APPS013-Codensity™ T408 Health Scan Tool Application Note

V2.0

Reference Number: 20TD003-03-01
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1 Table of Abbreviations

Abbreviation:	**Full Form:**
NVMe	Non-volatile Memory express (Transport protocol)
AI	Artificial Intelligence
API	Application Programming Interface
AUD	Access Unit Delimiters
AV	Audio Video
AV1	Alliance Open Media Video 1 Codec
CABAC	Context Adaptive Binary Arithmetic Coding
CBR	Constant Bit Rate
CPU	Central Processing Unit
CRF	Constant Rate Factor
DSP	Digital Signal Processing
EOF	End Of File
FIXQB	Fixed Quantization Parameter
FF	Form Factor
FPS	Frames Per Second
GOP	Group of pictures
HDR	High Dynamic Range
HHHL	Half Height, Half Length
HHFL	Half Height, Full Length
HLG	Hybrid Log Gamma
HRD	Hypothetical Reference Decoder
IE	Inference Engine
Mbps	Mega Bit per second
MBps	Mega Byte per second
NLP	Natural Language Processing
NPU	Neural Processing Unit
NVMe	Non-Volatile Memory express
PCIe	Peripheral Component Interconnect express
PPS	Picture Parameter Set
QP	Quoted Printable
RGB	Red Green Blue
RGBA	Red Green Blue Alpha
RDO	Optimization
ROI	Region of interest

SDK	Software Development Kit
SEI	Supplemental Enhancement Information

2 References

Technical Notes:

Specifications:

3 Background

Commercial servers with multiple PCIe slots can host multiple Codensity ™ T408 modules for video encoding, decoding and transcoding. This application describes the Healthy Scan Tool provided by NETINT Technologies which aids in diagnosing the status of T408 modules when installed in a host server. The Healthy Scan Tool is published in the software release package from NETINT Technologies.

3.1 Intended Audience

This document is intended as an aid to engineers/technicians/developers operating NETINT transcoders for troubleshooting common issues.

3.2 Compatibility

Software Compatibility

This guide is intended to be used with NETINT Codensity T408 Video Transcoder software release V2.0.0 or later.

Hardware Compatibility

NETINT Codensity T408 Video Transcoder module hardware.

Operation system

Any linux OP system which has installed

a) Python version 3

b) nvme-cli (https://github.com/linux-nvme/nvme-cli)

4 Health Scan Tool usage and theory

This application note assumes 10x T408 modules have been installed in a commercial server.

4.1 Input needed from customer

User needs to create a text file named "T408_serial_numbers.txt" on the host server which contains the serial numbers of the install 10x T408 modules.

```
TU03-06-02-B02-072
TU05-07-02-B03-067
TU03-06-02-B02-091
TU03-06-02-B02-092
TU03-06-02-B02-116
TU03-06-02-B02-101
TU03-06-02-B02-099
TU03-06-02-B02-113
TU03-06-02-B02-117
TU03-06-02-B02-122
```

Example text file containing 10x serial numbers of installed T408 modules

In order to obtain these serial numbers:

1. The serial number of each T408 module is printed on a decal on the side of the T408 module housing. During installation, take note of the serial numbers of each module and the physical slot it is inserted into.
2. The serial numbers of installed modules can also be displayed using the `*sudo nvme list*` command.

```
$ sudo nvme list
Node             SN                   Model                                    Namespace Usage                      Format           FW Rev
---------------- -------------------- ---------------------------------------- --------- -------------------------- ---------------- --------
/dev/nvme0n1     BTLJ808401811P0FGN   INTEL SSDPE2KX010T8                      1           1.00  TB /   1.00  TB    512   B +  0 B   VDV10120
/dev/nvme10n1    TU03-06-02-B02-072   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme1n1     TU05-07-02-B03-067   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme2n1     TU03-06-02-B02-091   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme3n1     TU03-06-02-B02-092   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme4n1     TU03-06-02-B02-116   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme5n1     TU03-06-02-B02-101   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme6n1     TU03-06-02-B02-099   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme7n1     TU03-06-02-B02-133   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme8n1     TU03-06-02-B02-117   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
/dev/nvme9n1     TU03-06-02-B02-122   T408-U2                                  1         393.62  MB / 393.62  MB      4 KiB +  0 B   152X0c6f
```

Example output from "sudo nvme list" showing the serial number

4.2 How to use Healthy Scan Tool

In the NETINT T408 release package, download the healthy scan tarball.

