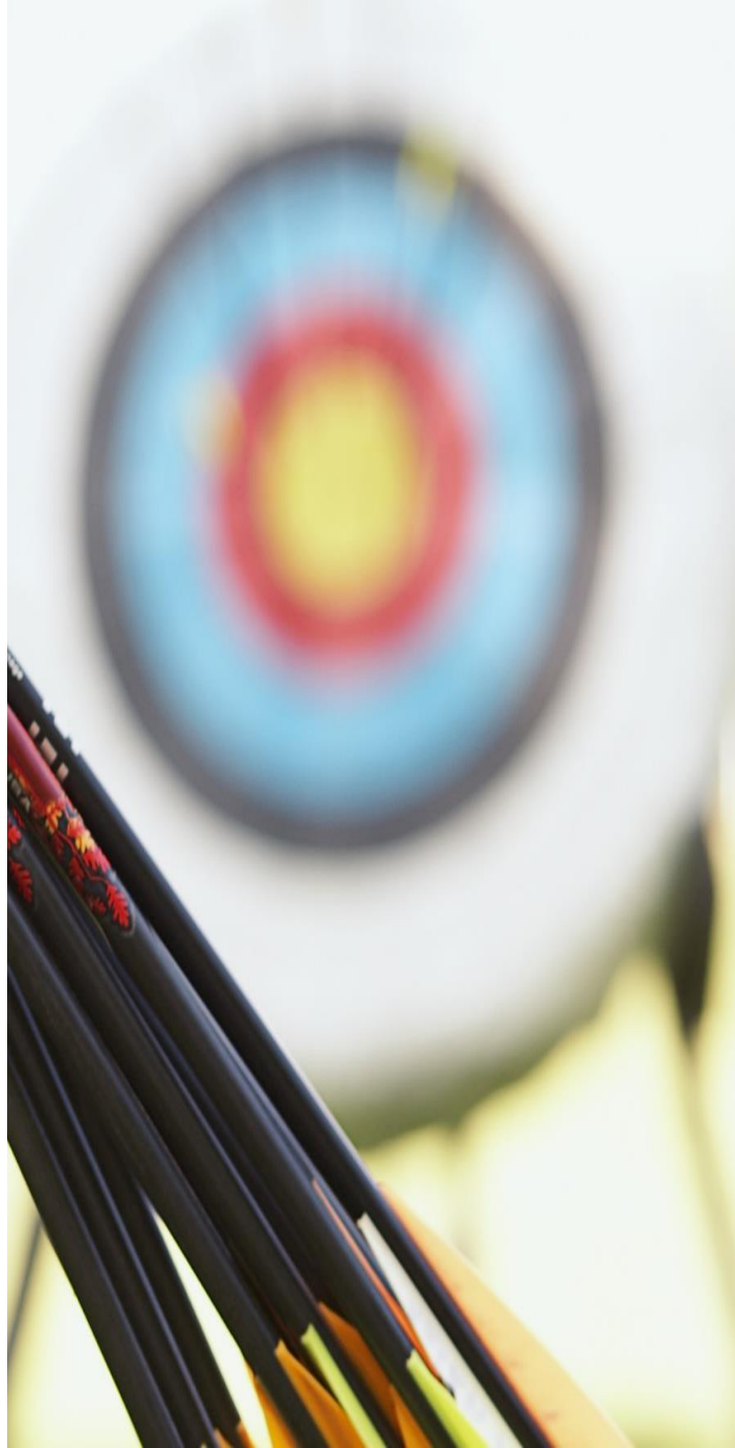
Windows Tech Series

Provisioning Windows IoT Devices and Solutions

Windows

Objectives

- Review Windows 10 IoT Provisioning issues
- Review Windows 10 IoT Provisioning tools
- Describe using Windows ICD to provision settings and state
- Review Features on Demand v2



Introduction to Windows IoT Provisioning

Windows IoT Provisioning

- Windows 10 IoT Enterprise
  - Devices can be provisioned using standard Windows tools, such as DVD/ISO, MDT, SCCM
  - Devices can be provisioned using imaging tools
- Windows 10 IoT Mobile Enterprise
  - Enterprises do not start with vanilla devices, so imaging is not appropriate
  - OEMs use imaging to configure initial device state
- Windows 10 IoT Core
  - Devices can be provisioned using imaging tools

Mobile devices – provisioning not imaging

- Transform a device
  - Install apps and enterprise configuration
- Flexible methods
  - Build package with Image Configuration Designer (new)
  - Trigger package installation from the cloud or corporate network
  - Apply package using media, USB tethering, or even email, for manual distribution
  - Leverage NFC or QR codes to trigger install

Mobile devices – what can be provisioned?

- You can provision:
  - First run experience customization
  - Automatic enrollment into Intune or third-party MDM
  - Certificates (root/CA)
  - Enterprise policies (password, encryption)
  - Enterprise profiles (Wi-Fi, VPN, email, proxy settings)
  - Line-of-Business and Store Apps
  - Start menu layout and pinned apps
  - Offline content (audio/video, pictures, documents, maps)
  - Lockdown mode (Assigned Access)

Barcode-based device provisioning

- OEM or Enterprise IT can use barcode scanning to provision mobile devices during OOBE
- Support scanning a provisioning package that has been split over multiple barcodes
- Not OEM-specific and is hardware independent

Windows IoT Provisioning Tools

Pre-Windows 10 tools for building images

- DVD/USB
  - Simple to use
  - A lot of post-build activity (drivers, application, settings)
- System Image Manager for Desktop and Server
  - Can be complicated to use
  - Ability to customize settings
- Image Configuration Editor (componentized desktop OS (WE8S))
  - Complicated to use but has the ability to provide a fairly customized OS
- Image Designer (specific to Phone)
- Platform Builder (For CE and Compact OS)

Pre-Windows 10 Tools – problems/challenges

- Long learning curve for imaging tools
  - Traditional Windows imaging tools are command-line driven and scripting based
  - Lack of UI leads to steep learning curve
- Distinct imaging processes across Windows products
  - Current desktop, mobile and Compact imaging process are completely distinct
  - Require more effort to master imaging process

Windows 10 IoT provisioning tools

- Windows Assessment and Deployment Kit (ADK)
- Image Configuration Designer (ICD)
- Same tools across PC, Phone and now IoT
- Easier to customize the device experience

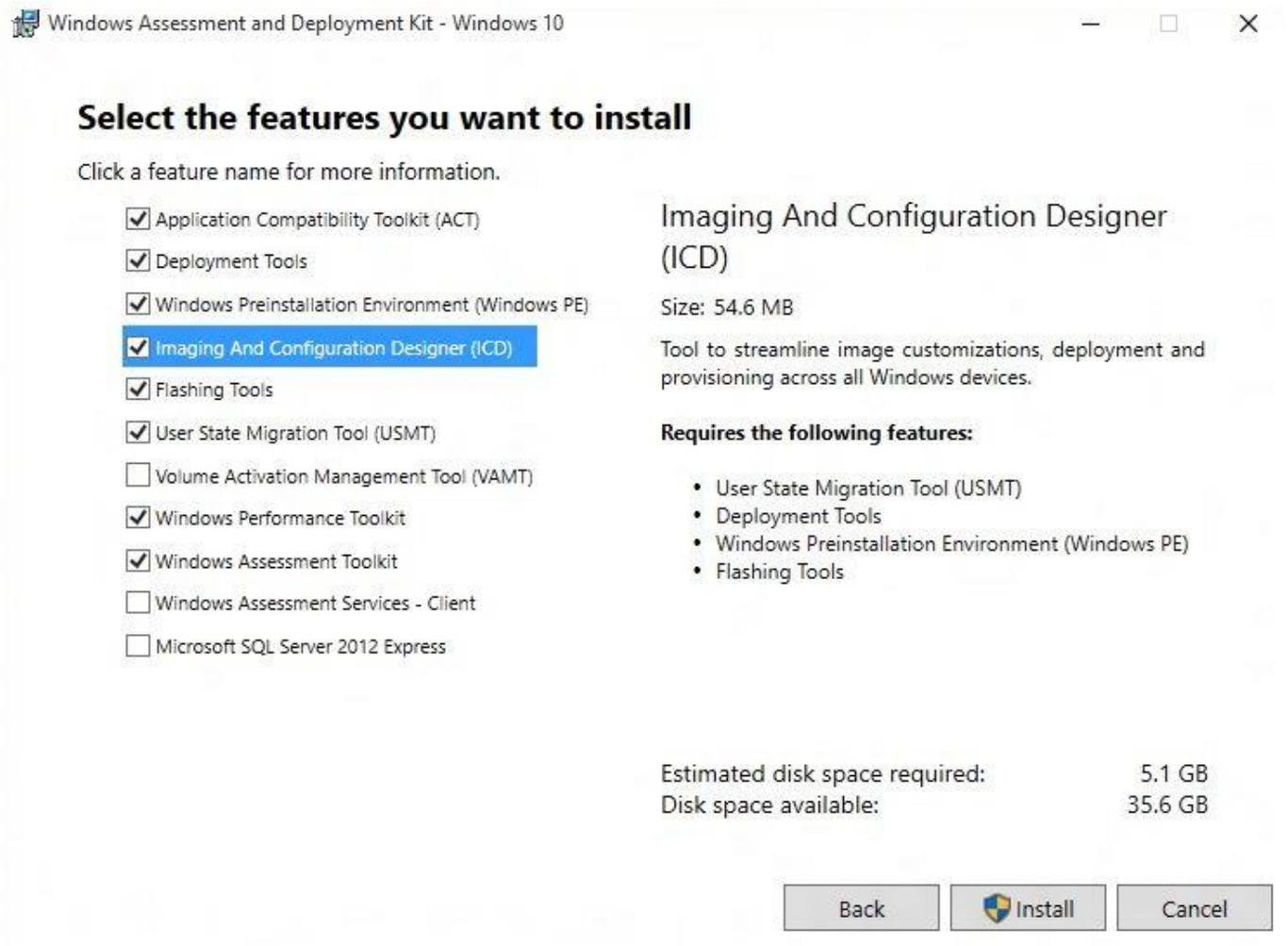
Windows Assessment and Deployment Kit (ADK)

