

# Netpump Data – Azure Cloud Configuration Test

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## Overview of this Demonstration of Netpump Data

Here, we outline the data transfer performance enhancing characteristics of Netpump Data with 3 tests with the following purposes:

1. The purpose of **Test 1** is to demonstrate the amount of time required to transfer around 6GB of data between two virtual servers using TCP/IP on the Azure Cloud without Netpump Data.
2. The purpose of **Test 2** is to demonstrate the amount of time required to transfer the same data between those servers using on the Azure Cloud with Netpump Data.
3. The purpose of **Test 3** is to demonstrate that Netpump Data can transfer data between remote servers from a third location (which cannot be done using ordinary TCP/IP).

Please note that once a full version of Netpump Data is installed, the GUI is **not** required and instead, Netpump Data operates in the background with “*drag and drop*” simplicity.

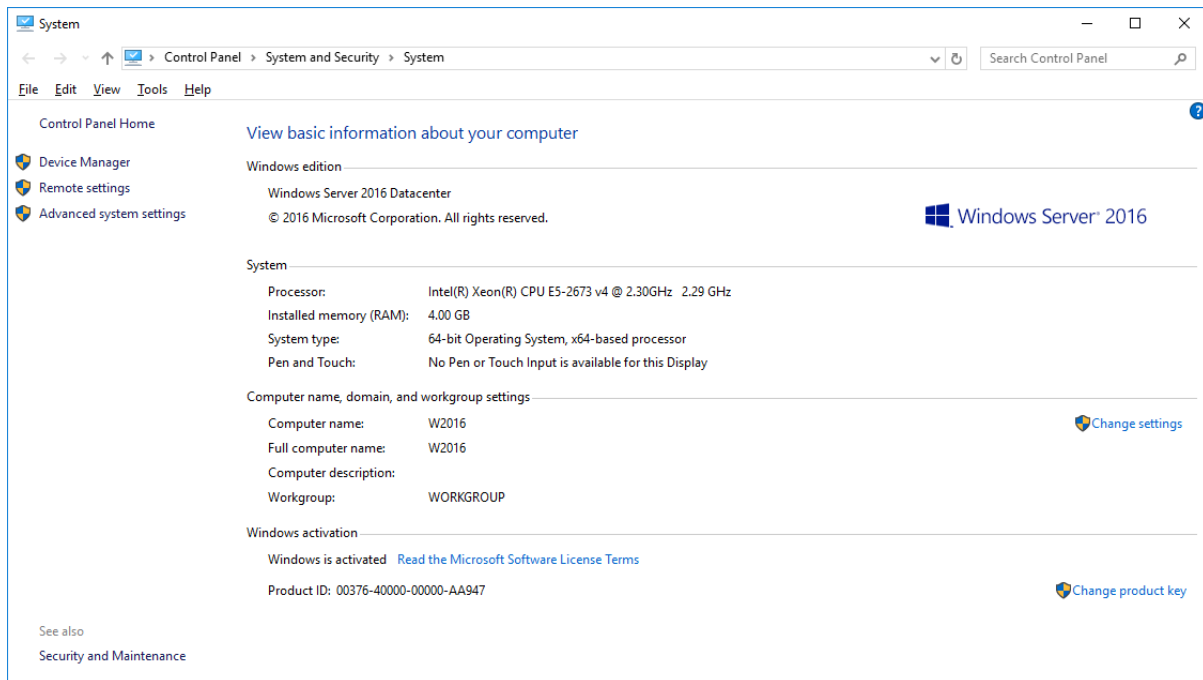
## Server Environment for the Demonstration of Netpump Data

The Netpump Data testing network is built on Azure and comprises five Public IP Virtual Windows 2016 Servers each with a linked Private IP Virtual Windows Server.

The Virtual Servers are located at the following Azure centres (**Virtual Servers**):

- Australia East (AU)
- South Africa North (SA)
- UAE North (UAE)
- UK South (UK)
- West US (US)

The screen capture below shows the configuration of all servers:



This is a minimal VM configuration as Netpump Data does not require large amounts of processing power or memory.

The IP addresses of each of the Virtual Servers are:

- AU – 20.92.87.232
- SA – 102.37.115.115
- UAE – 20.203.49.14
- UK – 20.90.248.122
- US – 40.118.212.73

The Virtual Servers and their corresponding Certificates are W2016

The Private IP address of the above Public IP VM's is 10.0.0.4

The Private VM's sitting behind each of the Virtual Servers are all allocated an IP address of 10.0.1.4

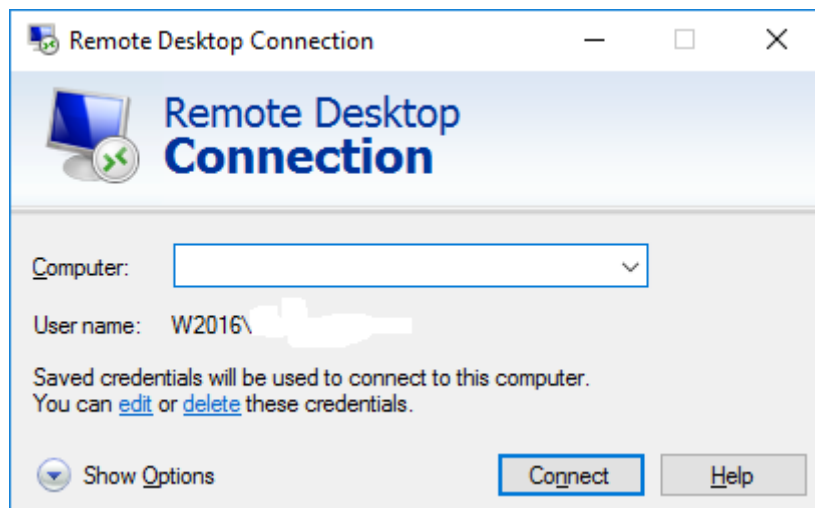
Access to the Virtual Servers is limited by IP address, with an allocated UID and Password provided once a testing time has been provided.

## Connecting to the Virtual Servers via Remote Desktop

To access the Virtual Servers you will need to use Remote Desktop which is available on your Windows device.

If the Remote Desktop icon is not on your desktop, simply open the search function from your Task bar and type Remote Desktop into the search field. Remote Desktop (App) or Remote Desktop Connection (App) will appear in the search results. Click on the relevant search result.

The following window will be displayed:



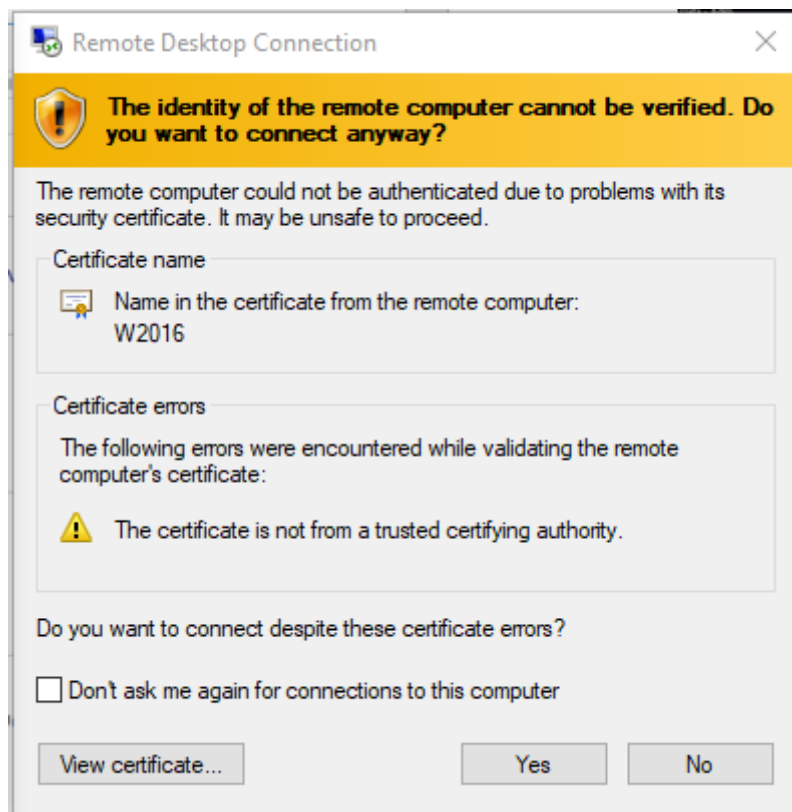
Enter the IP address of one of the Virtual Servers you wish to access in the box next to Computer:

The next screen will request the User ID and Password you have been provided.

Click on "Save Credentials".

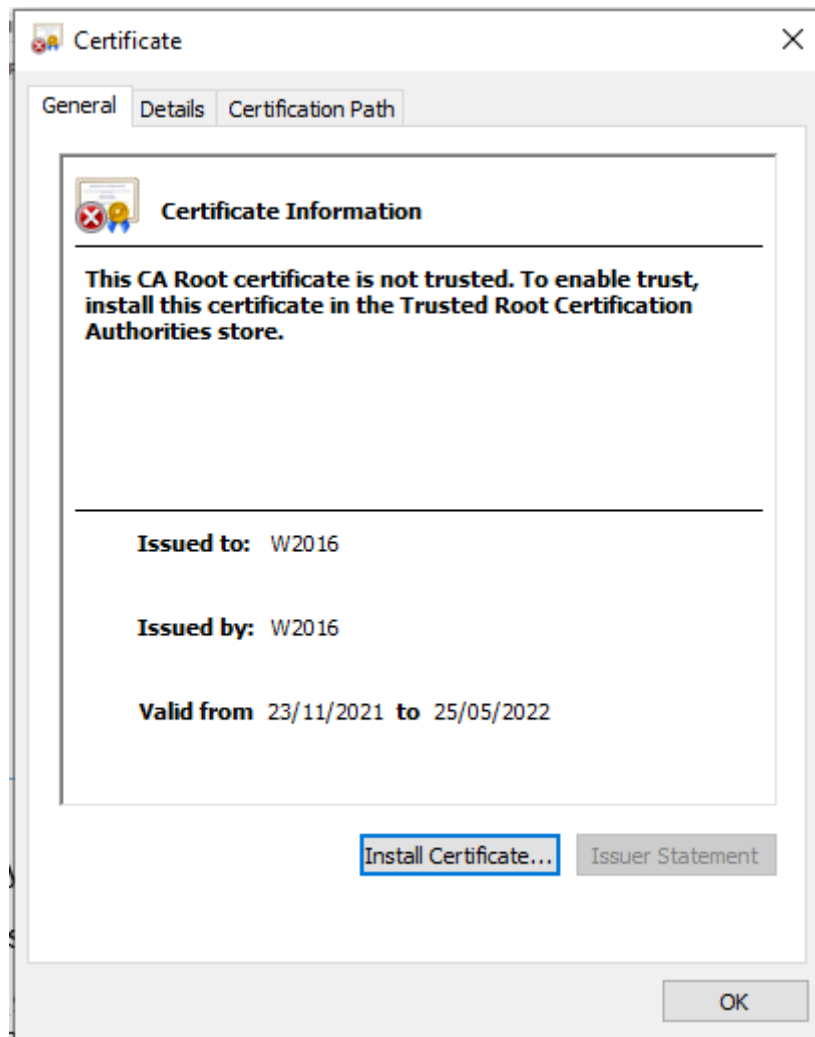
Click on "Connect".

You may then see the following Window



Under Certificate name, you will see the remote computers name and its Certificate – W2016

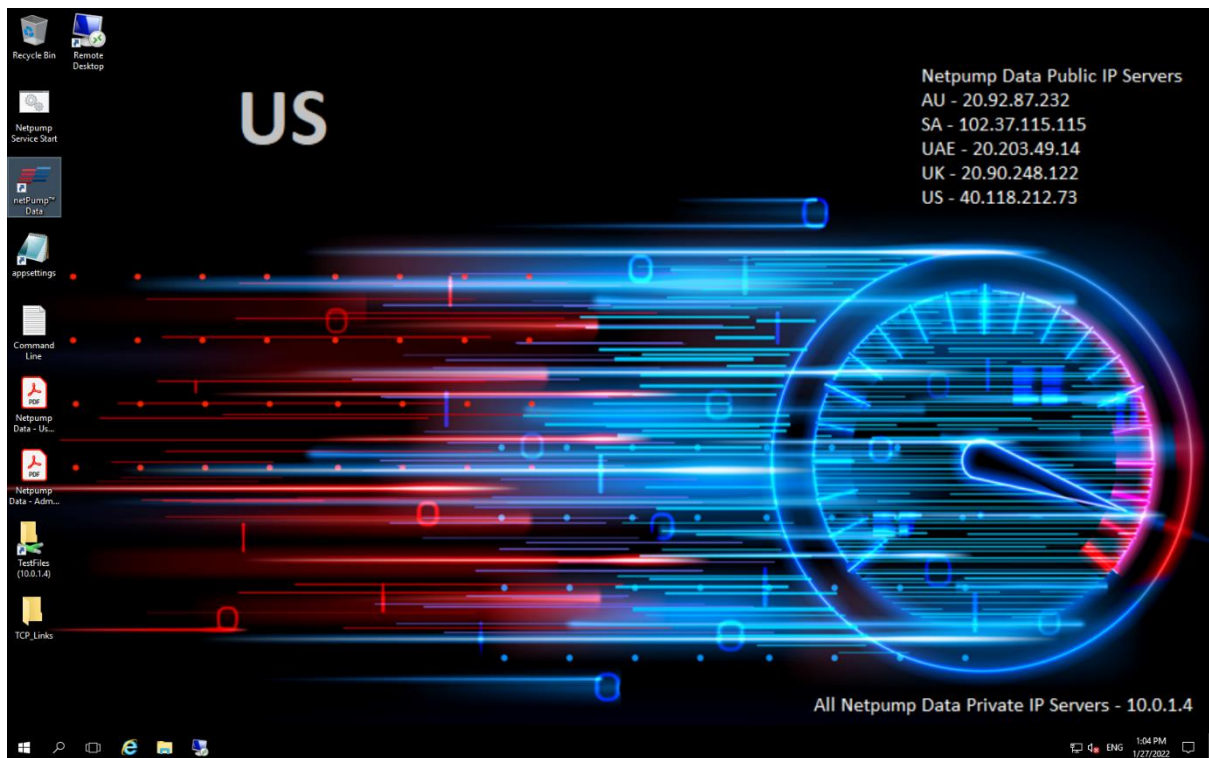
At this point you may simply click "Yes" to continue and/or click on the check box next to "Don't ask me..." and then click on "Yes". Alternatively, you may click on "View certificate", and the following window will be displayed.



