



# winhec

Shenzhen 2015



# Testing Systems and Devices with the Hardware Lab Kit

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The Hardware Lab Kit enables you to evaluate the compatibility of your systems and devices with Windows and assess ship readiness



# Introduction and Agenda

## Session Introduction

The Hardware Lab Kit (**HLK**) provides test coverage to assess compatibility with Windows, and offers automation and scale capabilities.

This session introduces key concepts of the HLK and the HLK testing workflow.

## Session Agenda:

The benefits of using the HLK

Testing with the HLK

Why use the HLK?



# Hardware Lab Kit Objectives

## One Windows Solution

One kit to target any system and any device of Windows 10.



## Self Enablement

Assess for yourself if you're ready to ship.

## Test sooner in the development cycle

Catch bugs earlier in development.

# The HLK Complements your testing

## Scales to meet your testing needs

Test 1-150 devices with a single instance of the HLK

## Shares our knowledge

HLK Tests come directly from the teams who created the feature.

## Tests Windows Hardware Compatibility Program Requirements

Microsoft endorsed measure of compatibility

# HCK vs HLK

<b>Hardware Certification Kit</b>	<b>Hardware Lab Kit</b>
Windows 7, 8, 8.1	Windows 10
Windows Client and Server	All Windows Platforms
Required Certification Program	Optional Compatibility Program
Required for Driver Signing	Optional for Driver Signing
Value at end of development cycle	Value throughout development cycle



# HLK Update

HLK Submission is available now!

From 4.30 and 5.15, some devices have submitted to the Sysdev Portal and the driver be signed successfully.

Please use the latest Playlist for Compatibility Program

HLK filter is the same as HCK filter.

# Driver signing update of Windows 10

All new Windows 10 kernel mode drivers must be submitted to and digitally signed by the Sysdev Portal.

- The driver passes compatibility validation via the Hardware Lab Kit (HLK). If the hardware partner submits successful HLK logs then the driver will be signed by the portal.
- Hardware partners can submit drivers without HLK logs by attesting asserting to compatibility and quality.

Windows 10 will not load new kernel mode drivers which are not signed by the portal.

- The Cross-certifications signed after Windows 10 release will not be loaded by Windows 10

Starting 90 days after the release of Windows 10, the portal will only accept driver submissions that have a valid Extended Validation ("EV") Code Signing Certificate.

# HLK Concepts & Workflow



# HLK Testing Environment

## HLK Test Server

- Test Execution Engine
- Automated scheduling and machine management
- Centralized test management and results collection
- Components: HLK Controller, HLK Studio
- Recommended platform: Windows Server 2012R2

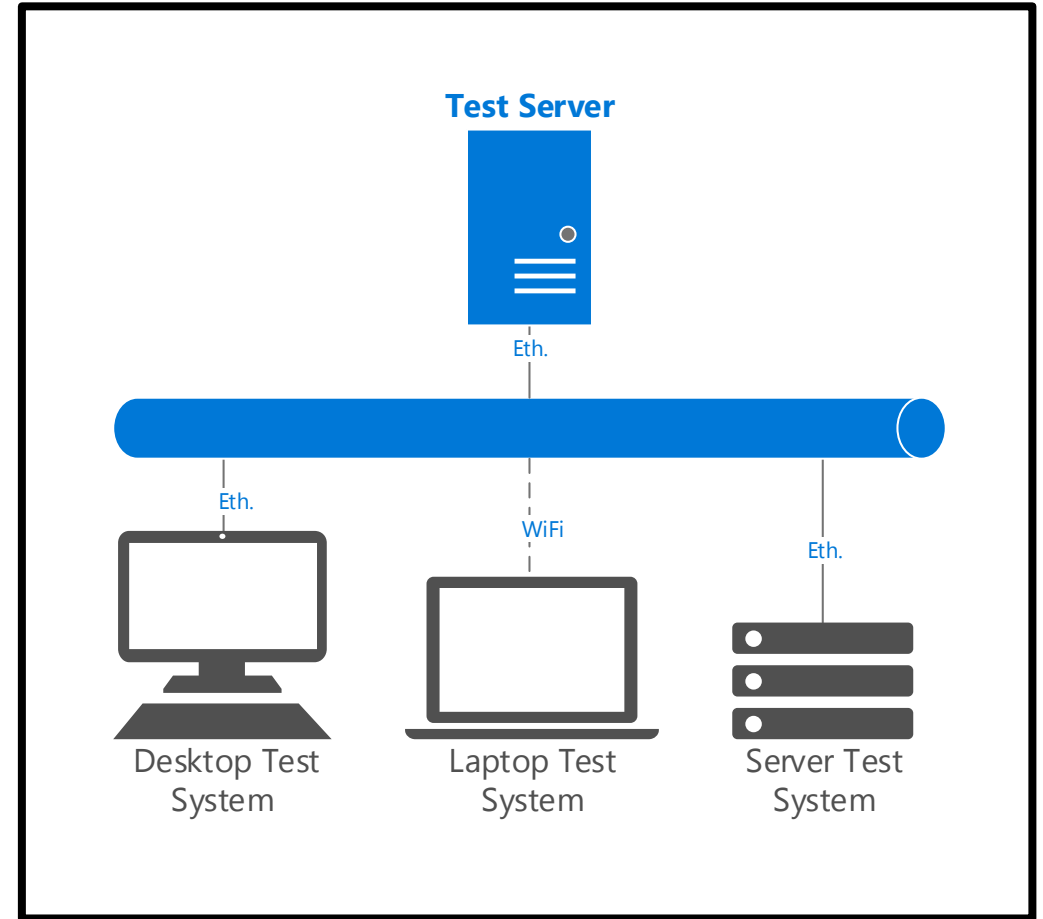
## Test Systems

- Configured to your scenarios
- Replicate real-world environments
- Client OS: Windows 10

