GALAXY REDUNDANT SERVER SOLUTION

SQL SERVER BACKUP & RECOVERY PROCEDURE

Using Carbonite Availability Virtual v8.5 ~ powered by Double-Take

WHAT'S IN THIS GUIDE

This manual is a procedural guide that provides... » concept overview of the data replication and failover process » server, network and system operation requirements » procedural steps to manage data replication jobs, failovers, and related tasks

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Table of Contents

IMPORTANT SECTIONS IN THIS GUIDE	3
TERMS USED IN THIS GUIDE	4
IMPORTANT CHANGES SINCE v7 (IN THIS GUIDE)	5
OVERVIEW OF HALTHY REDUNDANT SERVER	6
STAGES OF FAILOVER	7
REQUIREMENTS & SPECIFICATIONS	9
SYSTEM & OPERATIONAL REQUIREMENTS	9
NETWORK SETUP REQUIREMENTS	
SYSTEM SPECIFICATIONS FOR REDUNDANT SERVERS	10
REPLICATION CONSOLE PROCEDURES	
REPLICATION CONSOLE PROCEDURES	11 12
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11 12
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES SET UP E-MAIL NOTIFICATION (FAILURE ALERTS) CONFIGURE TYPE OF FAILOVER CREATE A NEW REPLICATION JOB	11 12 13 16 18
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11 1213161826
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11 12 13 13 16 18 26 27
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11 12 13 13 16 18 26 27 28
REPLICATION CONSOLE PROCEDURES ABOUT SERVICES	11 12 13 13 16 18 26 27 28 29

INTRODUCTION OF REDUNDANT SERVER SOLUTION

Galaxy Control Systems offers an engineered *redundant server solution* using the Carbonite Availability Solution for data replication with Microsoft[®] Hyper-V[®] virtual environment.

The Primary and Standby Servers are prebuilt at Galaxy Control Systems. Both servers are preloaded with Carbonite Replication Solution, Hyper-V[®], Windows Server[®] OS, and appropriate services. System Galaxy Access Control software is also included.



The server designated as the Primary will begin as the live host (source). The Standby server will begin as the replication target server. When the primary system is "healthy" and the data replication job is actively "protecting", the backup copy is being synchronized in 10-sec intervals.

IMPORTANT SECTIONS IN THIS GUIDE

INTRODUCTION:

- » Overview of Healthy Redundant Server
- » Stages of Disaster Recovery
- » Terminology Used
- » Recent Change History

REQUIREMENTS & SPECIFICATIONS

- » System & Operational Requirements
- » Network Requirements
- » Specifications for Redundant Servers

PROCEDURES:

- » Services
- » Set Up Email Notification (failure alerts)
- » Type of Failover
- » New Replication Job
- » View the Health of Replication Job
- » Identify a Replication Failure (Jobs View)
- » Perform a Manual Failover
- » Resume Replication (after Failover Complete)

TERMS USED IN THIS GUIDE

SOFTWARE	
Carbonite Availability	the data replication & site recovery solution; manages replication between servers.
Replication Console	the software UI used to configure, manage, monitor the <i>replication jobs,</i> perform the failover and related tasks.
Hyper-V	(VM) the Microsoft [®] software used to create & maintain a virtual environment; System Galaxy software & database will install and operate on the VM.
System Galaxy	(SG) the integrated access control software from Galaxy Control Systems.

SERVER	
Primary Server live host	the physical server currently operating as the "live host" – i.e. the server that is actively hosting the running copy of System Galaxy on a virtual environment (i.e. Hyper-V) .
Target Server standby server	the physical server operating as the "standby server" or backup server during replication, which is storing an up-to-date image of the live host while standing by for failover.

