



# 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

Chapter 1      Deployment image

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## Chapter 1 Deployment image

### A. Prerequisites

#### II ISO tools

Use a software that can edit ISO files, such as: [PowerISO](#), [DAEMON Tools](#), [ISO Workshop](#);

#### III Requirements

##### 1. System installation package

- 1.1. Prepare: [en-us\\_windows\\_server\\_2022\\_x64\\_dvd\\_620d7eac.iso](#)
- 1.2. Unzip to: [D:\en-us\\_windows\\_server\\_2022\\_x64\\_dvd\\_620d7eac](#)
- 1.3. After decompression is complete, change the directory [en-us\\_windows\\_server\\_2022\\_x64\\_dvd\\_620d7eac](#) to [D:\OS\\_2022](#)
- 1.4. All scripts and all paths have been set to [D:\OS\\_2022](#) by default as the image source.

##### 2. Language Pack

###### 2.1. Learn

- 2.1.1. [Add languages to a Windows 11 image](#)
- 2.1.2. [Language and region Features on Demand \(FOD\)](#)

###### 2.2. Language pack: Download

[20348.1.210507-1500.fe\\_release\\_amd64fre\\_SERVER\\_LOF\\_PACKAGES\\_OEM.iso](#)

#### IV 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:
  - 3.1. Real-time protection
  - 3.2. Cloud=delivered protection
  - 3.3. Automatic sample submission
  - 3.4. Tamper Protection

4. When you're not encapsulated, we recommend that you turn on Windows Security.

## V 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`
3. In this article, PS command line, green part, please copy it, paste it into the "Terminal" dialog box, press Enter and start running;
4. 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:\Yi.Solutions\_Encapsulation\_SIP.ps1"`

## B. Language package: extract

### II Language pack: Ready

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

### III Language pack: Extract scheme

1. Add
  - 1.1. Language name: [Simplified Chinese - China](#), language tag: [zh-CN](#), Scope of application: [Install.Wim](#), [Boot.Wim](#), [WinRE.Wim](#)
2. Delete
  - 2.1. Language name: [English - United States](#), language tag: [en-US](#), Scope of application: [Install.Wim](#), [Boot.Wim](#), [WinRE.Wim](#)

### IV 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](#)
  - [https://github.com/ilikeyi/solutions/blob/main/\\_Learn/Packaging.tutorial/OS.2022/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 = "Lao"; }

@{ 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_OC\WinPE-FontSupport-{Lang}.cab"

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

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-securestartup_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-atbroker_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-audiocore_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-audiodrivers_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-enhancedstorage_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-narrator_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-scripting_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-speech-tts_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-srh_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-srt_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-wds-tools_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-wmi_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{Lang}\winpe-appxpackaging_{Lang}.cab"

        "Windows Preinstallation Environment\x64\WinPE_OC\{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 }

```

## C. Customize the deployment image

### II Custom deployment image: Install.wim

#### 1. 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,

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

```
New-Item -Path "D:\OS_2022_Custom\Install\Install\Mount" -ItemType directory -ea SilentlyContinue
```

#### 3. 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

#### 3.1. Custom deployment image: 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](#)".

##### 3.1.1. 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 }
```

3.1.2. Specify the path to mount WinRE.wim

```
New-Item -Path "D:\OS_2022_Custom\Install\WinRE\Mount" -ItemType directory -ea SilentlyContinue
```

3.1.3. 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"
```

3.1.4. 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](#)".
- When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.

3.1.4.1. Language pack: add

- 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](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

        }

    }

}

```

```
}
```

3.1.4.2. Components: All packages installed in the image

3.1.4.2.1. View

```
Get-WindowsPackage -Path "D:\OS_2022_Custom\Install\WinRE\Mount" | Out-GridView
```

3.1.4.2.2. 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
```

3.1.5. Save image: WinRE.wim

```
Save-WindowsImage -Path "D:\OS_2022_Custom\Install\WinRE\Mount"
```

3.1.6. 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
```

3.1.7. After rebuilding WinRE.wim, the file size can be reduced

- 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](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

    }
}

```

#### 3.1.8. Backup WinRE.wim

- 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](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

```

#### 3.1.9. Replace WinRE.wim within the Install.wim image

- After each installation of Install.wim, use item "[Replace the WinRE.wim](#)";
- Learning "[After obtaining all the index numbers of Install.wim and replace the old WinRE.wim](#)".

### PROCESS FILES INSIDE THE INSTALL.WIM IMAGE, END

#### 4. 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](#)".
- When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.