# HLK Testing Environment – Desktop/Server

## 1-150 Devices

- Ethernet Connected (Preferred)
- Wireless Connected



# HLK Testing Environment – Mobile



## 1-2 Devices

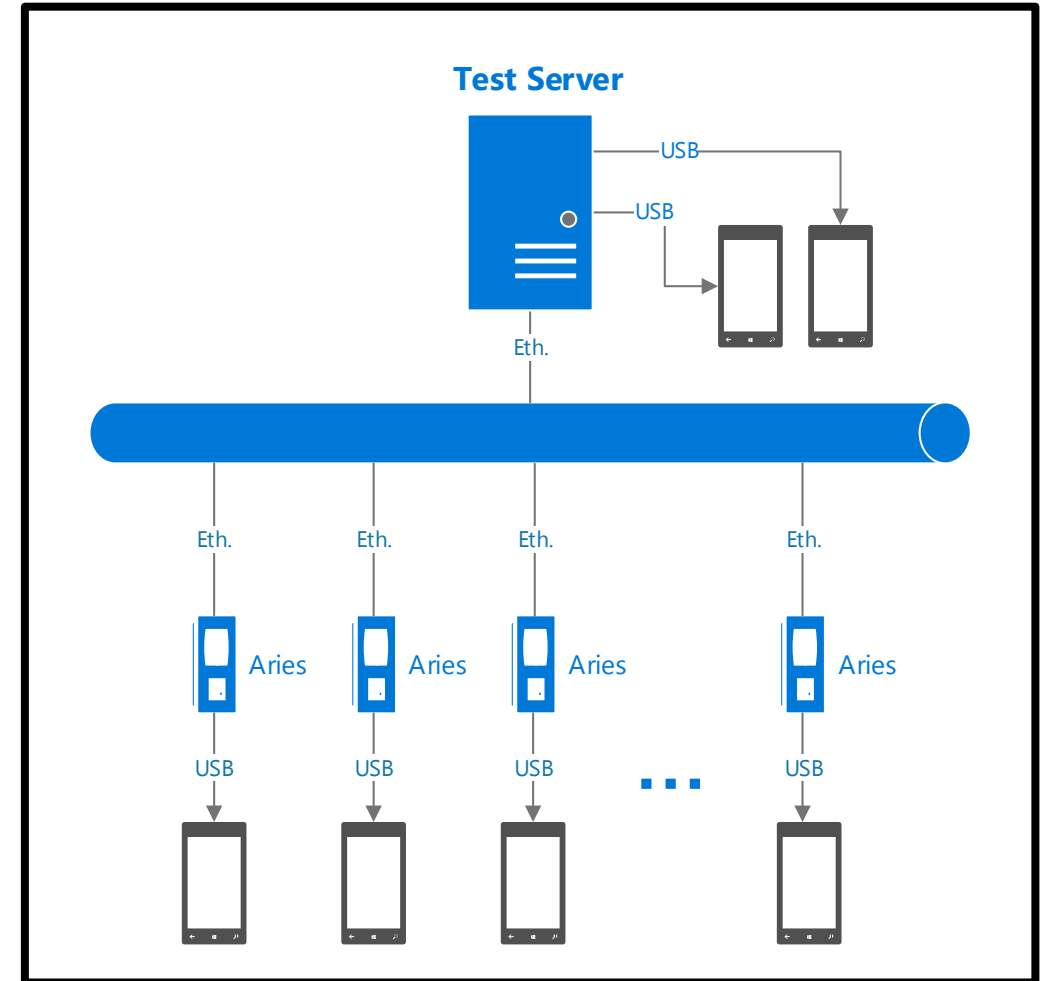
- Aries USB to Ethernet Connection
- Direct USB connection

## 1-24 Devices

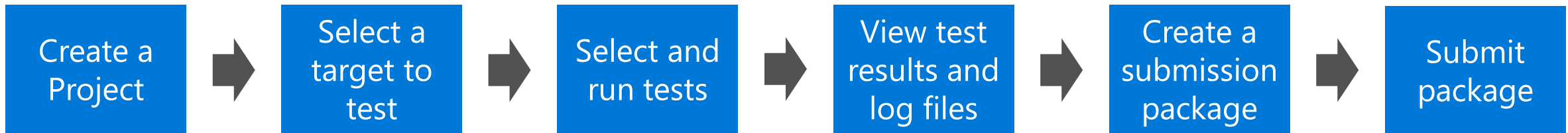
- Aries USB to Ethernet Connection

## 24+ Devices

- Aries USB to Ethernet Connection
- 24 devices per sub-network
- Special configuration recommended

