



# **Use MC/S with QNAP Turbo NAS**

# How to connect to your QNAP Turbo NAS from Windows Server 2012 using MC/S

QNAP provides you what others cannot!

In addition to the other available features on your Turbo NAS, MPIO (Multipath Input Output) enables you to have multiple paths to reach an iSCSI target. Notice only x-86 based QNAP NAS support MC/S.

Benefits of using MPIO with a Turbo NAS:

- It allows **better performance.** By using several TCP connections for data transmission, it will enhance network throughput.
- Ensures **failover.** It will avoid downtime in the event of network problems (faulty cable, switch power unit malfunction) with every application remaining online.
- It can provide **load balancing.** Whenever a large transfer occurs, it can use different switches to avoid the possibility of overloading a switch.

In this application note, we will set an iSCSI target with multiple connections to access your favorite Turbo NAS from Windows Server 2012.

Before getting started, please note:

- DO NOT use NIC Teaming on the server: NIC Teaming used with iSCSI is not supported by Microsoft.
- DO NOT use MC/S and MPIO together to connect a target. Microsoft does not support that configuration: "Although it is technically possible to layer Microsoft MPIO and MCS together since they function at different layers in the Windows stack, Microsoft does not support the layering of MPIO and MCS due to complexities this can introduce if troubleshooting is needed on a configuration."
- See "Microsoft iSCSI Software Initiator Version 2.X Users Guide" <u>http://download.microsoft.com/download/A/E/9/AE91DEA1-66D9-417C-ADE4-92D824B</u> <u>871AF/uGuide.doc</u>

Physical Network architectures	1
1 network link	1
2 network links	1
MC/S over a single network interface	2
MC/S over a 2 network interfaces	3
Failures and failover concept	4
Handled by MC/S feature	4
Handled by QNAP Trunking mode	4
Pre-requisites of using MC/S	5
Set up	5
Set up an iSCSI target on your Turbo NAS	5
Connect to QNAP iSCSI portal	5
Connect to your iSCSI target	8
Add a second connection1	0
Check the settings1	.4
Application1	.5
Others1	.7
Jumble Frame1	.7
Unbind Unnecessary Protocols2	20

# Abstract



Two different configurations will be demonstrated in this application note.

- The first one is based on simple network architecture. \_
- The second one will use a more advanced configuration to allow failover and load balancing.

# **Physical Network architectures**

#### 1 network link

The simplest way to try MC/S is to have a simple connection with 1 physical interface on each side.



# 2 network links



This architecture offers failover, load balancing and enhanced performance.

We will see in details how to set up the MC/S feature on this network architecture to allow failover.



# MC/S over a single network interface

In this example, we have only one network connection on each side. Without MC/S, one connection to an iSCSI target would result in 1 session each time you click "logon" and connect to an iSCSI target. Each session is composed in this case with 1 CP connection. It would look like:



With MC/S, we can have more than 1 TCP connection for each session. That means you can logon to the target and add several connections for the same session, such as:





# MC/S over a 2 network interfaces

MC/S can also provide failover. If your server has multiple network interfaces, it is possible to use MC/S in that purpose.



As seen previously, after an iSCSI logon, we can add TCP connections to the same session (this procedure will be explained in details later). When adding a TCP connection to a session, it is possible to specify the source interface. In that case, if we connect through the first interface, then add a connection through the second interface. The session will remain alive even if one on the network interface fails.

If your Turbo NAS has 2 network interfaces, you can enable failover mode (trunking mode) to allow failover on both sides.





# Failures and failover concept

#### Handled by MC/S feature

If the cable or the switch linked to IP1 or IP2 fails, one of the 2 connections will fail, but the other connection will remain connected:



#### Handled by QNAP Trunking mode

If one of the cables linked to the Turbo NAS failed, the all path will remain UP, because it is protected by the QNAP port trunking mode:





# Pre-requisites of using MC/S

- Have an existing iSCSI target created on the Turbo NAS (firmware version 3.2.0 or later).
- To allow full network failover, have trunking mode enabled on the Turbo NAS.

