
LAB RATS INC.

PROJECT PLAN

Project Troubleshooting

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Executive Summary

Introduction to the report

The overview of the requested project.

Project Report

Step by step guide for troubleshooting and configuring Network Interface Cards.

References for the report

Listed references and resources mentioned in the report.

Introduction

The following report will outline a step by step troubleshooting guild for network congestion and connectivity issues within Server 2019. This guild is meant to be a general reference and may not exactly mirror current networking configurations.

Project Report

For most system administrators, troubleshooting connectivity issues can be tedious at times. End users submit seemingly endless problems with complaints of their Internet being “slow” or the "Internet not working". Often these complaints have little to no information pertinent to the issue to help begin the troubleshooting process. It’s at this point a knowledgeable sysadmin will begin troubleshooting the complaint by beginning with the most common point of failure and working their way up in order of complexity.

Testing the NIC

The easiest way to check that the Network Interface Card is functioning is to send out a series of ping tests designed to narrow down what the issue might be.

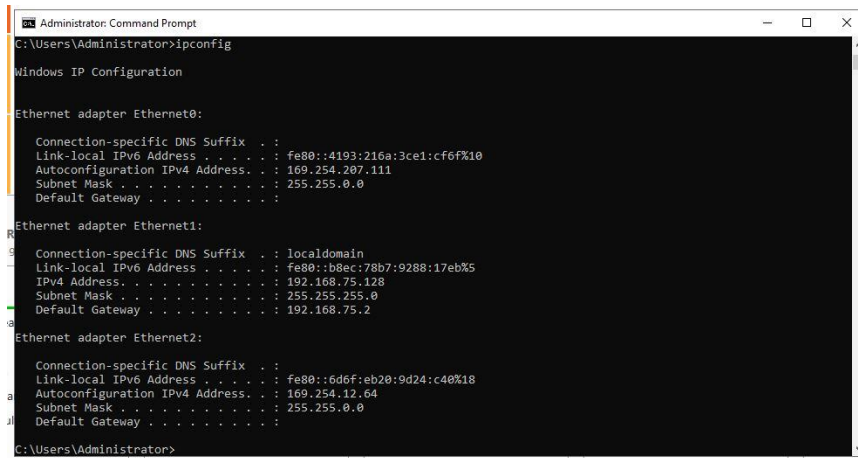
To begin, open the Windows search function and type in *cmd*. This will bring up the Command Prompt, click on it start the application.



Figure 1. Search CMD.

Once the command prompt is open, begin by typing in the following command:

ipconfig > press Enter.



```
Administrator: Command Prompt
C:\Users\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet0:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::4193:216a:3ce1:cf6f%10
    Autoconfiguration IPv4 Address. . : 169.254.207.111
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

Ethernet adapter Ethernet1:

    Connection-specific DNS Suffix  . : localdomain
    Link-local IPv6 Address . . . . . : fe80::b8ec:78b7:9288:17eb%5
    IPv4 Address. . . . . : 192.168.75.128
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.75.2

Ethernet adapter Ethernet2:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::6d6f:eb20:9d24:c40%18
    Autoconfiguration IPv4 Address. . : 169.254.12.64
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

C:\Users\Administrator>
```

Figure 2. IPCONFIG Command.

This command will display the configured IP information for all present NICs. From here you will begin sending out ping tests.

Ping test the loopback IP with the following command:

ping 127.0.0.1 > press Enter.

The loopback IP address, also referred to as localhost, is used to establish an IP connection to the same machine being used by the end-user. Pinging the loopback lets you test that the TCP/IP stack is configured and working.

Ping the IPv4 assigned IP address to test that the NIC is working.

ping 192.168.75.128 > press Enter.

This is the assigned IP address that the computer is currently using to get out to the network.

