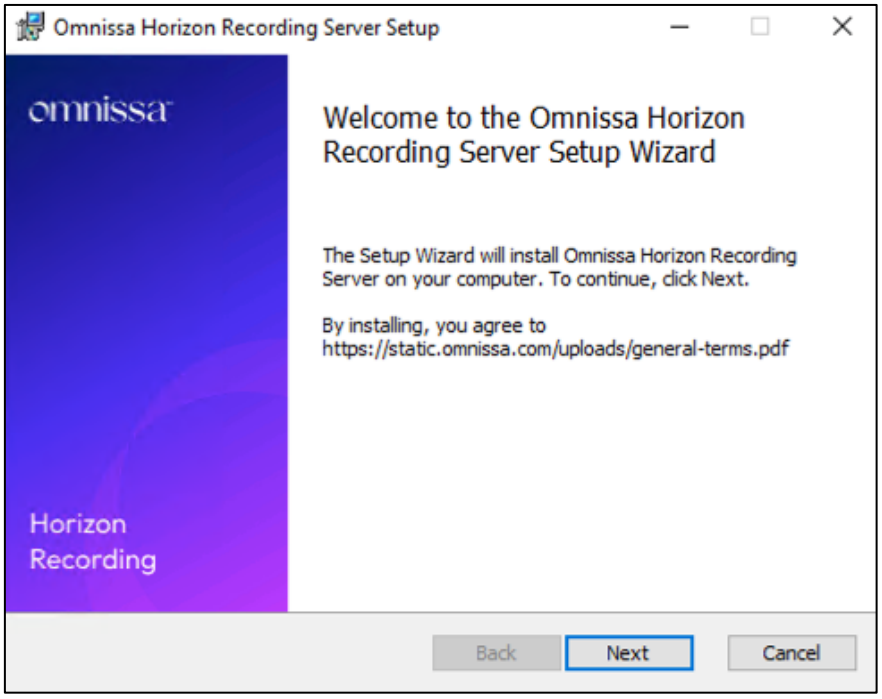
Notices

- Only Blast sessions can be recorded
- If an user has multiple displays, for every display one recording file will be created
- If notification message will be edited, a service restart for the agent is needed

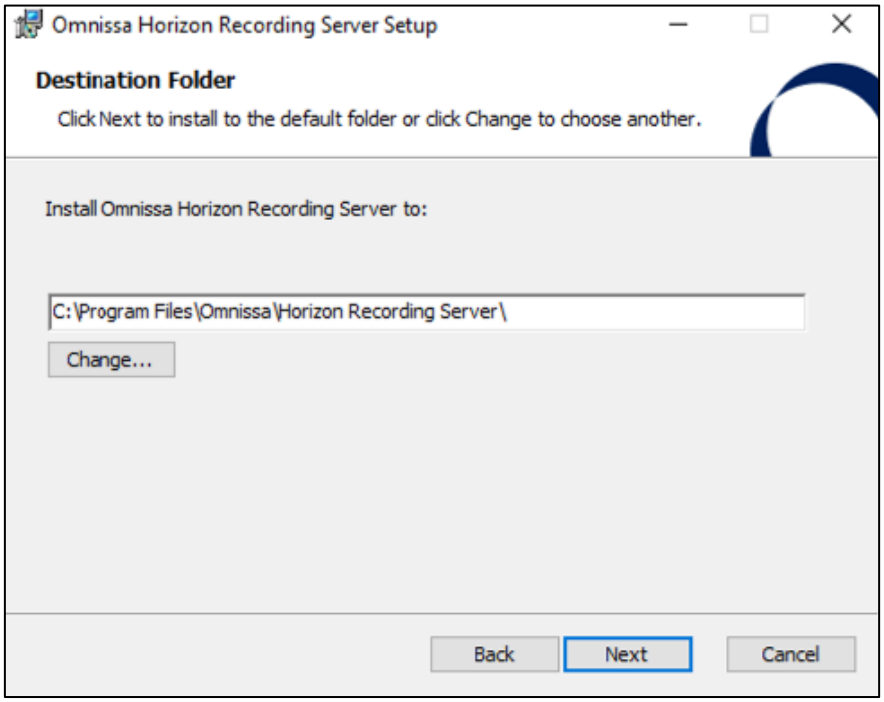
16.2 Setup

Setup Recording Server

- Execute Installer



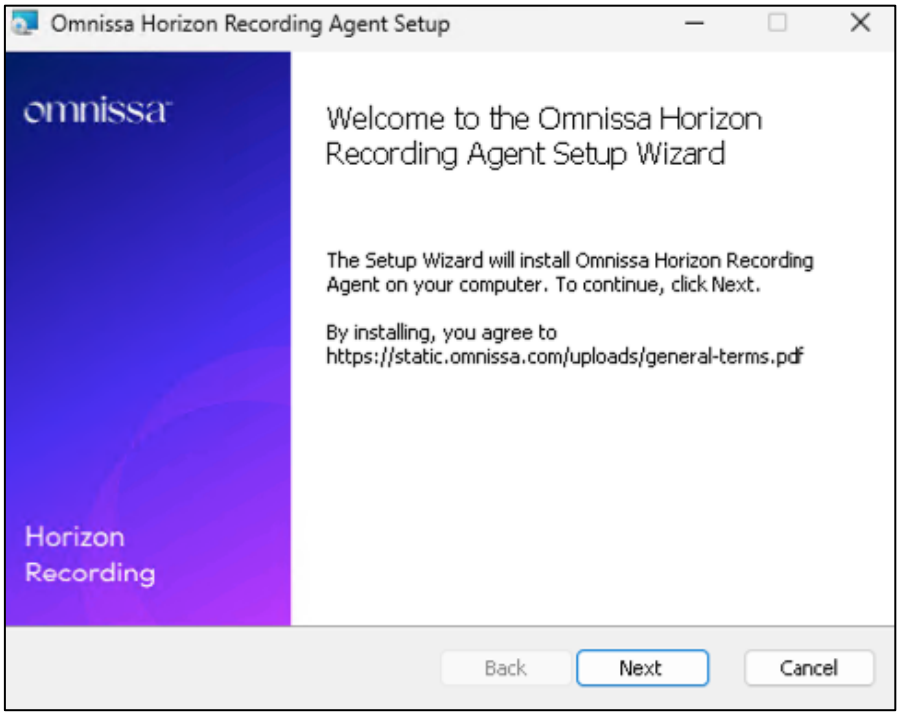
- Validate setup folder



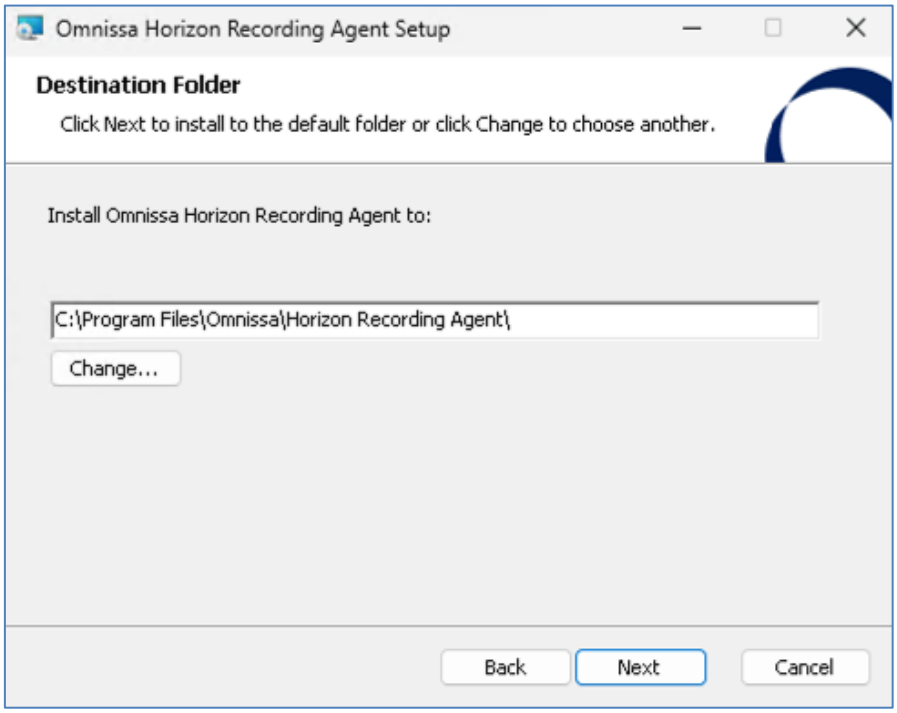
- Next and Finish

Setup Recording Agent

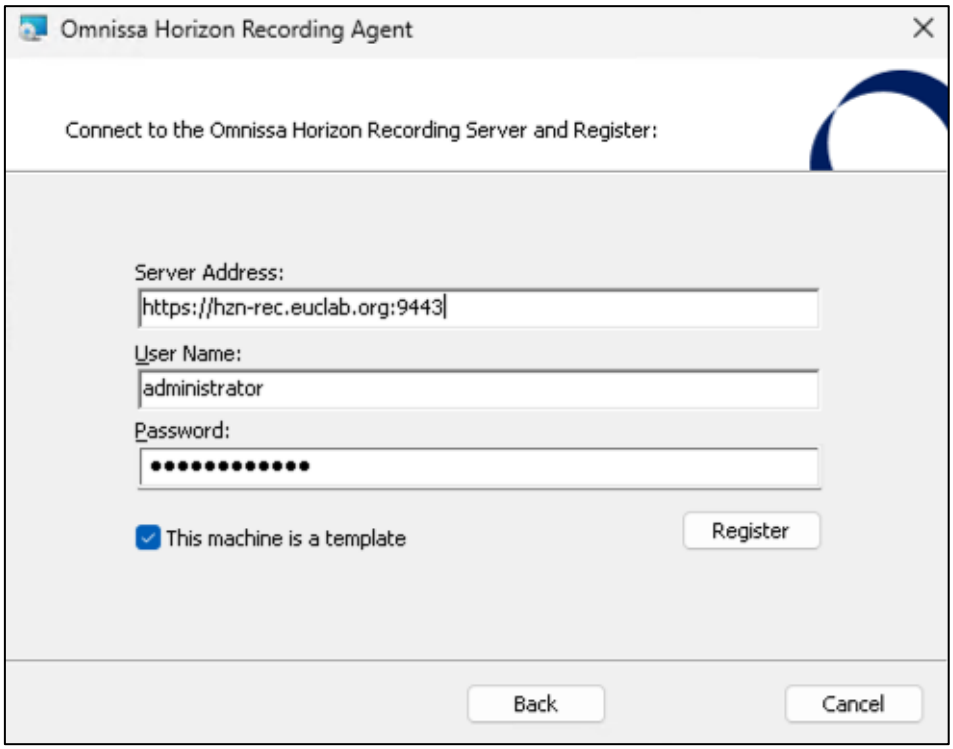
- Execute Installer



- Validate setup folder

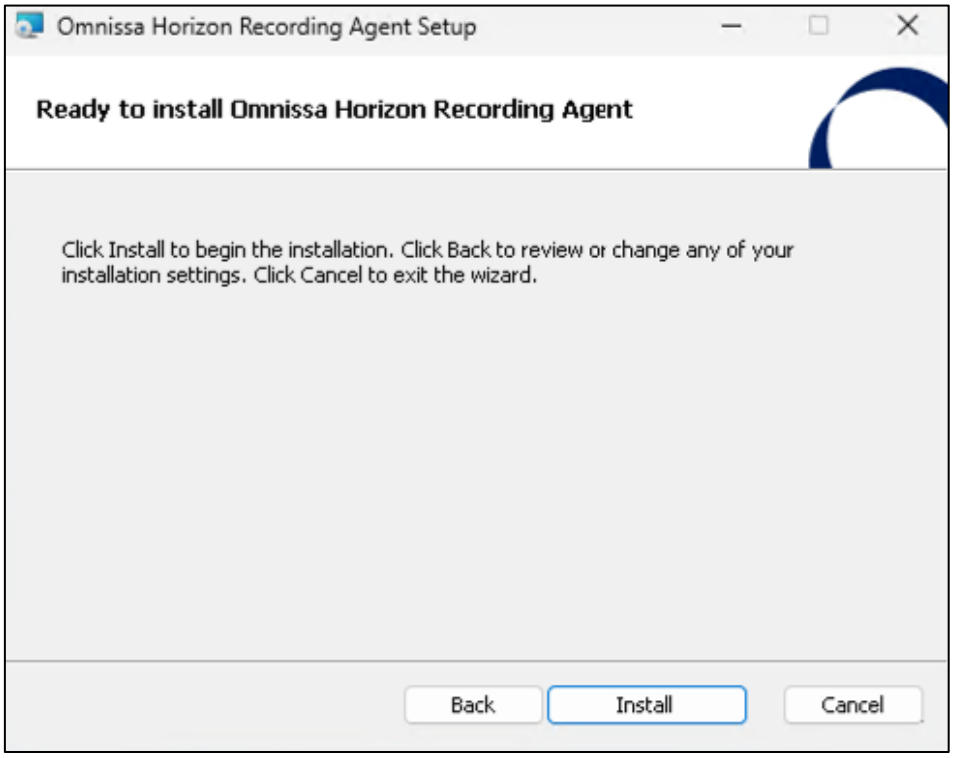


- Enter server address “https://<FQDN or IP>:9443”, the admin account for the UI, and enable the template option, if it is a golden image or similar. Click on →Register



  - If the certificate is unstrusted, you have to submit this in a pop-up window

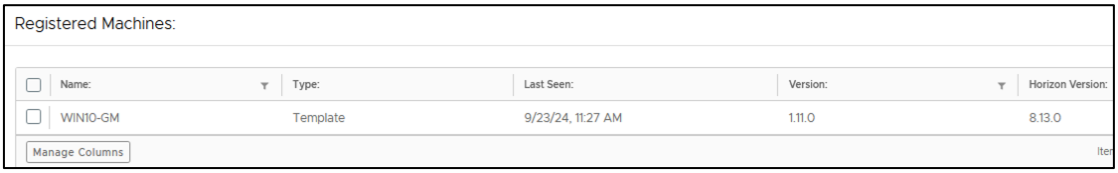
- Start installation



- The settings of the agent are stored in the Registry: HKEY_LOCAL_MACHINE\SOFTWARE\Omnissa\Horizon\Blast\Recording Agent

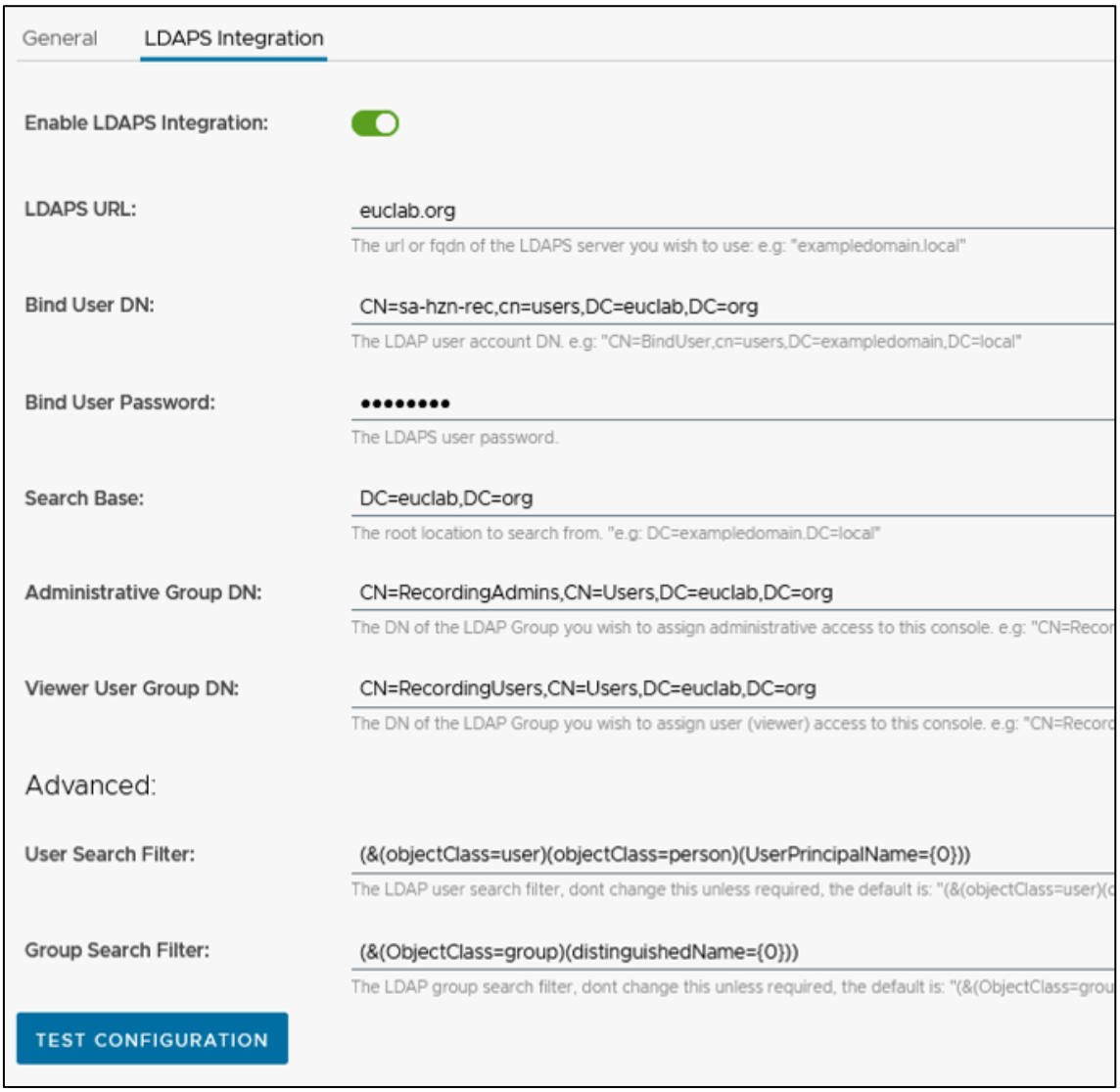
16.3 Initial configuration

- Login to the Admin UI: https://<FQDN or IP>:9443
    - Default Login for Administrator: Administrator / Recording123
    - Default Login for Viewer: Viewer / Recording456
- Go to →Administrator →Manage Agents
    - Here you can see the registered agent from the golden image VM



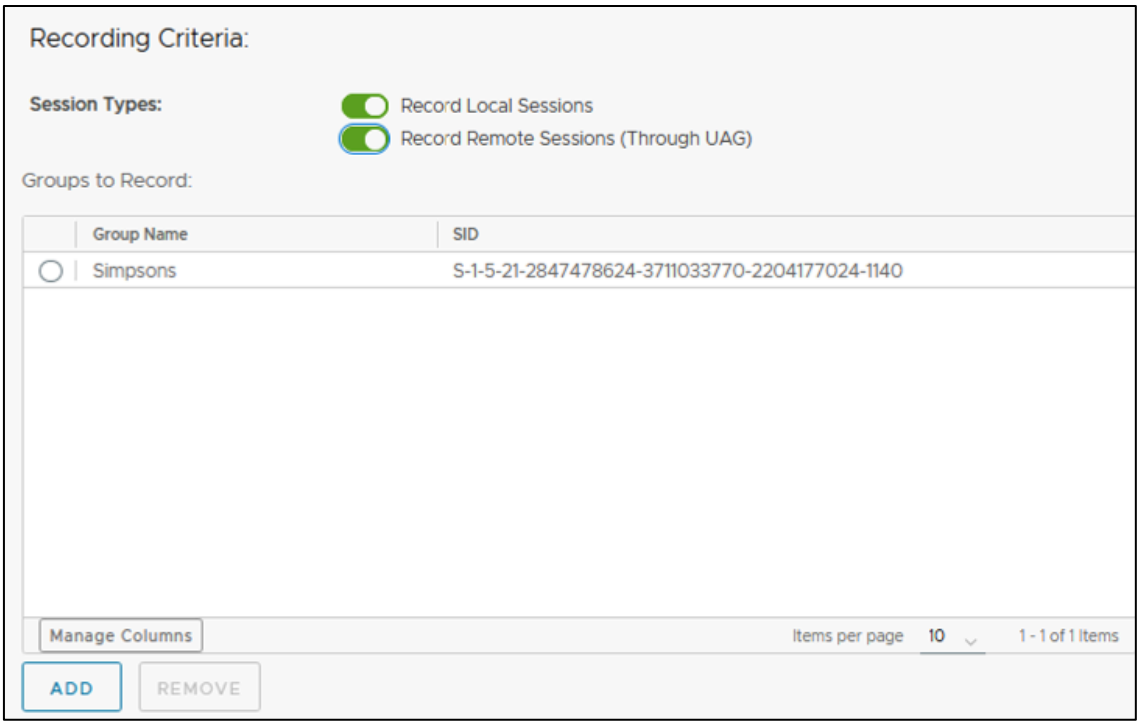
- Go to →Administrator →Service Settings to configure general items

- Authentication Settings – LDAPS integration (mandantory, if you would add AD groups for recording)



- Agent Settings
  - Notification message etc.

