

Vježba 1.1. Visoka dostupnost file servera - Storage Spaces uz korištenje iSCSI targeta

Prije nego što krenemo raditi vježbu, trebamo:

- 1. Na Server 2012 R2 profilu, pokrenuti Hyper-V Manager.
- 2. U Hyper-V Manageru, pokrenuti virtualni poslužitelj RITS-EXC-DC. Ne paliti ostale virtualke!
- 3. Kada se virtualni poslužitelj pokrene, desnim klikom miša označite Connect.
- 4. Ulogirajte se koristeći slijedeće podatke:

User name: RITS\Administrator

Password: RitsAdmin##

Napomena: Kada se logirate prvi put u svaku virtualku, baš natipkajte korisničko ime RITS\Administrator i pripadajući password. NE odabirati lokalnog administratora prilikom logiranja!

5. Na virtualnoj mašini SERVER1 dodati još 4 mrežne kartice na External Network switch. Istu proceduru napraviti i na SERVER2 i WITNESS virutalkama.

6. Na server WITNESS dodajte još 4 virtualna hard diska veličine 5GB. Kasnije ćemo u vježbi na tim diskovima podesiti 4 iSCSI LUN-a. VHDX datoteke od virtualnih hard diskova pospremite u direktorij WITNESS virtualne mašine.

7. Upalite sve preostale virtualne poslužitelje (SERVER1, SERVER2, WITNESS). Potrebno je pričekati 3-4 minute da se svi virtualni poslužitelji upale. Nakon toga, napravite konfiguraciju mrežnih kartica. Podesiti ih tako da ne diramo domensku mrežu (prva mrežna kartica sa subnetom 10.10.10.X), a na ostale tri mrežne kartice na SERVER1 podesimo IP adrese 192.168.0.30/24, 192.168.1.30/24, 192.168.2.30/24 i 192.168.3.30/24, bez default gatewaya). Istu proceduru ponoviti i na SERVER2 virtualnoj mašini (ali koristiti IP adrese 192.168.1.31/24, 192.168.2.31/24, 192.168.3.31/24), i na WITNESS virtualnoj mašini (ali koristiti IP adrese 192.168.0.32/24, 192.168.1.32/24, 192.168.2.32/24, 192.168.3.32/24).
8. Ulogirajte se na SERVER1 i SERVER2 virtualke sa istim korisničkim podacima i pokrenite iSCSI initiator. Sustav će vam postaviti pitanju da li da trajno uključi iSCSI initiator, odaberite potvrdnu opciju.

Zadatak 1: Implementacija NIC Teaming-a

Kako bismo mogli napraviti NIC Teaming, ulogirajmo se u RITS-EXC-SERVER1 kao **RITS\Administrator** i lozinkom **RitsAdmin##**. U Server Manageru, kliknimo na **Local Server**. Nakon toga, u "Properties" stranici za RITS-EXC-SERVER1, desno pored "Additional Network 1", kliknimo na izlistanu IP adresu, kako je prikazano slikom:



B			Server Manager				- 6	ji X
Server Ma	nager • Local Ser	ver			🔊 🛛 🖡 Manage	Tools \	liew	Help
III Dashboard	For SRV1					T	ASKS	• Î
Local Server	Computer name	SRV1		last installed undates	Never			^
All Servers	Domain	RITS.LOCAL		Windows Update	Not configured			
■ File and Storage Services ▷				Last checked for updates	Never			=
	Windows Firewall	Domain: Off, Public: Off		Windows Error Reporting	Off			
	Remote management	Enabled		Customer Experience Improvement Program	Not participating			
	Remote Desktop	Disabled		IE Enhanced Security Configuration	On			H
	NIC Teaming	Disabled		Time zone	(UTC+01:00) Sarajevo, Skop	je, Warsaw, Zagr	eb	
	Additional Network 1	192.168.0.30, IPv6 enabled		Product ID	Not activated			
	Additional Network 2	192.168.1.30, IPv6 enabled						
	Additional Network 3	192.168.2.30, IPv6 enabled						
	Additional Network 4	192.168.3.30, IPv6 enabled						
	Domain Network	172.10.0.30, IPV0 enabled						-
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	EVENTS							
	All events 84 total						ASKS	-
	Filter	► (ii) ► (ii) <					•	
	Server Name ID Severity	Source	Log Date and Time	()				
	SRV1 8198 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9:14	4:26 PM				^
	SRV1 8200 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9:14	4:26 PM				
	SRV1 1014 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9:14	4:26 PM				
							1	17.014
						В 🖗 🕼 н	IRV 6	/22/2015

U **Network Connections** dialog boxu, provjerimo da li su mrežne kartice "Additional Network 2", "Additional Network 3" i "Additional Network 4" upaljene. Ako nisu, selektirajmo i kliknimo desnim klikom miša na svaku od tih mrežnih kartica i kliknimo na "Enable". Sve bi trebalo izgledati kako je prikazano slikom:

@		Network Connections		_ 0 ×
🍥 💿 🔹 🕆 😰 🕨 Control Panel 🕨 Netv	work and Internet 🔸 Network Connections			V C Search Network Connections P
Organize 🔻				ur • □ 0
Additional Network 1 Unidentified network Microsoft Hyper-V Network Adap	Additional Network 2 Unidentified network Microsoft Hyper-V Network Adap	Additional Network 3 Unidentified network Microsoft Hyper-V Network Adap	Additional Network 4 Unidentified network Microsoft Hyper-V Network Adap	Pomain Network RITS.LOCAL Microsoft Hyper-V Network Adap

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Nakon provjere aktivnosti mrežnih adaptera, možemo zatvoriti **Network Connections** dialog box. Za svaki slučaj, osvježimo Properties pane za RITS-EXC-SERVER1, i sa desne strane "NIC Teaming" kliknimo "Disabled":



b			Server Manager				- 0	X
Server Ma	anager 🔸 Local Se	erver		,	🕄 🚩 Manag	ge Tools \	/iew H	elp
III Dashboard	For SRV1					TA	ASKS 🔻	^
Local Server	Computer name	CDV/1		Last installed undator	Never		^	
All Servers	Domain	RITS.LOCAL		Windows Update	Not configured			
■ File and Storage Services ▷				Last checked for updates	Never			=
	Windows Firewall	Domain: Off, Public: Off		Windows Error Reporting	Off			
	Remote management	Enabled		Customer Experience Improvement Program	Not participating			
	Remote Desktop	Disabled		IE Enhanced Security Configuration	On		=	
	NIC Teaming	Disabled		Time zone	(UTC+01:00) Sarajevo, Skor	pje, Warsaw, Zagr	eb	
	Additional Network 1	192.168.0.30, IPv6 enabled		Product ID	Not activated			
	Additional Network 2	192.168.1.30, IPv6 enabled						
	Additional Network 3	192.168.2.30, IPv6 enabled						
	Additional Network 4	192.168.3.30, IPv6 enabled						
	Domain Network	172.16.0.30, IPvb enabled						
							_	
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	EVENTS							
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	Server Name ID Severit	y Source	Log Date and Tir	ne				
	SRV1 8198 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9	14:26 PM			^	
	SRV1 8200 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9	14:26 PM				
	SRV1 1014 Error	Microsoft-Windows-Security-SPP	Application 6/22/2015 9	14:26 PM				
						В 1 6 н	9:17 IRV 6/22	PM
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U NIC Teaming prozoru, u "Adapters and Interfaces" pane-u, kliknimo na "Additional Network 1". Pritisnite i držite CTRL tipku i onda kliknite na "Additional Network 2"