Ping the Default Gateway to test that the LAN is working.

ping 192.168.75.2 > press Enter.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17763.737]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>ping 192.168.75.128

Pinging 192.168.75.128 with 32 bytes of data:
Reply from 192.168.75.128: bytes=32 time<1ms TTL=128
Reply from 192.168.75.128: bytes=32 time<1ms TTL=128
Reply from 192.168.75.128: bytes=32 time<1ms TTL=128
Reply from 192.168.75.128: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.75.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>ping 192.168.75.2

Pinging 192.168.75.2 with 32 bytes of data:
Reply from 192.168.75.2: bytes=32 time<1ms TTL=128
Reply from 192.168.75.2: bytes=32 time<1ms TTL=128
Reply from 192.168.75.2: bytes=32 time<1ms TTL=128
Reply from 192.168.75.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.75.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>
```

Figure 3. Internal Ping Tests.

Ping test an external address like Google with either of the following commands:

ping google.com > press Enter, or

ping 8.8.8.8 > press Enter (this is one of Google's DNS servers).

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17763.737]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping google.com

Pinging google.com [172.217.5.78] with 32 bytes of data:
Reply from 172.217.5.78: bytes=32 time=23ms TTL=128
Reply from 172.217.5.78: bytes=32 time=22ms TTL=128
Reply from 172.217.5.78: bytes=32 time=22ms TTL=128
Reply from 172.217.5.78: bytes=32 time=22ms TTL=128

Ping statistics for 172.217.5.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 22ms, Maximum = 23ms, Average = 22ms

C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=24ms TTL=128
Reply from 8.8.8.8: bytes=32 time=22ms TTL=128
Reply from 8.8.8.8: bytes=32 time=23ms TTL=128
Reply from 8.8.8.8: bytes=32 time=33ms TTL=128

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 22ms, Maximum = 33ms, Average = 25ms

C:\Users\Administrator>
```

Figure 4. Ping Test Google.

Pinging an external address will test if routing and the internet connection is working. After checking the results of the ping tests, if the results appear to be like the examples above, then you

know that the NIC is working. If you get back results that says *Request timed out*, there is an issue with the connection, and you will need to continue to trouble shoot. You can also check on the status of the NIC using the GUI by going to Network Connections and right clicking on the NIC and selecting *Status*. From here you check if the hardware is visible by the OS and if there is any connection being detected as well as if any traffic is being pushed through the NIC.

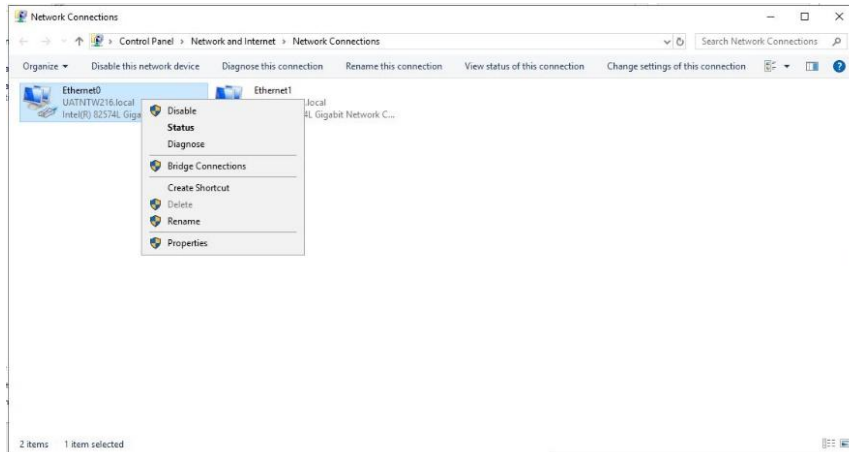


Figure 5. Network Connections.

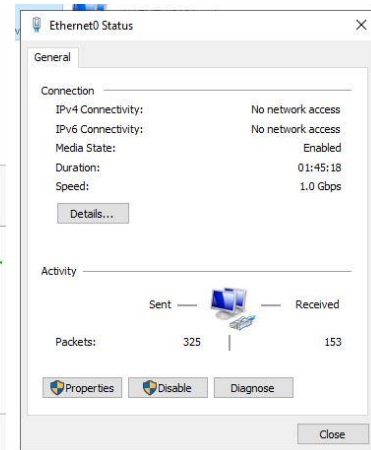


Figure 6. NIC Status.

Adding NICs to VM server

The need for additional NIC on a VM server can range from something as simple as an additional connection to a new device or to something more complex like expanding the throughput of a connection by setting up NIC teaming. Whichever the reason the process is straight forward. In VMware Workstation you will need to locate the *VM* menu at the top. Within this is a submenu called *Settings*. This is the option that you must open. Once you have the *Virtual Machine Settings* open you can click on the *Add* button at the bottom.