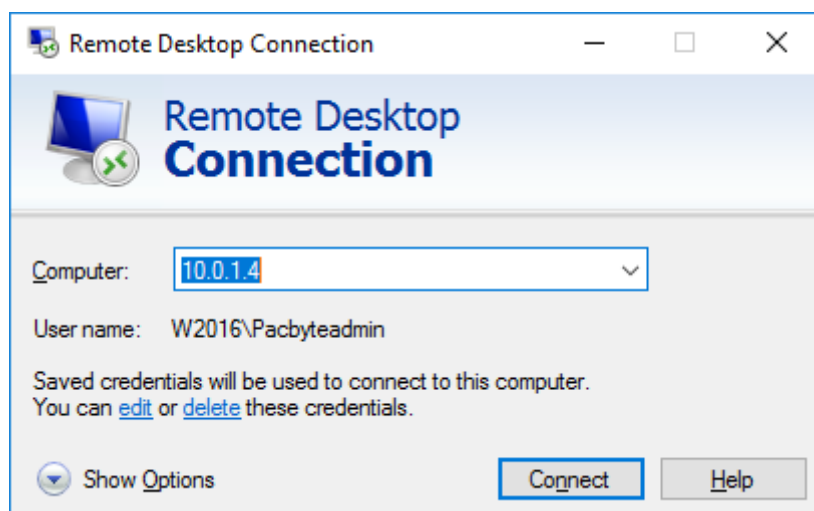
Click on *"Install Certificate"* and then *"OK"* and follow the steps to Connect.

## Desktop Environment

The Wallpaper of each Public IP VM Server shows the corresponding Virtual Server location. The functions required to operate and test Netpump Data are all contained within the icons on the left of the screen:

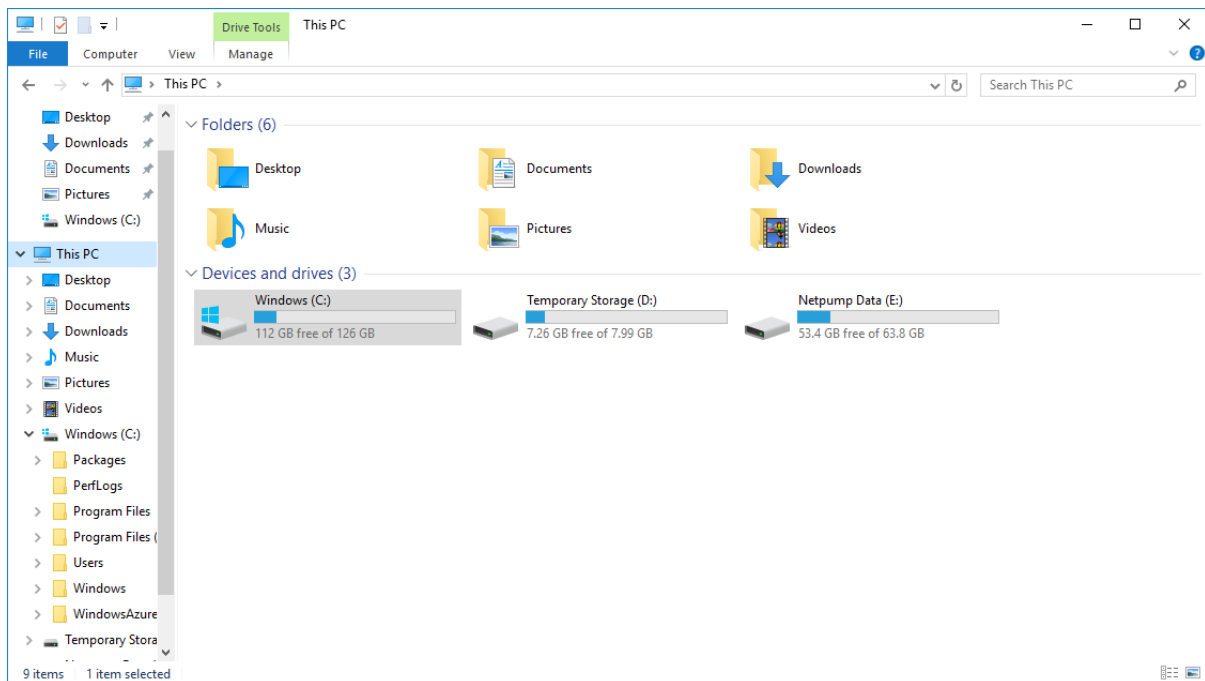


The Remote Desktop icon has been preconfigured to open a Private IP Server associated with the relevant Public IP Server. The screen captures below show the configuration of the Private IP Server:



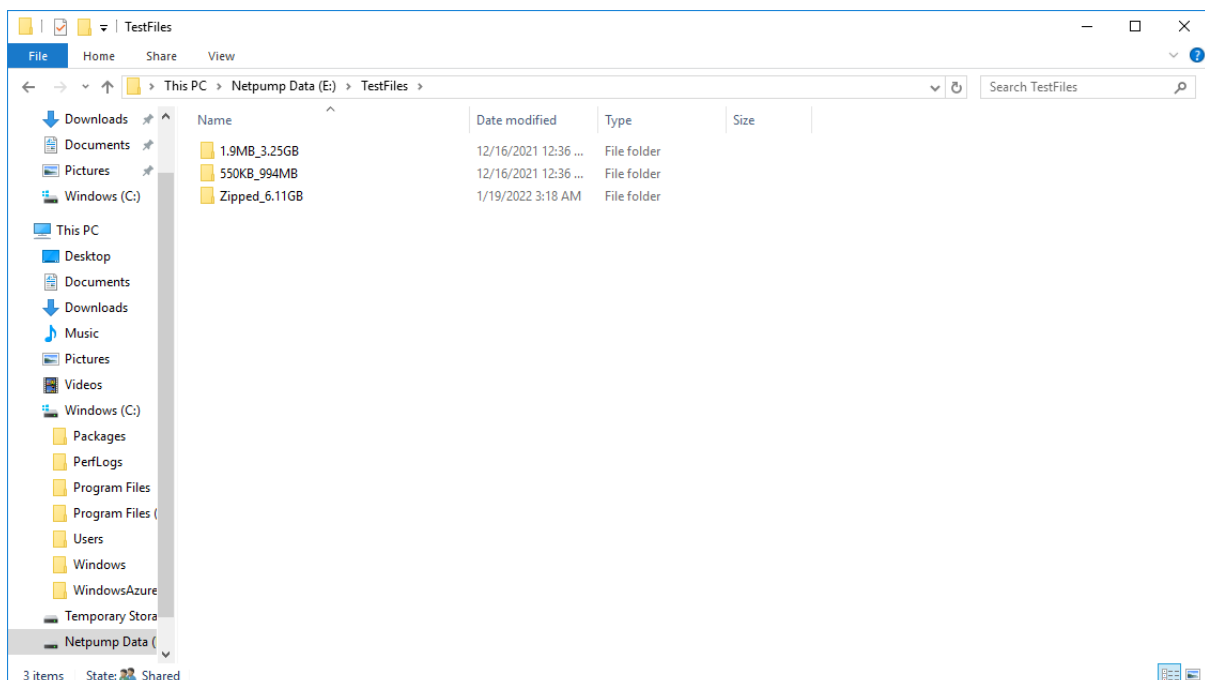
Default settings, simply click on Connect to open

Once you have connected to the Private IP Server from a given Virtual Server, open File Explorer and click on “This PC” on the Private IP Server to show the window below.



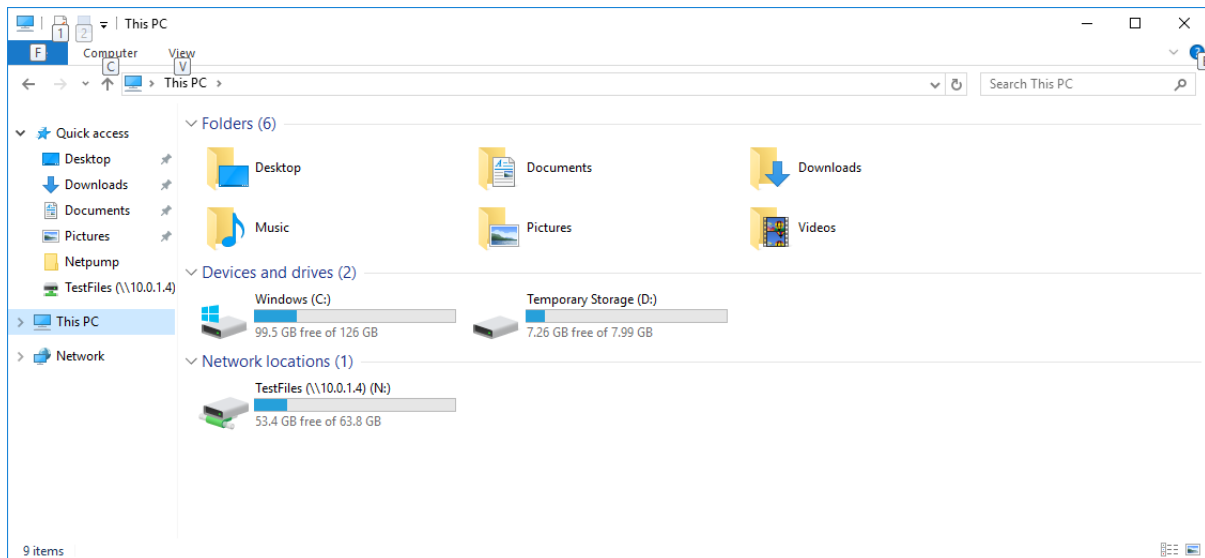
On the Private IP Server, the C:\ drive contains the operating system etc.

On the Private IP Server, the E:\ drive contains the Shared Folder for Data transfers using Netpump Data.



Double clicking on the E:\ drive will display the list of test files. These files are contained within a shared directory E:\TestFiles.

The Private IP Server Remote Desktop should be closed once you have explored this structure.

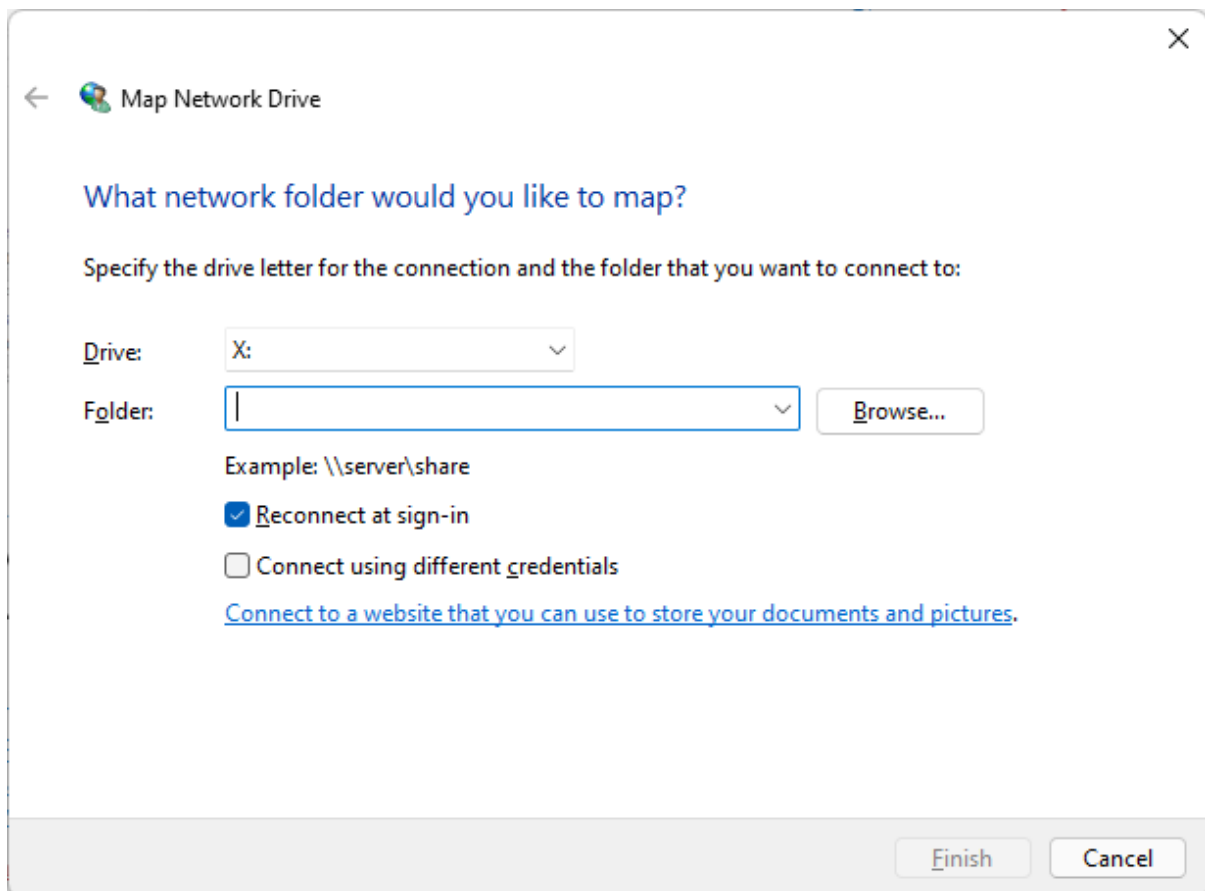


Returning to the Public IP Virtual Server, opening “*File Explorer*” will show the configuration above.

