NICK INFORMATIONSTECHNIK GMBH

ZeroPortal – Administration Handbook

Installation, setup, and operation

As of September 2026 (Server 1.0.30, Agent 1.0.36)

This handbook walks compactly through installing, setting up, and running ZeroPortal. It is written for administrators who set up and look after the portal. Where a topic needs more depth, the text points to the relevant detailed document (see chapter 14).

Contents

1. What ZeroPortal does

ZeroPortal delivers applications as **App-V** and **MSIX packages** to Windows devices and enforces **policies** on them. The packages sit on a network share; the portal manages who gets which package. Every device runs the **ZeroPortal agent**, which checks in with the portal regularly, fetches the assignments, and installs, updates, or removes packages.

The building blocks:

- **Portal (server):** web interface, database, package catalogue, permissions, policies. Runs as a Windows service with its own web server.
- **MariaDB:** the portal's database. Replicated for high availability.
- **Package share:** SMB share with the App-V and MSIX packages. Clients load packages straight from there, not through the portal.
- **Agent:** Windows service plus tray icon on every device. Syncs in the device and in the user context.
- **PowerShell module:** practically every administrative task can also be done by cmdlet: packages, assignments, groups and permissions, policies, licences, backup.

Sign-in to the portal uses the Windows account (Kerberos). Permissions are granted to AD groups.

2. System requirements and sizing

What you need

Component	Requirement
Portal server	Windows Server (64-bit), domain member. The installer brings .NET along.
Database	**MariaDB 11.8 or 12.3** (both LTS), local on the portal server or on its own machine; tested with 11.8.6 and 12.3.3. Older series (11.4, 10.x) are not suitable: setup only warns, the database tool and the portal start refuse. **MySQL is not supported.** In a cluster, the same version on every node.
Package share	SMB share, readable by computer accounts (App-V, MSIX) and users
Clients	Windows 10/11 or Windows Server (RDS) with the App-V client and/or MSIX support
Network	Clients reach the portal over HTTPS and the package share over SMB
Certificate	Server certificate for the portal URL that clients trust

Which MariaDB series? Always an **LTS series** (11.8 or 12.3): several years of bug fixes only. Rolling series (12.0, 12.1, 12.2, 13.x) are maintained for one year only and force a series change with a new program folder every three months (chapter 12). Maintenance periods: mariadb.org/about (Maintenance Policy).

Sizing the portal server

A single portal node is enough for very large environments:

Endpoints	Nodes	vCPU	RAM	Note
up to 10,000	1	2	8 GB	Even 10,000 requests within 10 minutes are no problem
up to 50,000	1	6	16 GB	50,000 sign-ins within 15 minutes are handled
up to 100,000	1	8	16 GB	100,000 sign-ins within 15 minutes are handled

A second node mainly serves **availability**; with random server selection it also spreads the sync load (chapter 11). Running MariaDB on the same server is common; from 50,000 devices, an SSD for the data directory is advisable. A sync transfers about 5 KB (10,000 syncs in 10 minutes: under 1 Mbit/s); package data travels by SMB from the share to the client, so the share has to handle the package sizes and simultaneous first installs. The agent checks in every 60 minutes plus 0 to 10 minutes random, and 30 seconds after system start.

Antivirus

On the portal server, exclude the installation directory, the MariaDB data directory, and the package share from real-time scanning. With Microsoft Defender:

```
Add-MpPreference -ExclusionPath "C:\Program Files\ZeroPortal"
Add-MpPreference -ExclusionPath "C:\Program Files\MariaDB*\data"
Add-MpPreference -ExclusionPath "D:\Packages"          # package share
Add-MpPreference -ExclusionProcess "C:\Program Files\ZeroPortal\zeroPortal.exe"
Add-MpPreference -ExclusionProcess "mysqld.exe"
```

The process exclusion for the portal service matters most: without it, the virus scanner used 7 to 15 percent CPU permanently in our measurements.

Clients with App-V: the App-V 5 client needs no exclusions; the time at first launch is spent streaming the package, not in the scanner. Exclusions only in two cases:

Environment	Rule
Session hosts and VDI with shared content store	Exactly one path: `C:\ProgramData\App-V` (with a relocated cache, the value of `Get-AppvClientConfiguration -Name PackageInstallationRoot`), by GPO under *Microsoft Defender Antivirus → Exclusions → Path Exclusions* or locally with `Add-MpPreference -ExclusionPath 'C:\ProgramData\App-V'`; with tamper protection only by GPO or Intune. Keep software inventory (e.g. ConfigMgr) out with an empty `skpswi.dat` in the cache root.
A single application	Only after measuring, if an application creates executable files itself at launch (Paint.NET with plugins): its cache folder, e.g. `C:\Users\*\AppData\Local\paint.net\AppCache`.

Do not exclude: `C:\Users\*\AppData\Local\Microsoft\AppV`, `…\Roaming\Microsoft\AppV`, the package share from the client, or `AppVClient.exe` and `AppVStreamingUX.exe`. For MSIX and App Attach there is no separate recommendation.

3. Installing the server

Order

1. **Install MariaDB:** series 11.8 or 12.3, standard installation with UTF-8 (utf8mb4), note the root password. Leave the program and data directory at the installer's defaults (`C:\Program Files\MariaDB 11.8` with `data` next to `bin`); otherwise the replication wizard's my.ini functions won't find the file. The service must be running before the portal is set up.
2. **Install the portal MSI** (`ZeroPortal-<Version>.msi`) into `C:\Program Files\ZeroPortal`. Setup creates the service and launches the configuration tool at the end (later: `C:\Program Files\ZeroPortal\ZeroPortalConfigTool.ps1` as administrator).
3. **Create the package share** and set permissions (see below).
4. **Open the portal** and run the initial setup (chapter 4).

The configuration tool

Five steps:

1. **Certificate:** pick a certificate from your own PKI or import a PFX. *Import to Trusted Root* only trusts a self-issued certificate on the server, not on the clients.
2. **Base Configuration:** host name and port of the built-in web server (e.g. `https://zeroportal.firma.local:8080`, no IIS needed), the checkbox *Open Windows Firewall for inbound traffic*, the database connection, and the replication password for cluster operation.
3. **Admin Users:** AD group of the full administrators (e.g. `Company\ZeroAdmins`), optionally a group with read access. Without the first group you cannot get in.
4. **Database Install / Update:** creates the database, portal users, and schema.
5. **Service Control:** *Save & Restart Service*.

The settings land in `C:\Program Files\ZeroPortal\appsettings.json`. This file is node-specific and belongs in every backup (chapter 12).

Setting up the package share

An SMB share, e.g. `\\fileserver\Packages`, with subfolders for App-V and MSIX. The share itself lets everyone through; NTFS grants the actual rights. Two groups of your own in Active Directory keep this maintainable when servers or packagers are added later:

Group	Members
`ZeroPortal-Server`	the **computer accounts** of every portal node
`ZeroPortal-Packagers`	the people who put packages there

The portal runs as a system service and reaches the share with the server's computer account, which is why the first group contains computers, not users. It needs write access because it puts App Attach images next to the package. Clients read as a computer account (machine-wide installation) and as the signed-in user.

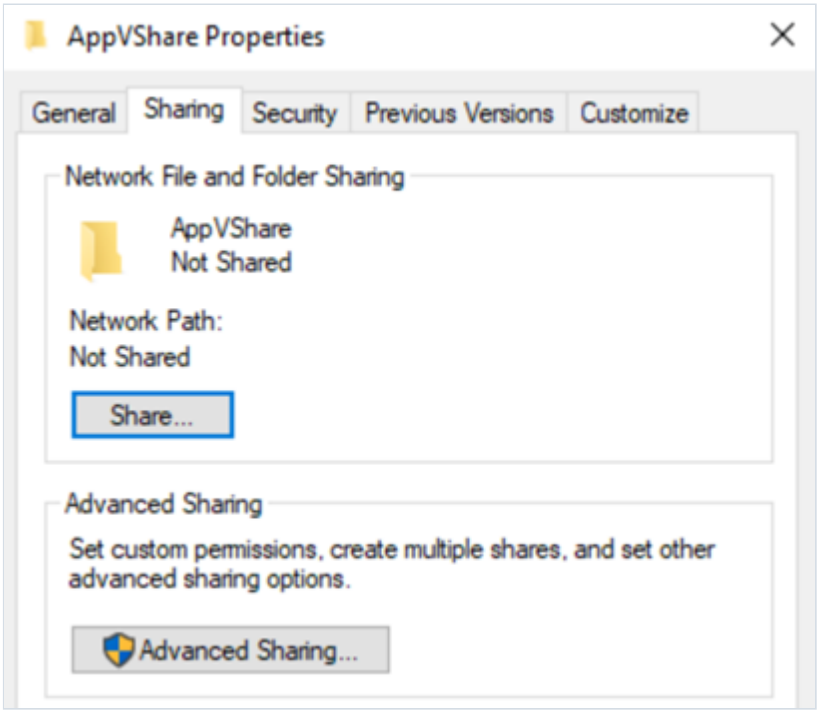
Share permissions (Properties → *Sharing* → *Advanced Sharing* → *Permissions*):

Account	Permission
Everyone	Change (Full Control works as well)

NTFS permissions (Properties → *Security* → *Advanced*), each applied to *This folder, subfolders and files*:

Account	Permission
SYSTEM	Full control
Administrators	Full control
`ZeroPortal-Server`	Full control
`ZeroPortal-Packagers`	Modify
Domain Computers	Read & execute
Domain Users	Read & execute

1. **Create a folder** on the file server, such as `D:\Packages`, with the subfolders `AppV` and `MSIX`.
2. **Turn off inheritance:** *Security* → *Advanced* → *Disable inheritance* → *Convert inherited permissions into explicit permissions*, then remove the *Users* entry. Otherwise every user may create files in the package folder, which is the default right on a data drive.
3. **NTFS permissions:** add them as in the table.
4. **Share it:** Properties → *Sharing* → *Advanced Sharing*, give it a share name and set the share permission as in the table. A `$` at the end hides the share on the network; common, but not required.