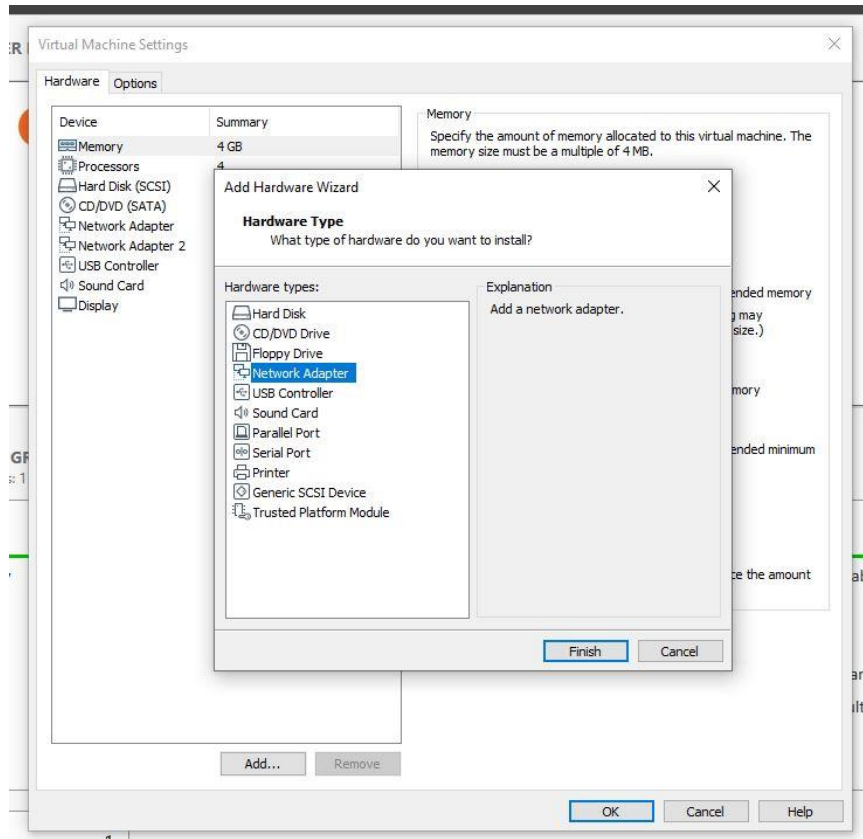


Figure 7. VM Settings.

A wizard for adding hardware will pop up. From here you select the *Network Adapter* option and click *Finish*. At this point the new NIC has been added to the VM. If need be you can select the new NIC and this will bring up it's default configurations. From here you can change any settings before you begin using the new NIC in the VM.

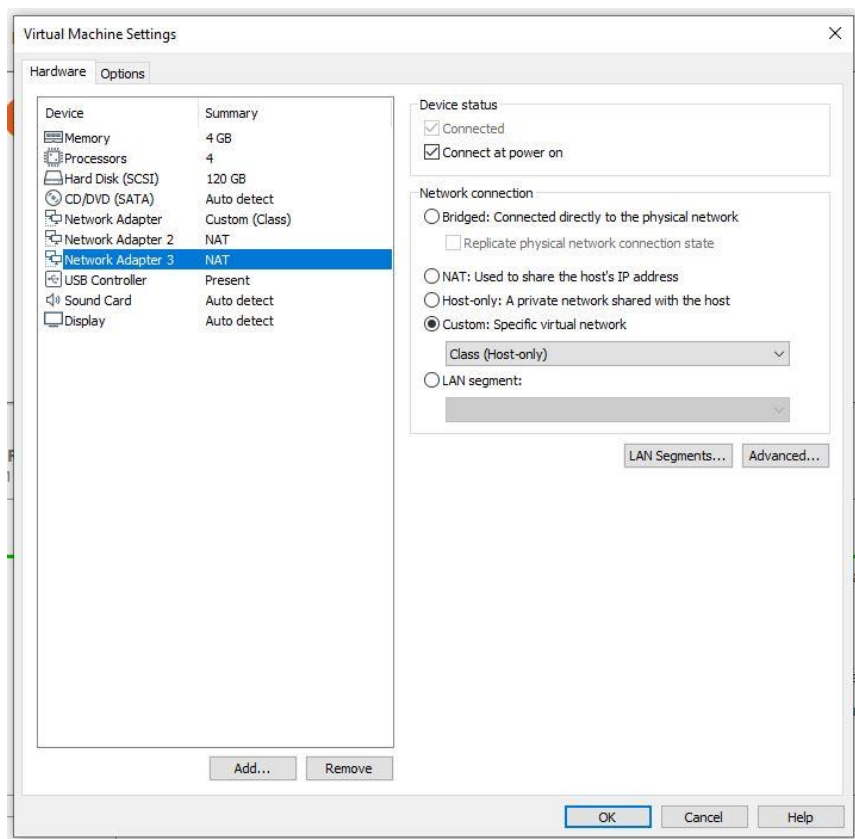


Figure 8. New NIC Configs.