		NIC	Teaming	_ 0 ×
SERVERS All Servers 1 total				TASKS 🔻
Name Status Server Type	Operating System Version	Teams		
SRV1 💮 Online Virtual	Microsoft Windows Server 2012 R2 Standa	rd 0		
TEAMS All Teams 0 total		TASKS 🔻	ADAPTERS AND INTERFACES	TASKS
Teâm Status Teaming Mode Load B	Jalancing Adapters		Network Adapters Team Interfaces Adapter Speed State Reason Available to be added to a team (5) Additional Network 1 10 Gbps Additional Network 3 10 Gbps Additional Network 4 10 Gbps Domain Network 10 Gbps 	
- 占 🖉 📋				9:19 PM 6/22/201

U NIC Teaming prozoru, u "Adapters and Interfaces" pane-u, kliknimo na "Tasks". U drop-down listi, kliknimo na "Add to New Team":

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	NIC	Teaming	_ 0
SERVERS All Servers 1 total			TASKS
me Status Server Type Operating System Version To	eams		
V1 🕤 Online Virtual Microsoft Windows Server 2012 R2 Standard 0			
AMS		ADAPTERS AND INTERFACES	
Teams 0 total	TASKS 🔻		TASKS 🔻
am Status Teaming Mode Load Balancing Adapters		Network Adapters Team Interfaces	
		Adapter Speed State Reason	
		 Available to be added to a team (5) 	
		Additional Network Add to New Team	
		Additional Network Add to Selected Team	
		Additional Network	
		Domain Network 10 Gpps	

Ovu grupu mrežnih kartica nazvati ćemo "iSCSI Access Team1". U polje "Team name", napišimo "iSCSI Access Team 1" i kliknimo OK:

S	NIC Teaming	_ 0 ×
SERVERS All Servers 1 total		TASKS 💌
Name Status Server Type Operating System Version	Teams	
SRV1 🐔 Configuring Virtual Microsoft Windows Server 20	NIC Teaming	
	New team	
	Saving X	
	Team name:	
	iSCSI Access Team 1	
TEAMS All Teams 0 total	Member adapters:	TASKS 🔻
Team Status Teaming Mode Load Balancing Adapters	In Learn Additional Network 1 10 Gbps ✓ Additional Network 2 10 Gbps △ Additional Network 3 10 Gbps △ Additional Network 4 10 Gbps □ Domain Network 10 Gbps	
	✓ Additional properties	
	OK Cancel	
E L 2 3 V		10 10 HRV 9:21 PM 6/22/2015

Nakon dodavanja dva mrežna adaptera u iSCSI Access Team 1, treba proći 30ak sekundi da se konfigurira NIC teaming i da se prozor osvježi. Kada je NIC Team uspješno napravljen, pokazati će se novi status "Active":



SERVERS All Servers 1 total			TASKS
Status Server Type Operating System Version	Teams		1 Kanada ka
Online Virtual Microsoft Windows Server 2012 R2 Standard	1		
VIS ams 1 total	TASKS 🔻	ADAPTERS AND INTERFACES	TASKS
n Status Teaming Mode Load Balancing Adapters		Network Adapters Team Interfaces	
I Access Team 1 () OK Switch Independent Address Hash 2		Adapter Speed State Reason	
		Additional Network 3 10 Gbps	
		Additional Network 4 10 Gbps	
		Domain Network 10 Gbps	
		 iSCSI Access Team 1 (2) 	
		Additional Network 1 10 Gbps 🕣 Active	
		Name Sent Received	
		Bytes: 0 98.942	
		Packets: 0 1,182	
		Packets discarded: 0 0	
		Pater (Second 0 0	
		bytes/second: 0 0	
		Packets/Second: 0 0	

Slijedeći korak je podešavanje IP konfiguracije za naše NIC Team-ove. Kliknimo na Start screen, otvorimo Control Panel, kliknimo na "Network and Internet", i onda na "Network i Sharing Center". Potražimo iSCSI Access Team 1, i sa desnim klikom miša uđimo u meni "Properties". IP podatke ćemo podesiti ovako:

- IP address: **192.168.0.130**
- Subnet mask: 255.255.255.0
- Default gateway: ostavimo prazno
- DNS: ostavimo prazno.

eneral	
You can get IP settings assigned this capability. Otherwise, you no for the appropriate IP settings.	automatically if your network supports eed to ask your network administrator
Obtain an IP address autom	natically
• Use the following IP addres	s:
IP address:	192.168.0.130
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	· · · ·
Obtain DNS server address	automatically
Use the following DNS serve	er addresses:
Preferred DNS server:	· · ·
Alternate DNS server:	· · ·
Validate settings upon exit	Advanced

Kada smo unijeli navedene podatke, zatvorimo "iSCSI Access Team 1 Properties" dialog box.

Istu proceduru ponovimo i sa Additional Network 3 i 4, od kojih možemo napraviti novi NIC Team imena "iSCSI Access Team 2". Nakon tridesetak sekundi, osvježiti će se prikaz i dobiti ćemo ovakav status:

	NIC Teaming	
All Servers 1 total Name Status Server Type Operating System Version Teams		TASKS 💌
SRV1 ⑦ Online Virtual Microsoft Windows Server 2012 R2 Standard 2		
TEAMS All Teams [2 total	TASKS ADAPTERS AND INTERFACES	TASKS
Team Status Teaming Mode Load Balancing Adapters SCSI Access Team 1 (1) OK Switch Independent Address Hash 2 ISCSI Access Team 2 (1) OK Switch Independent Address Hash 2	Network Adapters Team Interfaces Adapter Speed State Reason	^ =
	Additional Network 3 10 Gbps Active Name Sent Received Bytes: 0 45,064 Packets: 0 522 Packets discarded: 0 0	~
	Bytes/Second: 0 0 Packets/Second: 0 0	₩ 1 HRV 9:29 PM 672/201

Kada smo napravili i drugi NIC Team, zatvorimo NIC Teaming prozor i podesimo IP konfiguraciju koristeći slijedeće podatke:



- IP address: 192.168.1.130
- Subnet mask: 255.255.255.0
- Default gateway: ostavimo prazno
- DNS: ostavimo prazno.