PROCESS	
"failed"	the <i>activity state</i> that indicates the Double-Take replication job has detected a failure and is no longer updating or backing-up to the standby server (replication job is not protected).
Failover	the act of performing a failover or transferring live operations to the target/standby server.
"failed-over"	the <i>activity state</i> that indicates that the standby server has resumed live operation; however, data is not yet being replicated/protected.
healthy job status	when the data/software is being replicated and job activity state is "Protecting".
notification	an email that is distributed to designated addresses to notify of replication errors or warnings (optional / recommended).
"protecting"	replication job activity state that indicates data is being backed-up or copied to a standby server.
replication	the operation of storing the current, up-to-date copy of the data and software from a <i>live/source server</i> onto a <i>standby/target server</i> .
replication failure	a condition that interrupts the active data replication due to a fault or failure of the server hardware, system or connectivity between the live/source server and the standby/target server.
resume replication	manually recreating the replication job to re-establish duplication after a failover has completed. ["Resume replication" replaces the operation of 'reverse roles'. Once the failover is completed and the standby Target server assumes live-operation in the "production" environment, it may remain in place as the Primary (host) server. A replaced or repaired server becomes the new Standby/Target. The replication job must be recreated to re-establish data duplication.]
"stopped"	the activity state showing that data replication has stopped.
"synchronizing"	the <i>activity state</i> showing that the Double-Take software is synchronizing the mirror image on the standby server to match the source server image.

IMPORTANT CHANGES SINCE v7 (IN THIS GUIDE)

- 1. The "Replication Console" replaces "Double-Take Console" (UI & terminology). The new *Carbonite Replication Console* is considered to be "powered by Double-Take". The basic features are still available for a virtual environment with the exceptions below.
 - a) Removed *"Undo-Failover" button/option* (the automated feature is currently unavailable when using a virtual machine in the replication process).
 - b) Replaced "Reverse Roles" with "Resume Replication". The Reverse Roles automated feature/button is unavailable to the virtual environment. The steps to reverse roles has been replaced with manual steps to recreate a new replication job after a failover completes – see <u>"RESUME DATA REPLICATION (after Failover Completed)</u>".
- 2. Updated instructions throughout this guide to reflect the currently supported process & terminology.
 - a) Updated Requirements and Diagrams with applicable removals and substitutions.
 - b) All screens have been updated. Updated Terms & Definitions table.

OVERVIEW OF HALTHY REDUNDANT SERVER

The *redundant server solution* provides a means for quick disaster recovery in case of a catastrophic failure on the live/source server. The down-time is minimized, by the ability to switch to a stand-by server that has been mirroring the live server. This cutover to the stand-by server is called a FAIL-OVER.

IMPORTANT: There is a difference between a "failed" condition and a "failed-over" condition in the job status.

During a failure you should be aware of these things!

(i) During a server failure condition, the System Galaxy *database is offline* (i.e. not running on either server) and the data replication is stopped/failed (see Figure 2).

However, all Galaxy control panels remain fully functional and do not degrade in performance because all necessary programming is stored in the panel. This means all door & lock schedules, access, credentials/cards, input & output activation, arming/disarming, relays, etc. and all hardware remains fully operational. Events will be transmitted to the database when the server is online again.

(i) Once a Failover is complete, the System Galaxy comes back online on the standby server.

Data synchronization (mirroring) is still stopped/failed until you recreate the job that resumes replication. Since SG is online, the panels will reconnect and transmit their events to the SG database. System Galaxy extended functions can resume (e.g. badging, enrolling, monitoring, etc.). See Figure 3. At this point replication has not resumed.

(i) After the failure is repaired and the downed server comes back online, the administrator can **resume replication by recreating the job.** the server images will re-synchronize/replication job will resume a protected state (fig. 4).

FIGURE 1: Redundant Servers in their Initial Roles (live host & stand-by servers are both healthy) REDUNDANT SERVERS ARE HEALTHY



When the replication job's Activity is in the "protecting" state and the condition is healthy, then a replica of the SG database is being updated and stored on the target/standby server. See the section on **Stages of a Disaster Recovery Process** for details about interim states such as failed, failed-over,

STAGES OF FAILOVER

FIGURE 2: Redundant Servers are in Failure Condition (SG is not running on either server)

When a **failure condition occurs** at the source server, the data replication is interrupted. The state of the replication job will change from 'protecting' to 'failure condition met' and replication will "stop".

