

ZTSvc a Service for automatic Software Deployment

<http://www.coopware.in2.info/ztsvc.htm>

Compiled with .NET for AnyCPU

Version 1.1.0.0, 2023.10.15

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1. Preface and Features

This paper discusses an idea of automatic Software Deployment (zero touch) for © Microsoft Windows (W10, W11) clients in a Network environment. The main purpose is to automatically build a stable and reliable Software stack on © Microsoft Windows:



In detail the following features are supported at the moment:

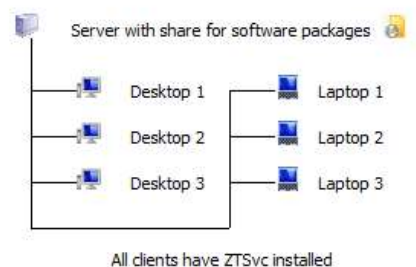
Feature	Description
Assigned Software Deployment	The Administrator assigns Software Packages to Collections or Devices in the Network
Available Software Deployment	User may choose from available Software Packages (if Device is unlocked by Administrator)
Fast Software Deployment ⚡	- Assigned Deployment starts after Reboot or ~ 1 min after Refresh - Available Deployment starts ~ 1 min after Refresh
Defined Install Order	Define install order for dependend Software Packages
Software Deployment from share	All Software Packages reside on a SMB share <code>zts\pkg</code> , no need of local cache
Centralized Inventory	All inventory data is copied to SMB folder <code>zts\inv</code>
Simple Installation	MSI Package for <code>ztinv.exe</code> , <code>ztset.exe</code> , <code>ztsvc.exe</code> and <code>ztwin.exe</code>
Tasks	Scheduled Tasks in the context of System (hidden) or current User (visible)

2. Prerequisites

To test the ZTSvc components you will need the following Prerequisites:

- SMB share on a Windows Server or Windows Desktop with Username and Password
- Client Computer(s) with ZTSvc installed (Desktop or Laptop)
- At least one `Install.cmd` that performs an unattended Software Installation (e.g. `msiexec /package xypad.msi /passive /norestart`)
Most installers provide switsches (`/q`, `/s`, `/silent` ...) for that purpose.
In the case of a MSI installation refer to the command line switches of `msiexec.exe`.
Be sure to test your scripts carefully to get a reliable automatic Software Deployment!

The Software Packages reside on a SMB share and have to be prepared for unattended Installation.



If you don't have a Network you can test ZTSvc on a single Computer.
Put your Software Packages on `C:\ZTS\pkg`, `D:\ZTS\pkg` or `E:\ZTS\pkg`.

3. Installation and Configuration of ZTSvc

ZTSvc consists of the following Components:

-  `ztinv.exe` ZTSvc Inventory Tool
-  `ztset.exe` ZTSvc Settings and ZTasks
-  `ztsvc.exe` ZTSvc Service
-  `ztwin.exe` ZTSvc Console

For the installation of ZTSvc it is recommended to use `ztsvc.msi` with the following public properties:

Property	Default	Description
INSTALLDIR=	%SystemRoot%\ZTS	This is the default install directory which you may change with this property.
UNCP=	\\server.domain.net\zts	This is the UNC path the Service will connect to install Software and copy the inventory data.
NDRV=	P:	This is the default drive name the Service will connect to. C:, D:, E:, F: to test on local drives
USER=	domain\ztsvc	Domain name\user name to connect (validate against) UNC path
PSWD=		Password for user (encryptet string!)

