Testing OTT Platforms using StormTest

How to verify applications on Xbox, PlayStation and Roku devices

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1 Introduction

StormTest® is a world class family of products designed to reduce the cost of getting high quality digital TV receiver technologies to market faster. It is primarily used to verify the functional and non-functional behaviour of the software on TV delivery devices, also known as set-top boxes (STBs).

However, as over-the-top TV (OTT) becomes more prevalent, end users are consuming their TV and movies via non-standard devices, which have not been designed primarily as an STB and are not supplied or controlled by the TV operator.

StormTest can also be applied to testing the TV and movie delivery software on such devices and this application note is intended to demonstrate how that is possible and what devices are suitable for such testing.

1.1 StormTest

StormTest automated tests function by driving the device under test (DUT) through a series of test steps using a trained set of infrared (IR) commands. The analogue audio and video output from the DUT is then captured by StormTest and the test can analyse this audio and video output in order to determine if each test step has passed.

For each of the devices considered in this application note, the standard methods of analysing audio and video are still valid and should be used in the same way they are currently used to test STBs.

2 Supported OTT devices

This application note deals with the testing of apps on the following devices:

1. Xbox 360 games console
2. PlayStation®3 games console
3. Roku streaming player (including Roku LT, Roku HD and Roku 2 XD)

Each of these devices can be tested using StormTest.

2.1 Xbox 360

2.1.1 Video capture

The Xbox 360 outputs composite video and HDMI. By connecting the composite video output to StormTest, or the HDMI output via a HDMI converter the applications that are run on the Xbox can be analysed by StormTest.

Noye: the HDMI output of the XBOX is required where PAL 60 is enabled on the XBOX

Figure 1: Xbox AV cable

Depending on the version of StormTest hardware that you have, it may be necessary to purchase some RCA to RCA connectors, such as this one, in order to connect the Xbox AV cable to StormTest:

Figure 2: RCA connector

2.1.2 Control

The Xbox 360 includes an infrared receiver built into it. This allows StormTest to control it using the IR codes from an Xbox 360 Media remote. S3 Group has already trained this remote control and can supply the IR codes for it and the remote control skin on demand to anyone that wishes to use it.

The only limitation when controlling the Xbox using this method is that there is no way to emulate the analogue stick on a standard Xbox controller. Often an application under test can be controlled using this stick, but can also be controlled with alternate buttons that are available on the media remote (such as the 4-way d-pad).

Figure 3: Xbox media remote

2.2 PlayStation 3

2.2.1 Video capture

The PlayStation 3 outputs composite video. By connecting this composite video output to StormTest, the applications that are run on the PlayStation can be analysed by StormTest.

Figure 4: PlayStation AV Cable

Similarly to the Xbox, it may be necessary to use RCA-to-RCA connectors in order to connect the AV cable to StormTest.

Note also that the PlayStation will disable its composite output if a device is connected to the HDMI output. If this occurs, the composite output can be re-enabled by following these steps:

1. Put the PlayStation into standby
2. Disconnect the HDMI cable if it is connected
3. Press the power button to bring it out of standby, but hold the button for about 5 seconds until you hear a second beep.

2.2.2 Control

The PlayStation 3 does **not** have an IR receiver. There are still options that allow a StormTest script to control the games console though. The two available options are:

2.2.2.1 USB IR dongle

This plugs into a USB port and allows the PlayStation to be controlled via IR. The limitation of this approach is that the 'PS' button is not supported and it is not possible to bring the PlayStation out of standby using a remote button press.