NOTE: Galaxy database will not be running on either server at this point, but the System Galaxy access control and all other hardware functions (scheduled locks/unlocks, access approval/denial, detection of hardware, arming/disarming, etc.) will all remain fully operation in a non-degraded performance. Events are buffered at the panel until transmission is possible.

IMPORTANT: SG Control Panels are designed to continue operating in full operational mode (non-degraded) when powered on. All cards, schedules, access rules and door/device programming is stored in the panels to prevent failure of the access control system if the server goes offline. Events are buffered in panel memory until the panel reconnects to the server. Events are transmitted to the server when the server communication is re-established.



FIGURE 3: Target Server is Failed-Over (SG resumes running on stand-by server/Hyper-V)

Once the FAILOVER process is performed at the target server, System Galaxy will start up (running on Hyper-V) on the standby/target server(02). Although System Galaxy is running again, redundancy or data replication has not been restored.



FIGURE 4: Replication has Resumed (live & stand-by servers are both healthy)

Once the failure condition is corrected/repaired, the administrator can current Primary (virtual machine) may remain in it's current location after the failover is completed, thereby preventing additional downtime. The new replication job would then provision a brand new virtual machine as a backup, on the opposing physical host.

The system is considered healthy again when the replication job is recreated and resumes replication (i.e. both servers are re-synchronized and data replication state indicates "protecting").



REDUNDANT SERVERS ARE RECOVERED / HEALTHY

REQUIREMENTS & SPECIFICATIONS

SYSTEM & OPERATIONAL REQUIREMENTS

- 1. Galaxy Control Systems supports server replication using Hyper-V and Double-Take software when the redundant server solution is purchased through Galaxy.
- 2. *Microsoft® Windows Server® 2012 | 2016* will be running on the host operating system of the primary and standby/target servers, as well as on the virtual machines.
- 3. *Hyper-V and Double-Take software* must be installed and running on the operating system of both the source/host server and the standby/target servers.
- 4. The *Double-Take services* must be set to run automatically. These services must be running on the Primary/Host OS & virtual machine, as well as on the Target server. The target virtual machine image is "off" during protected status.
 - » Double Take (Automatic Start)
 - » DT Management Service (Automatic Delayed Start)
- 5. The *Double-Take firewall ports/exceptions* must be open on both host servers and on network devices across the LAN as required (6320 TCP & UDP, 6330 TCP & UDP, 6332 TCP & UDP, and 6325 TCP & UDP).
- 6. The *active replication job* will copy a backup image of the *Hosted System Galaxy/Hyper-V session* from the *Live Primary server* onto the *Standby Target server*. The replication job updates the Target server every few seconds to maintain synchronization with the Live Primary.
- 7. Double-Take should be configured to *send email notifications* for warnings and errors when a replication failure occurs. This is especially recommended for servers using manual failover procedures.
- 8. *The failover process* may be initiated when a *replication failure occurs*.

CAUTION: The cause of a *replication failure* should be carefully evaluated in order to determine whether performing a cutover/failover is the best course of action. **IF a failover is necessary, the failover process must be "completed" before the new live-host server is operational**⁽¹⁾**. The data replication job must be recreated before protected replication can resume**.

IMPORTANT: to resume replication after a cutover, a new replication job must be manually recreated. The servers must be *resynchronized and in the "protecting" state* before redundancy is truly re-established.

⁽¹⁾ **NOTICE:** System Galaxy access control panels continue to be fully operational (i.e. no degraded operation) because all access control information is stored in the panel. Events are stored at the panel and transmitted to the SG database after the cutover is completed and System Galaxy is back online.

