RDK Diagnostics

Description

This provides HTML diagnostic clients which can be used for Hybrid Gateway devices as well as IP clients. It also supports retrieving diagnostic values over a TR-069 interface for devices where snmp support is not present (IP client devices). Also additional diagnostic screens to monitor MOCA devices are available.
HTML based diagnostic screens will send a JSON request to the Lighttpd server. This request is converted to a corresponding SNMP trigger or a TR-69 request to retrieve the data and send it back as a JSON response to the HTML client.

Capabilities

- Handle HTTP gets from Diagnostics Application.
- Retrieve data from SNMP and/or TR-069 Clients.

Feature Summary

- Application access to SNMP MIB objects
- Application access to TR-069 parameters
- Application access to RDK state variables

Diagnostic Parameters (example)

Parameter	SNMP MIB	TR-069 Object
MoCA Enable/Disable Status	mocaIfEnable	Device.MoCA.Interface.{i}.Enable
Firmware Version	ocStbHostSoftwareFirmwareVersion	SoftwareVersion
LAN IP Address		Device.IP.Interface.{i}.IPv4Address.{i}.IPAddress

State Variables

RDK will signal state variable transitions to application, and application will present the corresponding error messages to the user if necessary.

Diagnostics using SNMP

A glance on SNMP

- Simple Network Management Protocol (SNMP) is an Internet-standard protocol for collecting and organizing information about managed devices on IP networks and for modifying that information to change device behaviour.
- SNMP is the opensource component which is integrated with RDK.

- “snmpd” is the snmp agent which is running in the box.
- All MIBS are available in /usr/share/snmp/mibs/

SNMP MIB

- SNMP agents maintains a database describing the managed device parameters.
- Manager uses this database to request the agent to retrieve specific information and further translates the information as needed for the network mangement system .
- Agent and Manager shares MIB
- MIBs comprises of managed object identified by the name Object Identifier (OID).
- SNMP mibs starts with 1.3.6.1.2.1

SNMP Diagnostics

- SNMP queries are used to fetch the details from the box which will be displayed in the “Diagnostics” page
- SNMP is used only in “hybrid” box types and not in client boxes.
- Client boxes use TR069 protocol for fetching diagnostic details.

Steps to display Diagnostics page in PC Browser

- Step 1:

  Copy lighttpd config file from /etc to /opt

  ```
  cp /etc/lighttpd.conf /opt/
  ```

- Step 2 :

  Modify config file to show the page in browser.

  ```
  vi /opt/lighttpd.conf
  ```

  Comment below line

  ```
  server.bind              = "127.0.0.1"
  ```

- Step 3:

  Execute below command

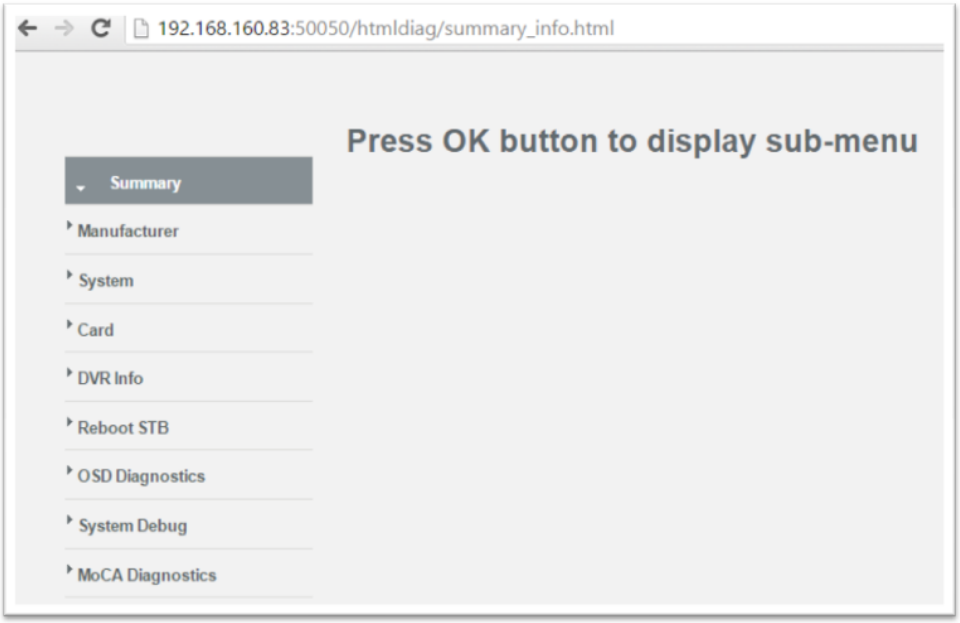
  ```
  ps -ef| grep "/usr/sbin/lighttpd" | grep -v "grep" | awk '{print $2}' | xargs kill -9 >& /dev/null;/usr/sbin/lighttpd -D -f /opt/lighttpd.conf &
  ```