- Recording Criteria



- Server Settings
  - DB connection type
  - Recording Storage Folder
  - Encryption
  - Retention Settings (Default 14 days)
  - etc.

17. Horizon Integration in Omnissa Access

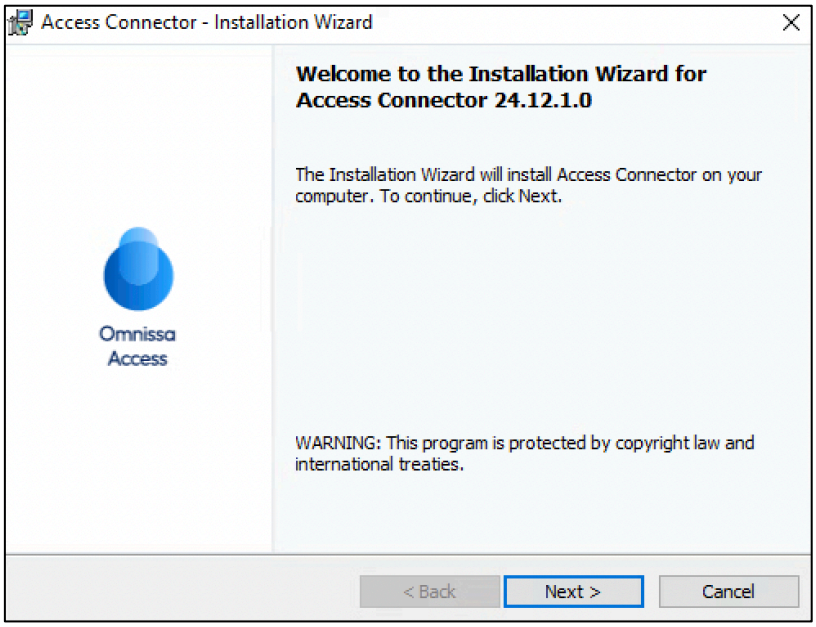
You can integrate Web apps and Virtual Apps (like Horizon applications and desktops) with Omnissa® Access™ to make these apps and desktops available to end users in the Omnissa® Intelligent Hub app and portal. Omnissa Access provides multi-factor authentication, conditional access, and single sign-on to the apps.

17.1 Setup Omnissa Access Connector

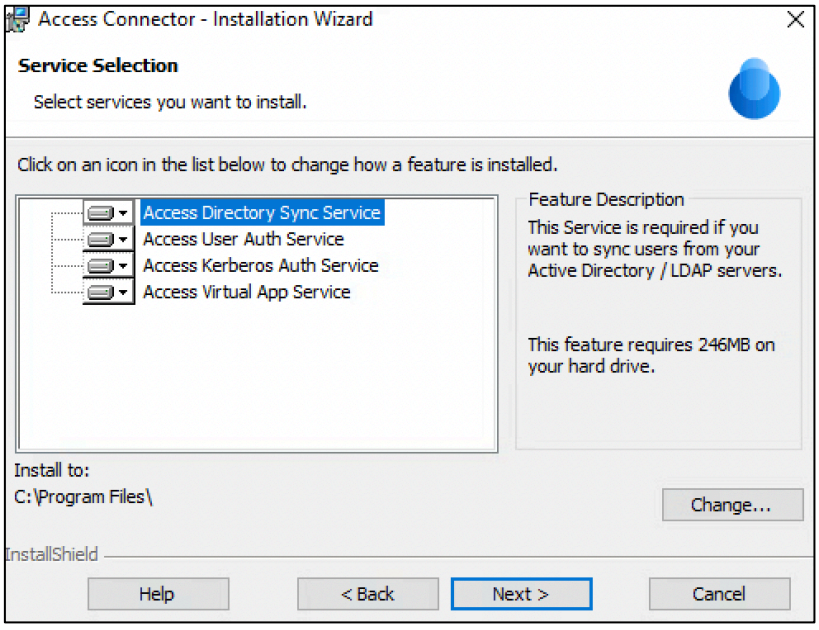
Version 24.12.1

The Omnissa Access connector integrates with on-premises infrastructure such as Active Directory, RSA SecurID, and Horizon for user authentication, directory integration, and virtual app integration[6].

- Prepare Windows Server OS (AD-joined)
- Execute the Omnissa Access Conector Installer

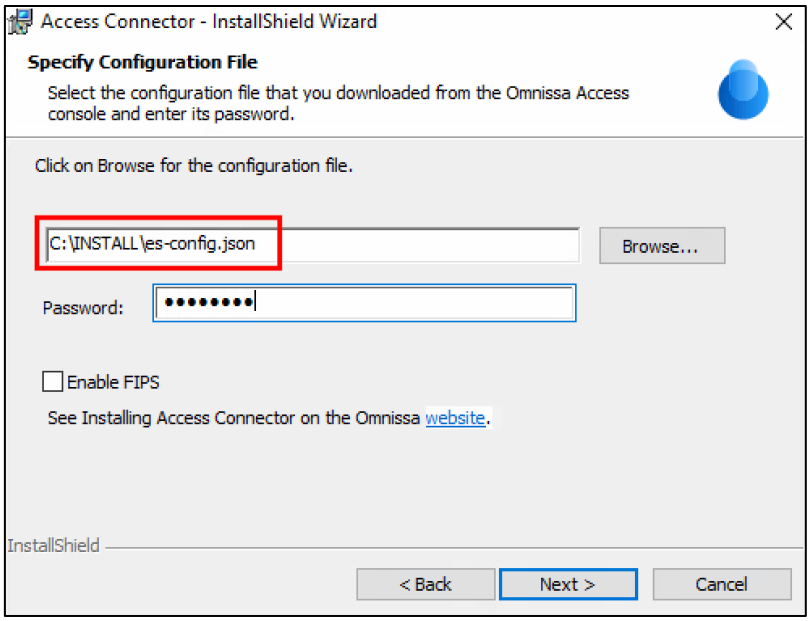


- Select the services you need (typically all of them):

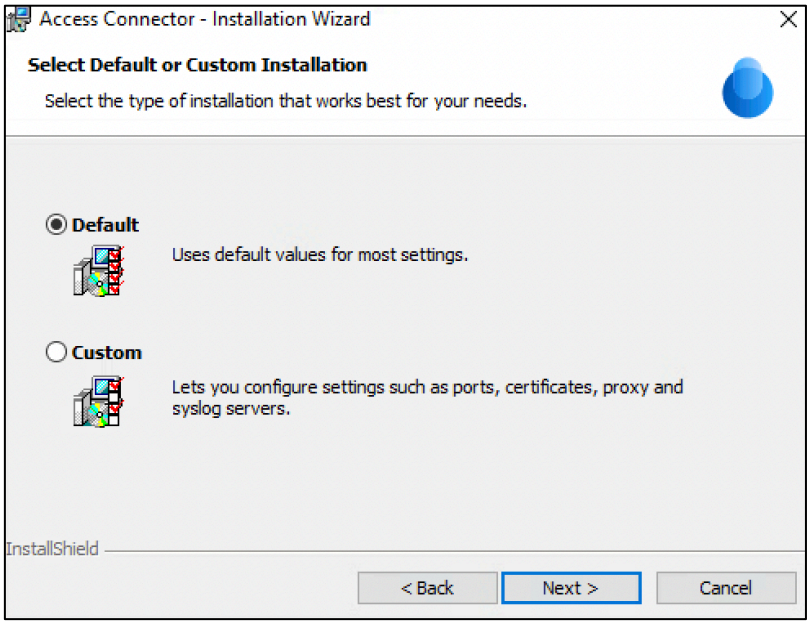


- The configuration (es-config.json) file which is needed, can be generated in the **Omnissa Access Console** via →Omnissa Connect Portal →Access →Integrations →Connectors →New

[6] Omnissa Access Connector Systems Requirements, see here

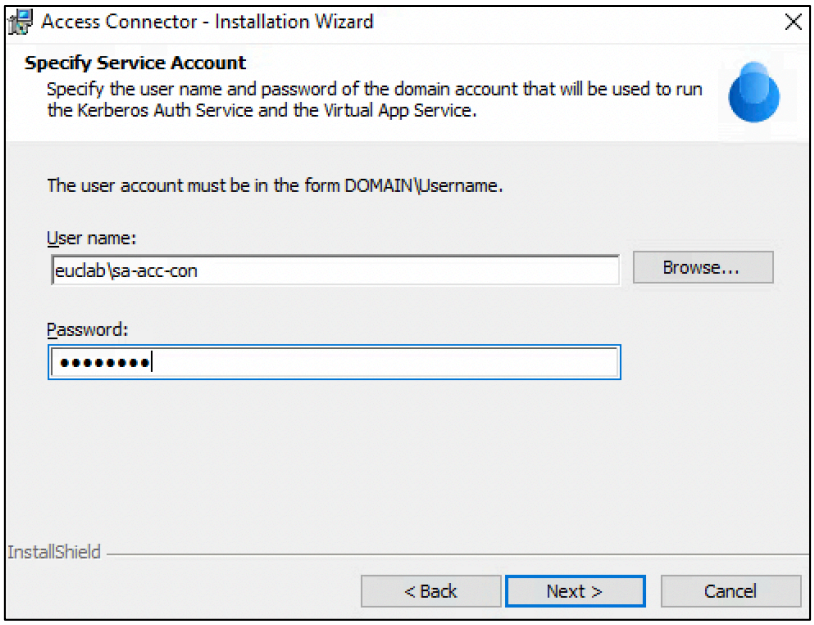


- If you are not using a proxy, you can choose the default setup option

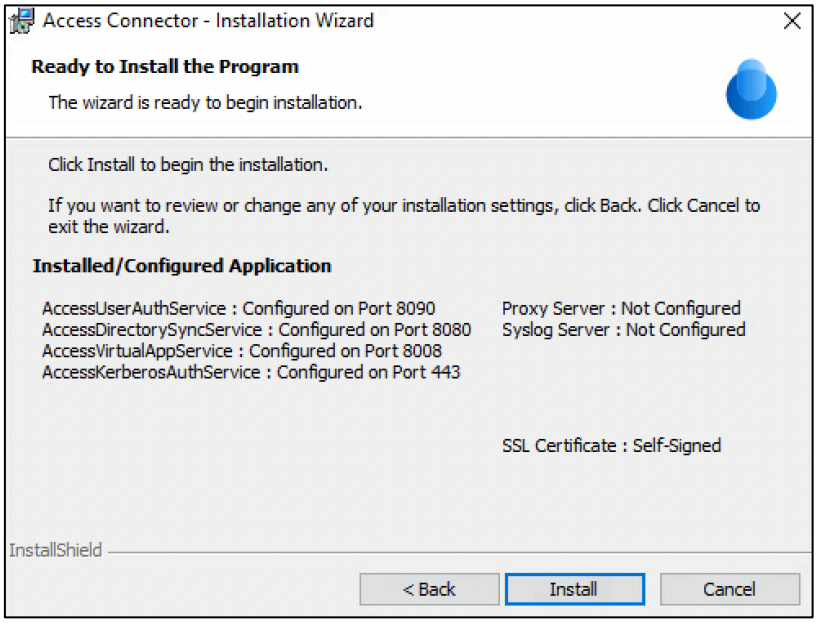


- You need to specify a service account, which is part of the Domain Admins group. After installation is complete, this account can be removed from Domain Admins. For Kerberos Auth Service, the following special characters are the only ones which are supported:

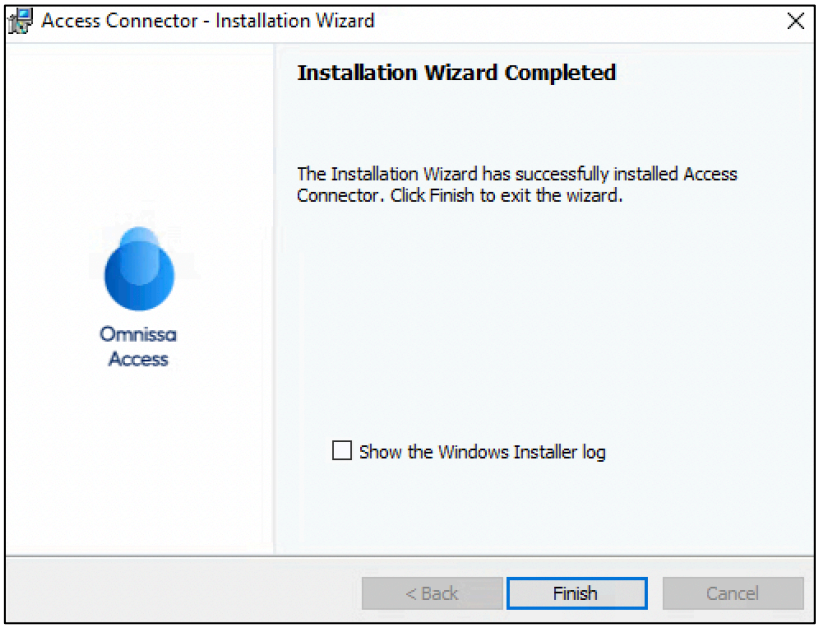
! (& % @ / = ? * , . #



- Click →Install to start the installation

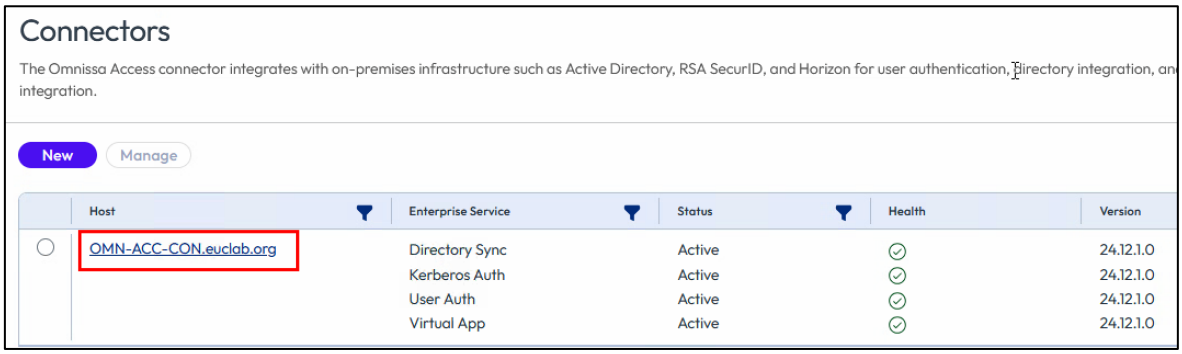


- When installation finished, you have to check, if these services are up and running:



  - Access Directory Sync Service
  - Access User Auth Service
  - Access Kerberos Auth Service
  - Access Virtual App Service

- In the Omnissa Access Console, refresh the list and verify the the newly installed Connector is shown accordingly



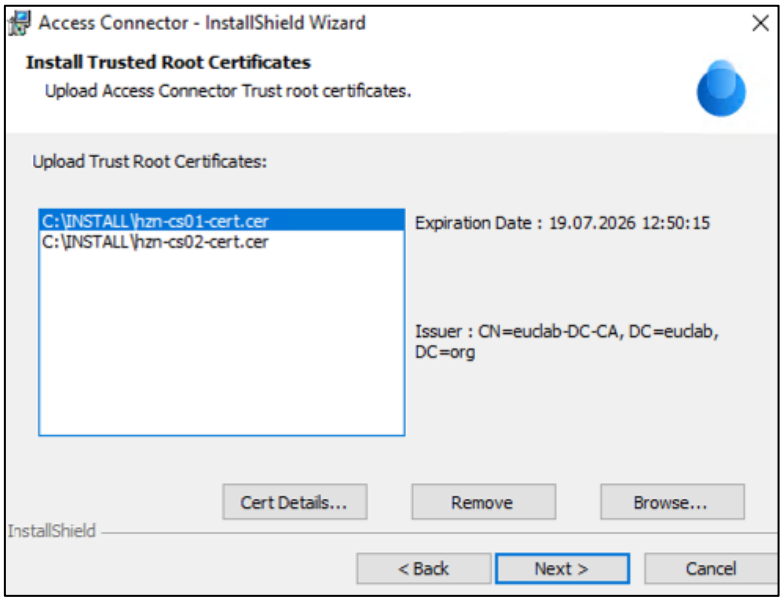
17.1.1 Upload Connection Server certificate to Omnissa Access Connector

Reference – URL

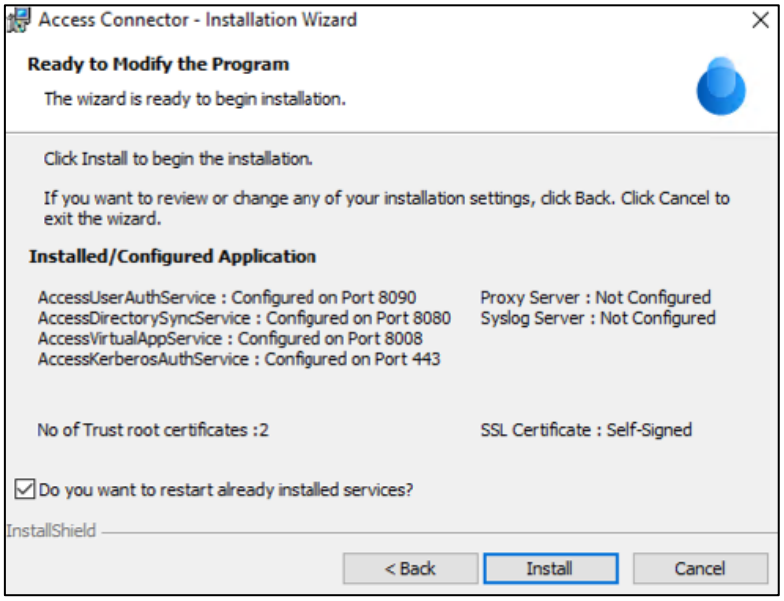
If the Horizon servers have self-signed certificates, you must upload the certificate chain to the Omnissa Access connector instances on which the Virtual App service is installed to establish trust between the connectors and the Horizon servers.

- Export the certificate(s) from the connection server(s) as cer- or pem-file.

- Execute the Omnissa Access Connector Installer again, select Add/Remove Services, and click Next, until you get the windows to →Upload Trust Root Certificates



- Click →Next until the last step, and enable the option to restart already installed services. Finish with →Install



17.2 Providing Access to Horizon Desktops and Applications in Omnissa Access

Reference – URL

Integrating Omnissa Horizon® with the Omnissa Access service lets you provide users the ability to access their assigned Horizon desktops and applications from the Omnissa Intelligent Hub app or portal. You can integrate independent Horizon pods, which consist of Horizon Connection Server instances, and pod federations, which contain multiple pods and can span multiple sites and data centers.

You deploy and manage desktop and application pools in the Horizon Console. You also create user assignments for Active Directory users and groups in Horizon, not in Omnissa Access. You must sync these users and groups to the Omnissa Access service from Active Directory before setting up the integration with Horizon.