Setting up NIC Teaming

When most hear NIC teaming they feel it's too complicated, but the Microsoft Server OS platforms have made it rather easy and intuitive. You begin by navigating to the Local Server in the Server Manager.

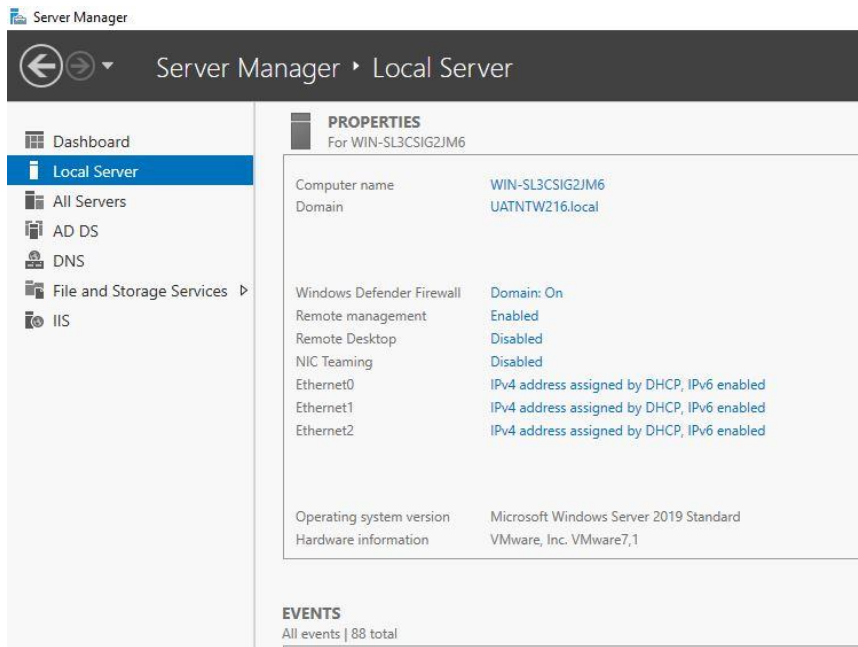


Figure 9. Local Server Manager.

From here you will see how many NICs are installed on the system as well as, if NIC Teaming is enabled or not. If not, click on *Disabled* and this link will open the NIC Teaming menu.

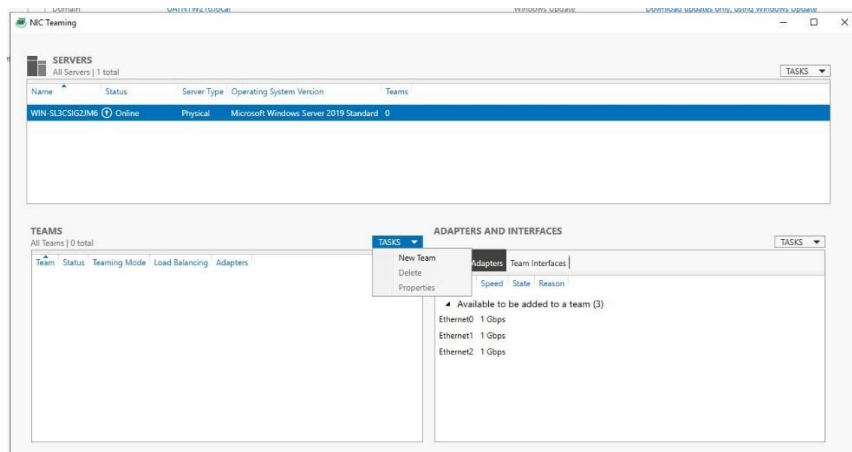


Figure 10. NIC Teaming.

Once the NIC Teaming menu is open you will again see how many NICs are available to team together. In the Teams section click on the *Tasks* dropdown and select *New Team*. This will open another submenu where you will be prompted to name the new team you are creating as well as select the NICs you wish to group together in this new team.

