CANONICAL

Ubuntu Desktop Certified Hardware Coverage for 14.04 LTS
Version 1.3

Introduction

The Ubuntu Certification team is continuously revisiting the scope of the tests comprising the Ubuntu Certified programme which is reviewed every six months, following the same Ubuntu cadence for point releases on Long Term Support releases. This review of new tests is performed during Ubuntu's development cycle and it never affects already released versions of Ubuntu.

This document lists the coverage for certification of Ubuntu Desktop 14.04 LTS. This coverage will remain as it is for Ubuntu Desktop 14.04 LTS through the life cycle of Ubuntu Desktop 14.04 LTS.

The following test categories are specified:

- Whitelist, or features that are required for certification. If any of the tests in the whitelist fails, the certification will fail.
- Greylist, or features that are tested, but that don't block certification. If any of the tests under the greylist fail, a note will be added to the certificate to warn the potential customer or user.
- Blacklist, or features that are not currently tested. The items in the blacklist category are just reference items: **anything not explicitly called out in the whitelist or greylist categories can be considered part of the blacklist category**. We will consider adding more tests as needed.

Note: only categories of hardware are tested and not specific types of hardware. For example, tests are run to verify USB controllers work, but the type of peripheral(s) used during those tests are not specified.

Full test descriptions can be found in Canonical certification site for partners:

http://certification.canonical.com

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Whitelist

Firmware

Ubuntu 14.04 LTS is installed using the factory default BIOS or UEFI, with the default options (including SecureBoot, if that's the default setting). Firmware needs to be compliant with Canonical Firmware Test Suite (FWTS).

It is recommended that after running Canonical fwts with the list of tests defined in the Appendix A, ideally, no CRITICAL or HIGH failures should be reported, but those are not automatically certification blockers.

Processors

ia32 (x86), x86_64 and ARM processors are tested to ensure proper functionality. We will test specific features as:
- CPU's performance states (frequency up and down in runtime)
- CPU's sleep states (cpu on and off in runtime)
- Running CPU at its maximum frequency

We will also include a general stress test performed for 120 minutes to verify that the system can handle a sustained high load for a period of time. This test uses the tool "stress" available in the Universe repositories.

Memory

Proper detection of the amount of memory installed is required (the amount of memory installed is the memory seen by the OS).

Also, a general stress test is performed for 120 minutes to verify that the system can handle a sustained high load for a period of time. This test uses the tool "stress" available in the Universe repository.

Internal Hard Drives

All internal hard drives are tested to be properly detected. On all of them, an in-house performance test is run. All disks need to report at least a read performance of 15MB/s.

Also, hard drives are load-tested using a default run of bonnie++ against each drive or LUN

found.

Optical Drives

Optical drives are tested for read/write based on specifications of the optical unit. Depending on the unit theoretical feature support, we will test:
- CD read capabilities (data only)
- CD write capabilities
- DVD read capabilities (data only)
- DVD write capabilities
- Bluray-disc read capabilities (data only)
- Bluray-disc write capabilities

Graphics

The ability to run the Unity environment out of the box is required. When certifying, stock Ubuntu open source drivers need to work to complete the installation of Ubuntu, although proprietary drivers are accepted, if they are installable through Ubuntu Drivers.

In the case of pre-installed vendor images, it is accepted to run directly with the proprietary drivers, if they are shipped directly with the image.

Laptops

- The integrated/internal display is tested with its highest resolution. At its highest resolution, the image should look clean, without any type of corruption.
- Each of available external video ports (HDMI, DisplayPort, VGA, DVI, etc.) are tested one by one. Hot plugging and different modes (mirror, extended, just internal, just external) are required to work. If several external ports are available, they are not required (nor tested) to work simultaneously.
- Display brightness. It should be possible to dim the brightness of the internal display.
- The system must support display rotation (0°, 90°, 180°, 270°)
- Hybrid graphics:
    - On systems with an integrated and a discrete GPU users should be able to choose between a performance profile (discrete GPU is used to accelerate rendering) and a power saving profile (discrete GPU is switched off to save battery).
    - On systems with Hybrid graphics, monitor hotplugging needs to work for all external graphics ports when system is in Performance mode. When the system is in Power Saving mode, monitor hotplugging is not required to work on the ports that are physically connected to the discrete GPU.