You may use `Install.cmd` to install `ztsvc.msi` (first uninstall previos Versions of ZTSvc):

```
msiexec.exe /x {CB0A5A36-BBBF-4057-A5AB-532CD6006278} /passive // Version 1.0.0.6
msiexec.exe /x {C00ABCDE-2018-0818-1008-A0B1C2D3E4F5} /passive // Version 1.0.0.8
msiexec.exe /x {C00ABCDE-2019-0919-1009-A0B1C2D3E4F5} /passive // Version 1.0.0.9
msiexec.exe /x {C00ABCDE-2020-1010-1010-A0B1C2D3E4F5} /passive // Version 1.0.1.0
msiexec.exe /x {C00ABCDE-2022-1010-1010-A0B1C2D3E4F5} /passive // Version 1.0.1.1
msiexec.exe /x {C00ABCDE-2021-1011-0521-A0B1C2D3E4F5} /passive // Version 1.0.1.2
msiexec.exe /x {C00ABCDE-2022-0624-1230-A0B1C2D3E4F5} /passive // Version 1.0.1.2
msiexec.exe /x {C00ABCDE-2023-0220-1230-A0B1C2D3E4F5} /passive // Version 1.0.1.3
msiexec.exe /X {C00ABCDE-2023-1010-1000-A0B1C2D3E4F5} /passive // Version 1.1.0.0

msiexec /Package ztsvc.msi UNCP="\\server.domain.net\zts" USER="domain\ztsvc" PSWD="1234" /passive
```

The `PSWD` parameter will be decryptet by `ztinv.exe`, `ztsvc.exe`, `ztwin.exe`. So you have to use `ztset.exe` once to encrypt your password string.

Perform this command lines with Administrator privileges (run as administrator). After the installation of `ztsvc.msi` the Service will start automatically. If you uninstall `ztsvc.msi` the Service will be stopped automatically and removed from the Service list. Here are some additional commands to control the ZTSvc Service (you should not need them normally):

Command	Description
<code>sc create ZTSVC binPath=C:\Windows\ZTS\ztsvc.exe</code>	registers the Service in SCM (Service starts automatically)
<code>net start ZTSVC</code>	starts the Service manually
<code>net stop ZTSVC</code>	stops the Service manually
<code>sc delete ZTSVC</code>	delete the Service from SCM (Service Control Manager)

The configuration of ZTSvc (HKLM\SOFTWARE\Coopware\ZTSvc) can be changed with `ztset.exe`:

Parameter	Description
lock	lock Device for assigned Software Deployment - if 0 available Deployment will be activated (default 1)
nmax	maximal number of tries to connect to the UNC path at Service start (default 8)
tmax	maximal time for one Package installation - if this value exceeds the current process will be terminated (default 20min)
trst	time when the Services will initialize a system Reboot or shutdown (default 24:00 = never)
tsdd	day(s) bitmask when the Service will initialize a system shutdown (default 0 = never)
twrs	time to wait before performing a Reboot or shutdown (default 60s)

Hardcoded Constants

- If no user is logged on and an ongoing Package Installation is executed a MessageBox (with `ServiceNotification`) will be displayed for 30s. After this time the MessageBox will be closed automatically.

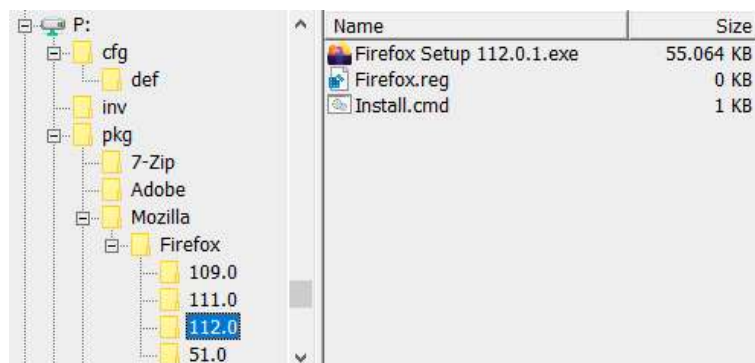
4. Software Deployment with ZTSvc

ZTSvc is designed to deploy Software (Packages) in the context of the local system automatically. Software Deployment will be configured with `P:\cfg\Assignment.ini` (assigned) Deployment and/or `%PUBLIC%\ztsvc.ini` (available Deployment):

Operating System	Path
Windows 10/11	<code>%PUBLIC%\ztsvc.ini</code>

It is recommended that you organize your Software Packages in a hierarchical structure with four levels in the following schema:

```
P:\cfg
P:\cfg\dev
P:\inv
P:\pkg
```



This schema allows an automatic detection of Software Packages (Name must be `Install.cmd`) with ZTWin described later in this text.

