Yi’ Solutions

Microsoft Windows Server 2022

Different system versions have different packaging methods. The packaging process includes: "Language pack: add, associate, delete", "Drive: add, delete", "Cumulative update: add, delete" etc.

There are many hidden stories hidden behind this. If you want to unlock these, are you ready to start trying to encapsulate them?

## Summary

1. [Encapsulation](#_Deployment_image)

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## Encapsulation

### Prerequisites

#### ISO tools

Use a software that can edit ISO files, such as: PowerISO, DAEMON Tools, ISO Workshop;

#### Requirements

##### System installation package

* 1. Prepare: [en-us\_windows\_server\_2022\_x64\_dvd\_620d7eac.iso](https://files.rg-adguard.net/file/9a0f4eb7-c3a9-e46b-3fc8-cdb71289dbfb)
  2. Unzip to: D:\en-us\_windows\_server\_2022\_x64\_dvd\_620d7eac
  3. After decompression is complete, change the directory en-us\_windows\_server\_2022\_x64\_dvd\_620d7eac to D:\OS\_2022

Note: Before decompressing to disk D, you should check whether it is a ReFS partition. If it is a ReFS partition, some commands will fail. Solution: Please use a disk partition in NTFS format.

* 1. All scripts and all paths have been set to D:\OS\_2022 by default as the image source.

##### Language Pack

###### Learn

* + 1. [Add languages to a Windows 11 image](https://learn.microsoft.com/en-us/azure/virtual-desktop/windows-11-language-packs)
    2. [Language and region Features on Demand (FOD)](https://learn.microsoft.com/en-us/windows-hardware/manufacture/desktop/features-on-demand-language-fod?view=windows-11)

###### Language pack: Download

[20348.1.210507-1500.fe\_release\_amd64fre\_SERVER\_LOF\_PACKAGES\_OEM.iso](https://software-download.microsoft.com/download/sg/20348.1.210507-1500.fe_release_amd64fre_SERVER_LOF_PACKAGES_OEM.iso)

#### Windows Security

* When processing the encapsulation task, a large number of temporary files will be generated, and a large number of installation files will be released when installing the application in InBox Apps;
* Turning on Windows Security scans files and takes up a lot of CPU.
* In test: 1 hour and 22 minutes before shutdown, 20 minutes after shutdown.

How to close:

With the command line in green, hold down the Windows key and press R to launch Run.

1. Open Windows Security or run: windowsdefender:
2. Select "Virus & Threat Protection" or Run: windowsdefender://threat
3. Find "Virus & Threat Protection Settings", click "Manage Settings" or Run: windowsdefender://threatsettings, we recommend that you turn off some features:
   1. Real-time protection
   2. Cloud=delivered protection
   3. Automatic sample submission
   4. Tamper Protection
4. When you're not encapsulated, we recommend that you turn on Windows Security.

#### Command line

1. Optional "Terminal" or "PowerShell ISE", if "Terminal" is not installed, please go to: <https://github.com/microsoft/terminal/releases> After downloading;
2. Open "Terminal" or "PowerShell ISE" as administrator, it is recommended to set the PowerShell execution policy: bypass, PS command line:

Set-ExecutionPolicy -ExecutionPolicy Bypass -Force

1. In this article, PS command line, green part, please copy it, paste it into the "Terminal" dialog box, press Enter and start running;
2. When there is .ps1, right-click the file and select Run with PowerShell, or copy the path and paste it into Terminal to run, the path with a colon, add the & character in the command line, example: & "D:\YiSolutions\\_Encapsulation\\_SIP.ps1"

### Language package: extract

#### Language pack: Ready

Mounted 20348.1.210507-1500.fe\_release\_amd64fre\_SERVER\_LOF\_PACKAGES\_OEM.iso or unzip it to any location;

#### Language pack: Extract scheme

##### Add

* 1. Language name: Simplified Chinese - China, language tag: zh-CN, Scope of application: Install.Wim，Boot.Wim，WinRE.Wim

##### Delete

* 1. Language name: English - United States, language tag: en-US, Scope of application: Install.Wim，Boot.Wim，WinRE.Wim

#### Execute the extract command

* Auto = automatically search all local disks, default;
* Customize the path, for example, specify the E drive: $ISO = "E:\"
* Extract.ps1
  + [\Expand\Extract.ps1](Expand/Extract.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Extract.ps1>
* Copy the code

$ISO = "Auto"

$SaveTo = "D:\OS\_2022\_Custom"

$Extract\_language\_Pack = @(

@{ Tag = "zh-CN"; Act = "Add"; Scope = @( "Install\Install"; "Install\WinRE"; "Boot\Boot" ) }

@{ Tag = "en-US"; Act = "Del"; Scope = @( "Install\Install"; "Install\WinRE"; "Boot\Boot" ) }

)

Function Extract\_Language

{

param( $Act, $NewLang, $Expand )

Function Match\_Required\_Fonts

{

param( $Lang )

$Fonts = @(

@{ Match = @("as", "ar-SA", "ar", "ar-AE", "ar-BH", "ar-DJ", "ar-DZ", "ar-EG", "ar-ER", "ar-IL", "ar-IQ", "ar-JO", "ar-KM", "ar-KW", "ar-LB", "ar-LY", "ar-MA", "ar-MR", "ar-OM", "ar-PS", "ar-QA", "ar-SD", "ar-SO", "ar-SS", "ar-SY", "ar-TD", "ar-TN", "ar-YE", "arz-Arab", "ckb-Arab", "fa", "fa-AF", "fa-IR", "glk-Arab", "ha-Arab", "ks-Arab", "ks-Arab-IN", "ku-Arab", "ku-Arab-IQ", "mzn-Arab", "pa-Arab", "pa-Arab-PK", "pnb-Arab", "prs", "prs-AF", "prs-Arab", "ps", "ps-AF", "sd-Arab", "sd-Arab-PK", "tk-Arab", "ug", "ug-Arab", "ug-CN", "ur", "ur-IN", "ur-PK", "uz-Arab", "uz-Arab-AF"); Name = "Arab"; }

@{ Match = @("bn-IN", "as-IN", "bn", "bn-BD", "bpy-Beng"); Name = "Beng"; }

@{ Match = @("da-dk", "iu-Cans", "iu-Cans-CA"); Name = "Cans"; }

@{ Match = @("chr-Cher-US", "chr-Cher"); Name = "Cher"; }

@{ Match = @("hi-IN", "bh-Deva", "brx", "brx-Deva", "brx-IN", "hi", "ks-Deva", "mai", "mr", "mr-IN", "ne", "ne-IN", "ne-NP", "new-Deva", "pi-Deva", "sa", "sa-Deva", "sa-IN"); Name = "Deva"; }

@{ Match = @("am", "am-ET", "byn", "byn-ER", "byn-Ethi", "ti", "ti-ER", "ti-ET", "tig", "tig-ER", "tig-Ethi", "ve-Ethi", "wal", "wal-ET", "wal-Ethi"); Name = "Ethi"; }

@{ Match = @("gu", "gu-IN"); Name = "Gujr"; }

@{ Match = @("pa", "pa-IN", "pa-Guru"); Name = "Guru"; }

@{ Match = @("zh-CN", "cmn-Hans", "gan-Hans", "hak-Hans", "wuu-Hans", "yue-Hans", "zh-gan-Hans", "zh-hak-Hans", "zh-Hans", "zh-SG", "zh-wuu-Hans", "zh-yue-Hans"); Name = "Hans"; }

