Intel® NUC Pro Software Suite

User Guide

V1.4 **8 June 2022**

NUC Group
Client Computing Group, Intel® Corporation

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Revision History

Version	Date	Description of Changes
1.4	06/08/2022	Initial Release

Table of Contents

1 Introduction

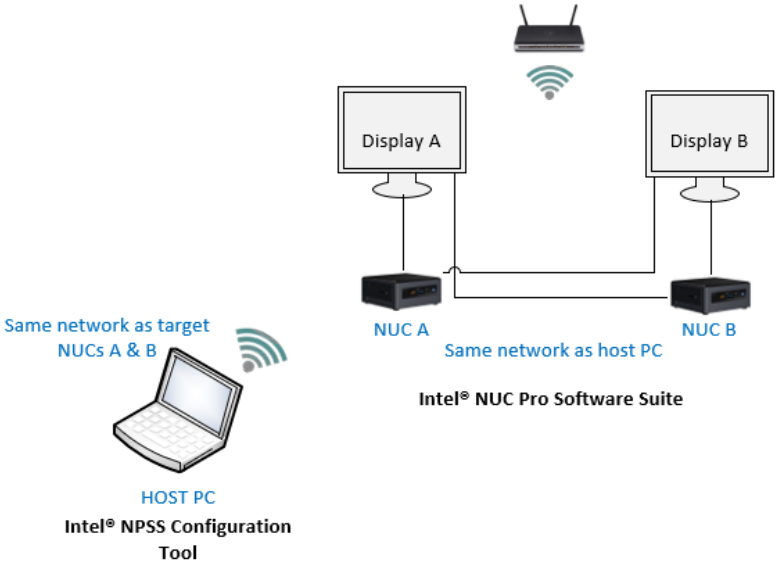
1.1 Overview

The **Intel® NUC Pro Software Suite** monitors unattended applications and provides redundant screen services for digital signage applications. Key capabilities of this tool include:

- Terminate and relaunch the application when targeted application becomes unresponsive.
- Gracefully shutdown or restart OS whenever it detects a target application failed x + times – as specified by the user, since the last Windows boot.
- Log application monitoring activity to easily accessible log file.
- This utility can enable hardware watchdog timer to execute a hard system reset if a monitored application causes the system to become unresponsive
- Manage Failover NUCs when a given NUC goes down due to power or network failure.
- Hardware Diagnostic feature runs diagnostics on HDMI-CEC WMI interfaces exposed by NUC ACPI BIOS

Intel® NUC Pro Software Suite – Configuration Tool provides step by step instructions to configure the target NUCs (primary and secondary) and the display between the NUCs. For the player failover feature to successfully work, it is critical to follow the instructions from the configuration tool.
However, this configuration tool is not needed for basic application monitoring.

The below image explains the overall topology of the application and configuration tool.



Software components are:

1. Intel® NUC Pro Software Suite and drivers installed on the target NUC
2. Intel® NUC Pro Software Suite – Configuration Tool installed on the host PC

1.2 Supported Products

1. Intel® NUC 11 Pro Kit / Board NUC11TN
2. Intel® NUC 11 Compute Element CM11EB with Intel® NUC Rugged Chassis Element CMCR1ABA / CMCR1ABB
3. Intel® NUC 11 Compute Element CM11EB with Intel® NUC Pro Chassis Element CMCM2FB/ CMCM2FBAV
4. Intel® NUC 8 Compute Element CM8CCB / CM8PCB / CM8i3CB / CM8i5CB / CM8v5CB / CM8i7CB / CM8v7CB with Intel® NUC Rugged Chassis Element CMCR1ABA / CMCR1ABB
5. Intel® NUC 8 Compute Element CM8CCB / CM8PCB / CM8i3CB / CM8i5CB / CM8v5CB / CM8i7CB / CM8v7CB with Intel® NUC Pro Chassis Element CMCM2FB/ CMCM2FBAV

1.3 Hardware requirements

For Configuration Tool unit:

Any system on the same local subnet

For target units

1. Supported NUC
2. HDMI CEC – Consumer Electronics Control supported Displays, supporting FHD or greater resolution
    a. While connecting multiple displays, it is recommended to use the same resolution, same make and model on both the displays
3. HDMI cables
4. Keyboard & Mouse (needing during setup only)
5. Network connectivity (all NUCs need to be on the same subnet)

1.4 Supported Operating System

1. Windows 10 Pro
2. Ubuntu 20.04 kernel version 5.11 or above

The latest version of the software has been tested on the following OS version:

1. Windows 10 Pro
    a. Version:
        i. 10.0.19043 Build 19043
        ii. 10.0.19044 Build 19044
2. Ubuntu 20.04 kernel
    a. Package Version:
        i. 5.4.0
    b. Package release:
        i. 110.124

2 Installation Steps - Microsoft Windows

1. Go to https://downloadcenter.intel.com and search for Intel® NUC Pro Software Suite

2. Download the zip package available for Windows Operating System – **IntelNpss-Windows.zip** and install files in the order mentioned below

NOTE: Refer to the section Installation Steps – Linux below if your target OS is Linux.

2.1 Driver installation on target NUC

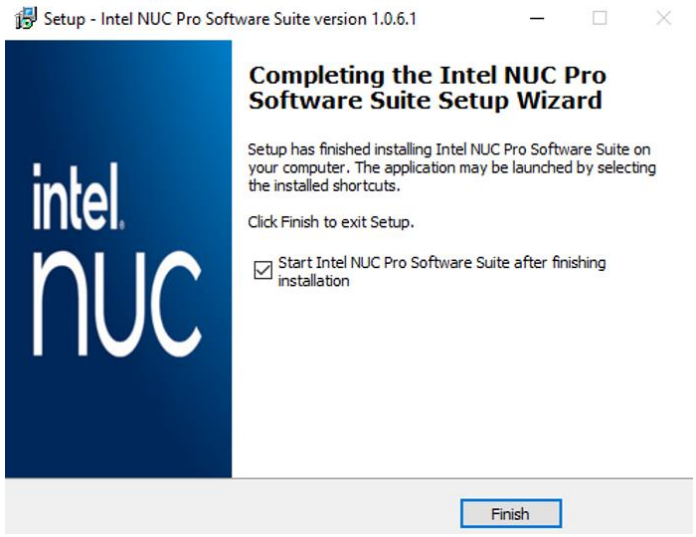
1. Double click the **IntelWatchdogTimer.msi.** Accept the License agreement and click Finish.

   NOTE: If you install the application before installing the driver, you will be redirected to Intel Download Center to install the driver.

2.2 Application installation on target NUC

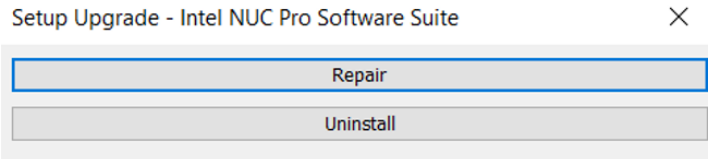
1. Double click the **IntelNpssApplicationInstaller.exe.** Accept the License agreement and click Install.

2. Please wait while the Setup installs Intel® NUC Pro Software Suite on the computer and click **Finish**



   NOTE: If the Watchdog Timer Driver is not installed before installing the application, you will first be redirected to install the driver and then proceed to application installation.

3. If the Intel® NUC Pro Software Suite application already exists on the user's computer, it prompts an upgrade to the latest version. Either click **Repair** to start the upgrade process or click **uninstall** and do fresh install of latest version of application.



4. Double click the Intel® NUC Pro Software Suite shortcut to get started

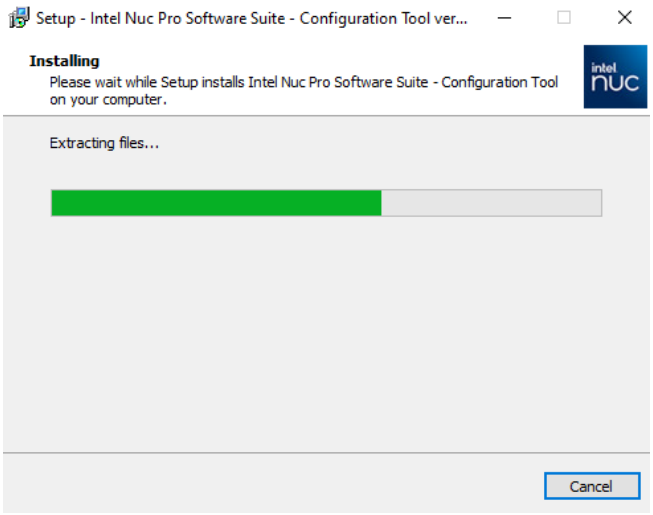
2.3 Configuration tool installation on host PC

If your target NUC supports player failover functionality, follow the instructions below to install the Intel® NUC Pro Software Suite – Configuration Tool.

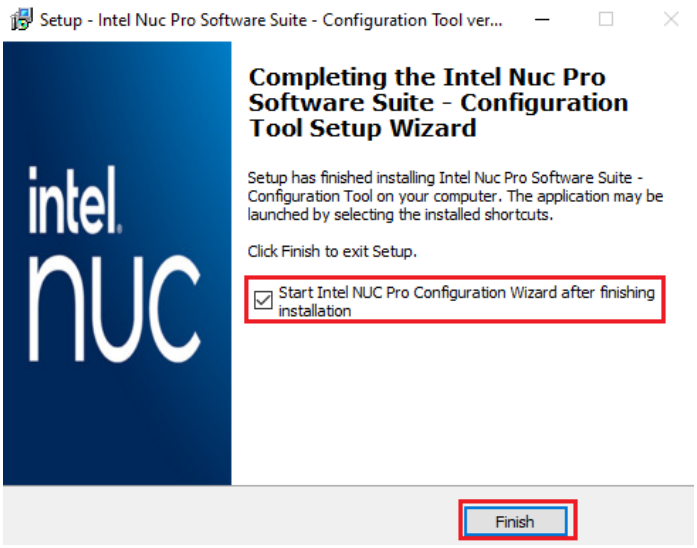
NOTE: Do not install the configuration tool on the target NUC. It should always be installed on a host PC that is part of the same network as target NUCs. Copy the **IntelNpssConfigurationInstaller.exe** onto the host PC**.**

1. On the host PC, double-click the **IntelNpssConfigurationInstaller.exe.** Accept the License agreement and click Install.

2. Wait for the installer to install the application.



3. Select the **Start Intel® NUC Pro Software Suite - Configuration Tool** after finishing Installation checkbox to open the application after clicking the **Finish** button.



3 Installation Steps - Linux

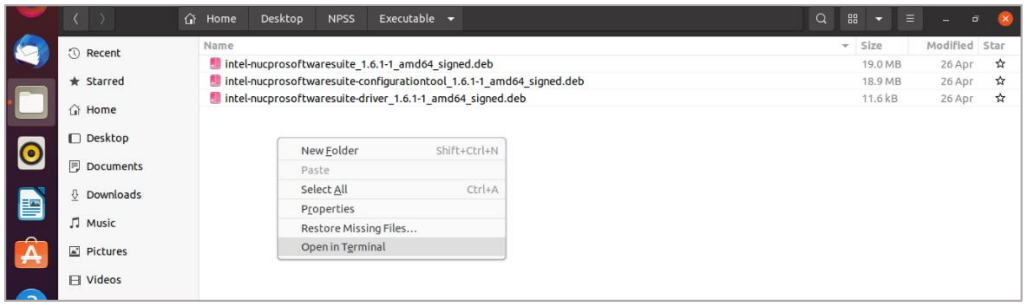
1. Go to https://downloadcenter.intel.com and search for Intel® NUC Pro Software Suite

2. Download the tar package available for Linux Operating System – **IntelNpss-Linux.tar** and install files in the order mentioned below

NOTE: Refer to the section Installation Steps – Windows above if your target OS is Windows.

3.1 Driver and application installation on target NUC

1. Locate and open **Terminal** on your target NUC



2. If the driver is already installed in the system, type in the command **sudo dpkg -r intel-nucprosoftwaresuite-driver** to uninstall.

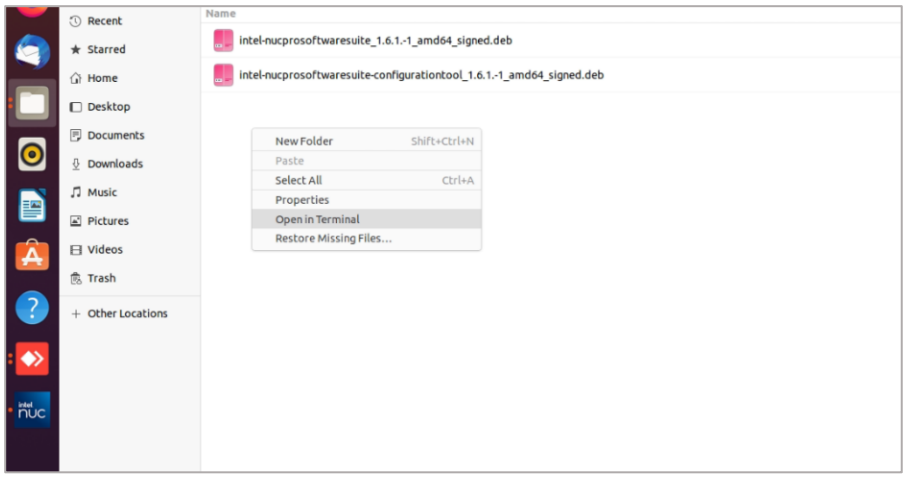
3. To install the new driver, enter **sudo dpkg -i intel-nucprosoftwaresuite-driver _1.6.1-1_amd64_signed.deb**

4. To install the Intel® NUC Pro Software Suite application, enter **sudo dpkg -i intel-nucprosoftwaresuite_1.6.1-1_amd64_signed.deb**

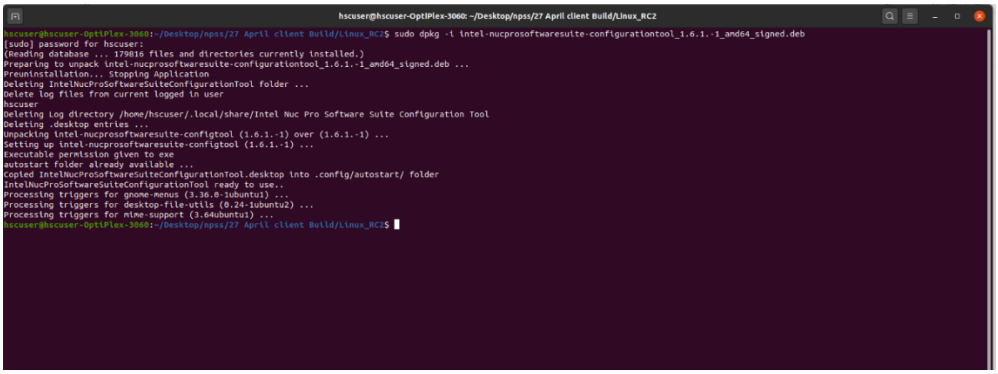
NOTE: Always use the latest version number of the installation files in the commands above.

3.2 Configuration tool installation on host PC

1. Locate and open **Terminal** on your host PC.



2. Type in the command **sudo dpkg -i intel-nucprosoftwaresuite-configurationtool_1.6.1-1_amd64_signed.deb**



3. Click **Enter** to execute the command: **Intel® NUC Pro Software Suite – Configuration Tool**

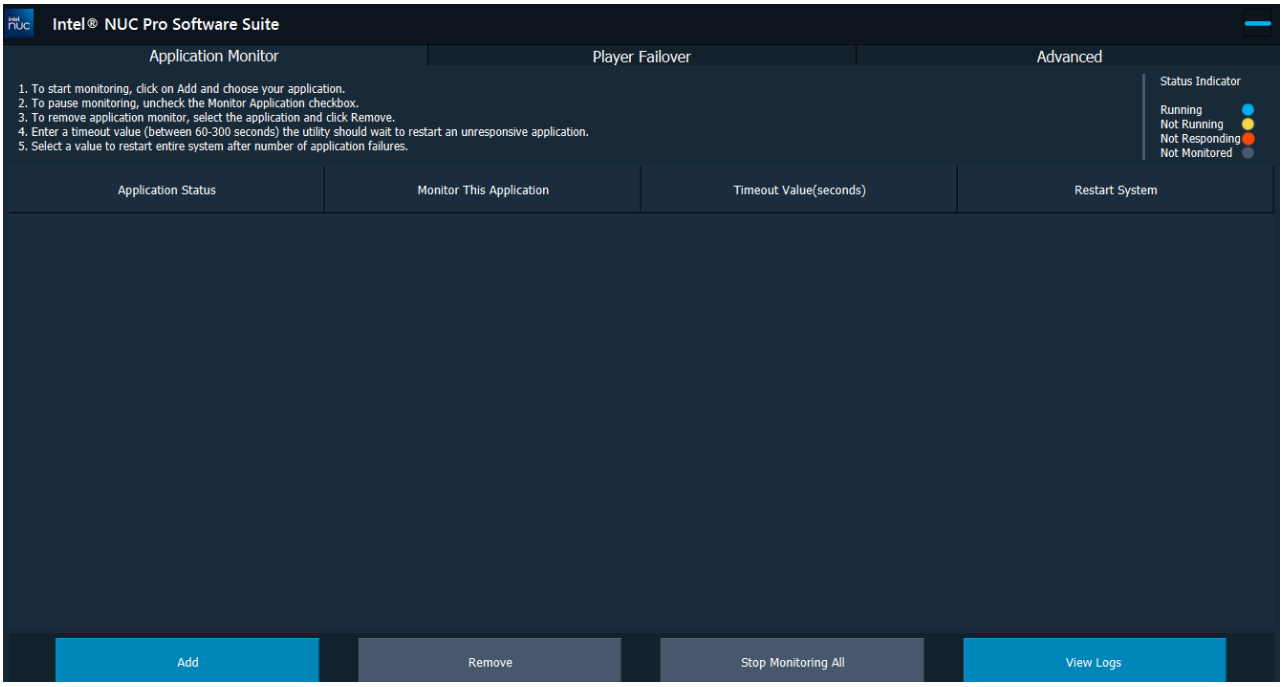
   NOTE: Always use the latest version number of the installation files in the commands above.