Windows Assessment Toolkit

Windows Performance Toolkit

NEW

Windows Imaging and Configuration Designer

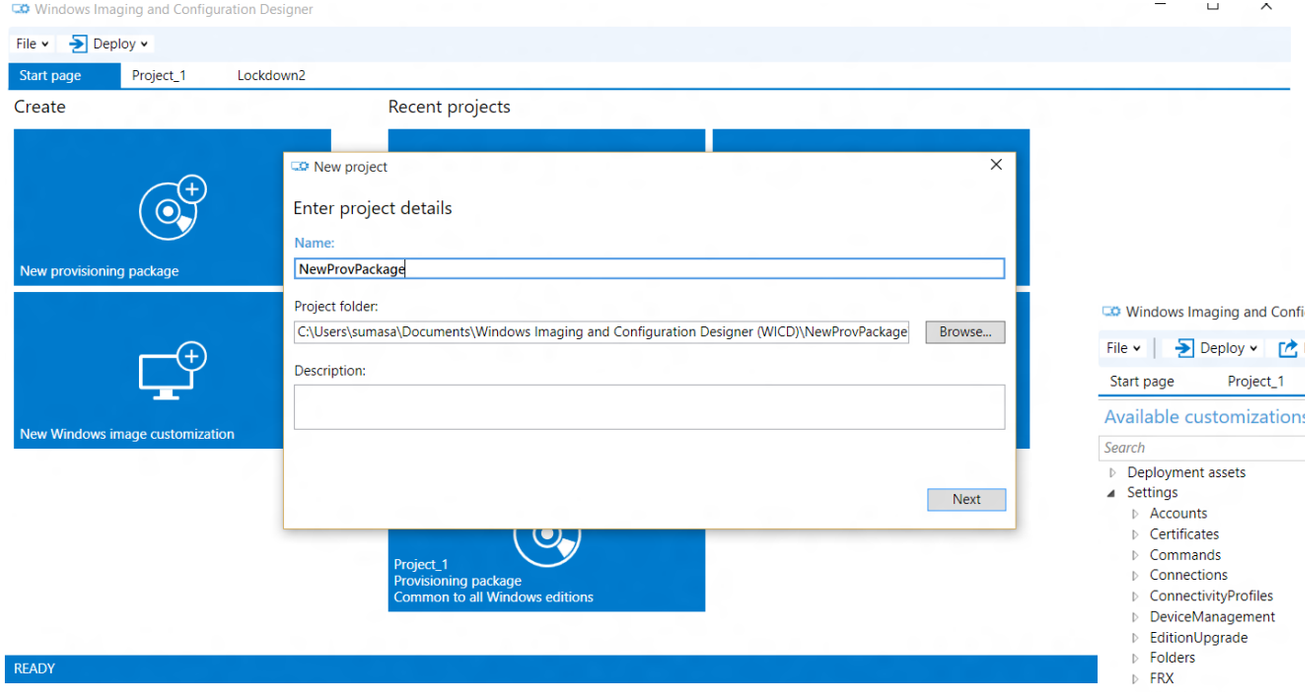


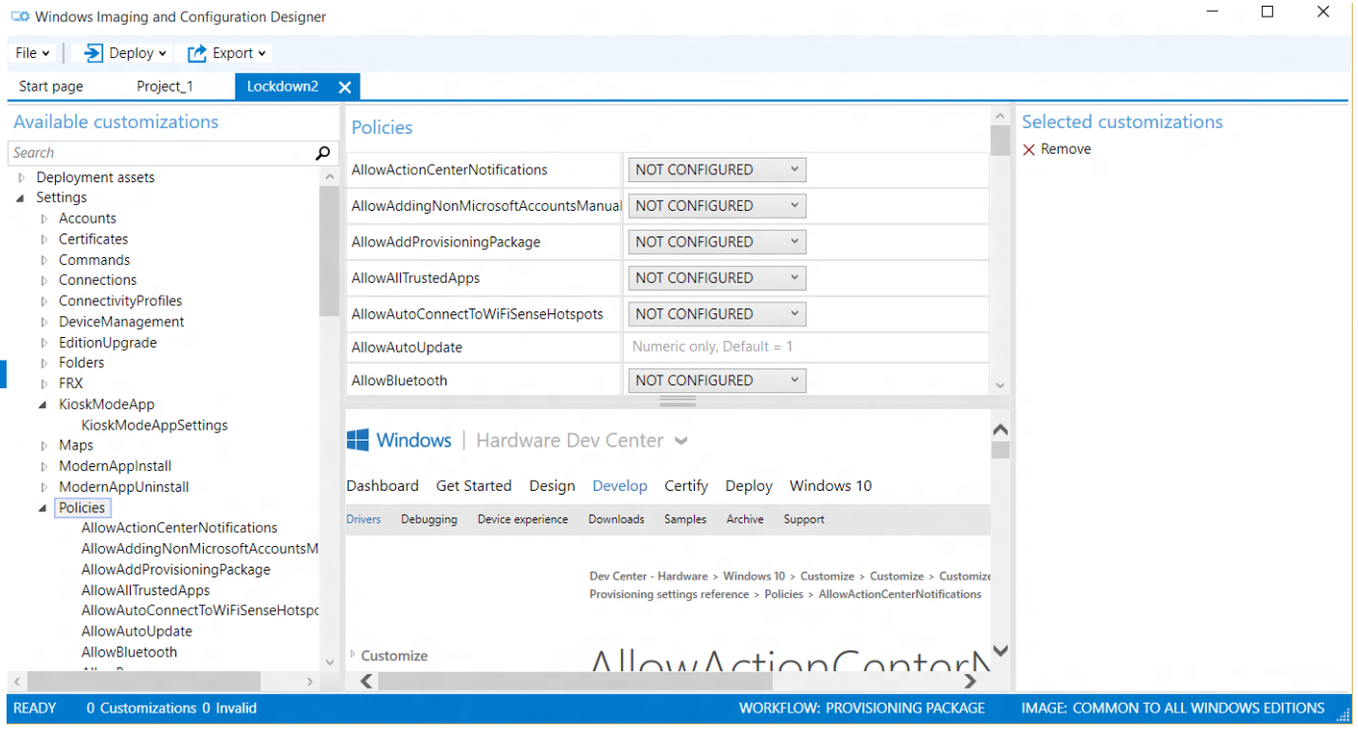
Windows Imaging Configuration Designer (ICD)

- Single tool used by OEMs to build all Windows 10 images
  - Core
  - Mobile
  - Enterprise
- Ability to customize settings on initial installation
- Ability to create Provisioning Packages to modify images post-build
- Ability to capture changes to one image and apply those changes to a new image

Configure OS to create your device experience

Image Configuration Designer (ICD) makes it easier to customize the device experience