#### Set up

Set up an iSCSI target on your Turbo NAS

You can refer the online application note "How to create and use the iSCSI target service on the QNAP NAS" on <a href="http://www.gnap.com/i/en/trade\_teach/">http://www.gnap.com/i/en/trade\_teach/</a>

#### Connect to QNAP iSCSI portal

Once MPIO (Multipath I/O) is enabled on your server, you can add an iSCSI LUN with MPIO support, for ONLY one of your network cards:

# From the Administrative Tools, launch the iSCSI Initiator:

🖄 l 🔂 🔝 = l	Shortcut Tools Application Tools	Administr	ative Tools		x
File Home Share	View Manage Manage			1	~ Ø
🌀 💮 = 🕇 🔞 « Sys	tem and Security 🔸 Administrative Tools	~ ¢	Search Adminis	strative Tools	Q
👉 Favorites	Name	Date modified	Type.	Size	^
Desktop	Jerminal Services	8/22/2013 8:39 AM	File folder		
🚺 Downloads	Component Services	8/21/2013 11:57 PM	Shortcut	2 KB	
📃 Recent places	Computer Management	8/21/2013 11:54 PM	Shortcut	2 KB	
	E Defragment and Optimize Drives	8/21/2013 11:47 PM	Shortcut	2 KB	
🌉 This PC	Event Viewer	8/21/2013 11:55 PM	Shortcut	2 KB	
7.0	🛃 iSCSI Initiator	8/21/2013 11:57 PM	Shortcut	2 KB	
👽 Network	Local Security Policy	8/21/2013 11:54 PM	Shortcut	2 KB	
20	MPIO	8/21/2013 11:46 PM	Shortcut	2 KB	
	DDBC Data Sources (32-bit)	8/21/2013 4:56 PM	Shortcut	2 KB	=
	📷 ODBC Data Sources (64-bit)	8/21/2013 11:59 PM	Shortcut	2 KB	
	Performance Monitor	8/21/2013 11:52 PM	Shortcut	2 KB	
	Resource Monitor	8/21/2013 11:52 PM	Shortcut	2 KB	
	👼 Security Configuration Wizard	8/21/2013 11:45 PM	Shortcut	2 KB	
	🛃 Server Manager	8/21/2013 11:55 PM	Shortcut	2 KB	
	Services	8/21/2013 11:54 PM	Shortcut	2 KB	
	🛃 System Configuration	8/21/2013 11:53 PM	Shortcut	2 KB	
	System Information	8/21/2013 11:53 PM	Shortcut	2 KB	
	🛞 Task Scheduler	8/21/2013 11:55 PM	Shortcut	2 KB	
	🔗 Windows Firewall with Advanced Security	8/21/2013 11:45 PM	Shortcut	2 KB	
	Windows Memory Diagnostic	8/21/2013 11:52 PM	Shortcut	2 KB	
	😹 Windows PowerShell (x86)	8/22/2013 8:37 AM	Shortcut	3 KB	~
24 items 1 item selected	1.11 KB				



In this new window you will be able to connect the first path to your iSCSI target LUN.

Click the "Discovery" tab, and then click "Add Portal" to add your Turbo NAS:

		iSCS	I Initiat	or Prope	rties			
rgets	Discover	y Favorite Targ	ets Volu	mes and Dev	/ices	RADIUS	Config	uration
)uick Ci Fo disco	onnect over and l	og on to a target	using a b	asic connect	ion, typ	e the IP	address	or
		target and a left	cier gener	connect				
Target:						Qu	iick Conr	nect
Discove	red targe	ts						
Mamo							Refre	sh
Name						latus		
To conr dick Co Fo com Hen di For targ select t For con	nect using nnect. pletely dis ck Disconr get proper he target nfguration get and th	advanced option connect a target nect. rties, including co and dick Propert of devices assoc en click Devices.	is, select a , select th infiguratio ies. iated with	a target and e target and n of sessions a target, se	then i		Conne Disconr Propertie Devices	ect es s
gets	Discover	iSCS	61 Initiat ets Volu	OK Or Prope	rties vices	Cancel	Config	Apply uration
Farget	portals						Defrech	
The sy Addre	ystem will ess	look for Targets Port	on followin Ad	ig portals: apter		1	P addres	ss
To add To ren then c	d a target nove a tar dick Remo	portal, click Disc rget portal, selec ve,	over Porta	il. ess above a	nd	Disco	ver Por	tal
ISNS se	ervers							
The sy	ystem is re	egistered on the	following is	SNS servers:		1	Refresh	
Name								
To add	d an iSNS	server, dick Add	Server.			Ade	d Server	·
To ren then c	nove an is dick Remo	SNS server, selec ve.	t the serve	er above and	đ		Remove	



Enter the IP address or DNS name of your Turbo NAS and click "OK".