To integrate Horizon pods and pod federations with Omnissa Access, you create virtual apps collections in the Omnissa Access console. A collection contains the configuration information for the pods and pod federation, sync settings, and other settings. You then sync the collection, which propagates Horizon resources and assignments to Omnissa Access.

In the Omnissa Access console, you can view the Horizon desktops and applications. You can also view user and group assignments for these desktops and applications.

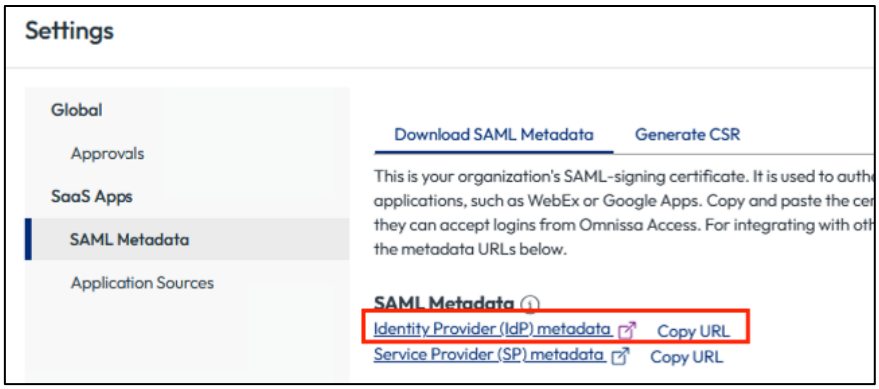
17.2.1 Configure SAML Authentication in Horizon for Omnissa Access Integration

Reference – URL

SAML authentication allow users to launch Horizon desktops and applications using single sign-on. When SAML authentication is configured, users logged into the Intelligent Hub app or portal can launch their remote Horizon desktops and applications without going through a second login procedure.

You must configure SAML authentication on at least one Horizon Connection Server instance in a pod. The best practice is to configure SAML authentication on all instances in the pod. It is NOT required to configure SAML authentication in the UAG!

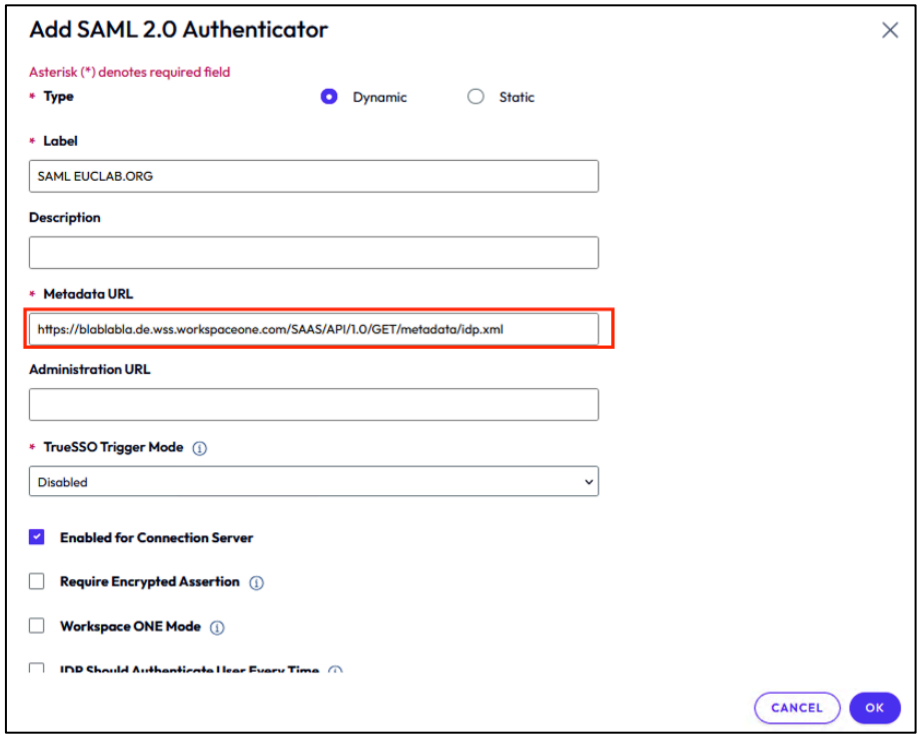
- Get the **SAML Metadata** – in **Omnissa Access Console**, go to →Resources →Web Apps →Settings. Here you can find the SAML Metadata for the IdP Provider:



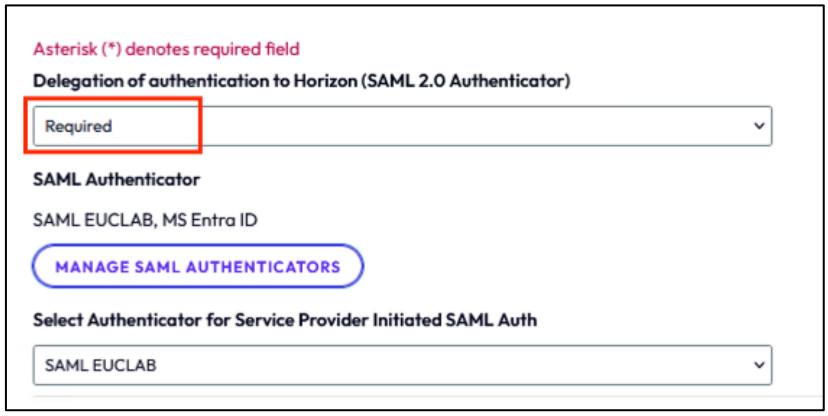
- In **Horizon Console**, go to →Settings →Servers →Connection Servers. Select the Connection Server you want to configure for SAML Authentication, and click to the tab →Authentication, to add the SAML Authenticator as **Allowed** or **Required**.
    - **Allowed** means, that a user which connects to the public URL from the UAG, is authenticated through this UAG, and the session is establishd accordingly, without using Omnissa Access for authentication. Alternatively, a user can connect and authenticate against the Omnissa Access hub, and then establish a Horizon session through the UAG.

- **Required** means, that a user which connects to the public URL from the UAG, is always forwarded to the Omnissa Access hub, and needs to authenticate, before establishing the Horizon session through the UAG.

- Click on →Manage SAML Authenticators and click →Add
  - Paste the Metadata URL you copied from the Omnissa Access Console



  - **If TrueSSO is implemented, you also need to set TrueSSO Trigger Mode to „Enabled“ or „Always“**
    - Enabled – is user entered a password and it is cached, this will be used. Otherwise TrueSSO will be used.
    - Always – TrueSSO will be used always, independed if a user password gets cached or not.
  - If you set the „Delegation of authentication to Horizon (SAML 2.0 Authenticator)“ to „**Requied**“, also enable the check box for the „**Workspace ONE mode**“ in the Authenticator settings:



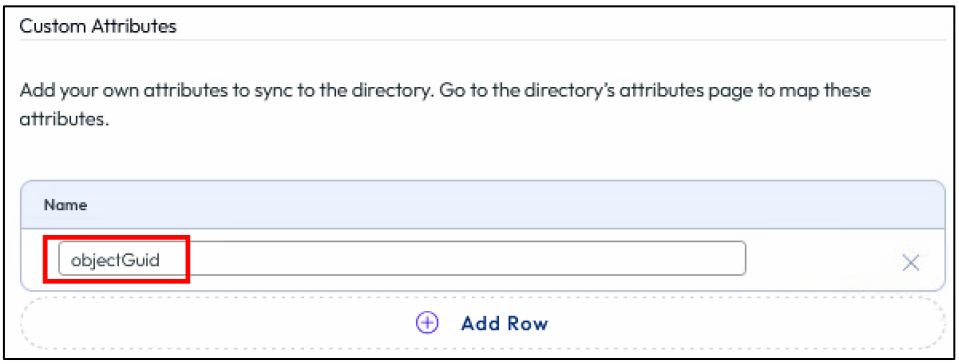
17.3 Add on-prem AD to Omnissa Access

Reference – URL

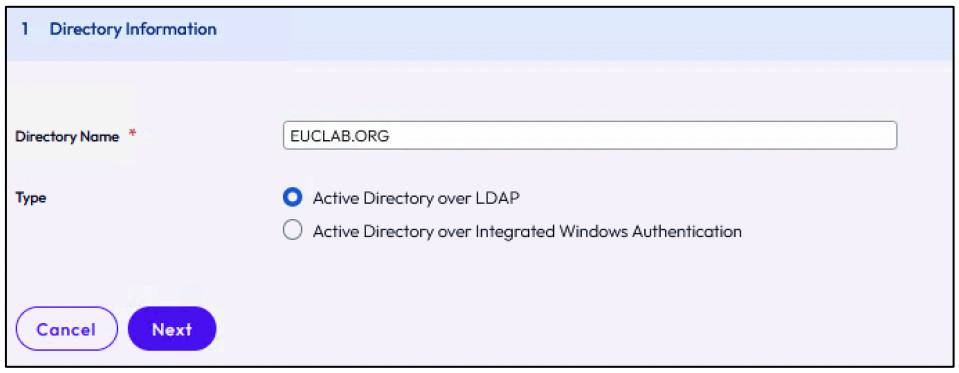
You can integrate your enterprise directory with Omnissa Access to sync users and groups to the Omnissa Access service. Omnissa Access supports integration with Active Directory and with LDAP directories such as OpenLDAP.

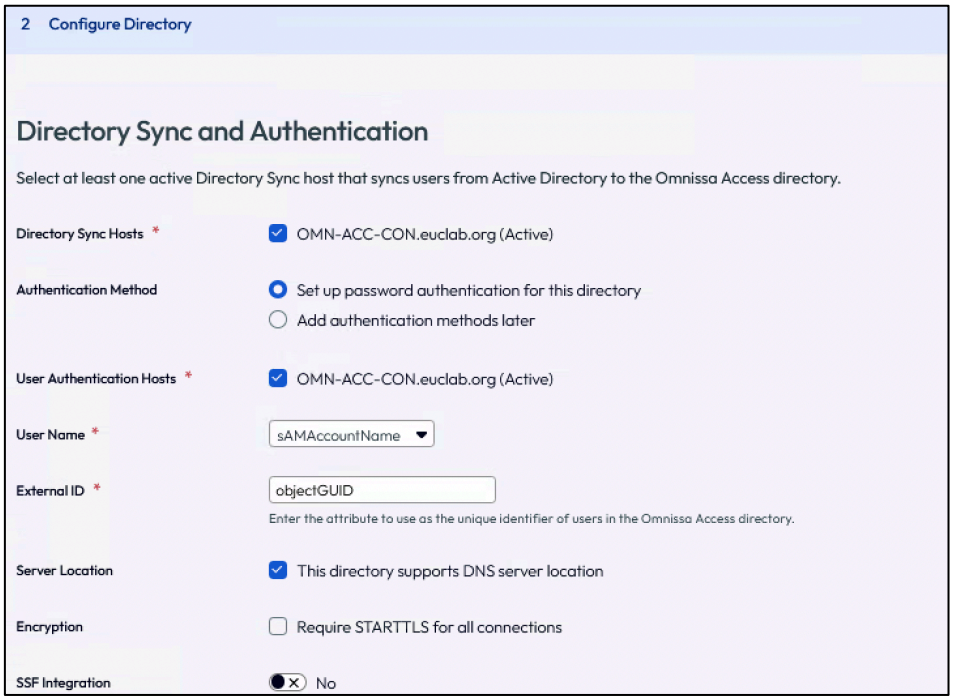
When you integrate a directory, a limited number of user and group attributes, specified by the administrator, are synced to the Omnissa Access service. User passwords and any attributes other than the ones specified by the administrator are not synced.

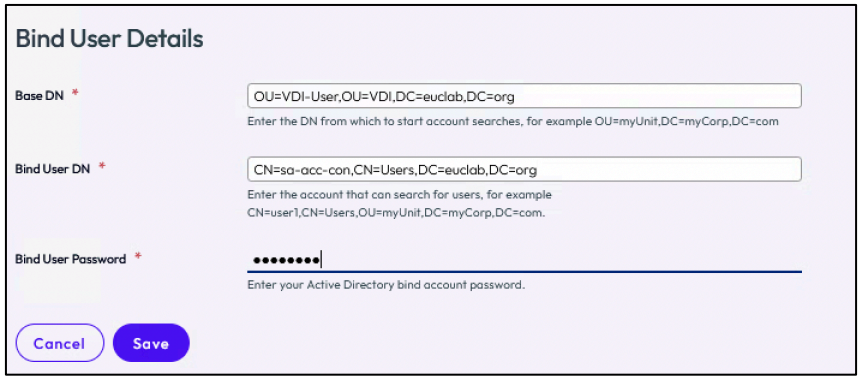
- In Omnissa Access Console, go to →Settings →User Attributes, and select the user attributes that are required
    - Add one custom attribute named objectGuid under →Custom Attributes



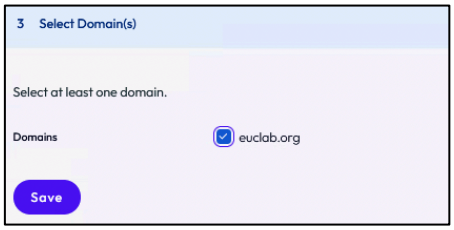
    - Click →Save when finished
- Go to →Integrations →Directories and click →Add Directory, and select →Active Directory.
    - Enter Directory Name
    - Select **Active Directory over LDAP**, if you plan to connect to a single Active Directory domain environment.
    - Select **Active Directory over IWA**, if you plan to connect to a multi-domain or multi-forest Active Directory environment.

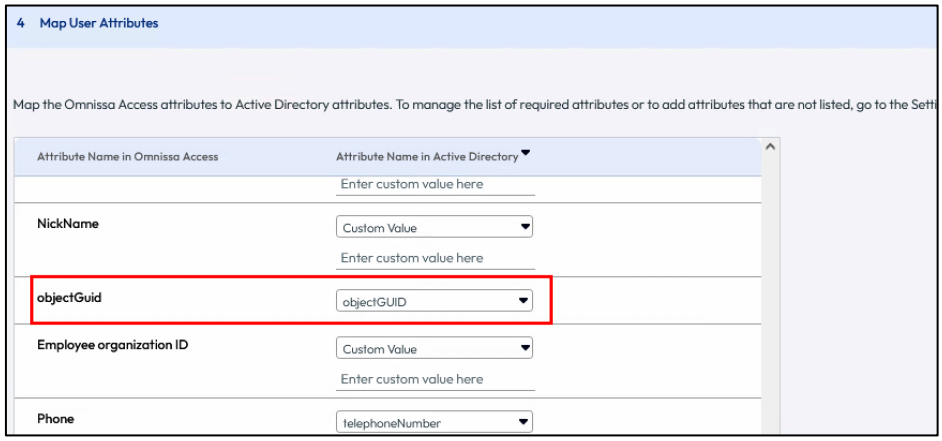
- 

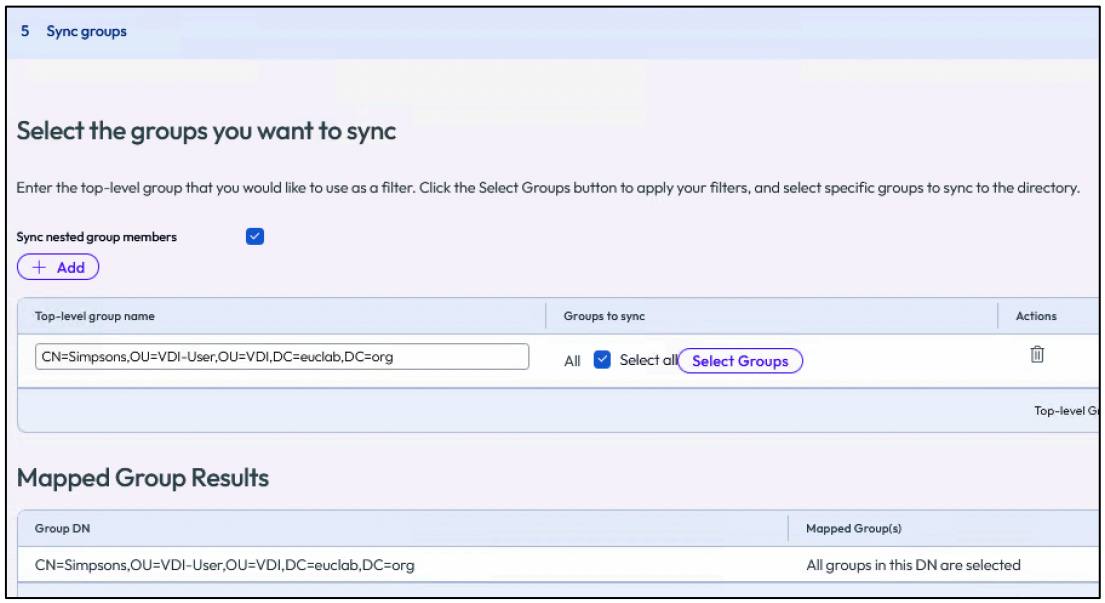
- Configure Directory
  - 

    - Enter the DN from which to start account searches
    - Enter the CN of the user account that can search for users – this account needs the following permissions:
      - Read
      - Read All Properties
      - Read Permissions
    - 

- Select Domain



- Map User Attributes
    - Set the **objectGUID** equivalent between Omnissa Access attributes and Active Directory attributes. Click →Save.
    - 

- Sync groups
    - Add all AD-groups you want to sync from AD to Omnissa Access. Enter the CN of the AD-group. Only group names are synced to the directory. Users that are members of the group are not synced to the directory until the group is entitled to an application or the group name is added to an access policy rule. Click →Save.
    - 

- Sync users
    - You can select users you want to sync

- Configure the sync frequency

17.4 Set Login Preferences in Omnissa Access

- In Omnissa Access Console, go to →Settings →Login Preferences, and enable →**Object GUID attribute for Horizon Virtual App Collection**
- If only one domain is in use, you also can disable the setting →**Show system domain on login page**. The only configured domain will be used then.
- If you are using password-based authentication in Omnissa Access and have NOT implemented TrueSSO, you can go to and enable →**Cache passwords**, to achieve SSO functionality for Horizon. Otherwise the user gets prompted for his password again, when he click on a Horizon resource.

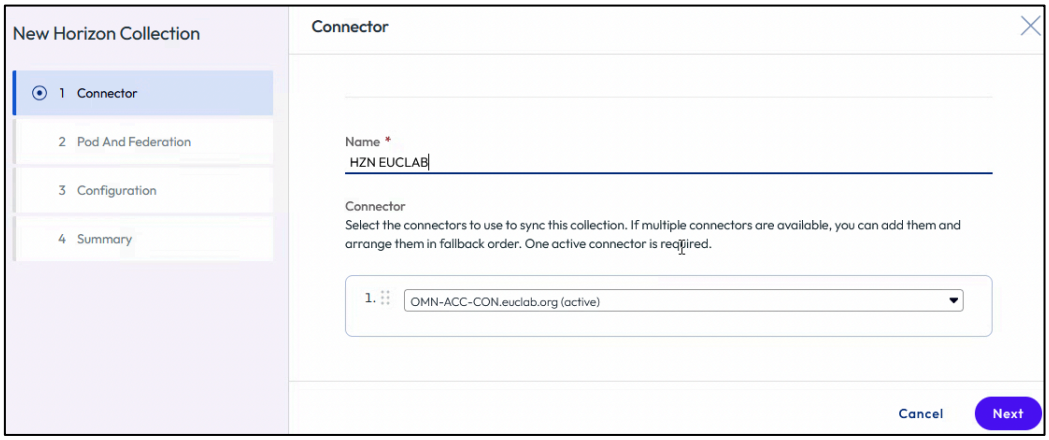
17.5 Create a Virtual App Collection for Horizon

Reference – URL

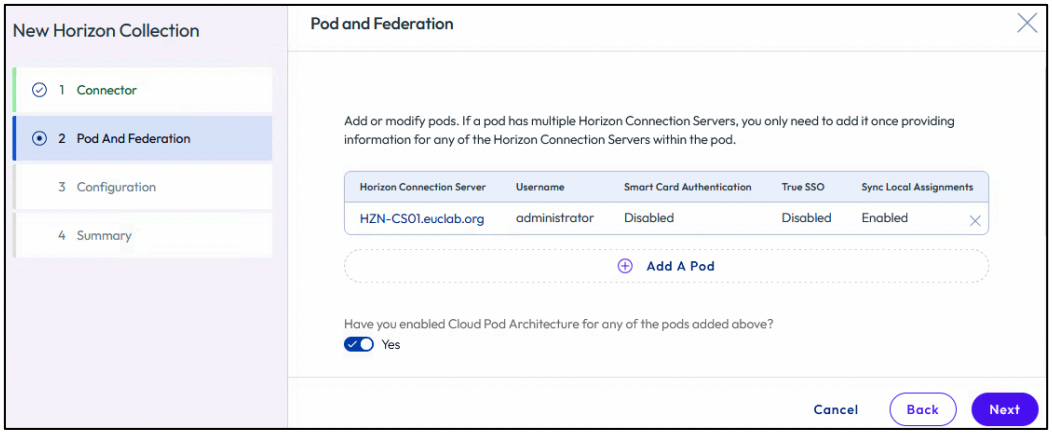
To integrate Omnissa Horizon desktops and applications with the Omnissa Access service, you create virtual apps collections. These types of integrations require you to install the Virtual App service, a component of the Omnissa Access connector (should be done already here).