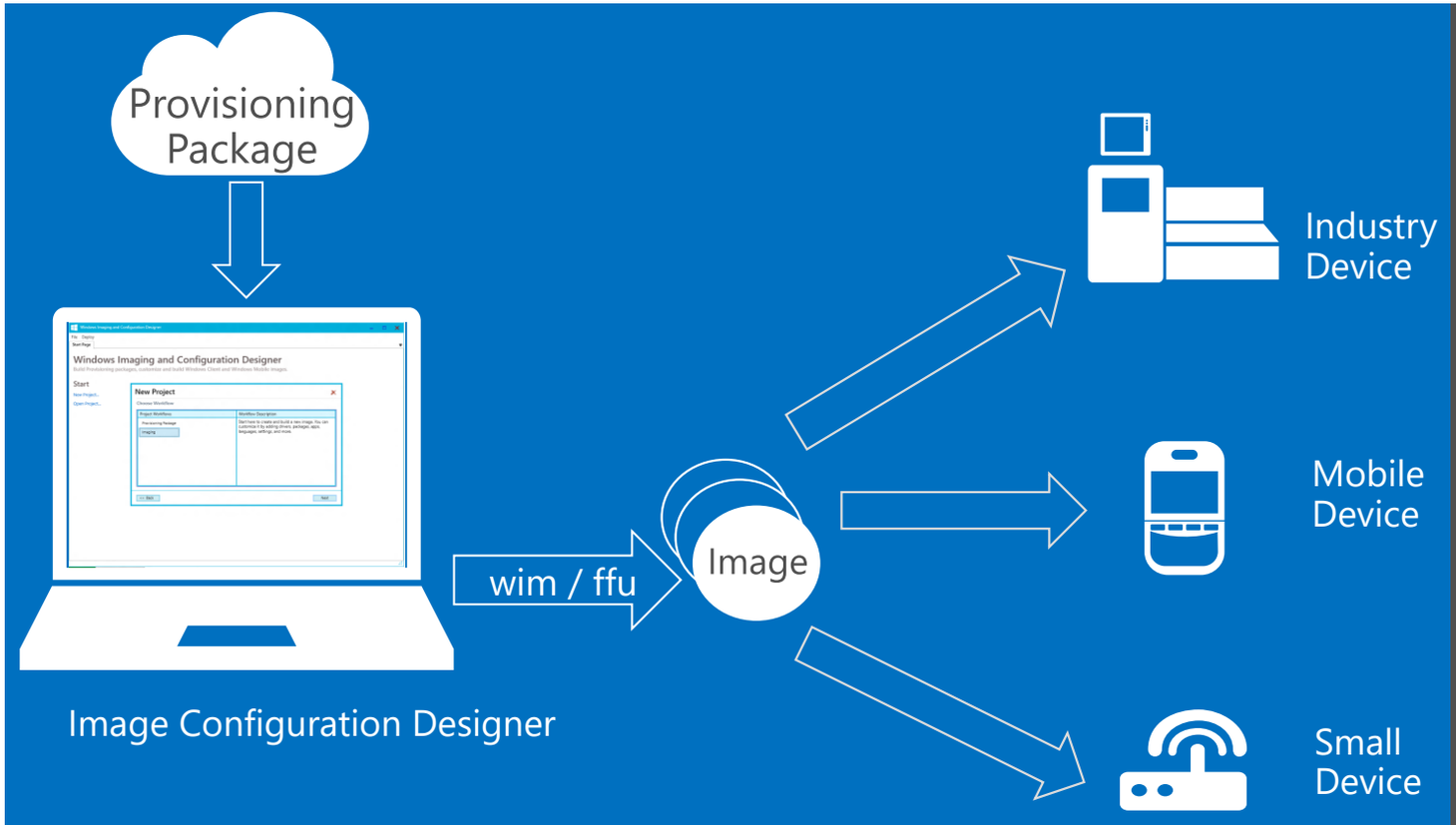


Windows ICD – goals and benefits

- Converged imaging experience
  - Imaging workflows and experience for desktop and mobile are converged when using WICD
- Ease of use
  - Turnkey solution with unified experience for Windows image customization
- Automated process
  - Desktop and mobile image generation can be completely automated
- Wide range of imaging collaterals
  - Drivers, apps, language packs, updates, Features on Demand packages, provisioning packages, and configuration settings

Configure OS to create your device experience

Image Configuration Designer (ICD) makes it easier to customize the device experience



1. Customize with Universal Applications, drivers, configuration settings
2. Design-in lockdown settings
3. Customize experience including startup screen
4. Test experience on target device

One tool for all your OS configuration needs

Windows ICD automation

- Command-line support
  - Build provisioning packages
  - Build deployment media with customized image, based on a WIM image
  - Build customized FFU image, based on Microsoft provided OS packages
- Imaging automation
  - Support customizations in provisioning packages and/or in a customization XML file
  - Support image and media type options via deployment configuration XML file
  - Support OEM customization package extracted from a reference device

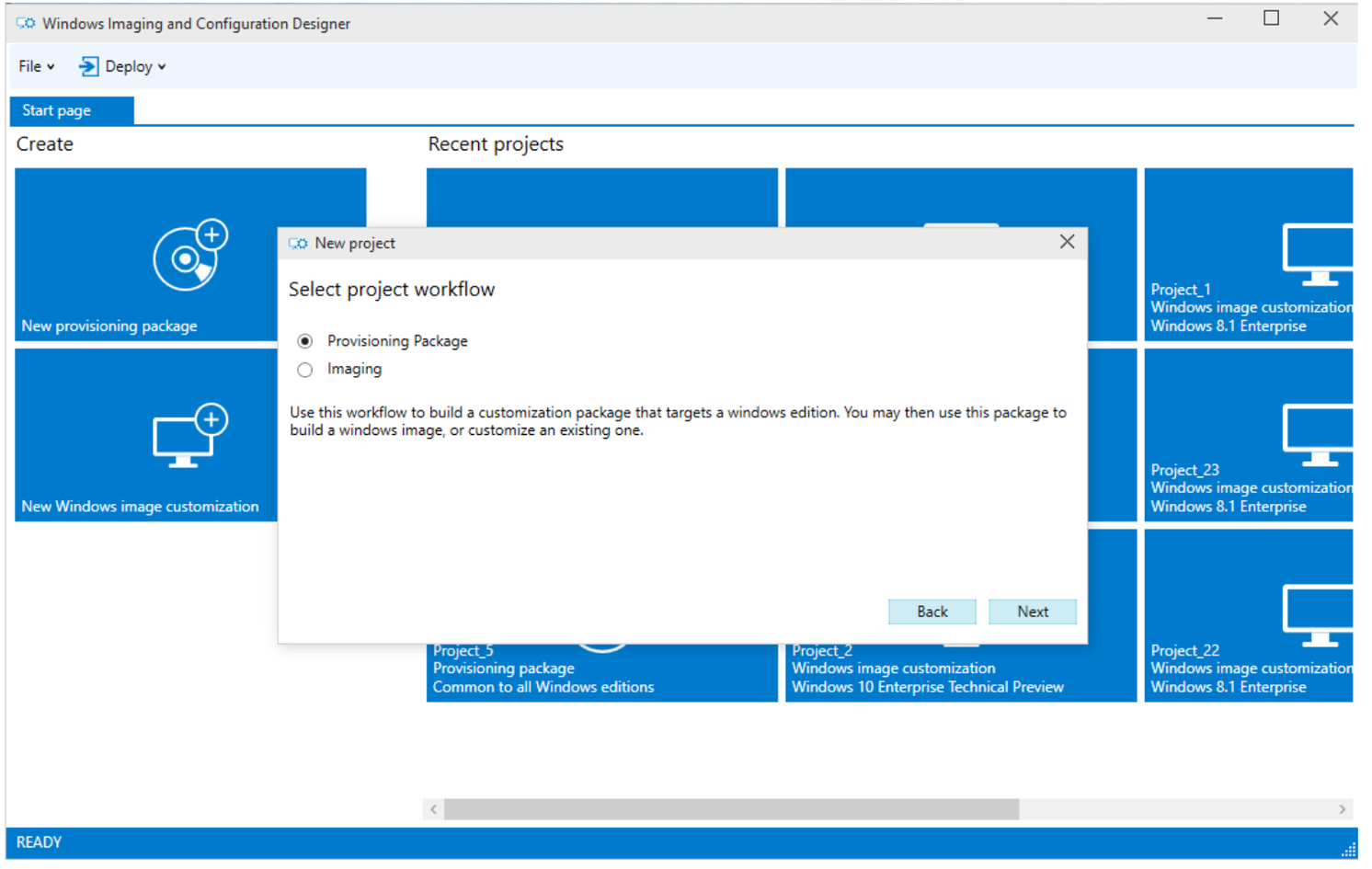
```
ICD.exe /Build-ImageFromWIM /MediaPath:<path_to_media_folder> /SourceImage:<path_to_image>
{[ImageIndex:<index>] | [ImageName:<name>]} [/ProvisioningPackage:<path_to_ppkg>]
[/CustomizationXML:<path_to_xml> /DeploymentConfigXML:<path_to_xml>
```

Using Windows ICD to Provision Settings and State

Using Windows ICD

Two basic workflows:

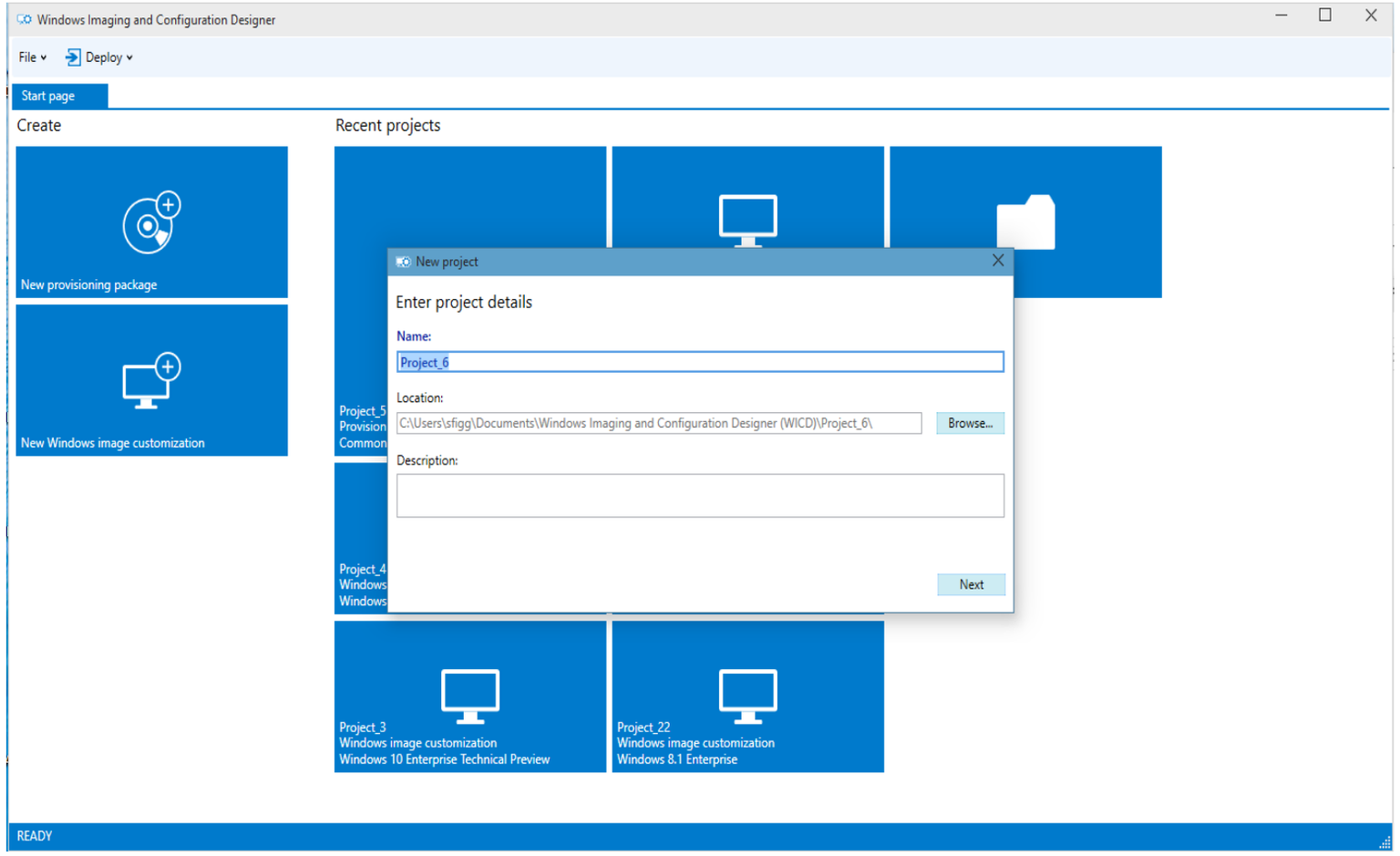
1. Windows imaging
2. Build provisioning package



Windows ICD workflow – Windows Imaging

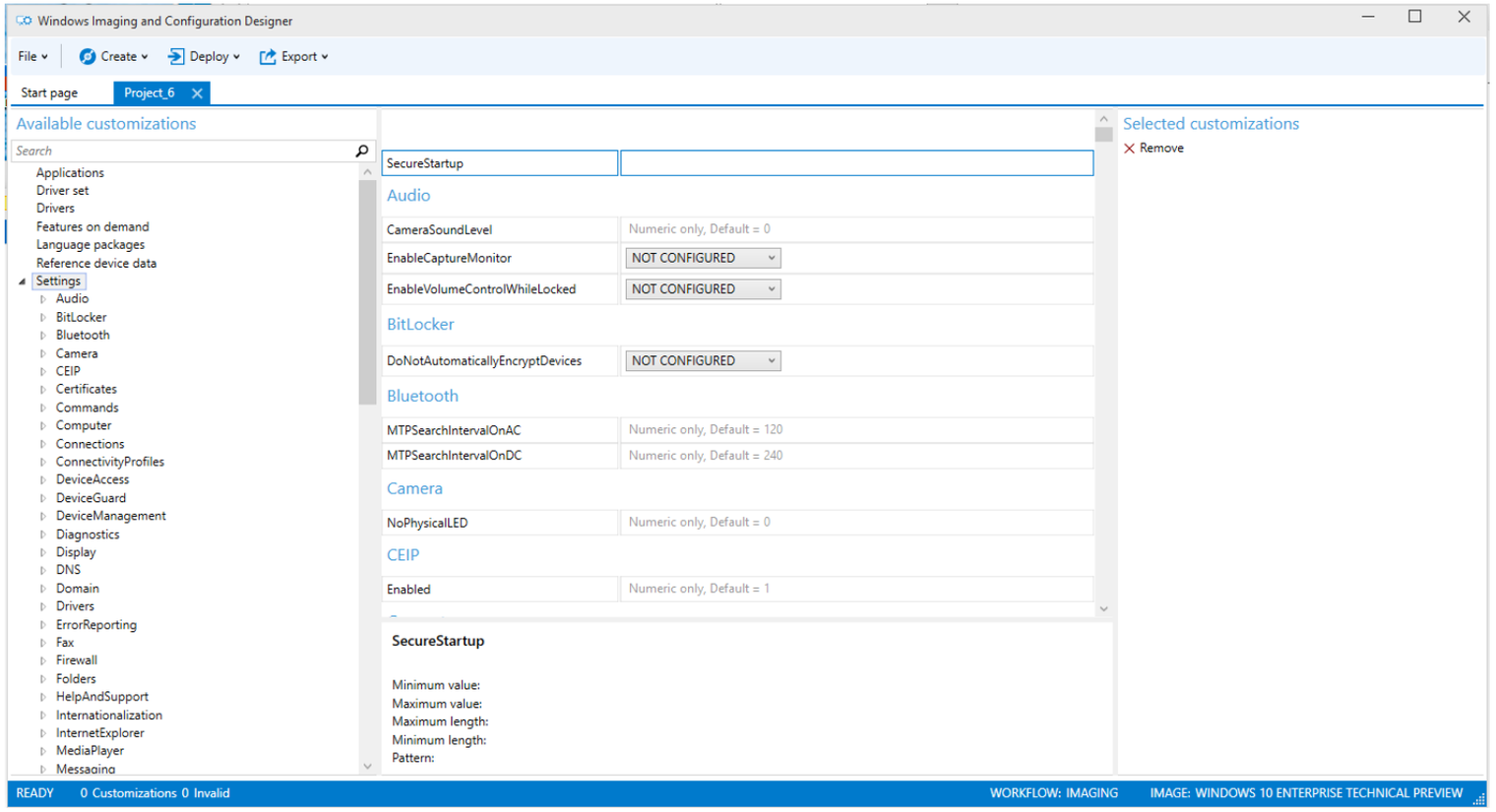
- Launch Windows ICD – start new project
  - Select Imaging workflow
  - Provide path to the WIM container (install.wim) and select the image
- Customize image
  - Select customization assets and provide asset payloads
  - Select configuration settings and set setting values
- Build installation media
  - Select media type
  - Select imaging type – WIM or FFU
  - Select Compact OS option
  - Select media destination – USB drive or folder path

1. Create Windows Imaging project



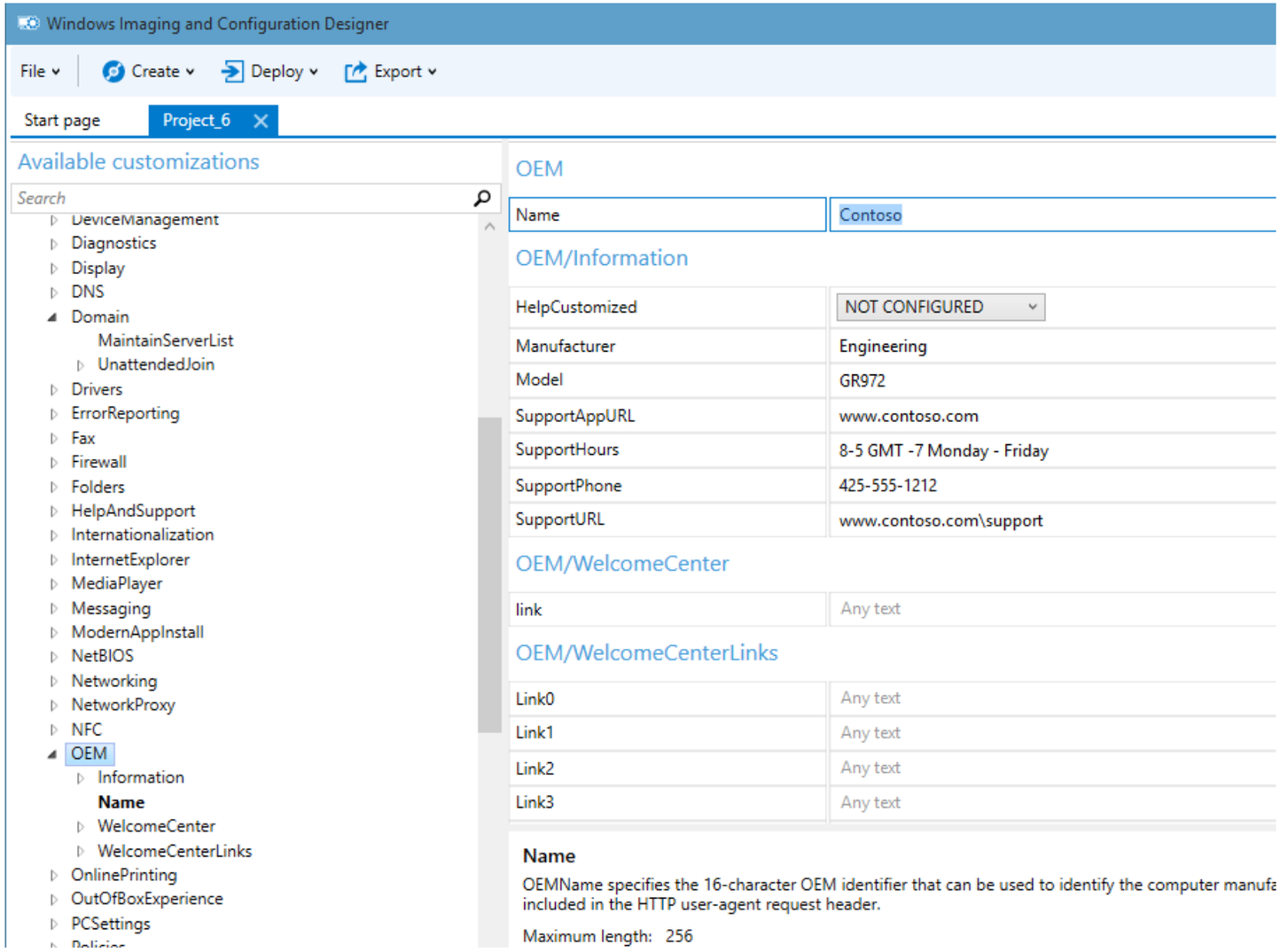
- New project
  - Start a new project workflow
- Open project
  - Continue with an existing project workflow