5. **Turn off offline files:** in the same dialog, under *Caching*, clear *Allow caching of share*, or in PowerShell `Set-SmbShare -Name Packages -CachingMode None`. Otherwise clients may read packages from a stale local cache instead of from the share.
6. **Restart the portal nodes** after their computer accounts have been added to `ZeroPortal-Server`; until then their Kerberos ticket does not carry the group.

The portal then reads the share as a **repository** (chapter 4). Packages are provided by copying them onto the share; there is no upload through the browser.

Firewall and ports

Every connection goes **outbound** from the client or node to the target; ZeroPortal needs no connection from outside in.

From → to	Port	For	Required
Clients and browsers → portal	Portal port, TCP (HTTPS), set in the configuration tool, e.g. 8080	Agent sync, web interface, App-V reporting	yes
Clients → package share	TCP 445 (SMB)	Load package data, mount App Attach images	yes
Portal → package share	TCP 445 (SMB)	Read packages, create App Attach images	yes
Portal → domain controller	TCP/UDP 389 (LDAP) or the configured port, plus TCP/UDP 88 (Kerberos) and 53 (DNS)	Sign-in, resolving users and groups	yes, on a domain
Portal → MariaDB	TCP 3306	Database; on the same server, traffic stays local	yes
Replica → Primary	Portal port (HTTPS) **and** TCP 3306	Forwarded writes, heartbeat, database replication	cluster only
Primary → Replica	Portal port (HTTPS)	Reachability check, wizard, maintenance mode	cluster only
Portal → mail server	TCP 587, or the configured port	Email notifications	only with email
Clients → internet	TCP 80 and 443	Revocation check of the package signature; without access see *Known issues*	no

The agent opens no inbound port; clients need no firewall rule. The configuration tool creates the rule `ZeroPortal Inbound <Port>`, the replication wizard the rule for port 3306 on both nodes, both only in the **Windows Firewall**. With a third-party or hardware firewall, the portal port and, in a cluster, port 3306 must be opened there by hand.

Sign-in without a password prompt (SSO)

For browsers to sign in silently with the Windows account, the portal URL has to be in the **intranet zone**. Usually you don't need an SPN:

- GPO: *User Configuration → Administrative Templates → Windows Components → Internet Explorer → Internet Control Panel → Security Page → Site to Zone Assignment List*, portal FQDN with value **1**. Also applies to Edge and Chrome.
- SPN: the portal service runs as Local System; the SPN for the server's own name already exists on the computer account. Only if the portal should also be reachable under an alias does that alias go onto

the computer account: `setspn -S HTTP/zeroportal.firma.local SERVERNAME$`. We do not recommend a load balancer with a shared name in front of several nodes; the agent fails over by itself (*Known issues*).

A login window despite correct permissions almost always means a missing intranet zone (chapter 13).

4. Initial setup

After first opening the portal with an account from the administrators group:

1. **Repositories** (*Global Configuration → Configuration*, section *Package Repositories*): enter the package share as an App-V or MSIX repository.
2. **Email** (section *E-Mail Notifications*): SMTP server, sender, recipients. This is how the portal reports expiring certificates, licence problems, an unreachable database, and a switched-off audit trail.
3. **Permissions** (*Global Configuration → Permissions*): create further groups (chapter 5). At least one group with read rights for the service desk makes sense.
4. **Licence** (*Global Configuration → Licensing*): 30 licences are included; beyond that, upload the licence file and pick the counting mode (chapter 6).
5. **Audit** (section *Audit trail*): leave it on, set the retention.
6. **Agent download** (*Download*): the agent MSI matching the server version is here. Chapter 7 describes the rollout.

5. Permissions

Basic principle

The portal consists of eight **areas**: App-V (packages and connection groups), MSIX (packages and App Attach), Policies, Reporting (App-V reporting), Download (agent MSI), Configuration (portal-wide settings, repositories, email, backup), High Availability, and Node Settings. For each area you give a group a **level**:

Level	What the person may do
None	The area does not appear in the menu and is blocked via the address bar too
Read	View everything, change nothing
Administrate	View, create, edit, delete

Full administrators may do everything. Three things are reserved for them and cannot be delegated: **granting permissions** (even level *Administrate* in the *Configuration* area allows no further rights), **backup and recovery** (chapter 12), and **managing users, devices, licences, and the audit trail** (portal groups, internal accounts, rollout tokens, licensing, audit).

> Level *Administrate* in the *Configuration* area is still far-reaching: it allows changing portal-wide settings, including repositories and email delivery. Give it only to people you trust with running the portal.

Creating portal groups

Rights hang on **portal groups**. The portal creates two of them itself from the groups in `appsettings.json`, that is, from the *Admin Users* step of the configuration tool:

Portal group	Rights	Members	Behaviour
Portal administrators	Administrate, all areas	AD group from `AccessGroups:FullAdmins`, plus a configured `RootUser` account	Checked at every service start; anything missing is recreated
Portal read-only	Read, all areas	AD group from `AccessGroups:ReadOnlyAdmins`	Once at first start, only if the group is configured; if deleted, it stays deleted

You create further portal groups yourself. A portal group contains AD groups (recommended), individual AD accounts, or devices and users without AD (chapter 7). Under *Global Configuration → Portal groups*, create the group and add members, then under *Permissions* pick the level per area. For example:

Portal group	Rights	Members
Package management	MSIX: Administrate · App-V: Administrate · Reporting: Read	`Company\SW-Packagers`
Service desk	MSIX: Read · App-V: Read · Reporting: Read	`Company\Helpdesk`

Package assignments

Who **receives** a package is set on the package itself (chapters 8 and 9); the permissions in this chapter only govern who may **manage** it in the portal. **MSIX** accepts AD groups and individual AD accounts, portal groups, internal accounts, and devices and users from enrollment; **App-V** accepts AD groups only.

Don't lock yourself out

Two emergency exits live in `appsettings.json`: the group from the configuration tool (`AccessGroups.FullAdmins`) and optionally a single account (`RootUser`). Both always apply, even if every right has been removed in the portal. Restart the service after a change.

6. Licensing

ZeroPortal counts, it does not block. If the licensed number is exceeded, delivery carries on; the portal reports the overage by email and on the licensing page.

- What counts is what the **ZeroPortal agent** delivers (MSIX, App Attach, and App-V too): devices or users that checked in through the agent within the **last 90 days**. Anyone getting App-V solely through the Microsoft App-V client needs no licence and is not counted, whatever the number of users and devices; App-V reporting is free of charge as well.
- The **mode** on the licensing page sets whether users or devices are counted; it is not detected automatically. For terminal servers (RDS, AVD), *per user* is recommended; in *per device* mode the portal counts the devices people connect from, not the session host.

- **30 licences are included** and never expire. Beyond that, you upload **licence files** signed by the vendor. Several files add up as long as they match the mode; files for the other mode appear grey, expired ones red, and neither counts.
- The licence is booked on the side during a sync and never blocks it. If the portal is unreachable, the agent removes nothing; everything installed keeps running.

Product support through the ticket system (4-hour response time on working days during German business hours) is included from 20,000 licensed users. Below that, and for the 30 free licences, support is billed as a package or by time; this also covers help with App-V and MSIX packages.