- 9. The automated option to "reverse roles" is no longer supported within the virtual environment. The only recovery method available to a virtual environment is to resume replication by recreating a new job. -see "Resuming Replication after Failover is Completed", when the Target server becomes the Live-Primary and a new Target is setup as the standby server.
- 10. *Resuming replication* is now a manual process after failover is completed. You must rename your instance when you recreate the new replication job.
- 11. In Carbonite 8.1 you cannot *undo a failover* when hosting SG in a virtual environment.

NETWORK SETUP REQUIREMENTS

- 1. You need three (3) static IP Addresses. One for each server and one for the Virtual Machine. Assign IP addresses to 2nd NIC card on each host server.
- 2. IP Addresses must be valid within the Network IP Range for each server.
- 3. It is recommended the System Administrator tags or labels the source server at all times.

SYSTEM SPECIFICATIONS FOR REDUNDANT SERVERS

In the Galaxy redundant server implementation, the following infrastructure will be observed:

HOST OS: SERVER-A and SERVER-B

- » Both servers (A/B) will run Microsoft Server 2012 | 2016 as the host operating system.
- » Both servers (A/B) will run the Double-Take services set to start automatically: Double Take, DT Hyper V, DT Management.
- » Both servers (A/B) will open both TCP & UDP ports 6320, 6330, 6332, and 6325 (necessary for Double-Take).
- » Both servers (A/B) will have the Double-Take Console software installed and able to run when in the role of the standby/target.

GUEST OS:

» The Hyper-V guest virtual environment will run Microsoft Server 2012 | 2016 (or appropriate version) as the operating system.

SERVER ROLES and RESPONSIBILITIES

- » The server operating in the live role (source) hosts the virtual machine where System Galaxy, database & services are running.
- » The server operating in the standby role (target) is where the data replication is updating the synchronized backup copy.
- » The live/source server will support card editing and event monitoring of the System Galaxy software.
- » The standby/target server will perform failover in the event of a catastrophic failure of the live server.
- » Once a failover is completed, the standby server will go-live and begin hosting System Galaxy. Replication must be resumed by recreating the replication job (manually).

FIGURE 5: HEALTHY REDUNDANT SERVER SOLUTION (PROTECTED)

REDUNDANT SERVERS - PROTECTED STATE



* Data replication (NIC-2) can use an Ethernet cable to same or different switch as NIC-1; or direct crossover cable.

REPLICATION CONSOLE PROCEDURES

This section contains the step-by-step instructions for the main tasks involved with configuring and operating the Carbonite[®]/Double-Take server.

SETUP & CONFIGURATION STEPS:

- » About Services (services should auto-start when platform is powered on)
- » Set Up Email Notification (for failure alerts)
- » Configure Type of Failover

MANAGE REPLICATION

- » Create a New Replication Job
- » View the Health of a Replication Job
- » Identify a Replication Failure (Jobs View)
- » Perform a Manual Failover from the Target Server
- » Resume Replication after Failover is Completed

SYSTEM ERRORS

» See the appropriate documentation from the solution manufacturer's for identifying errors or contact technical support as needed.

ABOUT SERVICES

IMPORTANT

- » Services must be running before any configuration or operation can occur.
- » Carbonite/Double-Take Services must be running all servers (Primary, Target, & in the live Hyper-V session).

QUICK STEPS

- 1. Open the *Services window* at each server:
 - » START > Control Panel > Administrative Tools > Services.
- 2. Locate the two Double-Take services. Ensure Status is "started" and Startup Type is "automatic".
 - » Double-Take (or name of Replication Console)
 - » Double-Take Management (or name of Replication Console)
- 3. Services should be set services to start automatically.