Desktops with an integrated display (aka All-In-Ones)

● The integrated/internal display is tested with its highest resolution. At its highest resolution, the image should look clean, without any type of corruption.
● The system must support display rotation (0°, 90°, 180°, 270°)
● Each of available external video ports (HDMI, DisplayPort, VGA, DVI, etc.) are tested one by one. Hot plugging and different modes (mirror, extended, just internal, just external) are required to work. If several external ports are available, they are not required (nor tested) to work simultaneously.

Desktops without an integrated display

● Each of available external video ports (HDMI, DisplayPort, VGA, DVI, etc.) are tested one by one, at their highest resolution. Hot plugging and different modes (mirror, extended, just internal, just external) are required to work.
● If several external ports are available, only two of them simultaneously are supported (dual-head).
● If the system contains both an integrated and a discrete GPU, only the discrete GPU is supported
● The system must support display rotation (0°, 90°, 180°, 270°)
● Desktops with multiple discrete GPUs are not supported; we only support one discrete GPU, as above.

Audio

Output sound needs to be undistorted between 0%-100%. Output lines tested:
● Internal speakers
● 3.5mm headphones
● HDMI audio output
● DisplayPort audio output

Input needs to be recorded undistorted between 0%-100%. Input lines tested:
● Internal microphone
● 3.5mm microphone

Plug detection: when a new audio line input or output is plugged in the system, it needs to be recognized.

Networking

● Ethernet. Connections are tested for functionality, but not for performance.

- Wireless:
  - 802.11 b/g/n/ac connection

USB controllers

USB controllers are tested using storage devices in all available USB ports.
- USB 2.0
- USB 3.0 SuperSpeed mode

Mediacard readers

Mediacard readers are tested for read and write for the following type or cards:

- SD
- SDHC

Bluetooth

Bluetooth is tested for device scanning and pairing. Apart from pairing, several profiles are specifically tested and required:

- File transfer (OBEX)
- Audio (A2DP)
- Audio (HSP)

Advanced Configuration and Power Interface

Suspend/Resume (S3)

A 30 cycle suspend/resume stress test is performed using the fwts S3 test. The test is passed if all 30 cycles complete without failure. Any errors reported in the fwts log for the 30 cycle suspend/resume stress test are informational only and do not affect the outcome of the test, however, we do recommend examining and fixing any failures noted, as they indicate firmware non-compliance with standards.

Apart from the stress test, a single cycle suspend/resume is performed and the following features and devices are tested and need to work after suspend:

- CPU
- Memory
- Networking (Wifi, Ethernet)

- Audio
- Bluetooth
- Display resolutions
- USB controllers
- Input devices
- Mediacards

Boot/Reboot
Both cold boot and soft boot are tested and required to work.

Input devices

Integrated input devices

- Internal keyboard (basic functionality)
- Trackpoint

Touch screens

Touch screens are tested for single touch and multitouch. Functionality tested:

- Single touch, including single tap and double tap
- For multitouch touchscreens with more than two finger support, at least 4 finger gestures must be recognized by the OS. Gestures tested include:
    - 2 finger expand/pinch zoom
    - 4 finger tap

Touchpads

Touchpads are tested for single touch and multitouch. Functionality tested:

- Single touch, including single tap and double tap
- Edge scrolling on touchpads (horizontal and vertical)
- 2 finger scrolling (horizontal and vertical)

Webcam

Internal webcams are tested to be able to take a static pictures and also video. If the webcam supports several resolutions, all of them are tested.

Sensors

- Lid close events in laptops need to be recognize by the OS and trigger a system suspend
- Lid open events in laptops need to be recognize by the OS and trigger a system wake up, when suspended.

Function keys

The following function or special keys in a laptop or an All-In-One system need to be supported (only when they exists in the system under test).