4 Intel® NUC Pro Software Suite – Features

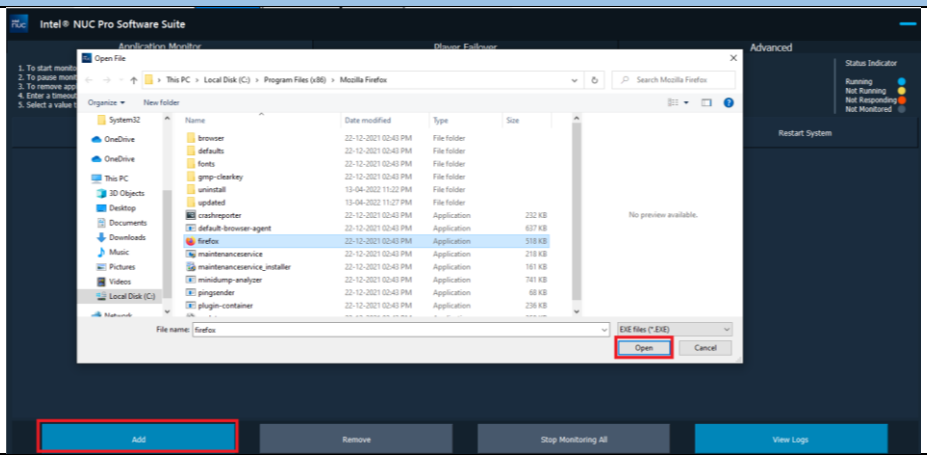
The Intel® NUC Pro Software Suite application supports 3 key features:

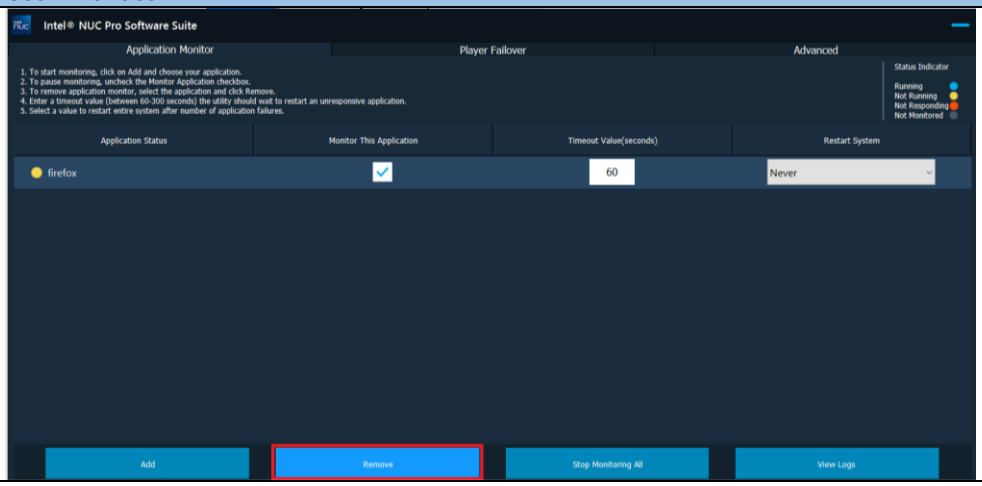
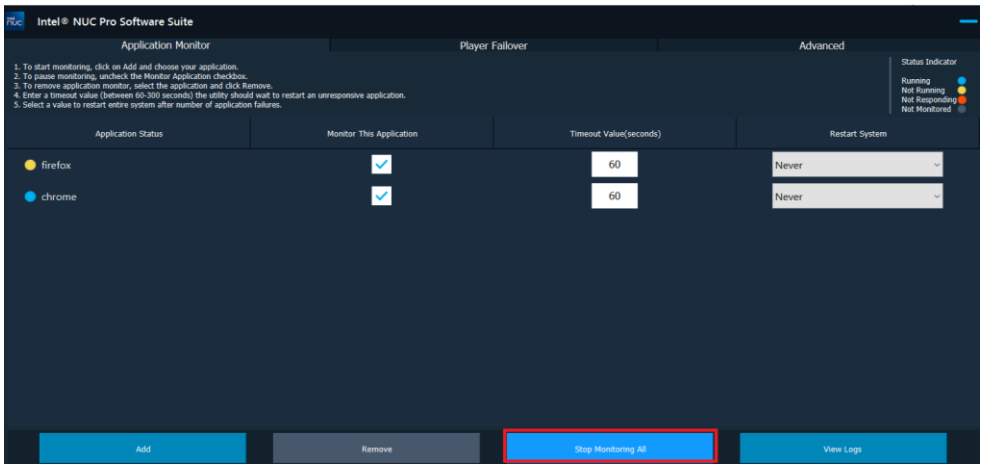
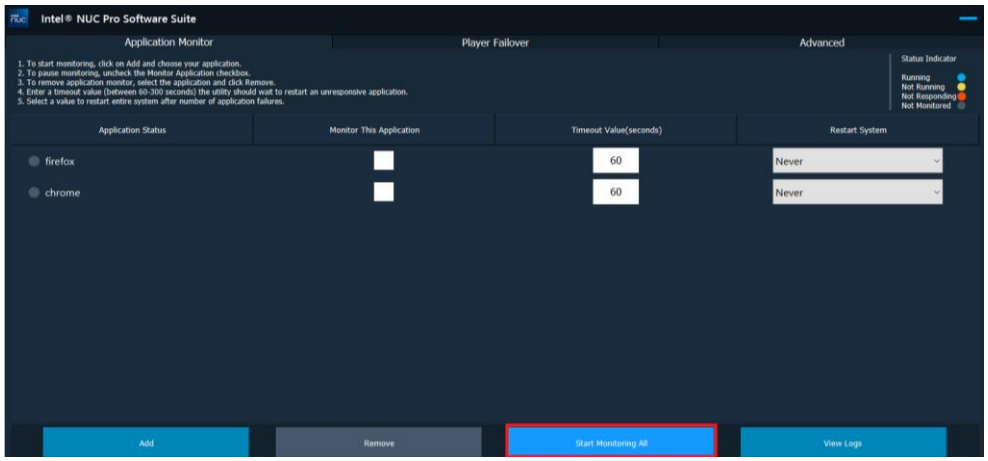
1. Application Monitor – to monitor the state of a running application
2. Player Failover – where a backup NUC can take over a primary NUC
3. Advanced features like HDMI diagnosis

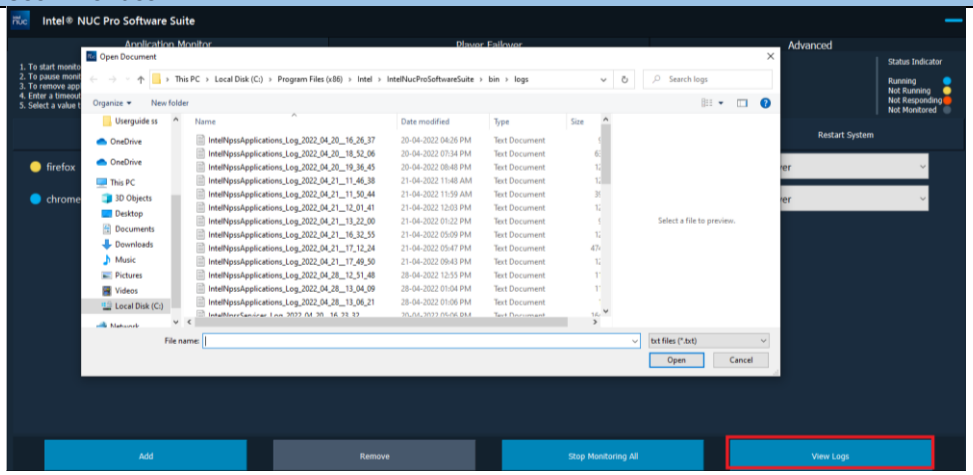
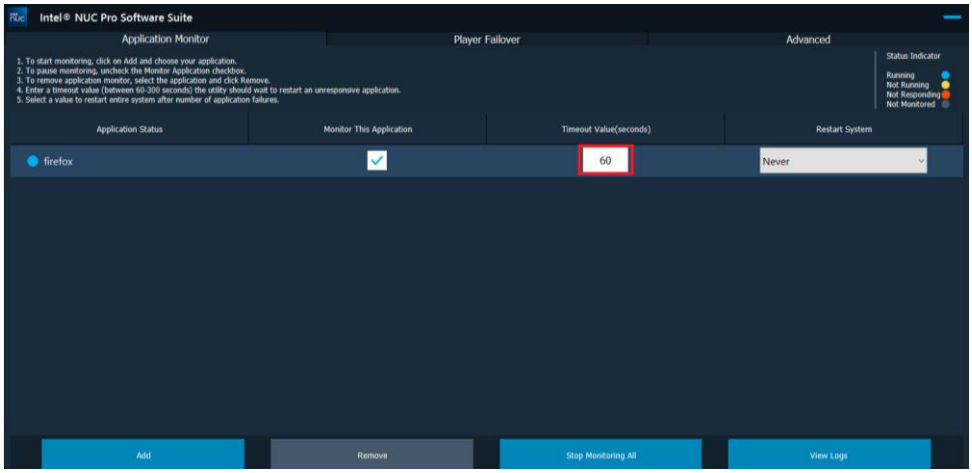
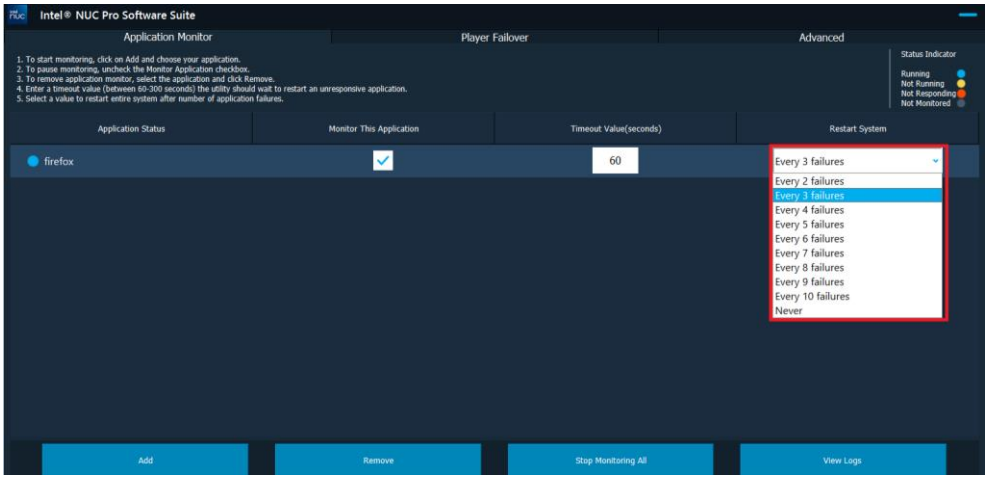
4.1 Application Monitor



The Application Monitor tab monitors the running state of desktop applications based on four major status indicators. Below are the controls for Application Monitor tab:

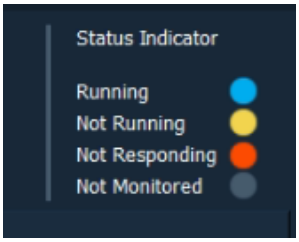
Feature	User Interface
Add: Click 'Add' to add an application for monitoring.	

Feature	User Interface
Remove: Select an application currently monitored and click 'Remove' to stop monitoring.	
Start/Stop Monitoring All: Click this button to start/stop monitoring all added desktop applications at once.	 

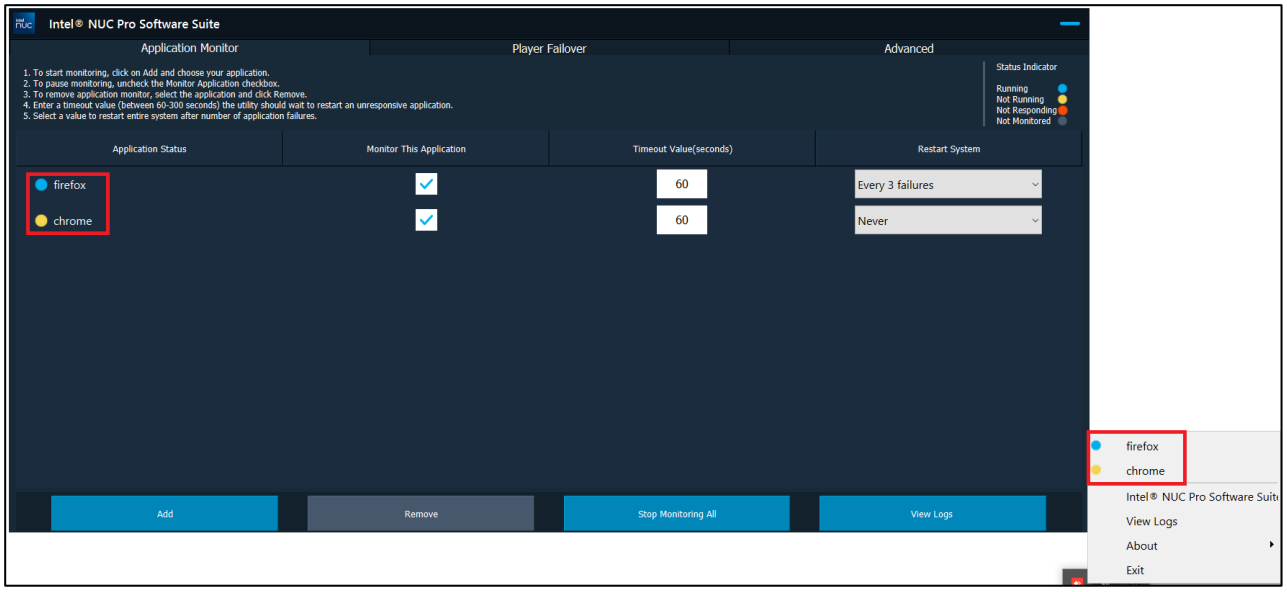
Feature	User Interface
View Logs: Click View Logs to open the captured logs for every activity during runtime.	
Timeout Value (seconds): The user can enter the time in seconds in the Timeout textbox. When the application is not responding for the given time, the Intel® NUC Pro Software Suite will restart the application.	
Restart System: Click the Restart System dropdown to select the restart occurrence. When the application is not responding for the selected times, the system will restart.	

4.1.1 Application Monitor - Status Indicator

The Application Monitor can monitor a maximum of five applications at a time. The added applications are monitored based on four major status indicators. The below table describes the status and corresponding color indicator.

Indicator	State
	Running status indicator helps identify the applications in the Running mode. (Cyan circle)
	Not Running status indicator helps identify the applications which are no longer running. (Yellow circle)
	Not Responding indicator helps identify an application in error state or when not responding. (Red circle)
	Not Monitored indicator helps identify applications which are no longer monitored by the system. (Gray circle)

These status indicators are displayed on the Application Monitor tab and in the system tray of the **Intel® NUC Pro Software Suite** application. The below screen shows an example of two applications in Running and Not Running state.



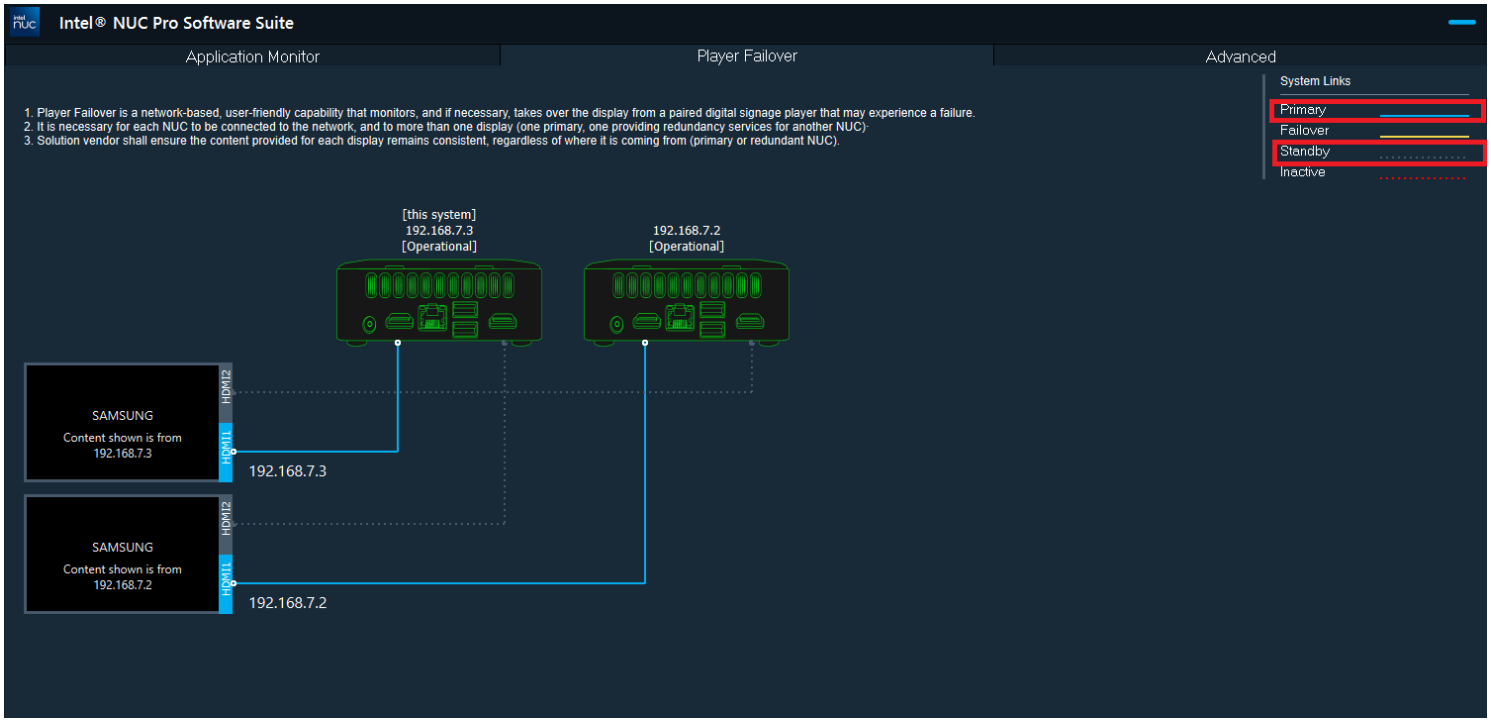
4.2 Player Failover

The Player Failover tab helps to manage the NUCs provide screen redundancy services to each other if a NUC encounters a system failure which may prevent it from continuing to operate.