🔍 Services							×
<u>File Action View</u>	Help						
	🗟 🛃 🖬 🕨 🔳 II 🕪						
🤹 Services (Local)	Services (Local)						
Do	uble-Take	Name 🔺	Description	Status	Startup Type	Log On As	•
		Distributed Transaction Co	Coordinate	Started	Automatic (D	Network S	
Sto	p the service	DNS Client	The DNS Cl	Started	Automatic	Network S	-
Res	start the service	Double-Take	Double-Take	Started	Automatic	Local System	
		Double-Take Management	Double-Tak	Started	Automatic (D	Local System	
Des	scription:	Encrypting File System (EFC)	Provideo th		Manual	Local Cystem	
Dou	uble-Take	Extensible Authentication	The Extens		Manual	Local System	٠l
I ► Ex	xtended Standard						-
						_	

SET UP E-MAIL NOTIFICATION (FAILURE ALERTS)

IMPORTANT

- Double-Take services must be running at both servers (Primary, Target, and Hyper-V session).
- You must configure E-mail Notification at **both servers** (Primary and Target).

QUICK STEPS

1. Go to the **Target Server's** host OS and double-click the [Double-Take Console] desktop icon to open the Double-Take Console software.



- 2. From the console toolbar, click on the 🚺 [SERVERS] button.
- _ 0 Carbonite Replication Console File Edit View Go Tools Help 📕 Servers 🔜 Jobs 📑 License Inventory CARBONITE Options Jobs 📉 🧃 强 🧕 0 Image: A state of the state ົງ 🖾 🅿 n (8) n Search: ** Filter: All jobs Jobs on All Servers Job Source Server Target Server Job Type Activity Mirror Status
- 3. Right-click the desired *server name* and select 'View Server Details' in the shortcut menu.

📑 🗟 🍾 📺 😤 💺 🛛	6	6	💥 🗐 🔒					
📫 🛋 🗙 🔔			Server 🔺		Activity	Version	Licensing Status	Product
		8	serverA	2. 15-	• II	7.0.4.2001.0	Licensed	Double-Take Availability for Hyper-V Standa
My Servers		8	serverB	Remo	server Details	0	Licensed	Double-Take Availability for Hyper-V Standa
				Renvie	de Credentials			

4. Click the '<u>Edit Server Properties</u>' in the TASKS list on the right side the screen.

ServerA Edit server properties Operating system: Microsoft Windows NT 6.1.7601 Service Pack 1 Provide credentials Roles: EngineRole View events on this server Status: Online View events on this server Activity: Polling View logs on this server Connected via: 192.168.200.1 on port 6325; WebServices View replication service details for this server Version: 7.0.1.2641.0 View replication service details for this server Version: Y Administrator Version: Y Administrator	Properties						Та	sks
Operating system: Microsoft Windows NT 6.1.7601 Service Pack 1 Roles: EngineRole Status: Online Activity: Polling Connected via: 192.168.200.1 on port 6325; WebServices Version: 7.0.1.2641.0 Access: Y Administrator Version: Administrator	serverA							Edit server properties
Roles: EngineRole View events on this server Status: Online View logs on this server Activity: Polling Image: Connected via: 192.168.200.1 on port 6325; WebServices View replication service details for this server Version: 7.0.1.2641.0 View replication service details for this server Accress: Y Administrator Version: Administrator	Operating system:	Microsoft Windo	ows NT 6.1.7601 S	ervice Pack 1			17	Provide credentiais
Status: Online Image: Connected via: View logs on this server Activity: Polling Image: Connected via: 192.168.200.1 on port 6325; WebServices View replication service details for this server Version: 7.0.1.2641.0 View replication service details for this server Acccess: Image: Administrator Image: Administrator	Roles:	EngineRole				<		View events on this server
Activity: Polling P	Status:	👩 Online						View logs on this server
Connected via: 192.168.200.1 on port 6325; WebServices View replication service details for this server /ersion: 7.0.1.2641.0 View replication service details for this server Access: Y Administrator Administrator Administrator	Activity:	Polling					E	view logs on this server
Access: Administrator	Connected via:	192.168.200.1	on port 6325; Web	Services				View replication service details for this server
Access: Y Administrator	/ersion:	7.0.1.2641.0						
loor name	Access:	Administrat	or					
ser name: duministrator	lser name:	administrator						
	Product		Serial Number	Expiration Date	Activation Code	Licensing Status	1	