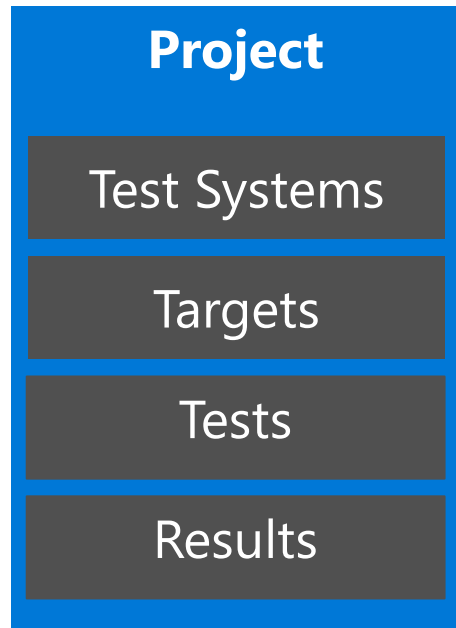


# HLK Testing Workflow



# Creating a Project

A project defines your test plan



Windows Hardware Lab Kit

Help | Configuration | Connect

ModelXYZ

Project	Selection	Tests	Results	Package
Load project	Create project			
Project Name	Date Modified			
ModelXYZ	2/11/2015 4:26:51 PM			

**ModelXYZ**  
Database Project

- ▶ Targets
- ▶ OS Platforms
- ▶ Product Types
- ▶ Test Status
- ▶ Machine Status ✓

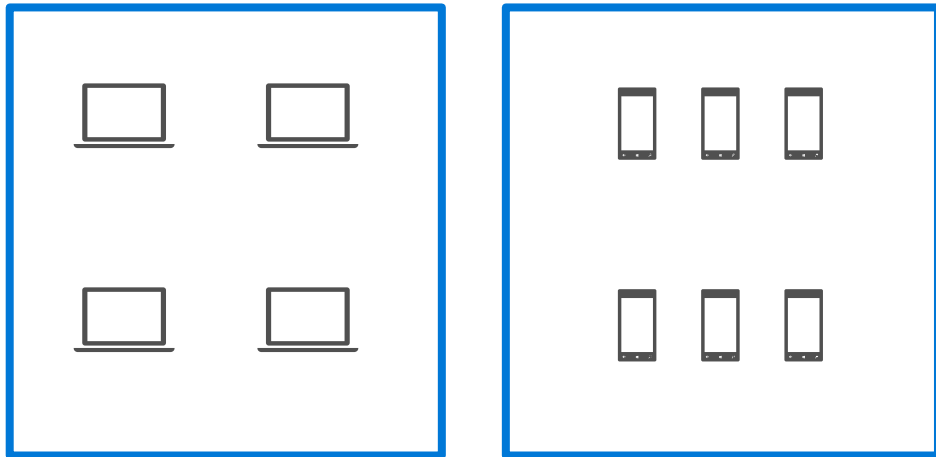


# Machine Management

## Machine Pools make test scheduling easy.

- Logical separation of test systems
- Enable distributed testing
- Dynamic Pool Growth