- Step 4:

  Use below url in the browser to see diagnostics page

  http://<hybrid box lan ip address>:50050/htmldiag/summary_info.html

  eg: http://192.168.160.83:50050/htmldiag/summary_info.html



Note: Use TAB, SHIFT+TAB and ENTER keys to browse through this page

SNMP queries through command line

- SNMP queries can be executed command line to fetch the details
- Execute below commands in the box console to see the output of the query

Example 1: Querying card binding status

snmpwalk -OQ -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostCardBindingStatus.0

Expected Output :

```
root@pacexg1v3:~# snmpwalk -OQ -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostCardBindingStatus
OC-STB-HOST-MIB::ocStbHostCardBindingStatus.0 = otherAuthFailure
root@pacexg1v3:~#
```

It shows that card is not authenticated for paid channels

Example 2: To check signal strength

snmpwalk -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostInBandTunerTable

```
root@pacexg1v3:~# snmpwalk -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostInBandTunerTable
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.1 = INTEGER: qam256(4)
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.2 = INTEGER: other(1)
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.3 = INTEGER: other(1)
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.4 = INTEGER: other(1)
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.5 = INTEGER: other(1)
OC-STB-HOST-MIB::ocStbHostInBandTunerModulationMode.6 = INTEGER: other(1)
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.1 = Gauge32: 571750000 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.2 = Gauge32: 0 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.3 = Gauge32: 0 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.4 = Gauge32: 0 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.5 = Gauge32: 0 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerFrequency.6 = Gauge32: 0 hertz
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.1 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.2 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.3 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.4 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.5 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerInterleaver.6 = INTEGER: 128
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.1 = INTEGER: .0 dBmV
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.2 = INTEGER: .0 dBmV
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.3 = INTEGER: .0 dBmV
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.4 = INTEGER: .0 dBmV
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.5 = INTEGER: .0 dBmV
OC-STB-HOST-MIB::ocStbHostInBandTunerPower.6 = INTEGER: .0 dBmV
```

Example 3: For HDMI status returned by TV

snmpwalk -OQ -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostDVIHDMITable

```
root@pacexg1v3:~# snmpwalk -OQ -v 2c -c public 127.0.0.1 OC-STB-HOST-MIB::ocStbHostDVIHDMITable
OC-STB-HOST-MIB::ocStbHostDVIHDMIOutputType.8 = hdmi
OC-STB-HOST-MIB::ocStbHostDVIHDMIConnectionStatus.8 = true
OC-STB-HOST-MIB::ocStbHostDVIHDMIRepeaterStatus.8 = false
OC-STB-HOST-MIB::ocStbHostDVIHDMIVideoXmissionStatus.8 = false
OC-STB-HOST-MIB::ocStbHostDVIHDMIHDCPStatus.8 = true
OC-STB-HOST-MIB::ocStbHostDVIHDMIVideoMuteStatus.8 = true
OC-STB-HOST-MIB::ocStbHostDVIHDMIOutputFormat.8 = format720p
OC-STB-HOST-MIB::ocStbHostDVIHDMIAspectRatio.8 = sixteenByNine
OC-STB-HOST-MIB::ocStbHostDVIHDMIHostDeviceHDCPStatus.8 = compliantHDCPdevice
OC-STB-HOST-MIB::ocStbHostDVIHDMIAudioFormat.8 = lpcm
OC-STB-HOST-MIB::ocStbHostDVIHDMIAudioSampleRate.8 = samplerate48kHz
OC-STB-HOST-MIB::ocStbHostDVIHDMIAudioChannelCount.8 = 2 channels
OC-STB-HOST-MIB::ocStbHostDVIHDMIAudioMuteStatus.8 = false
OC-STB-HOST-MIB::ocStbHostDVIHDMIAudioSampleSize.8 = sample16Bit
OC-STB-HOST-MIB::ocStbHostDVIHDMIColorSpace.8 = ycc444
OC-STB-HOST-MIB::ocStbHostDVIHDMIFrameRate.8 = frameRateCode6
OC-STB-HOST-MIB::ocStbHostDVIHDMIAttachedDeviceType.8 = tv
OC-STB-HOST-MIB::ocStbHostDVIHDMIEdid.8 = "00 FF FF FF FF FF FF 00 1E 6D F6 9C 01 01 01 01
1B 12 01 03 80 46 27 78 0A D9 B0 A3 57 49 9C 25
11 49 4B 21 08 00 45 40 01 01 61 40 01 01 01 01
01 01 01 01 01 01 01 1D 00 72 51 D0 1E 20 6E 28
```

Diagnostics using TR069

- TR069 queries are used to fetch the details from the box which will be displayed in the “Diagnostics” page
- TR069 is used only in “client” box types and not in hybrid boxes.
- Hybrid boxes use SNMP protocol for fetching diagnostic details.