2. Customize image



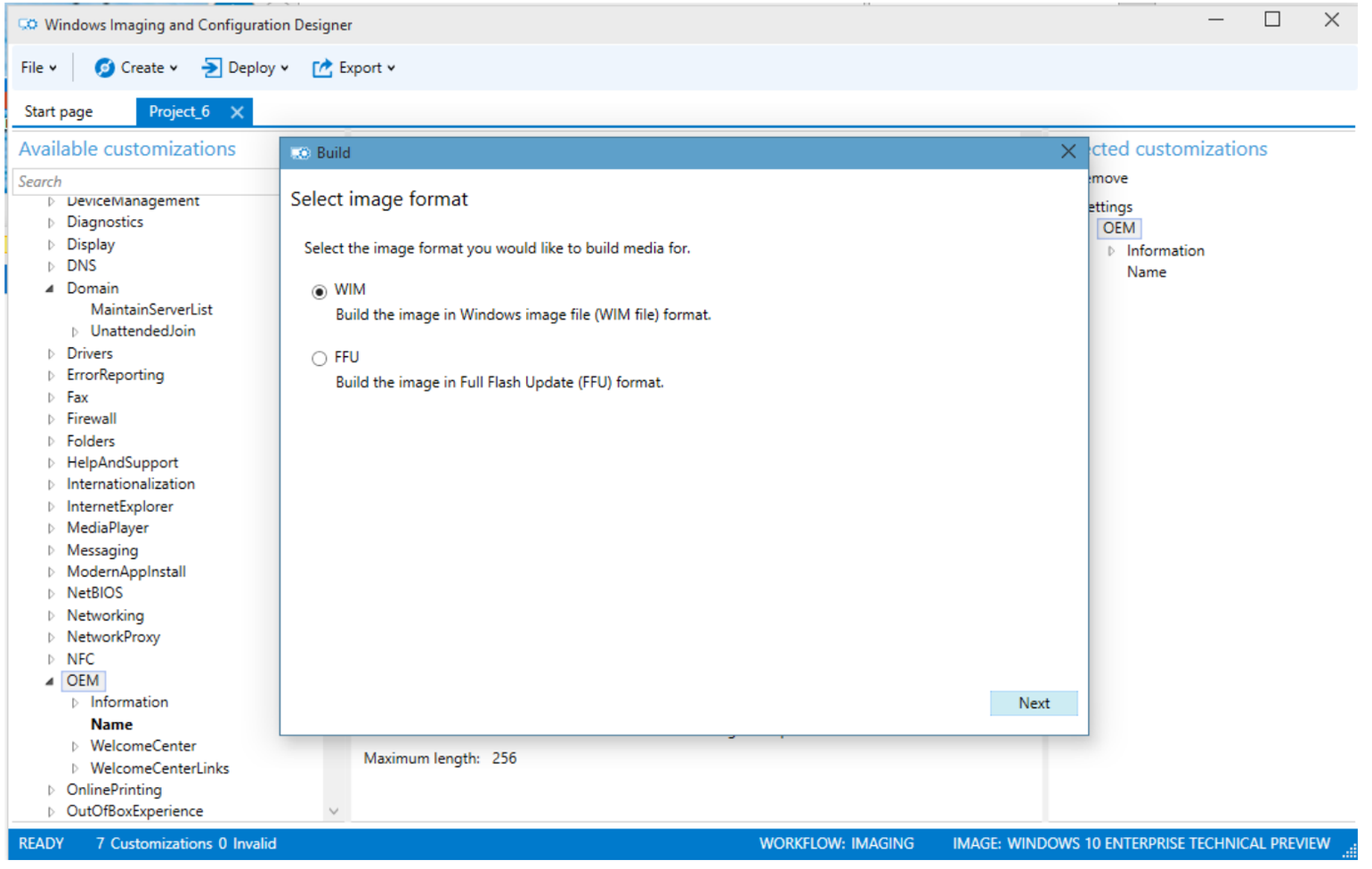
- Assets
  - Store Apps, drivers, updates, and so on
- Settings
  - Legacy unattend settings
- Customization XML
  - Generated by project saving
- Provisioning package
  - Apply at imaging time
  - Apply at deployment OOBE phase
  - Apply at device runtime

2. Customize image



Example customization of OEM settings

3. Build Installation Media



- Windows imaging
  - WIM or FFU image
  - Compact OS option
- Media type
  - USB drive
  - Local folder
- Deployment type
  - Production
  - Clean install
  - Recovery
- USB Flashing
  - Single device

4. Use Image to install Windows 10 IoT

- Boot device and finalize installation
  - USB/DVD install generally requires more post-build work
  - Using WICD can reduce post-build work

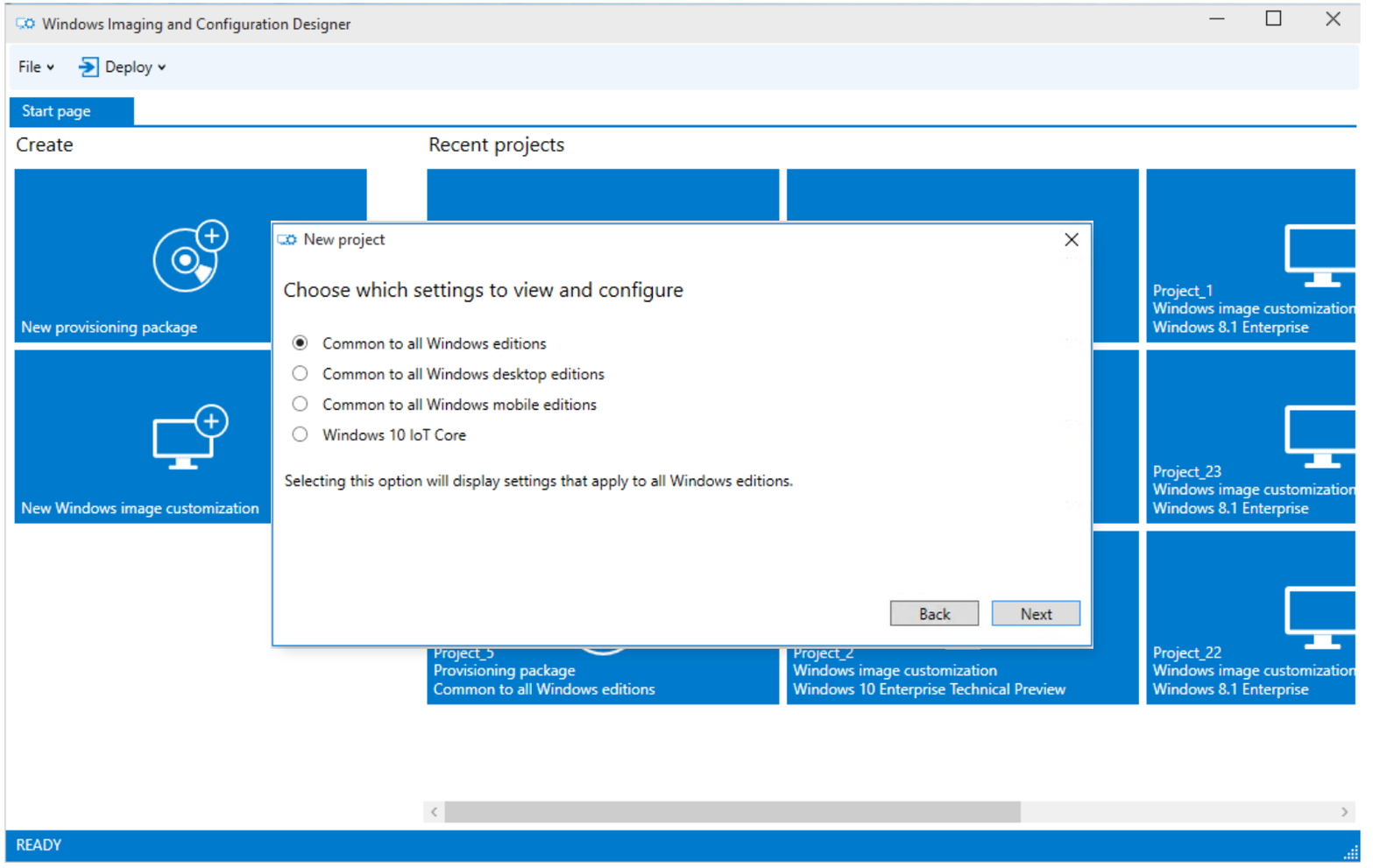
Provisioning packages

- Definition
  - A container for a collection of image customization assets and configuration settings
- Supported scenarios
  - Apply package at imaging time
  - Apply package at deployment time
  - Apply package at device runtime
- Method of creation
  - WICD GUI and command line
  - USMT (User State Migration Tool) ScanState