Internet Protocol Versio	on 4 (TCP/IPv4) Properties 🛛 🔛
General	
You can get IP settings assigned au this capability. Otherwise, you need for the appropriate IP settings.	itomatically if your network supports d to ask your network administrator
Obtain an IP address automat	ically
• Use the following IP address:	
IP address:	192.168.1.130
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	· · ·
Obtain DNS server address au	itomatically
• Use the following DNS server a	addresses:
Preferred DNS server:	· · ·
Alternate DNS server:	· · ·
Validate settings upon exit	Advanced
	OK Cancel

Kada smo unijeli navedene podatke, zatvorimo "iSCSI Access Team 2 Properties" dialog box. Slijedeći korak u proceduri je konfiguracija MPIO (Multipathing I/O), uz pomoću kojeg ćemo od naša dva NIC Teama napraviti višestruki pristup prema iSCSI LUN-ovima koje koristimo za vježbu.

Zadatak 2: Konfiguracija iSCSI initiator-a i MPIO-a

Da bismo mogli napraviti konfiguraciju MPIO-a, prvo ga moramo instalirati pošto se radi o dodatnoj opciji na Microsoftovim serverskim operacijskim sustavima. Ulogirajmo se na RITS-EXC-SERVER1 kao RITS\Administrator i lozinkom RitsAdmin## i pokrenimo Server Manager, kako bismo mogli napraviti instalaciju:

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		Server Manager			_ 0 ×
Server Manag	er 🕨 Dashboard			🕶 🧭 🚩 Manage Tools	View Help
Image: Dashboard WELL Image: Local Server Image: Dashboard Image: All Servers Image: Dashboard Image: File and Storage Services Image: Dashboard Image: Well Image: Dashboard Image: Dashboard Imag	COME TO SERVER MANAGER	gure this local server roles and features other servers to manage te a server group nect this server to cloud service Local Server 1 Manageability Events Services Performance BPA results	S Manageability Events Services Performance BPA results		Hide
				IS 17 4	9:37 PM HRV 6/22/2015

Kliknimo na "Add roles and features", i kliknimo Next na stranici "Before You Begin" (ako se pokaže). Isto tako, na stranici "Select installation type" kliknimo Next, i na stranici "Select destination server" provjerimo da li je označen SERVER1 poslužitelj. Procedura izgleda ovako:

b		Server Manager				_ 0	i x	
Server Manager	r • Dashboard		. ②	Manage	Tools	View	Help	
I Local Server All Servers File and Storage Services File RO Rol	Before you begin Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Roles and Features Wizard Destinat Strin This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing docu hosting a website. To remove roles, role services, or features: Start the Romove Roles and Features Wizard Before you continue, verify that the following tasks have been completed: • The Administrator account has a strong password • Network settings, such as static IP addresses, are configured • Network settings, such as static IP addresses, are configured If you must verify that any of the preceding prerequisites have been completed, close the wid complete the steps, and then run the wizard again. To continue, click Next: Skip this page by default	Cancel			Hide	4	-
	BPA results	BPA results BPA results						
🕂 占 🖉 🍔 👺				R	s 🖓 👍	HRV 6/	8:38 PM 22/2015	~

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E.		Server Manager			_ 0 ×
Server Manag	er • Dashboard		- @ I	Manage 7	Tools View Help
Image: Dashboard WE Image: Local Server Image: Local Servers Image: Image: Local Servers Image: Local Services Image: Image: Image: Local Servers Image: Local Servers Image: Image: Image: Image: Local Servers Image: Local Servers Image:	E Select destination Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results BPA results	Add Roles and Features Wizard SERVER Select a server or a virtual hard disk on which to install roles and features. Select a server from the server pool Select a virtual hard disk Server Pool Filter: Name IP Address Operating System SRV1RITS.LOCAL 172.160.30,19 Microsoft Windows Server 2012 Add Servers command in Server Manager. Offline servers and newly-added server collection is still incomplete are not shown. Image: BPA results BPA results	DESTINATION SERVER SRVI.RITS.LOCAL 2 R2.Standard 2 R2.Standard 2 R2.Standard 2 R2.Standard		Hide
				Ro f	HRV 6/22/2015

Na slijedećoj stranici kliknemo na "Features" i odaberemo "Multipath I/O", te Next i Install:

Visoko učilište Algebra - visoka škola za primijenjeno računarstvo | Ilica 242 | 10000 Zagreb | Hrvatska Upisano kod trgovačkog suda u Zagrebu pod MBS: 080664742 Poslovna banka: Zagrebačka banka d.d. Trg bana Josipa Jelačića 10, 10000 Zagreb, Hrvatska OIB: 14575159920 | matični broj: 2412926 | IBAN: HR7523600001102036972 tel. +385 (0)1 2222 182 | fax. +385 (0)1 2305 004 | info@racunarstvo.hr | www.racunarstvo.hr



a	Sen	ver Manager		_ 0 ×
Server Manager	r • Dashboard		🕶 🧭 🚩 Manage Tools	View Help
 Dashboard Local Server All Servers File and Storage Services > 	a ddd Roles and Confirm installation selections Before You Begin Installation Type Server Selection Server Roles Peatures Confirmation Results Multipath I/O Export configuration settings Specify an alternate source path BPA results BPA results	Features Wizard DESTINAL DESTINAL SR es services, or features on selected server, click Install. automatically if required istration tools) might be displayed on this page because the page because the page because the page on the set optional features, click Previous on the might be displayed on the page because the pag	TION SERVER IN RISLOCAL hey have ious to clear	Hide
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Instalacija MPIO opcije je sada završena. Da bismo ju mogli iskoristiti, potrebno je napraviti konfiguraciju *nečega* (iSCSI, SAS, Fibre Channel, Fibre Channel over Ethernet) što može koristiti multipathing kao algoritam za pristup sustavu za pohranu. U konkretnom slučaju, iskoristiti ćemo iSCSI initiator kako bismo kroz multipathing iSCSI-a osigurirali visoku dostupnost, propusnost i redundanciju pristupa sustavu za pohranu. Uz pomoć iSCSI initiator-a (iSCSI klijent) spojiti ćemo se na iSCSI target (iSCSI server) na virtualnom poslužitelju RITS-EXC-WITNESS, na kojem ćemo podesiti četiri LUN-a za pohranu podataka u našoj vježbi.