Discover	Target Portal
Enter the IP address or DNS name want to add.	and port number of the portal you
To change the default settings of the Advanced button.	ne discovery of the target portal, dick
IP address or DNS name:	Port: (Default is 3260.)
332.172	3260
Advanced	
Advanced	OK Cancel

Refresh         Name       Status         iqn.2004-04.com.qnap:ts-ec879pro:iscsi.mcs.c9de88       Inactive         To connect using advanced options, select a target and then dick Connect.       Connect	Name iqn.2004-04.com.qnap:ts-ecc		R	efresh
Name     Status       iqn.2004-04.com.qnap:ts-ec879pro:iscsi.mcs.c9de88     Inactive   To connect using advanced options, select a target and then dick Connect.       Connect     Connect	Name ign.2004-04.com.qnap:ts-ec6		Status	î
To connect using advanced options, select a target and then Connect		379pro:iscsi.mcs.c9de88	Inactive	5
To connect using advanced options, select a target and then dick Connect.				
	To connect using advanced op click Connect.	itions, select a target and	d then Co	onnect
To completely disconnect a target, select the target and Disconnect then click Disconnect.	To completely disconnect a tar then click Disconnect.	get, select the target an	d Dis	connect
For target properties, including configuration of sessions, select the target and click Properties.	For target properties, including select the target and click Prop	g configuration of session perties.	ns, Prop	perties
For configuration of devices associated with a target, select		ssociated with a target, s	elect De	vices

Return to the initiator window; go to the "Targets" tab. You will see all the targets on your Turbo NAS.



#### Connect to your iSCSI target

			iSCSI In	itiator Properties			
	Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
	Quick C To disc DNS na	Connect cover and log ame of the ta	g on to a target usir arget and then click	ig a basic connection, t Quick Connect.	ype the IP	address or	
	Target	:			Qu	uick Connect	
Next the target you	Discove	Discovered targets					
ant to connect to and						Refresh	
	Name				Status		
ck Connect	iqn. 20	004-04.com.	qnap:ts-ec879pro:k	scsi.mcs.c9de88	Inactive		
	To con click Co	nect using a onnect.	dvanced <mark>options, s</mark> e	elect a target and then		Connect	

On the new window, check "Automatically restore this connection when computer starts" to ensure the iSCSI target will be connected when Windows starts up.

**DO NOT** check "Enable multi-path" .

Co	nnect To Target
Target name:	
ign.2004-04.com.gnap:ts-ec87	9pro:iscsi.mcs.c9de88
✓ Add this connection to the list This will make the system aut connection every time this co linable multi-path	t of Favorite Targets. omatically attempt to restore the imputer restarts.
	OK Canad



If you have only 1 network interface, click "OK"

If you have more than 2 network interfaces, click "Advanced"

Connect	To Target	x
Target name:		-
Add this connection to the list of Fav This will make the system automatica connection every time this computer	orite Targets. ally attempt to restore the restarts.	
Enable multi-path		
Advanced	ОК	Cancel
2 network interface	1 network i	nterface

In Advanced Settings you can set the specific target-initiator pair in one of the iSCSI networks ONLY by choosing the initiator, IP source and portal. Assuming we have 2 IP addresses: 172.17.32.161 and 172.17.32.175, we choose the first one:

	Advanced Settings
neral IPsec	
Connect using	
Local adapter:	Microsoft iSCSI Initiator
Initiator IP:	172.17.32.161
Target portal IP:	172.17.32.172 / 3260
	E and a second se
CRC / Checksum	
🗌 Data digest	Header digest
Enable CHAP log	on
CHAP Log on inform	nation
CHAP helps ensure o an initiator.	onnection security by providing authentication between a target and
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name:	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret:	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS.	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn, 1991-05, com.microsoft:win-uij99c1tcrq uthentication either specify an initiator secret on the Configuration page or use
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual at To use mutual CHAP, RADIUS.	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq uthentication either specify an initiator secret on the Configuration page or use enerate user authentication credentials
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge Use RADIUS to au	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq uthentication either specify an initiator secret on the Configuration page or use enerate user authentication credentials uthenticate target credentials
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual at To use mutual CHAP, RADIUS. Use RADIUS to ge Use RADIUS to au	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq uthentication either specify an initiator secret on the Configuration page or use enerate user authentication credentials uthenticate target credentials
CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge Use RADIUS to au	onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-uij99c1tcrq uthentication either specify an initiator secret on the Configuration page or use enerate user authentication credentials uthenticate target credentials

Click "OK'

Click "OK" again.

Then, you can see your iSCSI target connected.

9



Once you are connected with the first connection, we can add the second TCP connection to the same iSCSI session. To do so, click "Properties" after Selecting the connected target.

You can see on the next windows the session you have connected to before. You can also see that there is only 1 connection.

Click "MCS..." to add another connection.