7. Connecting clients

The recommended path

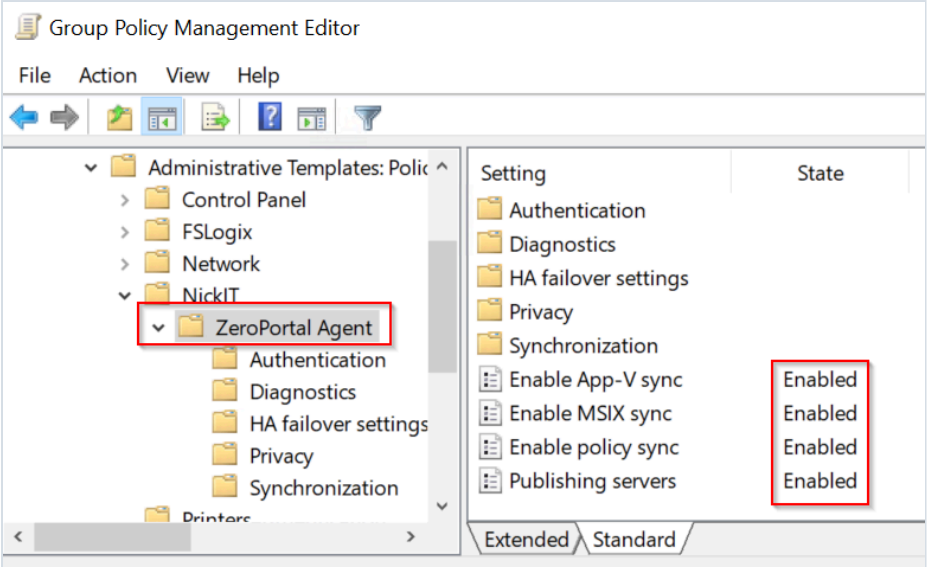
The agent is installed without parameters; every setting comes by group policy. After installation, App-V, MSIX, and policies are **off** in the agent until group policy turns them on.

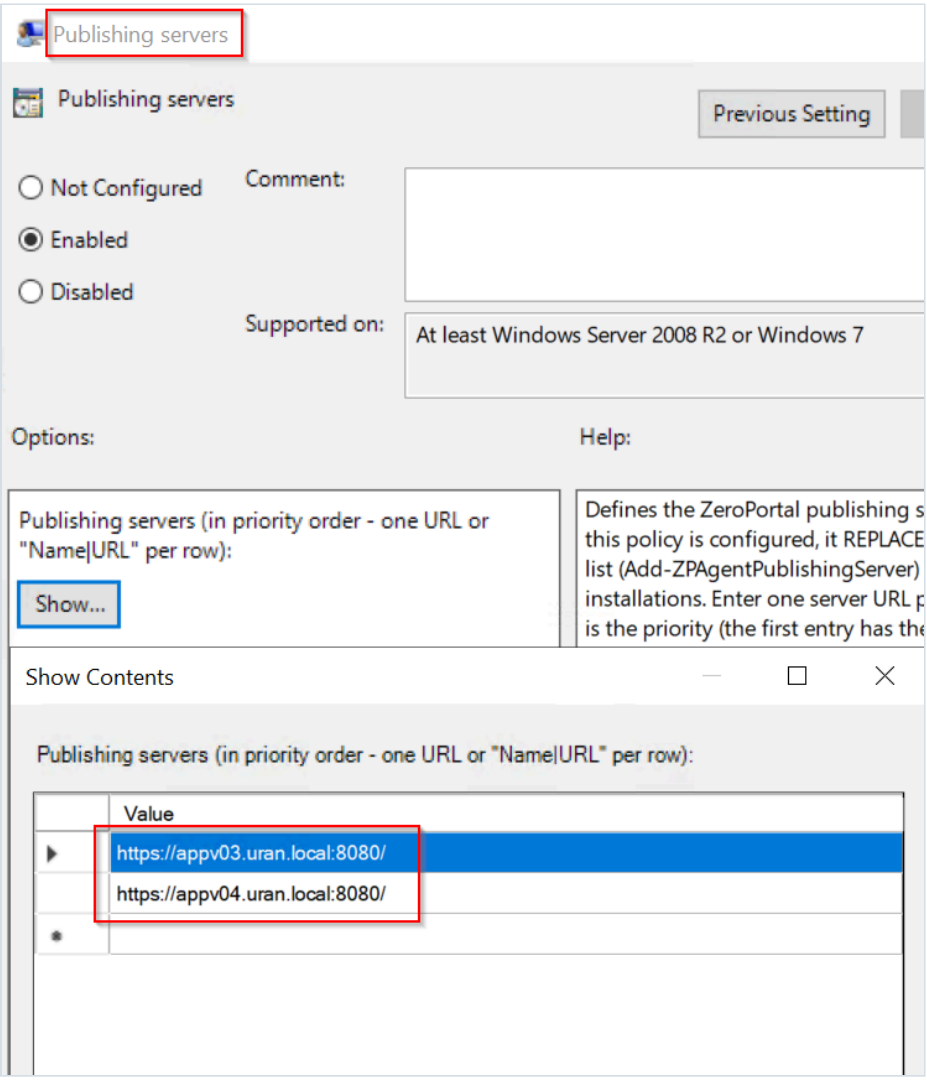
1. Copy the **ADMX template** into the central store (`\\<domain>\SYSVOL\<domain>\Policies\PolicyDefinitions`). The settings appear under *Computer Configuration* → *Administrative Templates* → *NickIT* → *ZeroPortal Agent*.
2. **One GPO** for the target computers with the four settings that decide everything else:

Setting	What it does
Publishing servers	The portal URLs, one per line, in priority order. Without them, the agent doesn't know whom to ask.
Enable MSIX sync	MSIX packages and App Attach.
Enable App-V sync	App-V packages and connection groups. Mind the rule below.
Enable policy sync	ZeroPortal policies: drives, printers, desktop, scripts, and the other templates.

With your own PKI, the same GPO puts the server certificate into the computer's *Trusted Root Certification Authorities*. 3. Roll out the **agent MSI** without parameters (GPO software installation, Intune, or any software deployment tool). The MSI is in the portal under *Download*. The agent enrolls itself at the first sync; the device appears under *Known clients*. 4. **Fine-tuning** (sync interval, tray behaviour, running applications) through ZeroPortal policies of type *Agent configuration* (chapter 10).

> **Where do I find the ADMX template?** It is installed with the **agent** and sits on every device with the agent under `C:\Program Files\NickIT\ZeroPortalAgent\admx`, along with the language folders `de-DE` and `en-US`. There is no separate download.





> **App-V: only one path per device.** If the **Microsoft App-V client** uses the portal itself as its publishing server, *Enable App-V sync* stays **off**. If instead the ZeroPortal agent takes over the App-V packages, enter **no** publishing server in the Microsoft client. If both run, they publish and remove the same packages in turn: shortcuts disappear and come back, the logs fill up. MSIX and policies are not affected and may run side by side.

Order of precedence: group policy before the ZeroPortal *Agent configuration* policy before the local value (`Set-ZPAgentConfiguration`, MSI parameters). Publishing servers and the enrollment token exist only in group policy. If a switch is set by GPO, local changes have no effect; `Get-ZPAgentConfiguration` shows this in the *SetByGroupPolicy* column.

Installing the agent

```
msiexec /i ZeroPortalAgent-<Version>.msi /qn
```

Parameters are only needed when no group policy applies (test, workgroup):

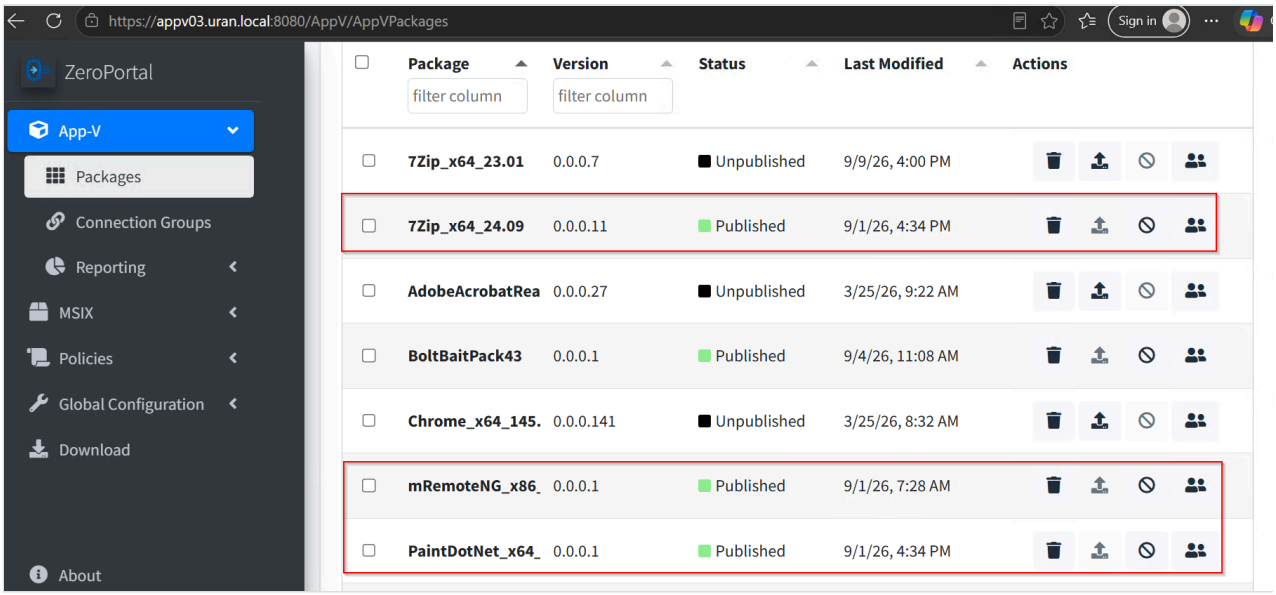
Parameter	Meaning
`SERVER=`	Portal URL, if not set by group policy
`APPVSYNC=1` / `MSIXSYNC=1` / `POLICYSYNC=1`	Turn on delivery of App-V or MSIX packages and policy processing
`TRUSTCERT=1`	Do not validate the server certificate (test only)
`NOTRAY=1` / `NOTOASTS=1`	No tray icon, or no notification windows
`ENROLLTOKEN=`	Enrollment token for devices without AD (see below)

Devices without Active Directory sign in with a key instead of Kerberos: under *Global Configuration → Agent enrollment*, create a token and install the agent with `ENROLLTOKEN=<value>`; at the first sync the device trades the token for a lasting key. This path is **experimental**, meant for pilot installs and single devices, and delivers only **MSIX packages in the user context** (no App-V, no App Attach, no machine-wide install); access to the package share comes from a ZeroPortal policy with SMB credentials. Details: *Devices without a domain (API key)*.