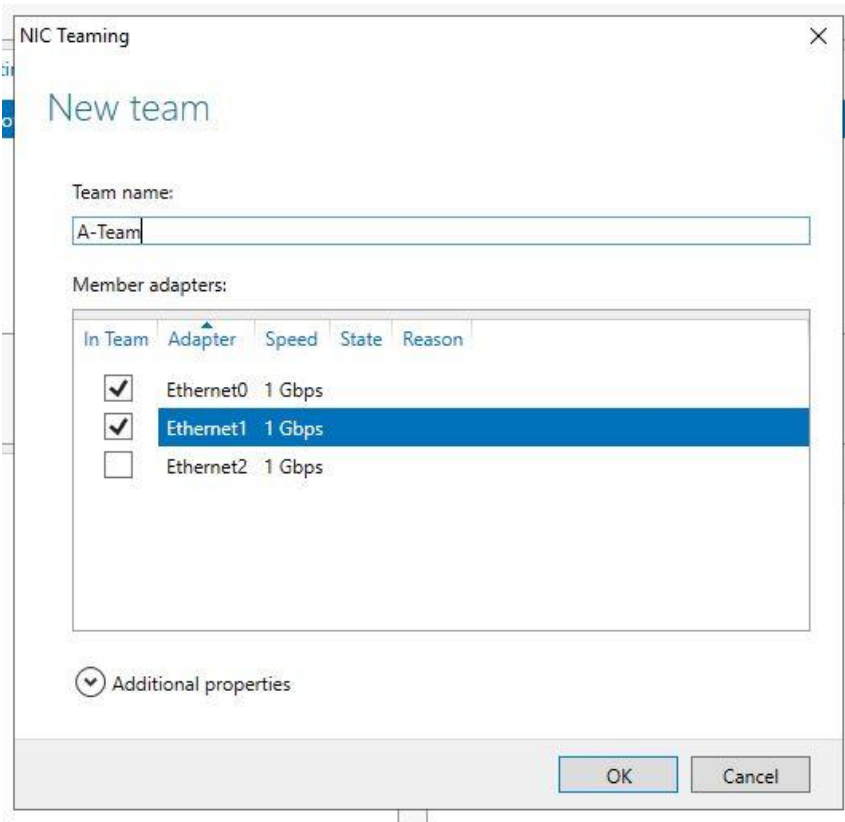


Figure 11. New Team Setup.

After you have named the new team and selected the NICs, click *OK*. You will be brought back to the NIC Teaming menu and the new team you have created will appear in the Teams section.

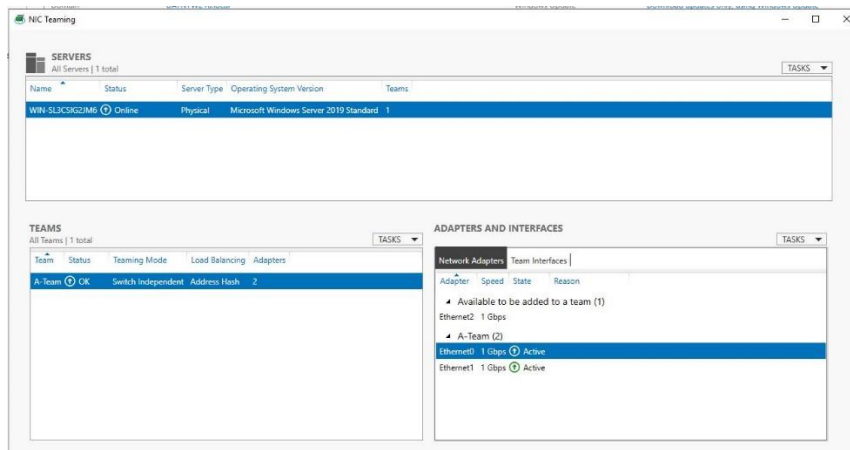


Figure 12. New Team Created.

From here you can confirm that the new team is up and running by going to Network

Connections. There you should see the new team where you can right click on it and select *Status* to view the details.

