



Learning Solutions

LAB 3.2. BRANCHCACHE

I. GIỚI THIỆU

Đối với một hê thống mạng công ty có nhiều chi nhánh, các user tại văn phòng chi nhánh thường xuyên truy cập dữ liệu đến các Server tại trụ sở chính thông qua đường truyền WAN. Khi số lượng truy cập quá nhiều trong cùng thời điểm thì dẫn đến tốc độ truy cập chậm hoặc truy cập thất bại.

BranchCache được phát triển nhằm giải quyết vấn đề nêu trên. BranchCache là 1 tính năng mới trong Windows Server 2008 R2 và Windows 7, có chức năng giảm thiểu lưu lượng truy cập file, lưu lượng truy cập website hoặc tăng tốc độ truy cập của các ứng dụng thông qua đường truyền WAN khi người dùng tại chi nhánh truy cập đến server tại văn phòng chính.

Bài lab này trình bày cách triển khai Branch Cache theo mô hình Distributed Cache

Để thực hiện bài lab này cần 02 máy nối vào cùng 01 switch:

- Server: Sử dụng Windows Server 2008 R2
- Client: Sử dụng Windows 7
- Cấu hình IP:

	Server	Client
IP Address	192.168.1.254	192.168.1.11
Subnet Mask	255.255.255.0	255.255.255.0

Các bước thực hiện:

A. CÁU HÌNH SERVER WINDOWS SERVER 2008 R2

- 1. Add feature Branch Cache
- 2. Cấu hình File server hỗ trợ Branch cache
- 3. Dùng policy để cấu hình BranchCache server
- 4. Cấu hình BranchCache trên shared folder

B. CÂU HÌNH BRANCHCACHE TRÊN CLIENT WINDOWS 7

C. KIÊM NGHIỆM: Client chép dữ liệu & giám sát tại Server

- 1. Cấu hình monitor counter tại server
- 2. Client chép dữ liệu và giám sát tại server



II. THỰC HIỆN

A. CÁU HÌNH SERVER

1. Add feature Branch Cache

- Start \rightarrow Administrative Tools \rightarrow Server Manager



- Click phải Features → Add features

Internet Buplore: Internet Buplore:	Notepad Internet Explorer Howle's Quick Screen Capture Computer Server Manager Computer Share and Storage Management Network System Configuration Control Panel Devices and Printers Windows Firewall with Advanced Security Devices and Printers Windows Server Backup Help and Support Run	<u>unia.</u>
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Remove Features	Help 🔿 Features: 0 of 42 installed	
	Remove Features	
Last Refresh: Today at 11:30 PM Configure refresh	Last Refresh: Today at 11:30 PM Configure refresh	
Add Area have be the energy	Add features to this server.	





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- Chọn Branch Cache \rightarrow Next

Add Features Wizard		×
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server. Patters: Image: Service (BITS) BitLocker Drive Encryption Image: Service (BITS) BitLocker Drive Encryption Image: DirectAcces DirectAcces Management Console Pailover Clustering Group Policy Management Internet Printing Client Internet Storage Name Server LPR Port Monitor Multipath I/O Network Load Balancing Peer Name Resolution Protocol Quality Windows Audio Video Experience Remote Differential Compression	Description: PranchCache installs the services needed to provide BranchCache client functionality. It also provides BranchCache server support for the HTTP protocol, Hosted Cache, and services other than the BranchCache for network files role service. Install Cancel Install Cancel

- Install





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- Close

Add Features Wizard			×
Installation Resu	ilts		
Features Confirmation Progress	The following roles, role services,	or features were installed successfully:	
Results	Windows automatic updatin automatically updated, turn	ng is not enabled. To ensure that your newly-installed role or feature n on Windows Update in Control Panel.	e is
	BranchCache	Installation succeeded	
	Print, e-mail, or save the installation	<u>on report</u>	(
		<previous next=""> Close Canc</previous>	el
File server hỗ trợ B	ranch cache		

2. Cấu hình File server hỗ trợ Branch cache

- Click phải Roles → Add Roles

		<u> </u>
File Action View Help		
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Server Manager (SV-01) Roles		
Roles Featu Add Roles Diagn Remove Roles Confit View Stora	ed on your server and add or remove roles and features.	
Refresh Roles Summary	Roles Summary Help	\leq
Help 🔊 Roles: 0 of 17 installed	Add Roles	
Add coles to this server	e refresh	