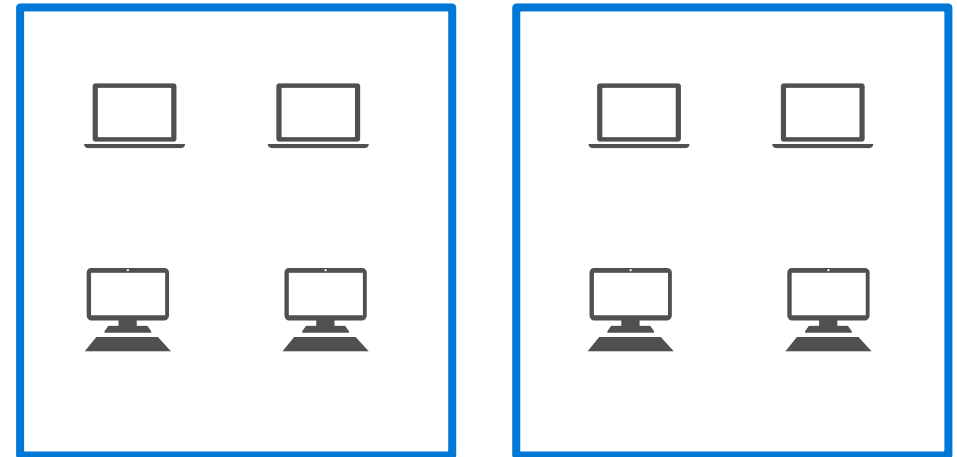
### Example: Platform Separation



Laptop Pool

Phone Pool

### Example: Usage separation



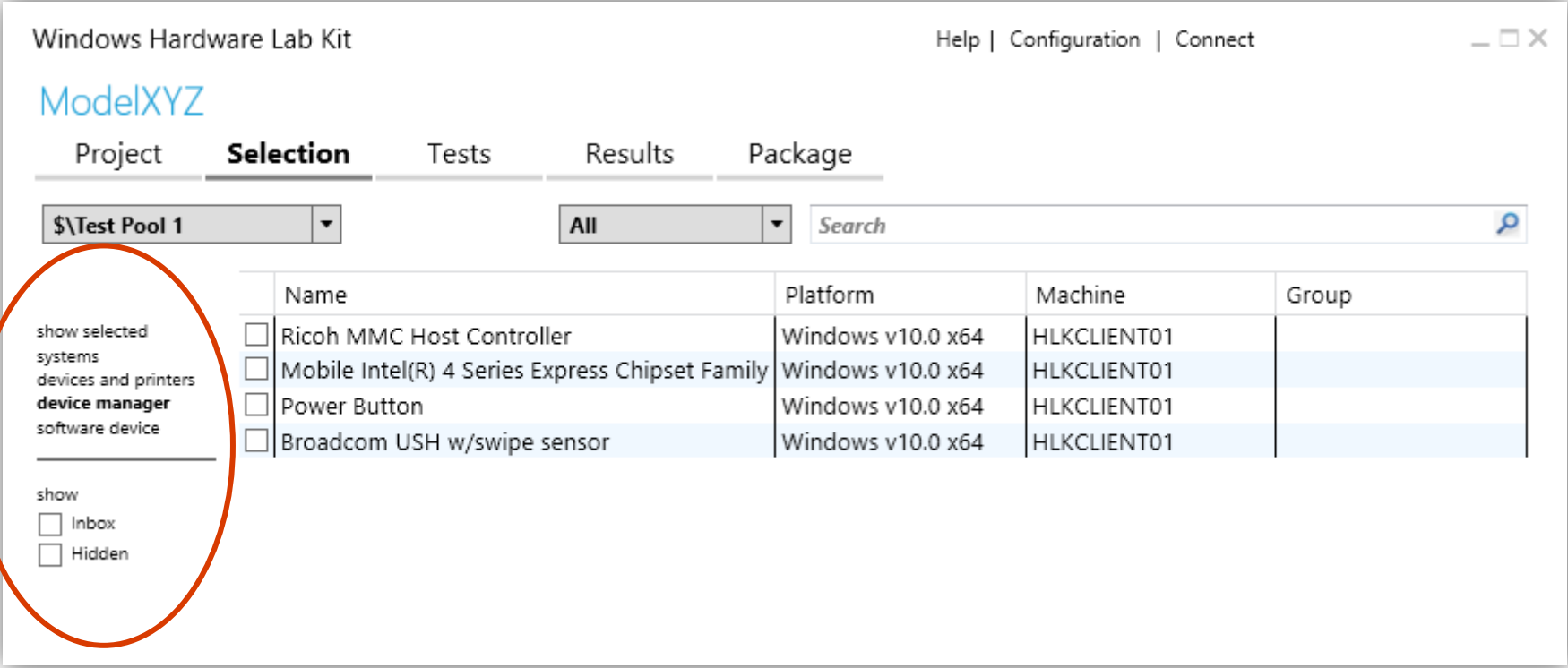
Beta A Pool

Beta B Pool

# Selecting target(s) to test

A target is a specific testable endpoint

- Systems
- Hardware
- Peripherals
- Filter Drivers

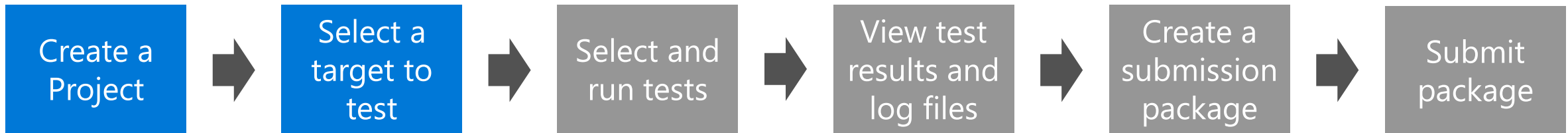


The screenshot shows the Windows Hardware Lab Kit interface. The title bar reads "Windows Hardware Lab Kit" and "ModelXYZ". The navigation tabs are "Project", "Selection", "Tests", "Results", and "Package". The "Selection" tab is active, showing a dropdown menu for "\$\Test Pool 1" and a filter dropdown set to "All". A search bar is present on the right. The main area contains a table with the following data:

	Name	Platform	Machine	Group
<input type="checkbox"/>	Ricoh MMC Host Controller	Windows v10.0 x64	HLKCLIENT01	
<input type="checkbox"/>	Mobile Intel(R) 4 Series Express Chipset Family	Windows v10.0 x64	HLKCLIENT01	
<input type="checkbox"/>	Power Button	Windows v10.0 x64	HLKCLIENT01	
<input type="checkbox"/>	Broadcom USH w/swipe sensor	Windows v10.0 x64	HLKCLIENT01	

On the left side, there is a sidebar with filter options. A red circle highlights the "show selected systems devices and printers" section, which includes a "device manager" link and a "software device" link. Below this, there are "show" options for "Inbox" and "Hidden", both with unchecked checkboxes.