A Package is the abstraction of one Software product and is stored in the following format:

```
[Publisher Name]
publ=Publisher of the Software
name=Name of the Software
icmd=Path to the script to install the Software unattended (silent)
vers=Version String
```

An example:

```
[Mozilla Firefox]
publ=Mozilla
name=Firefox
icmd=P:\Mozilla\Firefox\112.0\Install.cmd
vers=112.0
```

Inside `Install.cmd` the following lines ensure an unattended installation:

```
@echo off
set errorlevel=
set exitcode=0

"Firefox Setup 112.0.exe" /S
echo %date% %time% Install errorlevel=%errorlevel% >>%SystemRoot%\ZTS\SWInst.log
if not "%errorlevel%" == "0" set exitcode=%errorlevel%

exit /b %exitcode%
```

Installation Context

ZTSvc Version 1.1.0.0 is a .NET Service compiled for AnyCPU.

- On a x64 System it will always install (work) in 64 bit context.
- On a x86 System it will always install (work) in 32 bit context.

The Process of Software Deployment

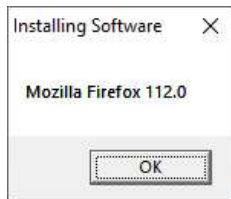
The Service reads all assigned Packages from `P:\cfg\Assignment.ini` and all available Packages from `%PUBLIC%\ztsvc.ini..` Next the Service looks for Footprints of every Package in the Registry (`HKLM\SOFTWARE\Coopware\ZTSvc\Packages`). If the corresponding parameters are not found (**first installation**) or the Version in the Registry does not match (**update/downgrade**) the Service will execute the script specified with `icmd`.

The Package script `icmd` can be executed from a local drive or from a Network drive. To connect the Network drive automatically the Service will perform a `WNetAddConnection` call with the Service parameters `uncp`, `ndrv`, `user`, `pswd`.

Before the script is executed the Service will do the following:

a) if no user is logged on:

send a Message to the active Session for 30 seconds



b) if a user is logged on:

start ZTWin and display the current Package (green icon, see images later in this text) A successful execution of `icmd` is reported to the Registry with `code=0`:

Name	Typ	Daten
(Standard)	REG_SZ	(Wert nicht festgelegt)
code	REG_DWORD	0x00000000 (0)
icmd	REG_SZ	P:\pkg\Mozilla\Firefox\112.0\Install.cmd
idat	REG_SZ	2023-06-29 12:00:20
vers	REG_SZ	112.0.1

Note: The Parameter `code` will hold the `icmd` exitcode in the Registry.

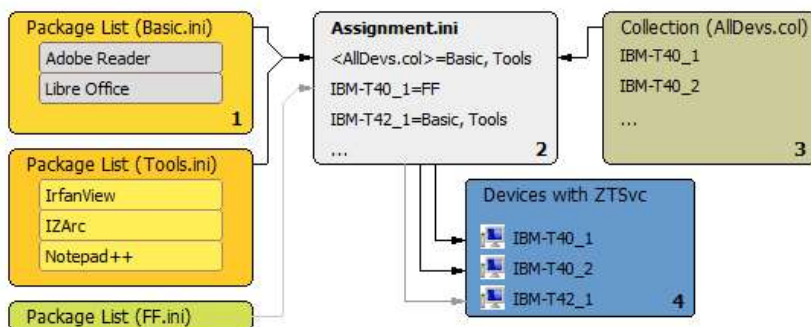
After Reboot or if you press ⚡ `icmd` will run again if `code` was not 0, 1641, 3010.

If `icmd` return `code=1641` an immediate Reboot is executed.