5. Expand the E-mail Notification option in the Server Properties screen.

Edit the properties of this server.		-
serverA		-
🕑 General		
✓ Licensing		
Setup		
🕑 Queue		
Source		
Target E-mail Notification		
Enable e-mail notifications	Test	
E-mail server (SMTP):		
Log on to e-mail server User name:		
		OK Cancel
Ready		Jobs with warnings 0 3 Jobs with errors 0

- 6. Check the [Enable Notification] option and enter the *Mail Server Address* (mailserver.domain.com).
- 7. Check the [Log onto email server] option and enter the Login Credentials for the e-mail server.
- 8. Enter the From Address, and Send To address (yourname@domain.com).
- **9.** Enter the desired text in the *Subject Prefix* field.
- **10.** (optional) You do not need to enable the *add event description* option this will make your subject line longer and you will see this in the message content anyway.
- **11.** Check the [Warning] and [Error] options.
- **12.** Click [TEST] to verify your e-mail will work with these settings.
- **13.** Save your settings and repeat these steps for the other Server.

Enable e-mail notifications	Ie
E-mail server (SMTP):	
mail.domain.com	
Log on to e-mail server	
User name:	
username	
Password:	
•••••	
From address:	
yourname@domain.com	
Send to:	
yourname@domain.com	
Subject prefix:	
Double-Take Notification	
Add event description to subject	
Include these events:	
Warning	
Exclude these event IDs:	

CONFIGURE TYPE OF FAILOVER

You must determine whether you want to depend on a <u>manual failover process</u> or an <u>automatic failover</u> <u>process</u>. A manual failover/cutover must be performed by the system administrator after Double-Take software has reported that a 'condition for failure' has been met. An automatic failover is initiated by the software whenever the system has met a 'condition for failure'.

IMPORTANT

- If using a manual failover, the user must perform the failover from the TARGET SERVER.
- An automatic failover will cut-over replication to the target sever without user intervention.

QUICK STEPS

The type of failover is configured in the Job Properties screen. This can be done from either the target or the source server once the job has been created.

1. Click the 🖼 [JOBS] button on the main toolbar, then click the 💊 [VIEW JOB DETAIL] button on the lower toolbar.

0	Carbonite Replication Console		_ 0 X
File Edit View Go The p			
Servers 🔜 Jobs License Inventory 📝 Options			CARBONITE
Jobs			
🗟 📏 📺 🤻 o 🕨 💷 🔳 🖉 🖓	🏠 💭 津 🛠 🗐 🗐 Filter: All jobs	- Search:	T
Jobs on All Servers > Job	Source Server Target Server	Job Type Activity	Mirror Status

2. Click the EDIT JOB PROPERTIES link under the TASKS list, on the right side of the screen.

Inspect the details of	this job.		
Properties			Tasks
SG_Repl	ica to serve	erB	Edit job properties
Job type:	Agentless Hyper-V		Validate job properties
Health: Activity:	Healthy Protecting	Additional information:	
Connection ID:	1	(None)	Source Server
Transmit mode:	Active		serverA
Target data state:	ок		Activity: Polling
Target route:	192.168.200.2		Status: 👩 Online

- 3. In the Edit Job Properties page, expand the Failover Monitor section and set the following:
 - a. Enable ("check") the [Monitor for Failover] option.
 - b. (Recommended) choose [Total Time to Failure] option and set Time to the desired value.
 - c. Set the [monitor on this interval] value to an appropriate value.
 - d. Enable ("check") the [Wait for User to Initiate Failover] option if you want the system to wait for the administrator to **manually** initiate a failover/cutover. Unchecking this option will allow the system to automatically failover when a condition for failure is met.

🔿 General		
Job name:		
vGALAXY to Galaxy02		
• Failover Monitor		
Monitor for failover		
Total time to failure:	00:05:00	
C Consecutive failures:	20	
Monitor on this interval:	00:00:10	



The "Wait for User to Initiate" option: Enabling (checking) this option means the system administrator must manually initiate a failover when the software reports that a 'condition for failure' has been met (e.g. Target server looses communication to the Source server).