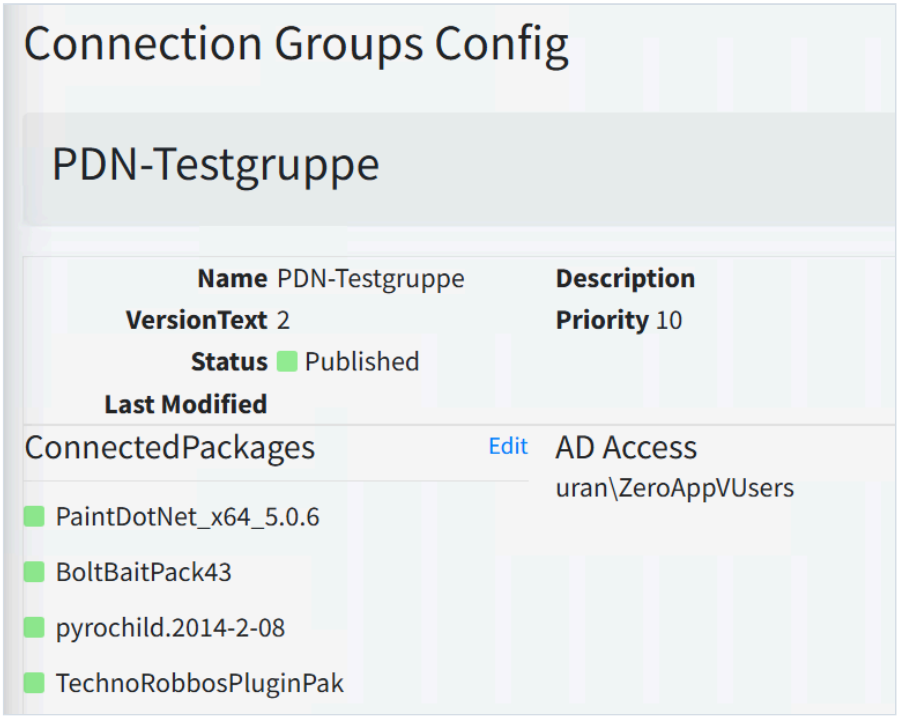
Every switch, cmdlet, event ID, and the agent's registry layout are described in *Client agent: operations and rollout*.

8. Distributing App-V packages

1. **Provide the package:** copy the package folder (`.appv`, `.xml` configurations) onto the App-V share, then under *App-V → Packages* add the package from the repository. The portal does not scan the share on its own.
2. **Assign it:** open the package and enter the **AD groups** under *AD Access*. A group of computer accounts delivers machine-wide, a group of users into the respective user's profile.
3. **Publish it:** set the package to *Published*. Clients fetch it at the next sync, or right away from the tray icon.



4. **Connection groups** (*App-V → Connection Groups*): run several packages in a shared environment, e.g. an application plus plugin. Assignment works as for packages.



5. **Retract it:** unpublish, or remove the assignment. The agent takes back a machine-wide publication right away; the package is only fully removed once every user has released it at their next sync or sign-in.

Connecting the Microsoft App-V client

If you use App-V without the ZeroPortal agent, the portal takes the place of the App-V publishing server. You need two addresses, both on your portal:

Purpose	Address
Publishing	`https://<portal>:<port>/AppVPublishing`

Purpose	Address
Reporting	`https://<portal>:<port>/AppVReportReceiver`

By group policy (the usual path): *Computer Configuration → Administrative Templates → System → App-V*. Under *Publishing*, enter the publishing address in *Publishing Server 1* and turn on refresh at sign-in for computers and users. Under *Reporting*, turn reports on and enter the reporting address. Under *Streaming*, decide on the shared content store (see below).

By PowerShell on the client, equivalent and handy for testing:

```
Add-AppvPublishingServer -Name ZeroPortal -URL 'https://portal.firma.local:8080/AppVPublishing' `
    -GlobalRefreshEnabled $true  -GlobalRefreshOnLogon $true `
    -UserRefreshEnabled   $true  -UserRefreshOnLogon   $true
Set-AppvClientConfiguration -ReportingEnabled 1 `
    -ReportingServerURL 'https://portal.firma.local:8080/AppVReportReceiver'
Sync-AppvPublishingServer -ServerId 1
```

Whether reports arrive, you see under *Reporting* in the portal; to send a report right away, use `Send-AppvClientReport -URL '<reporting address>' -DeleteOnSuccess:$false`.

Streaming: shared content store or load fully?

Environment	Recommendation
Terminal servers and VDI	**Shared content store** (`Set-AppvClientConfiguration -SharedContentStoreMode 1`). Packages stay on the share, nothing lives on the host. Requires a fast, always reachable share.
Workstations and notebooks	**Load fully.** Without the shared content store, the client streams the package at first launch; `Mount-AppvClientPackage` fetches it in advance, so the application also starts offline.

> **Only one path per device.** If the Microsoft client fetches the packages itself, *Enable App-V sync* stays off in the ZeroPortal agent, and vice versa. Both together make the two paths take the packages away from each other (chapter 7).

The ZeroPortal agent instead of the Microsoft client: then enter nothing in the Microsoft client. The portal address comes from the agent's ADMX template; reporting keeps running through the App-V client and is also turned on by group policy. All agent settings are in chapter 7.

Version changes: App-V has no version lock. The version published in the portal is put in place on the client, even if a newer one is there. Going back to an older version is therefore possible by publishing the older version.

Reporting: the portal collects the App-V client's report data (application usage, package state per device and user) under *Reporting* (chapter 12).