# HLK Testing Workflow



# Test Organization in the HLK

## Device vs System Tests

Device tests provide isolated feature testing

System tests provide integrated testing

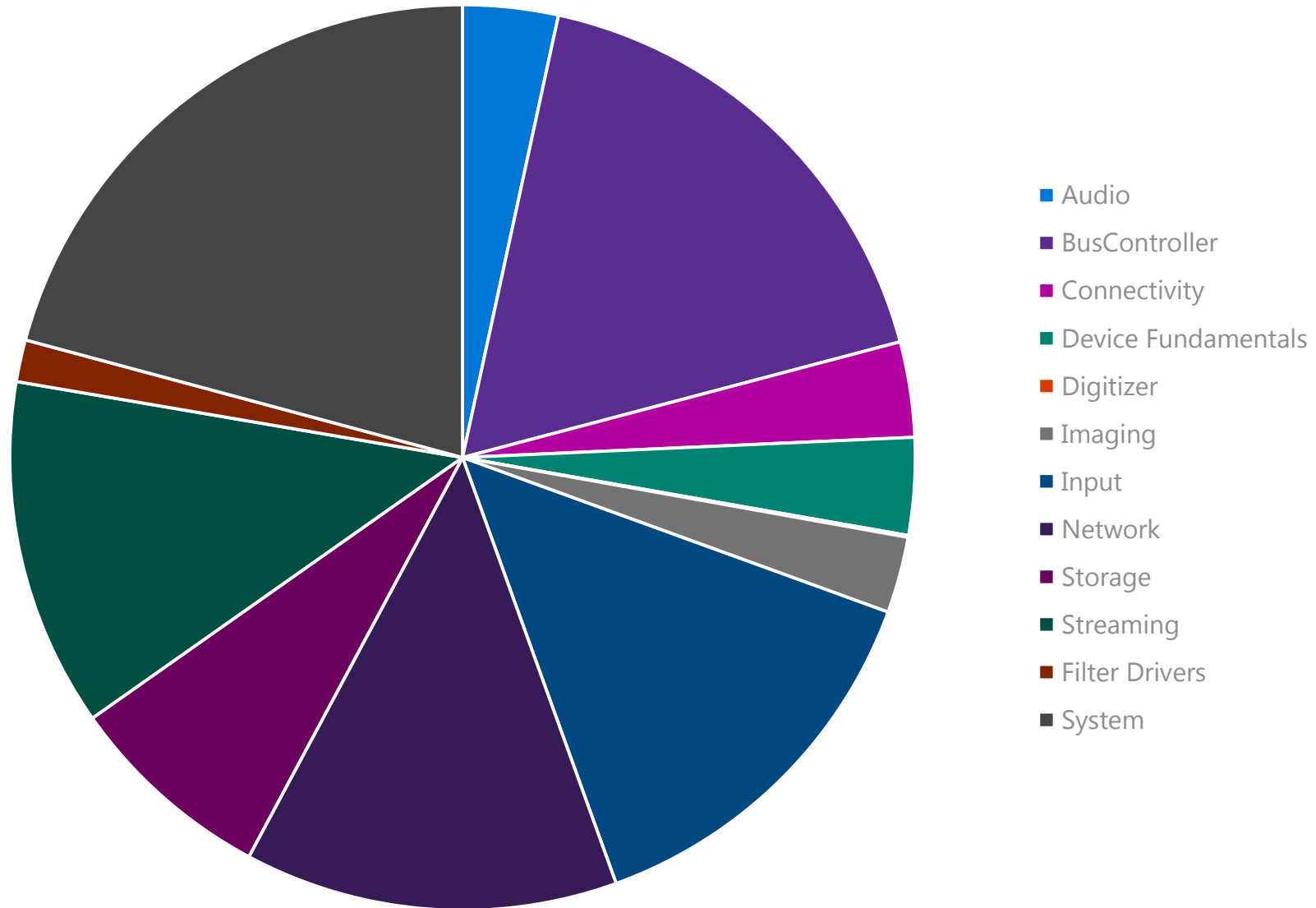
## Fundamentals vs Feature-Specific

Fundamentals tests are common across all Devices or Systems

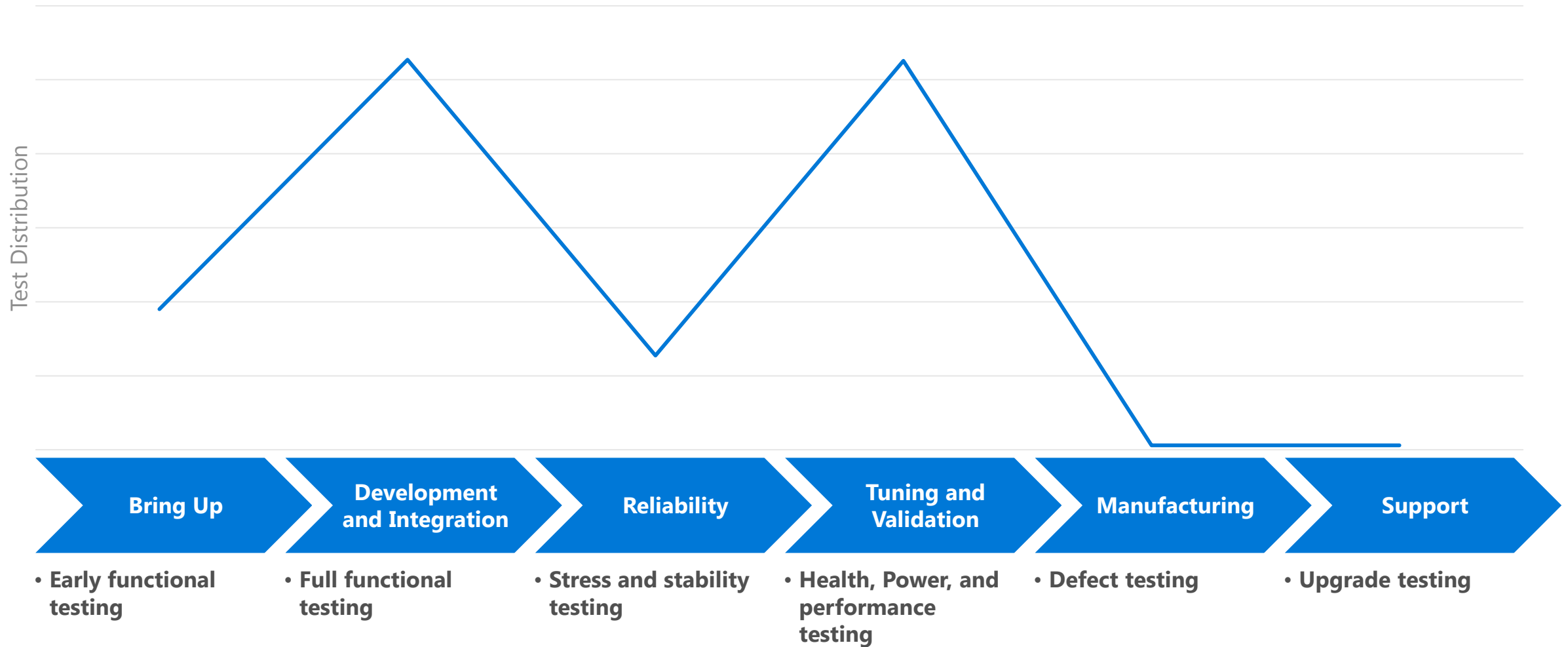
Feature specific tests are specific to a hardware or system capability