Zadatak 3: Konfiguracija iSCSI LUN-ova na virtualnoj mašini RITS-EXC-WITNESS

Potrebno je pripremiti dodane diskove za korištenje u iSCSI target-u. Dakle, podignimo alat diskmgmt.msc (Disk Management), i prebacimo prvo dodatne 5GB diskove u Online stanje (desni klik mišem u sivi prostor u kockici gdje piše "Offline", pa odaberemo "Online", za **svaki** od diskova od Disk 1 do Disk 4):

8		Disk Mar	agement	_ 0 ×
File Action V	/iew Help			
(= =) 🖬 👔				
Volume	Layout Type File System Status	Capacity Free Spa % Free		
	Simple Basic Healthy (R Simple Basic Healthy (R	300 MB 300 MB 100 %		
(C:)	Simple Basic NTFS Healthy (B	126.48 GB 109.20 GB 86 %		
Disk 0				
Basic 126.88 GB	300 MB	99 MB	(C:) 12648 GB NTES	
Online	Healthy (Recovery Partition)	Healthy (EFI System Partition)	Healthy (Boot, Page File, Crash Dump, Primary Partition)	
	<u></u>			
Disk 1				
1.00 GB	Online			
Offline 🕕	Properties			=
	Help			-
GDisk 2	(inde			
1.00 GB	1.00 GB			
Offline 🕕	Unallocated			
	1			
Disk 3				
1.00 GB	1.00 GB			
Offline 🕕	Unallocated			
	1			
Disk 4	1			~
Unallocated	Primary partition			
				12.12.434
				12:12 AM 3/18/2017

, nakon čega će nam diskovi biti u "Not Initialized" stanju. Desnim klikom na isto mjesto kao u prethodnom koraku, napravimo "Initialize disk". Po defaultu će nam biti checkbox-irani svi diskovi, i taj izbor potvrdimo:

a		Disk Management	_ 🗇 X
File Action Vi	iew Help		
(= =) 📰 🛛			
Volume	Layout Type File System Status Cap	icity Free Spa % Free	
	Simple Basic Healthy (R 300	MB 300 MB 100 %	
	Simple Basic Healthy (E 99 M Simple Basic NTES Healthy (B. 126.	B 99 MB 100 % I8 GR 100 20 GR 86 %	
- (0.)	ample base firms freddy gan faar		
		Initialize Disk	
	i	You must initialize a disk before Logical Disk Manager can access it.	
Disk 0		Select disks:	
126.88 GB	300 MB 99 MB	Disk 1	
Online	Healthy (Recovery Partition) Health	y ☑ Disk 3 Primary Partition)	
		Disk 4	
GDisk 1		Use the following partition style for the selected disks:	
1.00 GB	1.00 GB	O MBR (Master Boot Record)	
Not Initialized	Unallocated	<u>G</u> PT (GUID Partition Table)	_
	<u> </u>	Note: The GPT partition style is not recognized by all previous versions of	=
🔞 Disk 2		Wildows.	
Unknown 1.00 GB	1.00.68	OK. Cancel	
Not Initialized	Unallocated		
GDisk 3			
Unknown 1 00 GB	1.00 CB		
Not Initialized	Unallocated		
Disk 4			
Unallocated	Primary partition		•
			12:15 AM
			3/18/2017



Nakon toga, diskove je potrebno formatirati. Na svakom disku (jedan po jedan, kroz wizard), kliknemo desnim klikom miša na "Unallocated", odaberemo "New simple volume", i samo odklikamo Next-Next-Next-Next-Finish, za sva četiri diska. Krajnji rezultat bi trebao izgledati ovako:

2							Disk Ma	anagem	hent	 	 	 		0)	۲.
File Action Vie	w Help														
le e e	🖬 🖻 🖬 🤅	1													
Volume	Layout	Type	File System	Status	Capacity	Free Spa	% Free								
	Simple	Basic		Healthy (R	300 MB	300 MB	100 %								
	Simple	Basic		Healthy (E	99 MB	99 MB	100 %								
C:)	Simple	Basic	NIES	Healthy (B	125.48 GB	109.20 GB	86%								
New Volume (D:)	Simple	Basic	NTES	Healthy (P	990 IVIB	900 IVIB	98%								
New Volume (E:)	Simple	Basic	NTES	Healthy (P	990 MB	966 MB	98%								
New Volume (G:)	Simple	Basic	NTES	Healthy (P	990 MB	966 MB	98%								
										 1		 			~
Disk 1															
992 MB	New Volume	(D:)													
Online	Healthy (Prima	rv Partition)													
	,.	, ,													-
Disk 2															
Basic	New Volume	(E:)													
992 MB Online	990 MB NTFS	n (Doubition)													
Online	Healthy (Prima	ry Partition)													
Disk 3															
Basic	New Volume	(F:)													
992 MB	990 MB NTFS														≡
Online	Healthy (Prima	ry Partition)													
Basic	New Volume	(G:)													
992 MB	990 MB NTFS	,													
Online	Healthy (Prima	ry Partition)													
															\sim
📕 Unallocated 📕 F	Primary partition	1													
	$\mathbf{\Sigma}$											Re 🖬 🕼	HRV	12:17 AN	1
Unallocated F	Primary partition										 	Pa Ma da	HRV	12:17 AN 3/18/201	✓ И 17

Koristeći Server Manager, potrebno je napraviti četiri nova iSCSI LUN-a. Pokrenimo Server Manager, i u "Add Roles and Features" dodajmo pod "File and Storage Services" pod-rolu iSCSI Target Server:

b		S	erver Manager		_	ō x	:
۲	 Server Manage 	er • Dashboard		• 🕄 🚩 Manage	Tools View	Help	
	b	Add Roles and Features Wizard					^
 E Dash5 ↓ Local : ↓ Al Ser ↓ File an 	Select server roles Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	S Select one or more roles to install on the selected server. Roles The file and Storage Services (1 of 12 installed) File and iSCSI Services File Server BranchCache for Network Files Data Deduplication DFS Namespaces DFS Replication File Server VSS Agent Service Server for NFS Work Folders Storage Services (Installed) Harver W	DESTINATION SERVER WITNESS/Itslocal SCSI Target Server provides services and management tools for ISCSI targets.	Hit	de	88	
		BPA results Performance BPA results 2019	Install Cancel Performance BPA results	8/017 12:09 AM			~
	🛓 🕗 🗒 🌻				🙀 🁍 HRV	12:09 AM 3/18/201	7

, nakon čega je sa potvrdom na "Next", "Next" i "Finish" potrebno potvrditi odabir. Kada se završi instalacija, kliknimo sa lijeve strane na "File and Storage Services", i nakon toga na iSCSI:



è		Server Manager				۲.
E	∋ - Server M	anager • File and Storage Services • iSCSI • 🕲 🍢 маг	nage Tools	View	Help	
	Server M Servers Volumes Disks Storage Pools Shares ISCSI Work Folders	anager He and Storage Services ISCSI		TASKS		Ш
		Last refreshed on 3/18/2017 12:11:24 AM ISCSI TARGETS No VHD is selected. Select an ISCSI VHD to display its associated targets.		TASKS	•	
			Po 😨 😡	HRV	12:11 Al 3/18/20	И 17

