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

Table of contents

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 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.

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/_Documents/Attachment/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 }
```

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/_Documents/Attachment/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

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

3.1.6. Unmount image

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/_Documents/Attachment/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/_Documents/Attachment/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/_Documents/Attachment/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, optional

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, optional

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/_Documents/Attachment/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. Add deployment engine, optional

   - 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

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

10. Unmount image

    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. Rebuilding Install.wim reduces file size

- Install.Rebuild.wim.ps1
  - \Expand\Install\Install.Rebuild.wim.ps1
  - https://github.com/ilikeyi/solutions/blob/main/_Documents/Attachment/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
}
```

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

12.1. 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.

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

12.2.1. 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/_Documents/Attachment/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
```

12.2.2. 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/_Documents/Attachment/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
}
```

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/_Documents/Attachment/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

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

6. Unmount image

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: 1.1.0.4, select the download source code format: zip, and get the Multilingual-1.1.0.4.zip compressed package file after the download is completed;

- Unzip the downloaded main.zip or Multilingual-1.1.0.4.zip to: D:\Multilingual-1.1.0.4, 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\Unattend\Mul.Unattend.xml to D:\OS_2022\Autounattend.xml

```
Copy-Item "D:\Multilingual\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\Unattend\Mul.Unattend.xml to D:\OS_2022\Sources\Unattend.xml

```
Copy-Item "D:\Multilingual\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\Unattend\Mul.Unattend.xml to D:\OS_2022\Sources\OEM\Panther\Unattend.xml

```
Copy-Item "D:\Multilingual\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\Unattend\Mul.Unattend.xml to D:\OS_2022_Custom\Install\Install\Mount\Panther\Unattend.xml

```
Copy-Item "D:\Multilingual\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$\$$\Panther\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>%OSDSystemLocale%</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

II 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

1.2. x86

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

III 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/_Documents/Attachment/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
```

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