- In Omnissa Access Console, go to →Resources →Virtual App Collections and click →New
- Select Horizon

- Enter a proper name and select the existing Connector

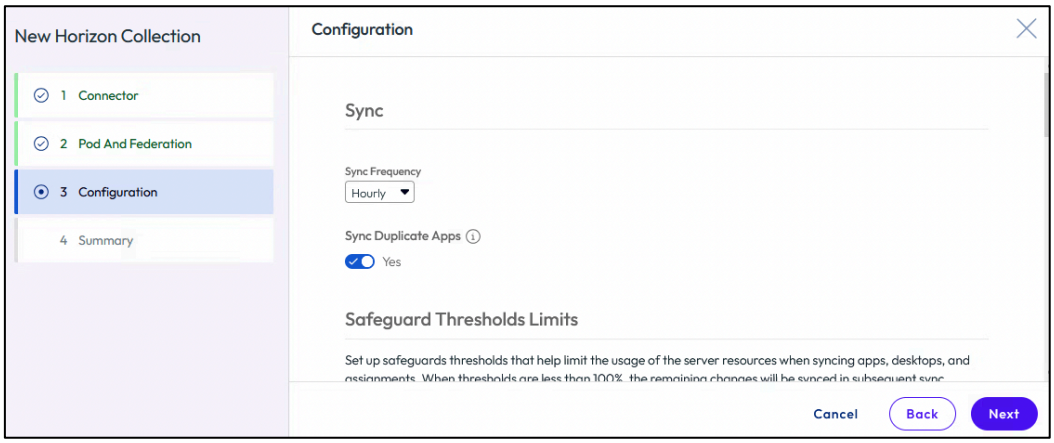


- Add at least one existing Pod. Optionally, you can add CPA configuration as well

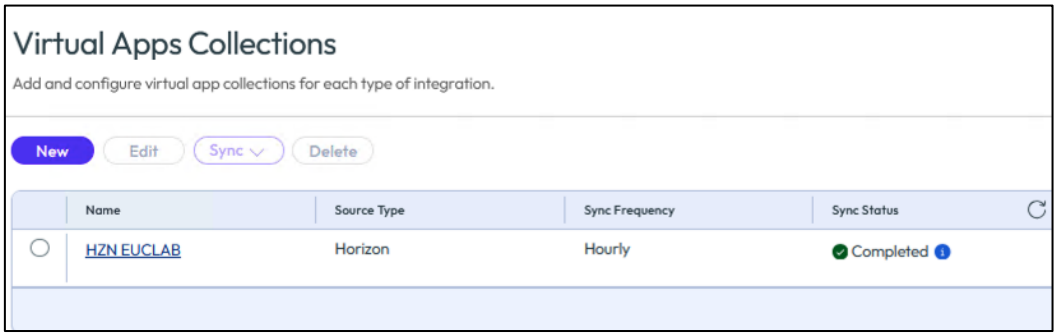


  - **If you have TrueSSO configured in your Horizon Pod, you should enable True SSO for the added Pod**.

- Setup default configuration, like sync frequency, Safeguard Threshold Limits and so on



- Save the configuration, after some moments you should see the Virtual App Collection

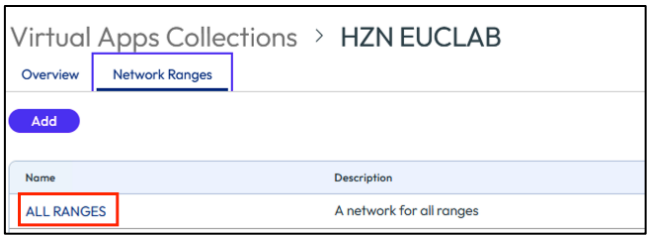


17.5.1 Assign Pod to Network Ranges

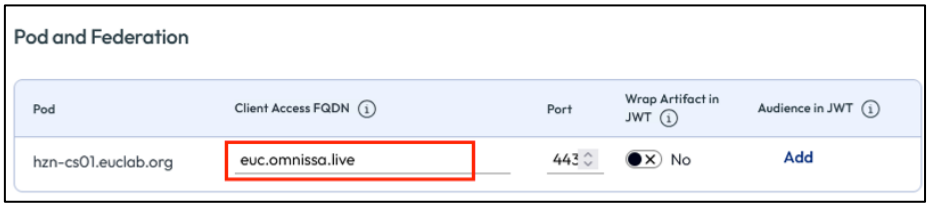
As the added Pod for the Virtual App Collection should be accessible from external, you have to assign the Pod to existing or newly created Network Ranges.

If you need to access Horizon resources through Omnissa Access from internal, you need to create a dedicated Network Range. See next chapter.

- In Omnissa Access, go to →Recources →Virtual App Collections, and select the Virtual App you just created
- Click on →Network Ranges, and select the default →ALL RANGES



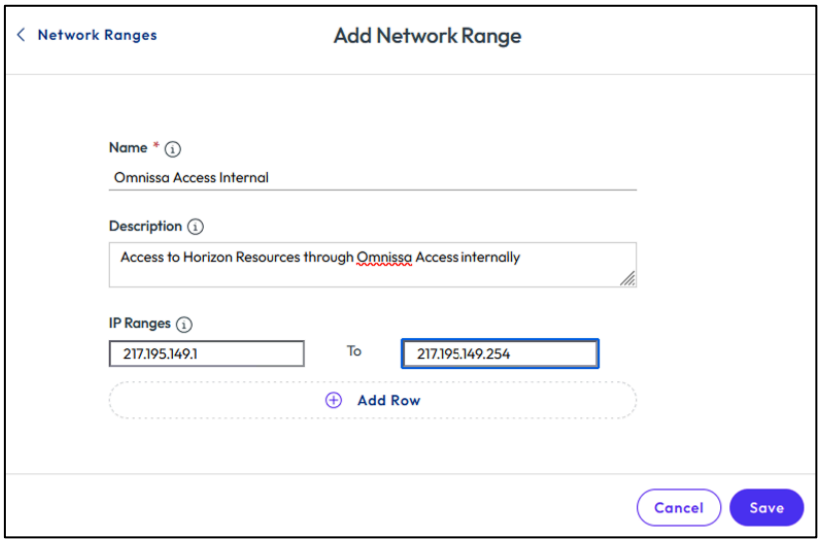
- Scroll down to “Pod and Federation”, and change the →Client Access FQDN to the external URL under the UAG is reachable from:



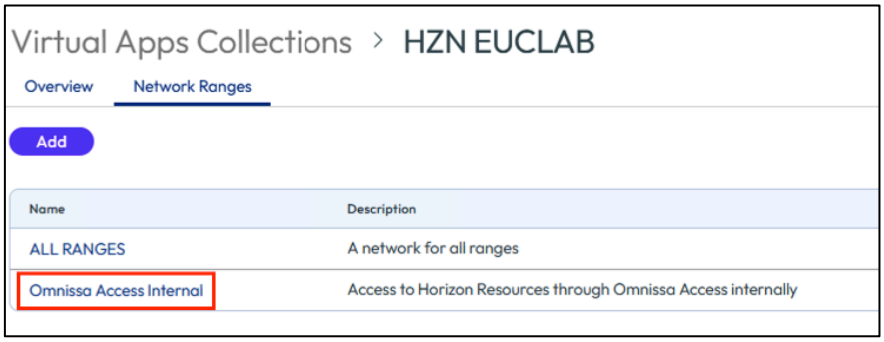
- Click →Save

17.5.2 Define Network Ranges

- To define a new Network Range (for internal access i.e.), go to →Resources →Policies and click on →Network Ranges and →Add Network Range



- To assign this newly created Network Range to a Pod, go to →Resources →Virtual Apps Collections, and select the target Virtual App. Go to →Network Ranges, and select the newly created Network Range



- Scroll down and verify that the internal FQDN for the affected Connection Server is configured:

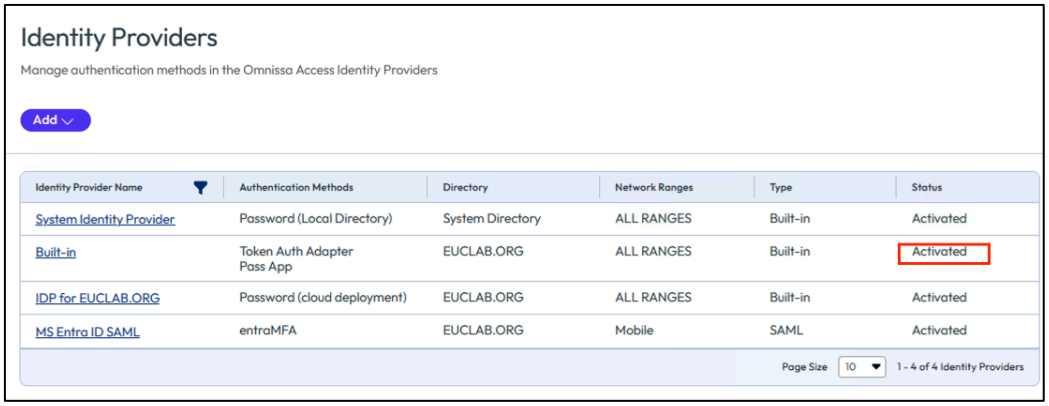
- Click →Save

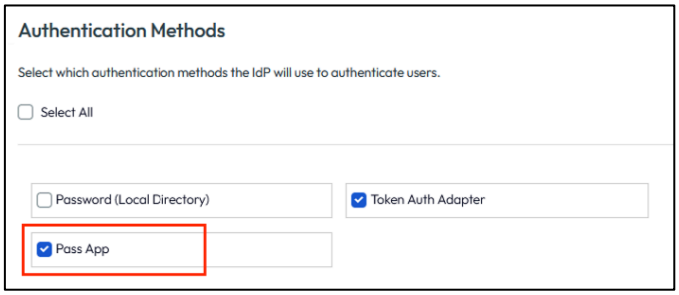
17.6 (Optional) Implementing Omnissa Pass as MFA

Omnissa Pass is a MFA solution, available as part of Omnissa Access. It is available as **Basic** (includes time-based one-time code passcodes = TOTP), and **Advanced** (includes phishing resistant protections as well as support for FIDO2 passkey credentials additionally).

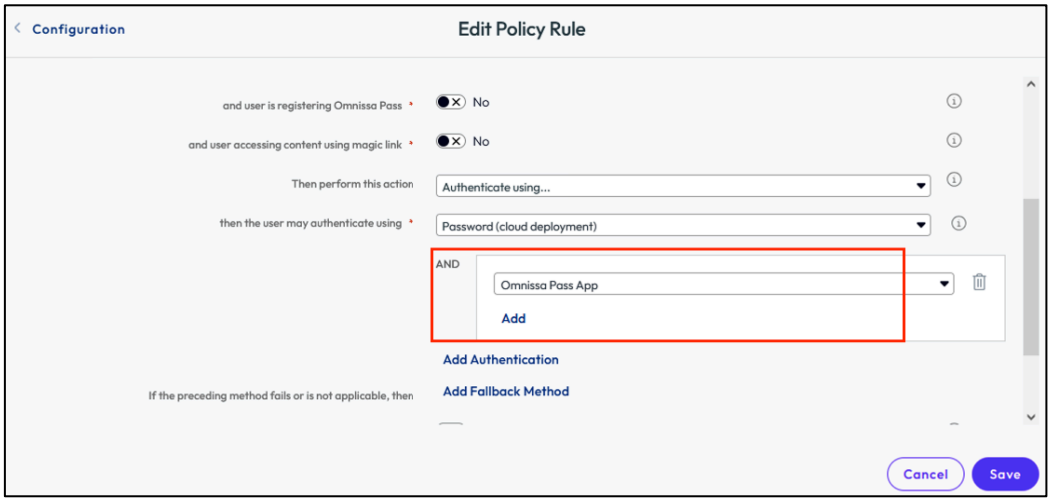
17.6.1 Prepared by Admin

- In **Omnissa Access**, go to →Integrations →Authentication Methods, select →Pass App and click →Configure
    - Enable Omnissa Pass, and configure the settings, as needed.
- Go to →Integrations →Identity Providers, select the →Build-in Provider. Confirm that the Build-in provider is activated, and under “Authentication Methids”, enable →Pass App

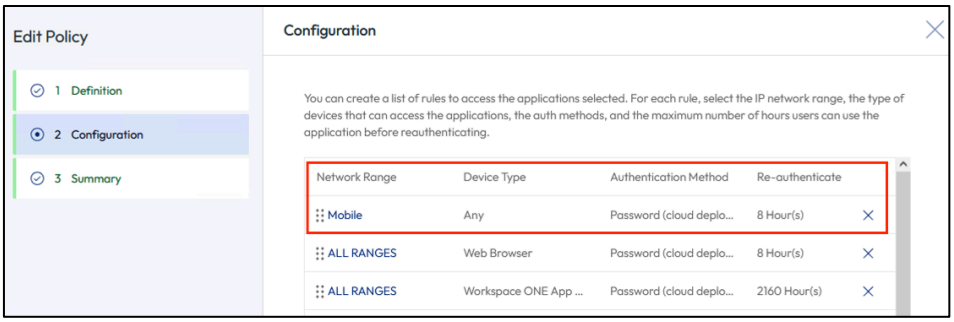




- Go to →Resources →Policies. Select the default policy, or create a new one. Add a policy rule, and configure it on your needs. To the existing authentication (like “Password (cloud deployment), add another authentication called “Omnissa Pass App”, and submit with →Save:

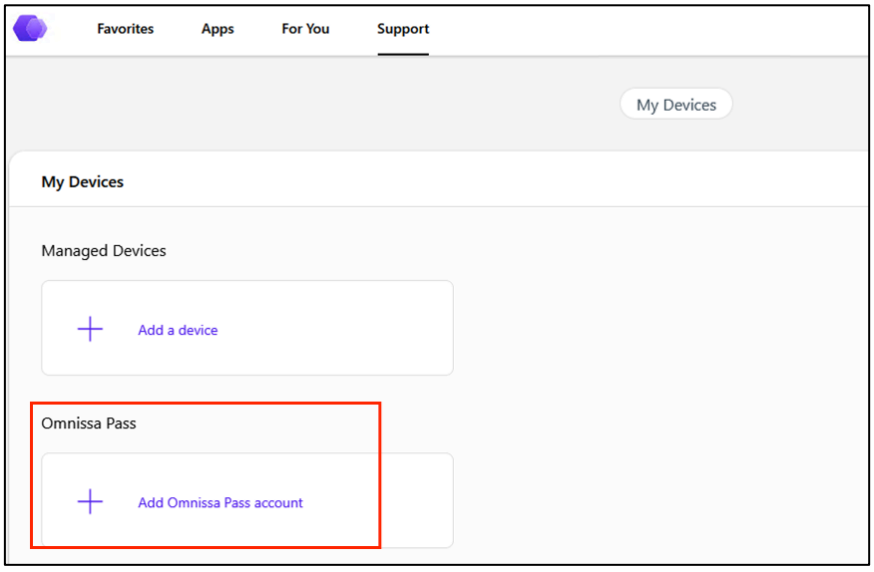


- Move the newly created policy rule to the top of the list, and click →Save:

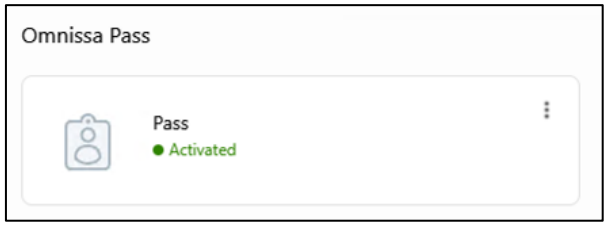


17.6.2 Prepared by End User

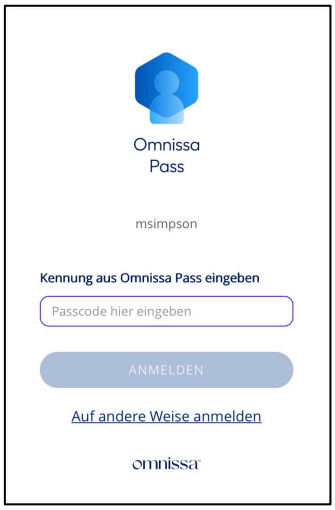
- To get Omnissa Pass working, the end user needs to download the app “Omnissa Pass” to his mobile device
- To add an account to the Omnissa Pass App, the end user needs to login to his Workspace One Hub, go to →Support, and “Add Omnissa Pass account”



- The end user needs to add an account and then scan the shown QR-code via Omnissa Pass App.
- After the account was added, it is recognized in the Hub:



- After the user is logged in via Omnissa Access, now he will be prompted for the MFA from Omnissa Pass:



18. 2FA for UAG with DUO

Simple example of a 2FA-integration with Horizon UAG and DUO

Two-Factor Authentication for VMware Horizon View (VDI)

https://duo.com/docs/vmwareview

https://duo.com/docs/authproxy-reference

To integrate Duo with your VMware View Server, you will need to install a local Duo proxy service on a machine within your network. This Duo proxy server will receive incoming RADIUS requests from your UAG, contact your existing local LDAP/AD to perform primary authentication, and then contact Duo's cloud service for secondary authentication.