Disabling (unchecking) this option means the Double-Take system automatically initiates a fail-over when any 'condition for failure' has been detected by the software. *An automatic failover may be undesirable in controlled tests/planned outages (e.g. server/router reboot).*

CREATE A NEW REPLICATION JOB

The steps below show how to create a new replication job in the case that the target server goes down and the replication job is dropped.

1. Go to the server host operating system and double-click the **Replication Console** startup icon on the desktop to open Replication Console (Main Screen – All Servers).





2. Right-click on the bottom (licensed) instance of the *Double-Take Availability Virtual* server (in the list of servers) and choose "Protect" from the shortcut menu..

•					Carbonite Replic	ation Console		_ 0 ×
File Edit View Go To	ools H	lelp						
Servers 🔜 Jobs 📔	Servers 🔜 Jobs 📑 License Inventory 🖸 Options							
Servers								
🎯 🔊 🗟 🦄 🗂	?	ŀę	🛛 🐞 🚺	🖁 🗐 🗐 🏅	Search		X	
🎽 🛋 🗙 📜 🔹 💙	·		Server	Activity		Version	Licensing Status	Product
	n 🗖	8	GCSHostA	ldle		8.1.0.677.0		DoubleTake Target
All Servers		8	GCSHostB	ldle		8.1.0.677.0		DoubleTake Target
🚞 My Servers 🗧		- 💡	GCSServer	ldle				DoubleTake Availability Virtual
sdnou		1			Protect Recover Migrate			

- 3. Choose the 'Full Server to Hyper-V..." option and accept all defaults.
- 4. Choose the 'Protect files and folders, application or entire server' task.

0	Carboni	te Replication Console	
File Edit View	Go Tools Help		
📕 Servers 🔙	Jobs 📑 License Inventory 📝 Options		CARBONITE
Choose I	Data for GCSServer		
	Choose the data on this server that you want to protect.		
	▲ Server Workloads		
	Workload types:	Workload items:	
	Files and Folders	🗹 🧫 C:	
	🖳 Full Server		
_	SQL		
	Pull Server to Hyper-V or ESX		
-			
	Show all workload types		
	▼ Replication Rules		
_			Next > Cancel
		🔥 Jobs with war	nings 0 🔕 Jobs with errors 0
			P 🖫 🏚 11:44 AM 11/1/2017

5. Under the CURRENT SERVERS list, select (highlight) the *name* of the physical server that you want to operate as the Target/standby server.

The target is the machine that is <u>NOT currently hosting the live session</u> running System Galaxy.

IMPORTANT! if you are recreating a job after failover completed, you must verify which machine is now the Primary and is currently hosting the "running" virtual session. Use the Hyper-V Console to view determine which server is currently "running" the live instance of Hyper-V/SG. Do not select the currently running server as the Target.

WARNING! Failure to choose the correct server could result in total loss of data in the event of a failure. Never Back-up your *synchronized copy* onto the currently running (live) server. If you set the *running host* as the target you are not truly protected, even if though the replication job indicates the "protecting" state. A catastrophic failure will prevent a successfully failover and your backup data can be permanently lost. Proceed with caution!

6. Click the NEXT button to continue.

0		Carbonite Replication Console	_ 0 ×						
File Edit View	Go Tools Help	e 📕	CARRONITE						
Servers	Jobs Ticense Inventory	ptions -	CARBONITE						
Choose T	arget Server								
	Choose the server that will store the pro	tected data.							
	▲ Current Servers								
	Servers:								
	Server 🔺	Version Product							
	GCSHostA	8.1.0.677.0 DoubleTake Target							
	🛃 💡 GCSHostB	8.1.0.677.0 DoubleTake Target							
	Show all servers								
	▼ Find a New Server								
	Diagnostics job								
			< Back Next > Cancel						
			A Jobs with warnings 0 S Jobs with errors 0						

- 7. Under GENERAL, enter the Job Name (be unique/descriptive).
- 8. Under REPLICA VM CONFIGURATION, enter the Display Name (be unique/descriptive).
- 9. Accept all the defaults.
- **10.** Click NEXT to continue.