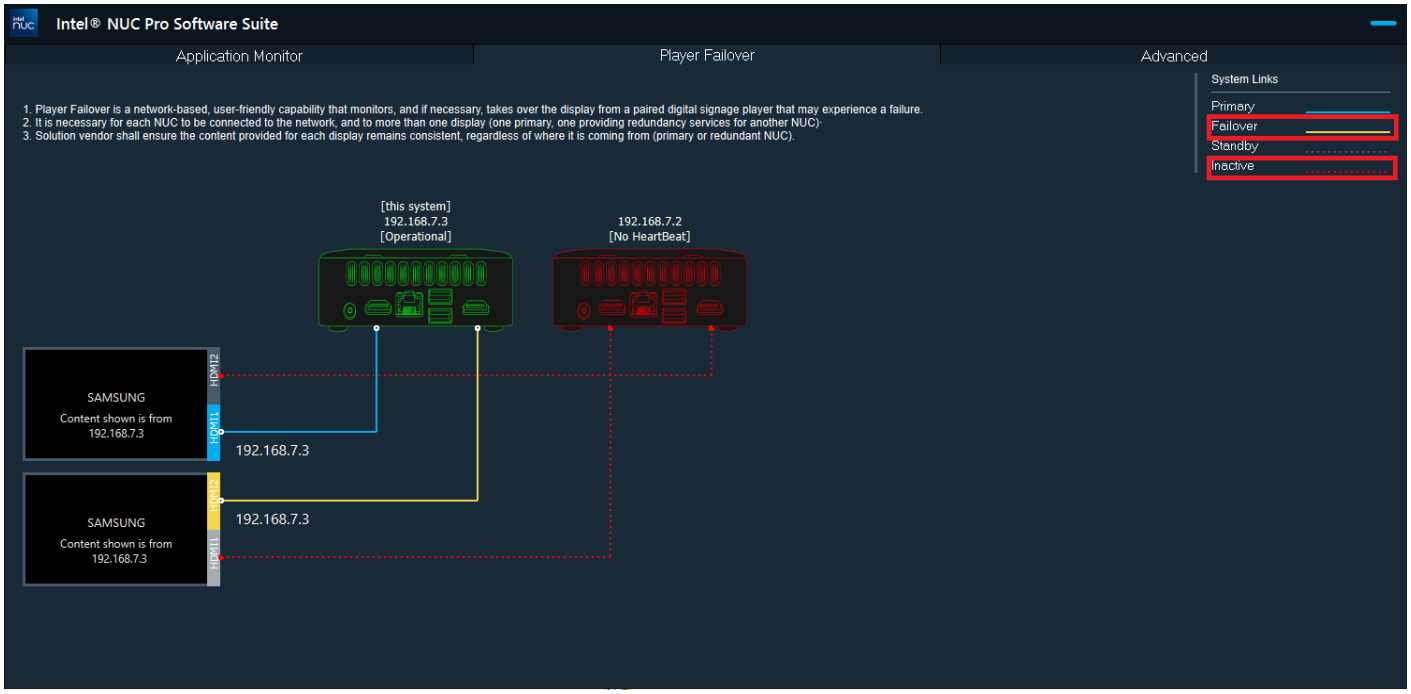
NOTE: To enable player failover functionality, ensure you complete all the steps under **Configuration tool installation** section above**.**

4.2.1 System Links

1. **Primary (Solid Blue)** - Link between NUC and its primary display.
2. **Standby (Dotted Grey)** - Link between NUC and its secondary display.

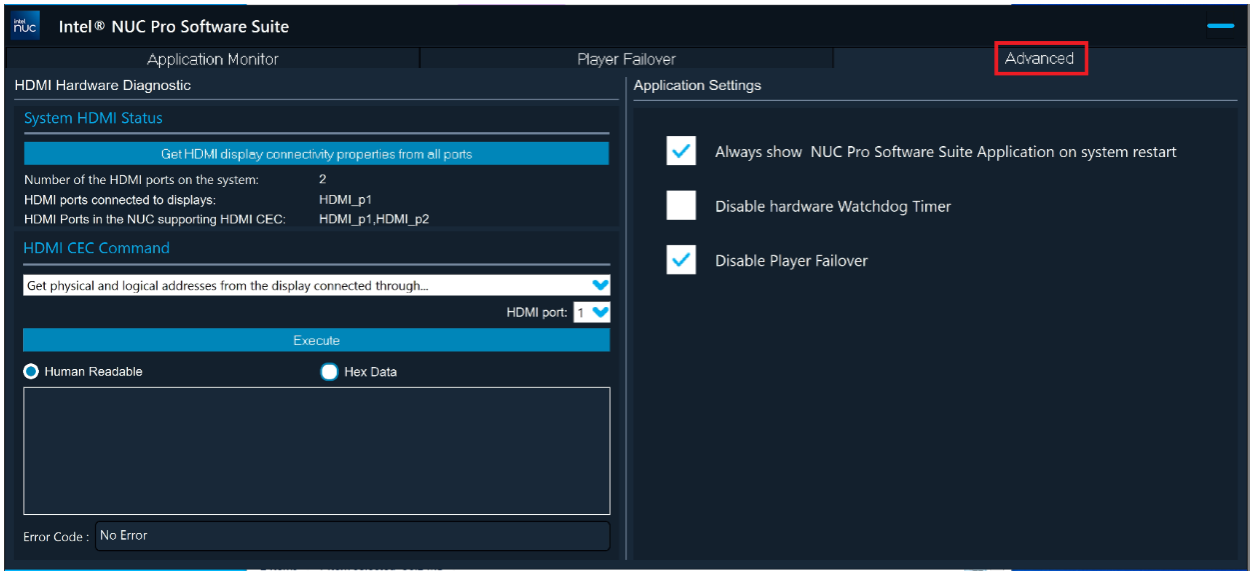


3. **Failover (Solid Yellow)** - In case of Failover, the Standby link connecting Active NUC, and its secondary display will become Failover.
4. **Inactive (Dotted Red)** - When a NUC goes down, system links coming out of Failover NUC should become inactive.



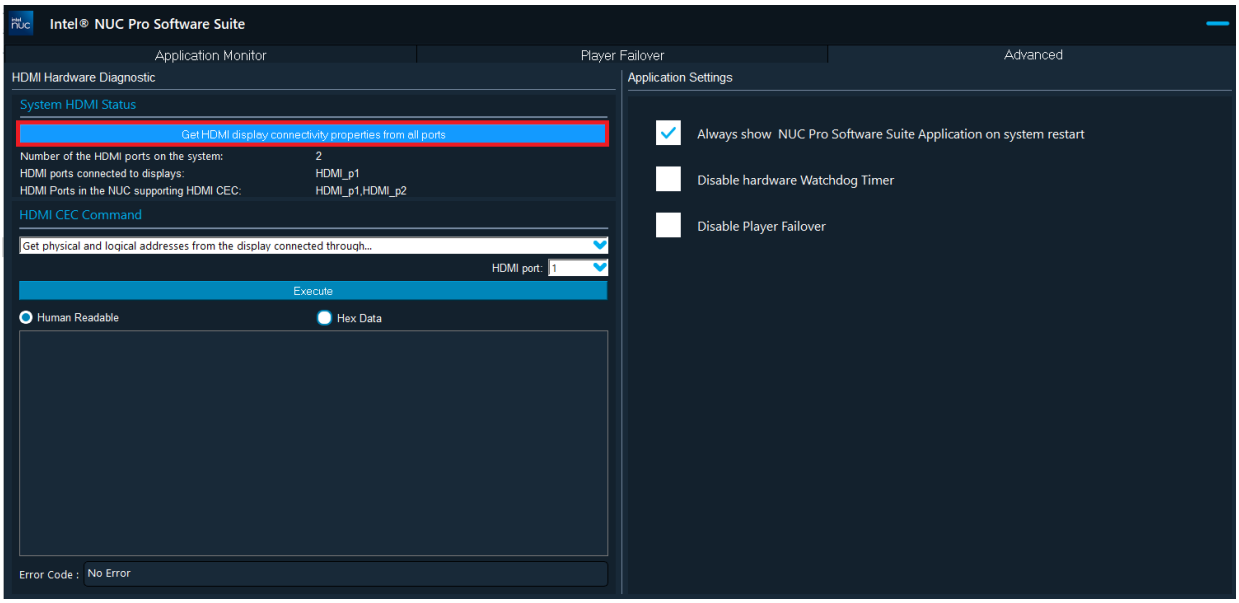
4.3 Advanced

The Advanced tab allows user to configure system settings in addition to performing HDMI hardware diagnostics. The below screen shows all available options in the Advanced tab.

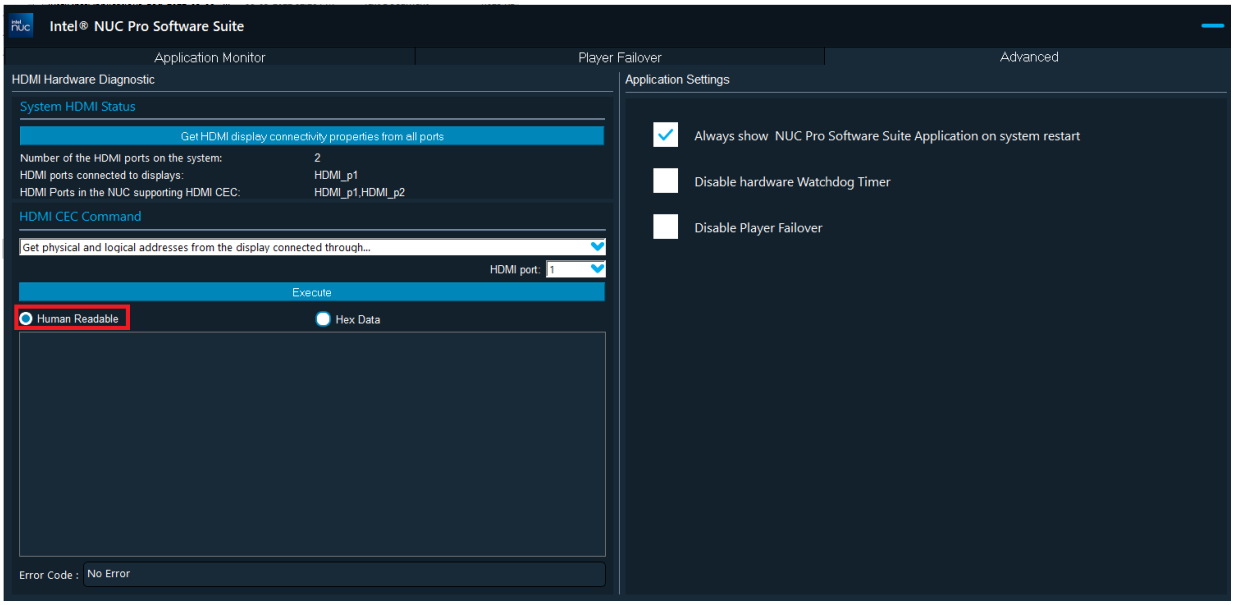


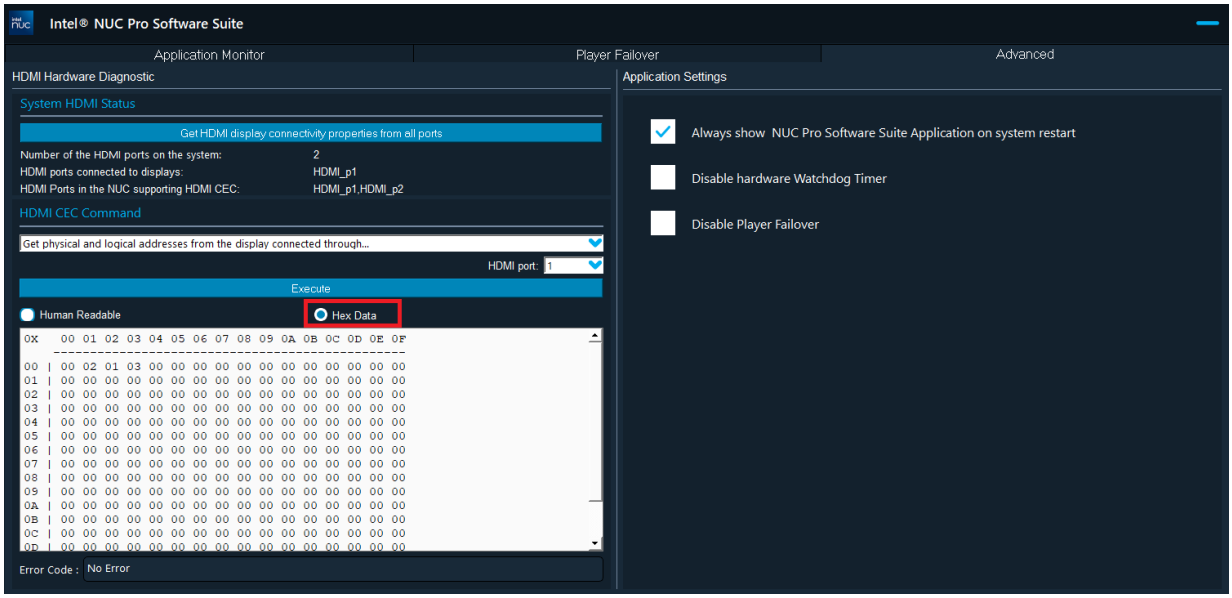
4.3.1 HDMI Hardware Diagnostic

1. **System HDMI Status** Click "***Get HDMI display connectivity properties from all ports***" to get the current state information of HDMI ports
   i. Number of the HDMI ports on the system
   ii. HDMI ports connected to displays
   iii. HDMI ports in the NUC supporting HDMI CEC



The HDMI Diagnostic makes WMI calls and shows the response in Human Readable or Hex Data format on UI.