@{ Match = @("zh-TW", "cmn-Hant", "hak-Hant", "lzh-Hant", "zh-hak-Hant", "zh-Hant", "zh-HK", "zh-lzh-Hant", "zh-MO", "zh-yue-Hant"); Name = "Hant"; }

@{ Match = @("he", "he-IL", "yi"); Name = "Hebr"; }

@{ Match = @("ja", "ja-JP"); Name = "Jpan"; }

@{ Match = @("km", "km-KH"); Name = "Khmr"; }

@{ Match = @("kn", "kn-IN"); Name = "Knda"; }

@{ Match = @("ko", "ko-KR"); Name = "Kore"; }

@{ Match = @("de-de", "lo", "lo-LA"); Name = "Laoo"; }

@{ Match = @("ml", "ml-IN"); Name = "Mlym"; }

@{ Match = @("or", "or-IN"); Name = "Orya"; }

@{ Match = @("si", "si-LK"); Name = "Sinh"; }

@{ Match = @("tr-tr", "arc-Syrc", "syr", "syr-SY", "syr-Syrc"); Name = "Syrc"; }

@{ Match = @("ta", "ta-IN", "ta-LK", "ta-MY", "ta-SG"); Name = "Taml"; }

@{ Match = @("te", "te-IN"); Name = "Telu"; }

@{ Match = @("th", "th-TH"); Name = "Thai"; }

)

ForEach ($item in $Fonts) {

if (($item.Match) -Contains $Lang) {

return $item.Name

}

}

return "Not\_matched"

}

Function Match\_Other\_Region\_Specific\_Requirements

{

param( $Lang )

$RegionSpecific = @(

@{ Match = @("zh-TW"); Name = "Taiwan"; }

)

ForEach ($item in $RegionSpecific) {

if (($item.Match) -Contains $Lang) {

return $item.Name

}

}

return "Skip\_specific\_packages"

}

Function Extract\_Process

{

param( $Package, $Name, $NewSaveTo )

$NewSaveTo = "$($SaveTo)\$($NewSaveTo)\Language\$($Act)\$($NewLang)"

New-Item -Path $NewSaveTo -ItemType Directory -ErrorAction SilentlyContinue | Out-Null

if ($ISO -eq "Auto") {

Get-PSDrive -PSProvider FileSystem -ErrorAction SilentlyContinue | ForEach-Object {

ForEach ($item in $Package) {

$TempFilePath = Join-Path -Path $\_.Root -ChildPath $item -ErrorAction SilentlyContinue

if (Test-Path $TempFilePath -PathType Leaf) {

Write-host "`n Find: " -NoNewLine; Write-host $TempFilePath -ForegroundColor Green

Write-host " Copy to: " -NoNewLine; Write-host $NewSaveTo

Copy-Item -Path $TempFilePath -Destination $NewSaveTo -Force

}

}

}

} else {

ForEach ($item in $Package) {

$TempFilePath = Join-Path -Path $ISO -ChildPath $item -ErrorAction SilentlyContinue

Write-host "`n Find: " -NoNewline; Write-host $TempFilePath -ForegroundColor Green

if (Test-Path $TempFilePath -PathType Leaf) {

Write-host " Copy to: " -NoNewLine; Write-host $NewSaveTo

Copy-Item -Path $TempFilePath -Destination $NewSaveTo -Force

} else {

Write-host " Not found"

}

}

}

Write-host "`n Verify the language pack file"

ForEach ($item in $Package) {

$Path = "$($NewSaveTo)\$([IO.Path]::GetFileName($item))"

if (Test-Path $Path -PathType Leaf) {

Write-host " Discover: " -NoNewLine; Write-host $Path -ForegroundColor Green

} else {

Write-host " Not found: " -NoNewLine; Write-host $Path -ForegroundColor Red

}

}

}

$AdvLanguage = @(

@{

Path = "Install\Install"

Rule = @(

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-Fonts-{DiyLang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-Server-Language-Pack\_x64\_{Lang}.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-Basic-{Lang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-Handwriting-{Lang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-OCR-{Lang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-Speech-{Lang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-LanguageFeatures-TextToSpeech-{Lang}-Package~31bf3856ad364e35~amd64~~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-MSPaint-FoD-Package~31bf3856ad364e35~amd64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-MSPaint-FoD-Package~31bf3856ad364e35~wow64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-Notepad-FoD-Package~31bf3856ad364e35~amd64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-Notepad-FoD-Package~31bf3856ad364e35~wow64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-PowerShell-ISE-FOD-Package~31bf3856ad364e35~amd64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-PowerShell-ISE-FOD-Package~31bf3856ad364e35~wow64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-StepsRecorder-Package~31bf3856ad364e35~amd64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-StepsRecorder-Package~31bf3856ad364e35~wow64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-WordPad-FoD-Package~31bf3856ad364e35~amd64~{Lang}~.cab"

"LanguagesAndOptionalFeatures\Microsoft-Windows-WordPad-FoD-Package~31bf3856ad364e35~wow64~{Lang}~.cab"

)

}

@{

Path = "Install\WinRE"

Rule = @(

"Windows Preinstallation Environment\x64\WinPE\_OCs\WinPE-FontSupport-{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\lp.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-securestartup\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-atbroker\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-audiocore\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-audiodrivers\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-enhancedstorage\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-narrator\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-scripting\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-speech-tts\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-srh\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-srt\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-wds-tools\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-wmi\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-appxpackaging\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-storagewmi\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-wifi\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-rejuv\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-opcservices\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-hta\_{Lang}.cab"

)

}

@{

Path = "Boot\Boot"

Rule = @(

"Windows Preinstallation Environment\x64\WinPE\_OCs\WinPE-FontSupport-{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\lp.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\WinPE-Setup\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\WINPE-SETUP-Server\_{Lang}.CAB"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-securestartup\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-atbroker\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-audiocore\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-audiodrivers\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-enhancedstorage\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-narrator\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-scripting\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-speech-tts\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-srh\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-srt\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-wds-tools\_{Lang}.cab"

"Windows Preinstallation Environment\x64\WinPE\_OCs\{Lang}\winpe-wmi\_{Lang}.cab"

)

}

)

$NewFonts = Match\_Required\_Fonts -Lang $NewLang

$SpecificPackage = Match\_Other\_Region\_Specific\_Requirements -Lang $NewLang

Foreach ($item in $Expand) {

$Language = @()

Foreach ($itemList in $AdvLanguage) {

if ($itemList.Path -eq $item) {

Foreach ($PrintLang in $itemList.Rule) {

$Language += "$($PrintLang)".Replace("{Lang}", $NewLang).Replace("{DiyLang}", $NewFonts).Replace("{Specific}", $SpecificPackage)

}

Extract\_Process -NewSaveTo $itemList.Path -Package $Language -Name $item

}

}

}

}

ForEach ($item in $Extract\_language\_Pack) { Extract\_Language -Act $item.Act -NewLang $item.Tag -Expand $item.Scope }

### Custom encapsulation

#### Custom encapsulation: Install.wim

##### View Install.wim details

Image name, image description, image size, architecture, version, index number, etc.;

