

## What is PANDAD?

Pandad enables the discovery of NION's that are running on the network and the communications between the NIONs. Pandad.exe is started in the background on the control computer when NWare.exe is started. Pandad is also a process running in the NioNodes and ControlNodes. This document speaks specifically of the instance of Pandad.exe that is running on the control computer. Pandad MUST be run by a user with Administrative privileges. This is where the "Create Semaphore Failed..." message comes from.

When NWare is started, Pandad is started as a service. Pandad's job is to create and maintain the log of all NIONs on the network. The process works like this:

1. Pandad on the control computer broadcasts a discovery packet when it starts.
2. Pandad in all the NioNodes respond with their device lists.
3. Pandad on the control computer creates a list of all the devices on the network from the replies it receives from the other NioNodes, ControlNodes, and other control PC's.
4. Pandad subscribes to a multicast group that is in use by all the NioNodes, ControlNodes, and control PC's.

As with all discovery processes, this broadcast bursts in the beginning, and quickly tapers off, with small broadcast packets continuing about 11 times a second (this works out to .9% of the total bandwidth of a 100 mbps network segment).

If there is more than one network interface in the control computer (wired or wireless), when NWare is first started, a dialogue box will open that asks which network interface to use for communications. The correct port MUST be selected here or no devices will be found on the network.

There are several ways to break or crash Pandad while it is running on the control PC. Here is a quick list of a few ways:

- Change the IP address of the network interface after Pandad has started.
- Unplug the network cable, or otherwise interrupt network communications.
- Shutdown, then restart NWare before Pandad has had an opportunity to exit.

When something happens to break or crash Pandad, it can be recovered without requiring the shutdown of NWare. Here are a few symptoms that indicate Pandad has crashed:

- Though they can be pinged, no NioNode devices are listed in the "Remote Log" tab of the Output Frame in NWare. If the NioNodes cannot be pinged, the network is broken, not Pandad.
- All NioNodes have all reverted to IP address only and their friendly names have gone away on the "Remote Log" tab of the Output Frame in NWare.
- No NioNode devices are listed in the "Role Deployment" dialogue box.

- No projects are listed in the dialogue box for “Upload and Connect”.
- No projects are listed in the dialogue box when starting NWare Kiosk.

This is the process to recover Pandad without shutting down NWare:

1. Ctrl+Alt+Del to bring up the “Task List” on the control Computer.
2. In the “Windows Task Manager” dialogue box choose the “Processes” tab.
3. In the “Image Name” column, click on “pandad.exe”. (Click on the column header to sort all entries alphabetically.)
4. Click “End Process”, “pandad.exe” should now exit. (Task Manager can now be closed, or it can just be minimized.)
5. Using Windows Explorer, My Computer or other method, navigate to the root of the version of NWare you are using (the root is where you find NWare.exe). Click to start Pandad.exe in “Interactive Mode”. A command line box should now open and await further instruction.

Pandad.exe should once again be present in the “Windows Task Manager”. In NWare it should be noted that all the NioNodes are once again present. It may take a few seconds for the list to be completed and updated. It will now be possible to continue with an interrupted deploy or finish an upload and connect. The NioNodes will also appear or reappear in your remote log.

### **What the heck is Pandad Interactive Mode?**

Pandad Interactive Mode allows the user the ability to directly influence and directly monitor the health of communications between NWare and the NioNodes it controls. The most common use of Pandad Interactive Mode is to establish Remote Links with NioNodes on different subnets. It can be used for other things as well. Entering the command “help” at the command prompt will provide a list of available commands.

If Pandad Interactive Mode is started before NWare, Pandad as a process will not be started. NWare will look to Pandad Interactive Mode for the network log, rather than starting its own Pandad process.

Pandad Interactive Mode is not bulletproof. The above list of causes (except for the shutdown and restart) can still crash Pandad. If Pandad has once again crashed, Pandad Interactive Mode will need to be stopped and restarted. Now Pandad Interactive Mode can be restarted, and everything will start working correctly. Once it is time to shut down Pandad Interactive Mode, it is feasible to just click the red “X” in the upper right-hand corner. However, the correct way to shut down Pandad is to type “exit” at the command line. This will provide feedback that the user can observe whilst Pandad Interactive Mode unsubscribes from the multicast group, “destroys the orb”, and closes the window.

## **Establishing and Monitoring Remote Links with Pandad Interactive Mode**

By utilizing the “remote\_link” command in Pandad Interactive Mode it is possible to communicate with the NION’s control network through routers and firewalls using VPN bridges. It is NOT RECOMMENDED to deploy a project through a remote\_link connection. A better solution would be to use a virtual desktop software package to control a computer that is on the local control network to execute project deployment. However, remote control of the system across routers and firewalls does work very well, once the remote\_link has been established.

To establish a remote link to a NION control network, follow these steps:

1. Start Pandad Interactive Mode.
2. At the prompt enter “remote\_link xxx.xxx.xxx.xxx” (where the xxx.xxx.xxx.xxx is replaced by the IP address of one of the NIONs)
3. Check that the remote link is working by entering the command “remote\_link\_status” (= 1 Pandad has found a NioNode = 0 Pandad has NOT found a NioNode, check your IP address and try again.)

By connecting to a NioNode through remote\_link, the distant NioNode will now send its Pandad log to your control computer as a unicast packet. This sharing allows NWare to see all of the NioNodes on the remote network as if it were residing on that network.

It should be noted that there is no way to tell Pandad to stop monitoring an IP address for a remote link. Once the command has been entered, it will always monitor that address until it is shut down. This is not inherently a problem and does not cause problems if an incorrect remote link is entered.

It should also be noted that more than one remote link can be started at any time and multiple can be engaged at any given time.

If a user is regularly working with a system that requires remote links, it is feasible to modify the “pandad.cfg.xml” file to automatically load remote links whenever Pandad.exe is started.

To set up pandad.cfg.xml to tell Pandad.exe to automatically load remote links, follow these steps:

1. Open the file “pandad.cfg.xml” in a text-editing program like Notepad.
2. Save the file as “pandad.cfg.bkp”
3. Line 42 should be a blank line between the last “End Comment” command (-->) and the “End Panda” command (</panda>)
4. Enter the remote link commands in this space, additional lines can be added if necessary.
5. Save the file as “pandad.cfg.xml”.
6. Start either NWare.exe or Pandad.exe to see if your modifications are correct and the system works.

The command should be entered as seen on the next line VERBATIM.

```
<remote_link ip="xxx.xxx.xxx.xxx" local_only="0" />
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Replace the xxx.xxx.xxx.xxx with the IP address of the NioNode that is being accessed, and be certain to keep the quotation marks in place. The command "local\_only="0"" tells Pandad running on the remote device to send the device log of everything on that segment of the network. If a "1" is entered in place of the "0", it will only send information about the device at the specific network address. There are examples in the commented out sections in the pandad.cfg.xml file that describe this as well. Always be sure to save the original pandad.cfg.xml file as a different name to insure it is available in the event that a backup, or a "return to original configuration" is required.

As can be seen here, Pandad Interactive Mode is a POWERFUL tool, use it well.

Have fun and good luck!!!