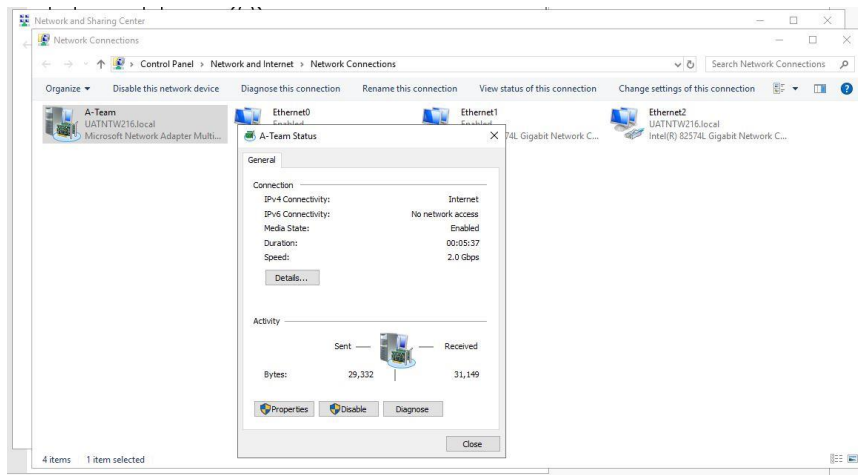


Figure 13. New Team Status.

Configure spare NIC for existing NIC Team

To add another NIC to an existing team is just as easy as creating a new team. Like before, go to the Local Server in the Server Manager, click on the link for NIC Teaming to bring up the NIC Teaming menu. Again, you will see the already created NIC team in as well as any unassigned NICs. From here go to the Teams section click on the *Tasks* dropdown and select *Properties*.

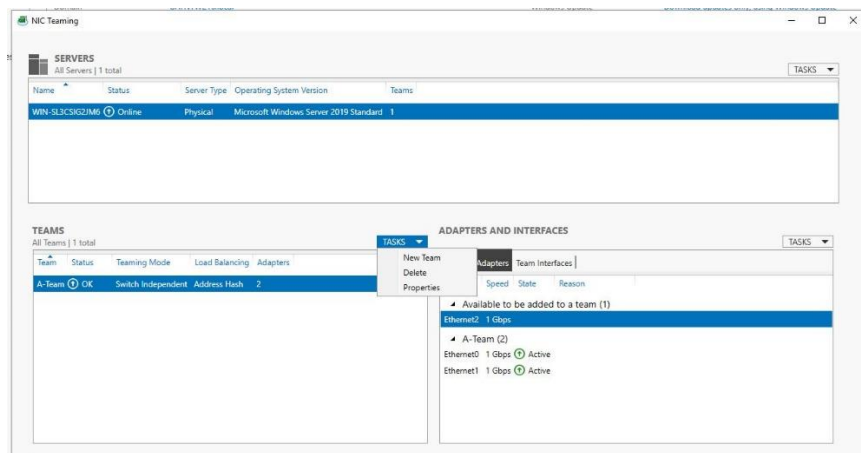


Figure 14. Adding NIC to Team.

This will take you to the same submenu as last time where you can select the additional NIC you wish to add to the team.