Target				Qu	uick Connect	Ĩ
Discove	red <mark>t</mark> argets			-		Ĩ.
					Refresh	
Name				Status		
iqn.20	04-04.com.	qnap:ts-ec879pro:i	scsi,mcs.c9de88	Connecte	d	
To con	nect using a	dvanced options, se	elect a target and then		Connect	
To con dick Co To com then di	nect using a nnect, pletely disco ck Disconneo	dvanced options, se nnect a target, sel	elect a target and then		Connect Disconnect	
To conr dick Co To com then di For tar select t	nect using a nnect. pletely disco ck Disconner get propertio he target ar	dvanced options, se onnect a target, sele ct. es, including configu nd click Properties.	elect a target and then act the target and uration of sessions,		Connect Disconnect Properties	

Top	sities	
essions Portal Groups		
	R	efresh
Identifier	1.0	
ffffe00101284020-40000137000	00008	
To add a session, click Add session.	Add	session
To disconnect one or more sessions, s	elect each Dis	connect
session and then click Disconnect.	0.0	connect
To view devices associated with a ses a session and then click Devices.	sion, select De	vices
Session Information		
Target portal group tag:	1	
Status:	Connected	
Connection count:	1	
Maximum Allowed Connections:	8	
Authentication:	None Specified	
Header Digest:	None Specified	
Data Digest:	None Specified	
Configure Multiple Connected Sessio	n (MCS)	
To add additional connections to a s configure the MCS policy for a selec dick MCS.	ession or ted session, M	ICS



Click "Add"

Round Robin V Description The round robin policy attempts to evenly distribute incoming requests to all processing paths. This session has the following connections: Source Portal Target Portal Status Type Weight C 172.17.32.161/... 172.17.32.172/... Connected Active 0 n/a < III > To add a connection, dick Add. Add.... To remove a connection, select the connection above and then Remove click Remove. To edit the path settings for the MCS policy, select a Edit... connection above and then click Edit. OK Cancel Apply

Multiple Connected Session (MCS)

MCS policy:

×

If you have only 1 network interface, click "OK"

If you have more than 2 network interfaces, click "Advanced"

Add Co	onnection	×
Target name:		
iqn.2004-04.com.qnap:ts-ec879pr	o:iscsi.mcs.c9de88	
Advanced	Connect	Cancel
2 network interface	1 network	interface



We have already connected the first IP, and we now choose 172.17.32.175 to connect to the second IP.

Click "OK". Click "OK" again.

You will see the second connection.

12

		Advanced Settings	?	
neral	IPsec			
Conn	ect using	-		
Local	adapter:	Microsoft iSCSI Initiator	~	1
Initiat	or IP:	172.17.32.175	~	I
Targe	t portal IP:	172.17.32.172 / 3260	*	
CRC	/ Checksum			
Da	ita <mark>d</mark> igest	Header digest		
En	able CHAP log	on		
CHA	P Log on infor	nation		
CHAP an init	helps ensure o iator.	connection security by providing authentication between a target and	1	
initiati specif Name	or. The name ied.	iqn.1991-05.com.microsoft:win-uij99c1tcrq	s	
Тэглэ	t cocroti		-	
Taryo	CSECIEC,			
Pe	rform mutual a	uthentication		
To us RADII	e mutual CHAP JS.	, either specify an initiator secret on the Configuration page or use		
Us	e RADIUS to g	enerate user authentication credentials		
Us	e RADIUS to a	uthenticate target credentials		
		OK Cancel	App	ily
		Multiple Connected Session (MCS)		
ICS po	licy:			
	D - his			

Round Robin					Y
Description					
The round robin po processing paths.	licy attempts to even	ıly <mark>d</mark> istribute ir	ncoming req	uests to all	
This session has the t	following connections				
Source Portal	Target Portal	Status	Туре	Weight	0
172.17.32.161/	172.17.32.172/	Connected	Active	n/a	C
172.17.32.175/	172.17.32.172/	Connected	Active	n/a	0
<	III , click Add.			Add	>
To add a connection To remove a connec click Remove.	III , click Add. tion, select the conne	ection above a	and then	Add Remove	>
To add a connection To remove a connec click Remove. To edit the path sett connection above ar	III , click Add. tion, select the conne tings for the MCS poli ad then click Edit.	ection above a	and then	Add Remove Edit	>



Click "Properties" in "Targets" tab.