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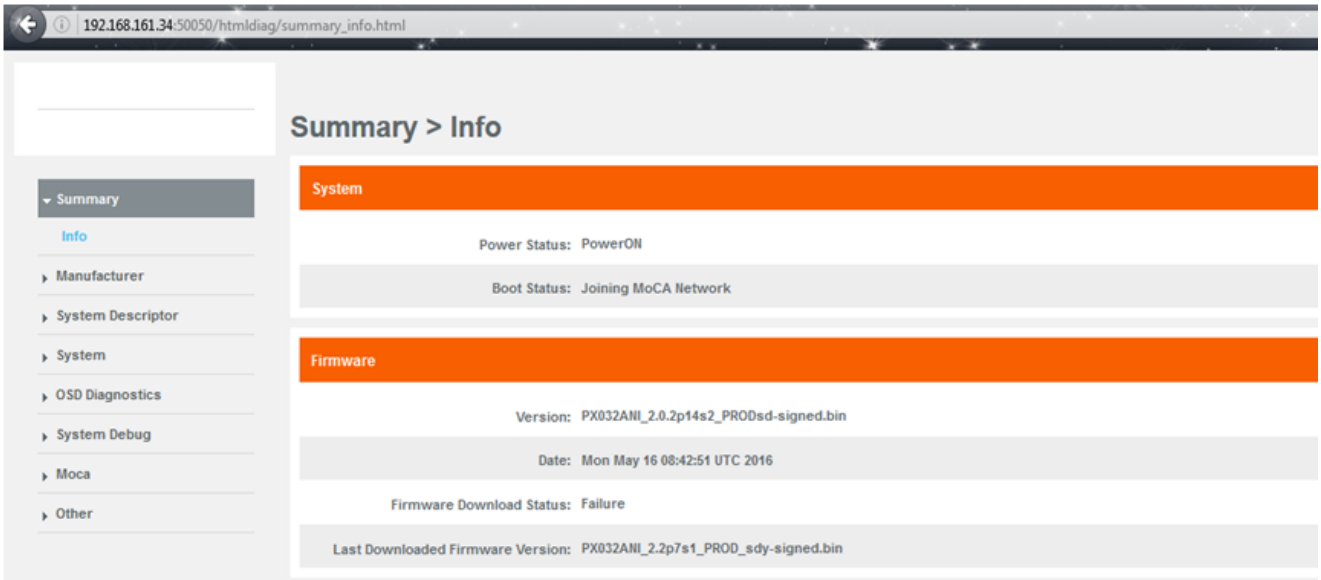
  ```

- Step 4:

  Use below url in the browser to see diagnostics page

  http://<client box lan ip address>:50050/htmldiag/summary_info.html

  eg: http://192.168.160.34:50050/htmldiag/summary_info.html



TR-069 queries through command line

- TR 060 queries can be executed command line to fetch the details using curl to query tr69Hostif
- Execute below commands in the box console to see the output of the query

Example 1: To fetch number of entries in the HDMI table

curl -d '{"paramList" : [{"name" : "Device.Services.STBService.1.Components.HDMI.1.Status"}]}' http://127.0.0.1:10999

```
root@pacexi3v2:~# curl -d '{"paramList" : [{"name" : "Device.Services.STBService.1.Components.HDMI.1.Status"}]}' http://127.0.0.1:10999
{"paramList":[{"name":"Device.Services.STBService.1.Components.HDMI.1.Status","value":"Disabled"}]}root@pacexi3v2:~#
```

Example 2: To fetch Human-readable name associated with this video decoder

curl -d '{"paramList" : [{"name" : "Device.Services.STBService.1.Components.VideoDecoder.1.Name"}]}' http://127.0.0.1:10999

```
root@pacexi3v2:~# curl -d '{"paramList" : [{"name" : "Device.Services.STBService.1.Components.VideoDecoder.1.Name"}]}' http://127.0.0.1:10999
{"paramList":[{"name":"Device.Services.STBService.1.Components.VideoDecoder.1.Name","value":"VideoDecoderHDMI0"}]}root@pacexi3v2:~#
```

Example 3: To fetch the device total cpu usage

curl -d '{"paramList" : [{"name" : "Device.DeviceInfo.ProcessStatus.CPUUsage"}]}' http://127.0.0.1:10999

```
root@pacexi3v2:~# curl -d '{"paramList" : [{"name" : "Device.DeviceInfo.ProcessStatus.CPUUsage"}]}' http://127.0.0.1:10999
{"paramList":[{"name":"Device.DeviceInfo.ProcessStatus.CPUUsage","value":33}]}root@pacexi3v2:~#
```