2.2.2.2 Wireless adapter

This device has a built-in IR receiver and communicates with the PlayStation via Bluetooth (as a PS3 accessory) link. This device supports all buttons and can also bring the PS3 out of standby. This is the recommended method for controlling a PlayStation 3 using StormTest. The device can be purchased online via this link for $99:

http://www.schmartz.com/PS3IR1000-Wireless-Infrared-Adapter-for-PlayStation/M/B003FIDAC4.htm

Figure 5: Wireless IR adapter for PS3

Once the device is paired with the PlayStation 3, the StormTest IR blaster should be positioned in front of the adapter and the PlayStation can be controlled. S3 has already trained the remote control codes and these are available on request. Note: This device can be directly wired into the StormTest IRNetbox for eliminating the need for IR

2.3 Roku Streamer

The Roku is a video streaming device whose sole function is the consumption of OTT services such as Netflix, Amazon Instant Video and HBO Go.

2.3.1 Video capture

All Roku streamer devices (except for the Roku 3) output composite video. The Roku LT and Roku HD have standard RCA jacks on the rear which can be connected to StormTest. The Roku 2 has a 3.5mm jack, so an appropriate 3.5mm jack to RCA cable is required.

Figure 6: Roku AV cable

If this AV cable is used, an RCA-RCA connector will be necessary.

The Roku 3 only has an HDMI output. To capture the video and audio from this device, the StormTest slot will need to have an HDMI convertor installed.

2.3.2 Control

There are two ways to control the Roku device, using IR and using ethernet.

2.3.2.1 IR Control

This is the recommended method and will work best with StormTest. S3 have already trained the remote control for the Roku and can supply the IR codes and the remote control skin on demand.

2.3.2.2 Ethernet Control

It is also possible to control the Roku via the ethernet port using the published Roku External Control Protocol. This protocol is described in the Roku SDK here:

http://sdkdocs.roku.com/display/RokuSDKv43/External+Control+Guide

To use this protocol from python, the python requests library can be used to send REST API calls to the Roku box. The requests library can be installed using pip. See here: http://docs.python-requests.org for more information.

Sending a key press from python is then as simple as

```
import requests
requests.post("http://192.168.1.12:8060/keypress/Up")
```

where the URL includes the IP address of the Roku.

An example Roku control script is shown in appendix A.

2.3.3 Ethernet

Note that some Roku devices do NOT have an ethernet port. If testing one of these devices, it is necessary to use a wireless access point. If you wish to use the Roku external control protocol described above, there must be a valid IP route between the StormTest script and the Roku device.

Appendix A

```
# Sample code to control a Roku using the Roku External Control Protocol
# More information on this protocol can be found here:
#  http://sdkdocs.roku.com/display/RokuSDKv43/External+Control+Guide

# This script assumes that the IP address for the ROKU has been stored in the
StormTest Database.
# To do this, open the admin console: http://10.2.6.17/stormadmin/
# Then for the Roku instance, click on 'configure'
# Finally, enter the IP address into the 'Serial Number' field and the 'IP
address' field

import requests
import stormtest.ClientAPI as ST

# IP address of the stormtest server
server = '10.2.6.17'

try:
    # Connect to the StormTest server
    ST.SetMasterConfigurationServer(server)
    ST.ConnectToServer(server)

    # Reserve the Roku
    ST.ReserveSlot(4,'default') # The Roku is currently in slot 4
    ST.ShowVideo()

    # Get the IP address of the Roku
    instanceData = ST.GetDutInstanceInSlot()
    ipaddress = instanceData[0][4]

    # Construct the URL to access the ECP protocol
    url = 'http://'+ipaddress+':8060/keypress/'

    #Send key presses to the Roku
    # Note that the following key presses are valid:
    # Home
    # Rev
    # Fwd
    # Play
    # Select
    # Left
    # Right
    # Down
    # Up
    # Back
    # InstantReplay
    # Info
    # Backspace
    # Search
    # Enter

    # Home key
    requests.post(url+'Home')
    ST.WaitSec(2)
```

```
    # Go Right 5 times
    for i in range(5):
        requests.post(url+'Right')
        ST.WaitSec(1)

except ST.StormTestExceptions:
    print "Exception raised:",sys.exc_info()[1]

finally:
    # End of test - release slot back to the server
    ST.ReleaseServerConnection()
```