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- Next

Add Roles Wizard		×
Before You Begin		
Before You Begin Server Roles Confirmation Progress Results	This wizard helps you install roles on this server. You determine which roles to install based on the tasks you want this server to perform, such as sharing documents or hosting a Web site. Before you continue, verify that: • The Administrator account has a strong password • Network settings, such as static IP addresses, are configured • The latest security updates from Windows Update are installed If you have to complete any of the preceding steps, cancel the wizard, complete the steps, and then run the wizard again. To continue, click Next. If so this page by default	

- Chọn File server \rightarrow Next

Before You Begin	Select one or more roles to install on this server.	Description
File Services Role Services Confirmation Progress Results	Active Directory Certificate Services Active Directory Poderation Services Active Directory Lightweight Directory Services Active Directory Rights Management Services Active Directory Rights Management Services Application Server DHCP Server Fax Server File Services Print and Document Services Print and Document Services Web Server (IIS) Windows Deployment Services Windows Server Update Services	File Services provides technologies that help you manage storage, enable file replication, manage shared folders, ensure fast file searching, and enable access for UNIX client computers.



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- Next



- Chọn BranchCache for network files \rightarrow Next

Add Roles Wizard	×
Select Role Se	rvices
Before You Begin Server Roles File Services Confirmation Progress Results	Select the role services to install for File Services: Description: Image: Service Service Service Service Services for Network File System Bervice State Service Servi
	< Previous Next > Install Cancel



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- Install

Add Roles Wizard		X
Confirm Installat	ion Selections	
Before You Begin Server Roles File Services Role Services Confirmation Progress Results	To install the following roles, role services, or features, click Install.	1

- Close

		0.m/f0.r
	Print, e-mail, or save this information < Previous Next > Install Cancel	UG UG
Add Roles Wizard Installation R	esults	10 N
Before You Begin Server Roles File Services Role Services Confirmation Progress Results	The following roles, role services, or features were installed successfully: 1 warning, 1 informational messages below Windows automatic updating is not enabled. To ensure that your newly-installed role or feature is automatically updated, turn on Windows Update in Control Panel. File Services Installation succeeded The following role services were installed: Elle Server	W ND:
	 BranchCache for network files You can now enable BranchCache on individual shared folders by using Share and Storage Management or Group Policy. For more information, see Configure Offline Availability for a Shared Folder. 	H10."//////////
	Print, e-mail, or save the installation report	
	< Previous Next > Close Cancel	



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3. Dùng policy để cấu hình BranchCache server

- Start \rightarrow Khung Search nhập **GPEDIT.MSC** \rightarrow Enter



- Computer configuration → Administrative Templates → Network → Lanman Server → nhấp kép Hash Publication for BranchCache

🗐 Local Group Policy Editor			
File Action View Help			
🗢 🔿 🚈 🔜 🗟 🖬 🍸			
📑 Local Computer Policy 📃	Setting	State	Comment
🖃 👰 Computer Configuration	Hash Publication for BranchCache	Not configured	No
🕀 🚞 Software Settings			
🕀 🚞 Windows Settings			
🖃 🚞 Administrative Templates 📃			
🕀 🚞 Control Panel			
🖃 🚞 Network			
Background Intelligent Tran:			
BranchCache			
DNS Client			
🚞 Lanman Server			
📔 Link-Layer Topology Discove 💌			
	Extended Standard		
]		