$ViewFile = "D:\OS\_2022\Sources\Install.wim"

Get-WindowsImage -ImagePath $ViewFile | Foreach-Object { Get-WindowsImage -ImagePath $ViewFile -index $\_.ImageIndex }

CYCLIC OPERATION AREA, START,

##### Specify the path to mount install.wim

New-Item -Path "D:\OS\_2022\_Custom\Install\Install\Mount" -ItemType directory -ea SilentlyContinue

##### Start mounting Install.wim

Default index number: 1

Mount-WindowsImage -ImagePath "D:\OS\_2022\sources\install.wim" -Index "1" -Path "D:\OS\_2022\_Custom\Install\Install\Mount"

PROCESS FILES INSIDE THE INSTALL.WIM IMAGE, OPTIONALLY, START

###### Custom encapsulation: WinRE.wim

WARNING:

* WinRE.wim is a file within the Install.wim image;
* When Install.wim has multiple index numbers, only process any WinRE.wim;
* Synchronizing to all index numbers reduces the Install.wim volume, Learn "[How to bulk replace WinRE.wim in all index numbers in Install.wim](#_How_to_extract)".
  + 1. View WinRE.wim details

Image name, image description, image size, architecture, version, index number, etc.;

$ViewFile = "D:\OS\_2022\_Custom\Install\Install\Mount\Windows\System32\Recovery\WinRE.wim"

Get-WindowsImage -ImagePath $ViewFile | Foreach-Object { Get-WindowsImage -ImagePath $ViewFile -index $\_.ImageIndex }

* + 1. Specify the path to mount WinRE.wim

New-Item -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount" -ItemType directory -ea SilentlyContinue

* + 1. Start mounting WinRE.wim

Default index number: 1

$FileName = "D:\OS\_2022\_Custom\Install\Install\Mount\Windows\System32\Recovery\WinRE.wim"

Mount-WindowsImage -ImagePath $FileName -Index "1" -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount"

* + 1. Language pack
* Automatically install language packs: Get "Component: All installed packages in the image" and match them. After matching the corresponding names, install the local corresponding language pack files, View the report "[Language installation package for WinRE.wim](#_Report:_Language_installation_1)".
* When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.
  + - 1. Language pack: add

WinRE.Instl.lang.ps1

[\Expand\Install\WinRE\WinRE.Instl.lang.ps1](Expand/Install/WinRE/WinRE.Instl.lang.ps1)

<https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/WinRE/WinRE.Instl.lang.ps1>

Copy the code

$Mount = "D:\OS\_2022\_Custom\Install\WinRE\Mount"

$Sources = "D:\OS\_2022\_Custom\Install\WinRE\Language\Add\zh-CN"

$Initl\_install\_Language\_Component = @()

Get-WindowsPackage -Path $Mount | ForEach-Object {

$Initl\_install\_Language\_Component += $\_.PackageName

}

Add-WindowsPackage -Path $Mount -PackagePath "$($Sources)\WinPE-FontSupport-zh-CN.cab"

$Language\_List = @(

@{ Match = "\*WinPE-LanguagePack-Package\*"; File = "lp.cab"; }

@{ Match = "\*SecureStartup\*"; File = "winpe-securestartup\_zh-CN.cab"; }

@{ Match = "\*ATBroker\*"; File = "winpe-atbroker\_zh-CN.cab"; }

@{ Match = "\*AudioCore\*"; File = "winpe-audiocore\_zh-CN.cab"; }

@{ Match = "\*AudioDrivers\*"; File = "winpe-audiodrivers\_zh-CN.cab"; }

@{ Match = "\*EnhancedStorage\*"; File = "winpe-enhancedstorage\_zh-CN.cab"; }

@{ Match = "\*Narrator\*"; File = "winpe-narrator\_zh-CN.cab"; }

@{ Match = "\*scripting\*"; File = "winpe-scripting\_zh-CN.cab"; }

@{ Match = "\*Speech-TTS\*"; File = "winpe-speech-tts\_zh-CN.cab"; }

@{ Match = "\*srh\*"; File = "winpe-srh\_zh-CN.cab"; }

@{ Match = "\*srt\*"; File = "winpe-srt\_zh-CN.cab"; }

@{ Match = "\*wds-tools\*"; File = "winpe-wds-tools\_zh-CN.cab"; }

@{ Match = "\*-WMI-Package\*"; File = "winpe-wmi\_zh-CN.cab"; }

@{ Match = "\*WinPE-AppxPackaging\*"; File = "winpe-appxpackaging\_zh-CN.cab"; }

@{ Match = "\*StorageWMI\*"; File = "winpe-storagewmi\_zh-CN.cab"; }

@{ Match = "\*WiFi\*"; File = "winpe-wifi\_zh-CN.cab"; }

@{ Match = "\*rejuv\*"; File = "winpe-rejuv\_zh-CN.cab"; }

@{ Match = "\*opcservices\*"; File = "winpe-opcservices\_zh-CN.cab"; }

@{ Match = "\*hta\*"; File = "winpe-hta\_zh-CN.cab"; }

)

ForEach ($Rule in $Language\_List) {

Write-host "`n Rule name: $($Rule.Match)" -ForegroundColor Yellow; Write-host " $('-' \* 80)"

ForEach ($Component in $Initl\_install\_Language\_Component) {

if ($Component -like "\*$($Rule.Match)\*") {

Write-host " Component name: " -NoNewline

Write-host $Component -ForegroundColor Green

Write-host " Language pack file: " -NoNewline

Write-host "$($Sources)\$($Rule.File)" -ForegroundColor Green

Write-Host " Installing ".PadRight(22) -NoNewline

try {

Add-WindowsPackage -Path $Mount -PackagePath "$($Sources)\$($Rule.File)" | Out-Null

Write-host "Finish" -ForegroundColor Green

} catch {

Write-host "Failed" -ForegroundColor Red

}

break

}

}

}

* + - 1. Components: All packages installed in the image
         1. View

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount" | Out-GridView

* + - * 1. Export to Csv

$SaveTo = "D:\OS\_2022\_Custom\Install\WinRE\Report.$(Get-Date -Format "yyyyMMddHHmmss").csv"

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount" | Export-CSV -NoType -Path $SaveTo

Write-host $SaveTo -ForegroundColor Green

* + 1. Save image: WinRE.wim

Save-WindowsImage -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount"

* + 1. Unmount image: WinRE.wim

Close any applications that may be accessing files in the image, including File Explorer.