, nakon čega je potrebno kliknuti na "To create an iSCSI virtual disk, start the New iSCSI Virtual Disk Wizard" opciju. Za lokaciju prvog VHDX-a za iSCSI LUN odabrati ćemo D disk:

a				Server	Manager						- 1	ت x	
\mathbf{E}	🔊 🔹 Server	Manager • File and	Storage Service	s ∙ iSCSI				- ② I	Manage	Tools	View	Help	
		b	New i	SCSI Virtual Dis <mark>k V</mark>	Vizard		_ □	×					^
	Servers Volumes Disks Storage Pools Shares ISCSI Work Folders	Select iSCSI virtual	disk location Server: Server Name WITNESS The list is filtered to show Storage location: Select by volume: Volume C: D: E: F: G: The iSCSI virtual disk will O Type a custom path:	Status Online wonly servers with the Free Space 109 GB 967 MB 967 MB 967 MB 967 MB	Cluster Role Not Clustered ISCSI Target Serve Capacity File Sys 126 GB NTFS 990 MB NTFS 990 MB NTFS 990 MB NTFS 990 MB NTFS 100 MB NTFS	Owner Node role installed. tem cted volume.	Browse				TASKS		11
					< Previous	Create	Cancel						~
	- 2)							R	🖥 🕼	HRV	12:17 AM 3/18/2011	7

, a same VHDX datoteke možemo proizvoljno imenovati, npr. brojevima prvi, drugi, treći i četvrti (na slici je pokazan primjer za prvi.vhdx:



i				Server Manager			_	0 X	£
\bigcirc	Server	Manager 🕨 File and	l Storage	e Services 🔸 iSCSI	- (🕄 🖡 Manage	Tools View	Help	
ii ii ii⊊⊳	Servers Volumes Disks Storage Pools Shares iSCSI Work Folders	Specify iSCSI virtu ISCSI Virtual Disk Location ISCSI Virtual Disk Name ISCSI Virtual Disk Size ISCSI Target Target Name and Access Access Servers Enable authentication ser Confirmation Results	Jal disk r Name: Description Path:	New iSCSI Virtual Disk Wizard			TASKS	•	=
				< Previous Next > Cr	eate Cancel		TASKS	•	~
						R	3 😭 🎝 HRV	12:18 AN 3/18/201	1 7

, nakon čega je potrebno kliknuti "Next", odabrati "Fixed drive size" od npr.900MB:

F _			Server Manager					_	י ה	C
$\langle \boldsymbol{\epsilon} \rangle$	∋ - Server	Manager + File and	Storage Services + iSCSI	-	3 I	Manage	Tools	View	Help	
		a	New iSCSI Virtual Disk Wizard	- 🗆 X						^
	Servers Volumes Disks Storage Pools Shares ISCSI Work Folders	Specify iSCSI virtu ISCSI Virtual Disk Location ISCSI Virtual Disk Name ISCSI Virtual Disk Size ISCSI Target Target Name and Access Access Servers Enable authentication ser Confirmation Results	Init disk size Free space: 933 MB Size: 900 Image: Space: 900 Image: Space: Space: Space: S					TASKS		
			< Previous Next > Create	Cancel				TASKS	•	
		3				R	5 🗐 (b	HRV	12:20 Al 3/18/20	И 17

, i potvrditi odabir sa "Next". Na slijedećem ekranu pitati će nas koji iSCSI Target imamo namjeru koristiti. Pošto još nismo napravili niti jedan, odabrati ćemo opciju "New iSCSI Target":



1				Serv	er Manager				- 0	x
	Server	Manager • File and	l Storage Servi	ces ∙ iSCSI			🛞 🚩 Manage	<u>T</u> ools <u>V</u> i	ew <u>H</u> elj	р
	Servers Volumes Disks Storage Pools Shares ISCSI Work Folders	Assign iSCSI targe ISCSI Virtual Disk Location ISCSI Virtual Disk Name ISCSI Virtual Disk Name ISCSI Virtual Disk Size SCSI Target Target Name and Access Access Servers Enable authentication ser Confirmation Results	Na Assign this ISCSI virtua Existing iSCSI targe Target Name Image: Second Seco	aw iSCSI Virtual Dis	k Wizard il target or create a new target for it. Description			<u>AT</u>	SKS V	=
		30			< Previous Next >	<u>Greate</u> Cancel		TA 100 100 100	5KS	AM 017

iSCSI Target ćemo nazvati "LAB1":

L				2	erver Manager					-	ī X	
\mathbf{E}	∋• Serv	er Manager 🕨 File and	d Storage :	Services • iSCS	il		- (;	© 🗗 🛚	<u>1</u> anage <u>T</u> o	ols <u>V</u> iew	<u>H</u> elp	
	Servers Volumes Disks Storage Pools Shares iSCSI Work Folders	Specify target na iscsi Virtual Disk Location iscsi Virtual Disk Name iscsi Virtual Disk Size iscsi Target Target Name and Access Access Servers Enable authentication ser Confirmation Results	Me Name: Description:	LAB1	Disk Wizard					TASKS	•	
					< Previous Ne	ext > Create	Cancel			TASKS	•	~
									8	👍 HRV	12:22 AM 3/18/2017	

, i na idućem ćemo ekranu odabrati opciju "Add", te "Query Initiator computer for ID" (pripazite da su virtualne mašine uključene u trenutku kada ovo radite!). Kliknuti ćemo na "Browse", i u to polje upisati server1:



Ē.			Serv	er Manager			-	D X
$\mathbf{\epsilon}$	∋- Serve	er Manager • File and Storage Service	es • iSCSI		- (;	🕄 🖡 Manage	<u>T</u> ools <u>V</u> iew	Help
		🚡 New	iSCSI Virtual Dis	k Wizard	_ 🗆 X			^
111	Servers						TASKS	•
i	Volumes	Specify access servers		n				
	Disks	Add initiator ID		access this iSCSI virtual disk.				
	Storage Po	Select a method to identify the initiat	or.					
	Shares	select a method to identify the initial	01.					
	Work Folders	Query initiator computer for ID (not supported on Windows Server 2008 R2, Windows 7, or earlier):						
		SERVER1.rits.local	Browse					=
		Select from the initiator cache on the target server:						
		 Enter a value for the selected type 						
		Type: Value:						
		IQN 💌	Browse					
		OK	Cancel					
				< Previous Next > Create	Cancel		TASKS	•
	_			., , , ,				~
						10	😭 🅼 HRV	12:24 AM 3/18/2017

, i pristisnuti "OK". Istu proceduru ćemo ponoviti i za SERVER2 (prvo Add, pa dodati computer name SERVER2, rezultat čega bi trebala biti konfiguracija slična ovoj:

1			Server Manager	_ 0 ×
$\mathbf{\epsilon}$	Server	Manager • File and	Storage Services 🔸 iSCSI 🛛 🗸 🖉 🛙	anage <u>T</u> ools <u>V</u> iew <u>H</u> elp
		1	New iSCSI Virtual Disk Wizard	^
	Servers Volumes Disks Storage Pools Shares <u>iSCSI</u> Work Folders	Specify access ser ISCSI Virtual Disk Location ISCSI Virtual Disk Size ISCSI Virtual Disk Size ISCSI Target Target Name and Access Access Servers Enable authentication ser Confirmation Results	Click Add to specify the iSCSI initiator(s) that will access this iSCSI virtual disk. Type Value IQN ign.1991-05.com.microsoftserver1.rits.local IQN ign.1991-05.com.microsoftserver2.rits.local Add Remove	TASKS
			< Previous Next > Create Cancel	TASKS 🔻
)	· · · · ·	

Time smo virtualnim mašinama SERVER1 i SERVER2 dopustili pristup na iSCSI Target. Nakon toga, završavamo iSCSI Target wizard korištenjem opcija "Next", "Next" i "Create".