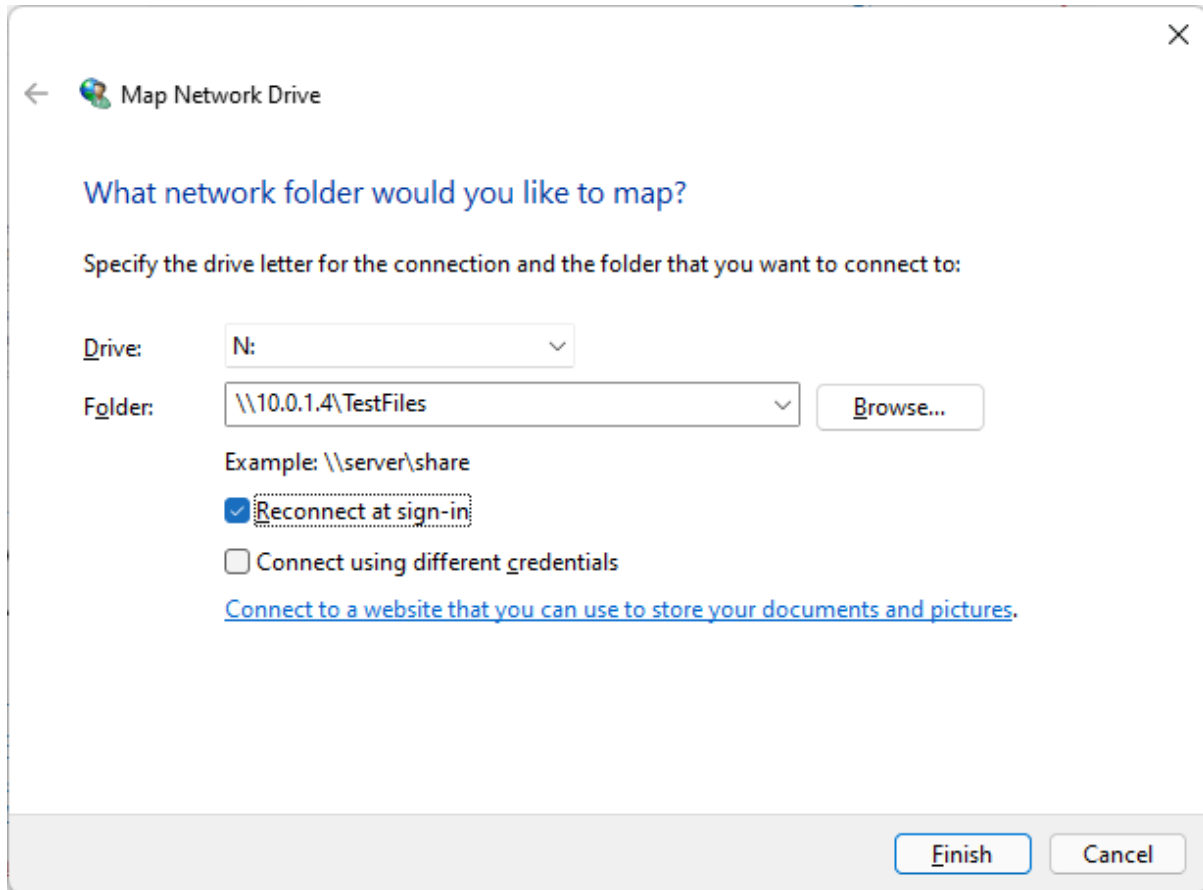
On all Public IP Virtual Servers, the shared drive on the relevant Private IP Servers are mapped as an N:\ drive.

If the N:\ drive is not shown when you click on This PC, you may add it in the following manner:

1. Right click on this PC, if “Map network drive ...” does not appear in the menu, click on “Show more options”. “Map network drive ...” will then be displayed.
2. Click on “Map network drive ...” and the following dialog box will appear:



3. Change the Drive to N:\ using the down arrow next to Browse.
4. In the Folder box type [\\10.0.1.4\TestFiles](#)
5. Ensure that box next to Reconnect at sign-in is checked.
6. Once the above steps are complete, your screen should look like the following



7. Click on Finish, and the N:\ drive will now be in the correct location.

The Desktop of each Virtual Server will show:

- A shortcut file called "*TestFiles (10.0.1.4)*" which is mapped to the shared folder "E:\TestFiles" on the Public IP Server
- One Folder named "*TCP\_Links*" which contains shortcuts to each of the other Virtual Servers. These links are all mapped to the folder "C:\TCP\_Test\_(Country Code)" and relevant IP address. The use of these shortcuts are described at steps 3 and 4 of Test 1 below.
- A .pdf document named "*The Netpump Data – User Guide and the Netpump Data – Administration Guide*", which addresses more technical configurations like reverse proxy and scripting etc.
- A .pdf document named "*The Netpump Data – User Guide*", which addresses the installation and simple functionality of Netpump Data.



- A .txt file named “*Command Line*” which contains the command string required to initiate the Netpump Data Service. The use of the command string is described at 2.4.2 in the Netpump Data User Guide and can be seen below:

```

Command Line - Notepad
File Edit Format View Help
"C:\Program Files\dotnet\dotnet.exe" netPump.Service.dll --urls=http://*:5000/

```

- An appsettings.json file which is the configuration file for the operation of Netpump Data. A full description of this file and its functionality is provided in detail at section 2.1 of the Netpump Data Administration Guide and can be seen below:

```

appsettings - Notepad
File Edit Format View Help
{
  "ServiceSettings": {
    "netPumpApiSecret": "1234",
    "ChunkRetrievalMaxParallelism": 8,
    "WriteChunksBatchSize": 50,
    "ChunkLengthBytes": 10485760,
    "DatabasePath": "logs/netpump.db",
    "FilesSequentiallyErroredLimit": 10,
    "DatabasePurgeSettings": {
      "RunIntervalUnit": "Days",
      "RunIntervalValue": 1,
      "SessionEndTimeUnit": "Days",
      "SessionEndTimeValue": 1
    },
    "TrustedCertificateThumbprints": []
  },
  "Logging": {
    "IncludeScopes": false,
    "LogLevel": {
      "Default": "Error",
      "System": "Error",
      "Microsoft": "Error"
    }
  },
  "Serilog": {
    "Using": [
      "Serilog.Extensions.Logging.File",
      "Serilog.Enrichers.Thread",
      "Serilog.Enrichers.Environment"
    ],
    "MinimumLevel": "Verbose",
    "WriteTo": [
      {
        "Name": "RollingFile",
        "Args": {
          "pathFormat": "logs/service-{Date}.log",

```

- A .bat file named “*Netpump Service Start*”, which runs a Batch file to initiate the Netpump Data Service and can be seen below:

```

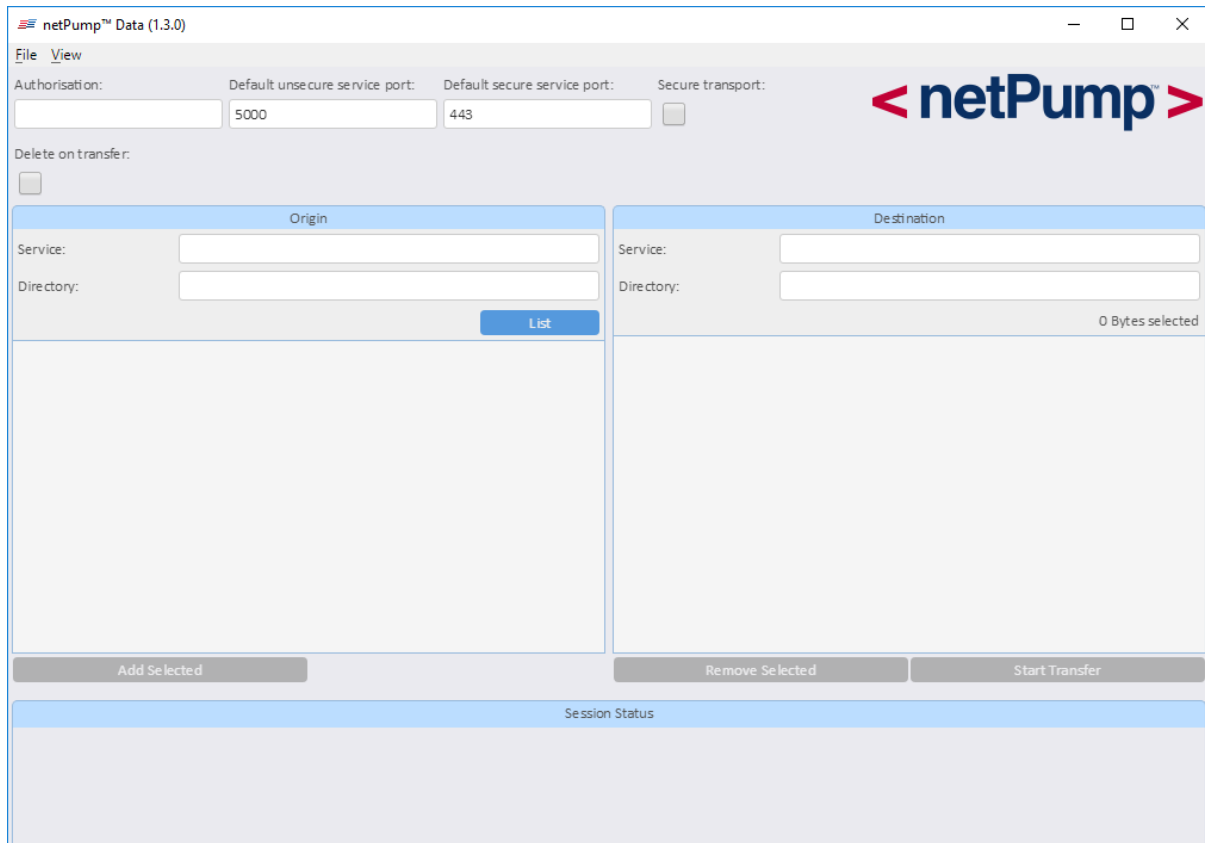
Administrator: C:\Windows\system32\cmd.exe - "C:\Program Files\dotnet\dotnet.exe" netPump.Service.dll --urls=http://*:5000/
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\Pacbyteadmin>cd \netpump

C:\Netpump>"C:\Program Files\dotnet\dotnet.exe" netPump.Service.dll --urls=http://*:5000/
Hosting environment: Production
Content root path: C:\Netpump
Now listening on: http://*:5000
Application started. Press Ctrl+C to shut down.

```

- A shortcut file called “*Netpump Data*”, which initiates the Netpump Data GUI. As mentioned in the Overview above, the GUI is *only* used for demonstration purposes. Once a licenced version of Netpump Data is installed, it is designed to operate in the background as a service *only*, and manages the TCP/IP protocol between devices with Netpump Data operating on them. The GUI may be seen below:



## Testing Network Configuration and Limits

All Virtual Servers require authorised IP address before access can be gained. Access is authorised by Pacbyte on a server-by-server basis.

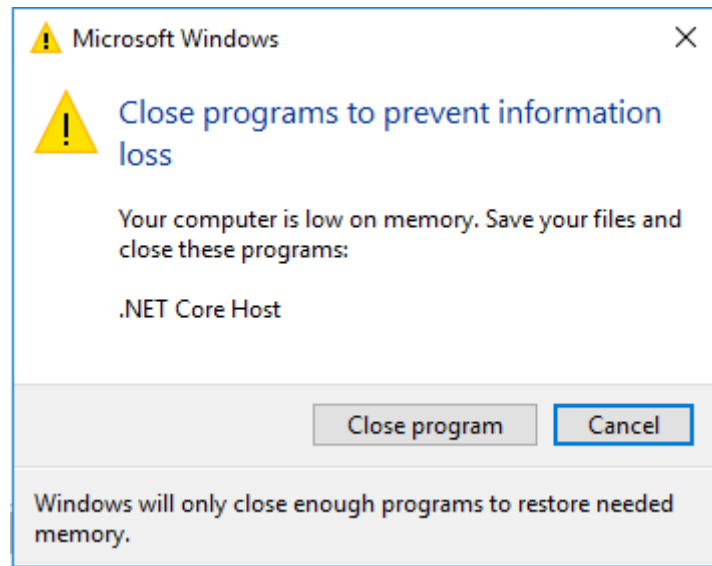
Once access has been enabled, the UID and Password you have been provided by Pacbyte will be needed for each Remote Desktop connection made.