Dismount-WindowsImage -Path "D:\OS\_2022\_Custom\Install\WinRE\Mount" -Discard

* + 1. After rebuilding WinRE.wim, the file size can be reduced
* WinRE.Rebuild.ps1
  + [\Expand\Install\WinRE\WinRE.Rebuild.ps1](Expand/Install/WinRE/WinRE.Rebuild.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/WinRE/WinRE.Rebuild.ps1>
* Copy the code

$FileName = "D:\OS\_2022\_Custom\Install\Install\Mount\Windows\System32\Recovery\WinRE.wim"

Get-WindowsImage -ImagePath $Filename -ErrorAction SilentlyContinue | ForEach-Object {

Write-Host " Image name: " -NoNewline

Write-Host $\_.ImageName -ForegroundColor Yellow

Write-Host " The index number: " -NoNewline

Write-Host $\_.ImageIndex -ForegroundColor Yellow

Write-Host "`n Rebuilding ".PadRight(28) -NoNewline

Export-WindowsImage -SourceImagePath $Filename -SourceIndex $\_.ImageIndex -DestinationImagePath "$($FileName).New" -CompressionType max

Write-Host "Finish`n" -ForegroundColor Green

}

if (Test-Path "$($FileName).New" -PathType Leaf) {

Remove-Item -Path $Filename

Move-Item -Path "$($FileName).New" -Destination $Filename

Write-Host "Finish" -ForegroundColor Green

} else {

Write-host "Failed" -ForegroundColor Red

}

* + 1. Backup WinRE.wim
* WinRE.Backup.ps1
  + [\Expand\Install\WinRE\WinRE.Backup.ps1](Expand/Install/WinRE/WinRE.Backup.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/WinRE/WinRE.Backup.ps1>
* Copy the code

$WimLibPath = "D:\OS\_2022\_Custom\Install\Install\Update\Winlib"

$FileName = "D:\OS\_2022\_Custom\Install\Install\Mount\Windows\System32\Recovery\WinRE.wim"

New-Item -Path $WimLibPath -ItemType Directory -ea SilentlyContinue

Copy-Item -Path $FileName -Destination $WimLibPath -Force

* + 1. Replace WinRE.wim within the Install.wim image
* After each installation of Install.wim, use item "[Replace the WinRE.wim](#_Replace_the_WinRE.wim)";
* Learning "[After obtaining all the index numbers of Install.wim and replace the old WinRE.wim](#_After_getting_all)".

PROCESS FILES INSIDE THE INSTALL.WIM IMAGE, END

##### Language pack

* Automatically install language packs: Get "Component: All installed packages in the image" and match them. After matching the corresponding names, install the local corresponding language pack files, View the report "[Language installation package for Install.wim](#_Report:_Language_installation)".
* When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.

###### Language pack: add

* Install.Instl.lang.ps1
  + [\Expand\Install\Install.Instl.lang.ps1](Expand/Install/Install.Instl.lang.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/Install.Instl.lang.ps1>
* Copy the code

Function Language\_Install

{

param($Mount, $Sources, $Lang)

$Initl\_install\_Language\_Component = @()

if (Test-Path $Mount -PathType Container) {

Get-WindowsPackage -Path $Mount | ForEach-Object { $Initl\_install\_Language\_Component += $\_.PackageName }

} else {

Write-Host "Not mounted: $($Mount)"

return

}

$Script:Init\_Folder\_All\_File = @()

if (Test-Path "$($Sources)\$($Lang)" -PathType Container) {

Get-ChildItem -Path $Sources -Recurse -Include "\*.cab" -ErrorAction SilentlyContinue | ForEach-Object {

$Script:Init\_Folder\_All\_File += $\_.FullName

}

Write-host "`n Available language pack installation files"

if ($Script:Init\_Folder\_All\_File.Count -gt 0 ) {

ForEach ($item in $Script:Init\_Folder\_All\_File) {

Write-host " $($item)"

}

} else {

Write-host "There are no language pack files locally"

return

}

} else {

Write-Host "Path does not exist: $($Sources)\$($Lang)"

return

}

$Script:Init\_Folder\_All\_File\_Match\_Done = @()

$Script:Init\_Folder\_All\_File\_Exclude = @()

$Global:Search\_File\_Order = @(

@{

Name = "Fonts"

Description = "Fonts"

Rule = @(

@{ Match\_Name = "\*Fonts\*"; IsMatch = "No"; Capability = ""; }

)

}

@{

Name = "Basic"

Description = "Basic"

Rule = @(

@{ Match\_Name = "\*LanguageFeatures-Basic\*"; IsMatch = "Yes"; Capability = "Language.Basic~~~lb-LU~0.0.1.0"; }

@{ Match\_Name = "\*Server-LanguagePack-Package\*"; IsMatch = "Yes"; Capability = "Language.Basic~~~lb-LU~0.0.1.0"; }

)

}

@{

Name = "OCR"

Description = "Optical character recognition"

Rule = @(

@{ Match\_Name = "\*LanguageFeatures-OCR\*"; IsMatch = "Yes"; Capability = "Language.OCR~~~fr-FR~0.0.1.0"; }

)

}

@{

Name = "Handwriting"

Description = "Handwriting recognition"

Rule = @(

@{ Match\_Name = "\*LanguageFeatures-Handwriting\*"; IsMatch = "Yes"; Capability = "Language.Handwriting~~~fr-FR~0.0.1.0"; }

)

}

@{

Name = "TextToSpeech"

Description = "Text-to-speech"

Rule = @(

@{ Match\_Name = "\*LanguageFeatures-TextToSpeech\*"; IsMatch = "Yes"; Capability = "Language.TextToSpeech~~~fr-FR~0.0.1.0"; }

)

}

@{

Name = "Speech"

Description = "Speech recognition"

Rule = @(

@{ Match\_Name = "\*LanguageFeatures-Speech\*"; IsMatch = "Yes"; Capability = "Language.Speech~~~fr-FR~0.0.1.0"; }

)

}

@{

Name = "RegionSpecific"

Description = "Other region-specific requirements"

Rule = @(

@{ Match\_Name = "\*InternationalFeatures\*zh-TW\*"; IsMatch = "Yes"; Capability = ""; }

)

}

@{

Name = "Retail"

Description = "Retail demo experience"

Rule = @(

@{ Match\_Name = "\*RetailDemo\*"; IsMatch = "Yes"; Capability = ""; }

)

}

@{

Name = "Features\_On\_Demand"

Description = "Features on demand"

Rule = @(

@{ Match\_Name = "\*MSPaint\*amd64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.MSPaint~~~~0.0.1.0"; }

@{ Match\_Name = "\*MSPaint\*wow64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.MSPaint~~~~0.0.1.0"; }

@{ Match\_Name = "\*Notepad\*amd64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.Notepad~~~~0.0.1.0"; }

@{ Match\_Name = "\*Notepad\*wow64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.Notepad~~~~0.0.1.0"; }

@{ Match\_Name = "\*PowerShell-ISE-FOD-Package\*amd64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.PowerShell.ISE~~~~0.0.1.0"; }

@{ Match\_Name = "\*PowerShell-ISE-FOD-Package\*wow64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.PowerShell.ISE~~~~0.0.1.0"; }

@{ Match\_Name = "\*StepsRecorder\*amd64\*"; IsMatch = "Yes"; Capability = "App.StepsRecorder~~~~0.0.1.0"; }

@{ Match\_Name = "\*StepsRecorder\*wow64\*"; IsMatch = "Yes"; Capability = "App.StepsRecorder~~~~0.0.1.0"; }

@{ Match\_Name = "\*WordPad\*amd64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.WordPad~~~~0.0.1.0"; }

@{ Match\_Name = "\*WordPad\*wow64\*"; IsMatch = "Yes"; Capability = "Microsoft.Windows.WordPad~~~~0.0.1.0"; }

)

}

)

ForEach ($item in $Global:Search\_File\_Order) {

New-Variable -Scope global -Name "Init\_File\_Type\_$($item.Name)" -Value @() -Force