- Super key (Windows logo key). The Super key needs to bring up the Dash.
- Volume. Output volume needs to react to up and down volume keys
- Volume mute. Audio output needs to be muted and unmuted when pressing the volume mute key.
- Microphone mute. Audio input needs to be muted and unmuted when pressing the microphone mute key.
- Brightness. Internal display brightness needs to react to brightness keys.
- Monitor. Several display modes need to react to monitor hotkey.
- Media control. Keys that control media play need to be able to control a video played through "Totem" or an audio file played through "Rhythmbox"
- Wireless. Soft and hard wireless keys need to turn on and off wireless in the system
- Suspend. Suspend key needs to send system to suspend
- Hibernate. Hibernate key needs to send system to hibernate
- Battery info. The battery key needs to make the power management dialog appear.
- Lock screen. The screen needs to be locked when pressing the lock screen key.
- Keyboard backlight. Backlight of the internal keyboard needs to be turned on and off when pressing the keyboard backlight key.
- Keyboard overhead lighting. Keyboard overhead lighting needs to be turned on and off when pressing the keyboard overhead lighting key.

External expansion and other ports

The following expansion cards and ports are tested for detection, including hotplugging:

- Express card
- PCMCIA
- Firewire ports
- Esata ports

LEDs

LED indicators are very common in laptops and some types of desktops. When those exist, they will be tested depending on the system specification.

- Power/suspend button LED. Fixed light when the system is powered on; blinking light when the system is suspended.
- Suspend chassis LED. Fixed light when the system is suspended.
- Volume mute LED. Fixed light when output volume is muted.
- Caps lock LED. Fixed light when input is set to all caps.
- Num lock LED. Fixed light when numeric keypad is on.
- Power supply LED. Fix light when the system is plugged in.
- Camera LED. Fix light when the camera is on.

Greylist

Input devices

Touchpads

Touchpads are also tested for advanced multitouch gestures. Gestures in this section for touchpads include:

- 2 finger expand/pinch zoom
- 4 finger tap

Mediacard readers

Mediacard readers are also tested for read and write for the following type or cards:

- MMC (before and after suspend)

Advanced Configuration and Power Interface

Hibernate/Resume (S4)

A general 30 cycle hibernate/resume stress test is performed. This test is performed using the fwts S4 test. No Critical/High failures in the fwts log are allowed.

Hybrid suspend

A single cycle hybrid suspend (combined suspend+hibernate) is performed.

Suspend/Resume (S3) time

On average, resume time needs to be less than 5 seconds, with an overall suspend/resume time of less than 10 seconds.

Sensors

Free-fall sensors (accelerometer) are tested for the following functionality:
- Recognition. The device is recognized and the driver loaded correctly.
- Parking the HDD. The HDD is parked when a sudden fall is recognized.

Networking

- Wireless
  - 802.11ac (min 100Mbps sustained throughput)
- WWAN connections (3G/4G)
  - GSM
  - CDMA

LEDs

- Wireless LED. Fixed light when wireless signal is on (it can blink when transmitting data).
- Bluetooth LED. Fixed light when bluetooth signal is on.
- Microphone mute LED. Fixed light when input volume is muted.

Blacklist

- Dial-up modems
- Fingerprint readers

Q & A

- **Does changing the speed of processors require a new certificate?**
  No. Only changing the CPU family would require retesting and issuing a new certificate.

Appendix A. FWTS tests

As part of the certification process, we run a series of firmware tests that are part of the Canonical Firmware Test Suite. In general, any HIGH or CRITICAL error found in the fwts log can cause potential errors in the system and should be looked at by OEMs/ODMs.

Category	Test Item	Description
Information	acpidump	Check ACPI table acpidump.
Information	version	Gather kernel system information.
ACPI	acpitables	ACPI table settings sanity checks.
ACPI	apicinstance	Check for single instance of APIC/MADT table.
ACPI	hpet_check	High Precision Event Timer configuration test.
ACPI	mcfg	MCFG PCI Express* memory mapped config space.
ACPI	method	ACPI DSDT Method Semantic Tests.
CPU	mpcheck	Check Multi Processor tables.
CPU	msr	CPU MSR consistency check.
CPU	mtrr	MTRR validation.
System	apicedge	APIC Edge/Level Check.
System	klog	Scan kernel log for errors and warnings.