Port Forwarding between the Public IP address and the Private IP address (10.0.0.4) is enabled on all servers for ports 0-1023 and 5,000- 5,050, with Port 3389 enabled for Remote Desktop.

Localhost is not enabled on any of the Virtual Servers and all data transfers are IP address based only.

Versions of Netpump Data may be requested for installation at a localised level to transfer data to and from the VM servers. Full information, setup and configuration instructions are supplied with a full version of licensed software.

A minimal VM Server configuration has been used for this testing environment. The server configuration detailed on page 2 shows that the servers only have 4GB RAM, which is the minimum requirement to use Netpump Data. As these VM Servers are sitting on the Azure Cloud and have Azure functionality built into them, the demands on the VM servers are higher than Physical Servers. As a consequence, you may occasionally see the following error message:



If you do receive this message, simply click on “*Cancel*”, the Netpump Data transfers will continue.

## Testing performance differences between the Virtual Servers using TCP/IP v Netpump Data

The test files provided are:

- A folder that contains 1,800 files with an average size of 1.9MB named 1.9MB\_3.25GB
- A folder that contains 1,800 files with an average size of 550KB named 550KB\_994MB
- A folder that contains three (3) zipped files with a total size of 6.11GB named Zipped\_6.11GB

These files are located in a shared Directory E:\TestFiles on the 10.0.1.4 VM's.

These shared folders have been mapped to the Public IP servers as an N:\ drive.

A further copy of these files may be found on the Public IP servers in a Shared directory C:\TCP\_Test\_(Country Code) e.g. TCP\_Test\_US. These folders have been mapped to each of the other Public IP servers and may be accessed through the TCP\_Links folder on the Desktop.

A further folder on the Public IP servers is C:\TCP\_Test\_Local. This folder has simply been created as a repository for any files copies using the TCP links.

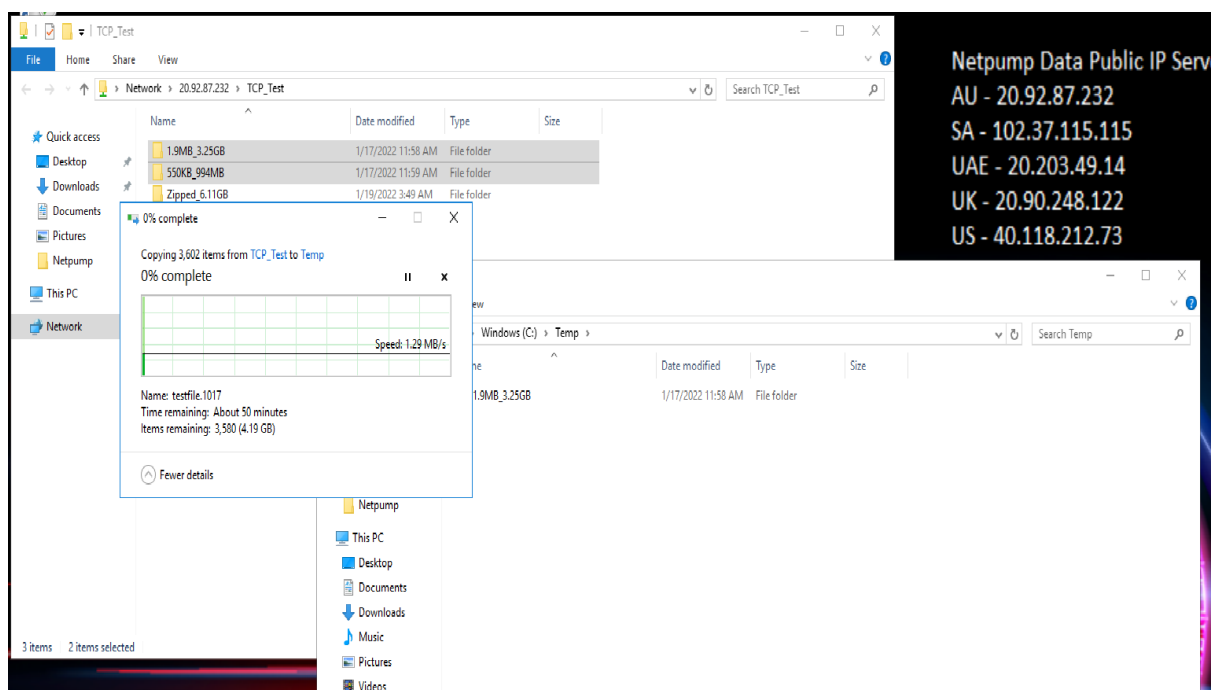
The tests described below allow a comparison of standard TCP data transfers and the performance increase of Netpump Data.

Select two Public IP servers to run comparative tests between, we will call these **Servers A and B**.

## Test 1: Ordinary TCP/IP transfer on the Azure cloud without Netpump Data

1. Using Remote Desktop on your Windows 8.1 or later device, open a Virtual Server, which we will call **Server A** in the context of Tests 1 and 2.
2. Open an instance of File Explorer on Server A and go to C:\TCP\_Test\_Local.
3. Double click on the TCP\_Links Folder.

4. Double click on a link to one of the other Virtual Servers, which we will call **Server B** in the context of Tests 1 and 2 and wait for the file list to be populated.
5. Open the stopwatch function on your phone, or other timing device so that you are ready to accurately record the transfer time for a given file from Server B to Server A.
6. Select the folder(s) you would like to transfer from the list on Server B.
7. Right click on these folders and select “Copy”.
8. Move the mouse to the folder TCP\_Test\_Local on Server A.
9. Right click and at the same time you select “Paste” start the timing device.
10. You should see a screen like the one below:



11. Once the transfer is complete, stop your timing device and record the time it took to copy the files from Server B to Server A.

## Test 2: Transfer on the Azure cloud using Netpump Data

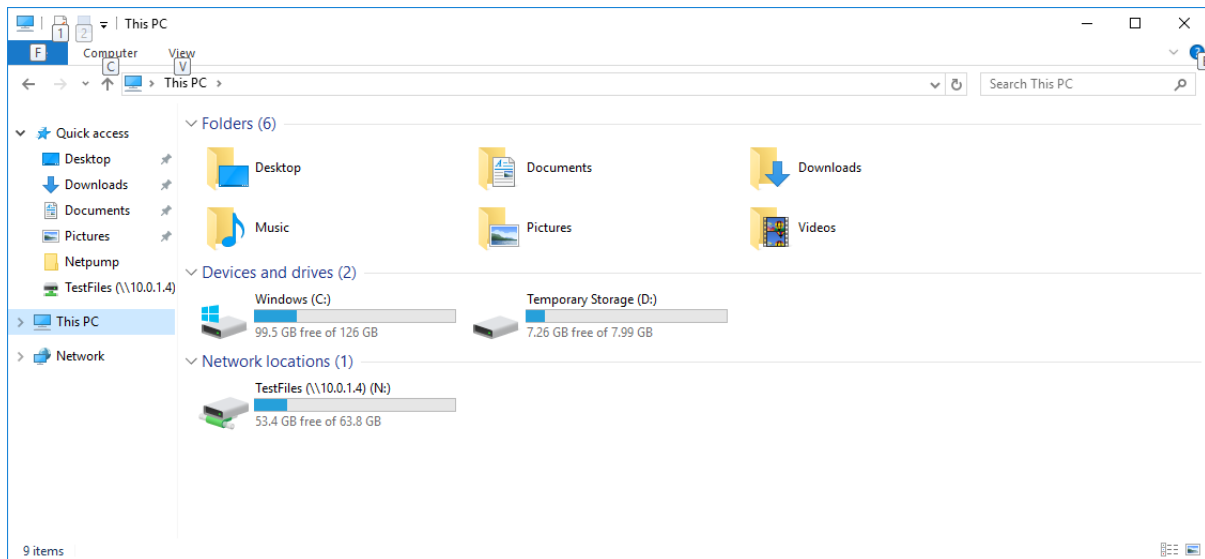
Here, we will repeat the same data transfer from Server B to Server A using the Netpump Data demonstration GUI.

For ease of this demonstration, Netpump Data is configured with default settings. These settings are:

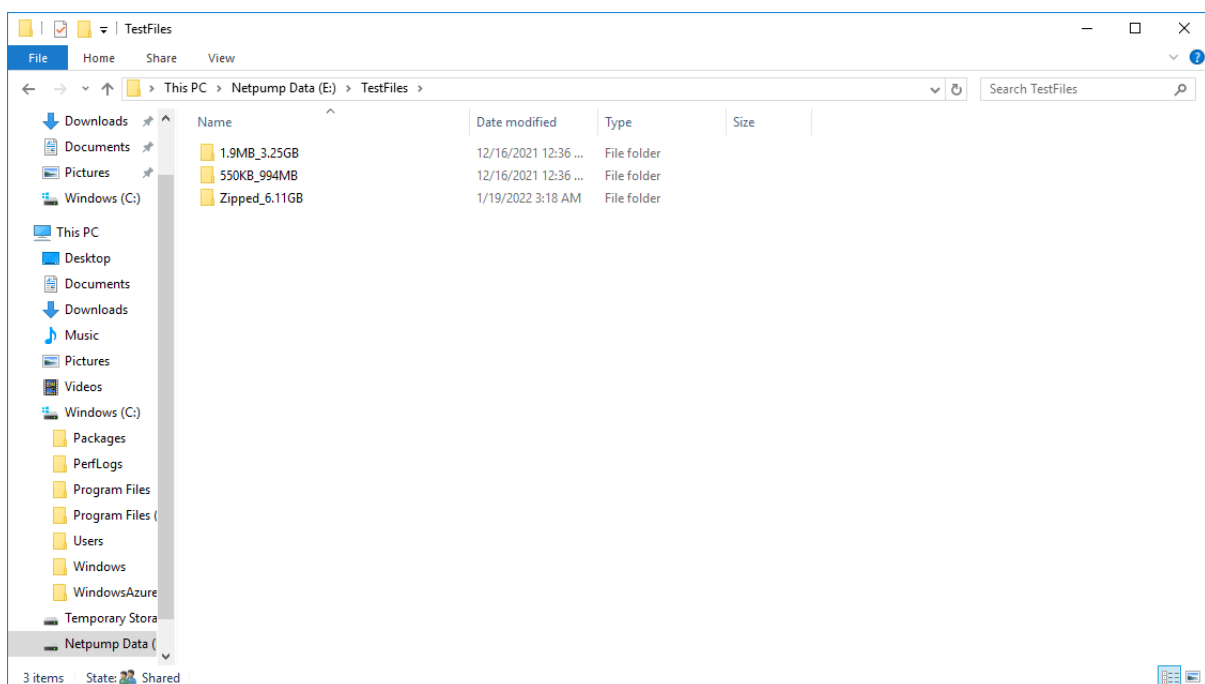
- Authorisation code: 1234
- Default unsecure port is set to Port 5,000
- For this demonstration the secure port is enabled, but not operational.
- The number of threads used is 8.
- Data segmentation is set at 10MB.

## Instructions

1. Disconnect from Server A and open Server B using Remote Desktop.
2. Open File Explorer on Server B and click on This PC, you will see the following