Windows ICD workflow – build provisioning package

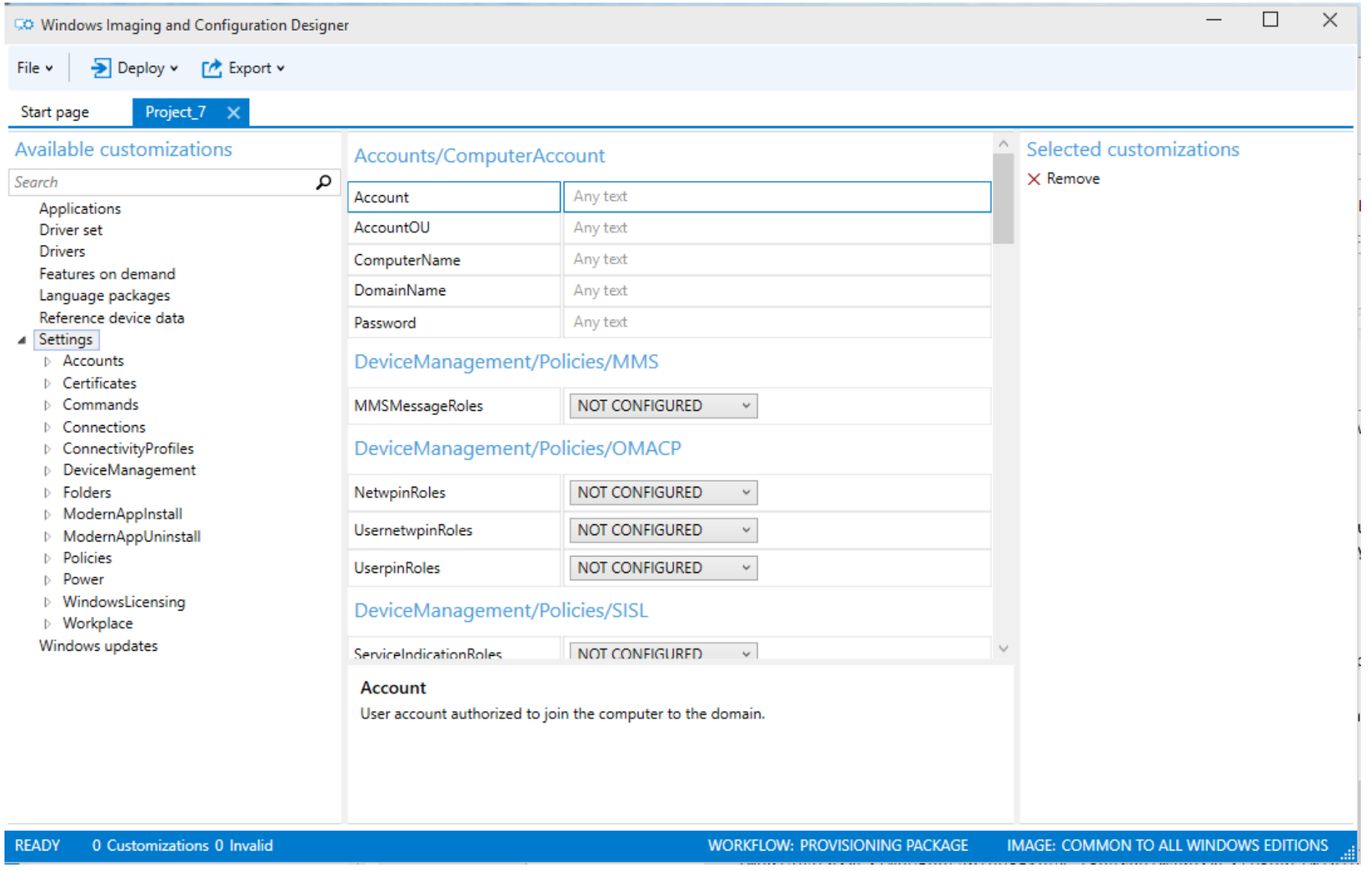
- Launch Windows ICD – start new project
  - Select provisioning package
  - Select Windows edition to configure
  - Optional: import existing provisioning package
- Customize provisioning package
  - Select customization assets and provide asset payloads
  - Select configuration settings and set setting values
- Build provisioning package
- Install provisioning package

1. Create provisioning package project



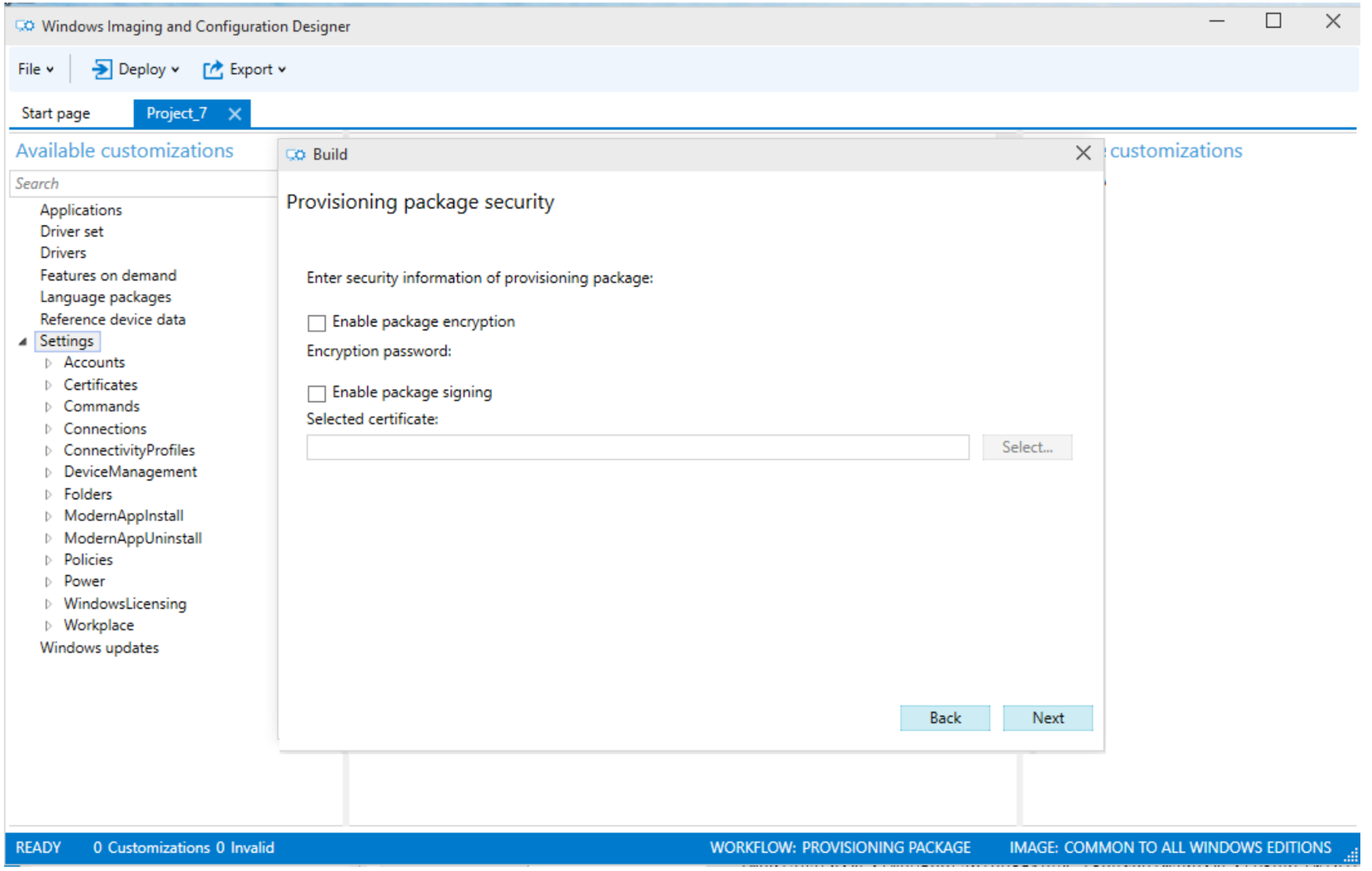
- New project
  - Start a new project workflow
- Open project
  - Continue with an existing project workflow
- Select Windows edition

2. Customize provisioning package



- Assets
  - Store Apps, drivers, updates, and so on
- Language packs
- Settings
- Windows updates

