



# TECHNICAL NOTES

Provisioning and Recovery DHCP Option 43

# INTRODUCTION

A BrightSign player can download an autorun script from a URL value stored in its registry. This feature allows a player to recover from run-time or load errors associated with the autorun script; it can also be used to provision a player that has been deployed in the field, providing it with a presentation script. As of firmware version 4.8.66, it is possible to set the recovery/provisioning URL of a BrightSign player using DHCP Option 43. This tech note outlines how to configure a DHCP server to communicate this URL to a player.

## Default Recovery/Bootstrapping Operation

BrightSign players utilize a provisioning/recovery URL if they detect one of the following situations:

- The player is in a crash/reboot cycle caused by the current autorun script.
- The local storage does not currently contain an autorun script.

The player will then direct an HTTP GET request at the URL stored in the player registry. The URL is set to a BrightSign Network address as a factory default.

If the HTTP GET request is successful, the player will reboot and attempt to utilize whatever content was downloaded as an autorun script. Note that the player does not make any checks to determine if the content is actually a *.brs* autorun file before attempting to run it.

## Request/Response String Formats

When a BrightSign player requests information from a DHCP server, the query will include an Option 60 string containing the vendor identity of the player: `[BS_OEM_ID] + " " + [BS_OEM_MODEL]` (e.g. "BrightSign XD1230"). This string can be used to match the correct

Option 43 response for the vendor and model number of the device. Alternatively, the correct response can be determined using other information available to a DHCP server, including subscriber ID where port-based IP allocation is used.

The Option 43 response should consist of TLV (type-length-value) encoded data, and the provisioning/recovery URL should be defined using Tag 85 (0x55). The tag and length are 1 byte each.

## Option 43 Configuration

When the player receives the Option 43 response, it will replace the default URL in the registry with the value in the response string. The value supplied by the DHCP server is not saved in persistent storage; the registry override remains in effect only as long as the DHCP lease remains active. If necessary, the recovery/provisioning script can permanently change the registry value using BrightScript functions.

The player can store a different URL for each network interface. When multiple DHCP responses are received from different network interfaces, the player will choose to recover or bootstrap using the first non-empty URL value in the following interface order:

1. Ethernet
2. WiFi
3. 3G

## Verifying Correct Configuration

To verify that the player is responding correctly to the DHCP server, access the BrightSign shell via the serial port (see the **Enabling BrightScript Debug Mode** technical note for more details). At the BrightSign prompt, type "ifconfig": If the Option 43 action has been successful, the new provisioning/recovery URL will be returned; if the action was unsuccessful, the default BrightSign Network URL will be returned.

To verify that the player actually sends provision/recovery requests to the URL, you can either look at the logs from the web server delivering the recovery script or replace the server with a [Netcat](#) and observe the HTTP GET request from the player (since the Netcat does not respond to the request, the player will pause and wait before sending another request).

## Encoder Example

The following simple webpage script can be used to convert a URL into the proper hexadecimal format for use with Option 43 responses:

```
<html>
<head>
<title>BrightSign Option 43 Recovery URL encoding</title>
<script>
```

```

function convertUrl()
{
    url = document.getElementById("url").value;
    out = document.getElementById("out");

    // First construct the required TLV as a byte array
    data = [];
    data.push(0x55);          // Tag
    data.push(url.length);
// Length
// Value
    for(var i = 0; i < url.length; i++)
    {
        data.push(url.charCodeAt(i));
// ASCII only, please.
    }

    // Now convert to a hex string.
    // (Other formats could also be produced)
    hex = ""
    for(var i = 0; i < data.length; i++)
    {
        b = (data[i] + 256).toString(16).substr(-2).toUpperCase();
        hex = hex.concat(b)
    }

    out.value = "option 43 hex " + hex;

    return false; // Prevent submit/reload
}
</script>
</head>
<body>
<h1>BrightSign Option 43 Recovery URL encoding</h1>
<p>Enter the required Recovery URL below:
<form onsubmit="return convertUrl()">
<input type="text" size="100" id="url">
<input type="submit" value="Convert">
</form>
<textarea id="out" rows=4 cols=120 readOnly="true"></textarea>
</body>
</html>

```