1) `healthy_scan.tar.gz`

Upload this tarball to the host server where the 10x T408 drives are installed. Unzip the tarball using `tar -zxvf healthy_scan.tar.gz` command.

This will extract the following files:

1. healthy_scan/healthy_scan.py
2. healthy_scan/test_clip.h264
3. healthy_scan/test_clip.h264.list

Place the 'T408_serial_numbers.txt' in the healthy_scan folder so it is in the same folder as healthy_scan.py

Execute following command in the directory:.

"python3 healthy_scan.py "

The tool will print out the following message to allow users to create/update T408_serial_numbers.txt to populate the correct serial number of the T408 module before it starts scanning its health.

"Please remember to update the serial number text file . eg ./T408_serial_numbers.txt"

"Continue? [Y/N]"

When user selects "Y", the tool will perform a health scan to determine good and bad T408 modules. It will exit health scan if user selects "N".

Note: If T408 card in the server already has traffic on it, the health scan tool will skip its health check to avoid impact on ongoing services.

In the server console, it will print out 2 lists of serial numbers as below,

```
1. T408 cards - good status
TU03-06-02-B02-072
TU05-07-02-B03-067
TU03-06-02-B02-091
TU03-06-02-B02-092
TU03-06-02-B02-116
TU03-06-02-B02-101
TU03-06-02-B02-117
TU03-06-02-B02-122
TU03-06-02-B02-113
2. T408 cards - bad status
TU03-06-02-B02-099
```

In the example above the T408 module with serial number "TU03-06-02-B02-099" indicates a bad status while other 9x T408 modules are in good status.

NETINT Codensity T408 modules toggle the U.2 PCIe Activity pin output. This is an open drain output that T408 modules toggle whenever there is encoder or decoder activity. This output is also toggled every second regardless of activity. Most U.2 servers typically have 2x LEDs per slot. One indicates that the drive is powered up, the second is the disk activity LED.

The status of the T408 can be determined from the activity LED:

Activity LED	**T408 Status**
Blinking once per second	T408 is idle with good status
Blinking more frequently	T408 is active with good status
Not Blinking	T408 is likely in bad status (or host is not ignoring T408 activity pin)

Note that when healthy_scan.py is running, it will add transcoding workload to T408 drives for 1 min.

5 Possible Side-effects or Shortcomings

- Healthy scan tool will add traffic on T408 modules to help users to determine idle T408 module status. It's recommended run this tool when the host system is not experiencing high workload.
- In very rare situations, the number of bad T408 modules listed in the host console output might be less than the number of T408 modules which are observed not blinking regularly during healthy scan tool's execution. This is because firmware on one or more T408 drives has crashed but it can still be detected by the"sudo nvme list" command. To recover the crashed T408 module, refer to crash auto recovery application note.
- It's possible that some servers have an LED design that is not compliant with what has been described above. In this situation, T408 drive status can only be determined on the console print-out of the healthy scan tool.

6 Revision History

Version	Change	Create Date	Author
0.5	Document Created	Feb 17,2020	Fred Zhou
0.6	Add tarball (tar.gz) to "How to use Healthy Scan Tool"	Feb 28, 2020	Lawrence Lu
1.1	Issued version	Feb 28, 2020	
2.0	Updated as per new app note template	December 2, 2021	Balwinder Sidhu

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