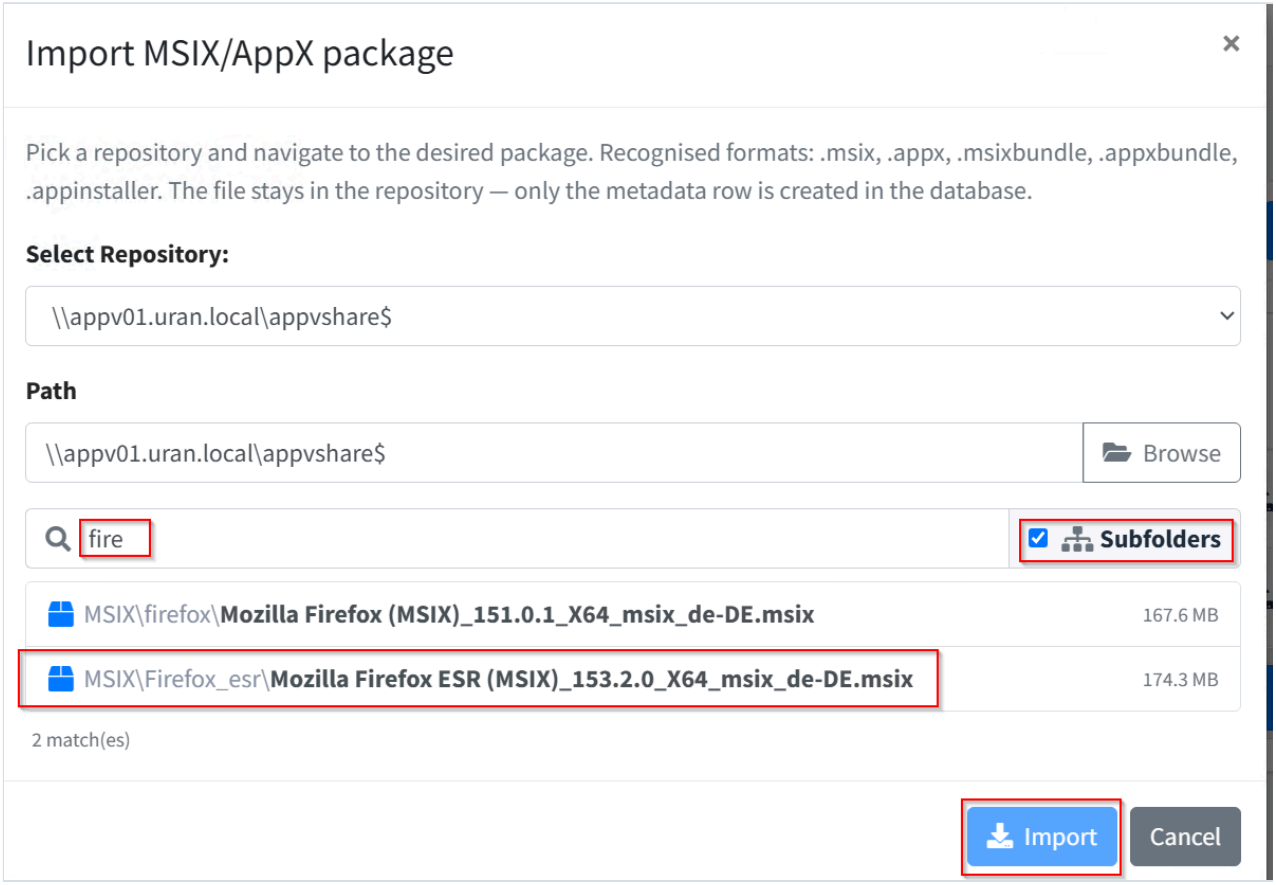
9. Distributing MSIX packages

Prerequisites

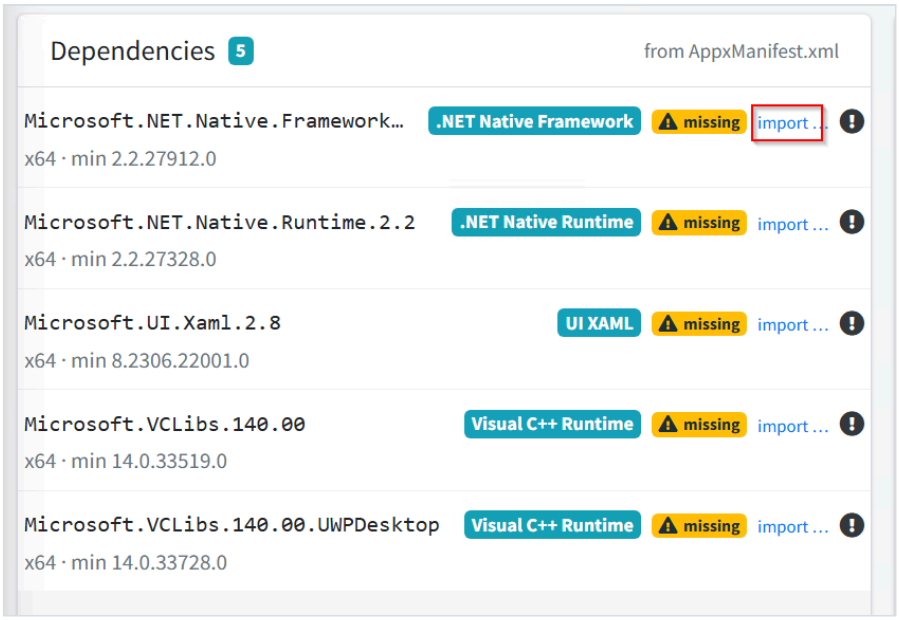
- *Enable MSIX sync* is on in group policy (chapter 7).
- The package's **signing certificate** is trusted on the clients: for your own packages, distribute it by GPO into *Trusted People* or *Trusted Root Certification Authorities*. Clients without internet access also need the intermediate and root certificates of the chain (*Known issues*).
- Clients read the package share as a computer account (machine-wide installation) and as the user. For branch offices, *Package source root override* points to a local share or DFS; if a package is missing there, the agent takes the central source.

Importing and assigning a package

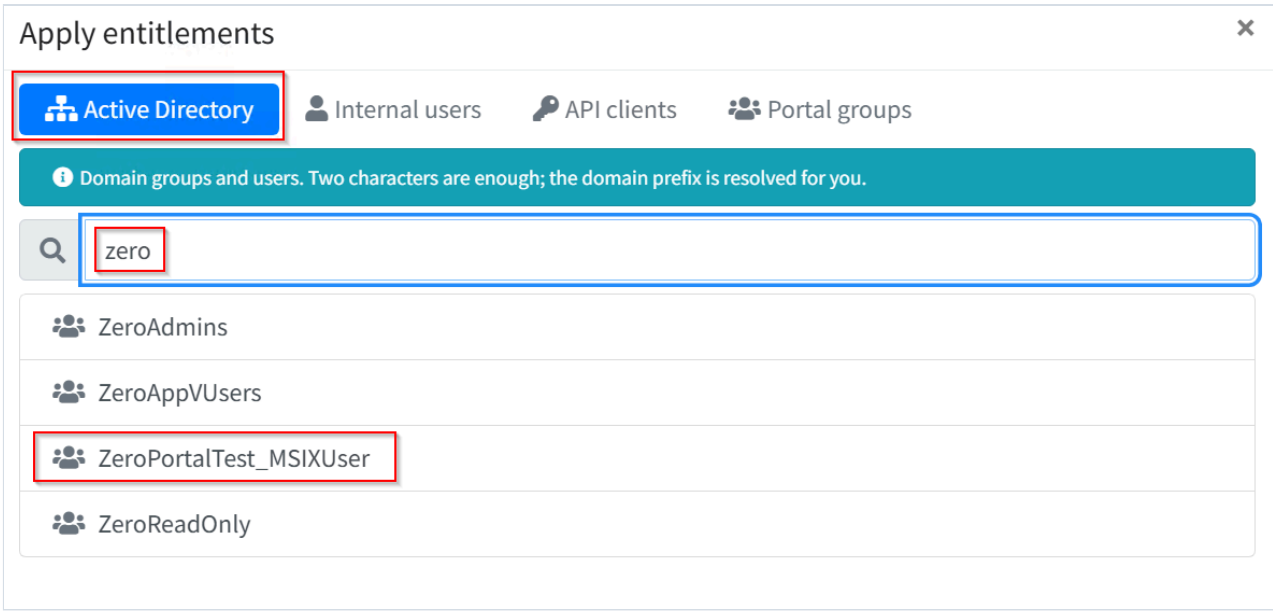
1. **Import** (*MSIX → Packages → Import*): pick `.msix`, `.msixbundle`, `.appx`, or `.appxbundle` from the repository. The portal reads name, version, architecture, and dependencies.

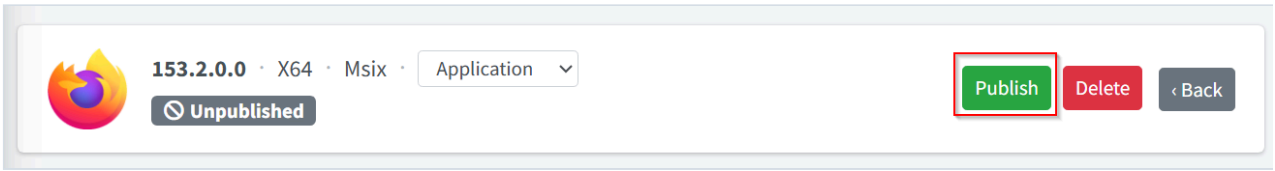


2. **Frameworks (dependencies):** the package page shows missing frameworks (`Microsoft.VCLibs`, `Microsoft.UI.Xaml`, …). *Import* looks in the package folder first; otherwise the repository browser opens with the framework name pre-filled. Frameworks sit in the repository once and are shared by every package.



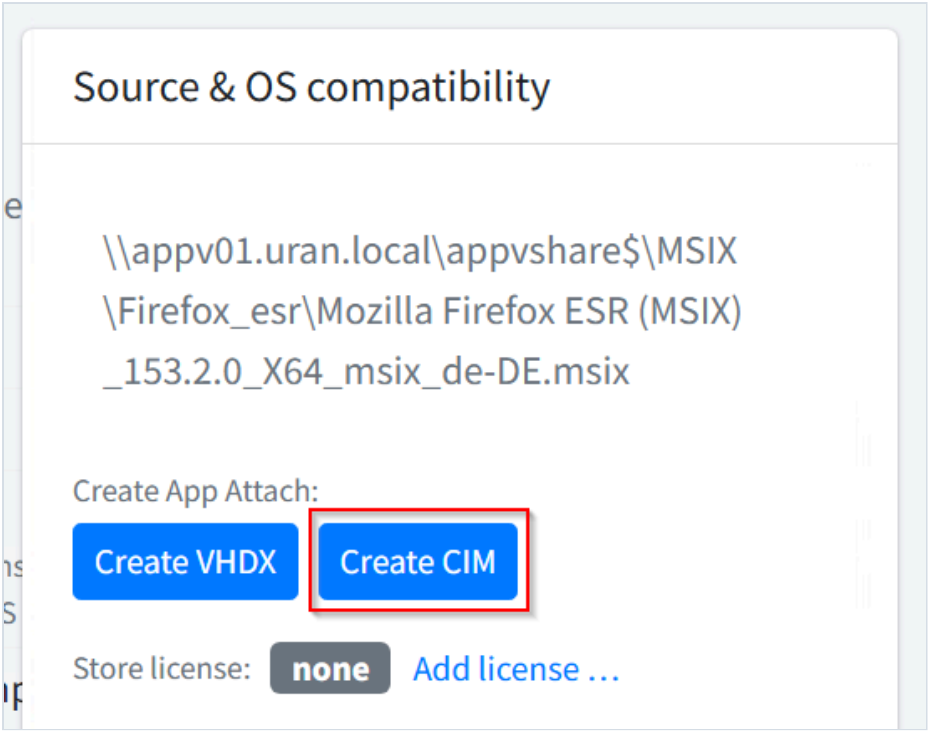
3. **Assign and publish:** on the *AD entitlements* card, pick the recipients: AD groups and individual AD accounts, portal groups, internal accounts, and devices and users from enrollment. Computer assignments install machine-wide; every user sign-in registers the package in the profile.