##### 4.1. Language pack: add

- 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](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"

```

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

##### 4.2.1. View

```
Get-WindowsPackage -Path "D:\OS_2022_Custom\Install\Install\Mount" | Out-GridView
```

##### 4.2.2. 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
```

#### 5. Cumulative updates

##### 5.1. Download

Check the "[Windows Server 2022 Update History](#) ", 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](#)" (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](#)

##### 5.2. 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
```

### 5.3. 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
```

#### 5.3.1. Clean up components after curing updates

- 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](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

    }

}
```

### 6. 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.

### 7. 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
```

### 8. 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
```

9. Save image: Install.wim

```
Save-WindowsImage -Path "D:\OS_2022_Custom\Install\Install\Mount"
```

10. 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.

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

11.1. Get WimLib

After going to the official website of <https://wimlib.net>, select a different version: [arm64](#), [x64](#), [x86](#), and extract it to: [D:Wimlib](#) after downloading.

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

11.2.1. Extract the WinRE.wim file from Install.wim

- 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](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
```

11.2.2. 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](#)
  - [https://github.com/ilikeyi/solutions/blob/main/\\_Learn/Packaging.tutorial/OS.2022/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

}
```

## 12. Rebuilding Install.wim reduces file size

- 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](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

}

```

### III Custom deployment image: boot.wim

#### 1. 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 }
```

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

```
New-Item -Path "D:\OS_2022_Custom\Boot\Boot\Mount" -ItemType directory -ea SilentlyContinue
```

#### 3. 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"
```

#### 4. 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](#)".
- When adding languages, different schema versions must be corresponded, and if not, errors are reported during the addition process.

##### 4.1. Language pack: add

- 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](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
    }
}
}
```

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

##### 4.2.1. View

```
Get-WindowsPackage -Path "D:\OS_2022_Custom\Boot\Boot\Mount" | Out-GridView
```

##### 4.2.2. 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
```

#### 4.3. 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
```

#### 4.4. 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.

##### 4.4.1. 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"
```

##### 4.4.2. 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"
```

#### 5. Save image: Boot.wim

```
Save-WindowsImage -Path "D:\OS_2022_Custom\Boot\Boot\Mount"
```

#### 6. 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
```

IV 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](#)", Intervene in the installation process by leaving it unattended.

1. Add method

1.1. Add to ISO installation media

1.1.1. Unattended

1.1.1.1. 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
```

1.1.1.2. 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
```

1.1.1.3. 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

1.1.1.3.1. Create \$OEM\$ path

```
New-Item -Path "D:\OS_2022\sources\`$OEM$\`$$\Panther" -ItemType Directory
```

1.1.1.3.2. 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
```

1.1.2. Deployment engine: add

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

1.1.2.1. 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

1.1.2.2. 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

}
```

1.2. Add to mounted

Through "Customized deployment image: Install.wim", execute "Start mounting Install.wim" and mount to:  
D:\OS\_2022\_Custom\Install\Install\Mount

#### 1.2.1. 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
```

#### 1.2.2. Deployment engine: add

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

##### 1.2.2.1. 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
```

##### 1.2.2.2. 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

}
```

## 2. Deployment Engine: Advanced

### 2.1. Deployment engine: adding process

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

### 2.2. 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\\$\`\\$1\Yi\Engine\Deploy\Allow\Unattend.xml](#)
- [D:\OS\\_2022\\_Custom\Install\Install\Mount\Panther\Unattend.xml](#)

#### 2.2.1. 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.

##### 2.2.1.1. Multi-language

```
<UILanguage>%OSDUILanguage%</UILanguage>

<InputLocale>%OSDInputLocale%</InputLocale>

<SystemLocale>%OSDSysLocale%</SystemLocale>

<UILanguage>%OSDUILanguage%</UILanguage>

<UILanguageFallback>%OSDUILanguageFallback%</UILanguageFallback>

<UserLocale>%OSDUserLocale%</UserLocale>
```

##### 2.2.1.2. 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>
```

#### 2.2.2. 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.

##### 2.2.2.1. 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>
```

##### 2.2.2.2. Custom user

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

2.2.2.3. Delete

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

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

2.2.2.4. Replace

From the beginning `<OOBE>` to `</OOBE>`

`<OOBE>`

`<ProtectYourPC>3</ProtectYourPC>`

`<HideEULAPage>true</HideEULAPage>`

`<HideWirelessSetupInOOBE>true</HideWirelessSetupInOOBE>`

`</OOBE>`

D. Generate ISO

1. 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;

1.1. x64

[https://github.com/ilikeyi/solutions/raw/main/\\_Software/Oscdimg/amd64/oscdimg.exe](https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/amd64/oscdimg.exe)

1.2. x86

[https://github.com/ilikeyi/solutions/raw/main/\\_Software/Oscdimg/x86/oscdimg.exe](https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/x86/oscdimg.exe)

1.3. arm64

[https://github.com/ilikeyi/solutions/raw/main/\\_Software/Oscdimg/arm64/oscdimg.exe](https://github.com/ilikeyi/solutions/raw/main/_Software/Oscdimg/arm64/oscdimg.exe)

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

- ISO.ps1
  - `\Expand\ISO.ps1`
  - [https://github.com/ilikeyi/solutions/blob/main/\\_Learn/Packaging.tutorial/OS.2022/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
```



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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