# Test Coverage



# Phased Testing Design

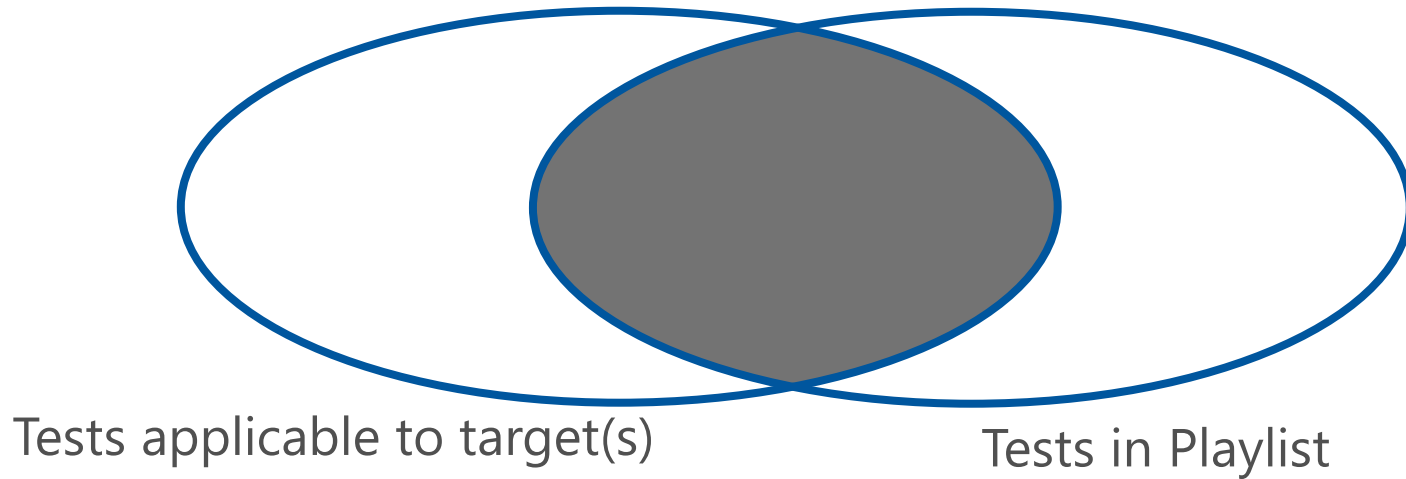


# Create and share sets of tests with Playlists



## Playlists define a set of tests in a portable format

- Load playlists into a project to modify the project test list



## Create custom playlists for your testing scenarios

- Focus on the tests you care about
- Share with others

# Windows Hardware Compatibility Program Playlist

## Official Playlist

- The Windows Hardware Compatibility Program uses an official playlist to determine which devices meet the requirements for compatibility with Windows 10.
- Uniform Playlist for Windows 10 Desktop

## For submission to the SysDev

- All playlists that we have published are acceptable to use for submissions to the Hardware Developer Portal (sysdev).

## Download from Here

<https://sysdev.microsoft.com/en-US/Hardware/compatibilityplaylists/>



# Selecting and running tests

## Special Configuration

6 selected tests require special configuration. Configuration needs are specified in the help documentation for each of the

## Manual

0 selected tests require interaction with the test while the test is running.

## Non-Distributable

0 selected tests are non-distributable.

## Multi-Device

5 selected tests are capable of being scheduled to run once. The test can run on multiple devices at the same time.

## Multiple Machines

0 selected tests require multiple machines in order to execute the test.

## Windows Hardware Lab Kit

Hel

### ModelABC

Project

Selection

**Tests**

Results

Package

Run Selected

















 View Details

Load Playlist

Save Selected As Playlist

View By

Bring...

<input type="checkbox"/>	Status	Test Name	Type	Length	Target	M
<input type="checkbox"/>		DF - Fuzz zero length buffer FSCTL test (Reliability)		15m	Generic USE	HL
<input type="checkbox"/>		DF - PNP Rebalance Request New Resources Device Test (Development and Integration)	  	03m	Generic USE	HL
<input type="checkbox"/>		DF - PNP Remove Device Test (Reliability)	  	08m	Generic USE	HL
<input type="checkbox"/>		DF - Reboot restart with IO before and after (Reliability)	  	04m	Generic USE	HL
<input type="checkbox"/>		DF - Reinstall with IO Before and After (Development and Integration)	  	10m	Generic USE	HL
<input type="checkbox"/>		DF - Sleep and PNP (disable and enable) with IO Before and After (Reliability)	  	45m	Generic USE	HL
<input type="checkbox"/>		Selective Suspend Test (XHCI)		01m	Generic USE	HL
<input type="checkbox"/>		USB (USBDEX) Verifier Test		05m	Generic USE	HL
<input type="checkbox"/>		USB 3.0 Hub Enumeration Bounce		02m	Generic USE	HL
<input type="checkbox"/>		USB 3.0 Insertion Test		01m	Generic USE	HL
<input type="checkbox"/>		USB Serial Number Test		01m	Generic USE	HL

# View test results and log files

- ✓ Test status in real-time
- ✓ Logs available immediately

Windows Hardware Lab Kit Help | Configuration | Connect

ModelXYZ

Project Selection Tests **Results** Package

Apply Filters View By Bring...