3. Double click on the N:\Drive and you should see the three test folders as pictured below:



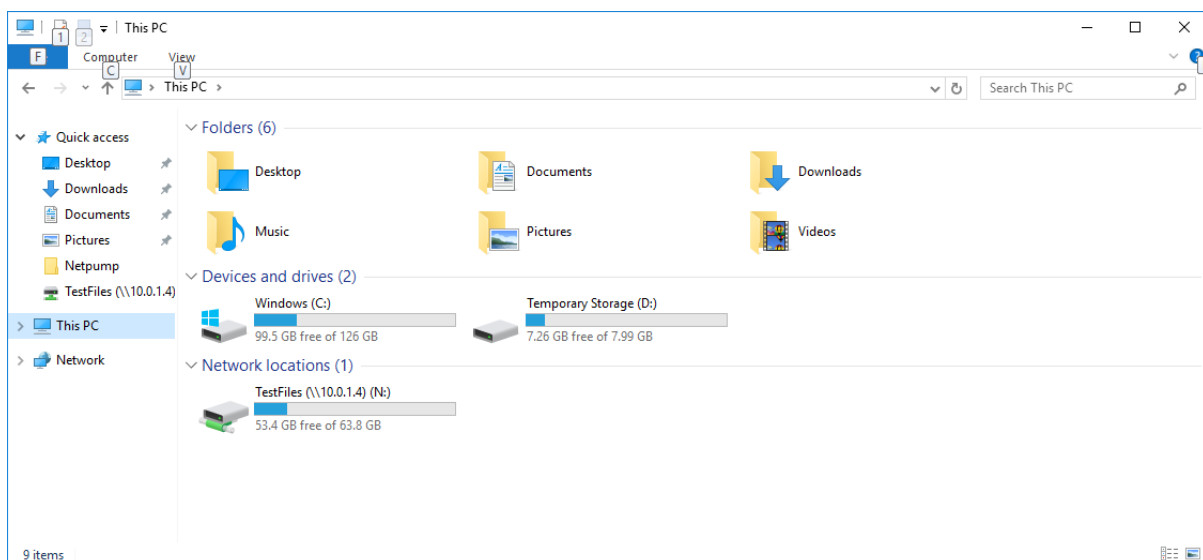
4. Close the File Explorer windows.
5. Double Click on the Netpump Service Start icon, and you should see the following:

```
C:\Windows\system32\cmd.exe

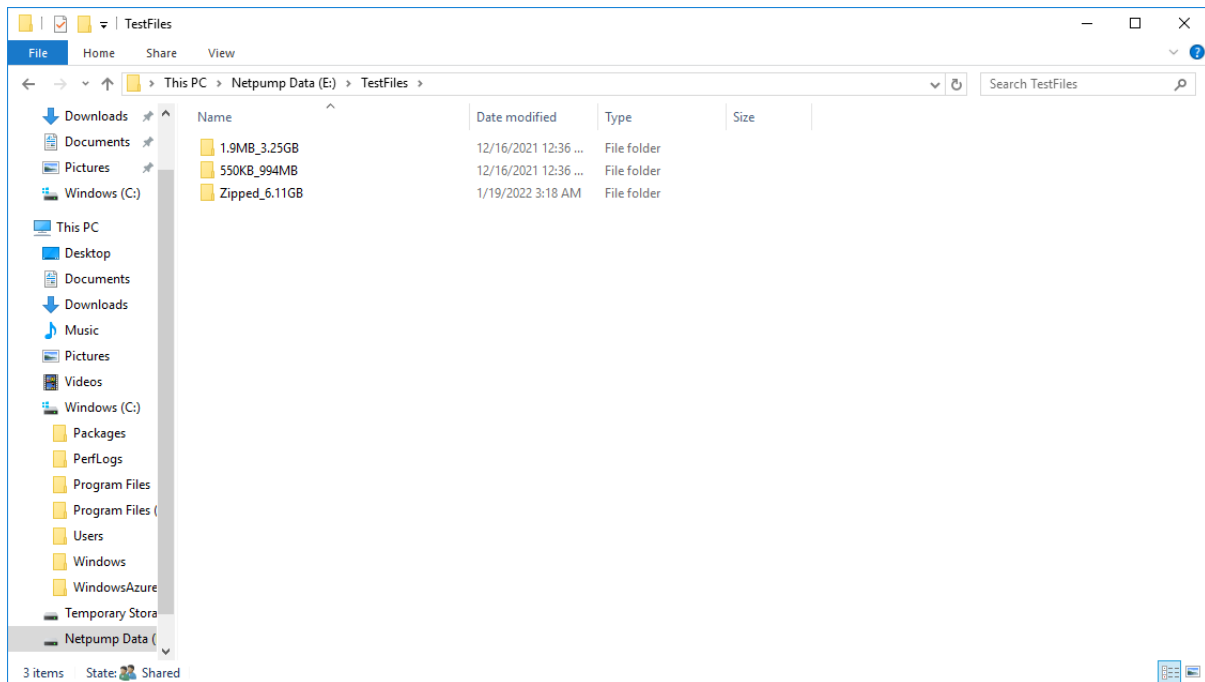
C:\Users\Pacbyteadmin\Desktop>cd \netpump

C:\Netpump>"C:\Program Files\dotnet\dotnet.exe" netPump.Service.dll --urls=http://*:5000/
Hosting environment: Production
Content root path: C:\Netpump
Now listening on: http://[::]:5000
Application started. Press Ctrl+C to shut down.
```

6. Once this is done, close the Remote Desktop access to Server B. Do not close the above window when you close the Remote Desktop access to Server B.
7. Using Remote Desktop, open Server A.
8. Open File Explorer on Server A and click on This PC, you will see the following



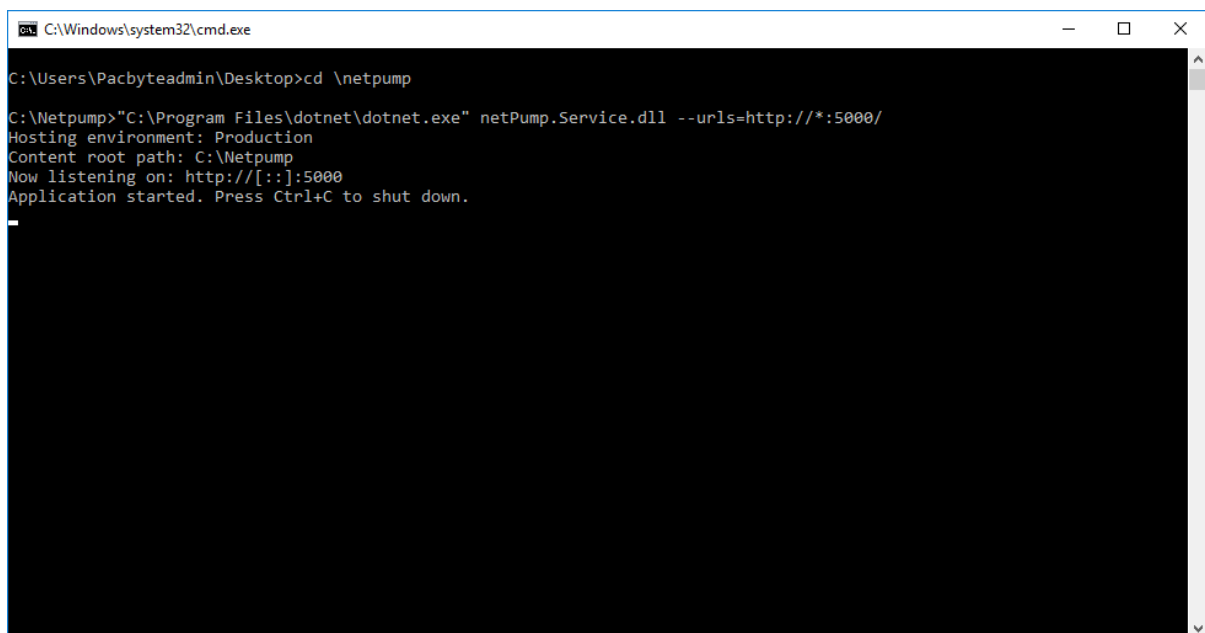
9. Double click on the N:\Drive and you should see the three test folders as pictured below:



10. Delete the three folders and empty trash.

11. Close the File Explorer windows.

12. Double Click on the Netpump Service Start icon, and you should see the following:



13. Once this is open, double click on the Netpump Data icon, the following window will open:

netPump™ Data (1.3.0)

File View

Authorisation:  Default unsecure service port:  Default secure service port:  Secure transport: ☐

Delete on transfer: ☐

Origin

Service:

Directory:

List

Destination

Service:

Directory:

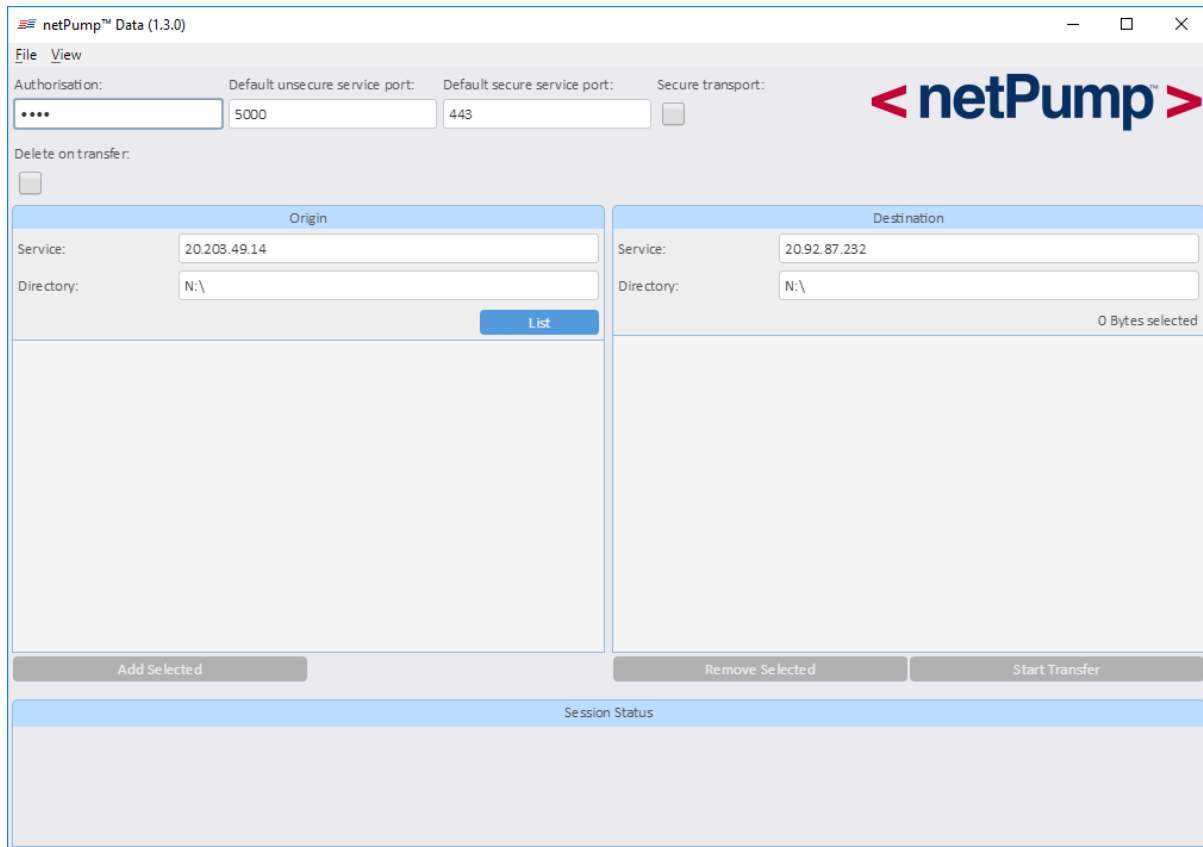
0 Bytes selected

Add Selected Remove Selected Start Transfer

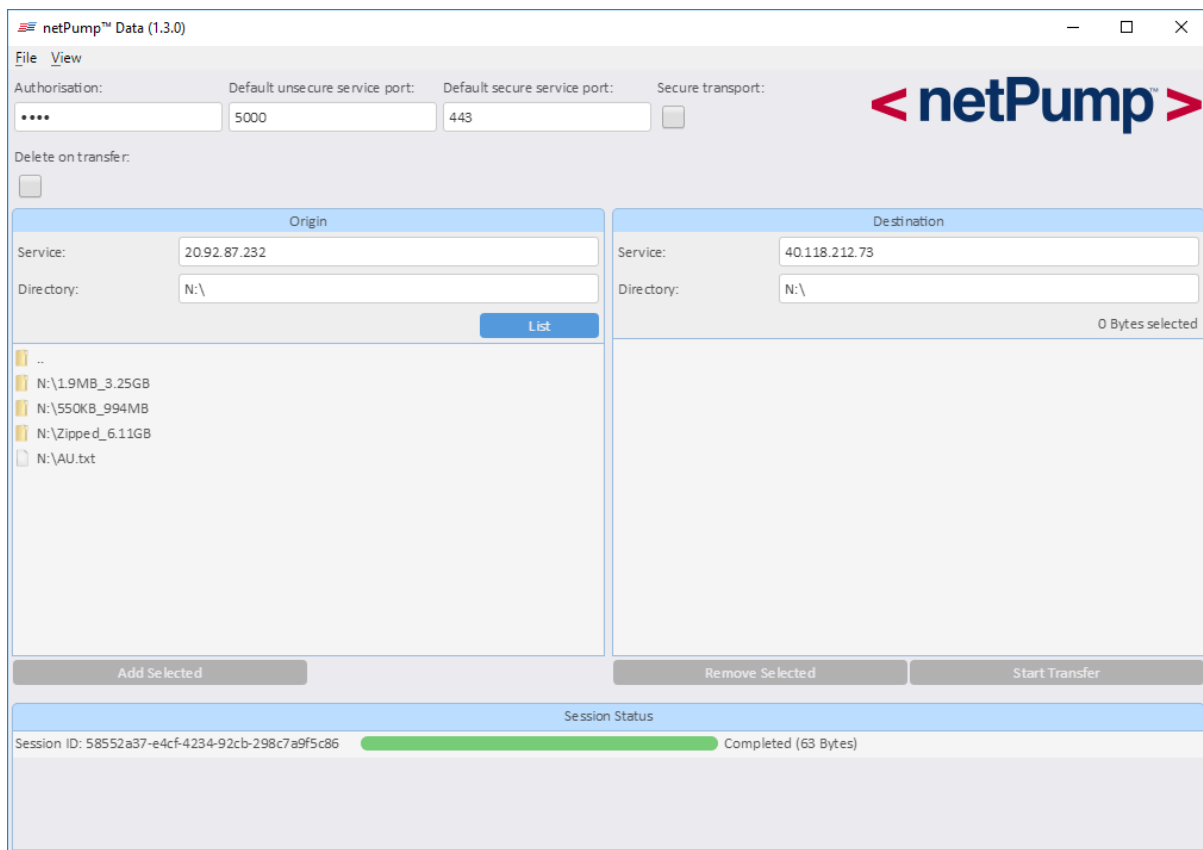
Session Status

14. In the Authorisation box enter 1234.
15. In the Service box under Origin, enter the IP Address for Server B and in the Directory box below this enter N:\.
16. In the Service box under Destination, enter the IP Address for Server A, in the Directory box underneath this enter N:\
17. Do not use Localhost for either of the Service addresses, always use the IP addresses.