3. Build provisioning package



- Export provisioning package
- Version control

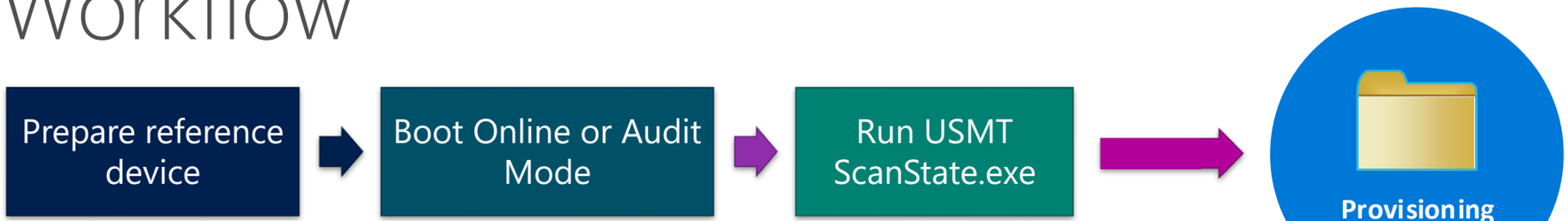
- Support for encryption
- Signing

4. Install provisioning package

- Online
  - Double-click on provisioning package
  - Command-line installation via DISM (Deployment Imaging System Management)
- Offline
  - Mount WIM for modification
  - Command-line installation via DISM
- Windows ICD import
  - Import into new or existing Windows ICD project

USMT (User State Migration Tool) ScanState

- Purpose
  - Extract Win32 app files and associated settings from a reference device into a provisioning package
  - Enable offline apply of Win32 apps during imaging process
  - Provide the ability to restore these Win32 apps to the factory default state
- Workflow

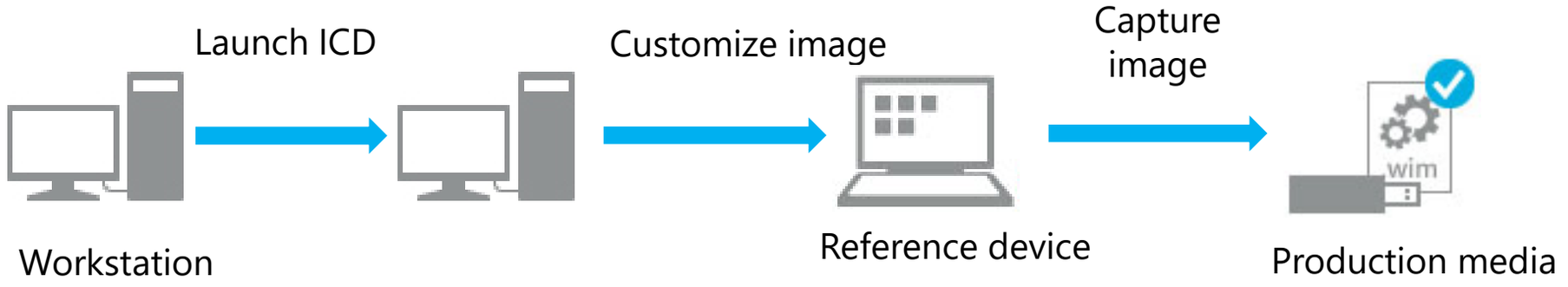


- USMT ScanState command line
  - Install USMT from ADK; copy ScanState and its dependencies to the reference device
  - Run this command: **`ScanState.exe /Apps /PPKG <StorePath>`**

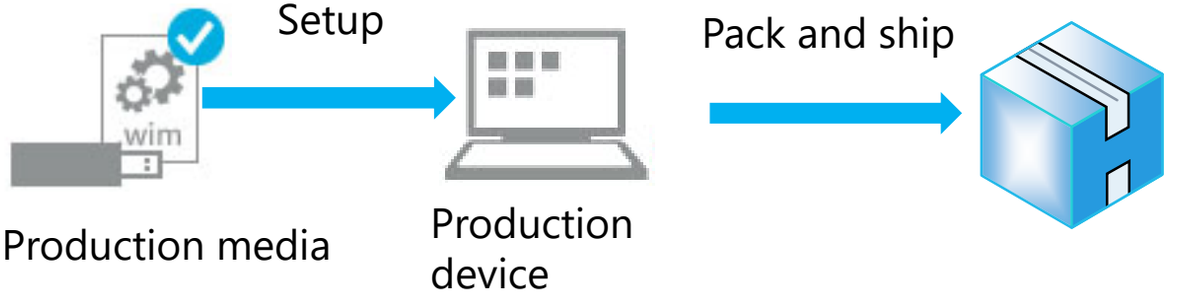
Basic Windows ICD imaging and deployment

The most basic Windows ICD-based workflow

Technician Lab



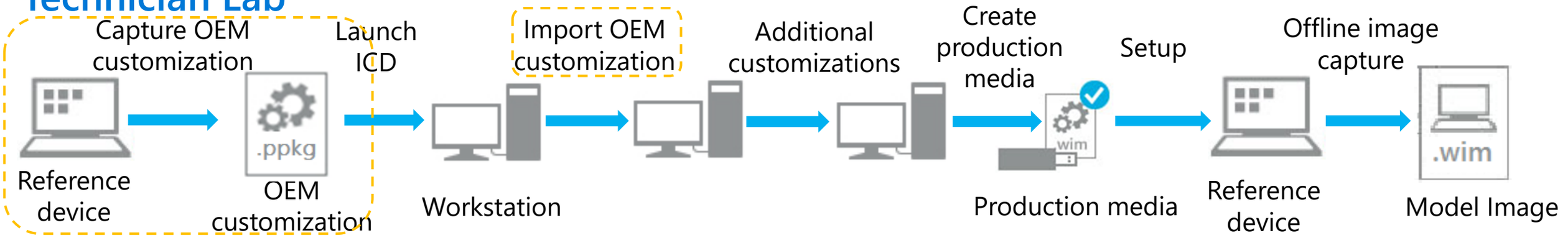
Factory Floor



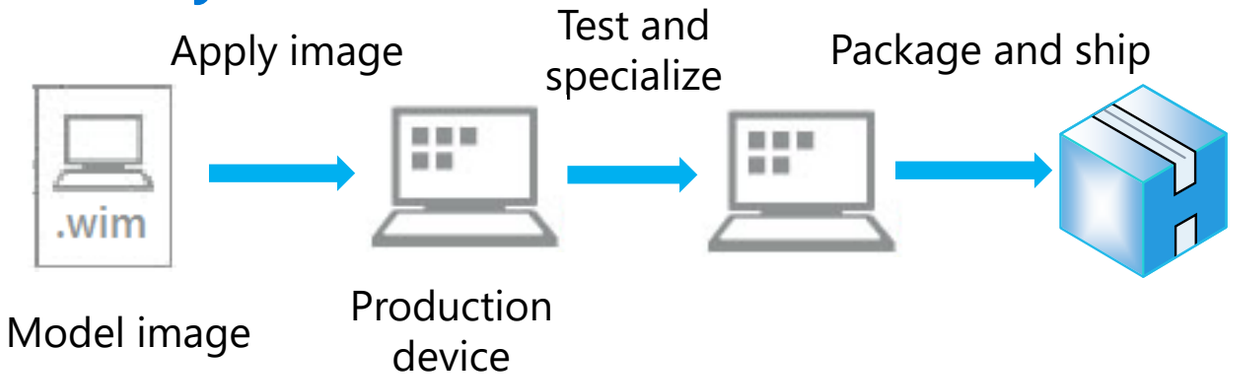
Full image customization – apply WIM

More complex – incorporates ScanState

Technician Lab



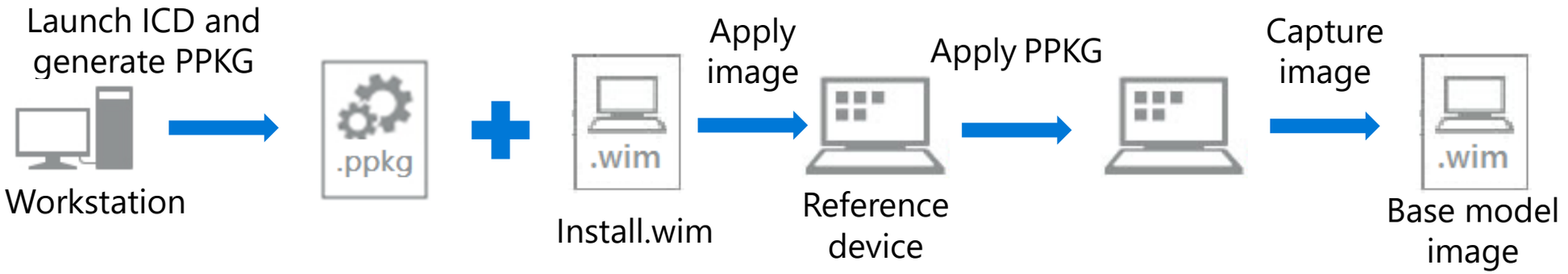
Factory Floor



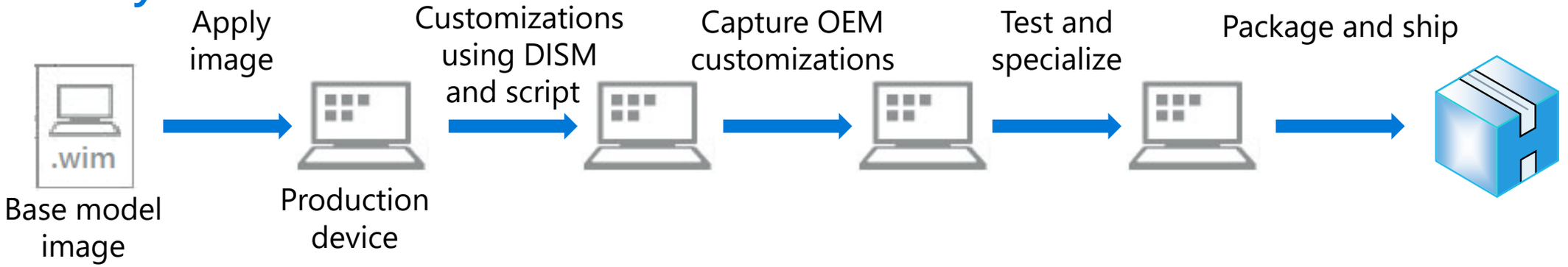
Imaging with provisioning package

OEM customizations will be captured at factory time, so the provisioning package applied offline in lab will not contain OEM customization files captured from a reference device.