Status	Test Name	Target	Machine(s)
	▶ AutoMemoryBenchmark	HLKCLIENT01	HLKCLIENT01
	▶ Check PM Profile	HLKCLIENT01	HLKCLIENT01
	▶ UEFI GOP mode test	HLKCLIENT01	HLKCLIENT01
	▶ USB Generic HID Test	HLKCLIENT01	HLKCLIENT01
	▶ USB Internal Device Idle Test	HLKCLIENT01	HLKCLIENT01
	▶ Verify Post Device Supports Display And	HLKCLIENT01	HLKCLIENT01

**ModelXYZ**  
Database Project

- ▶ Targets  
HLKCLIENT01
- ▶ OS Platforms  
Windows v10.0 x64
- ▶ Product Types
- ▶ Test Status
- ▶ Machine Status   
HLKCLIENT01

# Troubleshooting Test Failures

## 1) Is there a test log?

- **If Yes** – continue to step 2
- **If No** – there was a setup issue or a system crash.
  - Setup issues – read test documentation
  - System Crashes – enable Kernel Crash Dumps

## 2) Install latest updates and filters

- Check for a newer version of the HLK
- Download the latest filters from the HLK Download page on MSDN
- Filters are updated as often as twice a day
- HCK and HLK use the same filter.

## 3) Make sure the test was run correctly

- Verify special configuration if required
- Verify user interaction



# Troubleshooting Test Failures

## 4) Identify failure category

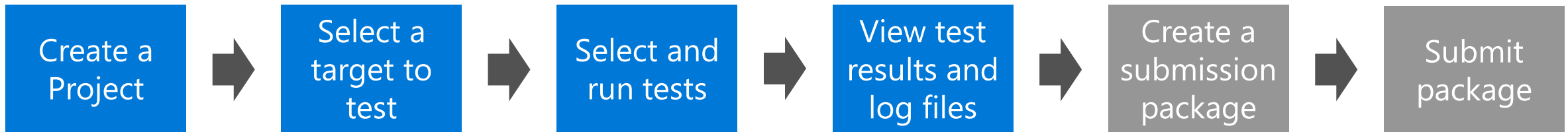
Failure Category	Useful Logs
Test failed because of test results	Test Log
System Crashed	HLK Event Log, Kernel crash dump file
Test Crashed	HLK Event Log, User mode dump file

## 5) Contact Windows HLK Support

- [WHLKHelp@microsoft.com](mailto:WHLKHelp@microsoft.com)



# HLK Testing Workflow



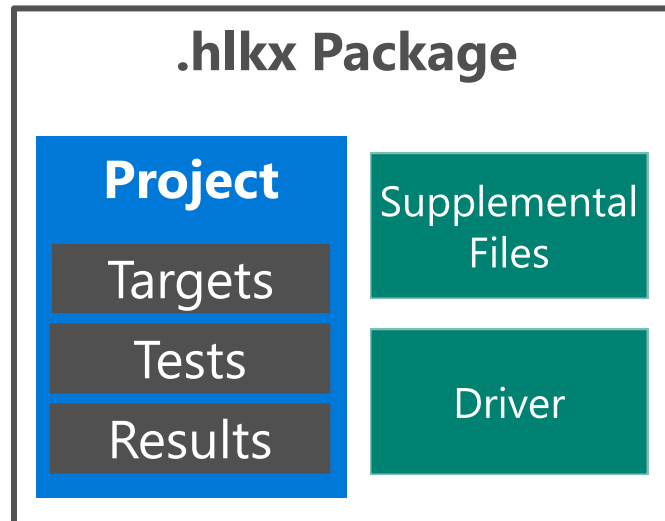
# Create a submission package

## Submit your test results with an HLK package

The only way to qualify for the Windows Hardware Compatibility Program

Includes:

- Project details
- Supplemental files
- Driver being qualified



# Submitting a package

Learn more at WinHEC 2015 Session:

Introduction to Windows Driver Signing, Publishing, Distribution and Servicing

<http://channel9.msdn.com/Events/WinHEC/2015/DDDF202>

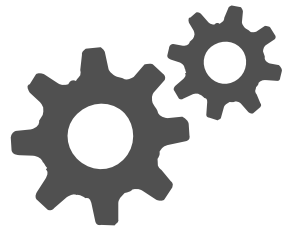
# Additional ways to use the HLK

## HLK .NET APIs

- Automate any parts of the testing process
- All functionality of HLK Studio accessible
- Support for any Microsoft .NET Framework 4.0 (and later) programming language

## HLK Powershell Cmdlets

- Scripting supported steps to automate HLK Testing





# Key Takeaways

- ✓ Increase your test coverage
- ✓ Ensure compatibility with Windows
- ✓ Assess driver ship-readiness
- ✓ Qualify for the Windows Hardware Compatibility Program



# Call to action – Download the HLK

 Windows | Hardware Dev Center ▾



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Dev Center - Hardware > Windows 10 > Downloads

## Download kits and tools for Windows 10



### Get started with Windows 10

[Join the Windows Insider Program](#)