In Properties, you will find one connected session and two connections.

irgets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
Quick C	onnect					-
Fo disc DNS na	over and log ame <mark>of t</mark> he ta	on to a target usin arget and then click	ig a basic connection, t Quick Connect.	ype the IP	address or	
Farget	:			Qu	iick Connect	
iscove	ered targets					
					Refresh	
Name				Status		1
ign.20	04-04.com.	qnap:ts-ec879pro:i	scsi.mcs.c9de88	Connecter	d	
'o con	nect using a	dvanced options, se	elect a target and then		Connect	
To con dick Co To com hen d	nect using a onnect. Ipletely disco ick Disconne	dvanced options, so nnect a target, sel	elect a target and then		Connect Disconnect	
To con click Co To com then d =or tar select	nect using a nnect. Ipletely disco ick Disconner get properti the target ar	dvanced options, se nnect a target, sel ct. es, induding configu d dick Properties.	elect a target and then ect the target and uration of sessions,		Connect Disconnect Properties	
To con dick Co To com then d =or tar select the tar	nect using ai onnect. Ipletely disco ick Disconnei get propertii the target ar nfiguration o get and ther	dvanced options, se nnect a target, sel ct. es, including config nd click Properties. f devices associated n click Devices.	elect a target and then ect the target and uration of sessions, d with a target, select		Connect Disconnect Properties Devices	
Fo con fick Cc fo com hen d for tar select :	nect using an innect. Ipletely disco ick Disconner get propertii the target ar nfiguration o get and ther	dvanced options, se nnect a target, sel ct. es, including configu nd click Properties. f devices associated n click Devices.	elect a target and then ect the target and uration of sessions, d with a target, select		Connect Disconnect Properties Devices	

sions	Portal Groups		8
			Refresh
Identifi	er		
fffffe	200101284020-400001	37000000c	
er ( 1202)	77. <b>6703-</b> 762-7634 6.	e.	
o add a	session, click Add sessi	ion.	Add session
o discor	nect one or more sessi	ons, select each	Disconnect
ession a	ind then dick Disconned	it.	
o view of session	devices associated with and then click Devices	a session, select	Devices
Session	Information		
Target	portal group tag:	1	
		Connected	
Status:			
Status: Connec	tion count:	2	
Status: Connec Maximu	tion count: Im Allowed Connections	2	
Status: Connec Maximu Authen	tion count: Im Allowed Connections Itication:	2 s: 8 None Speci	fied
Status: Connec Maximu Authen Header	tion count: Im Allowed Connections tication: Digest:	2 s: 8 None Speci None Speci	fied
Status: Connec Maximu Authen Header Data D	tion count: Im Allowed Connections Itication: Digest: igest:	2 s: 8 None Speci None Speci None Speci	fied fied
Status: Connec Maximu Authen Header Data D Configu	tion count: Im Allowed Connections tication: Digest: igest: ure Multiple Connected	2 St 8 None Speci None Speci None Speci Session (MCS)	fied fied fied



#### Check the settings

You can also find those 2 connections by opening a command prompt window (cmd.exe) and use "netstat.exe".

If you have 2 network interfaces, we can see the 2 connections that you made from 2 different IP addresses.

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:51490	127.0.0.1:51491	ESTABLISHED
TCP	127.0.0.1:51491	127.0.0.1:51490	ESTABLISHED
TCP	172.17.32.161:49282	172.17.32.161:49306	ESTABLISHED
тср	172 17 32 161-49306	172 17 32 161 49282	ESTARI TSHED
TCP	172.17.32.161:50935	172.17.32.172:3260	ESTABLISHED
TCP	1/2.1/.32.101:5099/	1/2.1/.32.161:49282	I IME_WALL
TCP	172.17.32.161:50999	172.17.32.161:49282	TIME_WAIT
TCP	172.17.32.161:51002	172.17.32.161:49282	TIME_WAIT
TCP	172.17.32.161:51009	172.17.32.161:49282	TIME_WAIT
TCP	172.17.32.161:51010	172.17.32.161:49282	TIME_WAIT
TCP	172 17 32 161 51017	210 61 248 241.80	ESTABLITSHED
TCP	172.17.32.175:50971	172.17.32.172:3260	ESTABLISHED

If you only have one network interface, we can see the 2 connections that you made from the same IP address

Contract of the second second			
Active Conn	ections		
Proto         Lo           TCP         12           TCP         12           TCP         12           TCP         17           TCP         17	Address         7.0.0.1:51490         7.0.0.1:51491         7.17.32.161:49282         7.17.32.161:49282         7.17.32.161:51026         7.17.32.161:51027         7.17.32.161:51028         7.17.32.161:51028         7.17.32.161:51028         7.17.32.161:51028         7.17.32.161:51029         7.17.32.161:51030         7.17.32.161:51031	Foreign Address 127.0.0.1:51491 127.0.0.1:51490 172.17.32.161:49306 172.17.32.161:51029 172.17.32.161:49282 64.233.187.113:80 172.17.32.161:49282 210.61.248.241:80 172.17.32.161:49282 172.17.32.161:49282	State ESTABLISHED ESTABLISHED ESTABLISHED ESTABLISHED TIME_WAIT CLOSE_WAIT ESTABLISHED ESTABLISHED ESTABLISHED



In the "Server Management" console, go to "All Servers" > "File and Storage Services" > "Disks". You can see the newly-added disks as designated.