Technician Lab



Factory Floor



Using Features on Demand v2

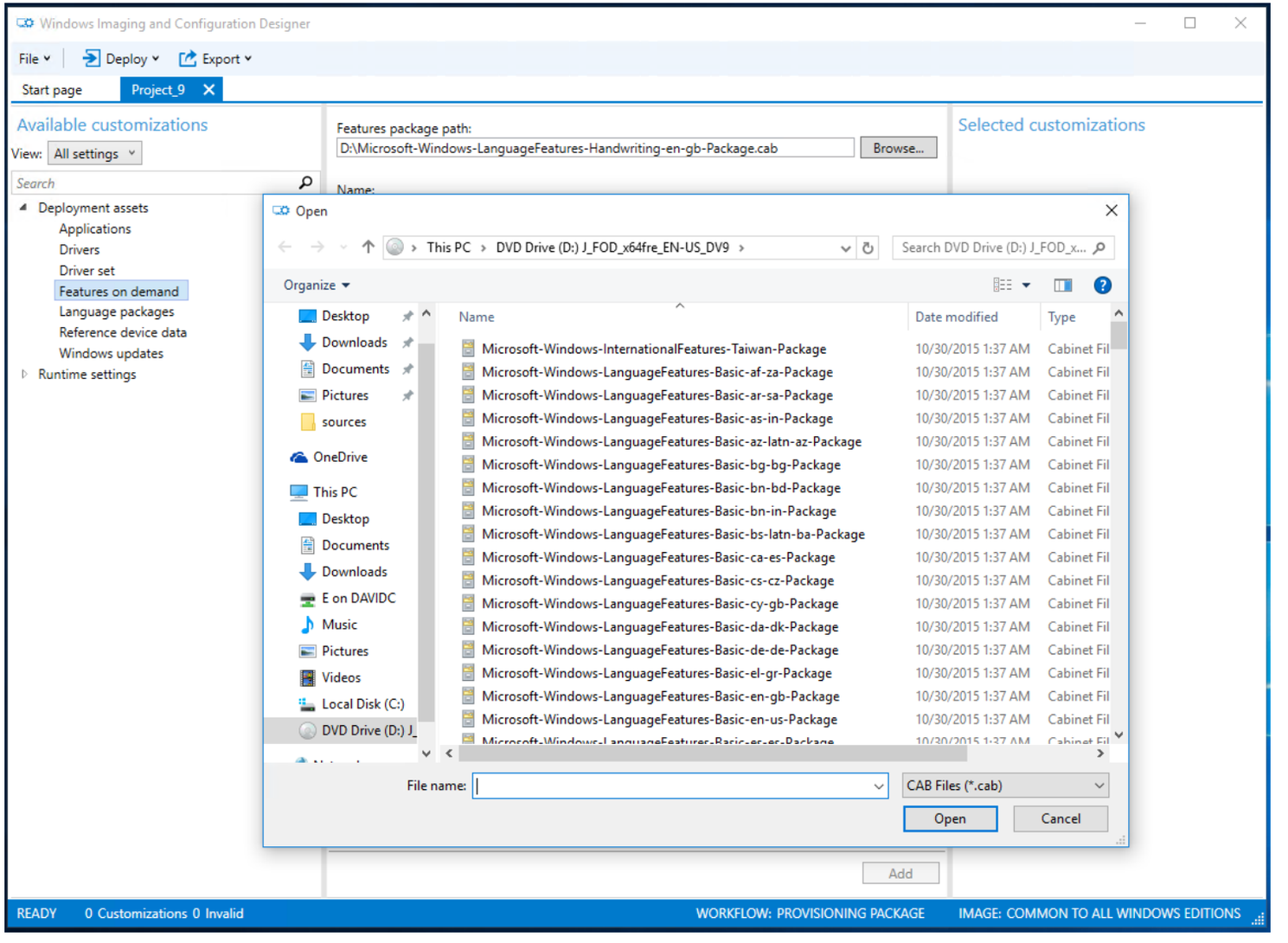
Why Features on Demand v2?

- Challenges with Features on Demand v1
  - Optional features cannot be easily decoupled from a specific version of Windows package
  - Complexity with maintaining the source of feature payload
  - Windows package with feature payloads removed are still being serviced
- Benefits
  - Allow more OS components to become optional features and help with OS footprint reduction
  - Reduce package size and install time
  - No longer needs to service removed optional features

FoD v2 and Windows ICD

You can install FoD .cabs through Windows ICD:

1. Create a provisioning package
2. Apply the .cab files you want from the Windows Features on Demand .iso.



FoD v2 and DISM

- Enhanced DISM CBSProvider
  - Enumerate Capabilities in an image
  - Install Capabilities with a priority-ordered list of source locations – local or remote
  - Remove Capabilities
  - Support for running operating systems, and for servicing an offline image
- DISM.exe and DISM PS CmdLets
  - Get-Capabilities
  - Get-CapabilityInfo
  - Add-Capability
  - Remove-Capability
  - New “Capability Identity” property in the output of /Get-Packages and /Get-PackageInfo

Capability identity

Use DISM **Get-PackageInfo** command to get the capability identity of a FoD v2 optional feature:

Package Identity: Microsoft-Windows-LanguageFeatures-Speech-es-es-Package~31bf3856ad364e35~amd64~~10.0.9926.0

Applicable: Yes

.....

Description : Speech recognition and Cortana for Spanish

.....

Name: Spanish speech recognition

Product Name: Microsoft-Windows-LanguageFeatures-Speech-es-es-Package

Product Version:

Release Type: OnDemand Pack

Restart Required: Possible

Support Information: http://support.microsoft.com/?kbid=777777

State: Not Present

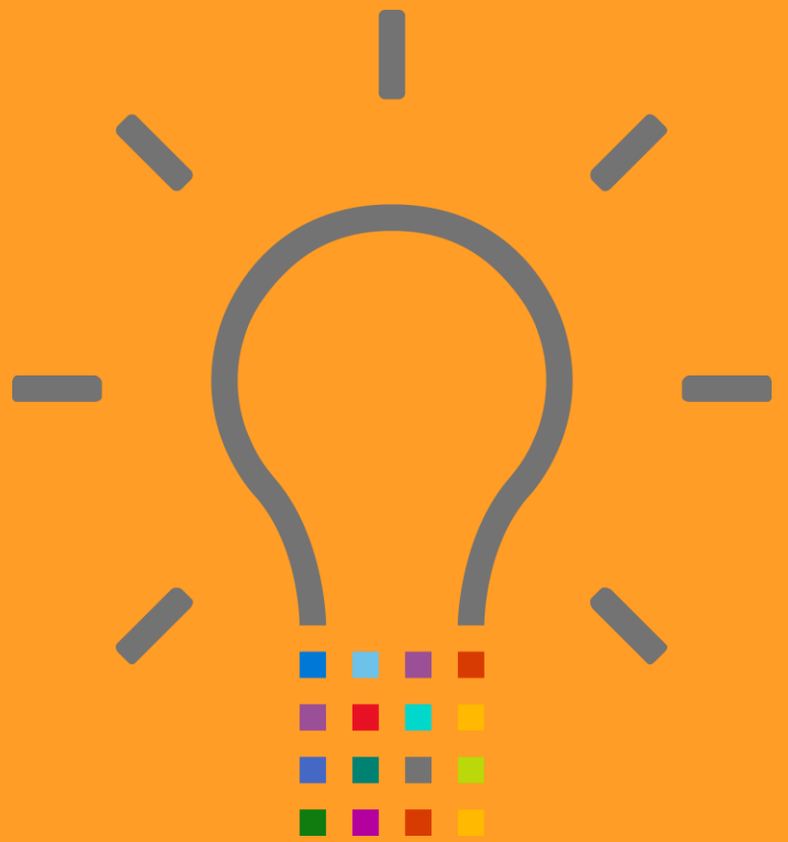
.....

Capability Identity: Language.Speech~~~es-ES~0.0.1.0

Module review

In this module, you learned about:

- Windows 10 IoT Provisioning issues
- Windows 10 IoT Provisioning tools
- Using Windows ICD to provision settings and state
- Features on Demand v2



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