Krajnji rezultat izgleda ovako:



P		Server Manager	-	. 🗇 🗙	
\mathbf{E}	∋ - Server M	anager \cdot File and Storage Services \cdot iSCSI \cdot \odot $arFilter$	Manage Tools Vie	w Help	
	Servers Volumes Disks Storage Pools Shares ISCSI Work Folders	iSCSI VIRTUAL DISKS All ISCSI virtual disks 1 total Filter P Path Status Virtual Disk Status Target Name All ISCSI Virtual Disk Status Target Name VITNESS (1) Virtual Disk Status DASC SIVirtual Disk Status Not Connected Iab1 Not Connected Iab2 Not Connected Iab2 Not Connected Iab2 Not Connected Iab	TAS	KS - isk Disk Scal 90	III
		Image: Constraint of the second se	TAS	> (S - (S)	~
			😼 🙀 🌘 HRV	3/18/2017	

Potrebno je odraditi istu proceduru za preostale iSCSI LUN-ove, koji će biti smješteni na diskovima E, F, i G. U gornjem desnom kutu, pod "Tasks", kliknemo na "New iSCSI Virtual Disk", i slijedimo wizard, odaberemo pripadajući disk, ali kod konfiguracije iSCSI Targeta, dodamo ovaj disk na postojeći iSCSI Target (opcija "Existing iSCSI target" u konfiguracijskom prozoru "Assign this iSCSI virtual disk to an existing iSCSI Target or create new target for it"). Nakon dodavanja sva četiri virtualna diska/LUN-a, konfiguracija bi trebala izgledati otprilike ovako:

	Server M	anager	_ 0 ×
Manager • File and Storage	e Services 🔸 iSCSI	• (3)	Manage Tools View Help
SCSI VIRTUAL DISKS All ISCSI virtual disks 4 total Filter Path Status WITNESS (4) DASCSIVirtualDisks/Drugivhdx EvisCSIVirtualDisks/Drugivhdx EvisCSIVirtualDisks/Lorei.vhdx GruSCSIVirtualDisks/cetvrti.vhdx	 (Ē) ▼ (ℝ) ▼ Virtual Disk Status Target Nam Not Connected Iab1 Not Connected Iab1 Not Connected Iab1 Not Connected Iab1 	e Target Status Initiator ID Not Connected IQNiqn.1991-05.com.microsoft.server1.rits.local, I Not Connected IQNiqn.1991-05.com.microsoft.server1.rits.local, I Not Connected IQNiqn.1991-05.com.microsoft.server1.rits.local, I Not Connected IQNiqn.1991-05.com.microsoft.server1.rits.local, I	CN-idqn 1991-05.com.microsoftserver2.nits.local (QN-idqn.1991-05.com.microsoftserver2.nits.local (QN-idqn.1991-05.com.microsoftserver2.nits.local (QN-idqn.1991-05.com.microsoftserver2.nits.local (QN-idqn.1991-05.com.microsoftserver2.nits.local (
< Last refreshed on 3/18/2017 12:17:47 AM iscsi TARGETS DijSCSIVirtualDisks\Prvi.vhdx on WITNESS Filter	 (a) (b) (c) <li< th=""><th>н</th><th></th></li<>	н	
	Manager File and Storage iscsi virtual disks 4 total Filter Path Status WITNESS (4) DiscSi VirtualDisks/Drugivhdx EvijSCSI VirtualDisks/treci.vhdx G:vJSCSI VirtualDisks/treci.vhdx G:vJSCSI VirtualDisks/treci.vhdx C:vJSCSI VIrtu	Kanager * File and Storage Services * iSCSI iscsi virtual disks 4 total Filter 	Server Manager Manager File and Storage Services SiSCSI SCSI VIRTUAL DISKS All ISCSI VIRTUAL DISKS All ISCSI VIRTUAL DISKS Virtual Disk Status Virtual Disk Virtual Disk Virtual Disk Status Virtual Disk Virtual



Zadatak 4: Konfiguracija iSCSI Initiatora na SERVER1

Prebacimo se na SERVER1. Koristeći Server Manager, kliknimo na "Tools" meni i odaberimo iSCSI Initiator. Prvi puta kada pokrećemo ovaj servis, pitati će nas da li želimo da servis ostane trajno startan, što smo u uvodnom dijelu vježbe prihvatili odabirom "Yes". U polje "Target" ćemo upisati IP adresu RITS-EXC-WITNESS, 192.168.0.32 i, kada se iSCSI initiator spoji na target, pritisnuti ćemo "Done":