ī.			Ser	ver Manager				0	x
E	€ •• File a	and Storage Ser	rvices • Volur	nes 🕨 Disks	• (2	🕑   🚩 Manage	Tools View	Help	2
II I	Servers Volumes	DISKS All disks   3 total	) م				TASK	•	<
i	Storage Pools	Number Virtual Disk	Status Capacity	Unallocated Part	ition Read Only	Clustered Subsyster	n Bus Type	Nam	
		2 0 1	Offline10.0 GBOnline233 GBOnline492 MB	10.0 GB         Unk           0.00 B         MBF           0.00 B         MBF	nown 🗸 { {		ISCSI SATA USB	QNA WDC USB	
		< Last refreshed on 12/6/	/2014 8:42:45 AM	III				>	=
		VOLUMES	Disk is Offline	TASKS 💌	STORAGE POC QNAP iSCSI Stora	DL ge Multi-Path Disk Device No related storaae pool e	on WIN TASK	5 💌	
			1			,			
			112				. 15 07 1	9:08 AI	M



#### - You can now format the disk, bring it online, and create a volume for it

Filter			<u>ب</u>	)• (1)	•						۲
Number V	irtual Disk JIJ99C1TCI	Status RQ (3)	Capacity	Unallocated	Partition	Read On	ily	Clustered	Subsystem	Bus Type	Nam
2		Offline	10.0 GB	10.0 GB	Unknown	✓				iSCSI	QNA
0		Online	233 GB	0.00 B	MBR		Ne	w Volume		SATA	WDC
1		Online	492 MB	0.00 B	MBR		Bri	ing Online		USB	USB
							Ta	ke Offline			
							Re	set Disk			
							Ke	set Disk			
× .				- 10							>
<	ed on 12/6/2	014 8:42:4	δAM								



©Copyright 2014. QNAP Systems, Inc.



#### Jumble Frame

According to the Microsoft iSCSI Software Initiator Version 2.X Users Guide, you can enable Jumbo Frame (jumbo packet) on all your equipment to enhance performance.

"if Jumbo Frames if supported in your network infrastructure. Jumbo Frames can be used to allow more data to be transferred with each Ethernet transaction and reduce the number of frames. This larger frame size reduces the overhead on both your servers and iSCSI targets. For end to end support, each device in the network needs to support Jumbo frames including the NIC and Ethernet switches."

In Windows Server 2012, click "Configure" in your network interface properties

Vetworking	Sharing			
Connect usin	g:			
Intel(R	) 82575EB Gig	abit Network C	onnection	
This connect	ion uses the fol	lowing items:	C	onfigure
Clier	nt for Microsoft and Printer Sha Packet Scheo osoft Network -Layer Topolog	Networks aring for Micros duler Adapter Multip ny Discovery M	oft Network lexor Protoc apper I/O [	s ol )river
	I muse Tenelae	Discourse D		
	-Layer Topolog met Protocol V	y Discovery R	esponder IPv6)	
	-Layer Topolog met Protocol V met Protocol V	iy Discovery R ersion 6 (TCP/ ersion 4 (TCP/	esponder IPv6) IPv4)	
<ul> <li>✓ ▲ Unk</li> <li>✓ ▲ Inter</li> <li>✓ ▲ Inter</li> <li>✓ ▲ Inter</li> <li>Install.</li> </ul>	-Layer Topolog met Protocol V met Protocol V	y Discovery R ersion 6 (TCP/ ersion 4 (TCP/ Uninstall	esponder IPv6) IPv4) Pr	operties
A Inte     A Inte     A Inte     A Inte     A Inte     Description	-Layer Topolog met Protocol V met Protocol V	y Discovery R ersion 6 (TCP/ ersion 4 (TCP/ Uninstall	esponder IPv6) IPv4) Pr	operties
<ul> <li>Interview Interview</li> <li>Install.</li> <li>Description</li> <li>Transmissi wide area across division</li> </ul>	-Layer Topolog met Protocol V met Protocol V 	y Discovery R ersion 6 (TCP/ ersion 4 (TCP/ Uninstall ocol/Internet F ol that provide ccted networks	esponder IPv6) IPv4) Protocol. The s communic	operties e default ation