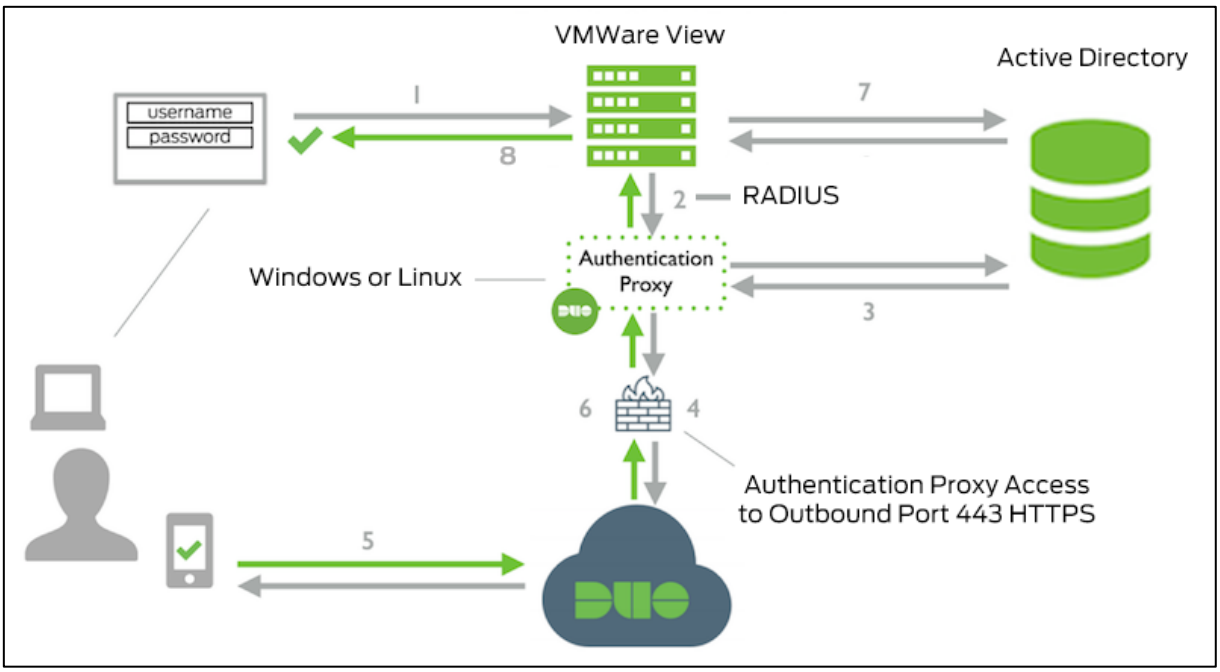


Figure 1: Network flow for DUO 2FA

You need a DUO admin account, see https://admin.duosecurity.com/

18.1 Prepare VM for DUO Proxy Service

- Setup Ubuntu Desktop 24.04 LTS[7]
- VM should have at least 1x CPU, 4GB RAM.
- Configure static IP address
- Install VMware Tools
  - Open Terminal and execute the following commands:
    ```
    sudo apt install open-vm-tools
    sudo apt install open-vm-tools-desktop open-vm-tools
    ```
  - Reboot the OS per `reboot`
  - Verify installation: |lsmod | grep vmw
- (optional) enable SSH access
  - Setup SSH:
    ```
    sudo apt update
    sudo apt install openssh-server
    ```
  - Check Status SSH: `sudo systemctl status ssh`
  - Make sure that firewall port is open for SSH: `sudo ufw allow ssh`
  - Allow SSH access for specific user:
    - Edit the file /etc/ssh/sshd_config and add this line:
      `AllowUsers` *`username`*

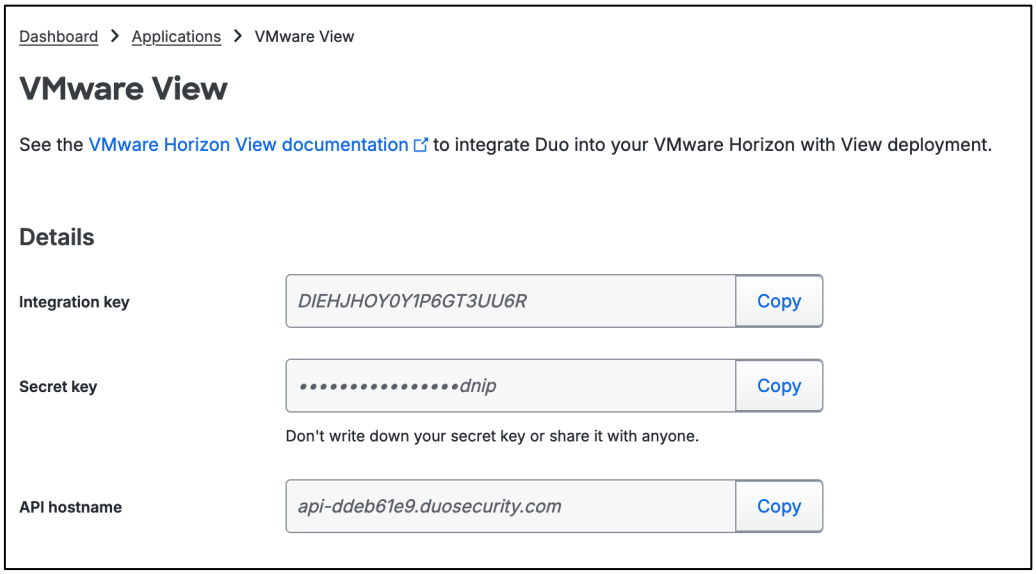
[7] https://ubuntu.com/download/desktop

- Reload the configuration: `sudo service ssh reload`

18.2 Create Acpplication in DUO

- Login to Duo Admin Panel (URL)
- Go to →Applications and click on →Protect an Application
- Select “VMware View” and click on →Protect

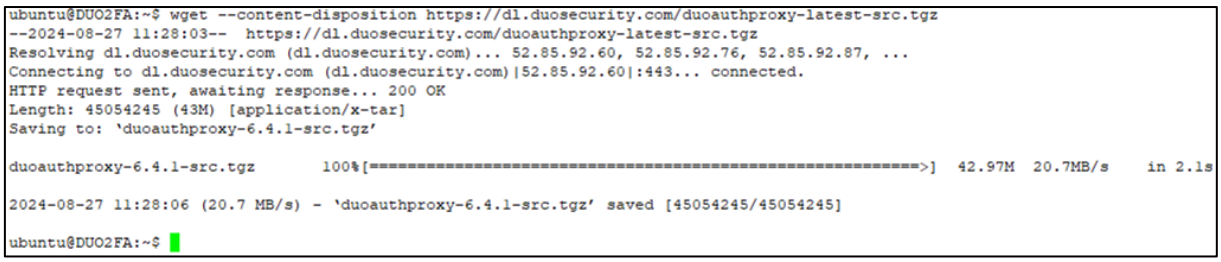
- Copy the information about **Integration key, Secret key and API hostname** to a safe place. You need these information later for the setup of the DUO Proxy Service.



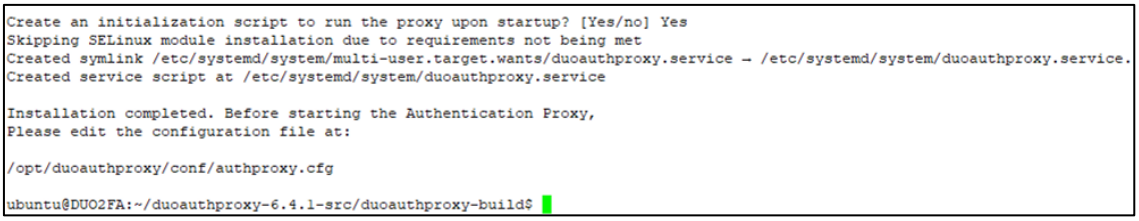
18.3 Install the Duo Authentication Proxy

- Ensure that Perl and a compiler toolchain are installed:
  `sudo apt-get install build-essential libffi-dev perl zlib1g-dev`
- Download the most recent Authentication Proxy for Unix:
  `wget --content-disposition`

`https://dl.duosecurity.com/duoauthproxy-latest-src.tgz`



- Extract the Authentication Proxy files and build it as follows:
  `tar xzf duoauthproxy-6.4.1-src.tgz`
  `cd duoauthproxy-version-src`
  `make`
- Install the authentication proxy (as root):
  `cd duoauthproxy-build`
  `sudo ./install`
  - Default user will be created to run the Authentication Proxy (duo_authproxy_svc) as well as a default user group (duo_authproxy_grp)
  -



18.3.1 Update Duo Authentication Proxy

Update from 6.4.1 to 6.6.0

To upgrade the Duo Authentication Proxy, simply download the most recent version and install it over your currently running version. The installer preserves your current configuration, log files, and encryption when upgrading to the latest release[8].

- Switch to root
  `su`
- Check Duo Authentication Proxy version
  `/opt/duoauthproxy/bin/authproxyctl version`
- Download the most recent Authentication Proxy for Unix:
  `wget --content-disposition`
  `https://dl.duosecurity.com/duoauthproxy-latest-src.tgz`
- The most recent Authentication Proxy version may have additional prerequisites beyond those installed for your current running version. You can install (or verify the presence of) these by running this command:
  `sudo apt-get install build-essential libssl-dev libffi-dev`
- Extract the Authentication Proxy files and build it as follows:
  `tar xzf duoauthproxy-6.6.0-src.tgz`

[8] https://duo.com/docs/authproxy-reference#upgrading-the-proxy

`cd duoauthproxy-version-src`
`make` (will take a few moments)

- Install the authentication proxy
  `cd duoauthproxy-build`
  `sudo ./install`

```
ubuntu@DUO2FA:~/duoauthproxy-6.6.0-src/duoauthproxy-build$ sudo ./install

In what directory do you wish to install the Duo Authentication Proxy?
[/opt/duoauthproxy]

Enter the name of a user account under which the Authentication Proxy should be run. We recommend a non-privileged and locked down account.
Or you can press <Enter> and our default locked down user will be created for you:
[duo_authproxy_svc]

Enter the name of a group under which the Authentication Proxy logs will be readable. Or press <Enter> and a default group will be created for you:
[duo_authproxy_grp]

Preparing for upgrade installation...
Removing initscript...
Removed "/etc/systemd/system/multi-user.target.wants/duoauthproxy.service".
Preserving old installation...

Copying files... Done.

Create an initialization script to run the proxy upon startup? [Yes/no] Yes
Skipping SELinux module installation due to requirements not being met
Created symlink /etc/systemd/system/multi-user.target.wants/duoauthproxy.service → /etc/systemd/system/duoauthproxy.service.
Created service script at /etc/systemd/system/duoauthproxy.service

Applying config and logs from old installation...
Removing old installation...
Upgrade complete.

Installation completed. Before starting the Authentication Proxy,
Please edit the configuration file at:

/opt/duoauthproxy/conf/authproxy.cfg
```

- Check Duo Authentication Proxy version
  `/opt/duoauthproxy/bin/authproxyctl version`
- Check Duo Authentication Proxy Service
  `/opt/duoauthproxy/bin/authproxyctl status`
- Satrt Duo Authentication Proxy Service
  `/opt/duoauthproxy/bin/authproxyctl start`

18.4 Configure and Start Authentication Proxy

The Duo Authentication Proxy configuration file is named authproxy.cfg, and is located in the conf subdirectory of the proxy installation. With default installation paths, the proxy configuration file will be located at `/opt/duoauthproxy/conf/authproxy.cfg`.

- Edit authproxy.cfg
  `sudo nano /opt/duoauthproxy/conf/authproxy.cfg`
  - ad_client section

```
[ad_client]
host=dc.euclab.org
service_account_username=sa-duoservice
service_account_password=VMware1!
search_dn=DC=euclab,DC=org
```

- radius_server_challenge section

```
[radius_server_challenge]
ikey=DIEHJHOY0Y1P6GT3UU6R
skey=********************PP79GIc2Rrcng2xdnip
api_host=api-ddeb61e9.duosecurity.com
radius_ip_1=192.168.188.36
radius_secret_1=VMware1!VMware1!
failmode=safe
client=ad_client
port=1812
```

  - radius_ip = IP address of the Connection Server or UAG

- in case of troubleshooting, edit the main section accordingly for debug mode

```
[main]
debug=true
log_dir=log
log_max_files=6
log_max_size=10485760
```

  - default for debug mode is ‘false”
  - Log files are located under `/opt/duoauthproxy/log`

- Start the Authentication Proxy
  `sudo /opt/duoauthproxy/bin/authproxyctl start`

```
ubuntu@DUO2FA:~$ sudo /opt/duoauthproxy/bin/authproxyctl start
Running a validation of your configuration...
[info]  Testing section 'ad_client' with configuration:
[info]  {'host': 'dc.euclab.org',
         'search_dn': 'DC=euclab,DC=org',
         'service_account_password': '*****',
         'service_account_username': 'sa-duoservice'}
[info]  There are no configuration problems
[info]  ---------------------------
[info]  Testing section 'radius_server_challenge' with configuration:
[info]  {'api_host': 'api-ddeb61e9.duosecurity.com',
         'client': 'ad_client',
         'failmode': 'safe',
         'ikey': 'DIEHJHOY0Y1P6GT3UU6R',
         'port': '1812',
         'radius_ip_1': '192.168.188.36',
         'radius_secret_1': '*****',
         'skey': '*****[40]'}
[info]  There are no configuration problems
[info]  ---------------------------
[info]  SUMMARY
[info]  No issues detected

The results have also been logged in /opt/duoauthproxy/log/connectivity_tool.log

Checking updates for Duo Authentication Proxy...
[info]  No updates detected. Your Duo Authentication Proxy is up to date.
ubuntu@DUO2FA:~$
```

  - Verify that service is running via
    `sudo /opt/duoauthproxy/bin/authproxyctl start`

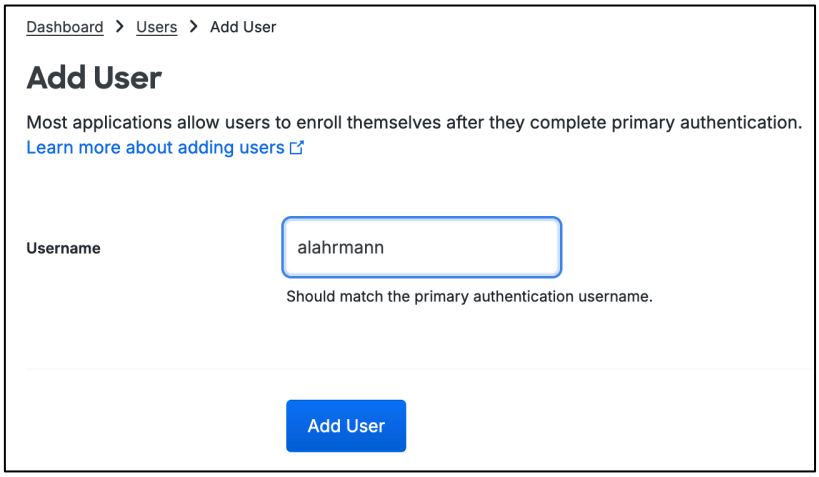
- Verify functionality via Connectivity Tool:
  `sudo /opt/duoauthproxy/bin/authproxy_connectivity_tool`

- You can check the status of the service also this way:
  - `sudo systemctl status duoauthproxy`

18.5 Enroll users for using DUO 2FA

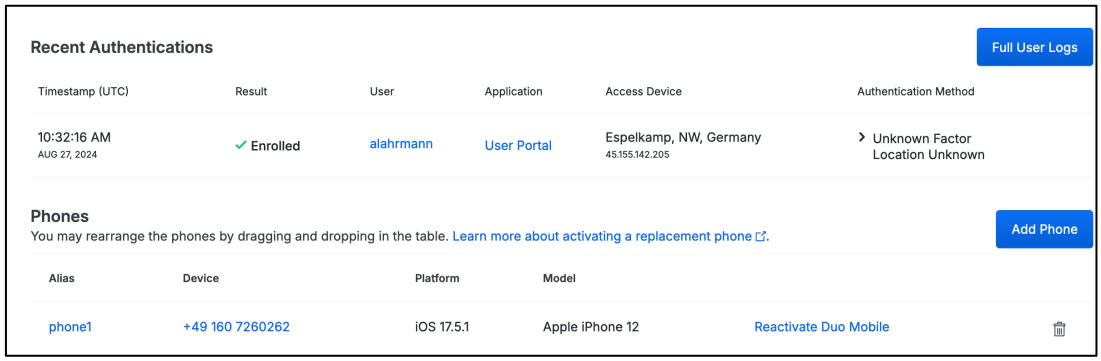
With DUO Free Edition, users from local AD cannot synced automatically to Duo Cloud Service. So users have to be added manually in Duo Admin Panel (URL).

- Click on →Users →Add User on the left to add a user manually



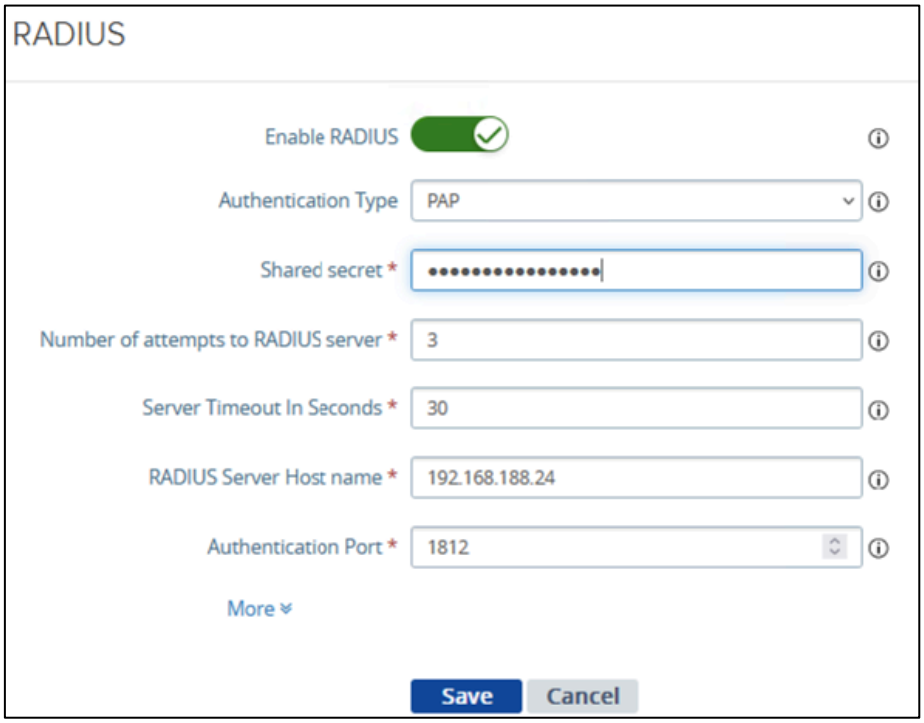
  - Enter user's mail address
- Once generated, click on →Send Enrollment Email on the top right

- User will get the enrollment URL via mail
  - When user has finished enrollment, you can see the details in DUO Admin portal



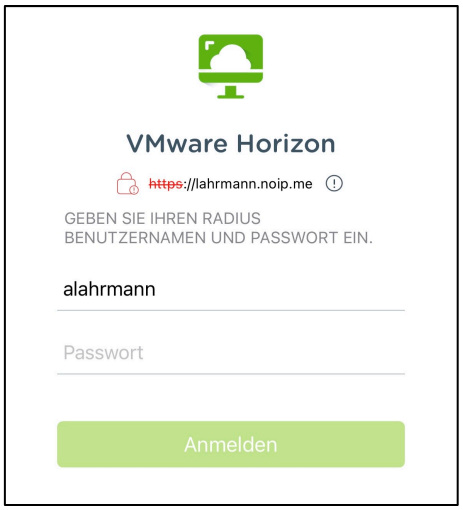
18.6 Configure UAG for Radius

- Configure RADIUS as Authentication Setting

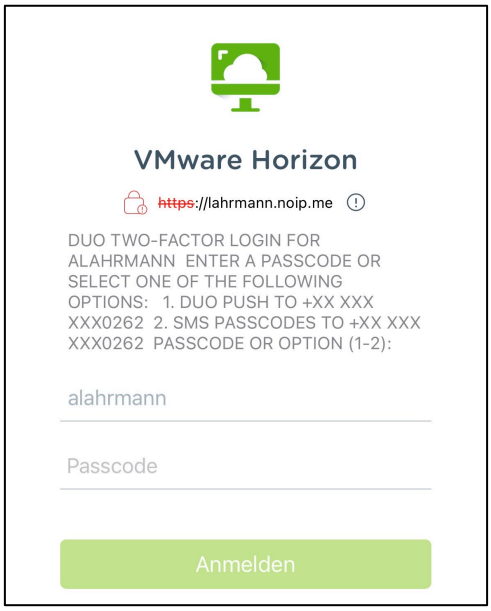


18.7 Verify external access per 2FA

- Launch Horizon Client (here from iOS), and enter username and (AD-)password



- You can choose now between (1) Duo Push per App or (2) SMS passcode. Alternatively, you can enter the passcode from Duo app directly.