	iSCSI Initiator Properties	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration	
	Quick Connect To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.	
	Target: 192.168.0.32 Quick Connect	
	Discovered targets Refresh	
	Name Status	
	To connect using advanced options, select a target and then	
	dick Connect. To completely disconnect a target, select the target and Disconnect	
	then dick Disconnect. For target properties, including configuration of sessions, Properties	
	select the target and dick Properbes. For configuration of devices associated with a target, select be target and then drive Davises Devices	
	une target and men dick bevices.	
		Windows Server 2012 R2
	OK Cancel Apply	Windows Server 2012 R2 Standard
		Build 9600 De 0페 No. Lev. 9:51 PM
		10 Fill 1 6/22/2015
8		
- 1	CCCL Initiates Despective X	
Recycle Bin		
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quide Connect Volumes and Devices RADIUS Configuration Volumes and Devices V	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Targets Quick Connect X	
Recycle Bin	Targets Discovery Favorite Targets Local Initiation Properties Quick Connect Quick Connect X To disc Quick Connect X DNS no Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X	
Recycle Bin	Targets Discovery Favorite Targets Image of the targets Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect X Quick Connect Quick Connect X	
Recycle Bin	Targets Discovery Favorite Targets Line Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X X X Discover Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets	
Recycle Bin	Targets Discovery Favorite Targets Image: Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you not to each target individually. X Discover Connected below. If multiple targets are available, you need to connect to each target individually. Connections made here will be addee to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Status Viane Status Viane	
Recycle Bin	Targets Discovery Favorite Targets Image: Targets Volumes and Devices RADIUS Configuration Quick Connect X To dest Quick Connect X Discover Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restruc them will be made every time this computer restarts. Discovered targets Name Status Ivp. 1991-05.com.microsoftsmx3-accitest-target Connected	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To dest Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you rounded are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be addee to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Status Ivgn. 1991/05.com.microsoftsm/3-sociliest-target Connected	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To diac Quick Connect X Discovery Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Discovered targets Name Discovered targets Name Status Ign: 1991-05.com.microsoft.sry3-scattest-target Connected To com Progress report	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect X To dot Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Status Usen Implify 1.05.com.microsoft:srv3-societed-target Connected To con Progress report Login Succeeded.	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To date Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Name Discovered targets Discovered targets Name Status Ign:1991-05.com.mcrosoft.srv3-scstest-target Name Status Ign:1991-05.com.mcrosoft.srv3-scstest-target Connected To com Login Succeeded. For tar select	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To dec Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Discovered targets Name Discovered targets Connections microsoftsrs/3-sociliest-target Name Discovered targets Name Status Imaget Progress report Login Succeeded. Login Succeeded. For tar status	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To dec Quick Connect X Discovery Targets that are available for connection at the IP address or DNS name that you provide are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Status Impl: 1991-05.com.microsoft.sary3-scentest-target Connection Progress report Connected To com Login Succeeded. Every time targets	
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Quick Connect X To dec Quick Connect X Targets Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Discovered targets Status Virg.1591:05.com.microsoftsrs/3-socilest-target Connected To cord cake targets Progress report Connect Login Succeeded. For targets Connect The target Connect	Windows Server 2012 R2
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect Volumes and Devices RADIUS Configuration Quick Connect Volumes and Devices RADIUS Configuration To date Quick Connect Volumes Volumes Discover Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. Connections made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Name Discovered targets Name Status Irgn: 1991-05.com.microsoft.sry3-sculent-larget Connected Connected To com Ingn: 1991-05.com.microsoft.sry3-sculent-larget Connected For targets Status Connected Connected For targets Connect Done	Windows Server 2012 R2
Recycle Bin	Targets Discovery Favorite Targets Volumes and Devices RADUS Configuration Quick Connect X To dec Quick Connect X Discover Targets that are available for connection at the IP address or DNS name that you provided are listed below. If multiple targets are available, you need to connect to each target individually. X Discover Connections made here will be added to the list of Favorite Targets and an attempt to restrice them will be made every time this computer restarts. Discovered targets Name Discovered targets Status Immetions made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Name Discovered targets Name Status Immetions made here will be added to the list of Favorite Targets and an attempt to restore them will be made every time this computer restarts. Discovered targets Name Status Immetions fastored scattest-target Connected To com Immetions fastored scattest-target Connected To com Connect Done To com OK Cancel Apply	Windows Server 2012 R2

Kliknimo nakon toga na OK u prozoru "iSCSI Initiator Properties" kako bismo potvrdili do sada napravljenu konfiguraciju.

Sada možemo krenuti konfigurirati MPIO. Potrebno je iz Tools menija u Server Manageru odabrati "MPIO", u "MPIO Properties" dialog box-u kliknuti na "Discover Multi-Paths" tab i u slijedećem prozoru sa mišem napraviti selekciju na opciji "Add support for iSCSI devices" i kliknuti Add. Slijedi restart virtualnog poslužitelja, nakon čega možemo koristiti MPIO.

Procedura izgleda ovako:

A		Server Manage	r	
Server M	anager • Dashboard			🕶 😥 🚩 Manage 🏾 Tools View Help
Dashboard	WELCOME TO SERVER MANAGER			Component Services Computer Management
Local Server Local Server All Servers File and Storage Services ▷	QUICK START QUICK START WHAT'S NEW 4 5 4 5	nfigure this local server Add roles and features Add other servers to manage Create a server group Connect this server to cloud service	25	Event Viewer Event Viewer ISCSI Initiator Local Security Policy Microsoft Azure Services MPIO ODBC Data Sources (32-bit) ODBC Data Sources (34-bit) Performance Monitor Resource Monitor Security Configuration Wizard Services System Configuration System Information
	ROLES AND SERVER GROUPS Roles: 1 Server groups: 1 Servers to	stal: 1		Task Scheduler Windows Firewall with Advanced Security Windows Memory Diagnostic Windows PowerShell Windows PowerShell (v6b)
	Services Manageability Events	Local Server 1 Manageability Events	All Servers 1 Manageability Events	windows vowershell (x8b) Windows Powershell ISE Windows Powershell ISE (x86) Windows Server Backup
	Services Performance BPA results	Services Performance BPA results	Services Performance BPA results	
				▼
L.		Server Manage	r	_ 0 X
Server M	anager 🕨 Dashboard			🕶 🕄 🚩 Manage Tools View Help
Dashboard Local Server All Servers File and Storage Services	WELCO MPI MPIO Devices Discover Multi-P SPC-3 compliant Device Hardware Id Pevice Hardware Id Add support for ISCSI devi Add support for SAS devi Others	O Properties X aths DSM Install Configuration Snapshot ices ces Add IVICE	25	Hide
	ROLES Roles: 1	Add 1	All Servers 1 Manageability Events	
	Performance BPA results	Performance BPA results	Services Performance BPA results	
				6/22/2015

Nakon ponovnog pokretanja virtualnog poslužitelja, ulogirajmo se u RITS-EXC-SERVER1 sa korisničkim imenom RITS\Administrator i lozinkom RitsAdmin##. Pokrenimo Server Manager, i napravimo završnu provjeru da li smo MPIO dobro podesili. To ćemo napraviti tako da opet iz Tools drop-down liste odaberemo "MPIO" i provjerimo da li u MPIO Properties dialog boxu, na MPIO Devices tab-u, imamo **Device Hardware ID MSFT2005iSCSIBusType_0x9** na listi. To će nam dati do znanja da je dodatni upravljački program za MPIO uspješno instaliran i da ga možemo krenuti koristiti.



L			Server Manager				- 0	x
\odot	- Server N	lanager • Dashboard			- 🕄 🚩 Manage	Tools Vi	ew Helj	
		MPIO Properties						^
Dashb	MPIO Devices Discover	Multi-Paths DSM Install Configuration Snapshot						
All Ser	To add support for a ne Product Ids as a string	ew device, click Add and enter the Vendor and of 8 characters followed by 16 characters. Multiple	ura this local sorver					
📲 File an	Devices can be specifie	d using semi-colon as the delimiter.	jule this local server					
	To remove support for then click Remove.	currently MPIO'd devices, select the devices and	roles and features					
	Devices:		other servers to manage					
	MSFT2005iSCSIBusTy	/pe_0x9	other servers to manage					
	Vendor 8Product	16	ite a server group					
			nect this server to cloud service:	S				
							Hide	=
		Add Remove						
			Local Server 1	All Servers 1				
		OK Cancel	 Manageability 	Manageability				
L	1	erento	Events	Events				
		Services	4 Services	4 Services				
		Performance	Performance	Performance				
		BPA results	BPA results	BPA results				
								~
		9	6/22/2015 D.55 DM	6/22/2015 D.55 DM		· (A)	9:55 P	M
						CEAR of	6/22/20	015

Kliknimo na OK kako bismo zatvorili "MPIO Properties" dialog box.