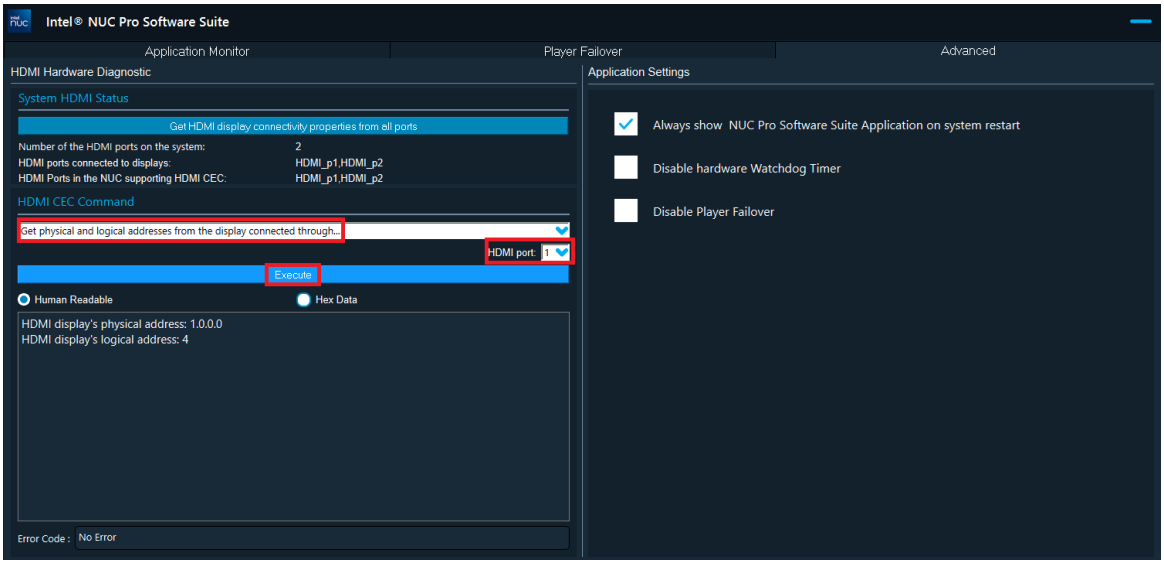




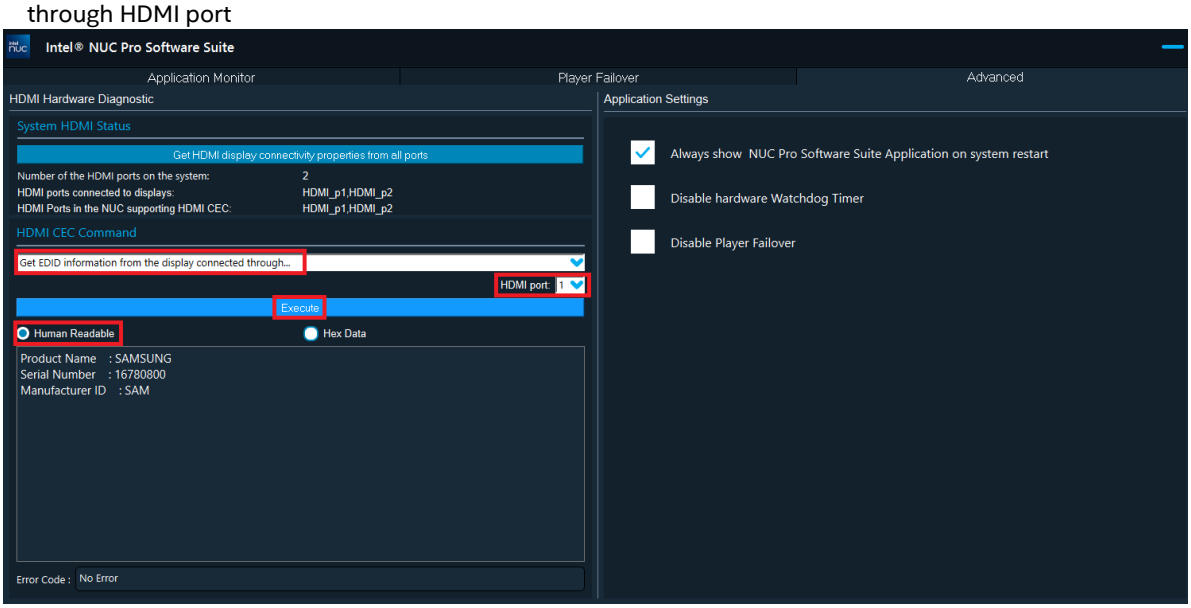
2. **HDMI CEC Command**

When a user clicks the HDMI CEC Command dropdown, the below mentioned commands are available. Select any command and click 'Execute' to view the results.

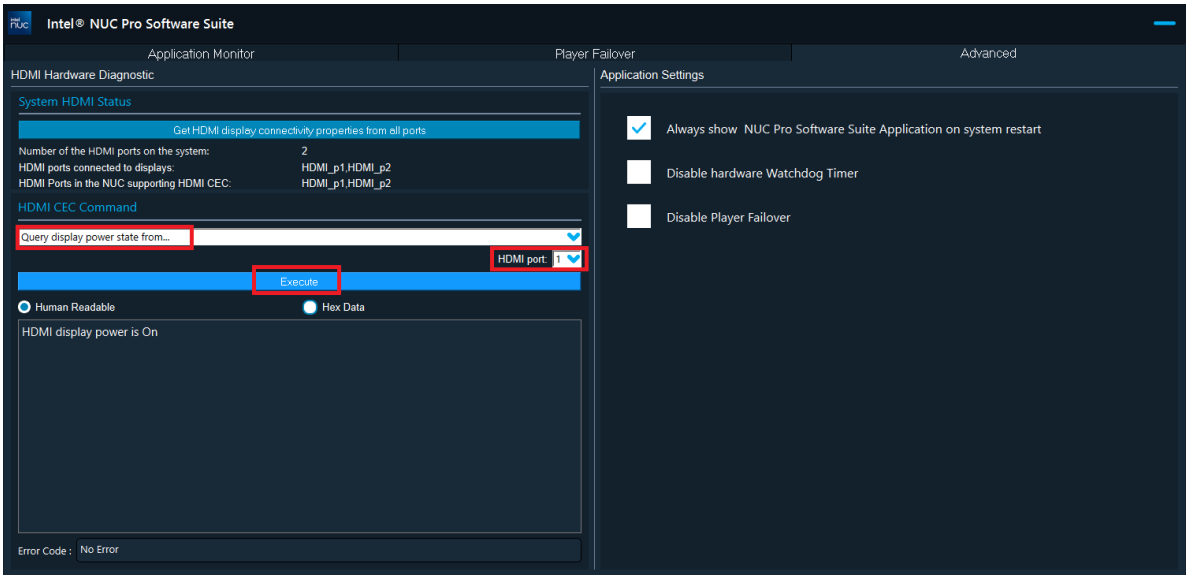
i. Get physical and logical addresses from the display connected through...
On Execute of this command, the user can get physical and logical address of the NUCs connected through HDMI



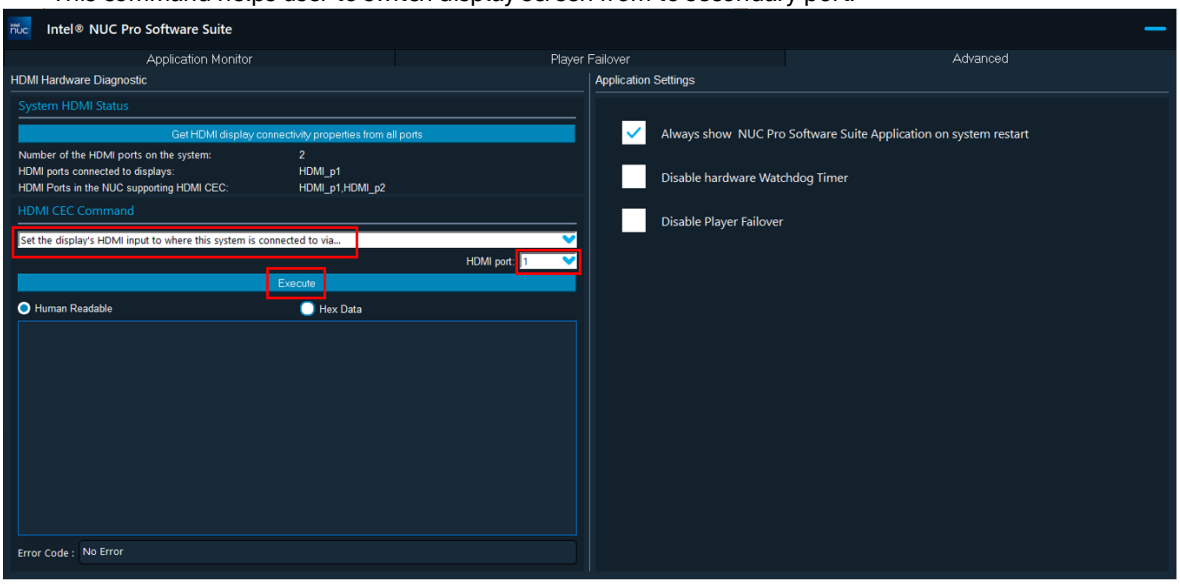
ii. Get EDID information from the display connected through...
On Execute this command, the user can get Product Name, Serial Number, Manufacturer ID of the connected through HDMI port



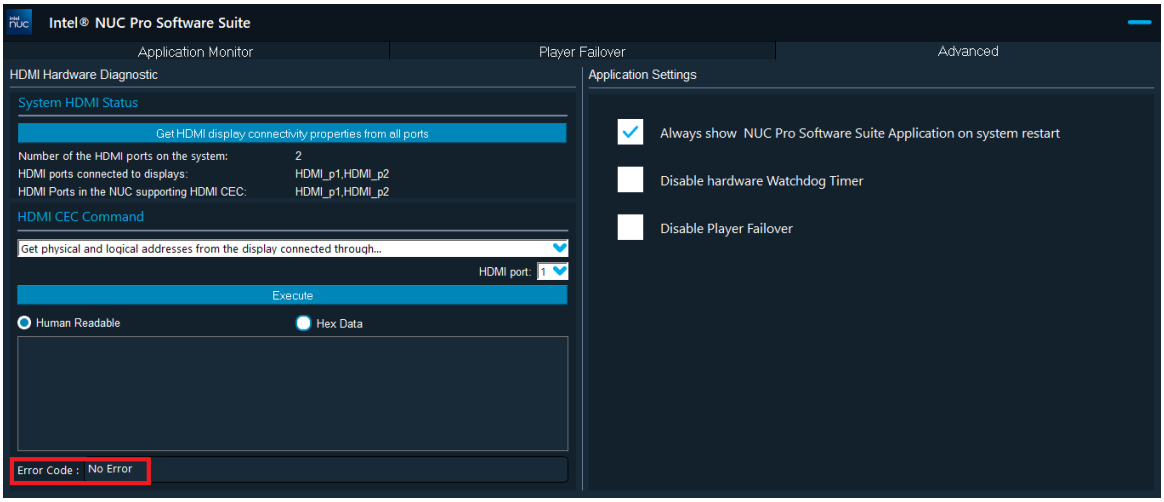
iii. Query display power state from...
On Execute this command, the user can get the power status of the display



iv. Set the display's HDMI input to where this system is connected to via...
This command helps user to switch display screen from to secondary port.



3. **Error Codes**



The user can get any of the error codes below in response to a HDMI CEC Command.

Error Code	Description
00h	No error
E1h	Function not supported
E2h	Undefined device
E3h	EC no respond
E4h	Invalid Parameter
E5h	Node busy. Command could not be executed because command processing resources are temporarily unavailable
E6h	Command execution failure. Parameter is illegal because destination device has been disabled or is unavailable
E7h	Invalid CEC Opcode
E8h	Data Buffer size is not enough
EFh	Unexpected error
Others	Reserved

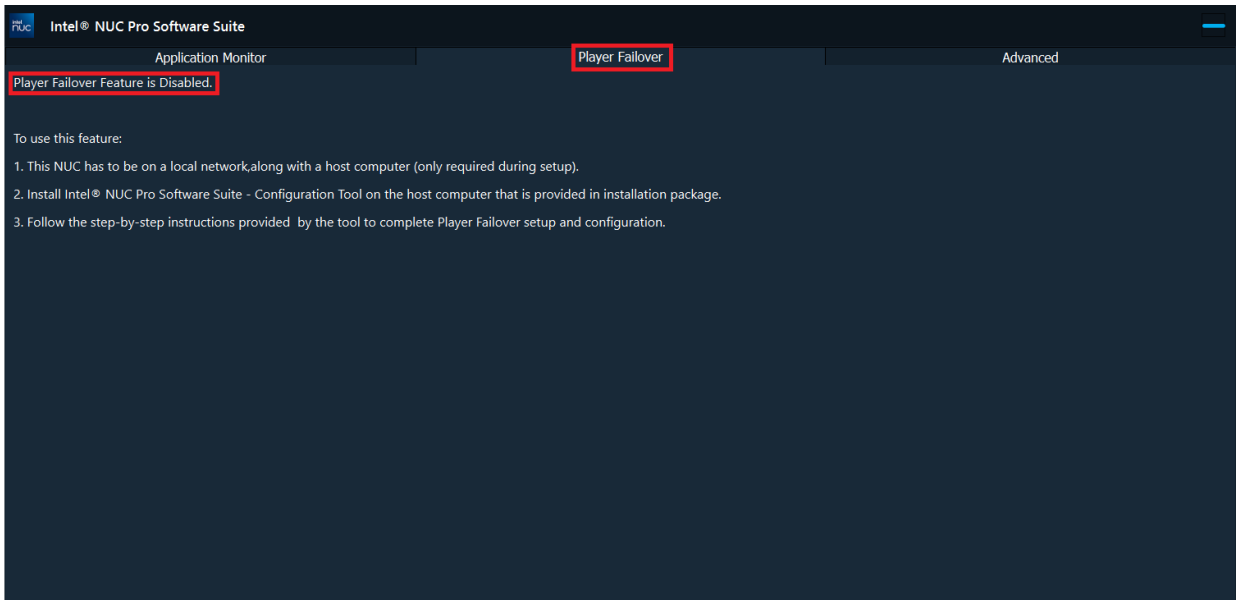
4.3.2 Application Settings

1. **Always show Intel® NUC Pro Software Suite on system restart** - Check this box to open the application on the desktop after every system restart. When this is not checked, the application will be displayed only in the system tray.

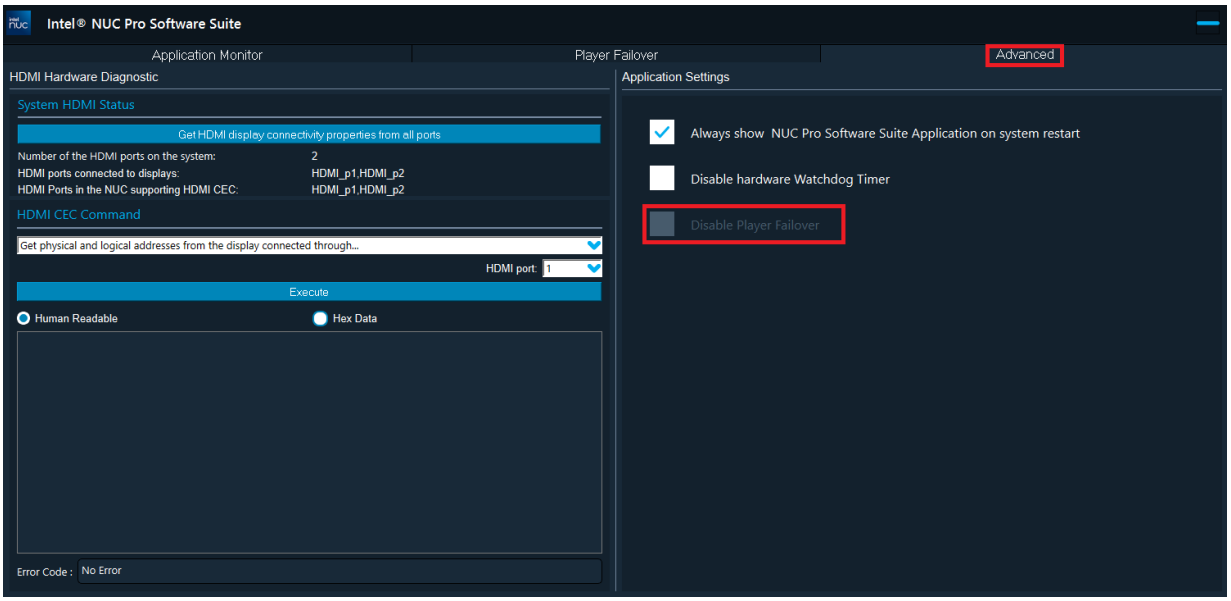
2. **Disable/Enable Hardware Watchdog Timer** – Default Hardware Watchdog Timer is enabled on launching the application. When a user manually checks this box and if "IntelNPSSService" service stops, then after default time (300 sec), the system will restart.

3. **Enable/Disable Player Failover –**

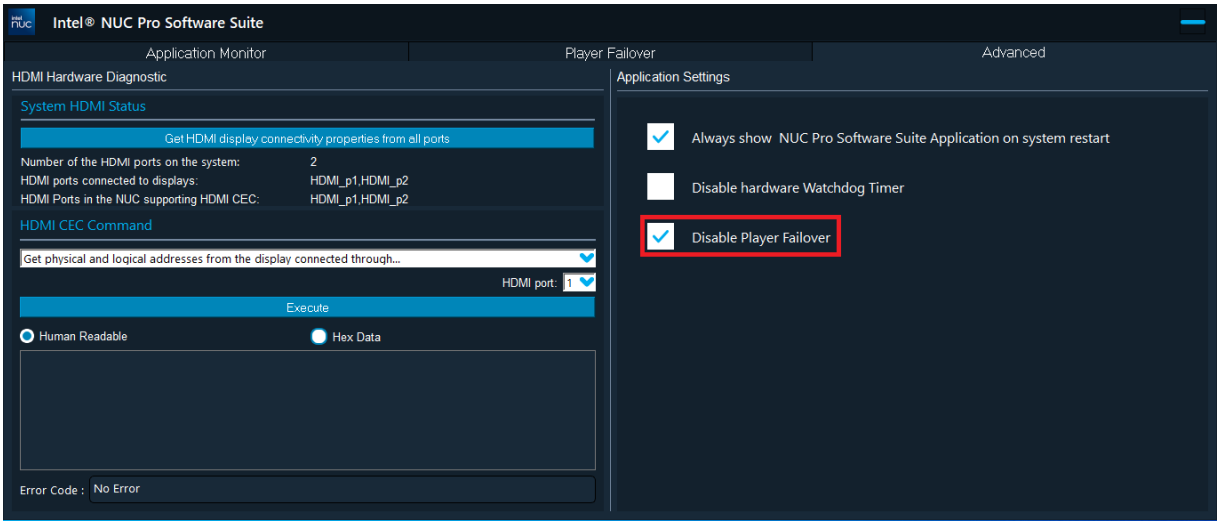
   i. During first launch of Intel® NUC Pro Software Suite, until the NUCs and corresponding displays are successfully connected, the default player failover is disabled as indicated in the screen below. No NUC is visible in the 'Player Failover' section.