Delivery format: MSIX or App Attach

The default is the classic MSIX installation from the repository. Alternatively, a package is mounted from the share as **App Attach** (VHDX or CIM) instead of copied, which saves space and time on terminal servers. The **MSIX delivery format** policy sets the format (chapter 10); the portal creates the images itself on request (*MSIX → Package → App Attach*).



Deploying an older version (downgrade)

Windows refuses to install an older MSIX version over a newer one; the agent only tries a downgrade when it is explicitly allowed. **Default:** forbidden. If a newer version is on the client, the package counts as satisfied without an error, even for a mere format switch (MSIX or App Attach). **Recommendation:** allow downgrades per package family through the **Package downgrade control** policy (default: forbid everything); the agent switch `MSIX/AllowDowngrade` allows it across the board, a policy rule takes precedence.

A permitted downgrade removes the newer version first, then installs the older one; user data outside the package is kept. **Frameworks are never downgraded.** If the application is running, the package is skipped with a reason in the agent log and retried at the next sync; the agent only closes the application for a format switch (`MSIX/TerminateAppsForFormatSwitch`, default on). If the older version needs older frameworks the client no longer has, it won't start: test downgrades on a test device first.

Retracting and frameworks

When a publication is lifted, the agent removes the applications first, then the frameworks. A framework stays without an error as long as another package uses it (even one not from the portal); the next sync checks again. Frameworks updated by the Microsoft Store are left alone.

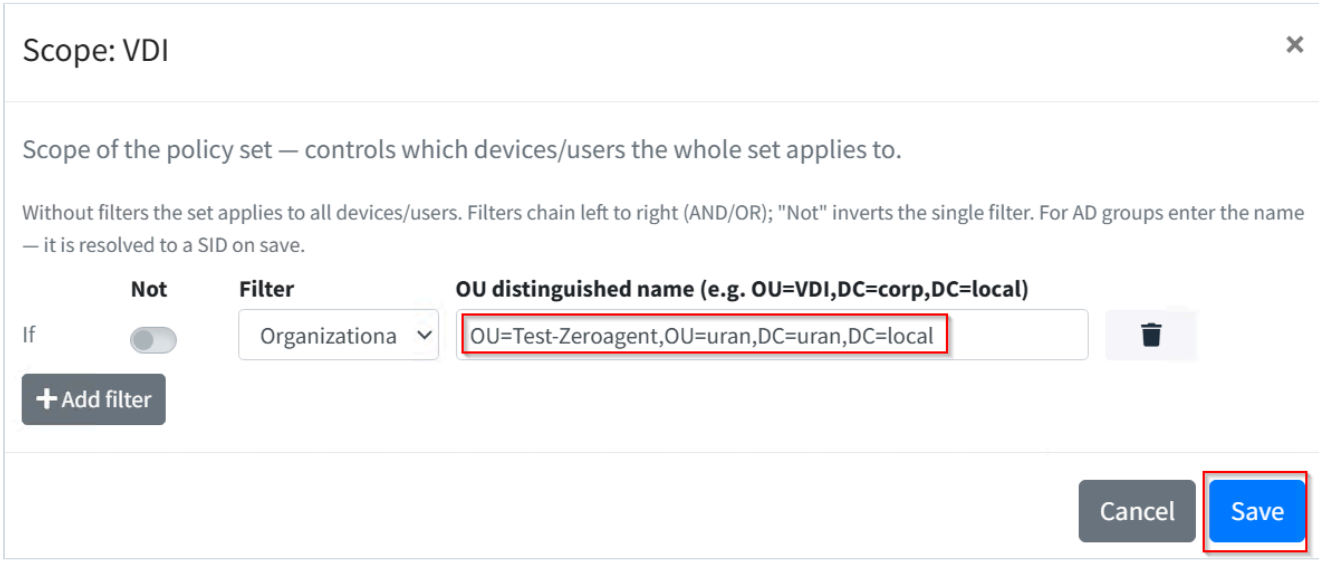
10. Policies

Policies control settings on devices centrally from the portal, independent of the AD structure. The agent fetches them during a sync, applies them **before** package processing, and takes them back once a device or user leaves the scope.

- **Policy set:** a container with a priority and a scope (filter) that applies to every policy in it.

- **Policy:** a group of settings of one type (registry, drives, printers, scripts, desktop, agent configuration, MSIX delivery format, …), optionally with its own filters.
- **Filter:** AD group, OU (including all child OUs), computer name (`*`, `?`), IP range, environment variable, operating system, session type, time window, registry value, file or folder; combined with AND/OR, each can be negated.

The agent processes computer parts (delivery rules, agent configuration, HKLM, services) in the machine sync and user parts (drives, printers, desktop, HKCU) in the user sync. A set targeting computers (computer name, IP range, OU) also brings its user parts to every user who signs in there (like group policy loopback processing); that is the normal case for VDI and terminal servers. A set targeting only users (user group, user OU) carries no computer parts; a computer group as the only filter carries only the computer parts.



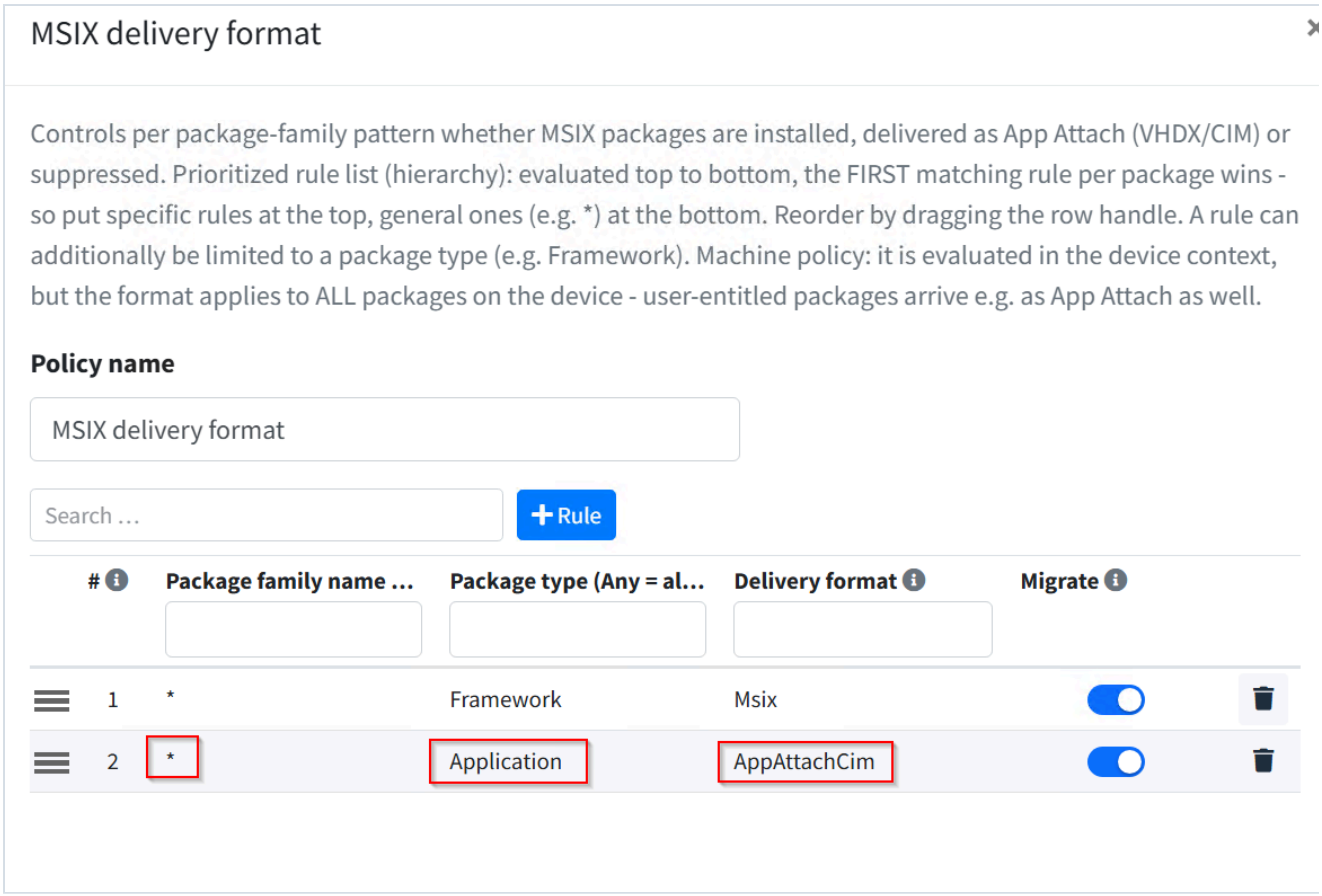
Creating a policy set

1. *Policies* → *New set*, set the priority and scope.
2. In the set, *Add policy* and pick the type. List types get new rows through the add button; for package families, the list filters as you type.
3. Save. Every change raises the policy's revision; reading the history and restoring an earlier state is done in PowerShell (`Get-ZeroPortalPolicyHistory`, `Restore-ZeroPortalPolicy`).