If `icmd` return `code=3010` the Flag `boot` is set and at the End of the Software Deployment Task a Reboot is executed.

The ZTSvc Service writes the logfile `C:\Windows\ZTS\ztsvc.log`.

Assigned Software Deployment



1 Build Package Lists:

Build Package Lists which may contain one or more Packages (FF.ini - Firefox Example later in the Text)

2 Edit Assignments:

Reference Package Lists in Assignment.ini

3 Build Collections:

Reference Collections in Assignment.ini

4 Package Deployment: ⚡

According to Assignment Packages will be deployed
IBM-T40_1 will get Adobe Reader, LibreOffice from AllDevs.col and Firefox from direct Assignment
IBM-T40_2 will get Adobe Reader, LibreOffice from Collection (AllDevs.col)
IBM-T42_1 will get Adobe Reader, LibreOffice, IrfanView, IZArc, Notepad++ from direct Assignment

The administrator can assign single Software Packages or groups of Software Packages to Devices. The `cfg` Folder is used to store additional *.ini Files.

The most important File is `P:\cfg\Assignment.ini` which maps Devices to Packages or Package Groups. Use Notepad to create and edit this file (Encoding: ANSI or UTF8).

Example for a Package Definition: `P:\cfg\dev\FF.ini`

```
[Mozilla Firefox]
publ=Mozilla
name=Firefox
icmd=P:\Mozilla\Firefox\112.0\Install.cmd
vers=112.0
```

Example for an Assignment: `P:\cfg\Assignment.ini`

```
Computer1=AR, FF, ...
Computer2=AR, FF, XYPad
```

You may mix Assigned and Available Software Deployment. However, the assigned Software Packages will allways overwrite the available selection at the next system start.

Available Software Deployment

With the small ZTWin console the user may find and select Software Packages in a self Service mode (if the DEvice was unlocked by an Administrator). See Introduction to ZTSvc Console in the next chapter.

5. Introduction to ZTSet and ZTWin

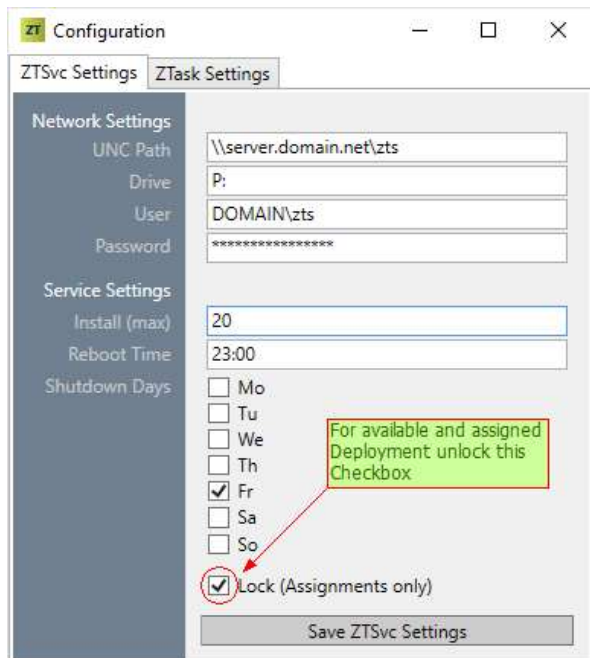
If you read until here you should be familiar with the basic concept of Software Deployment with ZTSvc.

To assist you with the configuration of ZTSvc Service and the creation of `ztsvc.ini` or Package List files in the expected format you may use ZTWin Console (`ztwin.exe`).

To change Settings for ZTSvc or to create a new ZTask you may also use ZTSet (`ztset.exe`) directly.

5.1 ZTSet

Configure the Service ZTSvc with ZTWin Menu *View/ZTSvc Settings*:



Network Settings:

Configure a SMB Share in an Active Directory Domain with a Domain User with read/write access on the share: **read access** in the `zts\cfg` and `zts\pkg` folder **write access** in `zts\inv` folder to copy the inventory data).