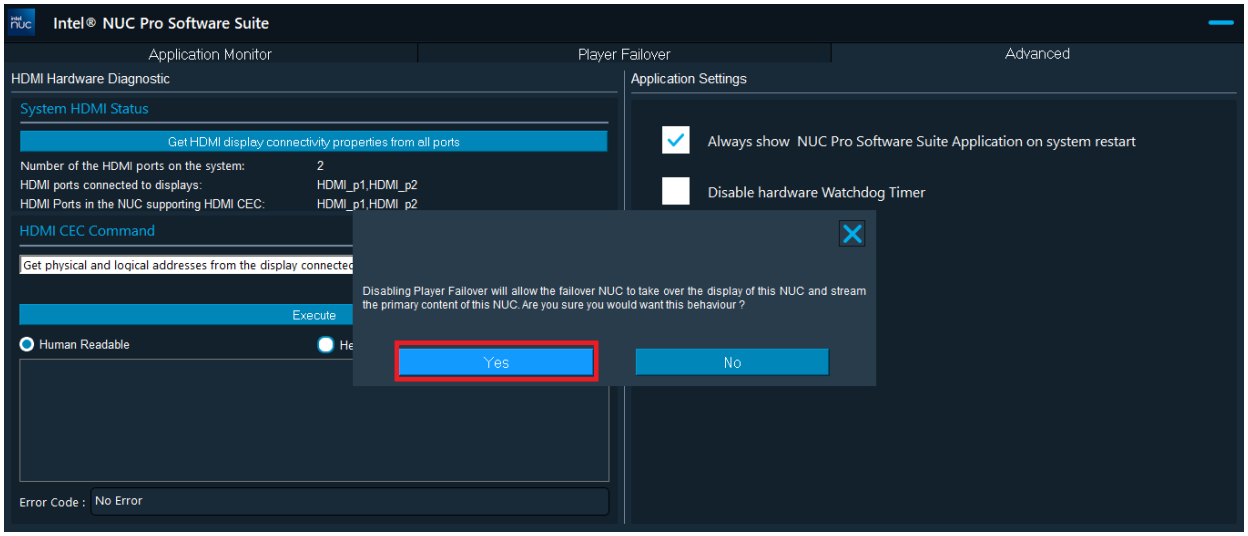


   ii. After Discovering the NUCs, User can see NUCs on Player Failover section and during the entire process of configuration "Disable Player Failover" is disabled and grayed out.

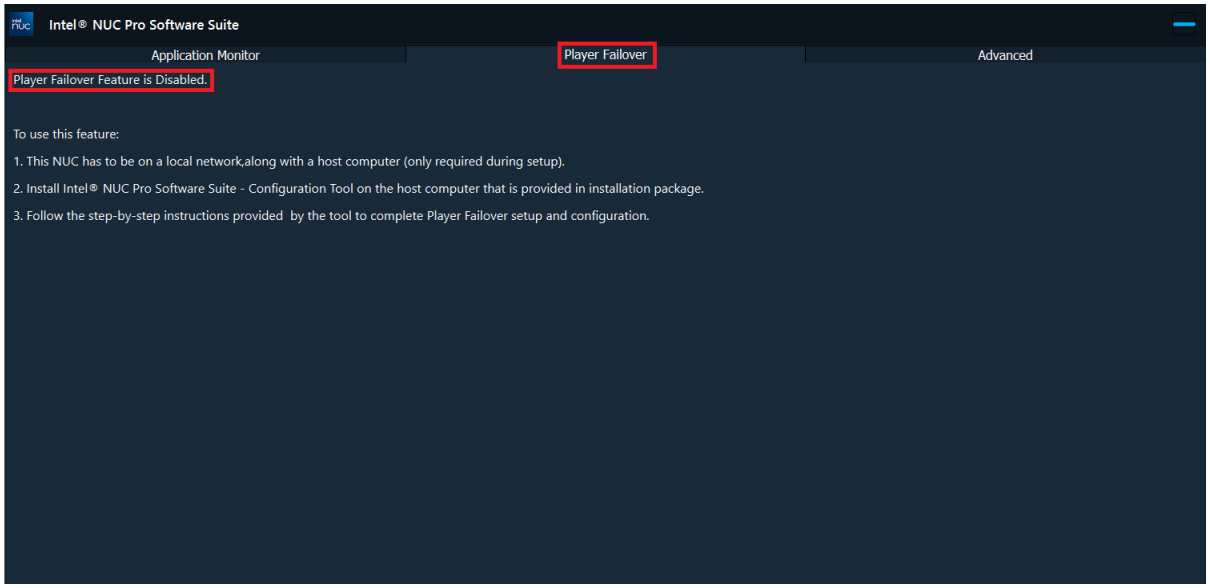


   iii. After the configuration is complete, user can check the "Disable Player Failover" which will prompt for user confirmation.





iv. On click of **Yes**, Player failover is disabled and No NUC is visible in the 'Player Failover' section.



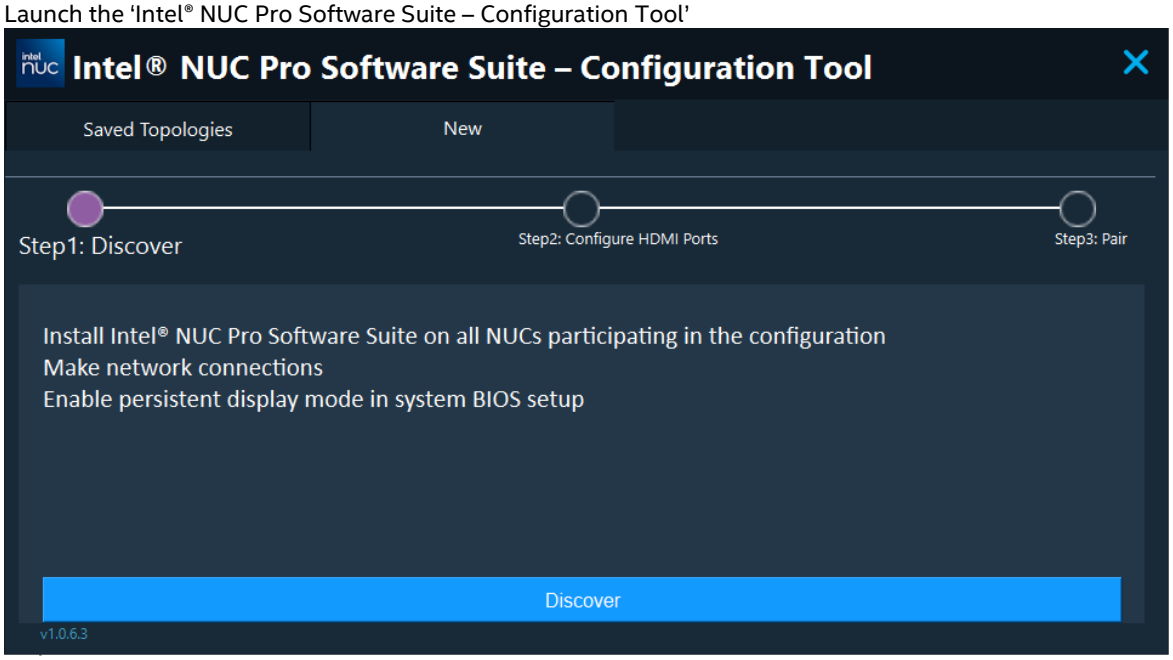
5 Intel® NUC Pro Software Suite - Configuration Tool

The **Intel® NUC Pro Software Suite – Configuration Tool** provides step by step instructions to configure the target NUCs and setup the primary and secondary connection between the target system and displays.

Do not install the configuration tool on the target NUCs. Instead, install the configuration tool on a host PC which is on the same network as the target NUCs.
If you have not installed the configuration tool yet, refer to the installation section for Windows and Linux

5.1 Process of Execution

1. Launch the 'Intel® NUC Pro Software Suite – Configuration Tool'



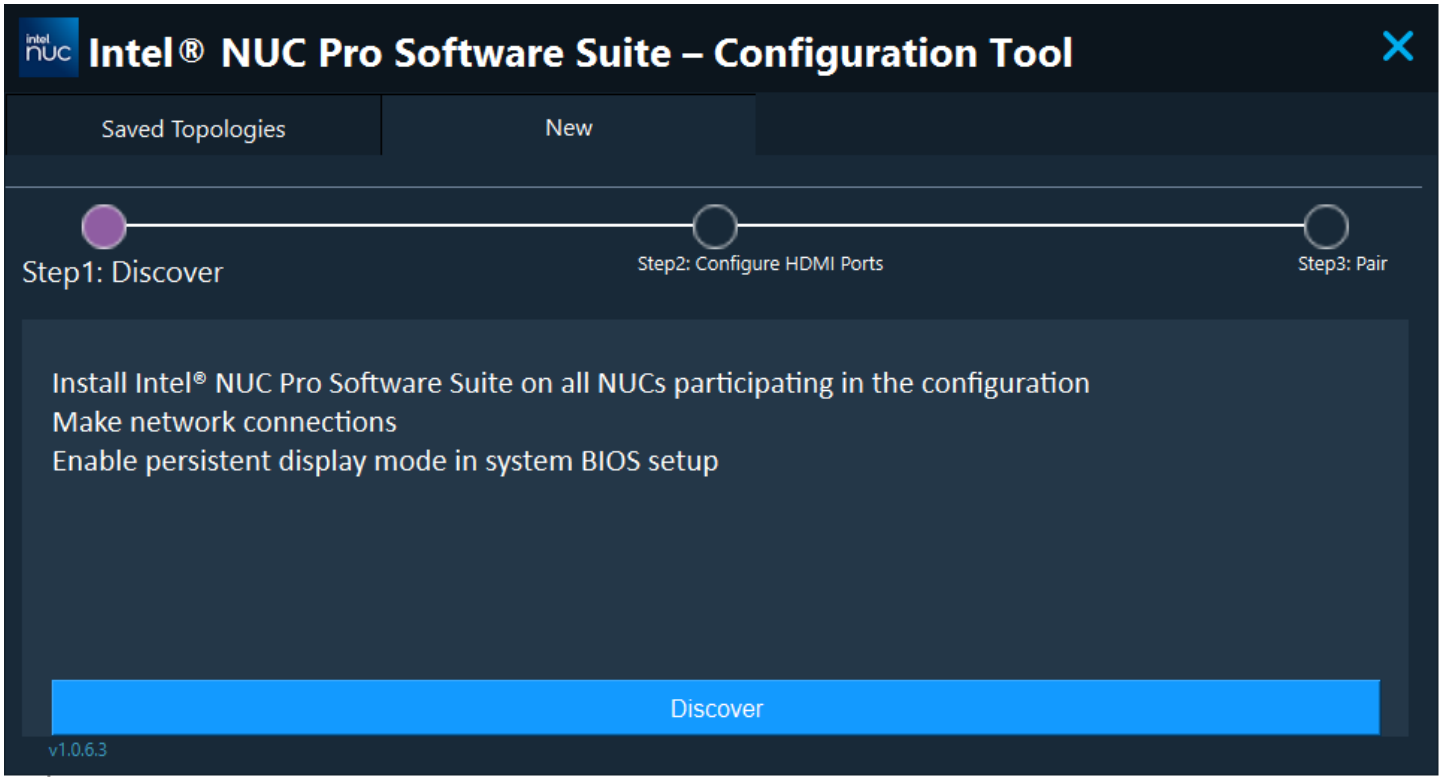
2. Switch to **New** tab to start the configuration.
3. The Configuration tool is divided into three steps:
   i. Discover
   ii. Configure HDMI Ports
   iii. Pair

4. Configuration Steps Indicator

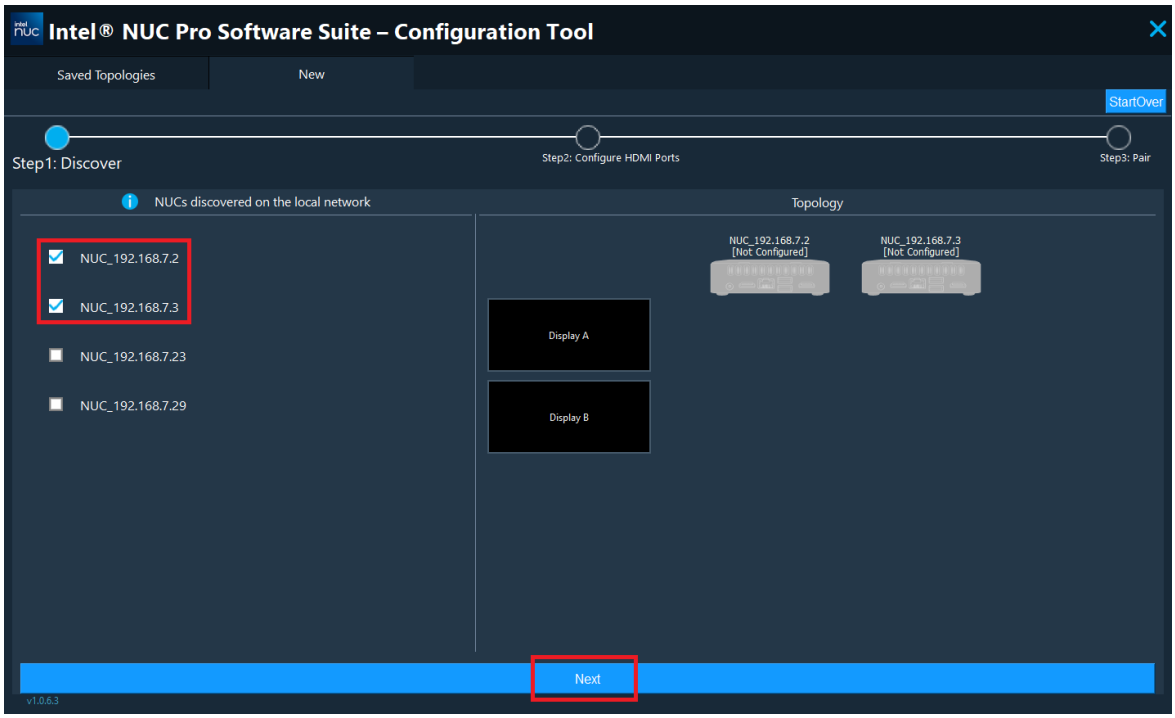
icon indicates the check is incomplete or in progress
icon indicates the check is complete.

5.1.1 Discover

1. In the Step 1, click **Discover** button to view the available NUCs IP Address on the Local Network or Wi-Fi or LAN.



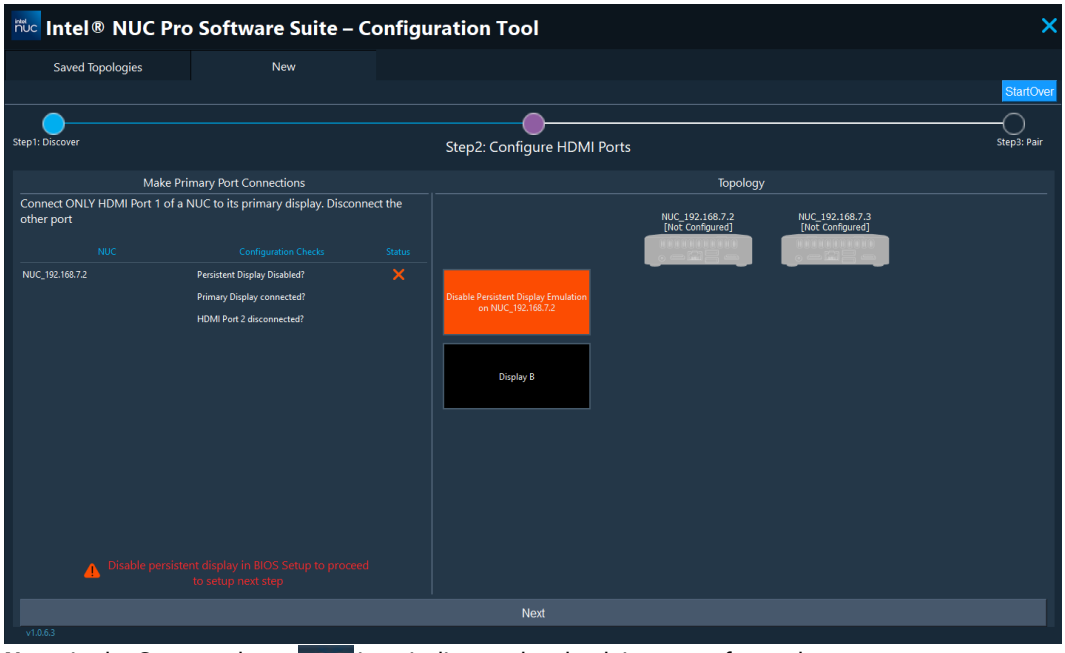
2. Select the IP Address checkbox to view the topology of the NUCs on the right-hand section of the window.



3. Click **Next** button to go to **Step2: Configure HDMI Ports**.

5.1.2 Configure HDMI Ports

1. In this step, the user must perform all three **Configuration Checks** for each NUC to make Primary Port connections.



Note: In the Status column, icon indicates the check is not performed

icon indicates the check is performed.