If two settings contradict each other, the first match wins: first by the priority of the policy set, then by the priority of the policy within the set; the lower number wins.

Delivery rules for MSIX and App Attach

The **MSIX delivery format** policy sets per package family whether a package goes out as `Msix` (the default without a rule), as `AppAttachVhdx` or `AppAttachCim` (mount an image from the share, e.g. for terminal servers and AVD), or not at all (`Deny`). Each rule: pattern on the family name (`LibreOffice*`), optional package type, format. The list is evaluated top to bottom and the first matching rule wins; specific rules at the top, the `*` rule at the bottom. It is a machine policy and also applies to user-assigned packages. A new policy already contains `*` / Framework → Msix, because frameworks always come as MSIX.



Typical terminal server set: `Contoso.Legacy_*` → Deny, `*` / Framework → Msix, `*` → AppAttachCim. Workstations without a rule of their own keep getting classic MSIX.

Templates, fields, and which filter applies in which sync: *Policies and templates*.

11. High availability

A second portal node with a replicated database keeps the sync running when a server fails or is under maintenance. The **Primary** writes the database; every change in the portal and every licence booking happens here. The **Replica** follows along through MariaDB replication; clients sync here, the web interface is usable, and the node forwards writes to the Primary. With random server selection in the agent's group policy, the syncs spread over both nodes. The Primary checks the other nodes every 10 seconds, each Replica checks in every 5 minutes (configurable). *Global Configuration → High Availability* shows the state.

Setup

1. Install the second server as in chapter 3.
2. On **both nodes**, enter the same **replication password** in the configuration tool, step *Base Configuration*; the path to the MariaDB program files that the wizard needs is also there.
3. Let the second node join the cluster (enter the Primary's address). If the Primary already holds data, run a full database sync first (*Setting up high availability*).
4. On the **second node**, under *Global Configuration → High Availability*, run the **replication wizard**: a unique server ID for both nodes, the Primary's host and port.

5. Check on the same page: both nodes green, replication lag 0.

Pointing clients at both servers

Enter both URLs in the *Publishing servers* group policy; the order is the priority. Without group policy, locally with `Add-ZPAgentPublishingServer`. If the first server is unreachable, the agent switches to the next after 10 seconds and avoids the failed one for 10 minutes; this applies equally to packages, App-V, and policies. A server that answers but reports an error is not blocked, only skipped.

Updating the cluster

1. Update the **Primary first**: install the MSI, then run the database update with `ZDBInstallUpdate.exe` (command in chapter 12).
2. Then the **Replicas**, each also with `ZDBInstallUpdate.exe`. Never migrate a Replica before the Primary.
3. Check the cluster page.

Failure scenarios and recovering a failed Primary are described in *Setting up high availability*.

12. Operations: backup, logs, audit, updates

Backup and recovery

Under *Global Configuration → Configuration*, section *Backup and recovery* (full administrators only), **Download backup** creates an XML file with the whole portal configuration in five areas, each of which can be deselected on restore: portal configuration (repositories, email and notifications, proxy, licence files), users, groups, and permissions (portal groups, levels, internal accounts, sign-in providers, API clients), policies, the MSIX catalogue, and the App-V catalogue (packages, connection groups, assignments). **Restore** reads the file: existing entries are updated by their ID, missing ones created, stored passwords never overwritten. The PowerShell module processes the same file (`Export-ZeroPortalConfiguration`, `Import-ZeroPortalConfiguration`), for example for daily backups via a scheduled task.

Not in the backup: passwords, secrets, and API client keys; node-specific settings (`appsettings.json`, LDAP connection, node and cluster identity); history data (audit, policy history, delivery history, App-V reporting); known devices and users, rollout tokens; the package files themselves. A complete recovery plan therefore covers:

1. The configuration backup from the portal (regularly, e.g. daily via PowerShell).
2. `C:\Program Files\ZeroPortal\appsettings.json` per node.
3. `C:\ProgramData\ZeroPortal\DataProtection` per node (keys for stored passwords; without this folder, stored passwords must be entered again).
4. A MariaDB dump (`mariadb-dump`), if reporting and audit data should be kept.
5. The package share.

Logs

What	Where	Note
Portal	`C:\ProgramData\NickIT\ZPServer\Logs` (older installs: `C:\Windows\Temp\ZeroPortalLogs`)	Default level *Warning*: start, warnings, errors only
Agent (device)	`C:\ProgramData\NickIT\ZeroPortalAgent\Logs\agent-<date>.log`	one file per day
Agent (user)	`usersync-<user>-<date>.log` in the same folder, or under `%LocalAppData%\NickIT\ZeroPortalAgent\Logs`	one file per day and user

- **Portal log:** service start and stop, database and certificate problems, errors on requests; who changed what in the portal is in the audit trail. At level *Warning* it stays small (a few KB a quarter); if it grows faster, it contains an error, or the level (`Logging:Console:LogLevel:Default` in `appsettings.json`) was not set back after troubleshooting. Restart the service after a change.
- **Agent log:** one line per package operation with event ID, package name, result, and on failure the Windows error code, plus decision lines and a summary per sync. Default level *Information*; for troubleshooting set *Log level* by group policy or `Set-ZPAgentConfiguration -LogLevel Debug` to *Debug*, and back afterwards. The agent does not write to the Windows event log. Logs are not deleted automatically: remove files older than 30 days with the *Scripts* policy or a scheduled task; `Clear-ZPAgentLog` deletes them all at once.

Audit

The portal records who changed what and when: assignments, publications, policies, permissions, backups. The entries are under *Global Configuration → Audit trail*; switching it on and off and the retention in days are set on the configuration page in the section of the same name (0 = unlimited, maximum 3650 days). If the audit trail is switched off, exactly that is still recorded and a warning email goes out.

Notifications

The portal sends fourteen different notifications, each switchable on its own and with its own cooldown, so a persistent condition does not flood the mailbox:

- **Operations:** database unreachable, server certificate expiring, audit trail switched off.
- **Licences:** licence expiring, quota exceeded.
- **Cluster:** node failed and reachable again, replication stopped, failover (this node is now Primary), Primary unreachable and reachable again.
- **Security and maintenance:** API key used from a foreign machine, App-V reporting data growing large, agent suppressed a repeated correction.

Reporting (App-V only)

Reporting shows the App-V reporting data: which applications were launched on which devices by which users, and which package state is there. Setup and retention under *Reporting → Configuration*. There is no reporting for MSIX; there, the agent log and the tray notifications are the source of information.

Updating a single node

1. Take a backup (section *Backup and recovery*).
2. Install the new server MSI over the existing installation.
3. Run the database update. Without this step, the service starts with an outdated database and says so in the log: `"C:\Program Files\ZeroPortal\ZDBInstallUpdate.exe" "C:\Program Files\ZeroPortal\appsettings.json" --admin-user root --admin-password <password>`
4. Restart the service, open the portal, check the version in the footer and the portal log.
5. Roll out the new agent MSI from the download centre to the clients by GPO or software deployment. It installs over the existing version; after a big version jump, it is safer to uninstall the old version and install the new one fresh.

Left untouched: `appsettings.json`, the certificate, the database (apart from the schema update), and the packages on the share. In a cluster, follow the order in chapter 11.

Updating MariaDB

The portal knows MariaDB through `MySqlSettings.BinPath` (program files, for dumps, backup, and a replica's full sync) and `MySqlSettings.DataPath` in `appsettings.json`; the portal start only checks the minimum version.

Patch within a series (11.8.6 to 11.8.9): run the installer, it updates the same folder. Nothing to do in ZeroPortal.

Series change (11.8 to 12.3; also 12.1 to 12.2, because every 12.x is its own series with its own program folder), per node; in a cluster the Replicas first, the Primary last (a Replica may temporarily be newer than its Primary, never older):

1. Take a backup (section *Backup and recovery*).
2. Start the new series' installer and choose *Upgrade existing instance*. It leaves the data directory where it is, attaches the service to the new program files under `MariaDB <series>\bin`, runs `mariadb-upgrade`, and removes the old series.
3. Check that the service is running and the portal starts (`DB version OK` in the portal log).
4. Start the configuration tool, click **Auto-detect** on the database page, check that `BinPath` points to `…\MariaDB <series>\bin`, and save. The tool does not pick up the old path by itself.
5. Replication, heartbeat, and failover keep running without further change: everything replication needs is in the my.ini in the data directory, and that stays where it was.

Afterwards the replication wizard's my.ini functions no longer find the file, because they look under `…\MariaDB <new series>\data`. Make my.ini changes by hand, or move the data directory, including `--defaults-file` in the service command, into the new folder.