19. Add MS Entra ID as IdP to Omnissa Access

Reference – URL

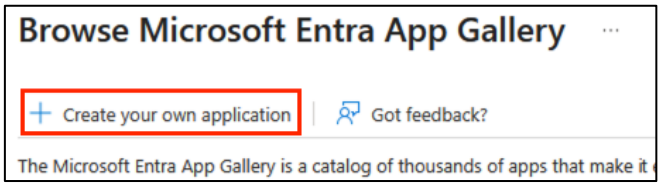
In the Omnissa Access console, you can configure **Microsoft Entra ID MFA** as the secondary authentication method for any supported primary authentication methods in the Omnissa Access service. You configure Microsoft **Entra ID as an identity provider (IDP)** in the Omnissa Access console and then you configure an **Omnissa Access authentication access policy rule** that makes Microsoft Entra ID MFA the secondary authentication method in the rule.

You then configure an **Entra conditional access policy in the Microsoft Entra admin center** to apply the access controls to manage how the secondary authentication is implemented after Omnissa Access primary authentication is completed.

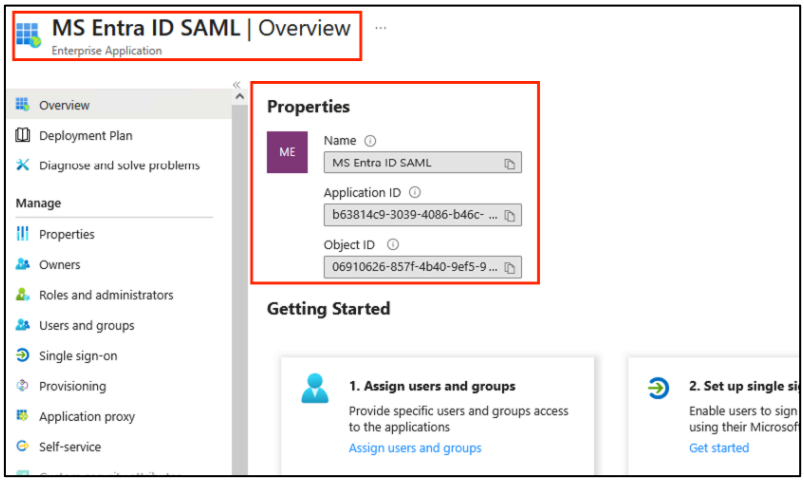
Users use their existing authentication method to log in to Omnissa Access and are then prompted for the Microsoft Entra ID MFA without an additional Entra ID login prompt.

19.1 Create Enterprise Application in Entra ID

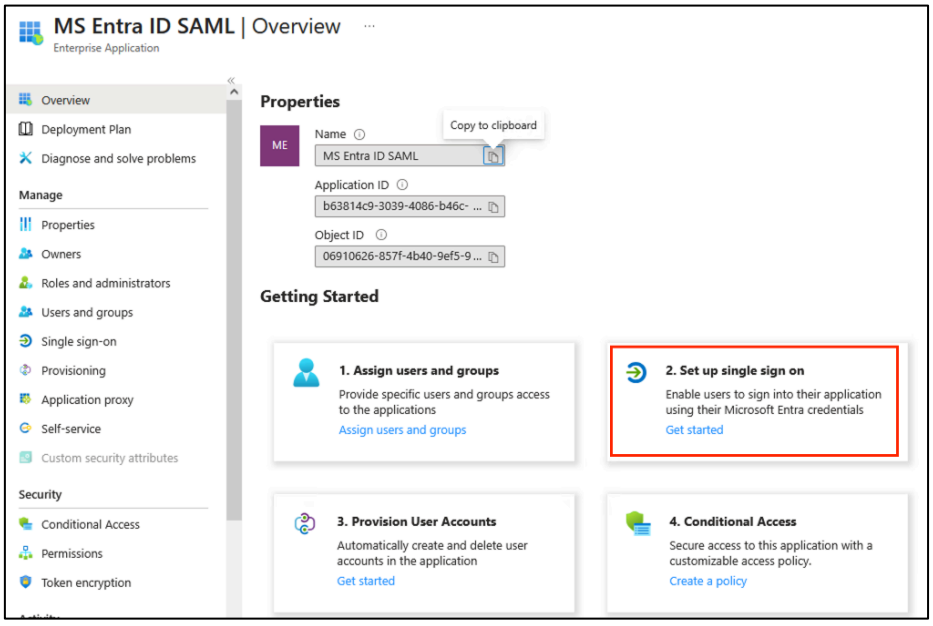
- In **MS Entra admin center**[9], go to →Entra ID →Enterprise apps →All applications and click →New application →Create your own application



- Set a name and choose "Integrate any other application you don't find in the gallery (Non-gallery)
- In the end of the process you should see the new application



- Select the previously created enterprise application, and go to →Set up single sign on

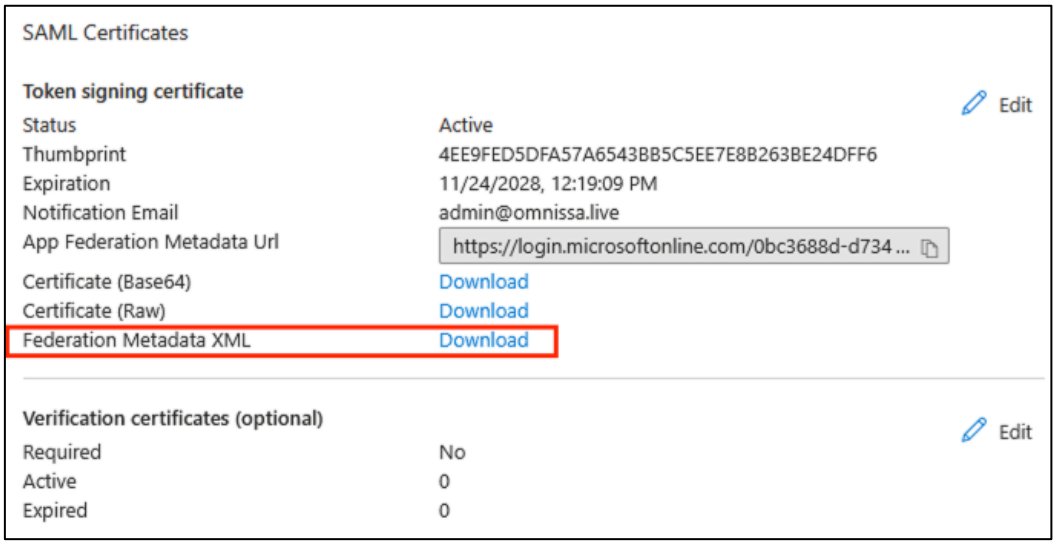


- Select →SAML
- You need to configure the "**Basic SAML configuration**", and add the following fields:

[9] https://entra.microsoft.com

- **Identifier**: https://HORIZON_UAG_FQDN/portal
  (i.e. https://euc.omnissa.live/portal)
- **Reply URL**: https://HORIZON_UAG_FQDN/portal/samlsso
  (i.e. https://euc.omnissa.live/portal/samlsso)
- **Sign on URL**: https://HORIZON_UAG_FQDN
  (i.e. https://euc.omnissa.live)
- Click →Save

- Under →SAML Certificates, you now can download the IdP metadata:

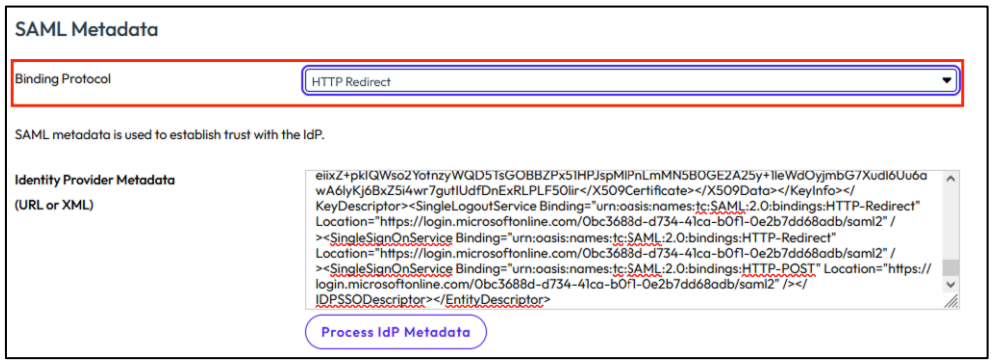


19.2 Configure Entra ID as IdP in Omnissa Access

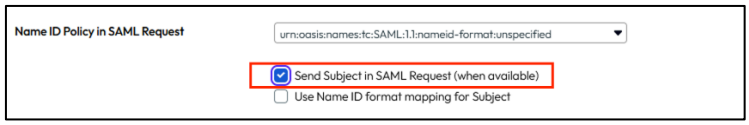
- In **Omnissa Access**, go to →Integrations →Identity Providers, click →Add and select SAML IDP
- Configure the settings for SAML IDP
  - General Information (Identity Provider Name and Type)

- Under Identity Provider Metadata, enter the content from the previously downloaded xml file and click →Process IdP Metadata

- Under “Binding Protocol”, select →HTTP Redirect



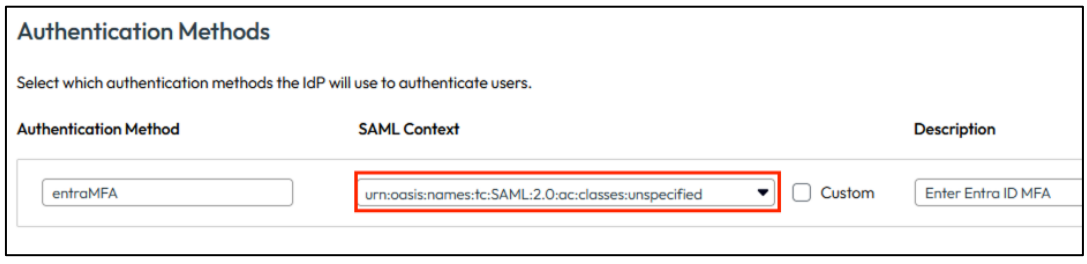
- Enable “Send Subject in SAML Request (when available)”



- Select the users which can authenticate using this IdP

- Select the networks this IdP can be accessed from (typically no internal networks)

- Enter the authentication method with the given SAML contect and a description for end users



20. Configure Horizon - UAG with MS Entra ID as IdP

Reference – URL

Prerequsites:

- A Microsoft Entra user account with an active subscription. If you don't already have one, you can Create an account for free. (just a personal Microsoft account is not sufficient!)
- In Entra ID, create a service accouont which has the “Hybrid Identity Administrator” role assigned.

20.1 Add custom domain name to Entra ID tenant

Reference – URL

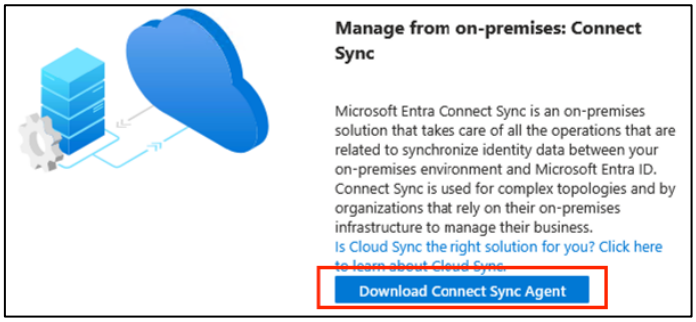
Microsoft Entra tenants come with an initial domain name like domainname.onmicrosoft.com. You can't change or delete the initial domain name, but you can add your organization's DNS name as a custom domain name and set it as primary. By adding your domain name, you can add user names that are familiar to your users, such as alain@contoso.com.

20.2 Sync on-prem AD with MS Entra ID

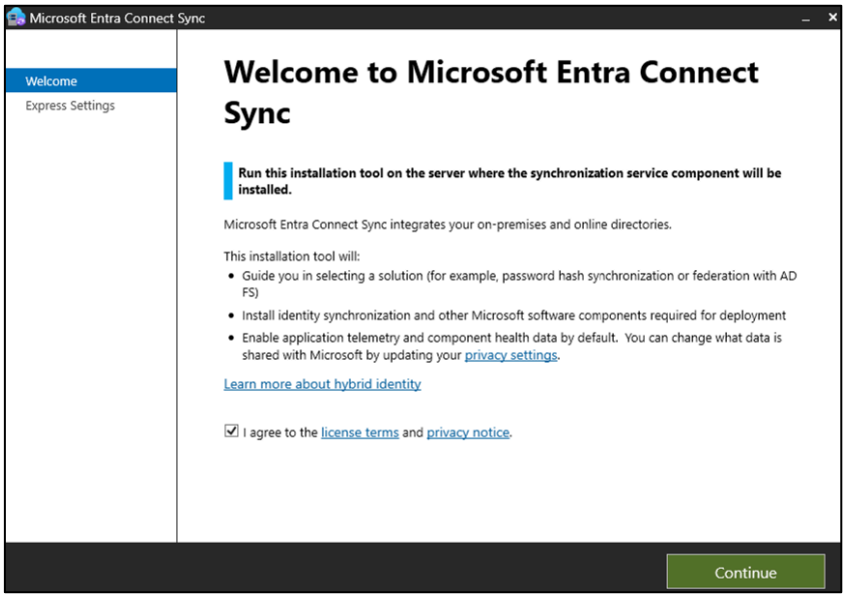
MS Entra Connect Sync, Version 2.5.79.0

With a MS Entra Connect Sync server AD users and groups can be synced between an on-prem AD and the Entra ID.

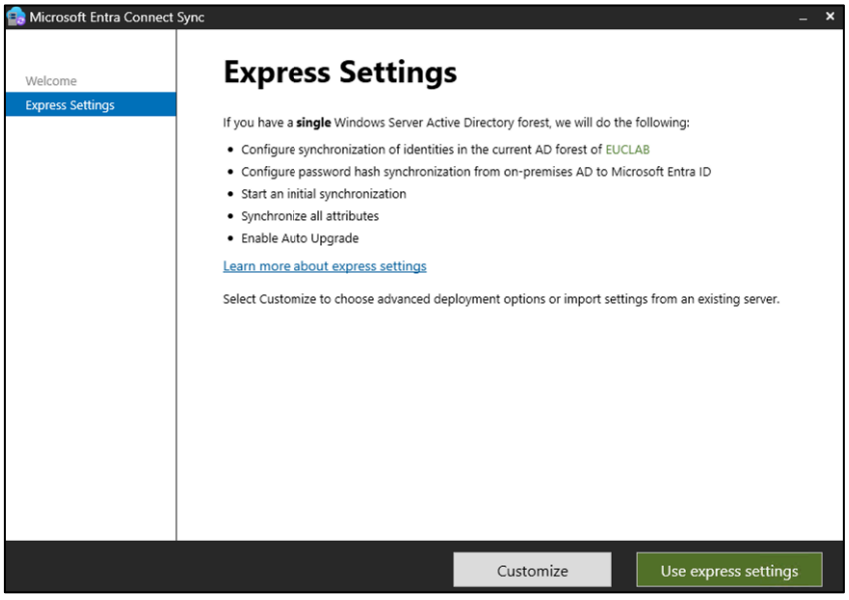
- In MS Entra admin center, go to →Entra ID →Entra Connect →Get started, and click on “Download Connect Sync Agent” under →Manage from on-premises: Connect Sync.



- You need a prepared MS Windows Server (at least 2016), domain-joined. Exceute the installer file “AzureADConnect.msi”.

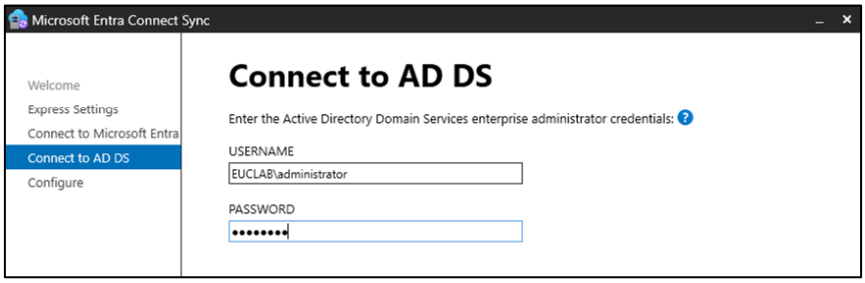


- You can use express settings for a single AD

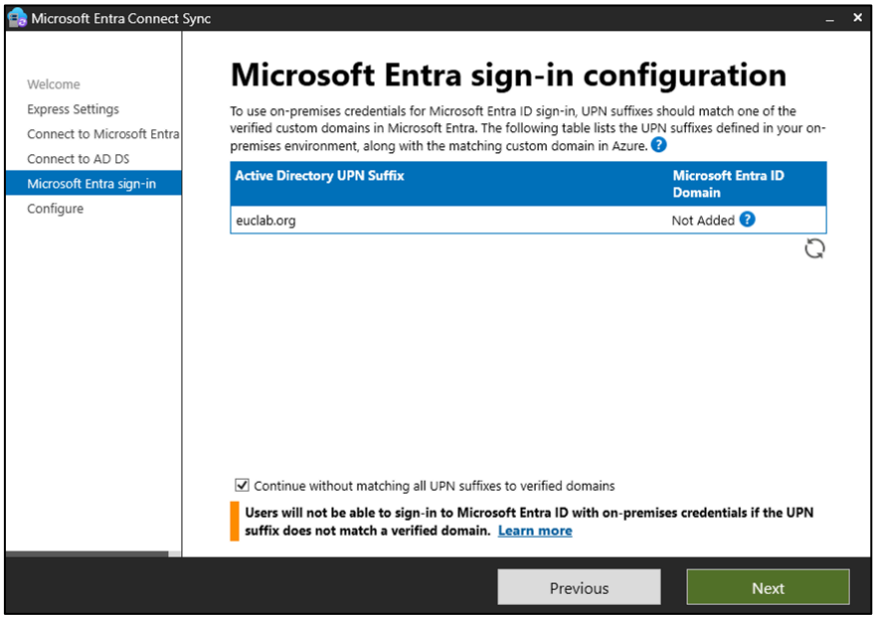


- Enter the username for your MS Entra ID Hybrid Identity Administrator account, and click →Next

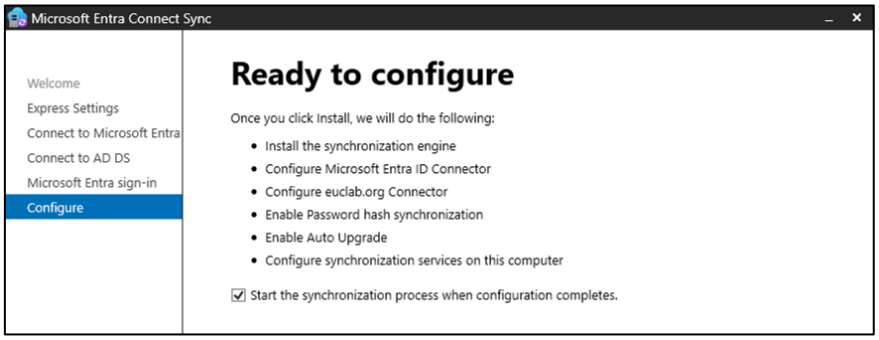
- Enter the credentials of you on-prem AD administrator, and click →Next



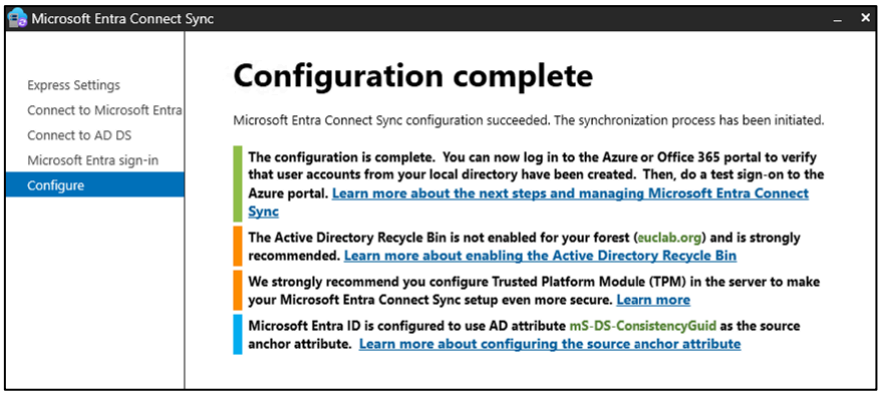
- Continue without matching app UPN suffixes to verified domains