}

ForEach ($WildCard in $Script:Init\_Folder\_All\_File) {

ForEach ($item in $Global:Search\_File\_Order) {

ForEach ($TTT in $item.Rule) {

if ($WildCard -like "\*$($TTT.Match\_Name)\*") {

Write-host "`n Fuzzy matching: " -NoNewline; Write-host $TTT.Match\_Name -ForegroundColor Green

Write-host " Language pack file: " -NoNewline; Write-host $WildCard -ForegroundColor Green

$OSDefaultUser = (Get-Variable -Scope global -Name "Init\_File\_Type\_$($item.Name)" -ErrorAction SilentlyContinue).Value

$TempSave = @{ Match\_Name = $TTT.Match\_Name; Capability = $TTT.Capability; FileName = $WildCard }

$new = $OSDefaultUser + $TempSave

if ($TTT.IsMatch -eq "Yes") {

ForEach ($Component in $Initl\_install\_Language\_Component) {

if ($Component -like "\*$($TTT.Match\_Name)\*") {

Write-host " Component name: " -NoNewline; Write-host $Component -ForegroundColor Green

New-Variable -Scope global -Name "Init\_File\_Type\_$($item.Name)" -Value $new -Force

$Script:Init\_Folder\_All\_File\_Match\_Done += $WildCard

break

}

}

} else {

Write-host " Do not match, install directly" -ForegroundColor Yellow

New-Variable -Scope global -Name "Init\_File\_Type\_$($item.Name)" -Value $new -Force

$Script:Init\_Folder\_All\_File\_Match\_Done += $WildCard

}

}

}

}

}

Write-host "`n Grouping is complete, pending installation" -ForegroundColor Yellow

Write-host " $('-' \* 80)"

ForEach ($WildCard in $Global:Search\_File\_Order) {

$OSDefaultUser = (Get-Variable -Scope global -Name "Init\_File\_Type\_$($WildCard.Name)" -ErrorAction SilentlyContinue).Value

Write-host "`n $($WildCard.Description) ( $($OSDefaultUser.Count) item )"

if ($OSDefaultUser.Count -gt 0) {

ForEach ($item in $OSDefaultUser) {

Write-host " $($item.FileName)" -ForegroundColor Green

}

} else {

Write-host " Not available" -ForegroundColor Red

}

}

Write-host "`n Not matched, no longer installed" -ForegroundColor Yellow

Write-host " $('-' \* 80)"

ForEach ($item in $Script:Init\_Folder\_All\_File) {

if ($Script:Init\_Folder\_All\_File\_Match\_Done -notcontains $item) {

$Script:Init\_Folder\_All\_File\_Exclude += $item

Write-host " $($item)" -ForegroundColor Red

}

}

Write-host "`n Install" -ForegroundColor Yellow

Write-host " $('-' \* 80)"

ForEach ($WildCard in $Global:Search\_File\_Order) {

$OSDefaultUser = (Get-Variable -Scope global -Name "Init\_File\_Type\_$($WildCard.Name)" -ErrorAction SilentlyContinue).Value

Write-host "`n $($WildCard.Description) ( $($OSDefaultUser.Count) item )"; Write-host " $('-' \* 80)"

if ($OSDefaultUser.Count -gt 0) {

ForEach ($item in $OSDefaultUser) {

Write-host " Language pack file: " -NoNewline; Write-host $item.FileName -ForegroundColor Green

Write-Host " Installing ".PadRight(22) -NoNewline

if (Test-Path $item.FileName -PathType Leaf) {

try {

Add-WindowsPackage -Path $Mount -PackagePath $item.FileName | Out-Null

Write-host "Finish`n" -ForegroundColor Green

} catch {

Write-host "Failed" -ForegroundColor Red

Write-host " $($\_)" -ForegroundColor Red

}

} else {

Write-host "Does not exist`n"

}

}

} else {

Write-host " Not available`n" -ForegroundColor Red

}

}

}

Language\_Install -Mount "D:\OS\_2022\_Custom\Install\Install\Mount" -Sources "D:\OS\_2022\_Custom\Install\Install\Language\Add" -Lang "zh-CN"

###### Components: All packages installed in the image

* + 1. View

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Install\Install\Mount" | Out-GridView

* + 1. Export to Csv

$SaveTo = "D:\OS\_2022\_Custom\Install\Install\Report.$(Get-Date -Format "yyyyMMddHHmmss").csv"

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Install\Install\Mount" | Export-CSV -NoType -Path $SaveTo

Write-host $SaveTo -ForegroundColor Green

##### Cumulative updates

###### Download

Check the "[Windows Server 2022 Update History](https://support.microsoft.com/en-gb/topic/windows-server-2022-update-history-e1caa597-00c5-4ab9-9f3e-8212fe80b2ee) ", for example, install the cumulative update: KB5030216

Go to the download page: <https://www.catalog.update.microsoft.com/Search.aspx?q=Kb5030216> Or "[Direct download](https://catalog.s.download.windowsupdate.com/c/msdownload/update/software/secu/2023/09/windows10.0-kb5030216-x64_cbe587155f9818548b75f65d5cd41d341ed2fc61.msu)" (If you cannot download, please go to the download page), save to

D:\OS\_2022\_Custom\Install\Install\Update\windows10.0-kb5030216-x64\_cbe587155f9818548b75f65d5cd41d341ed2fc61.msu

###### Add

$KBPath = "D:\OS\_2022\_Custom\Install\Install\Update\windows10.0-kb5030216-x64\_cbe587155f9818548b75f65d5cd41d341ed2fc61.msu"

Add-WindowsPackage -Path "D:\OS\_2022\_Custom\Install\Install\Mount" -PackagePath $KBPath

###### Solid update

It cannot be uninstalled after curing, which cleans the recovery image and resets the basis of any superseded components.

Dism /Image:"D:\OS\_2022\_Custom\Install\Install\Mount" /cleanup-image /StartComponentCleanup /ResetBase

* + 1. Clean up components after curing updates
* Install.Update.Curing.ps1
  + [\Expand\Install\Install.Update.Curing.ps1](Expand/Install/Install.Update.Curing.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/Install.Update.Curing.ps1>
* Copy the code

$Mount = "D:\OS\_2022\_Custom\Install\Install\Mount"

Get-WindowsPackage -Path $Mount -ErrorAction SilentlyContinue | ForEach-Object {

if ($\_.PackageState -eq "Superseded") {

Write-Host " $($\_.PackageName)" -ForegroundColor Green

Remove-WindowsPackage -Path $Mount -PackageName $\_.PackageName | Out-Null

}

}

##### Deployment engine: Add

* Learn "Deployment Engine", if added to ISO installation media, can skip adding to mounted.
* After adding the deployment engine, continue at the current location.

##### Health

Check whether there is any damage before saving. When the health status is abnormal, abort saving

Repair-WindowsImage -Path "D:\OS\_2022\_Custom\Install\Install\Mount" -ScanHealth

##### Replace the WinRE.wim

WinRE.wim in all index numbers in Install.wim has been replaced in batches. Please skip this step.

$WinRE = "D:\OS\_2022\_Custom\Install\Install\Update\Winlib\WinRE.wim"

$CopyTo = "D:\OS\_2022\_Custom\Install\Install\Mount\Windows\System32\Recovery"

Copy-Item -Path $WinRE -Destination $CopyTo -Force

##### Save image: Install.wim

Save-WindowsImage -Path "D:\OS\_2022\_Custom\Install\Install\Mount"

##### Unmount image: Install.wim

Close any applications that may be accessing files in the image, including File Explorer.