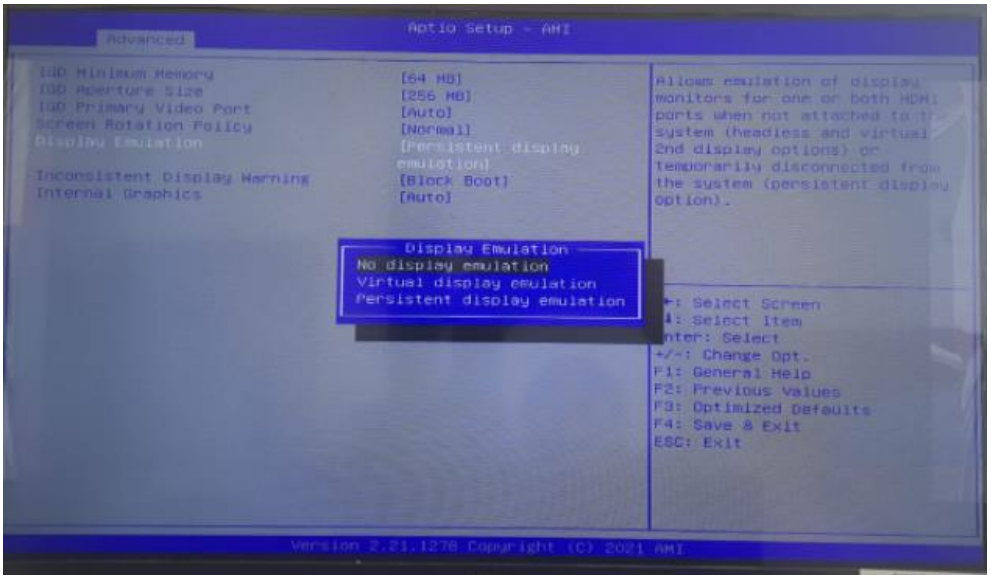
5.1.2.1 Persistent Display Disabled?

1. Persistent display feature allows the user to make the permissions for switching between primary and redundant connection in player failover state.

2. Make sure to disable the Persistent Display to avoid redundant connection issue.

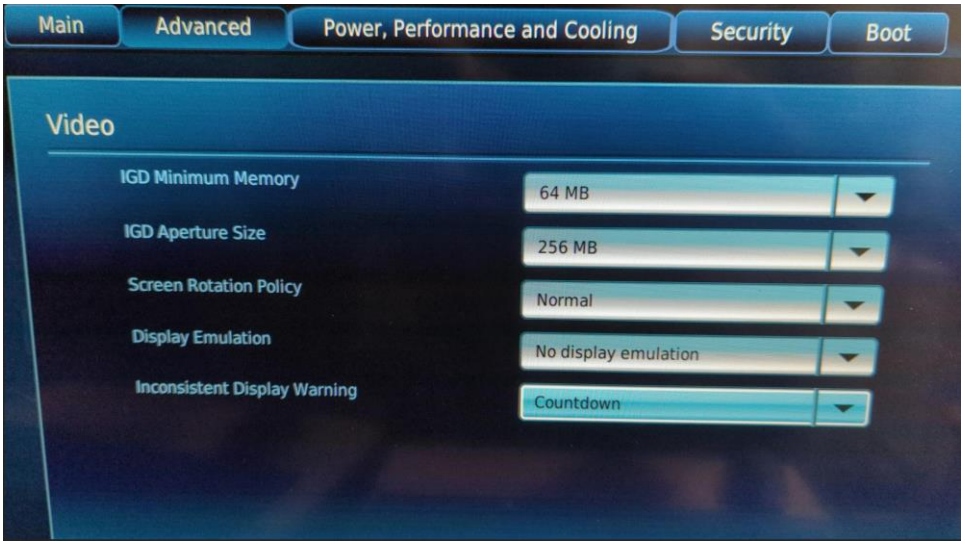
   i. How to Enable or Disable Persistent Display?

   1. **Press** *F2* during boot to enter the BIOS.
   2. Once in the BIOS, navigate to ***Advanced > Devices > Video***.
   3. **Select** the *Display Emulation* option.



   4. Select **Enable** or **Disable** option from the list.

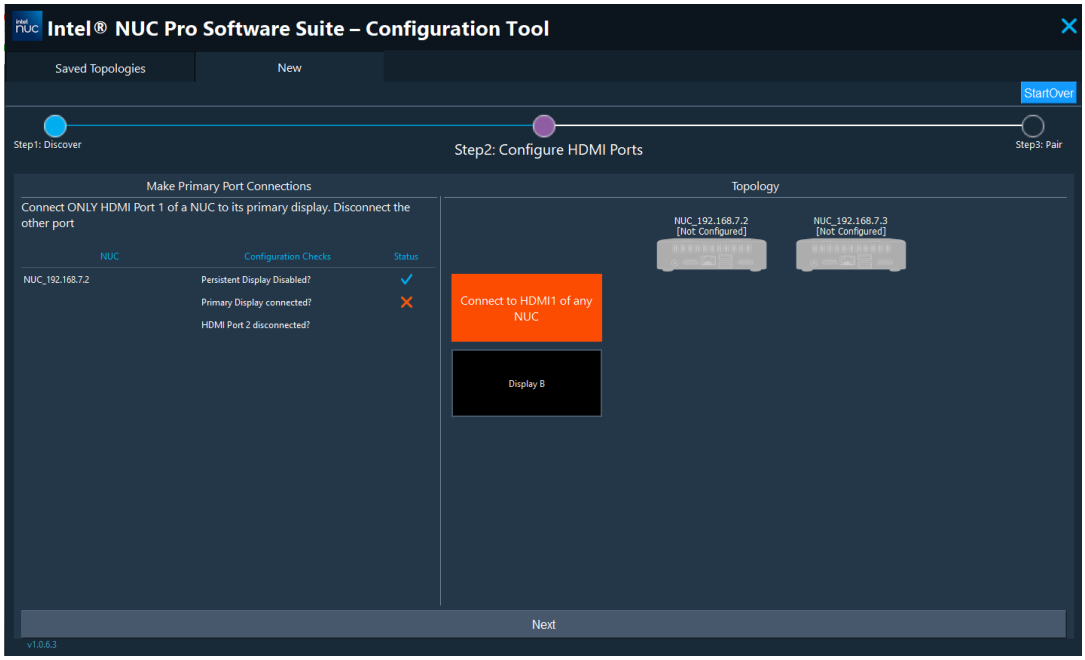
3. Make sure to select Inconsistent display warning to “Countdown”

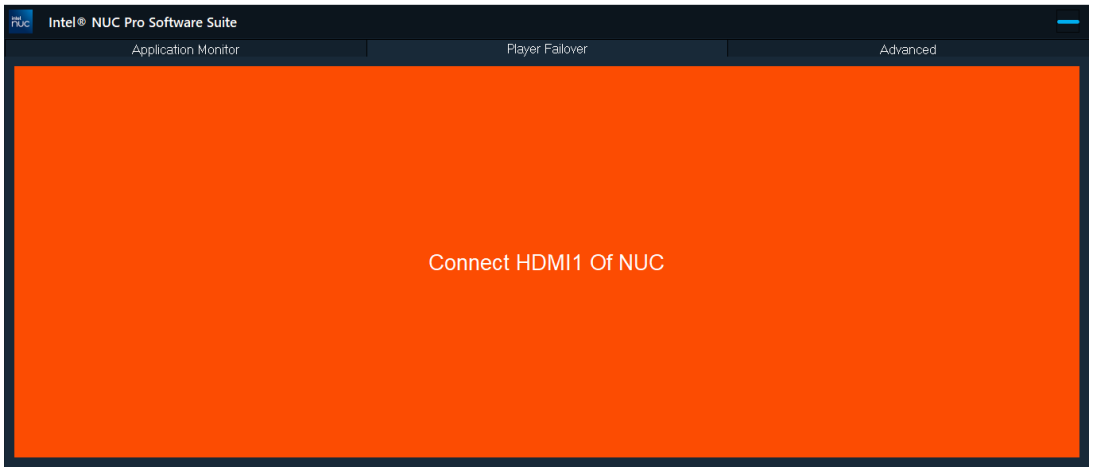


5.1.2.2 Primary Display Connected?

1. Connect the primary display's HDMI port connection to primary port of the NUC.

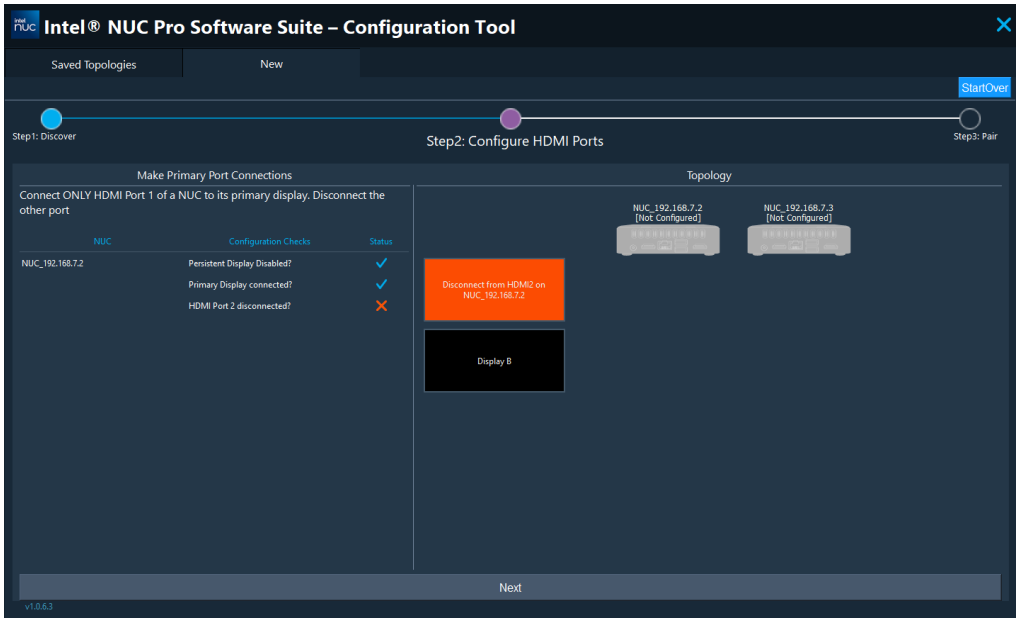
Note: If the primary port connection is not established correctly between NUC and Display, an error message displays both in Display B of config tool and in the Intel® NUC Pro Software Suite as below:

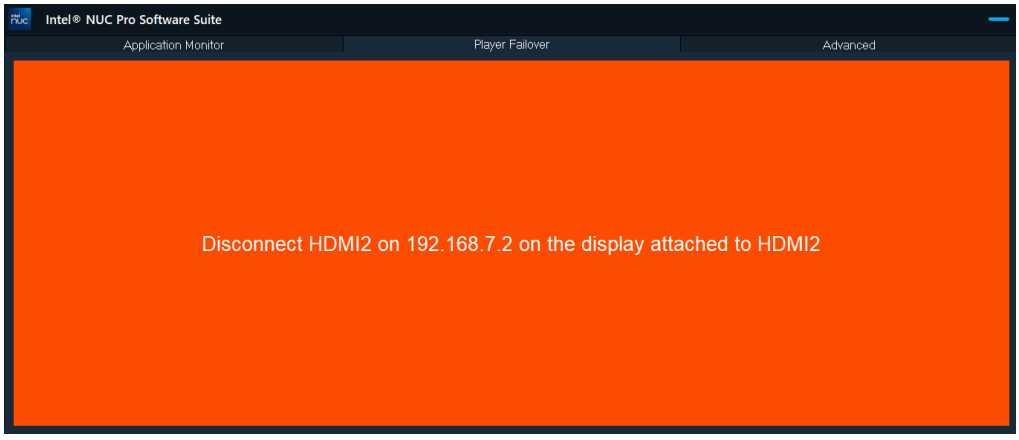




5.1.2.3 HDMI Port 2 Disconnected?

1. The Secondary connection (Dotted Line) must be disabled as we are configuring the Primary Connection to complete the configuration.
   Note: If the Secondary Connection is not disabled, an error message displays in both Config tool and Intel® NUC Pro Software Suite as below:

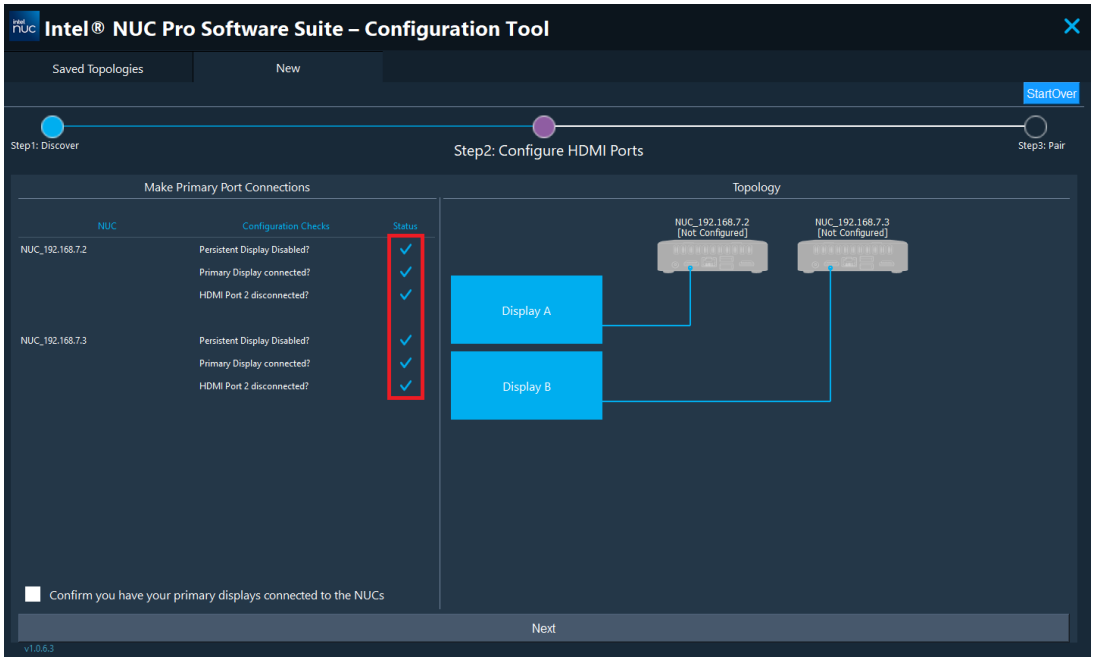




2. The Topology section displays:

   i. Two NUCs with its unique IP Address

ii. Configuration states of NUCs (Configured or Not Configured)
iii. Two Displays (Display A & Display B)
iv. Primary Connection between the primary ports of Display and NUC

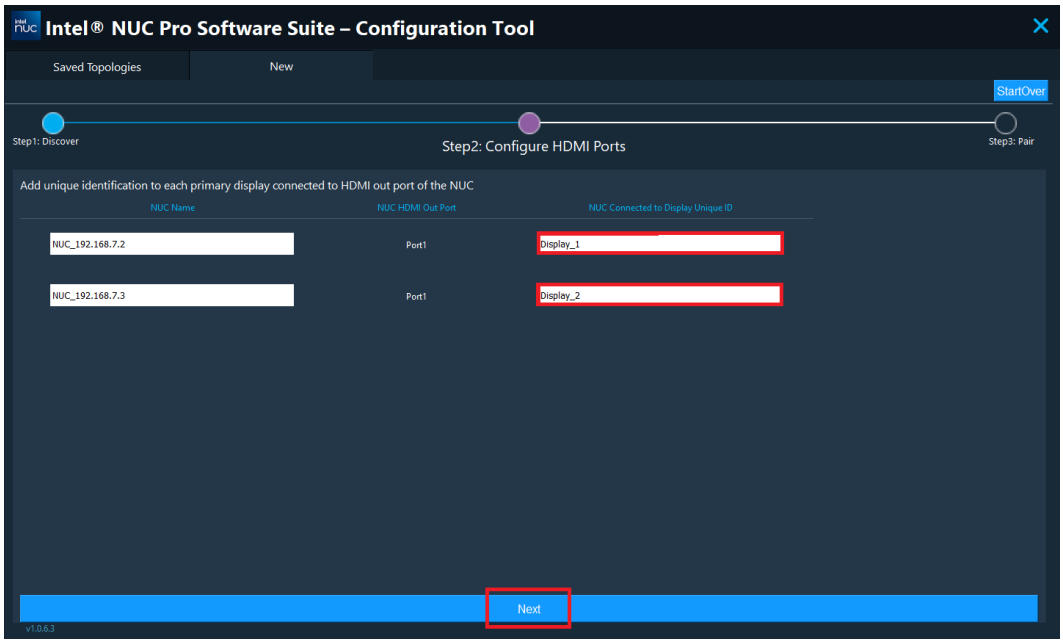


3. Click "**Confirm you have your primary displays connected to the NUCs**" checkbox to enable the **Next** button.

4. After performing all the configuration checks for each NUC, if any of the check fails due to unknown reasons, a Cross Mark displays in the status column for respective configuration check.

5. In this scenario, user must fix all the issues until a check mark appears in status column.

6. In the next window, enter the unique EDID (provided to the Display after enabling Persistent display) in the respective fields of the NUC name.