Uninstalling

Server: uninstalling through *Apps & Features* removes the program files under `C:\Program Files\ZeroPortal`. What remains: the data directory `C:\ProgramData\NickIT\ZPServer` with the logs, the MariaDB database (MariaDB is a separate installation), and the package share.

Client: uninstall the agent MSI through *Apps & Features* or `msiexec /x`. The agent removes no packages when uninstalled; installed App-V and MSIX packages stay on the device. If they should go, lift the publication in the portal first and wait for a sync.

13. Emergencies and troubleshooting

Nobody can get into the portal

At **every start**, the service checks whether the AD group entered in `appsettings.json` under `AccessGroups:FullAdmins` and the optional emergency account `RootUser` have full rights, and only recreates what is missing (portal group *Portal administrators*, membership, permission on every area); the event is logged as a warning in the portal log.

1. **Sign-in or permission?** A repeated password prompt is a sign-in problem, usually the missing intranet zone, or an SPN missing for an alias name (chapter 3). The message "no access" means: signed in, but not permitted.
2. **Check the group:** is the right AD group under `AccessGroups:FullAdmins`, and are you a member? This entry always applies.
3. **Restart the service.** Afterwards the group's members have every right again. If neither a group nor an emergency account is configured, the service repairs nothing and logs an error: enter one of the two values and restart.
4. **Emergency account:** if a `RootUser` is set up, sign in with it.

After the rescue, anchor the rights on a portal group again, not on a single person.

The Primary fails (cluster)

- **Package delivery keeps running on the Replicas**, because reads always happen locally. Administration, enrollment, and licence bookings wait; every page shows the bar "No Primary reachable", and the Replica sends an email.
- If the Primary returns, the cluster catches up on its own, usually within a minute. If it doesn't come back, run **Promote to Primary…** on the Replica's HA page.
- A Replica that has been missing for more than seven days, or is reset from a snapshot, needs a full database sync (*Setting up high availability*).

Other emergencies

Case	What to do
Server certificate expired	Configuration tool, step *Certificate*, pick a new certificate, *Save & Restart Service*. The portal warns by email beforehand.
An MSIX package's signing certificate expired	With a timestamp in the signature, no problem: the package keeps installing. Without a timestamp it must be re-signed and imported again. The package page shows whether a timestamp is present. Packages already installed keep running.
Configuration accidentally destroyed	Restore the backup (chapter 12). Stored passwords stay unchanged.

Case	What to do
Database lost	Import the MariaDB dump, then the configuration backup. Without the dump, audit and reporting data are lost, the configuration is not.
Agent on a client broken	Uninstall and reinstall the agent (chapter 7). Installed packages are kept; the next sync restores the target state.
A package is wrongly going out to many devices	Unpublish it in the portal. Clients take it back at the next sync. To only pause it, remove the assignment instead.

Common symptoms

Symptom	Cause and fix
Login window when opening the portal	Portal URL not in the intranet zone, or an alias name without SPN (chapter 3). A missing permission would be an error page, not a login window.
"No access" despite group membership	Group not in a portal group, or level *None*. New Kerberos ticket after a group change: sign out and back in.
Portal does not start	Read `C:\ProgramData\NickIT\ZPServer\Logs\ZeroPortalLogs.log`. Common: MariaDB not started, certificate expired, database update forgotten after an MSI update.
Package does not arrive on the client	On the client, `Get-ZPAgentSync`: is MSIX or App-V on? After installation all three areas are off (chapter 7). Then `Get-ZPAgentStatus` and `Sync-ZPAgentPublishingServer`, check assignment and publication in the portal, then that day's agent log.
Packages missing for individual users	Check the permission in the portal; new AD groups only apply with a new Kerberos ticket (ADMX setting *Purge the user's Kerberos tickets before a user sync*).
Tray reports "failed"	Click the notification: it opens the log folder. The error line names the package, error code, and cause.
MSIX error 0x800B0109	Signing certificate not trusted on the client (chapter 9).
MSIX error 0x80073D06	Downgrade refused by Windows. Allow the downgrade by policy, or publish a newer version.
MSIX error 0x80073D02 on removal	The framework is still used by another package. Nothing to do; it stays until unused.
MSIX error 0x80073CF3 on installation	A required dependency is missing or too old. Import and assign the matching framework (chapter 9).
App-V package missing from the Start menu	Check the package in the user context (`Get-AppvClientPackage`). The shortcut sweep is off by default; if it is on, check whether it applies.
App-V application starts very slowly the first time, progress bar to 100 %	The package streams completely because no primary feature block was recorded during sequencing. Re-sequence, or turn on the shared content store. Antivirus exclusions don't change this.

Symptom	Cause and fix
App Attach does not mount	Is the share readable from the client as a computer account? Is the image file in the repository? The agent log shows the path and error code.
Client certificate warning	Server certificate not in the client's chain of trust. Distribute the certificate by GPO; `TRUSTCERT=1` only for tests.
Licensing page shows an overage	Counts the last 90 days; retired devices drop out after 90 days. Load a licence file or check the mode.
Replica shows lag	Check MariaDB replication (*High Availability* page, `SHOW REPLICA STATUS`). After a network interruption it usually catches up by itself.

For error reports to the vendor: portal version (footer), agent version (`Get-ZPAgentStatus`), that day's agent log, and the relevant line from the portal log.

14. Reference

Paths and ports

	Value
Portal installation	`C:\Program Files\ZeroPortal`
Portal configuration	`C:\Program Files\ZeroPortal\appsettings.json`
Keys for stored passwords	`C:\ProgramData\ZeroPortal\DataProtection`
Portal log	`C:\ProgramData\NickIT\ZPServer\Logs` (older installs: `C:\Windows\Temp\ZeroPortalLogs`)
Database update	`C:\Program Files\ZeroPortal\ZDBInstallUpdate.exe`
Configuration tool	`C:\Program Files\ZeroPortal\ZeroPortalConfigTool.ps1`
Agent installation	`C:\Program Files\NickIT\ZeroPortalAgent`
Group policy template (ADMX)	`C:\Program Files\NickIT\ZeroPortalAgent\admx`
Agent logs	`C:\ProgramData\NickIT\ZeroPortalAgent\Logs`
Portal port	set in the configuration tool (HTTPS), e.g. 8080; firewall rule `ZeroPortal Inbound <Port>`
MariaDB	3306, open between the nodes in a cluster (rule from the replication wizard)
Clients and portal → share	SMB 445
Agent inbound	no port; the agent only connects outbound
All ports at a glance	chapter 3, section *Firewall and ports*

Agent switches (selection)

By group policy (ADMX, chapter 7), by the ZeroPortal *Agent configuration* policy, or locally with `Set-ZPAgentConfiguration -<switch> <value>`; group policy takes precedence. Every switch with explanation: *Client agent: operations and rollout*.

Switch	Default	Meaning
`MSIX/SyncIntervalMinutes`	60	Interval of the periodic sync
`Agent/SyncJitterMinutes`	10	Random delay of 0 to n minutes
`Agent/ServerFailover`	on	One server per sync, the next one if unreachable; off = work through every server (independent portals)
`Agent/FailoverTimeoutSeconds`	10	Wait per server before switching; raise it for heavily loaded servers, otherwise a slow server counts as dead
`Agent/ServerBlacklistMinutes`	10	How long a failed server is avoided
`Agent/PurgeUserTicketsBeforeSync`	off	`klist purge` before every user sync, so new group memberships apply right away
`Agent/LogLevel`	Information	Agent log level (None to Debug)
`MSIX/AllowDowngrade`	off	Allow downgrades across the board; a policy takes precedence
`MSIX/DeferRemovalWhileInUse`	on	Defer removal while the application runs; at the latest after `MSIX/RemovalIdleTimeoutHours` (24)
`MSIX/TerminateAppsForFormatSwitch`	on	Close the running application for an MSIX/App Attach format switch; off = postpone the switch while it runs

Important events in the agent log

ID	Meaning
2507	Framework still needed in the device context and stays installed
2516	The same in the user context
2538	Downgrade not allowed, package counts as satisfied; the same ID also reports a user registration switched to App Attach
3620	App Attach requested, but no reachable image in the requested format; falling back to MSIX
4000	Service startup error with the full cause
4501	Deploying a package in the device context failed (with error code and message)
4502	Retracting a package in the device context failed
4512	Removal in the user context failed
4531	Mounting an App Attach image failed, falling back to MSIX

Further documents

Topic	Document
First setup step by step with screenshots: GPO, agent, App-V, MSIX, policies	*Quick Admin Guide*
Agent: installation, switches, tray, registry	*Client agent: operations and rollout*
Permissions, enrollment, licences, audit	*Users, permissions, licences and logs*
MSIX, frameworks, App Attach, downgrade	*Distributing MSIX packages*
Policies: structure, templates, PowerShell	*Policies and templates*
Setting up and running a cluster	*Setting up high availability*
Devices without AD	*Devices without a domain (API key)*
Sign-in problems, slow MSIX installation without internet	*Known issues*