Dismount-WindowsImage -Path "D:\OS\_2022\_Custom\Install\Install\Mount" -Discard

CYCLIC OPERATION AREA, END.

##### How to batch replace WinRE.wim in all index numbers in Install.wim

###### Get WimLib

After going to the official website of <https://wimlib.net>, select a different version: [arm64](https://wimlib.net/downloads/wimlib-1.14.3-windows-aarch64-bin.zip), [x64](https://wimlib.net/downloads/wimlib-1.14.3-windows-x86_64-bin.zip), [x86](https://wimlib.net/downloads/wimlib-1.14.3-windows-i686-bin.zip), and extract it to: D:Wimlib after downloading.

###### How to extract and update WinRE.wim in Install.wim

* + 1. Extract the WinRE.wim file from Install.wim
* Install.WinRE.Extract.ps1
  + [\Expand\Install\Install.WinRE.Extract.ps1](Expand/Install/Install.WinRE.Extract.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/Install.WinRE.Extract.ps1>
* Copy the code

$Arguments = @(

"extract",

"D:\OS\_2022\sources\install.wim", "1",

"\Windows\System32\Recovery\Winre.wim",

"--dest-dir=""D:\OS\_2022\_Custom\Install\Install\Update\Winlib"""

)

New-Item -Path "D:\OS\_2022\_Custom\Install\Install\Update\Winlib" -ItemType Directory -ea SilentlyContinue

Start-Process -FilePath "d:\wimlib\wimlib-imagex.exe" -ArgumentList $Arguments -wait -nonewwindow

* + 1. Get all index numbers of Install.wim and replace the old WinRE.wim
* Install.WinRE.Replace.wim.ps1
  + [\Expand\Install\Install.WinRE.Replace.wim.ps1](Expand/Install/Install.WinRE.Replace.wim.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/Install.WinRE.Replace.wim.ps1>
* Copy the code

Get-WindowsImage -ImagePath "D:\OS\_2022\sources\install.wim" -ErrorAction SilentlyContinue | ForEach-Object {

Write-Host " Image name: " -NoNewline

Write-Host $\_.ImageName -ForegroundColor Yellow

Write-Host " The index number: " -NoNewline

Write-Host $\_.ImageIndex -ForegroundColor Yellow

Write-Host "`n Replacement "

$Arguments = @(

"update",

"D:\OS\_2022\sources\install.wim",

$\_.ImageIndex,

"--command=""add 'D:\OS\_2022\_Custom\Install\Install\Update\Winlib\WinRE.wim' '\Windows\System32\Recovery\WinRe.wim'"""

)

Start-Process -FilePath "d:\wimlib\wimlib-imagex.exe" -ArgumentList $Arguments -wait -nonewwindow

Write-Host " Finish`n" -ForegroundColor Green

}

##### Rebuilding Install.wim reduces file size

* Install.Rebuild.wim.ps1
  + [\Expand\Install\Install.Rebuild.wim.ps1](Expand/Install/Install.Rebuild.wim.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Install/Install.Rebuild.wim.ps1>
* Copy the code

$InstallWim = "D:\OS\_2022\sources\install.wim"

Get-WindowsImage -ImagePath $InstallWim -ErrorAction SilentlyContinue | ForEach-Object {

Write-Host " Image name: " -NoNewline

Write-Host $\_.ImageName -ForegroundColor Yellow

Write-Host " The index number: " -NoNewline

Write-Host $\_.ImageIndex -ForegroundColor Yellow

Write-Host "`n Rebuilding".PadRight(28) -NoNewline

Export-WindowsImage -SourceImagePath $InstallWim -SourceIndex $\_.ImageIndex -DestinationImagePath "$($InstallWim).New" -CompressionType max | Out-Null

Write-Host "Finish`n" -ForegroundColor Green

}

if (Test-Path "$($InstallWim).New" -PathType Leaf) {

Remove-Item -Path $InstallWim

Move-Item -Path "$($InstallWim).New" -Destination $InstallWim

Write-Host "Finish" -ForegroundColor Green

} else {

Write-host "Failed" -ForegroundColor Red

}

#### Custom encapsulation: boot.wim

##### View Boot.wim details

Image name, image description, image size, architecture, version, index number, etc.;

$ViewFile = "D:\OS\_2022\Sources\Boot.wim"

Get-WindowsImage -ImagePath $ViewFile | Foreach-Object { Get-WindowsImage -ImagePath $ViewFile -index $\_.ImageIndex }

##### Specify the path to mount Boot.wim

New-Item -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount" -ItemType directory -ea SilentlyContinue

##### Start mounting Boot.wim

Default index number: 2

Mount-WindowsImage -ImagePath "D:\OS\_2022\sources\boot.wim" -Index "2" -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount"

##### Language pack

* Automatically install language packs: Get "Component: All installed packages in the image" and match them. After matching the corresponding names, install the local corresponding language pack files, View the report "[Language installation package for Boot.wim](#_Report:_Language_installation_2)".
* When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.

###### Language pack: add

* Boot.Instl.lang.ps1
  + [\Expand\Boot\Boot.Instl.lang.ps1](Expand/Boot/Boot.Instl.lang.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/Boot/Boot.Instl.lang.ps1>
* Copy the code

$Mount = "D:\OS\_2022\_Custom\Boot\Boot\Mount"

$Sources = "D:\OS\_2022\_Custom\Boot\Boot\Language\Add\zh-CN"

$Initl\_install\_Language\_Component = @()

Get-WindowsPackage -Path $Mount | ForEach-Object {

$Initl\_install\_Language\_Component += $\_.PackageName

}

Add-WindowsPackage -Path $Mount -PackagePath "$($Sources)\WinPE-FontSupport-zh-CN.cab"

$Language = @(

@{ Match = "\*WinPE\*Setup\*Server\*Package\*"; File = "WINPE-SETUP-Server\_zh-CN.CAB"; }

@{ Match = "\*WinPE\*Setup\*Package\*"; File = "WinPE-Setup\_zh-CN.cab"; }

@{ Match = "\*WinPE-LanguagePack-Package\*"; File = "lp.cab"; }

@{ Match = "\*SecureStartup\*"; File = "winpe-securestartup\_zh-CN.cab"; }

@{ Match = "\*ATBroker\*"; File = "winpe-atbroker\_zh-CN.cab"; }

@{ Match = "\*AudioCore\*"; File = "winpe-audiocore\_zh-CN.cab"; }

@{ Match = "\*AudioDrivers\*"; File = "winpe-audiodrivers\_zh-CN.cab"; }

@{ Match = "\*EnhancedStorage\*"; File = "winpe-enhancedstorage\_zh-CN.cab"; }

@{ Match = "\*Narrator\*"; File = "winpe-narrator\_zh-CN.cab"; }

@{ Match = "\*scripting\*"; File = "winpe-scripting\_zh-CN.cab"; }

@{ Match = "\*Speech-TTS\*"; File = "winpe-speech-tts\_zh-CN.cab"; }

@{ Match = "\*srh\*"; File = "winpe-srh\_zh-CN.cab"; }

@{ Match = "\*srt\*"; File = "winpe-srt\_zh-CN.cab"; }

@{ Match = "\*wds-tools\*"; File = "winpe-wds-tools\_zh-CN.cab"; }

@{ Match = "\*-WMI-Package\*"; File = "winpe-wmi\_zh-CN.cab"; }

)