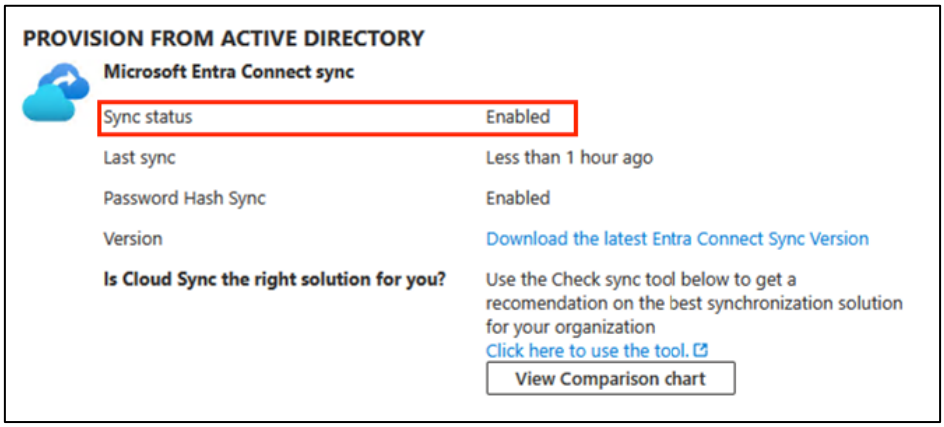
- Click →Install



- It takes a few minutes to complete



- You can check the functionality in MS Entra admin center under →Entra ID →Entra Connect →Connect Sync

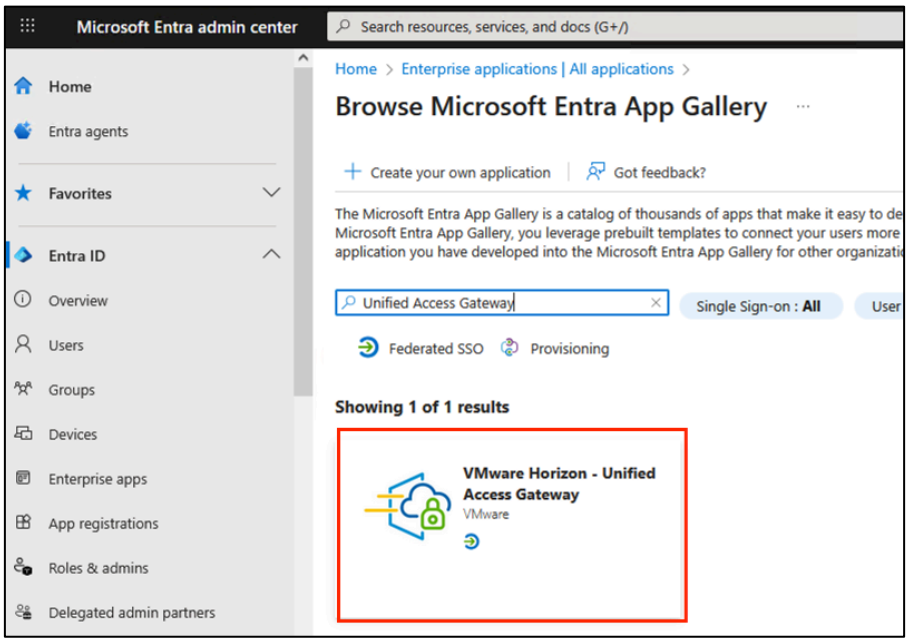


- Also you can verify synchronization if on-prem AD users and groups are shown under →Entra ID →User now. Be aware, that the UPN is different from the on-prem AD!

20.3 Add UAG in MS Entra from the gallery

We need the UAG as managed SaaS, and add this from the gallery.

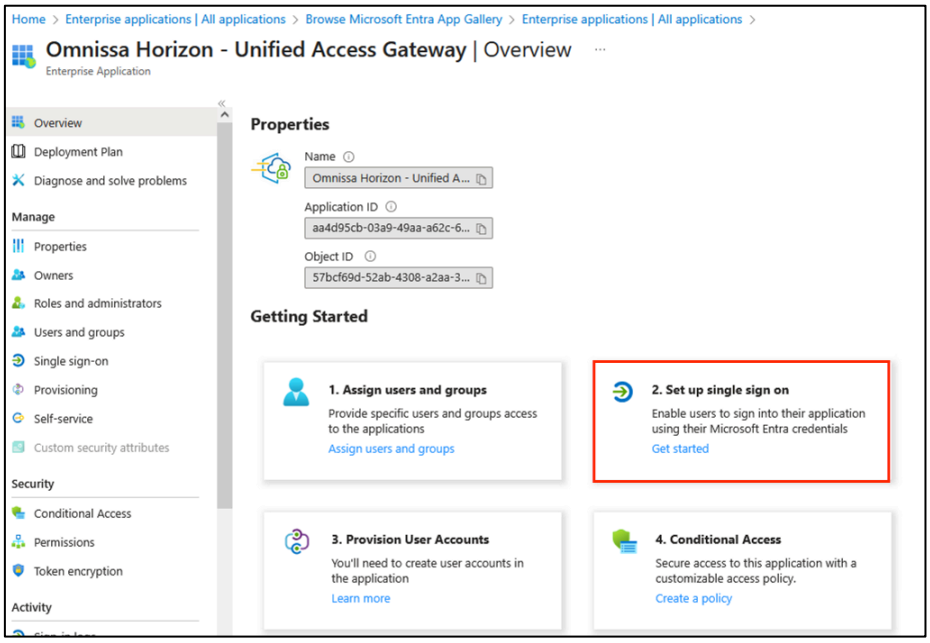
- In **MS Entra admin center**[10], go to →Entra ID →Enterprise apps →All applications and click →New application and search and select for “Unified Access Gateway” – it takes a few seconds to deploy:



[10] https://entra.microsoft.com

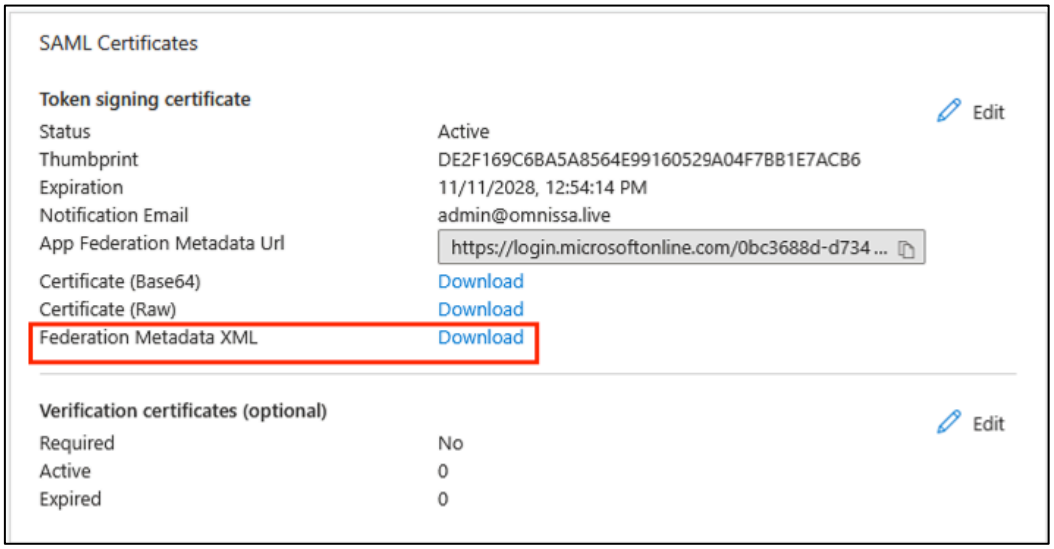
20.4 Configure MS Entra SSO for the UAG

- Select the previously created enterprise application, and go to →Set up single sign on

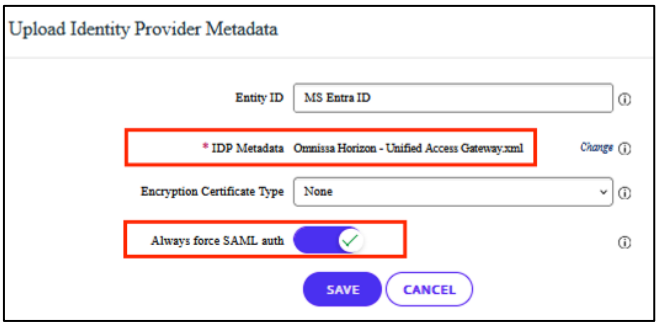


- Select →SAML
- You need to configure the "**Basic SAML configuration**", and add the following fields:
    - **Identifier**: https://HORIZON_UAG_FQDN/portal
      (i.e. https://euc.omnissa.live/portal)
    - **Reply URL**: https://HORIZON_UAG_FQDN/portal/samlsso
      (i.e. https://euc.omnissa.live/portal/samlsso)
    - **Sign on URL**: https://HORIZON_UAG_FQDN
      (i.e. https://euc.omnissa.live)
    - Click →Save

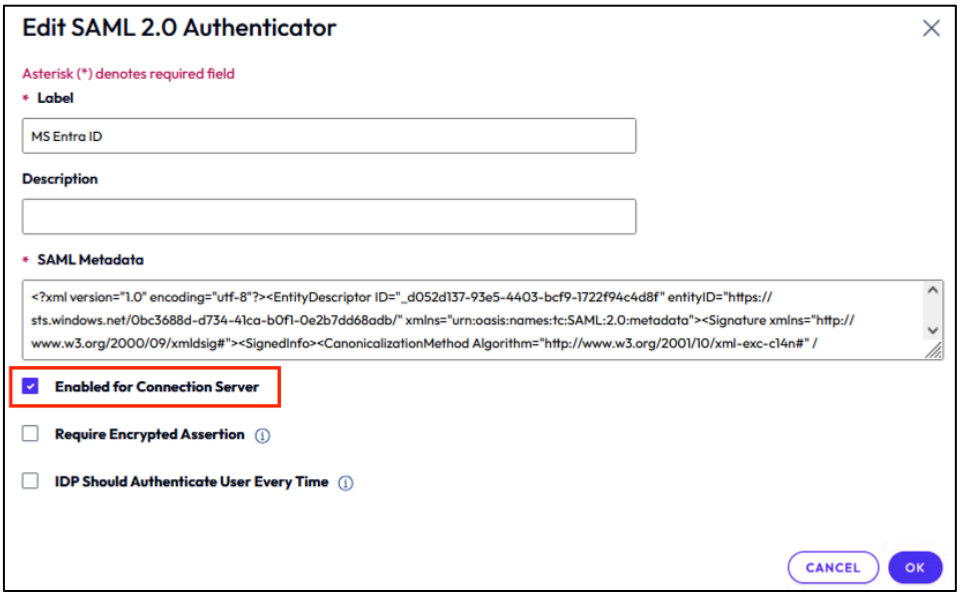
- Under →SAML Certificates, you now can download the IdP metadata:



  - You need this metadata, to upload them to the UAG under →Advanced Settings →Identity Briedging Settings →Upload Identity Provider Metadata:



  - Furthermore, you need to add this metadata for the Connection Server(s), in the Horizon Console under →Settings →Servers →Connection Servers, select one Connection Server, go to →Edit →Authentication, and click on →Manage SAML Authenticators. Add the ifnroamtion you have downloaded previously from MS Entra admin center:



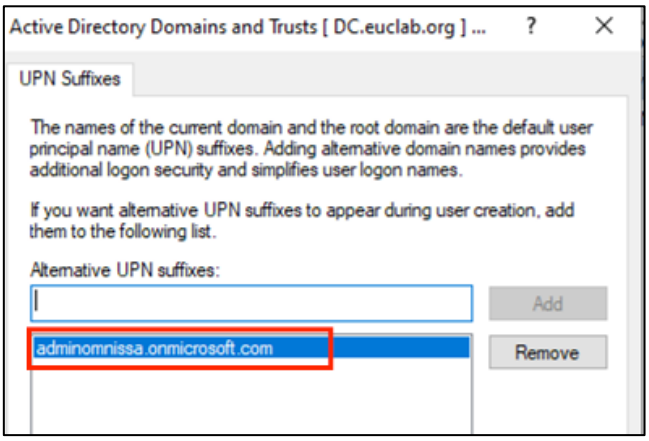
- To add users and groups, select the enterprise application again, and go to →Assign users and groups, then click →Add user/group

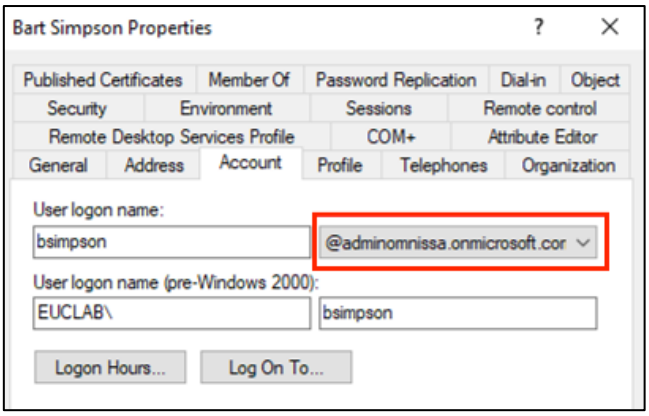
20.5 Open concern

When UAG and Horizon is configured with Entra ID as IdP, there is are two major concerns.

1. All AD users are synced from on-prem Active Directory (without filtering specific users/groups only.

2. Additionally, for every user a new UPN in the format *username@domain.onmicrosoft.com* is created in Entra ID. To use these UPNs for login via UAG, in the on-prem domain this "alternative UPN suffix" needs to be added in the →Active Directory Domains and Trusts, and the AD-users need to be configured to use this alternative UPN:





Actually, SSO is not usable, as after successful authentication against UAG, the user can select his Horizon session, but gets prompted for the AD credentials again during the login.

21. Linux Deployment in Horizon

21.1 Create a Linux VM in vSphere

Done with Red Hat Enterprise Linux Workstation 8.10

- Verify System Requirements for Horizon Agent for Linux, see URL
- Install Linux OS
  - Check network connectivity (DNS, GW, DHCP etc.)
  - Set hostname as FQDN (https://access.redhat.com/solutions/5444941)
    - `hostname`
    - `hostnamectl`
    - `hostnamectl set-hostname FQDN`
- Prepare Linux VM for cloning as golden image (URL)
  - To make sure that desktop users are added to the local Remote Desktop Users group of the virtual machine, create a restricted Remote Desktop Users group in Active Directory
  - Map the Linux machine's host name to 127.0.0.1 in the `/etc/hosts` file?

```
[root@gm-rhel8x admin]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4 gm-rhel8x
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6 gm-rhel8x
[root@gm-rhel8x admin]#
```

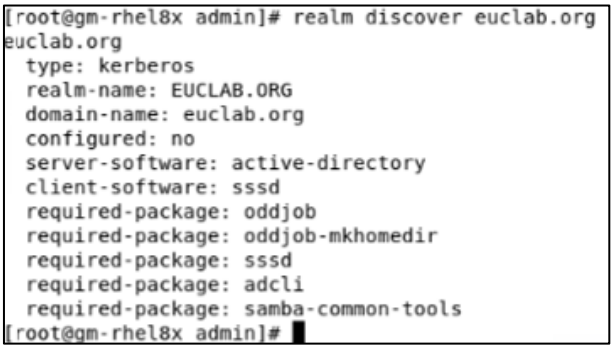
```
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4 gm-rhel8x gm-rhel8x.euclab.org
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6 gm-rhel8x gm-rhel8x.euclab.org
```

  - Install service packs and updates to the guest Linux distribution
  - If needed, manually install OVT (Open VMware Tools) on the machine
  - Verify that `virbr0` is deactivated
    - `sudo virsh net-destroy default`
    - `sudo virsh net-undefine default`
    - `sudo service libvirtd restart`
  - check DNS between Linux OS and Horizon Connection Server
  - Configure the Linux machine to run in graphical mode by default
    - `sudo systemctl set-default graphical.target`
  - Install libXScrnSaver
    - `sudo yum install libXScrnSaver`[11]
  - Install Linux Dependency Packages for Horizon Agent, see URL
    - `sudo yum install libappindicator-gtk3`
    - `sudo yum install nss-tools`
- Install Horizon Agent, URL
  - Extract the tar.gz file on a local folder
  - Run the `install_viewagent.sh` script – command line optione here
    - `sudo ./install_viewagent.sh`
  - Reboot Linux VM
  - Check status of Horizon Agent
    - `sudo service viewagent status`

- Configure SSSD Offline Domain Join (URL)
  - Ensure that the golden image uses the same domain as the instant clones
  - Check that DNS lookup of AD is resolving

[11] Not documented yet (but requested by Agent installer)

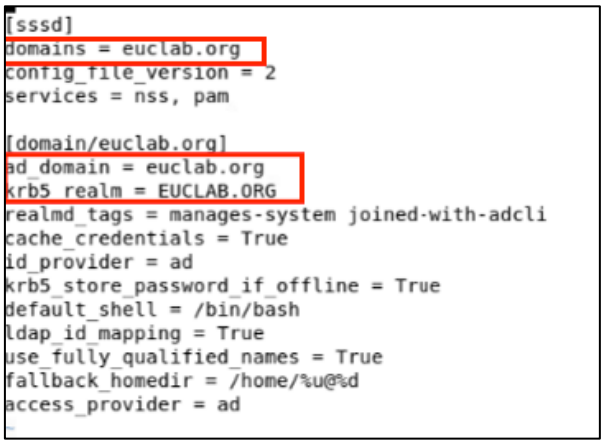
        - `dig +short SRV _ldap._tcp.addomain.test`
        - `dig +short SRV _kerberos._tcp.addomain.test`
        - `dig +short SRV _kerberos._udp.addomain.test`
    - Discovering and joining an AD Domain using SSSD (URL) - Connecting to AD using POSIX ID mapping
        - Install the following packages
          `yum install samba-common-tools realmd oddjob oddjob-mkhomedir sssd adcli krb5-workstation`
    - To display information for a specific domain, run `realm discover` and add the name of the domain you want to discover
        - `realm discover ad.example.com`



    - Configure the local RHEL system with the realm join command
        - `realm join ad.example.com`
    - You can check again now
        - `realm discover ad.example.com`

    - Check that you can login with a domain account

- Check the `/etc/sssd/sssd.conf` configuration file, that it includes the proper DNS name of the AD domain, as follows:



- Modify the `/etc/krb5.conf` configuration file to use only the rc4-hmac encryption algorithm
- To ensure that Horizon Agent recognizes the Linux VM as domain-joined using SSSD authentication, add/edit the following line to the `/etc/omnissa/viewagent-custom.conf` configuration file
  - `OfflineJoinDomain=sssd`
- Check and edit the `/etc/krb5.conf` file, and add/edit this entry:
  - `default_realm = DOMAIN.COM`

- Power off the Golden Master and take a snapshot

- Prepare a Linux Machine for Remote Desktop Deployment, see URL
  - Add hostname (short and FQDN) to the /etc/hosts file
    ```
    127.0.0.1   RHEL-GM810 RHEL-GM810.euclab.org localhost
    localhost.localdomain localhost4 localhost4.localdomain4
    ```
- Install Linux Dependency Packages for Horizon Agent, see URL
  ```
  sudo yum install libappindicator-gtk3
  sudo yum install nss-tools
  ```
- Install the Horizon Agent (use the rpm file), see URL
- After installing Horizon Agent, install libXScrnSaver
  ```
  sudo yum install libXScrnSaver
  ```
- You can check the agent service status
  ```
  sudo service viewagent status
  ```
- Add machine to domain (URL)
  ```
  realm join --user=[domain user account] [domain name]
  ```
  - You can check the domain status
    realm list

- Switch to root user
  su

- Disable root login per SSH - Open the /etc/ssh/sshd_config and set PermitRootLogin to no

22. Nacharbeiten

Eingeschränkte Rechte im vCenter und in der AD für den View Composer nötig:

AD-Account für den View Composer:
https://docs.vmware.com/en/VMware-Horizon-7/7.10/horizon-installation/GUID-3446495C-FEC8-425C-AFF8-A6CAABA5E973.html

Ferner muss dieser AD-Account administrative Rechte auf dem Composer Server haben

vCenter User bzw. Rolle

https://docs.vmware.com/en/VMware-Horizon-7/7.10/horizon-installation/GUID-467F552F-3034-4917-A985-B5E5FEC5C68F.html

Getestet und läuft.