- Chọn Enable \rightarrow OK

Hash Publication for BranchCache Previous Setting Next Setting Not Configured Comment: Image: Comment: Image	💭 Hash Publication for BranchCache			×
Not Configured Comment: Enabled Disabled Supported on: At least Windows 7 or Windows Server 2008 R2 At least Windows 7 or Windows Server 2008 R2 Values: Options: Help: Values: O = Allow hash publication only for shared folders on w enabled In this policy enables a hash generation service to generate hashes to client computers on which BranchCache is enabled. Hashes are mathematically-derived digital fingerprints of files that uniquely in the matically-derived digital fingerprints of files that uniquely	Hash Publication for BranchCache		Previous Setting Next Setting	
Options: Help: Values: O = Allow hash publication only for shared folders on wienabled This policy enables a hash generation service to generate hashes for data stored in shared folders, and then provide these hashes to client computers on which BranchCache is enabled. Hashes are mathematically-derived digital fingerprints of files that uniquely identify the constant of files. These digital fingerprints are very the constant of files.	C Not Configured Comment: C Enabled C Disabled Supported on:	At least Windows	s 7 or Windows Server 2008 R2	
Values: 0 = Allow hash publication only for shared folders on wi enabled This policy enables a hash generation service to generate hashes for data stored in shared folders, and then provide these hashes to client computers on which BranchCache is enabled. Hashes are mathematically-derived digital fingerprints of files that uniquely identify the content of files. These digital fingerprints are very	Options:		Help:	
1 = Disallow hash publication on all shared folders 2 = Allow hash publication for all shared folder Hash publication actions: Allow hash publication for all shared folder Allow hash publication for all shared folder I = Disallow hash publication for all shared folder Allow hash publication for all shared folder I = Disallow hash publication for all shared folder Allow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disallow hash publication for all shared folder I = Disa	Values: 0 = Allow hash publication only for share enabled 1 = Disallow hash publication on all share 2 = Allow hash publication for all shared Hash publication actions: Allow hash publication for all shared for	ed folders on wi ed folders folder ler	This policy enables a hash generation service to generate hashes for data stored in shared folders, and then provide these hashes to client computers on which BranchCache is enabled. Hashes are mathematically-derived digital fingerprints of files that uniquely identify the contents of files. These digital fingerprints are very small, enabling Windows to compare files without consuming a significant amount of Wide Area Network (WAN) bandwidth. A client computer in a branch office can obtain a hash for a file across a WAN link if all of the following conditions are true: 1) The user has permissions to access the file. 2) BranchCache is enabled on the client computer. 3) Hash publication is permitted on the shared folder that the client computer is accessing. If the client computer obtains the hash, the computer can then search for an identical version of the file in the cache of other computers in the branch office. If Windows finds an identical version of the file in the branch office, the client computer downloads the locally-cached copy instead of downloading the file across the WAN link.	

- Kết quả

📕 Local Group Policy Editor			
File Action View Help			
🗢 🔿 🖄 📷 🗟 🖬 🛛 🍸			
📑 Local Computer Policy	Setting	State	Comment
🖻 👰 Computer Configuration	Hash Publication for BranchCache	Enabled	No
🕀 🚞 Software Settings			
🕀 🚞 Windows Settings			
🖃 🧮 Administrative Templates 📃			
🕀 🚞 Control Panel			
🖃 🧮 Network			
Background Intelligent Tran:			
BranchCache			
DNS Client			
Lanman Server			
📔 Link-Layer Topology Discove 🔻			
	Extended A Standard		



- Cập nhật policy: Start \rightarrow khung Search nhập **GPUPDATE** /**FORCE** \rightarrow Enter

5 (4)	
Programs (1)	
> See more results	
GPUPDATE /FORCE Log off	
💦 Start 🔍 🔊 📁 (😤) 🖳	

4. Cấu hình BranchCache trên shared folder

- Trên volume C: tạo folder NhatNghe_Data → Share Everyone allow full control

📕 NhatNghe_Data Properties 🛛 🔀
General Sharing Security Previous Versions Customize
Network File and Folder Sharing
NhatNghe_Data Shared
Network Path: \\SV-01\NhatNghe_Data
Share
Advanced Sharing
Set custom permissions, create multiple shares, and set other advanced sharing options.
🚱 Advanced Sharing
Password Protection
People must have a user account and password for this computer to access shared folders.
To change this setting, use the <u>Network and Sharing Center</u> .
Close Cancel Apply

- Trong NhatNghe_Data chứa tập tin dung lượng khoảng 300 MB



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- Start \rightarrow Administrative Tools \rightarrow Share and Storage Management

Remote Desktop Services ۲ **Component Services** Computer Management Data Sources (ODBC) Command Prompt 🛃 Event Viewer iSCSI Initiator Notepad Þ Local Security Policy Performance Monitor Administrator Internet Explorer Security Configuration Wizard Documents Server Manager Howie's Quick Screen Capture Services Computer 🙀 Share and Storage Manager Storage Explorer Network 🕗 System Configuration Task Scheduler Control Panel Windows Firewall with Advanced Security Devices and Printers Windows Memory Diagnostic Windows PowerShell Modules Administrative Tools 🐞 Windows Server Backup Help and Support Run... ۲ All Programs Search programs and files P Log off 🕨 8 💐 Start

- Click phải NhatNghe_Data → Properties

🙀 Share and Storage Manageme	nt	
😿 File Action View Window	Help	_B×
🙀 Share and Storage Management (Share and Storage Management (Local)	Actions
	Shares Volumes	Share and Storage Man 🔺 📥 📄
	4 entries	Connect to another co
	Share Name Protocol Local Path Ouota File Scr.	📫 Provision Storage
	Protocol: SMB (4 items)	Provision Share
	ADMINS SMB C:\Windows	Manage Sessions
	I SMB C:\	Manage Open Files
	1 IPC\$ SMB	View 🕨
	🕫 NhatNghe_Data SMB C:\NhatNghe_D	New Window from Here
	Stop Sharing Properties	🔾 Refresh
	Help	🕐 Help
	hep	NhatNghe Data 🔺
		X Stop Sharing



- Chọn Advanced...