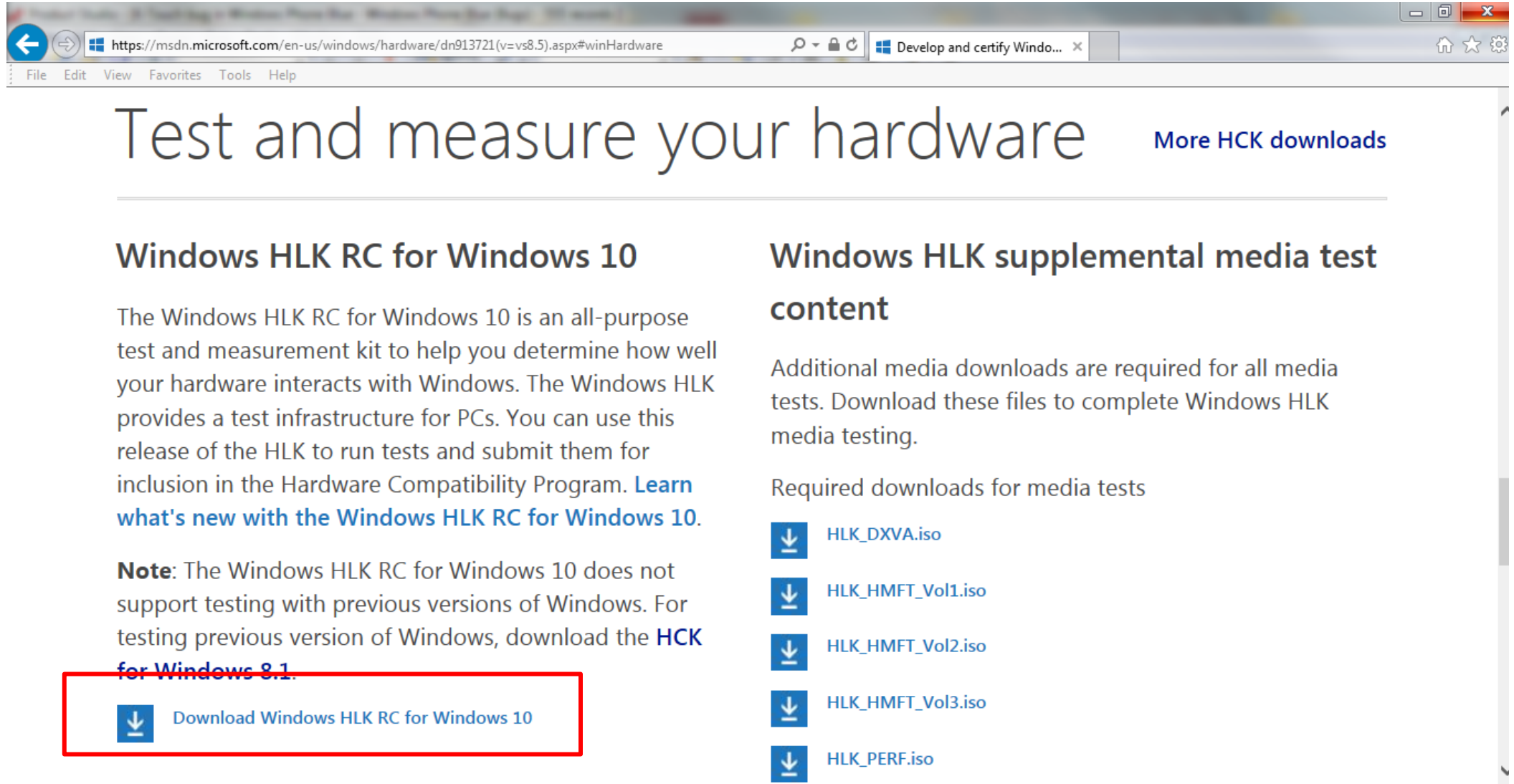
Then, download tools that will help you:

[Build, test, debug, and deploy drivers](#)

[Test and measure your hardware running Windows](#)

[Customize, assess, and deploy Windows on your hardware](#)

# Call to action – Download the HLK



The screenshot shows a web browser window with the URL [https://msdn.microsoft.com/en-us/windows/hardware/dn913721\(v=vs8.5\).aspx#winHardware](https://msdn.microsoft.com/en-us/windows/hardware/dn913721(v=vs8.5).aspx#winHardware). The page title is "Test and measure your hardware" and there is a link for "More HCK downloads".

## Windows HLK RC for Windows 10

The Windows HLK RC for Windows 10 is an all-purpose test and measurement kit to help you determine how well your hardware interacts with Windows. The Windows HLK provides a test infrastructure for PCs. You can use this release of the HLK to run tests and submit them for inclusion in the Hardware Compatibility Program. [Learn what's new with the Windows HLK RC for Windows 10.](#)

**Note:** The Windows HLK RC for Windows 10 does not support testing with previous versions of Windows. For testing previous version of Windows, download the [HCK for Windows 8.1.](#)

[Download Windows HLK RC for Windows 10](#)

## Windows HLK supplemental media test content

Additional media downloads are required for all media tests. Download these files to complete Windows HLK media testing.

Required downloads for media tests

- [HLK\\_DXVA.iso](#)
- [HLK\\_HMFT\\_Vol1.iso](#)
- [HLK\\_HMFT\\_Vol2.iso](#)
- [HLK\\_HMFT\\_Vol3.iso](#)
- [HLK\\_PERF.iso](#)