Service Settings:






Choose the day(s) when the Service should perform a Shutdown (bitmask `tssd`).
Lock (Assignments only) hides the ZTWin Self Service Mode (Available Packages).

5.2 ZTWin






Try *View/Show Assignments for this Device* to get a HTML Report for assigned Packages.

Press  and wait while ZTWin is searching for available Software Packages.






(All Scripts have to be named Install.cmd!) Then select the Packages you want to be installed by ZTSvc and the press  If (stop=0) the service will read the new saved ztsvc.ini and start to install. If (stop=1) the service will install after a reboot.

Publisher	Name	Version	Script
 AOB	IrfanView	4.58	P:\pkg\IrfanView\4.58\Install.cmd
 AOB	IZArc	4.1.8	P:\pkg\IZArc\4.1.8\Install.cmd
 AOB	LibreOffice	6.4.7	P:\pkg\LibreOffice\6.4.7\Install.cmd
 AOB	Microsoft	Windows10	P:\pkg\Microsoft\Windows10\Install.cmd
 AOB	MinGW	7.3.0	P:\pkg\MinGW\7.3.0\Install.cmd

While the Software Deployment Task watch the installation progress ...

Publisher	Name	Version	Install Command	Install Date
 AOB	IrfanView	4.58	P:\pkg\IrfanView\4.58\Install.cmd	currently installing
 Coopware	XYPad	1.1.1.3	P:\pkg\Coopware\XYPad\1.1.1.3\Install.cmd	
 AOB	Notepad++	8.5.2	P:\pkg\Notepad++\8.5.2\Install.cmd	
 Settings	User	1.0.0.1	P:\pkg\Settings\User\1.0.0.1\Install.cmd	
 AOB	TextPad	8.8.0	P:\pkg\TextPad\8.8.0\Install.cmd	

After the Software Deployment Task click on Packages to update Status

Publisher	Name	Version	Install Command	Install Date
 AOB	IrfanView	4.58	P:\pkg\IrfanView\4.58\Install.cmd	2023-07-31 14:40:02
 Coopware	XYPad	1.1.1.3	P:\pkg\Coopware\XYPad\1.1.1.3\Install.cmd	2023-07-31 14:40:08
 AOB	Notepad++	8.5.2	P:\pkg\Notepad++\8.5.2\Install.cmd	2023-07-31 14:40:14
 Settings	User	1.0.0.1	P:\pkg\Settings\User\1.0.0.1\Install.cmd	2023-07-31 14:40:19
 AOB	TextPad	8.8.0	P:\pkg\TextPad\8.8.0\Install.cmd	2023-07-31 14:40:25

Select Inventory Software.dat to control deployments ...

Host	DisplayName	Publisher	DisplayVersion
 C102-ST6	IrfanView 4.58 (32-bit)	Irfan Skiljan	4.58
 C102-ST6	Microsoft Edge Update		1.3.177.11
 C102-ST6	Microsoft Edge WebView2-Laufzeit	Microsoft Corpo...	115.0.1901.188
 C102-ST6	Microsoft Edge	Microsoft Corpo...	115.0.1901.188
 C102-ST6	Notepad++ (32-bit x86)	Notepad++ Team	8.5.2

6. ZTasks

With ZTSet (ztset.exe) you may register ZTasks in the Registry.