ForEach ($Rule in $Language) {

Write-host "`n Rule name: $($Rule.Match)" -ForegroundColor Yellow; Write-host " $('-' \* 80)"

ForEach ($Component in $Initl\_install\_Language\_Component) {

if ($Component -like "\*$($Rule.Match)\*") {

Write-host " Component name: " -NoNewline

Write-host $Component -ForegroundColor Green

Write-host " Language pack file: " -NoNewline

Write-host "$($Sources)\$($Rule.File)" -ForegroundColor Green

Write-Host " Installing ".PadRight(22) -NoNewline

try {

Add-WindowsPackage -Path $Mount -PackagePath "$($Sources)\$($Rule.File)" | Out-Null

Write-host "Finish" -ForegroundColor Green

} catch {

Write-host "Failed" -ForegroundColor Red

}

break

}

}

}

###### Components: All packages installed in the image

* + 1. View

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount" | Out-GridView

* + 1. Export to Csv

$SaveTo = "D:\OS\_2022\_Custom\Boot\Boot\Report.$(Get-Date -Format "yyyyMMddHHmmss").csv"

Get-WindowsPackage -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount" | Export-CSV -NoType -Path $SaveTo

Write-host $SaveTo -ForegroundColor Green

###### Language packs: sync to ISO installer

Copy-Item -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount\sources\zh-CN" -Destination "D:\OS\_2022\sources\zh-CN" -Recurse -Force

###### Regenerate Lang.ini

After regeneration, you can adjust the "Installation Interface", the order when selecting "Language", open lang.ini, the default preferred value = 3, non-default value = 2.

* + 1. Regenerate the mounted directory lang.ini

Re-generated Lang.ini file location: D:\OS\_2022\_Custom\Boot\Boot\Mount\Sources\lang.ini

Dism /image:"D:\OS\_2022\_Custom\Boot\Boot\Mount" /gen-langini /distribution:"D:\OS\_2022\_Custom\Boot\Boot\Mount"

* + 1. After regenerating lang.ini, synchronize to the installer

Re-generated Lang.ini file location: D:\OS\_2022\Sources\lang.ini

Dism /image:"D:\OS\_2022\_Custom\Boot\Boot\Mount" /gen-langini /distribution:"D:\OS\_2022"

##### Save image: Boot.wim

Save-WindowsImage -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount"

##### Unmount image: Boot.wim

Close any applications that may be accessing files in the image, including File Explorer.

Dismount-WindowsImage -Path "D:\OS\_2022\_Custom\Boot\Boot\Mount" -Discard

#### Deployment engine

* + - * Learn about "Automatically Adding Languages Installed in Windows Systems", learn: <https://github.com/ilikeyi/Multilingual>, how to download:
      * After entering the website, click "Code", "Download Compressed Package", and after the download is completed, you will get the main.zip compressed package file.
      * Go to the <https://github.com/ilikeyi/Multilingual/releases> download page, select the available version: 1.1.1.1, select the download source code format: zip, and get the Multilingual-1.1.1.1.zip compressed package file after the download is completed;
      * Unzip the downloaded main.zip or Multilingual-1.1.1.1.zip to: D:\Multilingual-1.1.1.1, and rename: D:\Multilingual
      * Learn "[Unattended Windows Setup Reference](https://learn.microsoft.com/en-us/windows-hardware/customize/desktop/unattend/)", Intervene in the installation process by leaving it unattended.

##### Add method

###### Add to ISO installation media

* + 1. Unattended
       1. Add to: [ISO]:\Autounattend.xml

Autounattend.xml interferes with the WinPE installer when booting an ISO installation.

Copy D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml to D:\OS\_2022\Autounattend.xml

Copy-Item "D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml" -Destination "D:\OS\_2022\Autounattend.xml" -Force

* + - 1. Add to: [ISO]:\Sources\Unattend.xml

When mounting or unpacking an ISO, after running the [ISO]:\Setup.exe installer, [ISO]:\Sources\Unattend.xml will intervene in the installation process.

Copy D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml to D:\OS\_2022\Sources\Unattend.xml

Copy-Item "D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml" -Destination "D:\OS\_2022\Sources\Unattend.xml" -Force

* + - 1. Add to: [ISO]:\sources\$OEM$\$$\Panther\unattend.xml

Copy it to the system disk during the installation process, copy to: {system disk}:\Windows\Panther\unattend.xml

* + - * 1. Create $OEM$ path

New-Item -Path "D:\OS\_2022\sources\`$OEM$\`$$\Panther" -ItemType Directory

* + - * 1. Copy

Copy D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml to D:\OS\_2022\Sources\$OEM$\Panther\Unattend.xml

Copy-Item "D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml" -Destination "D:\OS\_2022\sources\`$OEM$\`$$\Panther\Unattend.xml" -Force

* + 1. Deployment engine: add

Add "Automatically add installed languages for Windows systems" to D:\OS\_2022\sources\$OEM$\$1\Yi\Engine in the directory.

* + - 1. Deployment Engine: Copy

Copy D:\Multilingual\Engine to D:\OS\_2022\Sources\$OEM$\$1\Yi\Engine

Copy-Item "D:\Multilingual\Engine" -Destination "D:\OS\_2022\sources\`$OEM$\`$1\Yi\Engine" -Recurse -Force

* + - 1. Deployment engine: custom deployment tags

$Flag = @(

"Is\_Mark\_Sync" # Allow global search and synchronization of deployment tags

# Prerequisite deployment

# "Auto\_Update" # Allow automatic updates

# "Use\_UTF8" # Beta: Global language support using Unicode UTF-8

"Disable\_Network\_Location\_Wizard" # Network Location Wizard

"Disable\_Cleanup\_Appx\_Tasks" # Appx Cleanup and maintenance tasks

"Disable\_Cleanup\_On\_Demand\_Language" # Prevent cleanup of unused on-demand feature language packs

"Disable\_Cleanup\_Unsed\_Language" # Prevent cleaning of unused language packs

"Prerequisites\_Reboot" # Restart your computer

# Complete first deployment

# "Popup\_Engine" # Allow the deployment engine main interface to pop up for the first time

# "Allow\_First\_Pre\_Experience" # Allow first preview, as planned

"Reset\_Execution\_Policy" # Restore PowerShell execution policy: Restricted

"Clear\_Solutions" # Delete the entire solution

"Clear\_Engine" # Delete the deployment engine and keep the others

# "First\_Experience\_Reboot" # Restart your computer

)

ForEach ($item in $Flag) {

Write-host " $($item)" -ForegroundColor Green

New-Item -Path "D:\OS\_2022\sources\`$OEM$\`$1\Yi\Engine\Deploy\Allow" -ItemType Directory -ErrorAction SilentlyContinue | Out-Null

Out-File -FilePath "D:\OS\_2022\sources\`$OEM$\`$1\Yi\Engine\Deploy\Allow\$($item)" -Encoding utf8 -ErrorAction SilentlyContinue

}

###### Add to mounted

Through "[Custom encapsulation: Install.wim](#_Custom_encapsulation:_Install.wim)", execute "Start mounting Install.wim" and mount to: D:\OS\_2022\_Custom\Install\Install\Mount

* + 1. Unattended

Copy D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml to D:\OS\_2022\_Custom\Install\Install\Mount\Panther\Unattend.xml

Copy-Item "D:\Multilingual\\_Learn\Unattend\Mul.Unattend.xml" -Destination "D:\OS\_2022\_Custom\Install\Install\Mount\Panther" -Force

* + 1. Deployment engine: add

Add "Automatically add languages installed on Windows systems" to the D:\OS\_2022\_Custom\Install\Install\Mount\Yi\Engine directory.