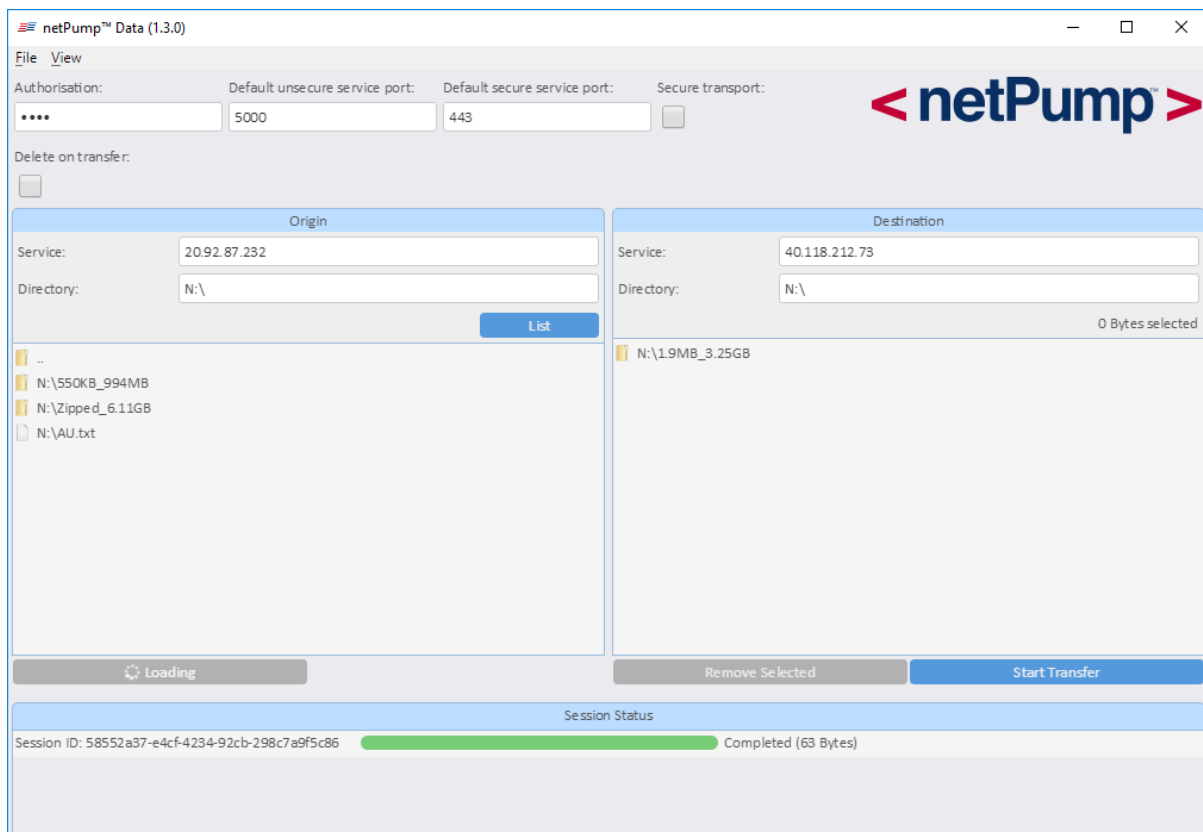




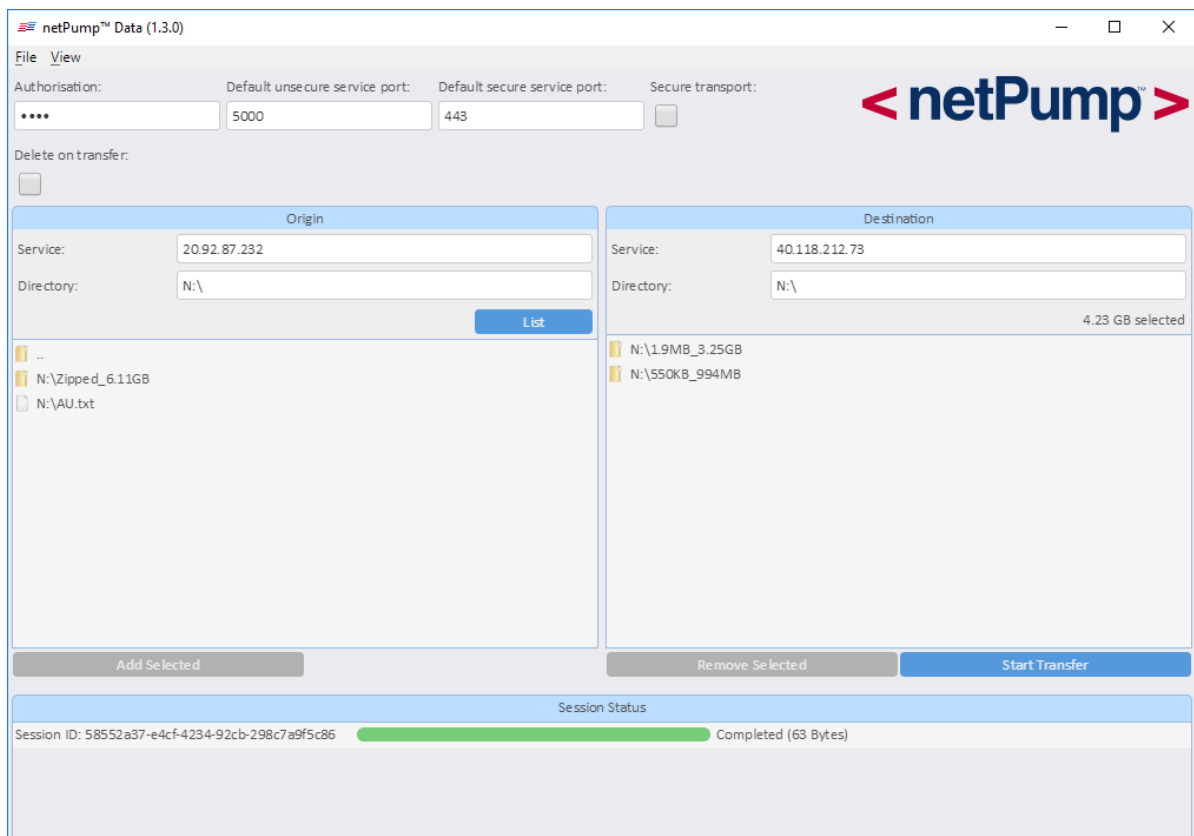
18. Click on the List button and the Folders within the Shared folder will be listed:



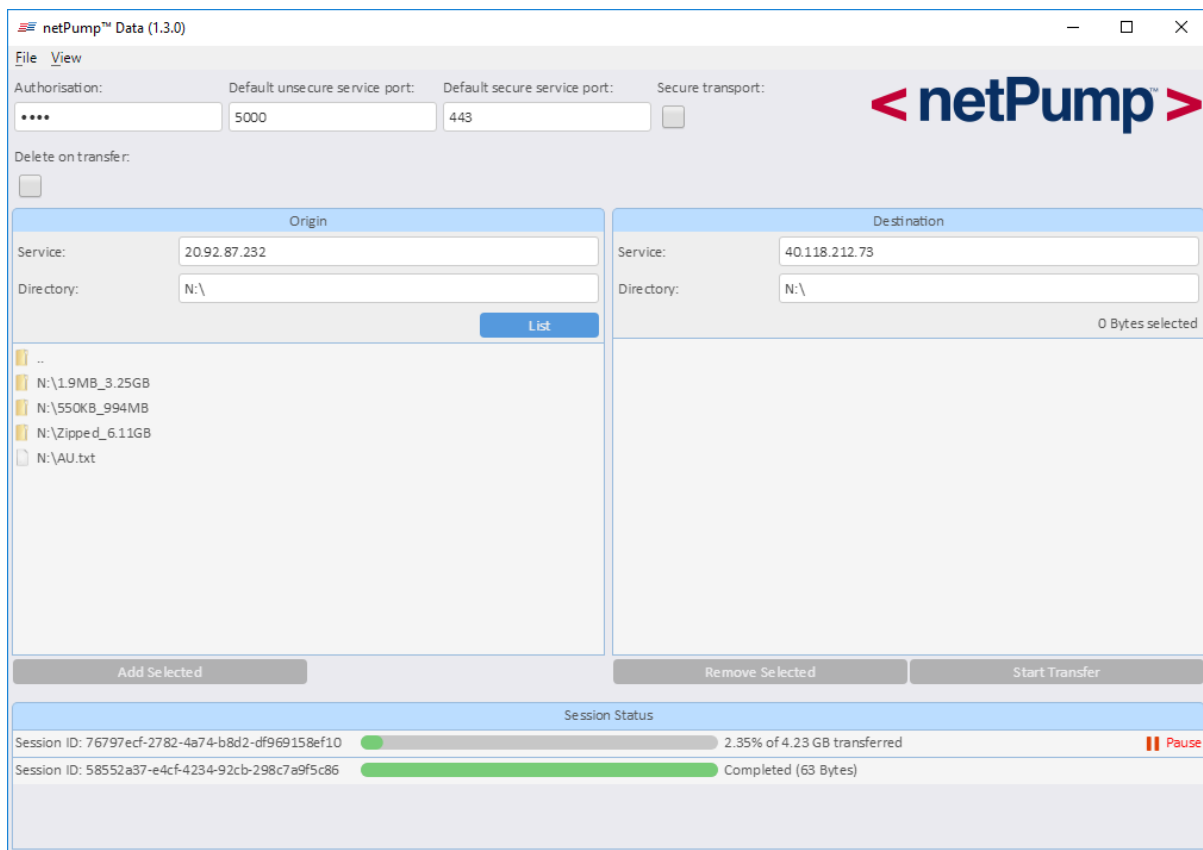
19. Click on the first folder, then click on Add Selected



20. Click on each additional folder, one at a time, and click on Add Selected. Repeat until all folders have been added. Multiple individual files may be added by holding down the Shift key, clicking on the first file, then clicking on the last file, then clicking on Add Selected.



21. Once all folders have been selected, with your timing device set to zero, start your timing device at the same time you click on Start Transfer.
22. A transfer status bar will appear, with a green line showing progress as well as a percentage of the transfer completed.



23. Once the transfer is complete, the test at the right of the green status line will show Complete.
24. Stop your timing device and close Netpump Data.
25. Open File Manager and verify that the files have been copied to N:\ or Remote Desktop from Server A to 10.0.1.4 and go to E:\TestFiles.
26. Close Remote Desktop.

The time of transfer between Server A and Server B using Netpump will be considerably less than the TCP transfer.

Tests with your own data on your own networks may be arranged on request.

## Test 3 – Transferring data between remote servers from a third location.

Repeat the steps 1 to 12 then skip to step 26 from Test 2. This means that Server A and Server B both have the Netpump Service running.

A third server Server C will be introduced.