Zadatak 5: Konfiguracija opcije Storage Spaces korištenjem iSCSI targeta

Na virtualnom poslužitelju RITS-EXC-SERVER1, u Server Manageru, sa lijeve strane, kliknimo na **File and Storage Services**, i u Servers tabu na **Storage Pools**. Otvoriti će nam se konfiguracijski alat za opciju Storage Spaces:

ī.					Server Manager						- 6	J X
\mathbf{E}	Server M	anager • File an	d Storage	e Services • \	/olumes • Storag	e Pools	÷	©	Manage	Tools \	/iew	Help
ii i	Servers Volumes Disks	STORAGE POOLS All storage pools 1 Filter	s total							T	ASKS	
	Storage Pools	A Name	Туре	Managed by	Available to	Read-Write Server	Capacity	Free Space	Percent Allocated	Status		
	iSCSI Work Folders	 Storage Spaces (1) Primordial) Available Dis	iks SRV1	SRV1	SRV1						
		Last refreshed on 6/22/20 VIRTUAL DISKS No related data is available.	PHYSICAL DISKS Primordial on SRV1				TA	ASKS	Ŧ			
			No relate	ed virtual disks exist.		Filter	Q	(ii) •	(€) ▼		0)
		To cre	ate a virtual disk,	start the New Virtual Dis	k Wizord.	🗴 Slot Name		Status	Capacity Bus U	sage C	Chassis	м
						PhysicalDisk5 (SRV1)		5.00 GB iSCSI Ai	utomatic		Ui
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U Storage Pools panelu, kliknimo na "Tasks" i u drop-down listi na **New Storage Pool**. Time pokrećemo "New Storage Pool Wizard":



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Iskoristiti ćemo wizard da bismo napravili novi Storage Space, u tri koraka:

- Kreiranje Storage Pool-a "sakupljamo" više diskova u jedan pool (nazvati ćemo ga iSCSIPool) kako bismo ga kasnije mogli dijeliti po potrebi. Dodati ćemo sva četiri diska koja su nam na raspolaganju na WITNESS kroz iSCSI target;
- 2. Kreiranje Virtualnog Diska od pool-a radimo Virtualni Disk, kako bismo mogli diskove dodane u pool kombinirati po nekom od mogućih modela (Simple, Mirror, Parity)
- 3. Kreiranje Volume-a radimo *block device* koji ćemo moći formatirati i koristiti kao disk u našem Storage Spaces sustavu.

Prva faza, kreiranje Storage Pool-a, proceduralno izgleda ovako:

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Pool je kreiran, i krećemo u fazu izrade virtualnog diska (nazvati ćemo ga npr.StorSpaceDisk, koristiti ćemo Parity model i Fixed provisioning metodu na kompletnom dostupnom kapacitetu). Na "Virtual Disks" tabu, u meniju "Tasks", odaberemo opciju "New Virtual Disk" i slijedimo dalje proceduru:

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Kada završimo sa fazom kreiranja virtualnog diska, automatski se pokreće "New Volume Wizard", koji će nam pomoći da na našem virtualnom disku napravimo particiju. Iskoristiti ćemo NTFS datotečni sustav sa labelom "StorageSpace". Također, iskoristiti ćemo i sav dostupan kapacitet i formatiranu particiju mapirati na H disk. Procedura izgleda ovako:

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Kreiranje Storage Spaces sustava za pohranu, sa multipathing pristupom iSCSI targetu i LUN-ovima koji nose naš Storage Space volume je završen. Sada možemo testirati da li smo sve napravili kako treba. Iskoristiti ćemo jednostavnu ideju – pokrenuti ćemo neku aplikaciju (npr.Notepad), snimiti nešto na H disk, odspojiti jedan od virtualnih switcheva sa virtualnog poslužitelja SERVER1 (kako bismo simulirali kvar mrežnih kartica, a time i *puteva* koje prolaze kroz te mrežne kartice u multipathing algoritmu) i pokušati snimiti nešto u datoteku. Ako je sve sa konfiguracijom u redu, nakon odspajanja virtualnog switch-a ne bi se trebalo ništa dogoditi – H disk bi i dalje morao biti vidljiv i moramo moći normalno pohraniti datoteku.



# Zadatak 6: Provjera da li visokodostupni Storage Space može tolerirati gubitak mrežnog adaptera

Na virtualnom poslužitelju RITS-EXC-SERVER1 pokrenimo Windows Explorer. Potrebno je kliknuti na H disk i na njemu napraviti novu tekstualnu datoteku (desni klik mišem – nova tekstualna datoteka – imenovati datoteku npr.datoteka.txt). Nakon toga, potrebno je učitati datoteku u Notepad (dupli klik) i držati notepad otvoren, te mu dopisati neki proizvoljni tekst (još nećemo snimiti datoteku), kako je primjerom pokazano na slici:

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Simulirajmo sada kvar u komunikaciji prema našem Storage Spaces podsustavu. Vratimo se u Hyper-V Manager, odaberimo virtualni poslužitelj **RITS-EXC-SERVER1**, i odaberimo **Settings**. U postavkama za RITS-EXC-SERVER1, postavimo se na zadnji mrežni adapter (ovaj je adapter dio iSCSI Teama "iSCSI Access Team 2"). U "Virtual Switch" drop-down listi, odaberimo opciju "Not connected" i kliknimo na "OK":

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			Network Adapter Private Network 2	Enable bandwidth management		
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			Some services offered			
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Prebacimo se sada u konzolu virtualnog poslužitelja RITS-EXC-SERVER1 i pokušajmo snimiti promijenjenu datoteku koja je učitana u Notepad:

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Ako smo sve dobro napravili, datoteka.txt je uspješno snimljena i njena veličina (Size) više nije 0 nego cca 1KB.

## Priprema za iduću vježbu

U Hyper-V Manageru, na listi virtualnih poslužitelja, selektirajmo virtualne poslužitelje RITS-EXC-DC, RITS-EXC-SERVER1, RITS-EXC-SERVER2, RITS-EXC-WITNESS, kliknimo desnim klikom miša i odaberimo "Turn Off". Nakon toga, na svakom pojedinom virtualnom poslužitelju napravimo **Revert** kako bi se stanja svih virtualnih poslužitelja vratila na stanja na početku vježbe.