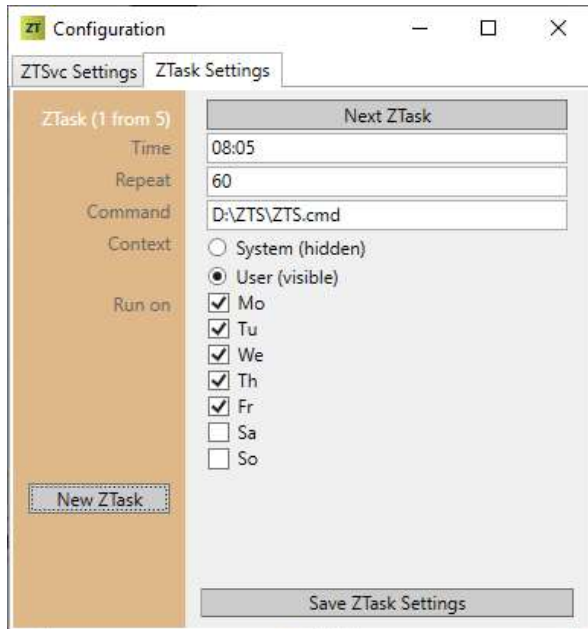
This tasks are automatically executed in the context of the current user (User Task) or in the context of the local system (System Tasks):

The current implementation of this feature supports time scheduled tasks from Monday to Sunday between 00:00 and 23:59. In the GUI enter the path of the Executable without quotes.

Here is an Example:

```
[HKLM\Software\Coopware\Ztsvc\ZTasks\ZTInv]
"bsw"=dword:0 // hide task (system tasks are always hidden)
"tcmd"="C:\Windows\ZTS\ztinv.exe"
"tday"=dword:31 // Mo - Fr (Mo=1, Tu=2, Wd=4, Th=8, Fr=16, Sa=32, Su=64)
"trp"=dword:60 // repeat time (0 min = do not repeat, here 60 min)
"typ"=dword:0 // context: system
[HKLM\Software\Coopware\Ztsvc\ZTasks\10:00]
"bsw"=dword:1 // show task (user tasks are always shown)
"tcmd"="C:\Windows\Notepad.exe"
"tday"=dword:31 // Mo - Fr (Mo=1, Tu=2, Wd=4, Th=8, Fr=16, Sa=32, Su=64)
"trp"=dword:10 // repeat time (every 10 min)
"typ"=dword:1 // context: user
```

Create new ZTask with ZTWin Menu *File/Create new ZTask*:



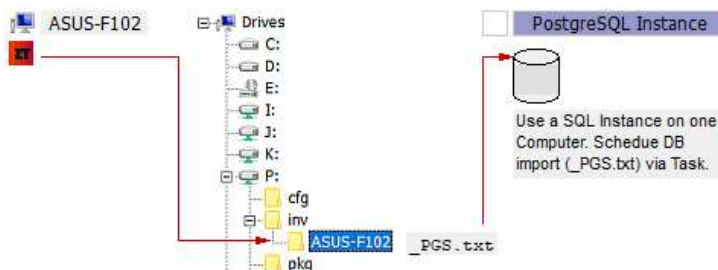
7. ZTInventory

On every Device with ZTSvc installed you will find a small Inventory Client (*ztinv.exe*). This client is triggered by *ztsvc.exe* (typically every hour) and will write and copy the following files (to the central inventory directory):

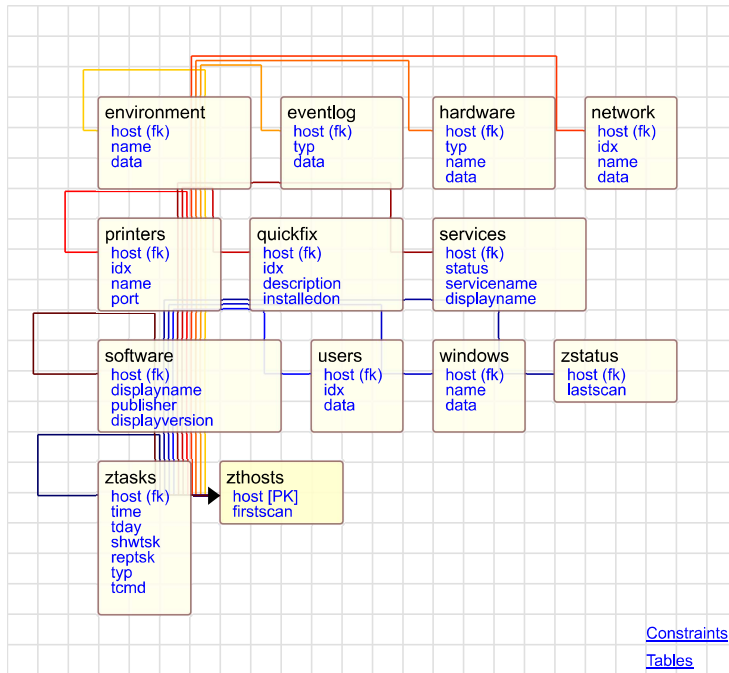
- *_CDB.txt*
- *_PGS.txt*
- *_SQL.txt*
- *Environment.dat*
- *Eventlog.dat*
- *Hardware.dat*
- *Network.dat*
- *Printers.dat*
- *QuickFix.dat*
- *Services.dat*
- *Software.dat*
- *Users.dat*
- *Windows.dat*
- *ZStatus.dat*
- *ZTasks.dat*
- *ZTHosts.dat*