NhatNghe_Data Prope	rties	X
Sharing Permissions		
2	NhatNghe_Data	
Share path:	\\SV-01\NhatNghe_Data	
Path:	C:\NhatNghe_Data	
Description:		
Advanced settings User limit:		
Maximum allowed		
Access-based enum	neration:	
Disabled		
Offline settings		
Selected files and p	programs available offline	
To change these se	ttings, click Advanced. Advanced	
	OK Cancel Apply	

- Chọn Enable BranchCache \rightarrow OK

Advanced X
User Limits Caching
You can choose whether and how the contents of the share are available to users who are offline.
$\ensuremath{\mathbb{C}}$ Only the files and programs that users specify are available offline
Enable BranchCache
O No files or programs from the share are available offline.
 All files and programs that users open from the share are automatically available offline
Optimized for performance
▲ Please see Help for details before choosing this option.
For more information about caching, see <u>Configuring Offline</u> <u>Availability for a Shared Resource</u> .
OK Cancel





B. CÂU HÌNH BRANCHCACHE TRÊN WINDOWS 7 CLIENT

- Start → khung Search nhập GPEDIT.MSC

- Computer Configuration → Administrative Templates → Network → BranchCache → Nhấp kép Turn on BranchCache



- Chọn Enable \rightarrow OK

🍜 Turn on BranchCa	che		
📷 Turn on BranchC	ache	Previous Setting Next Setting	N4
 Not Configured Enabled 	Comment:		, C
O Disabled			
	Supported on:	At least Windows Vista	4
Options:		Help:	
		This policy setting specifies whether BranchCache is enabled on the client computer. BranchCache reduces the utilization of the wide area network (WAN) links connecting branch offices to the data center or headquarters and increases access speeds for content that has already been downloaded into the branch office. BranchCache does this by enabling computers in a branch office to cache files and HTTP traffic from Intranet servers on which BranchCache is enabled, and then securely share the files with other computers in the branch. Computers in the branch office can retrieve content from a hosted cache server in the branch (when using Hosted Cache mode), or from other client computers in the branch (When using Distributed Cache mode). To access cached content, the computer must have permissions to access the content on the source server. Enable this policy setting on client computers in branch offices where WAN bandwidth is low, latency is high, and there are a number of client computers that need to access the same data from servers in the central office.	MANN - Mithol
		OK Caricer Apply	



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- Nhấp kép Set BranchCache Distributed Cache mode



- Chọn **Enable** → OK

ble → OK			Ű Ú
👰 Set BranchCache Distrik	buted Cache n	node	S
Set BranchCache Distr	ibuted Cache	mode Previous Setting Next Setting	Ð
 Not Configured Co Enabled 	omment:		
Disabled Su	pported on:	T At least Windows Vista	
Options:		Thelp:	
		This policy setting specifies whether the client computer should use the Distributed Cache mode. This BranchCache mode enables a client computer to retrieve content that has been downloaded and cached by other client computers in the branch office. To access cached content from other client computers in the branch, the computer must have permissions to access the content on the source server. This policy setting specifies whether the Distributed Cache mode is used. Enable this policy setting when using BranchCache in branch offices for which there is no server acting as a hosted cache. If you enable this policy setting to take effect, you also need to enable the "Turn on BranchCache" policy setting. If you disable or do not configure this policy setting, the Distributed Cache mode is used. For this policy setting to take effect, you also need to enable the "Turn on BranchCache" policy setting.	http://www.h
		OK Cancel Apply	





- Nhấp kép Configure BranchCache for network files

File Action View Help Image: Setting Image: Setting Setting Image: Setting Setting State Image: Setting Image: Setting Image: Setting Im
Image: Computer Policy Image: Setting State Image: Computer Configuration Image: Turn on BranchCache Enabled
Local Computer Policy Setting State Computer Configuration Enabled
Computer Configuration
Software Settings Windows Settings
Administrative Templates
Control Panel Determined Set percentage of disk space used for client computer cache Not configured
Background Intelligent Transfer
BranchCache DNS Client
Canman Server
Link-Layer Topology Discovery +
Extended Standard Setting(s)

- Chọn Enable \rightarrow chỉnh giá trị roundtrip network latency = $0 \rightarrow OK$