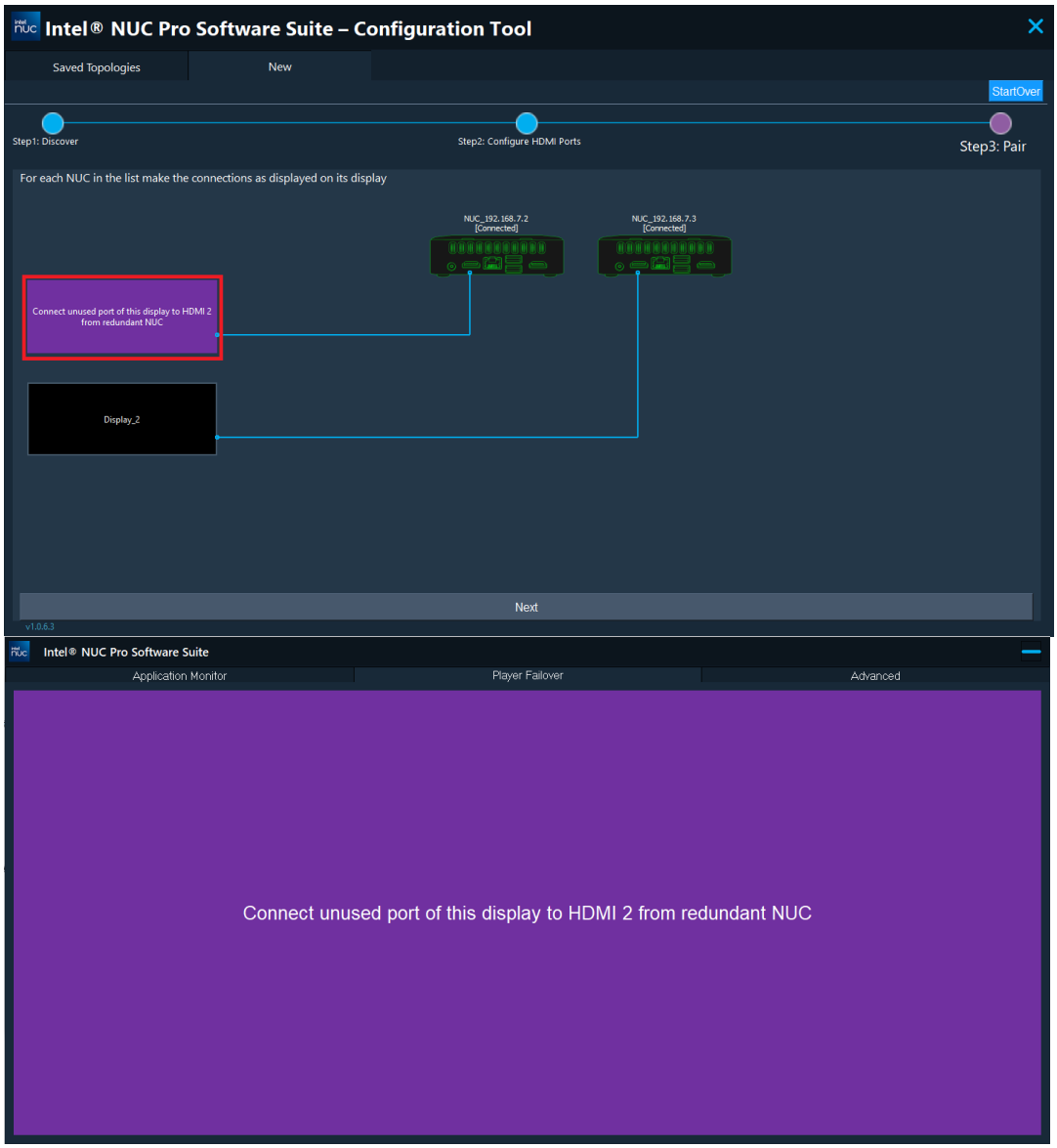
7. Click **Next** button to go to **Step3: Pair**.

5.1.3 Pair

1. The Unique ID information entered in the previous window displays here.

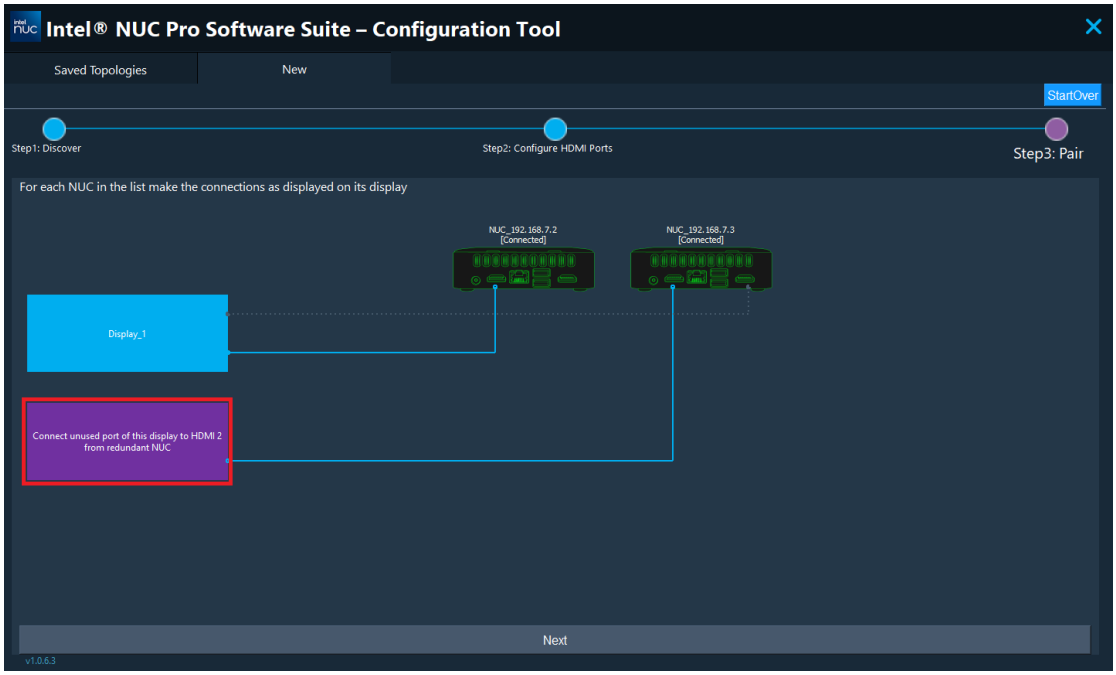
2. The user can see the message "**Connect unused port of this display to HDMI 2 from the redundant NUC**" to setup the

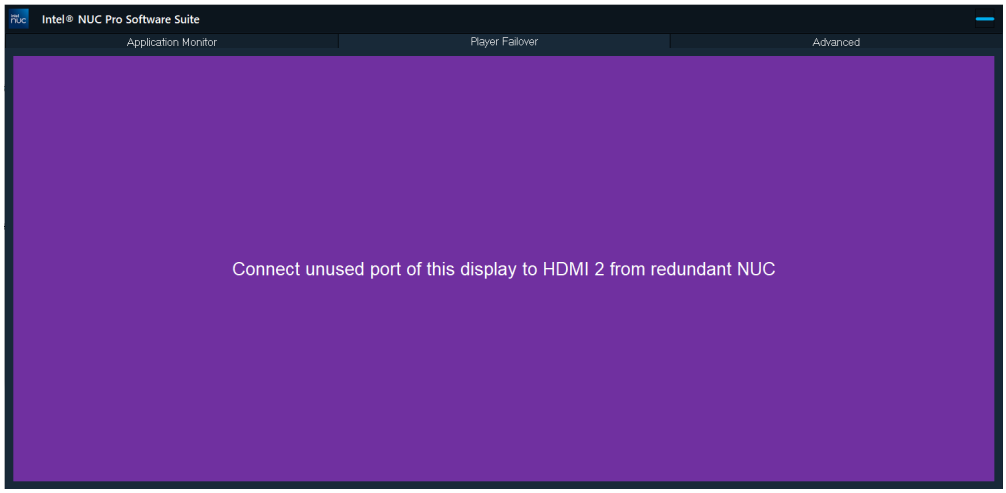
secondary connection (Dotted Line) in the Display A of Config tool and in the Intel® NUC Pro Software Suite.



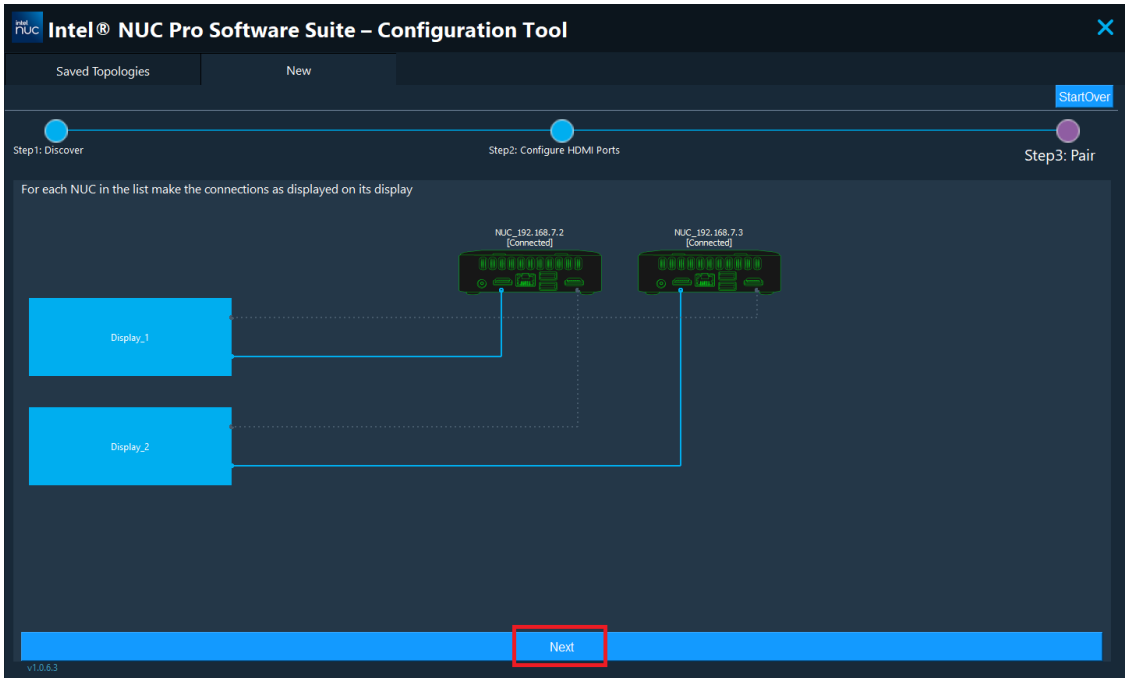
3. Connect the port 2 of Display A to HDMI 2 of the redundant NUC

4. After successful connection, user can see a secondary connection (Dotted Line) between display and NUC ports.





5. Now, connect the port 2 of display B to HDMI 2 of the redundant NUC. After successful connection for both NUCs, the Display A and Display B is set to show the data or information from the NUCs.



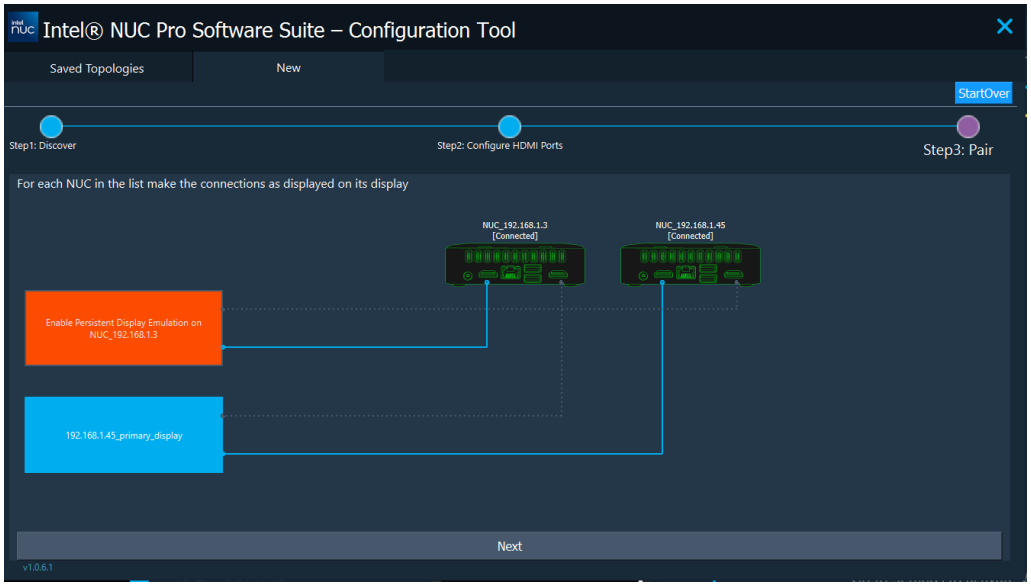
6. Perform the same steps for each Display or NUC and click **Next**.

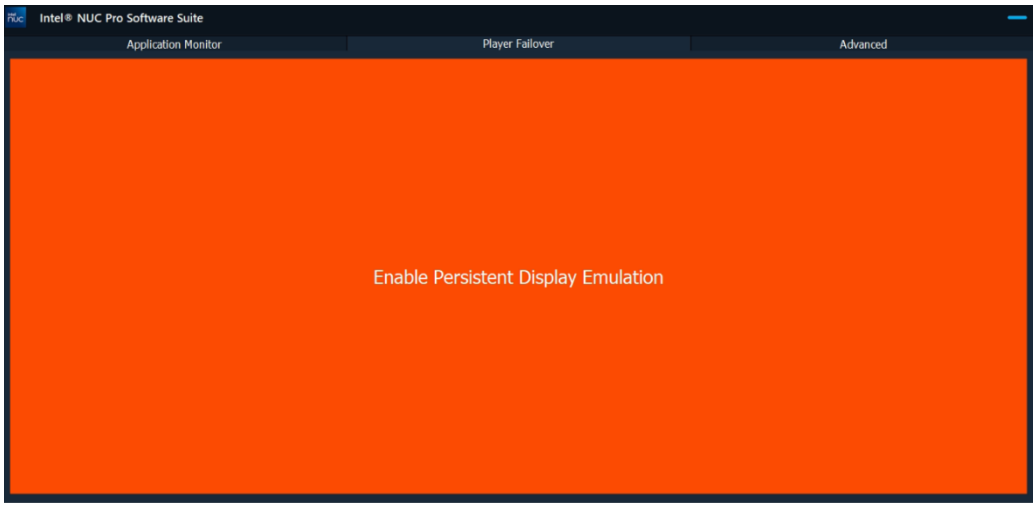
7. The display will show the message "**Enable Persistent Display Emulation on NUC**" as the display is not registered with the specific NUC.

8. To avoid display connectivity interruptions without the operating system redetecting and rearranging the display layout, enable the Persistent Display emulation in NUC.

9. For detailed steps to enable or disable the persistent display, click here.

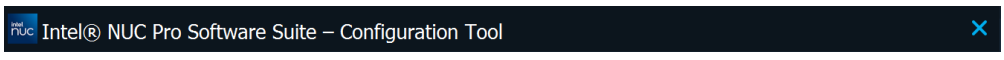
10. Enable the persistent display emulation for Display A and the screen will load the data from the NUC

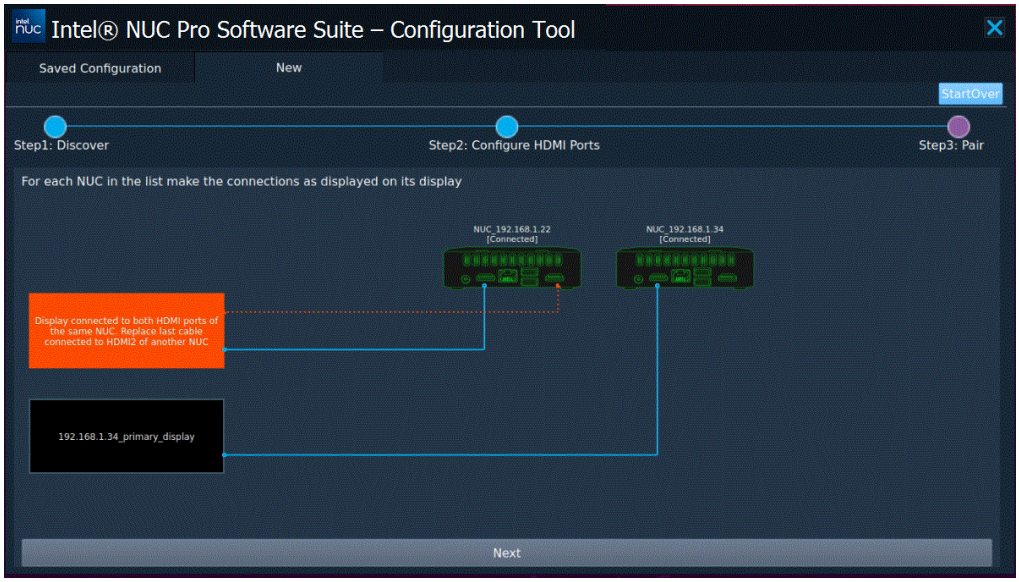




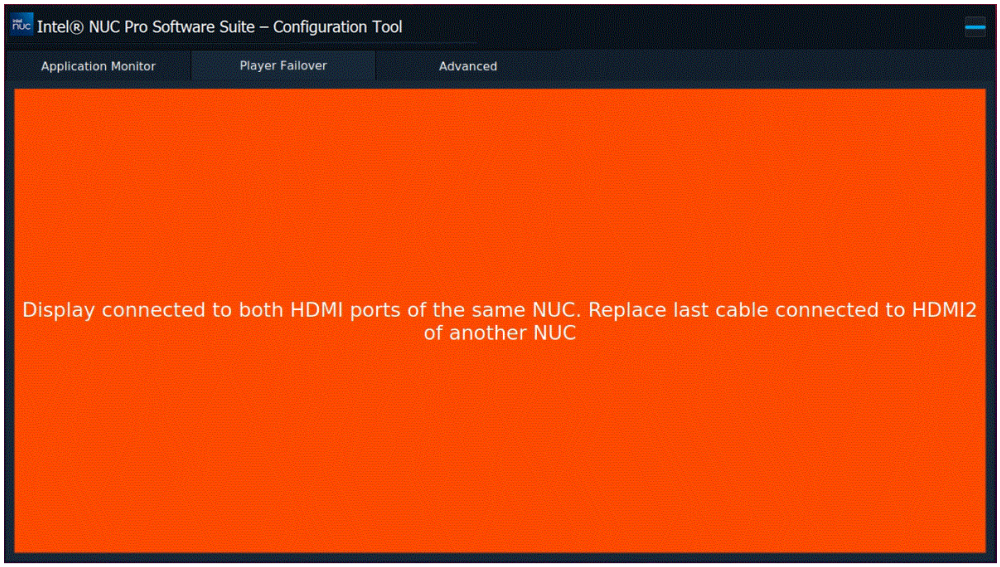
Note: If the user connects the port 2 of Display A to HDMI 2 of 1.22 NUC (used for making primary connection) as shown in the below example:

- The dotted line is a secondary connection, whereas the solid lines are a primary connection.