It is recommended to use a SQL database like PostgreSQL 15.1 on one Device to import Inventory data.

- The file *_CDB.txt* describes the schema and the creation of the ZTS database.
- The file *_PGS.txt* may be used for automatic import to PostgreSQL per client.
- The file *_SQL.txt* may be used for automatic import MySQL per client.
- After registering the host in the *zthosts* table (primary key) the client is allowed to import inventory records.
- You may schedule an import script for all clients for the PostgreSQL database.



Schema of ZTS Inventory Database:



Example for one import script (`_PGS.txt`):

```
COPY ZHosts (Host,FirstScan) FROM 'D:/ZTS/inv/ASUS-F102/ZHosts.dat' DELIMITER '|' CSV HEADER ENCODING 'UTF8';
```

```
DELETE FROM Environment WHERE Host='ASUS-F102';
DELETE FROM EventLog    WHERE Host='ASUS-F102';
DELETE FROM Hardware    WHERE Host='ASUS-F102';
DELETE FROM Network     WHERE Host='ASUS-F102';
DELETE FROM Printers    WHERE Host='ASUS-F102';
DELETE FROM QuickFix    WHERE Host='ASUS-F102';
DELETE FROM Services    WHERE Host='ASUS-F102';
DELETE FROM Software    WHERE Host='ASUS-F102';
DELETE FROM Users       WHERE Host='ASUS-F102';
DELETE FROM Windows     WHERE Host='ASUS-F102';
DELETE FROM ZStatus     WHERE Host='ASUS-F102';
DELETE FROM ZTasks      WHERE Host='ASUS-F102';
```