Go the "Advanced" tab, find "Jumbo Packet" in menu and specify its speed in Value.



ieneral	Advanced	Driver	Details	Events	Power Manageme	ent
The foll the prop on the r	owing propert perty you wan ight.	ties are av It to chan <u>o</u>	ailable fo ge on the	or this net e left, and	work adapter. Click then select its valu	ie Ie
Flow C Gigabit Interru Interru IPv4 C Jumbo Large Locally Log Lir Maxim Maxim Packe	ontrol Master Slave Moderation Moderation hecksum Offl Packet Send Offload Send Offload Send Offload Send Offload Administered which state Ever um number of um RSS Proc t Priority & VL	e Mode Rate oad V2 (IPv4) V2 (IPv6) J Address nt RSS Proc f RSS Que essor Nun AN	cesso sues aber		Disabled 1088 Bytes 1014 Bytes Disabled	~
					OK	Cancel

On your Turbo NAS, go to "Control Panel" > "System Settings" > "Network". Find the interface used to connect to Window Server 2012 and click the "Edit" icon

			Control Panel				000
Search Q							?
Overview  System Settings  General Settings	TCP/IP Wi-I IP Address	Fi IPv6 Servic	e Binding Pi	DDNS Service	3		
👹 Storage Manager					Ĩ	Refresh Po	rt Trunking
🔏 Network	Edit Link	Interface	DHCP	IP Address	Subnet Mask	Gateway	MAC addre
Security		Ethernet1 (1 GbE)	Yes	172.17.32.172	255.255.254.0	172.17.32.1	00:08:9B:
Hardware		Ethernet2 (1 GbE)	Yes				00:08:9B:
9 Power	4						•
Notification							
🟮 Firmware Update	DNS Server			Default Gate	wav		
👾 Backup / Restore					,	and the second	
💻 External Device	Obtain DNS	6 server address automat	tically: 🕕	Use the settin	ngs from: Etherne	t1 *	
🜉 System Status	Primary DNS se	erver: 0 0	0 0				
🗾 System Logs	Secondary DNS	server: 0 .0	0 .0				
2 Privilege Settings							
Network Services	Apply						
戱 Win/Mac/NFS	Apply All						
te ftp .							

©Copyright 2014. QNAP Systems, Inc.



In the "Network Parameters" tab, specify the speed in the "Jumbo Frame" menu.

	Control Panel	<b>O O O</b>
Search		?
Uverview		
System Settings	TCP/IP Wi-Fi IPv6 Service Binding Proxy DDNS Service	
🔣 General Settings		
🍯 Storage Manager	Network Parameters Advanced Options DHCP server	
💰 Network		Refresh Port Trunking
A Security	Network Speed: Auto-negotiation	Gateway MAC addre
in security	<ul> <li>Obtain IP address settings automatically via DHCP</li> </ul>	172.17.32.1 00:08:9B:
Hardware	Use static IP address	00:08:9B:
💡 Power	Fixed IP Address: 169 .254 .100 .100	•
Rotification	Subnet Mask: 255. 255 🕶 0 💌 0	
🟮 Firmware Update	Default Gateway: 169 254 100 100	
🌸 Backup / Restore	Jumbo Frame:	
🛄 External Device	1500	et 1 👻
🜉 System Status	4074	
📰 System Logs	7418	
& Privilege Settings	Appiy Cancel	
Network Services	Apply	
👌 Win/Mac/NFS		
FTP		



# Unbind Unnecessary Protocols

You can also unbind unnecessary protocols from your iSCSI NICs to optimize your connection. This should only be done on DEDICATED network interfaces that are used only for iSCSI.

- Clear the checkbox for "Client for Microsoft Networks"
- Clear the checkbox for "File and Printer Sharing for Microsoft Networks"
- Clear the checkbox for "QoS Packet Scheduler"
- Clear the checkboxes for the "Link-Layer Topology Discovery Mapper I/O Driver"
- Clear the checkboxes for the "Link-Layer Topology Discovery Responder
- Clear the checkboxes for the "Internet Protocol Version 6 (TCP/IPv6)"

Intel(R) 82	575EB Gigabit Network Cor	nnection #2
		Configure
This connection	uses the following items:	
🗌 🛶 Microso	ft Network Adapter Multiplex	or Protocol
Microso     Anternation     Anternation     Anternation     Anternation     Anternation	ft Network Adapter Multiplex yer Topology Discovery Map yer Topology Discovery Res Protocol Version 6 (TCP/IP Protocol Version 4 (TCP/IP	xor Protocol oper I/O Driver ponder v6) v4)
	ft Network Adapter Multiplex yer Topology Discovery Map yer Topology Discovery Res Protocol Version 6 (TCP/IP Protocol Version 4 (TCP/IP Uninstall	or Protocol oper I/O Driver ponder v6) v4) Properties