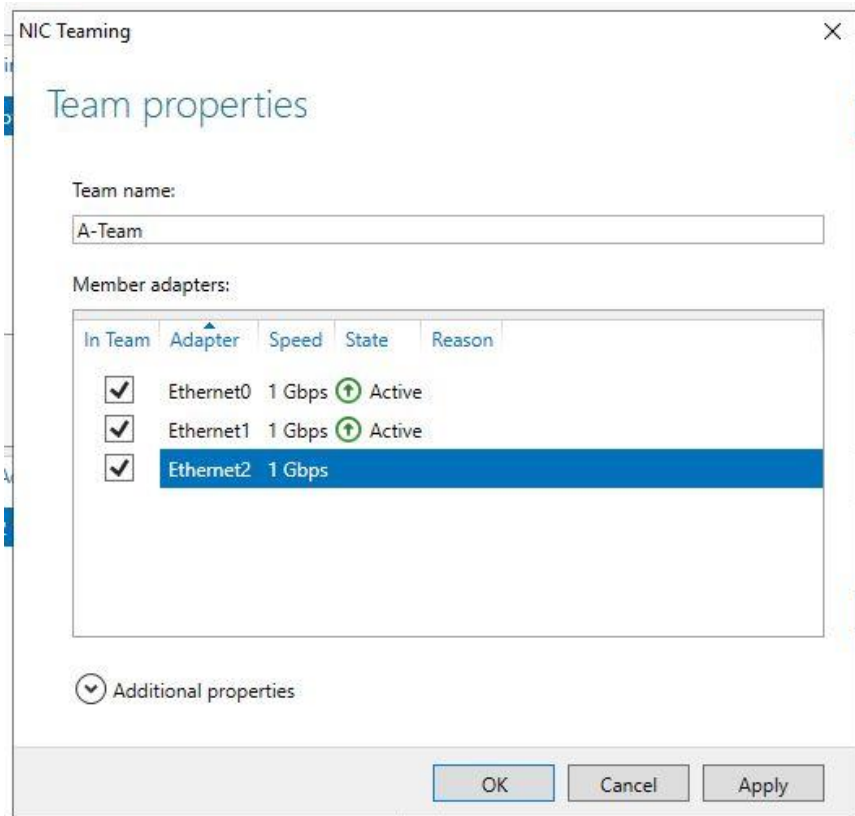


Figure 15. Add NIC Team Setup.

After selecting the NIC to add, click *OK*. Again, you will be brought back to the NIC Teaming menu and the existing team will appear in the Teams section with all the NICs being assigned to the team.

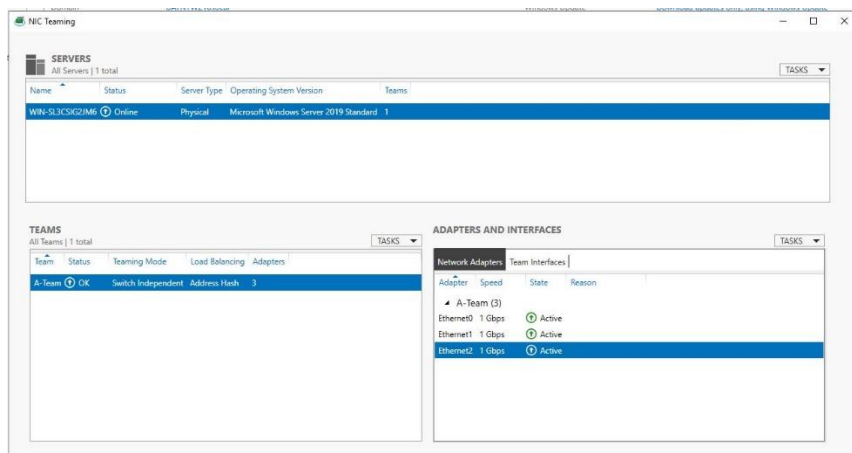


Figure 16. Team Updated.

Additional Troubleshooting

After working on the server, several errors indicating that the server is unable to join the domain are appearing. After a reboot of the server the same error message comes up. This is most likely indicative of a network connection issue. That being the case, running through the steps to check the NIC would be the first thing to do. After that if the NIC is working correctly then would be checking that AD DS is pointing to the correct domain and to check the built-in logs. The AD DS built-in logs are the most important instrument for troubleshooting issues with the domain controller. These logs are enabled and configured for maximum verbosity to help sysadmins pinpoint the exact issue and fix it (Microsoft, 2019).

In closing, the information in this guild was laid out to assist any sysadmin in troubleshooting while also trying to promote the continued growth of a skill that every sysadmin needs, researching the solution for themselves. Hopefully, this guild has been a helpful in the general configuring and troubleshooting of network congestion and connectivity issues within Server 2019.

References

Figure 1. Search CMD [screen capture]. (2020).

Figure 2. IPCONFIG Command [screen capture]. (2020).

Figure 3. Internal Ping Tests [screen capture]. (2020).

Figure 4. Ping Test Google [screen capture]. (2020).

Figure 5. Network Connections [screen capture]. (2020).

Figure 6. NIC Status [screen capture]. (2020).

Figure 7. VM Settings [screen capture]. (2020).

Figure 8. New NIC Configs [screen capture]. (2020).

Figure 9. Local Server Manager [screen capture]. (2020).

Figure 10. NIC Teaming [screen capture]. (2020).

Figure 11. New Team Setup [screen capture]. (2020).

Figure 12. New Team Created [screen capture]. (2020).

Figure 13. New Team Status [screen capture]. (2020).

Figure 14. Adding NIC to Team [screen capture]. (2020).

Figure 15. Add NIC Team Setup [screen capture]. (2020).

Figure 16. Team Updated [screen capture]. (2020).

Microsoft Docs. (2019). Troubleshooting Domain Controller Deployment. Retrieved from
<https://docs.microsoft.com/en-us/windows-server/identity/ad-ds/deploy/troubleshooting-domain-controller-deployment>