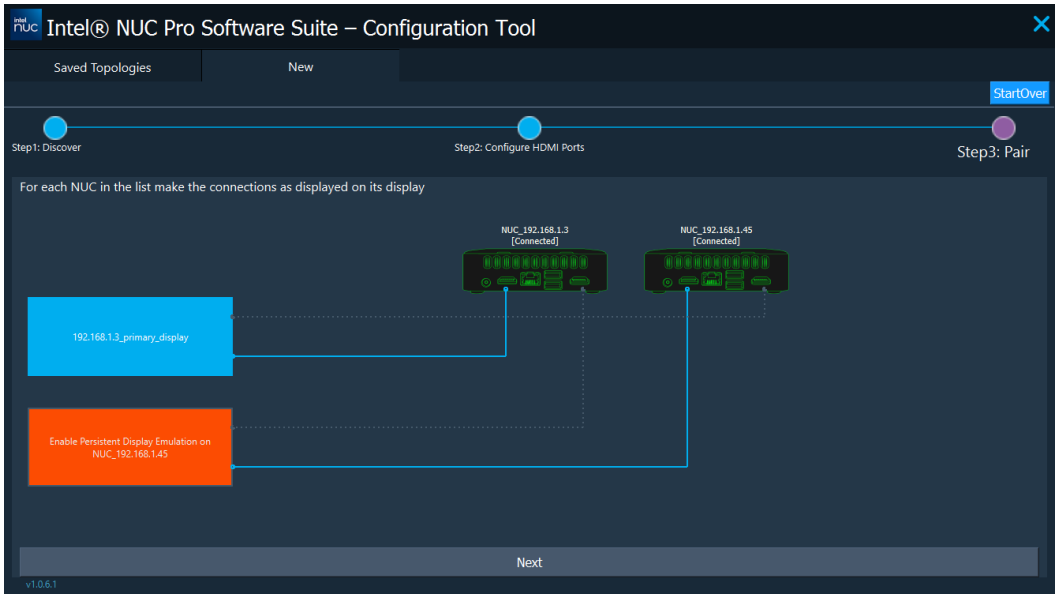


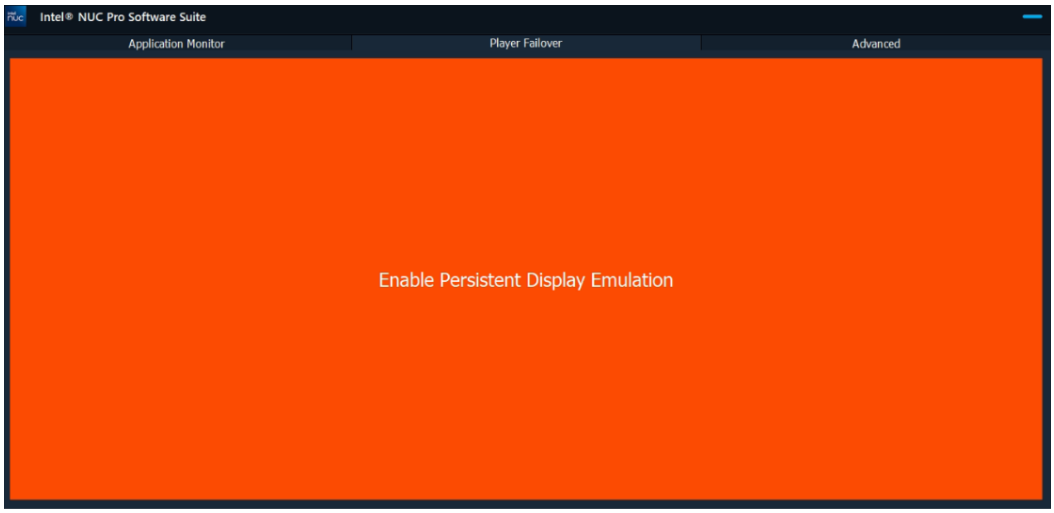


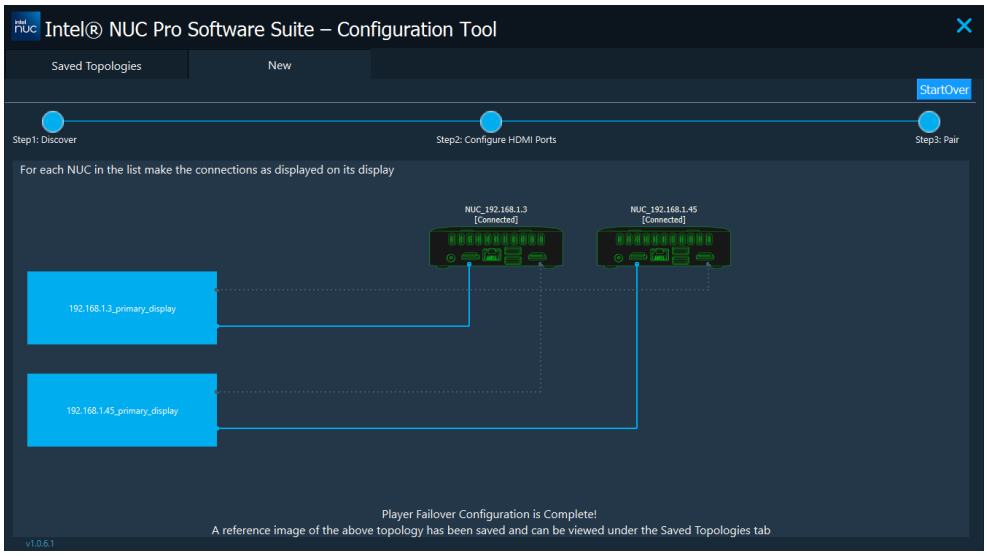
An error message, "**Display connected to both HDMI ports of the same NUC. Replace last cable connected to HDMI2 of another NUC**" shows in Display A of Config tool and in the Intel® NUC Pro Software Suite.



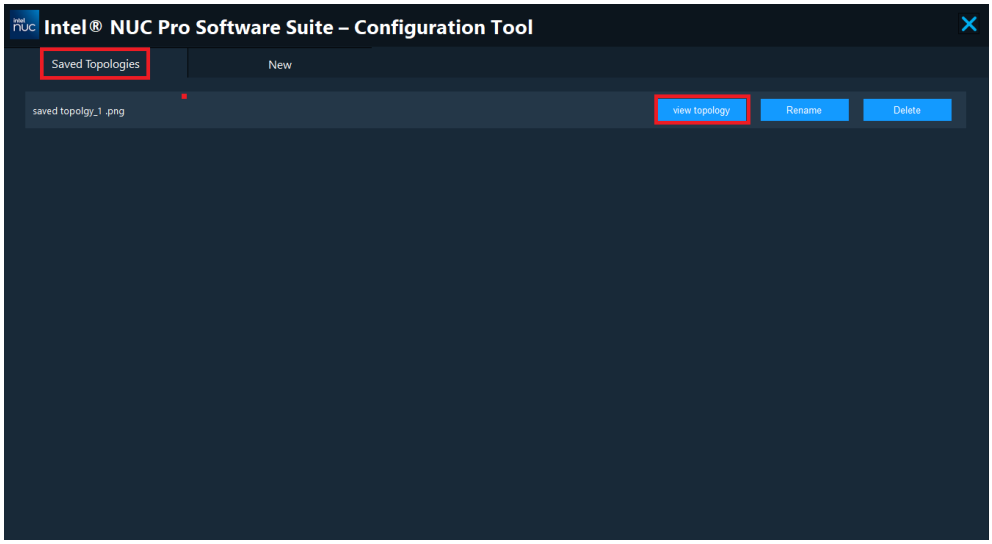
11. Enable the persistent display emulation for Display B and the screen will load the data from the NUC (192.168.1.45)

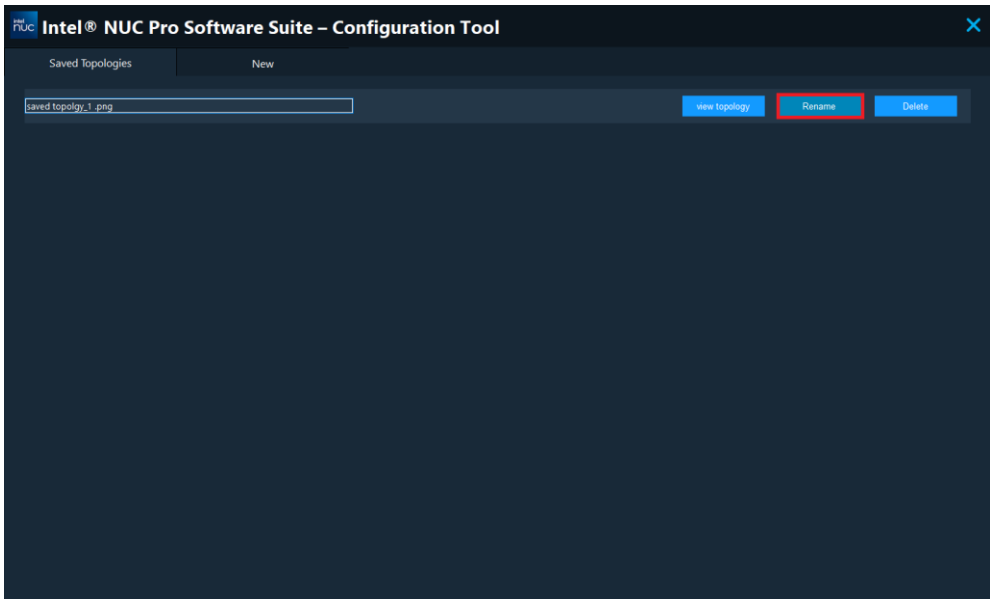


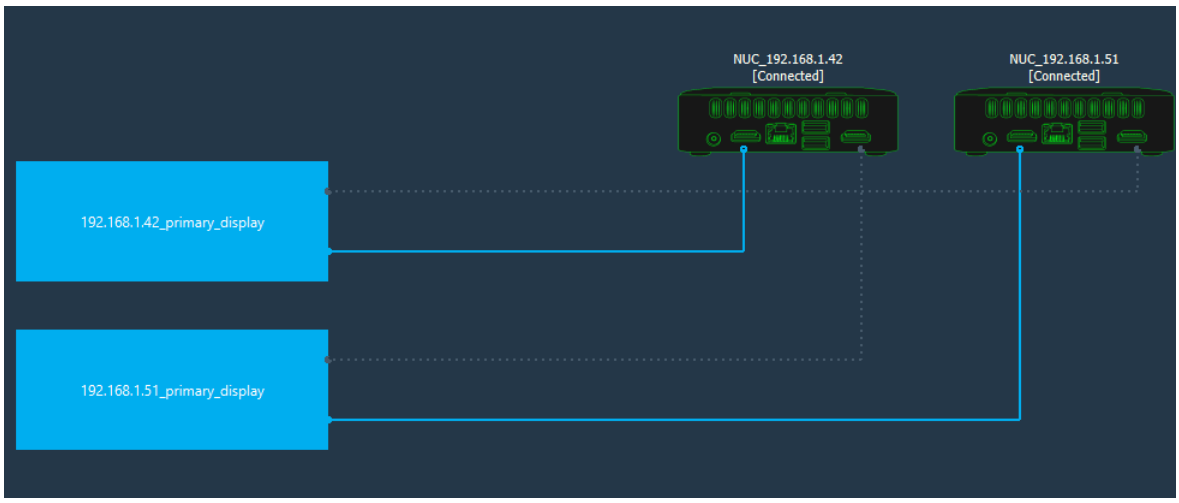




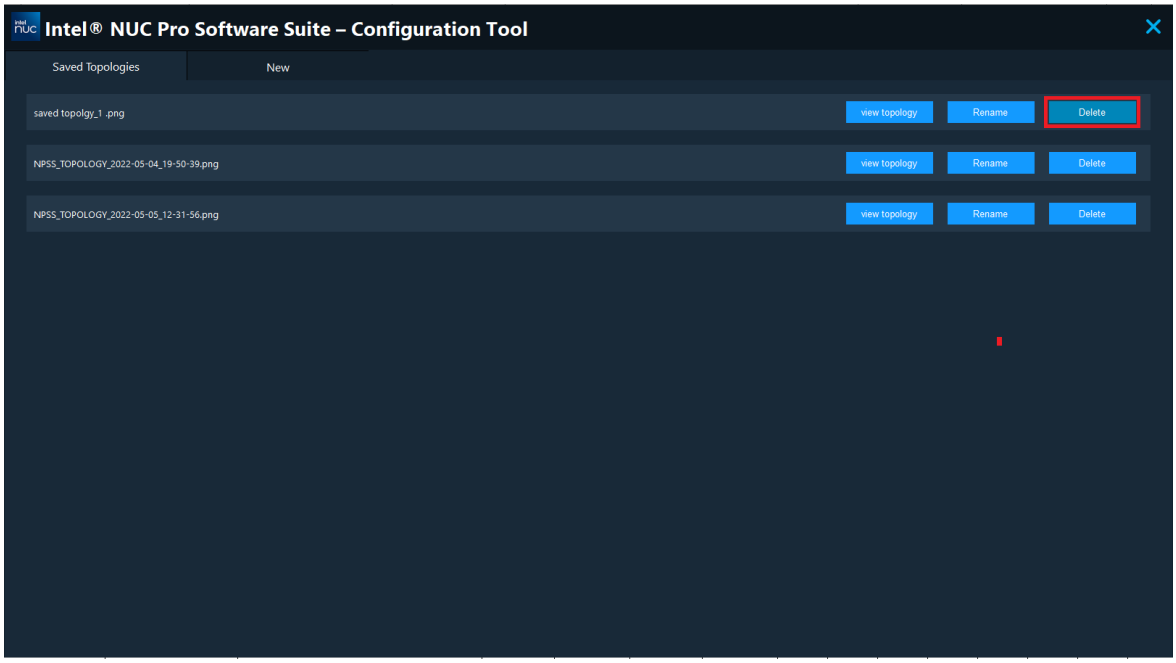
12. To view the saved topology, click on ‘Saved Topologies’ tab – View Topology button.
13. Click on Rename to change the name of topology.



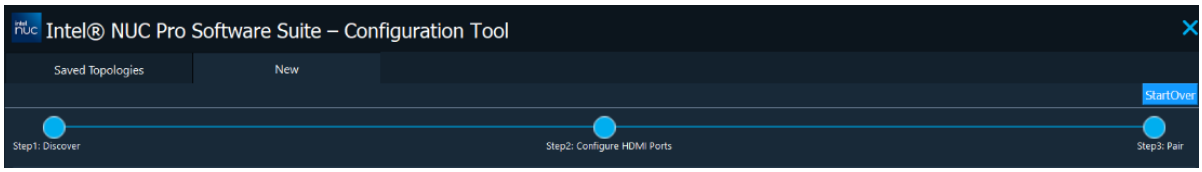




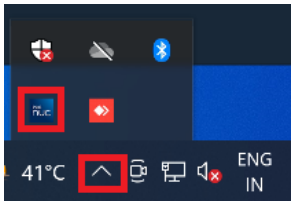
Click on Delete to remove the toplogy image.



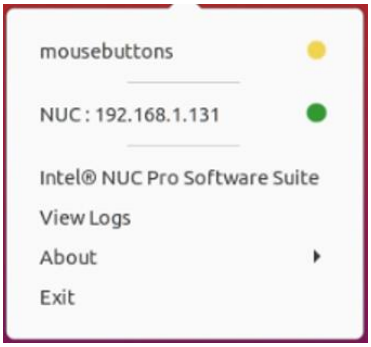
14. To register another NUC, click the **StartOver** button and the user will be navigated to the Step1:Discover.



6 System Tray Application



Open the system tray from desktop and right-click the application icon, the below options/status will be shown:



1. Applications added from Application Monitor along with their status.
2. Paired NUCs along with their status.
3. Application name to open the User Interface.
4. **View Logs** are used to open captured logs.
5. **About** shows the version of Application and service.
6. **Exit** closes the Application.

7 Known Errata

1. Player Failover feature can behave unexpectedly if HDMI cables are plugged out and plugged-in during runtime.

2. To unselect a row on Application Monitor, the user needs to press the CTRL key and click the desired row at the same time.

3. During configuration, there may be a chance when both NUC are not visible to each other and state message (like disconnect HDMI-2, persistent enable/disable etc.) are not updated on config tool
    - Work around 1: User need to do start over and restart configuration.
    - Work around 2: If user still gets the issue, then please check network connectivity with all NUC and Config tool machine and reboot all machines. Issue should be resolved.

4. In some scenarios few NUCs are in pre-configured state and one NUC needs to be replaced, after replacement user may get wrong connection in topology screen.
    - Work around: User can do start over and restart configuration for all target NUCs.

5. During configuration if HDMI cable is plugged out from either NUC then NPSS application hides from both HDMI screens
    - Work around: User need to exit NPSS through systray and try to relaunch