View Composer and Instant Clone Privileges Required for the vCenter Server User

https://docs.vmware.com/en/VMware-Horizon-7/7.12/horizon-installation/GUID-467F552F-3034-4917-A985-B5E5FEC5C68F.html

Example of Filtering to Exclude Domains

https://docs.vmware.com/en/VMware-Horizon-7/7.13/horizon-administration/GUID-FD0A107B-9F2C-45A5-B0CE-D3793BD2C3B0.html

https://kb.vmware.com/s/article/2006292

Configure CA Certificates in App Volumes Manager

https://docs.vmware.com/en/VMware-App-Volumes/2103/app-volumes-admin-guide/GUID-4EA6EF73-7800-4241-9162-2C407AC4AA7A.html

Troubleshooting Horizon 7 Server Certificate Revocation Checking

https://docs.vmware.com/en/VMware-Horizon-7/7.13/horizon-administration/GUID-EF771194-AE61-49D1-8424-ADB1D0CA0859.html

Configuring Certificate Revocation Checking on Server Certificates

https://docs.vmware.com/en/VMware-Horizon-7/7.13/horizon-installation/GUID-D1190AE8-1677-4637-9345-BEE0F39507DF.html

22.1 Troubleshooting Horizon

Instant-Clone Maintenance Utilities

IcCleanup.cmd – Tool um interne VMs zu identifizieren und zu löschen. Hierbei können vor allem die Abhängigkeiten der internen VMs untereinander sichtbar gemacht werden.

https://docs.vmware.com/en/VMware-Horizon-7/7.13/virtual-desktops/GUID-6025D684-2E05-4857-9C24-18F16DDC38FD.html

After updating Horizon View to 8.3, the Web browser access doesn't work anymore

https://www.comdivision.com/blog/horizon-view-upgrade-8-3-2106

https://kb.vmware.com/s/article/85801

When connecting to a Horizon View virtual machine using Blast, SSL Session is invalid

https://kb.vmware.com/s/article/2088354

Certificate issue connecting to VDI per HTML

https://communities.vmware.com/t5/Horizon-Desktops-and-Apps/Certificate-issue-connecting-to-VDI/td-p/494117

Use Case: Sessions per HTML Client sollen nicht getunnelt werden – nach erfolgtem Login erscheint jeweils eine Zertifikatsfehlermeldung

- CS verwendet bereits DNS anstatt IP adressen
- Wildcard-Zertifikat für Horizon Agent
    - https://www.petenetlive.com/KB/Article/0001128

- https://robbieroberts.wordpress.com/2014/04/04/creating-a-wildcard-webserver-certificate-with-your-internal-microsoft-ca/

c. -->Funktioniert nun:

i. https://kb.vmware.com/s/article/2088354

ii. Wichtig: Der Thumbprint in der Registry muss mit Leerzeichen hinterlegt werden (wie im Beispiel des KB-Artikels)

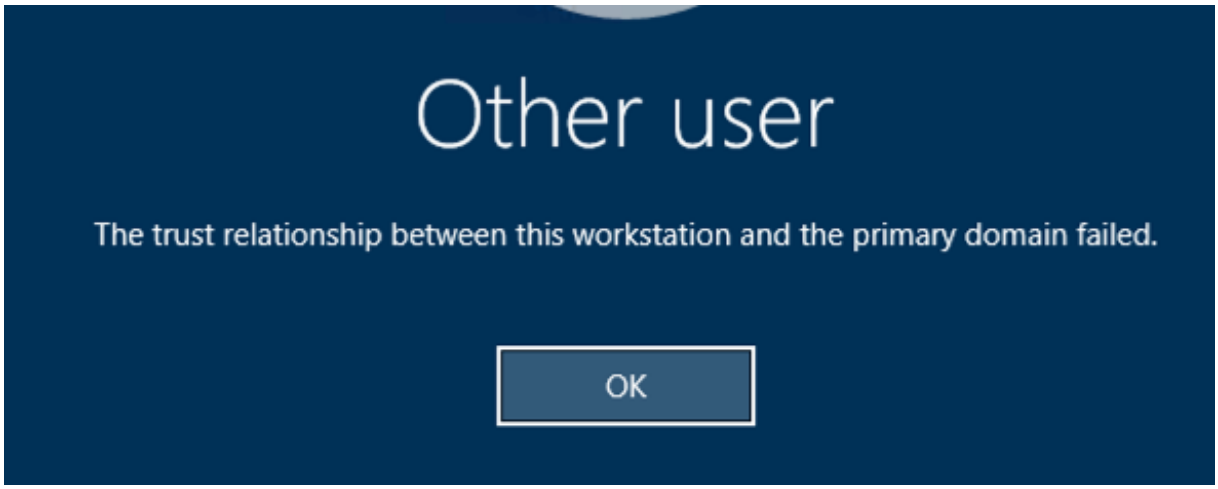
Administration dashboard in VMware Horizon reports the error: Server's certificate cannot be checked (2000063)

https://kb.vmware.com/s/article/2000063

Reset 120 day RDS Grace period on Windows Server 2016, 2019, 2022

https://www.virtualizationhowto.com/2020/10/reset-120-day-rds-grace-period-on-2016-and-2019/

The trust relationship between this workstation and the primary domain failed.



See https://learn.microsoft.com/en-us/answers/questions/1284756/fix-broken-trust-relationship-without-local-admin

- disconnect the machine from network
- log in with the domain admin credentials
- reconnect the machine to the network
- run the following command from Windows Powershell:
  Reset-ComputerMachinePassword

23. Scripting & Automation

23.1 S&A Horizon

23.1.1 FSLogix – create a VHD(X) disk per user AND pool ID OR Hostname

If a user should get more than one FSLogix disk, you can create a PS-script, like this – it will get the pool ID AND/Or Hostname, and set it to an environment variable:

```
# ------------------------------------------------------------------------
# hzn-post-sync.ps1 script
#
# This script reads a registry value to determine the Horizon Pool ID,
# creates a persistent system environment variable, and notifies the system
# of the change.
#
# Modifications:
# - Added logging functionality to C:\temp\fslogixmap.txt.
# - The entire script is now wrapped in a try/catch block to ensure all
# output and errors are captured in the log file, even if the script fails.
# ------------------------------------------------------------------------

# Define the path for the log file
$logFilePath = "C:\temp\fslogixmap.txt"

# Ensure the log directory exists
if (-not (Test-Path -Path "C:\temp")) {
    New-Item -Path "C:\temp" -ItemType Directory -Force | Out-Null
}

# Start the transcript to capture all console output to the log file
Start-Transcript -Path $logFilePath -Append

try {
    Write-Host "--- Script execution started at $(Get-Date) ---"

    # --- Read the registry value
    $regPath = "HKLM:SOFTWARE\Omnissa\Horizon\Node Manager"
    $regName = "Server Pool DN"

    try {
        Write-Host "Reading registry key: $regPath\$regName"
        $fullValue = (Get-ItemProperty -Path $regPath -Name
$regName).$regName
        Write-Host "Successfully read registry value: '$fullValue'"
    } catch {
        Write-Error "Unable to read registry key $regPath\$regName"
        exit 1
    }

    # --- Extract PoolID (after cn= and before the first comma)
    if ($fullValue -match "cn=([^,]+)") {
        $poolID = $matches[1]
        Write-Host "Extracted PoolID: '$poolID'"
    } else {
```

```
        Write-Error "Unable to extract poolID from '$fullValue'"
        exit 1
    }

    # --- Write persistent system environment variable
    Write-Host "Setting system environment variable HZNPoolID to '$poolID'"
    Set-ItemProperty -Path "HKLM:\SYSTEM\CurrentControlSet\Control\Session
Manager\Environment" `
        -Name "HZNPoolID" -Value $poolID

    # --- Notify Windows that environment variables changed
    Write-Host "Notifying Windows of environment variable change..."
    $signature = @"
[DllImport("user32.dll", SetLastError=true)]
public static extern IntPtr SendMessageTimeout(IntPtr hWnd, int Msg, IntPtr
wParam, string lParam, uint fuFlags, uint uTimeout, out IntPtr lpdwResult);
"@
    $SendMessageTimeout = Add-Type -MemberDefinition $signature -Name
"Win32SendMessageTimeout" -Namespace Win32Functions -PassThru
    $HWND_BROADCAST = [IntPtr]0xffff
    $WM_SETTINGCHANGE = 0x1A
    $result = [IntPtr]::Zero
    $SendMessageTimeout::SendMessageTimeout($HWND_BROADCAST,
$WM_SETTINGCHANGE, [IntPtr]::Zero, "Environment", 2, 5000, [ref]$result) |
Out-Null

    Write-Host "System Variable HZNPoolID defined as '$poolID'"

# Get the hostname
$hostname = $env:COMPUTERNAME

# Keep only the first 4 characters (safe handling if shorter)
if ($hostname.Length -ge 4) {
    $shortHostname = $hostname.Substring(0,6)
} else {
    $shortHostname = $hostname
}

# Save into permanent System Environment Variable (requires admin rights)
[System.Environment]::SetEnvironmentVariable('ShortHost', $shortHostname,
'Machine')

Write-Output "Shortened hostname saved system-wide as 'ShortHost':
$shortHostname"

} catch {
    # Catch any unexpected errors during script execution and write them to
the transcript.
    Write-Error "An unexpected error occurred during script execution:"
    Write-Error $_
} finally {
    # This block ensures the transcript is stopped, even if an error
occurred.
    Write-Host "--- Script execution finished at $(Get-Date) ---"
    Stop-Transcript
}
```

This should be executed via cmd-file (and placed as post-synchronization-script in the desktop pool settings in Horizon Console:

```
@echo off
REM -- hzn-post-sync.cmd script

REM --- Set Log file path
set "LogFile=C:\Temp\hzn_post_sync_log.txt"

REM --- Start Logging - overwrite any existing log file
echo [START] hzn-post-sync.cmd execution started on %date% at %time% >
"%LogFile%"
echo. >> "%LogFile%"

REM --- Get current PowerShell ExecutionPolicy
echo Getting current PowerShell ExecutionPolicy... >> "%LogFile%"
for /f "usebackq delims=" %%P in (`powershell -Command "Get-
ExecutionPolicy"`) do (
    set "SavedPolicy=%%P"
)

echo Saved ExecutionPolicy: %SavedPolicy% >> "%LogFile%"

REM --- Set a temporary ExecutionPolicy (example: RemoteSigned)
echo Setting temporary ExecutionPolicy to Unrestricted... >> "%LogFile%"
powershell -Command "Set-ExecutionPolicy Unrestricted -Force" >>
"%LogFile%" 2>&1

echo Temporary ExecutionPolicy set to Unrestricted >> "%LogFile%"
echo. >> "%LogFile%"

REM --- Running PowerShell Script to Get Pool ID
echo Running PowerShell Script C:\Temp\fslogix\hzn-post-sync.ps1... >>
"%LogFile%"
powershell -File C:\Temp\fslogix\hzn-post-sync.ps1 >> "%LogFile%" 2>&1
REM The '2>&1' part above redirects standard error (2) to standard output
(1)
REM and then appends both to the log file.

echo. >> "%LogFile%"

REM --- Restore the original ExecutionPolicy
echo Restoring original ExecutionPolicy: %SavedPolicy%... >> "%LogFile%"
powershell -Command "Set-ExecutionPolicy %SavedPolicy% -Force" >>
"%LogFile%" 2>&1

echo Original ExecutionPolicy restored to %SavedPolicy% >> "%LogFile%"
echo. >> "%LogFile%"
echo [END] hzn-post-sync.cmd execution finished on %date% at %time% >>
"%LogFile%"

shutdown -r -t 0
```

The last step is the configure the FSLogix GPO in order to specify where to create the VHD(X) files – under →Computer Configurations\Policies\Administrative Templats\FSLogix\Profile Containers\Container and Directory Naming

Tabelle 2: For Pool ID environment variable

GPO Key	GPO Settings	Details

SID Directory Name Pattern	%HZNPoolID%.%userdomain%	Use POOL ID and Users domain, i.e. : MYPOOL.MYDOMAIN
SID Directory Name Match	%HZNPoolID%.%userdomain%	Need to be the same as Name Pattern
VHD Name Pattern	Profile_%username%.%profileversion%	Use Profile_ as prefix and then username and profile version
VHD Name Match	Profile_%username%.%profileversion%*	Ask to look for any containers with prefix set by pattern
Volume Type (VHD,VHDX)	VHDX	Speciy to use VHDX container

Tabelle 3: For Hostname environment variable

GPO Key	GPO Settings	Details
SID Directory Name Pattern	%shortHostname%.%userdomain%	Use hostname prefix and Users domain ex : HOSTNA.DOMAIN
SID Directory Name Match	%shortHostname%.%userdomain%	Need to be the same as Name Pattern
VHD Name Pattern	Profile_%username%.%profileversion%	Use Profile_ as prefix and then username and profile version
VHD Name Match	Profile_%username%.%profileversion%*	Ask to look for any containers with prefix set by pattern
Volume Type (VHD,VHDX)	VHDX	Specify to use VHDX container

Now, as the environment variable is created at the time of the deployement of the VM, FSLogix GPO will use it to create/usr the right folder and container.

Reference: https://my-virt.alfadir.net/index.php/2025/09/24/create-fslogix-based-on-pool-id-or-hostname-prefix/

Horizon As Built Report

https://github.com/AsBuiltReport/AsBuiltReport.VMware.Horizon

PowerCLI Script to Horizon Desktop Pool machine counts & provisioning type

https://www.retouw.nl/2022/03/26/powercli-script-to-horizon-desktop-pool-machine-counts-provisioning-type/

24. References and KBs

EUC Component	Reference	URL
Horizon	Create a User Account for Instant-Clone Operations	https://docs.vmware.com/en/VMware-Horizon/2312/horizon-installation/GUID-E91881F4-F8C0-48A5-A1A4-61577E287E29.html
Horizon	Privileges Required for the vCenter Server User With Instant Clones	https://docs.omnissa.com/de-DE/bundle/Horizon8InstallUpgrade/page/PrivilegesRequiredforthevCenterServerUserWithInstantClones.html
Horizon	Generating a certificate template and generating/renewing certificate for Horizon connection server	https://kb.vmware.com/s/article/80314
Horizon	Cross-Origin Resource Sharing (CORS) with Horizon 8 and loadbalanced HTML5 access	https://kb.vmware.com/s/article/85801
Horizon	Add a Horizon 8 ADMX Template File to a GPO	https://docs.vmware.com/en/VMware-Horizon/2312/horizon-remote-desktop-features/GUID-633FB6A2-206E-40A2-A72B-0FD28823EBCA.html
Horizon	Horizon Cloud Pod (CPA) : After an upgrade to Horizon 8.7 or 8.8 (2209, 2212) with CPA, A Connection Server randomly goes offline and requires a service restart (92558)	https://kb.vmware.com/s/article/92558
Horizon	Purging old data from the Horizon Events Database (2150309)	https://kb.vmware.com/s/article/2150309

Horizon	Instant-Clone Maintenance Utilities	https://docs.omnissa.com/bundle/Desktops-and-Applications-in-HorizonV2406/page/InstantCloneMaintenanceUtilities.html
Horizon	Configuring Domains and Trust Relationships for Microsoft Active Directory	https://docs.omnissa.com/de-DE/bundle/Horizon8InstallUpgrade/page/ConfiguringDomainsandTrustRelationshipsforMicrosoftActiveDirectory.html
Horizon	Providing Secondary Credentials for Administrators Using the -T Option	https://docs.omnissa.com/de-DE/bundle/Horizon-AdministrationV2406/page/ProvidingSecondaryCredentialsforAdministratorsUsingthe-TOption.html
Horizon Edge Gateway	Add and Deploy a Horizon 8 Edge	https://docs.omnissa.com/bundle/HorizonCloudServicesUsingNextGenGuide/page/DeployaHorizonEdgeforUsewithHorizon8DeploymentsandtheHorizonCloudService-next-genControlPlane.html
Horizon CLI	Automating VMware Horizon 8 with VMware PowerCLI	https://blogs.vmware.com/euc/2023/01/vmware-horizon-8-powercli.html
Horizon CLI	Horizon Powershell Module	https://developer.omnissa.com/horizon-powercli/
Horizon CLI	Advance Deprecation Announcement for Horizon View API and Replacement with REST API	https://kb.omnissa.com/s/article/6000139?lang=en_US
Horizon Recording	Using Horizon Recording	https://docs.omnissa.com/de-DE/bundle/Desktops-and-Applications-in-HorizonV2312/page/UsingHorizonRecording.html
App Volumes	App Volumes User Accounts and Credentials	https://docs.vmware.com/en/VMware-App-Volumes/2312/app-volumes-install-guide/GUID-6D6AB71B-5632-4C32-8AAF-21DF3B333808.html
App Volumes	Best Practices for Provisioning Virtual Machines and Applications	https://docs.vmware.com/en/VMware-App-Volumes/2303/app-volumes-admin-guide/GUID-BCC67C19-AC5C-4D25-9F1B-9BE8536A2909.html
App Volumes	Create a Custom vCenter Server Role	https://docs.omnissa.com/bundle/AppVolumesAdminGuideV2503/page/CreateaCustomvCenterServerRole.html
App Volumes	Configure CA Certificates in App Volumes Manager	https://docs.omnissa.com/de-DE/bundle/AppVolumesAdminGuideV2503/page/ConfigureCACertificatesinAppVolumesManager.html

App Volumes	Replace the App Volumes Default Self-Signed Certificate	https://docs.omnissa.com/de-DE/bundle/AppVolumesAdminGuideV2503/page/ReplacetheAppVolumesDefaultSelf-SignedCertificate.html
App Volumes	Creating a new App Volumes AppStack template VMDK changing the default size of 20 GB (also valid for Writables)	https://kb.vmware.com/s/article/2116022?lang=en_us
App Volumes	Pruning the VMware App Volumes SQL database (2132454)	https://kb.vmware.com/s/article/2132454
DEM	Configure Dynamic Environment Manager	https://blog.yahyazahedi.com/2022/12/11/configure-dynamic-environment-manager/
DEM	Configuring Helpdesk Support Tool	https://docs.vmware.com/en/VMware-Dynamic-Environment-Manager/2309/com.vmware.dynamic.environment.manager-helpdesk/GUID-B2F834F5-CC85-4BD0-BCF7-F4269298DA2C.html
DEM	VMware Dynamic Environment Manager (DEM) 2312 by Carl Stalhood	https://www.carlstalhood.com/vmware-user-environment-manager/comment-page-1
UAG	Generate CSR and Private Key using uagcertutil Command	https://docs.omnissa.com/de-DE/bundle/UnifiedAccessGatewayDeployandConfigureV2503/page/GenerateCSRandPrivateKeyusinguagcertutilCommand.html
FSLogix	FSLogix documentation	https://learn.microsoft.com/en-us/fslogix/

25. Table of Revisions

Date	Modified/Added Section	Comment
07.11.2025	Added Chapter 17 – Integration in Omnissa Access	
12.11.2025	Reviewed and added chapter 5 about TrueSSO	
19.11.2025	Add chapter 12.5 - 12.5 Omnissa Horizon Accelerator – Horizon 8	
14.01.2026	Add chapter 18.3.1 Update Duo Authentication Proxy	