* + - 1. Deployment Engine: Copy

Copy D:\Multilingual\Engine to D:\OS\_2022\_Custom\Install\Install\Mount\Yi\Engine

Copy-Item "D:\Multilingual\Engine" -Destination "D:\OS\_2022\_Custom\Install\Install\Mount\Yi\Engine" -Recurse -Force

* + - 1. Deployment engine: custom deployment tags

$Flag = @(

"Is\_Mark\_Sync" # Allow global search and synchronization of deployment tags

# Prerequisite deployment

# "Auto\_Update" # Allow automatic updates

# "Use\_UTF8" # Beta: Global language support using Unicode UTF-8

"Disable\_Network\_Location\_Wizard" # Network Location Wizard

"Disable\_Cleanup\_Appx\_Tasks" # Appx Cleanup and maintenance tasks

"Disable\_Cleanup\_On\_Demand\_Language" # Prevent cleanup of unused on-demand feature language packs

"Disable\_Cleanup\_Unsed\_Language" # Prevent cleaning of unused language packs

"Prerequisites\_Reboot" # Restart your computer

# Complete first deployment

# "Popup\_Engine" # Allow the deployment engine main interface to pop up for the first time

# "Allow\_First\_Pre\_Experience" # Allow first preview, as planned

"Reset\_Execution\_Policy" # Restore PowerShell execution policy: Restricted

"Clear\_Solutions" # Delete the entire solution

"Clear\_Engine" # Delete the deployment engine and keep the others

# "First\_Experience\_Reboot" # Restart your computer

)

ForEach ($item in $Flag) {

Write-host " $($item)" -ForegroundColor Green

New-Item -Path "D:\OS\_2022\sources\`$OEM$\`$1\Yi\Engine\Deploy\Allow" -ItemType Directory -ErrorAction SilentlyContinue | Out-Null

Out-File -FilePath "D:\OS\_2022\sources\`$OEM$\`$1\Yi\Engine\Deploy\Allow\$($item)" -Encoding utf8 -ErrorAction SilentlyContinue

}

##### Deployment Engine: Advanced

###### Deployment engine: adding process

After copying the deployment engine, you can add deployment tags to intervene in the installation process.

###### Unattended solution

When the customization is unattended, please modify it simultaneously if the following files exist:

* D:\OS\_2022\Autounattend.xml
* D:\OS\_2022\Sources\Unattend.xml
* D:\OS\_2022\sources\$OEM$\$$\Panther\unattend.xml
* D:\OS\_2022\_Custom\Install\Install\Mount\Panther\Unattend.xml
  + 1. Multilingual or monolingual

In multi-language and monolingual, you can switch between each other. When replacing, please replace all the same ones in the file.

* + - 1. Multi-language

<UILanguage>%OSDUILanguage%</UILanguage>

<InputLocale>%OSDInputLocale%</InputLocale>

<SystemLocale>%OSDSystemLocale%</SystemLocale>

<UILanguage>%OSDUILanguage%</UILanguage>

<UILanguageFallback>%OSDUILanguageFallback%</UILanguageFallback>

<UserLocale>%OSDUserLocale%</UserLocale>

* + - 1. Monolingual

A single language needs to specify a language tag, for example, specify a language tag: zh-CN

<UILanguage>zh-CN</UILanguage>

<InputLocale>zh-CN</InputLocale>

<SystemLocale>zh-CN</SystemLocale>

<UILanguage>zh-CN</UILanguage>

<UILanguageFallback>zh-CN</UILanguageFallback>

<UserLocale>zh-CN</UserLocale>

* + 1. User plan

By default, the self-created user Administrator is used and logged in automatically. It can be switched by modifying the following configuration: self-created or customized user.

* + - 1. Self-created user Administrator

By default, the self-created user: Administrator is used and logged in automatically, inserted between <OOBE> and </OOBE>.

<UserAccounts>

<LocalAccounts>

<LocalAccount wcm:action="add">

<Password>

<Value></Value>

<PlainText>true</PlainText>

</Password>

<Description>Administrator</Description>

<DisplayName>Administrator</DisplayName>

<Group>Administrators</Group>

<Name>Administrator</Name>

</LocalAccount>

</LocalAccounts>

</UserAccounts>

<AutoLogon>

<Password>

<Value></Value>

<PlainText>true</PlainText>

</Password>

<Enabled>true</Enabled>

<Username>Administrator</Username>

</AutoLogon>

* + - 1. Custom user

After setting up a custom user and installing the system, in OOBE, you can choose settings such as local and online users.

* + - 1. Delete

Username: Removed from start <UserAccounts> to </UserAccounts>

Autologin: Remove from start <AutoLogon> to </AutoLogon>

* + - 1. Replace

From the beginning <OOBE> to </OOBE>

<OOBE>

<ProtectYourPC>3</ProtectYourPC>

<HideEULAPage>true</HideEULAPage>

<HideWirelessSetupInOOBE>true</HideWirelessSetupInOOBE>

</OOBE>

### Generate ISO

#### Download OScdimg

Select the Oscdimg version according to the architecture, and save it to: D:\ after downloading. To save in other paths, please enter the absolute path of OScdimg.exe;

* 1. x64

<https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/amd64/oscdimg.exe>

* 1. x86

<https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/x86/oscdimg.exe>

* 1. arm64

<https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/arm64/oscdimg.exe>

#### Use the oscdimg command line to generate an ISO file and save it to: D:\WS2022.iso

* ISO.ps1
  + [\Expand\ISO.ps1](Expand/ISO.ps1)
  + <https://github.com/ilikeyi/solutions/blob/main/_Learn/Packaging.tutorial/OS.2022/Expand/ISO.ps1>
* Copy the code

$Oscdimg = "D:\Oscdimg.exe"

$ISO = "D:\Win2022"

$Volume = "Win2022"

$SaveTo = "D:\Win2022.iso"

$Arguments = @("-m", "-o", "-u2", "-udfver102", "-l""$($Volume)""", "-bootdata:2#p0,e,b""$($ISO)\boot\etfsboot.com""#pEF,e,b""$($ISO)\efi\microsoft\boot\efisys.bin""", $ISO, $SaveTo)

Start-Process -FilePath $Oscdimg -ArgumentList $Arguments -wait -nonewwindow

Yi’ Solutions

This copy packaging tutorial is part of Yi’s Solutions content, learn more:

* Yi's official website | <https://fengyi.tel/solutions>
* Github | <https://github.com/ilikeyi/solutions>

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Suggestions or feedback: <https://github.com/ilikeyi/solutions/issues>