Control Panel		Configure BranchCache for network files Not configured	
Network		E Set percentage of disk space used for client computer cache Not configured	
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BranchCache	isrei		
DNS Client			2
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ole → chỉnh giá trị round	trip 1	etwork latency = 0 → OK	
🐏 Configure BranchCache for network	files		
E Configure BranchCache for network	files		(dd)
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Ground			
Not Configured Comment:		· · · · · · · · · · · · · · · · · · ·	0
Enabled			$ \ge$
© Endored			
Disabled			<u> </u>
Supported on:	At leas	Windows 7 or Windows Server 2008 R2	
			00
			õ
Options:		Help:	
			>
Enter the round trip network latency va	lue in	This policy setting changes the default round trip network	
milliseconds above which network files	must be	latency value above which network files are cached by client	
cached in the branch office		computers in the branch. BranchCache for network files enables	\geq
		computers in a branch office to cache data from Intranet servers	\geq
0		files with other computers in the branch. One of the content	>
		types that can be cached in a branch office is network files using	\leq
		the Server Message Block (SMB) protocol.	
			\leq
		By default, network files are cached in the branch office when =	
		link is above 80 ms. To always cache network files downloaded	C
		to computers in the branch office, set the network latency value	
		to 0. To disable branch caching for network files, set the latency	0
		value to a very high value.	<u></u>
		If you enable this policy setting you can configure the round trip	
		network latency above which network files should be cached by	
		client computers in the branch office.	\leq
		If you disable or do not configure this policy setting, the client	
		OK Cancel Apply	



7 🔼 💷 📑 🖬 🗖 Y			
ocal Computer Policy	Setting	State	-
Computer Configuration	Action on server disconnect	Not configured	
Software Settings	Administratively assigned offline files	Not configured	
Windows Settings	Allow or Disallow use of the Offline Files feature	Not configured	
Administrative Templates	At logoff, delete local copy of user's offline files	Not configured	=
Control Panel	Configure Background Sync	Not configured	
Background Intelligent Trans	efei	Not configured	
BranchCache	E Configure slow-link mode	Not configured	
DNS Client	🗈 Default cache size	Not configured	
Lanman Server	Enable Transparent Caching	Not configured	
📔 Link-Layer Topology Discov	ery 📄 Encrypt the Offline Files cache	Not configured	
Microsoft Peer-to-Peer Netv	vor 📰 Event logging level	Not configured	
Detwork Connections	Exclude files from being cached	Not configured	
Network Connectivity Statu	s In 📄 Files not cached	Not configured	
Offline Files	🗈 Initial reminder balloon lifetime	Not configured	
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QoS Packet Scheduler		Not configured	
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- Chọn Enable \rightarrow chỉnh giá trị network latency = 40 \rightarrow OK

🏂 Enable Transparen	t Caching			×
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Options: Enter the network lat network files will be t client. Enter network latency 40	ency value above v temporarily cached y value in milliseco	vhich on the nds	Help: Enabling this policy optimizes subsequent reads to network files by a user or an application. This is done by caching reads to remote files over a slow network in the Offline Files cache. Subsequent reads to the same file are then satisfied from the client after verifying the integrity of the cached copy. This policy not only yields improved end-user response times but also decreased bandwidth consumption over the WAN links to the server. The cached files are temporary and are not available to the user when offline. The cached files are not kept in sync with the version on the server, and the most current version from the server is always available for subsequent reads. This policy is triggered by the configured round trip network latency value. We recommend using this policy when the network connection to the server is slow. For example, you can configure a value of 60 ms as the round trip latency of the network above which files should be transparently cached in the Offline Files cache. If the round trip latency of the network is less than 60ms, reads to remote files will not be cached.	E
			OK Cancel Apply	

Cập nhật: Start \rightarrow khung Search nhập GPUPDATE /FORCE \rightarrow Enter -





C. Kiểm nghiệm: Client chép dữ liệu & giám sát tại Server

1. Cấu hình monitor counter tại server

- Cửa sổ Server Manager \rightarrow Diagnostics \rightarrow Performance \rightarrow Monitor Tools \rightarrow Performance Monitor

- Click phải details pane → Add Counters...

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- Kết quả → OK

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2. Client chép dữ liệu và giám sát tại server

- Client 1 truy cập server → chép dữ liệu trong NhatNghe_Data
- Quan sát dung lượng truyền từ server. Chú ý dung lượng trung bình (Average)



Sau khi Client 1 chép xong → Client 2 truy cập server → chép dữ liệu trong NhatNghe_Data.
Quan sát dung lượng truyền từ server. Chú ý dung lượng trung bình (Average)