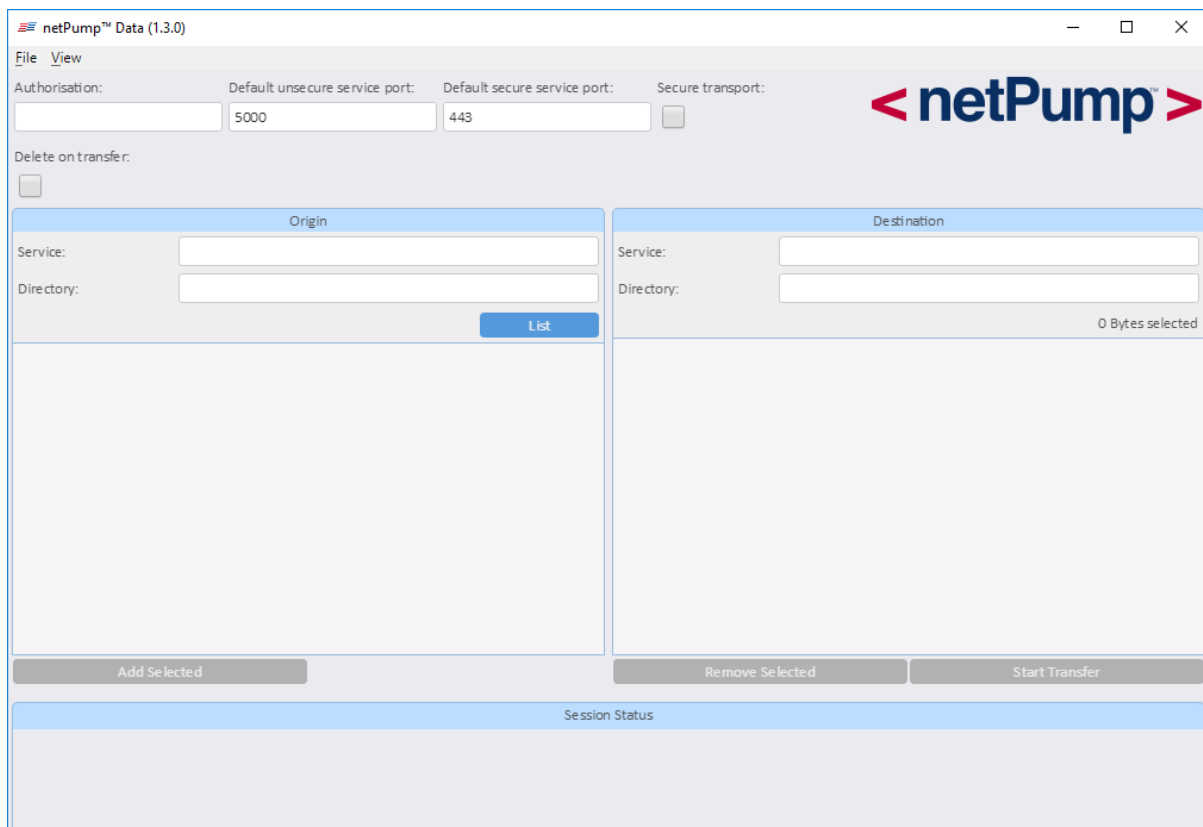
1. using Remote Desktop Open another Virtual Server that we will call **Server C**.
2. Double Click on the Netpump Service Start icon, and you should see the following:

```
C:\Windows\system32\cmd.exe

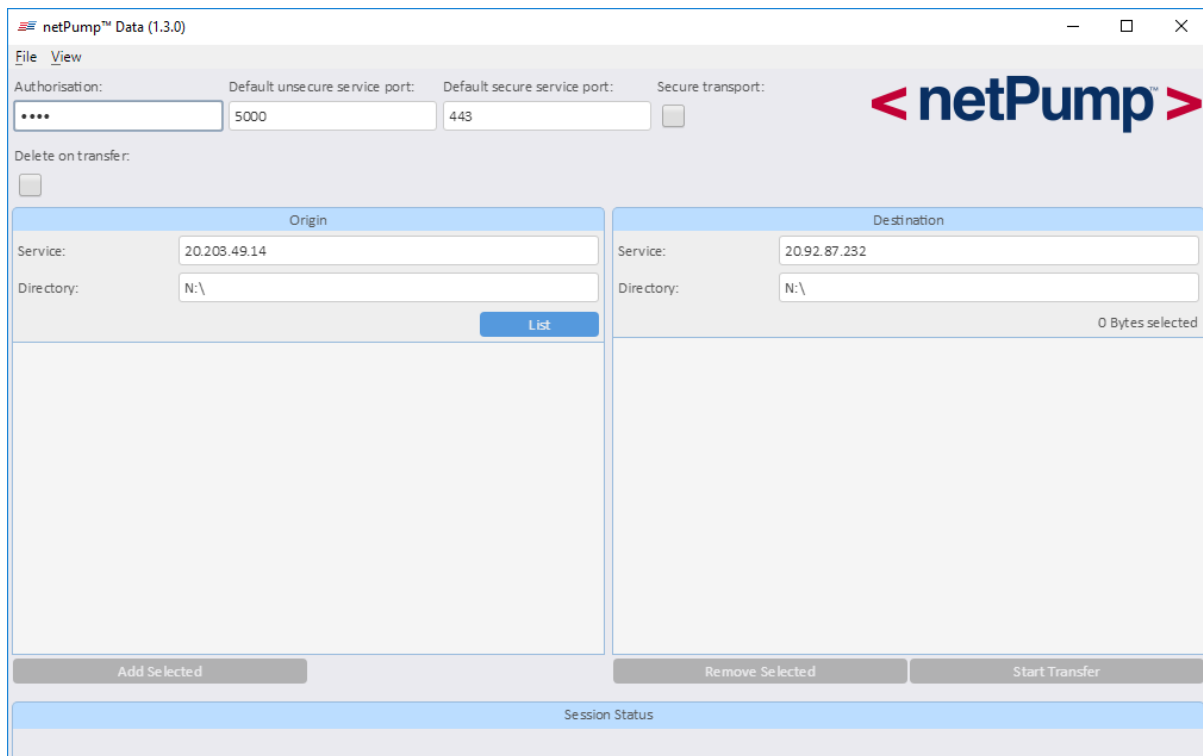
C:\Users\Pacbyteadmin\Desktop>cd \netpump

C:\Netpump>"C:\Program Files\dotnet\dotnet.exe" netPump.Service.dll --urls=http://*:5000/
Hosting environment: Production
Content root path: C:\Netpump
Now listening on: http://[::]:5000
Application started. Press Ctrl+C to shut down.
```

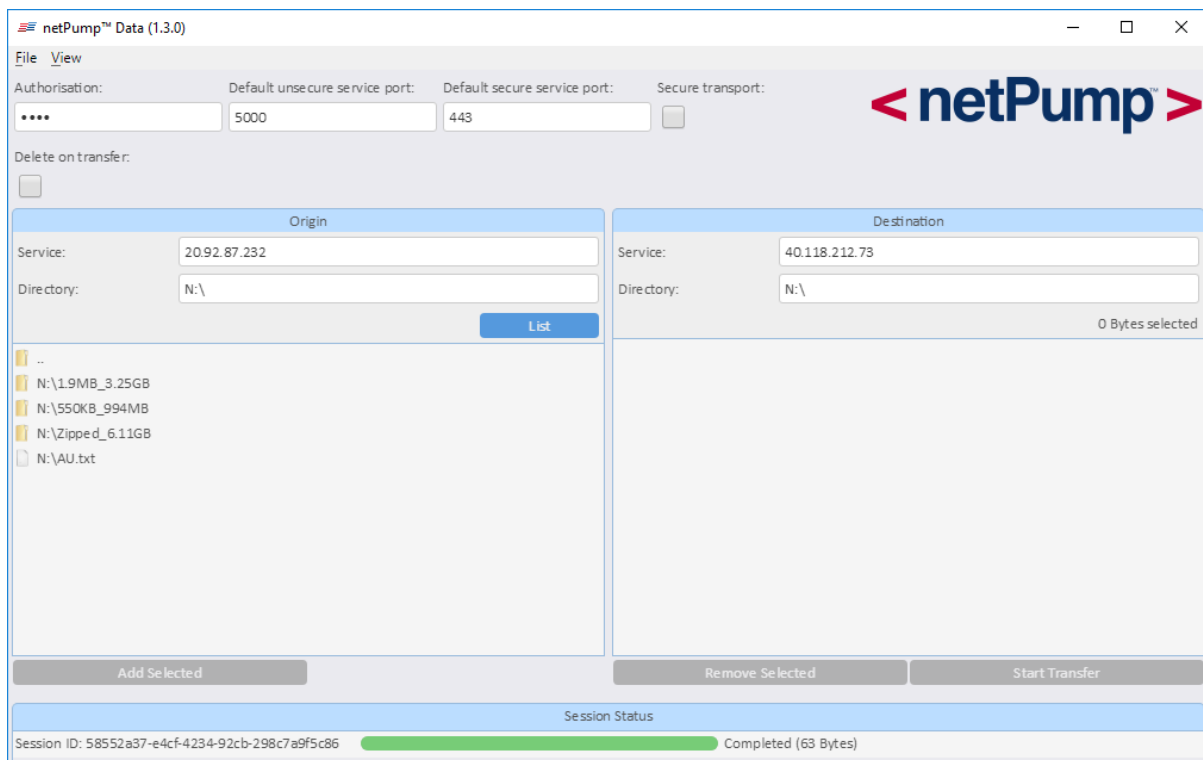
3. Once this is open, double click on the Netpump Data icon, the following window will open:



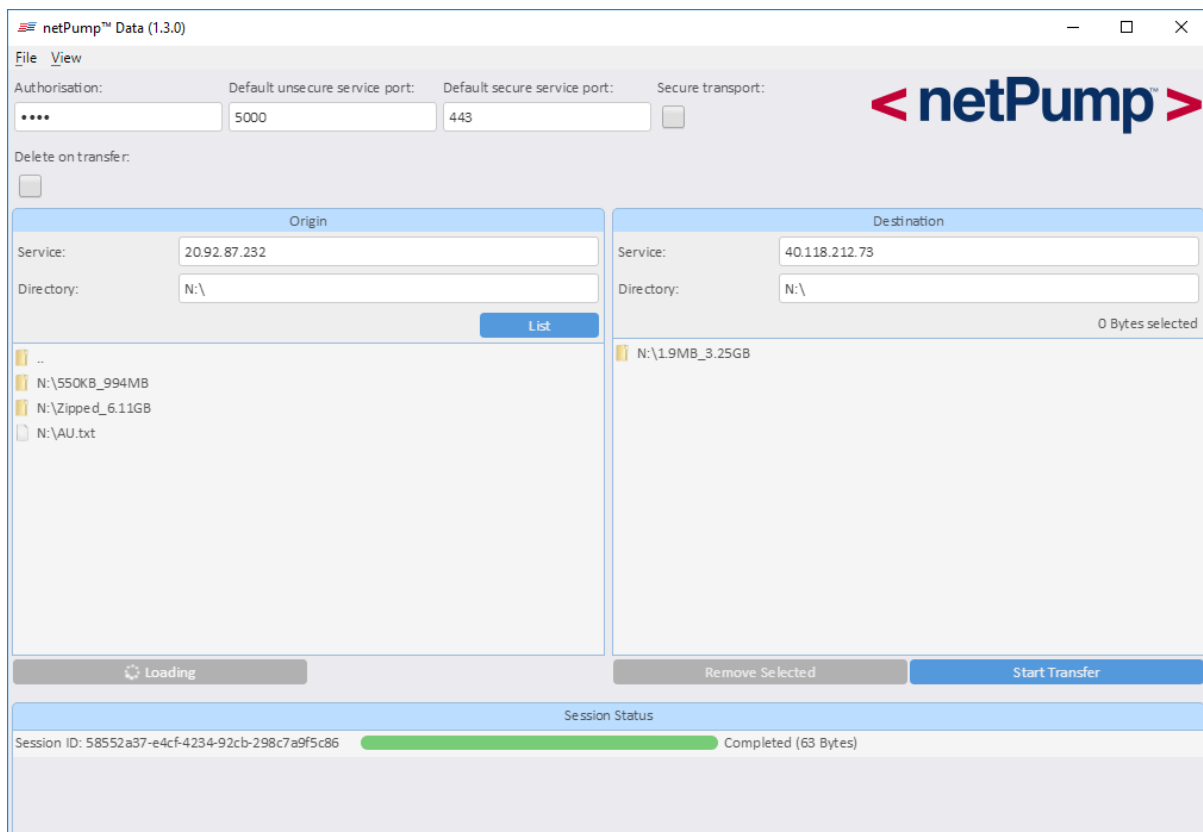
4. In the Authorisation box enter "1234".
5. In the Service box under Origin, enter the IP Address for Server B, in the Directory box underneath this enter N:\
6. In the Service box under Destination, enter the IP Address for Server A, in the Directory box underneath this enter N:\



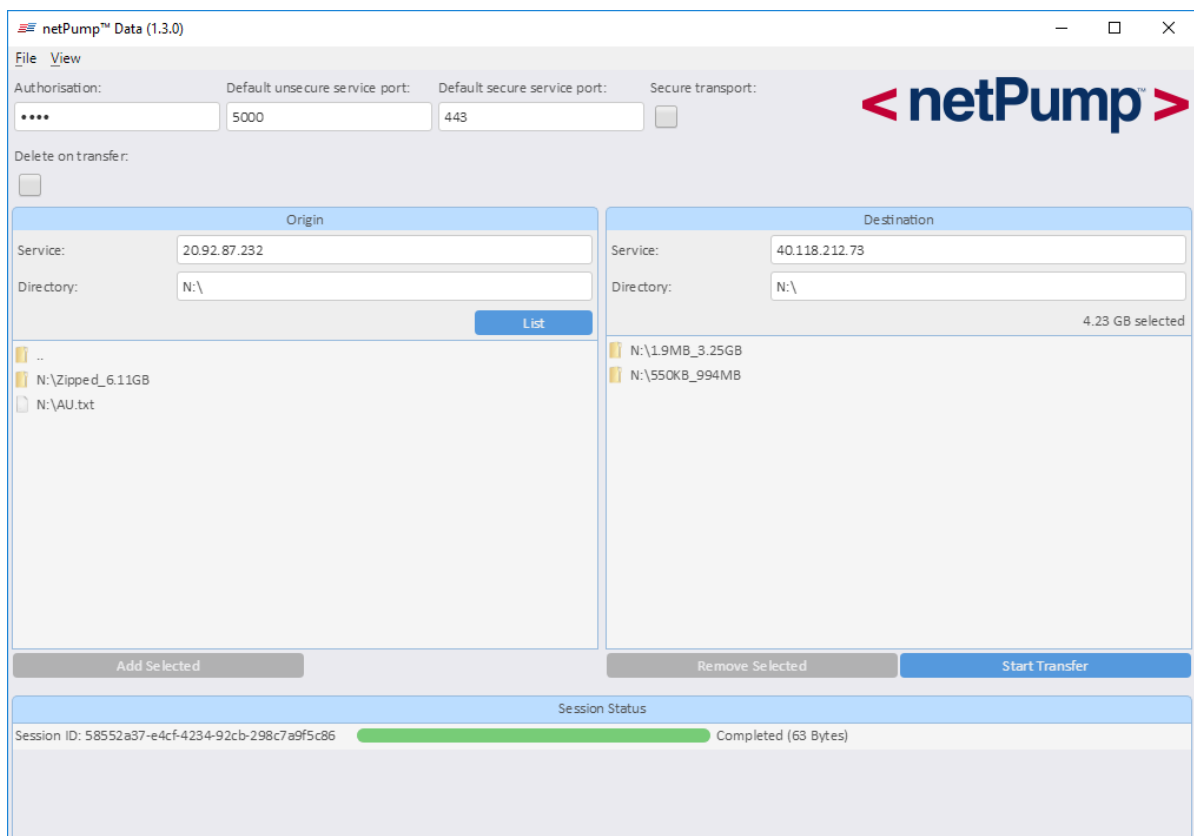
7. Click on the List button and the Folders within the Shared folder will be listed:



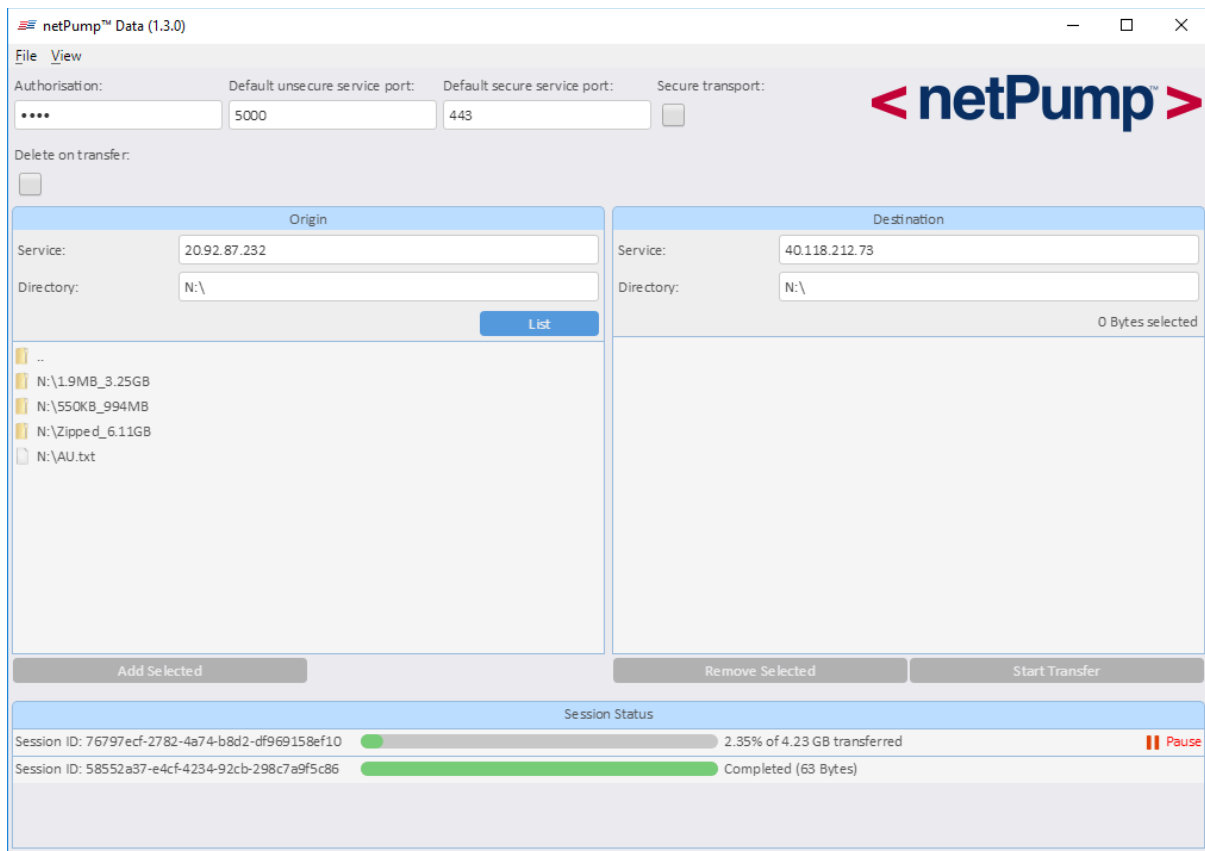
8. Click on the first folder, then click on Add Selected



9. Click on each additional folder, one at a time, and click on Add Selected. Repeat until all folders have been added. Multiple individual files may be added by holding down the Shift key, clicking on the first file, then clicking on the last file, then clicking on Add Selected.



10. Once all folders have been selected, with your timing device set to zero, start your timing device at the same time you click on Start Transfer.
11. A transfer status bar will appear, with a green line showing progress as well as a percentage of the transfer completed.



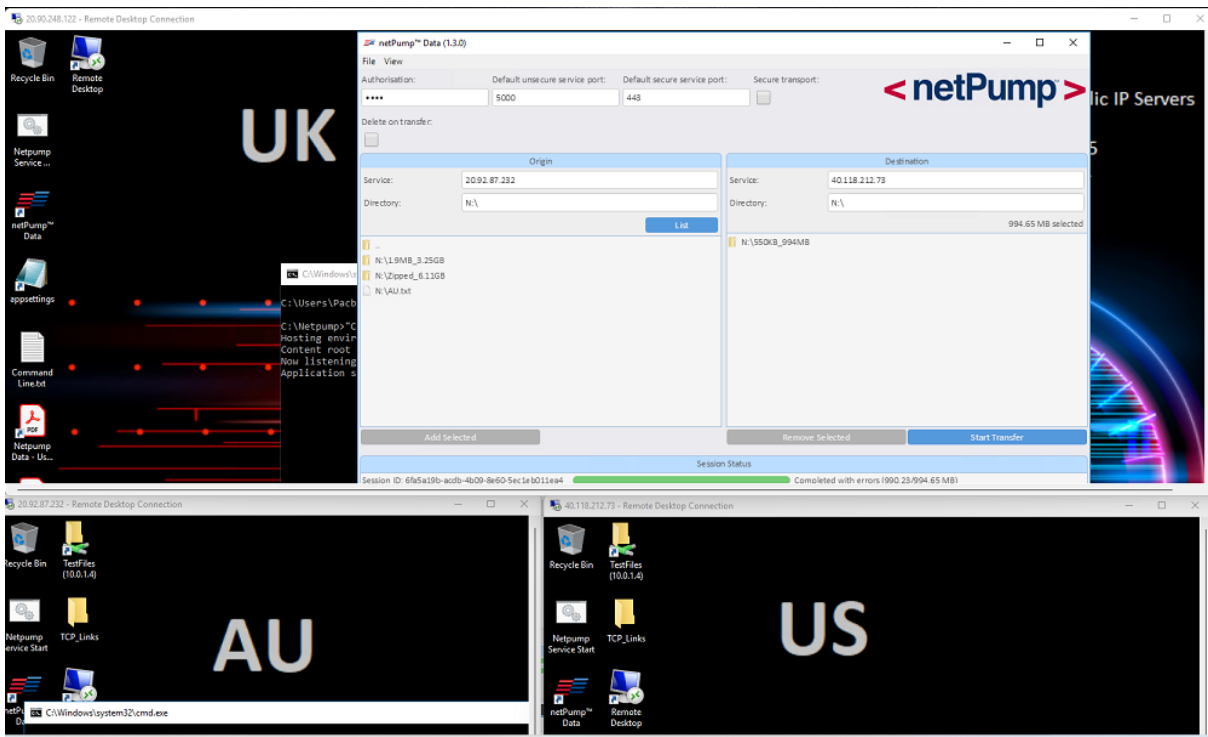
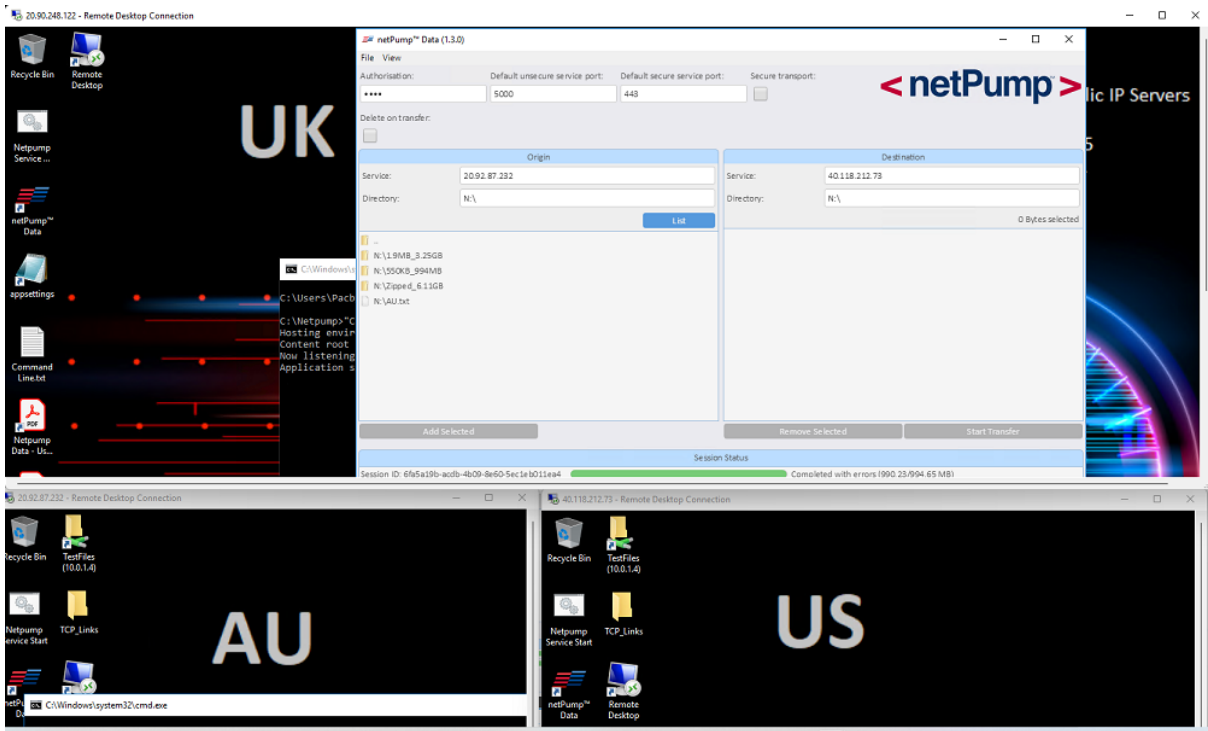
12. Once the transfer is complete, the test at the right of the green status line will show Complete.

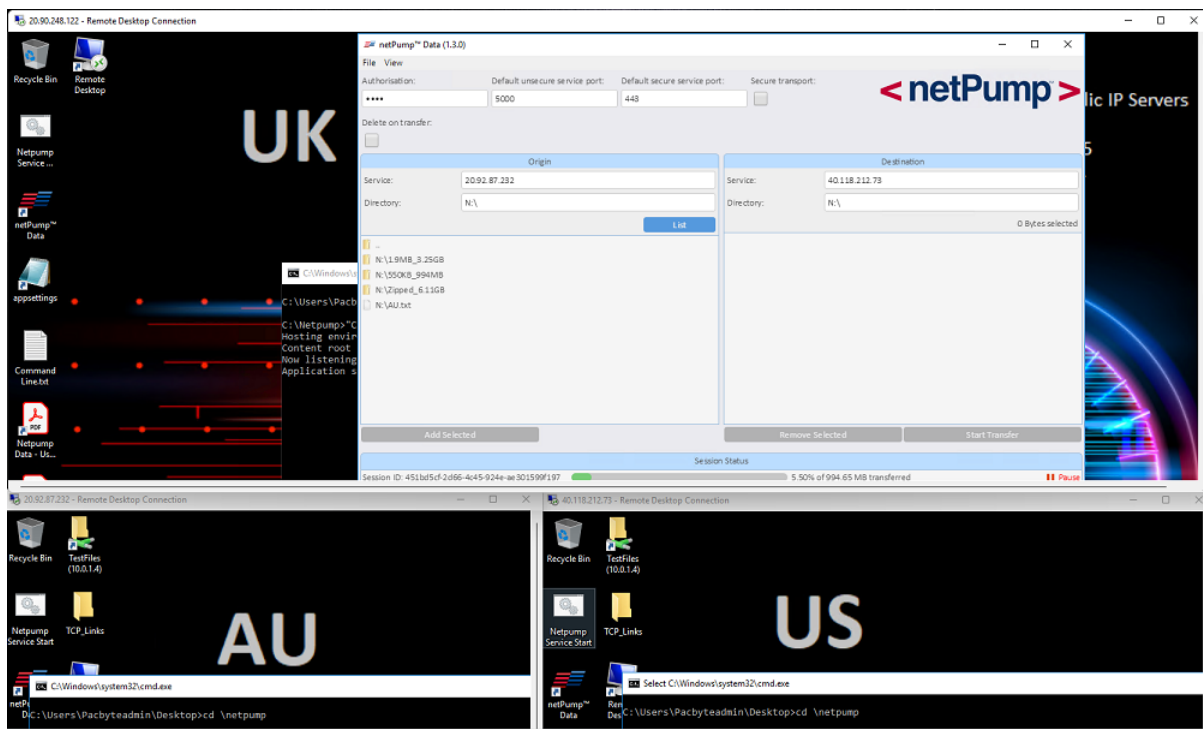
13. Close Remote Desktop.

The selected data has been transferred from Server B to Server A, but using Netpump Data on Server C.



The screen shots below show three servers open AU, US and UK. Data is being transferred from Au to US but controlled from the UK server.





## More information on the configured test environment

The Netpump Data testing environment has been configured to the simplest level possible, with the use of a GUI and manual control of the background software (service). This configuration demonstrates the power of Netpump Data in an *highly visible* manner, as well as allowing for the viewing of traditional TCP/IP data transfers.

Secure data transfer has not been configured on these servers, nor have any services been loaded in the background.

Netpump Data has full functionality to support secure data transfers, may be configured to operate in the background of any servers or remote client devices (that meet the minimum requirements), in the same way that data is currently moved around a network.

The Netpump Data Administration Guide, which is located on the desktop of all the Public IP Servers, contains full instructions and the location of sample scripting to enable easy implementation.