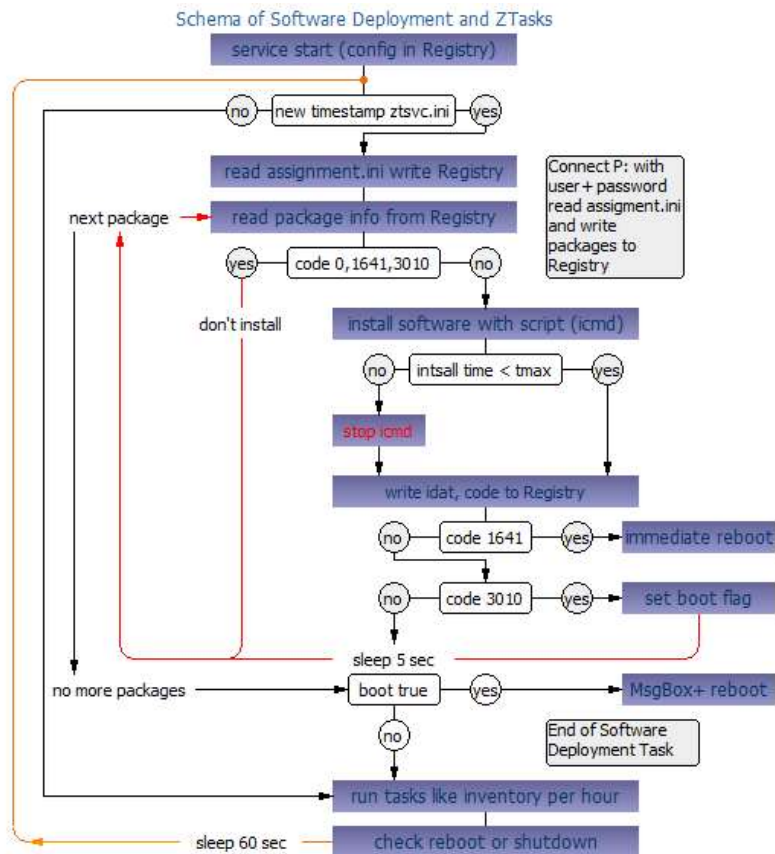
```

COPY Environment (Host,Name,Data) FROM 'D:/ZTS/inv/ASUS-F102/Environment.dat' DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY EventLog    (Host,Typ,Data)  FROM 'D:/ZTS/inv/ASUS-F102/EventLog.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Hardware    (Host,Typ,Name,Data) FROM 'D:/ZTS/inv/ASUS-F102/Hardware.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Network     (Host,Idx,Name,Data) FROM 'D:/ZTS/inv/ASUS-F102/Network.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Printers    (Host,Idx,Name,Port) FROM 'D:/ZTS/inv/ASUS-F102/Printers.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY QuickFix    (Host,Idx,Description,InstalledOn) FROM 'D:/ZTS/inv/ASUS-F102/QuickFix.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Services    (Host,Status,ServiceName,DisplayName) FROM 'D:/ZTS/inv/ASUS-F102/Services.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Software    (Host,DisplayName,Publisher,DisplayVersion) FROM 'D:/ZTS/inv/ASUS-F102/Software.dat'   DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Users       (Host,Idx,Data)      FROM 'D:/ZTS/inv/ASUS-F102/Users.dat'       DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY Windows     (Host,Name,Data)     FROM 'D:/ZTS/inv/ASUS-F102/Windows.dat'     DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY ZStatus     (Host,LastScan)      FROM 'D:/ZTS/inv/ASUS-F102/ZStatus.dat'     DELIMITER '|' CSV HEADER ENCODING 'UTF8';
COPY ZTasks      (Host,Time,TDay,ShwTask,RepTask,Typ,Tcmd) FROM 'D:/ZTS/inv/ASUS-F102/ZTasks.dat'     DELIMITER '|' CSV HEADER ENCODING 'UTF8';
    
```

You may use SQL Reporter (<https://coopware.in2.info/sqlrepo.htm>><https://coopware.in2.info/sqlrepo.htm>)
sqlrepo.exe to connect to the Postgres Database ZTS (e.g. with ODBC).

Appendix

Schema of ZTSvc Service:



Examples of successfully deployed Software on a Windows 11 Client with ZTSvc:

- 7-Zip 19.0.0
- Autodesk AutoCAD 2021 (64 bit)
- CorelDRAW Graphics Suite 2021 (64 bit)
- Gimp 2.8.8
- Google Chrome 108.0
- IBM SPSS Amos 27.0.0.0
- IBM SPSS Statistics 27.0.0.1
- IrfanView 4.58
- IZArc 4.1.8
- Java Runtime Environment 8u172
- LibreOffice 6.2.0
- Microsoft Office 2021
- Microsoft Project 2021
- Microsoft Visio 2021
- Microsoft Visual Studio 2017
- MiKTeX 2.9 (64 bit)
- Mozilla Firefox 117.0 de
- Notepad++ 8.5.2
- Origin 2019
- PDF Creator 2.3.0
- PostgreSQL 15.1
- Putty 0.63
- TeXnicCenter 2.0.2
- TextPad 8.8.0
- Vectorworks 2019
- VLC media player 3.0.18
- Xming 7.5.0.82
- XYPad 1.1.1.4
- ...