Double-click"InternetProtocolVersion4(TCP/IP4)";click"Advanced" in the "General" tab

General	Alternate Configuration				
You car this cap for the	n get IP settings assigned aut bability. Otherwise, you need appropriate IP settings.	omatically if to ask your	your n netwoi	etw <mark>ork</mark> : k admin	supports istrator
O	otain an IP address automatic	ally			
	se the following IP address:				
IP ac	ddress:				
Subr	net mask:				
Defa	ult gateway:	4			
() ()	btain DNS server address auto	omatically			
OUs	se the following DNS server ac	ldresses:			
Prefe	erred DNS server:			÷.	
Alter	nate DNS server:				
V	alidate settings upon exit			Adva	anced

IP Settings				A.
IP Seconds		<i>.</i>		
DNS server a	ddresses, in order o	fuse:		
				E
				Ĵ
	Add	Edit	Remove	
The fellowine	three cattings	noticed to all access	a stiene with T	CD (TD
ine following	three settings are a	ipplied to all conf	nections with 1	CP/IP
chabicu, i ui	resolution of unqual	ified names:		
Append pr	rimary and connection	ified names: on specific DNS s	uffixes	
Append pr     Apperd	rimary and connection nd parent suffixes of	itied names: on specific DNS s f the primary DN:	uffixes S suffix	
<ul> <li>Append pr</li> <li>Append the Append t</li></ul>	rimary and connection and parent suffixes of these DNS suffixes (ir	ified names: on specific DNS s f the primary DN: n order):	uffixes S suffix	
Append pi     Apper     Apper     Append th	rimary and connection nd parent suffixes of nese DNS suffixes (ir	ified names: on specific DNS s f the primary DN: n order):	uffixes S suffix	
Append pi     Apper     Append the Appe	rimary and connection nd parent suffixes of nese DNS suffixes (ir	ified names: on specific DNS s f the primary DN: n order):	uffixes S suffix	t
Append pi     Apper     Apper     Append th	rimary and connection nd parent suffixes of nese DNS suffixes (ir	ified names: on specific DNS s f the primary DN: n order):	uffixes S suffix	1
Append pi     Append t     Append t	rimary and connection nd parent suffixes of nese DNS suffixes (ir	ified names: on specific DNS s f the primary DN: n order): Edit	uffixes S suffix	t
Append pi     Apper     Append the	rimary and connection nd parent suffixes of nese DNS suffixes (in Add	thed names: on specific DNS s f the primary DN: n order): Edit	uffixes S suffix	t 3
Append pi     Append t     Append t      DNS suffix fo	rimary and connection nd parent suffixes of nese DNS suffixes (ir Add	ified names: on specific DNS s f the primary DN: n order): Edit	uffixes S suffix	t
Append pi     Append t     DNS suffix fo     Register t	rimary and connection nd parent suffixes of nese DNS suffixes (in Add	thed names: on specific DNS s f the primary DN: n order): Edit	uffixes S suffix	<b>t</b>
<ul> <li>Append pi</li> <li>Append the second seco</li></ul>	rimary and connection nd parent suffixes of nese DNS suffixes (in Add r this connection: his connection's add onnection s DNS suff	thed names: on specific DNS s f the primary DN: n order): Edit	uffixes S suffix	<b>t</b>
Append pi     Append t     Append t      DNS suffix fo     Register t     Use this of	rimary and connection nese DNS suffixes (in Add r this connection: his connection's add	ified names: on specific DNS s f the primary DN: n order): Edit resses in DNS	uffixes S suffix	<b>t</b>

Go to the "DNS" tab and clear the checkbox for "Register this connection's addresses in DNS"



Go to the "WINS" tab and clear the checkbox for "Enable LMHOSTS Lookup" and select the radio button for "Disable NetBIOS over TCP/IP"

WINS addresses, in order of	use:		t
Add	Edit	Remove	
TCP/IP is enabled.	, it applies to all (	Import LMHC	DSTS
NetBIOS setting O Default: Use NetBIOS setting fr is used or the DHCP se enable NetBIOS over T	om the DHCP se rver does not pr 'CP/IP.	rver. If static IP ovide NetBIOS s	address etting,
Enable NetBIOS over TC     Disable NetBIOS over TC	P/IP P/IP		