0			Carbo	nite Replicatior	Console			_	. 🗇 🗙	
File Edit View Go	Tools Help									
🧾 Servers 🔜 Job	os 📑 License Inver	ntory 📝 Optio	ns					CARBO	NITE 🔵	
Set Options	;									
									~	
Set Set	options for protecting	g this data.							=	
6	General									
	Job name:									1
	GCSServer to GCSH	ostB								
0	Replica Virtual Ma	chine Location								
	Local File Volum	e	SMB Share							
	Select the volume a	and folder on the ta	arget server that will h	hold the replica virtu	al machine:					
	Volume 🔺	Total Size	Free Space	Owner						
	🥯 C:	250 GB	231.84 GB	GCSHOSTB						
	🧼 D:	677.9 GB	662.26 GB	GCSHOSTB						
	Full nath where the	replica virtual mar	thing will be stored:							
	D:\HVRA Replicas\1	0.100.0.45	chine win be stored.							
(Replica Virtual Ma	chine Configurati	on							
	Display name:									
	GCSServer_Replica_	HostB								
	Hardware configura	ation:						1		
		Source	Replica							
				_					~	1
							< Back	Next >	Cancel	
						4	Jobs with warning	<u>s 0 🛛 🕄 Job</u>	s with errors 0	
		0	8					P 🖯 🕼	11:48 AM 11/1/2017	

- **11.** Double-take will perform the obligatory checks.
- **12.** Click FINISH to save and continue. *Your standby Target server will begin creating the backup image.*

•		Carbonite Replication Console	_ 0 ×
File Edit View	Go Tools Help		
📅 Servers 🔜	Jobs 📑 License Inventory 🥥 Options	C	ARBONITE
Summary			
1			
\$	Review this checklist and click Finish to start prot	ecting your data.	
	Checklist Item	Value	^
	BCD template available	BCD template detected on source	
	Replica size	OK.	
	Transmission schedule	Transmission schedule is disabled.	
	Attached SCSI disks	OK.	
	Pre-existing job	No pre-existing job found.	=
	Existing vhds	No existing Vhds on target.	
	Ø Device drivers available	Device drivers detected on source	
	SAN policy	OK.	
	Administrator Verification	The current user on the target is administrator or UAC is disabled.	
	Hard link processing requirements	Hard links will be processed.	
	Synthetic driver availability	Driver is available.	
	Operating System compatibility	The source and target have appropriate operating system versions.	
	Source Not HyperV	The source is not a Windows Hyper-V host.	
	Monitoring and failover	The target will monitor the following addresses on the source for failover: 10.100.0.45	
	Pre-existing replica	No pre-existing replica found.	\sim
	Check Cem Details		
	Fix Fix All		Recheck
		< Back	Finish Cancel
		Jobs with warnings	
			P P 11:49 AM

13. The user is returned to the I JOBS screen and the replication will connect and begin synchronizing with the Primary (source) virtual machine.

The process will cycle through several states of activity – i.e. Provisioning, Synchronizing Calc, Synchronizing %, – be before reaching the "Protecting" status. This process will take a while.

•	(Carbonite Replication Console		_ 0 ×
File Edit View Go Tools Help				
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Jobs 🥢				
2 🔧 🎽 🕅 o 🕨 🗉	🔳 🕷 🌒 🖓 🕤 🗯	ali jobs 👔 🗐 🗧	▼ Search:	5
Jobs on All Servers	Job	Source Server Target Server	Job Type	Activity Mirror Status
Jobs on My Servers	A GCSServer to GCSHostB	GCSServer GCSHostB	Full Server to Hyper-V	Provisioning
rer Groups				
	<	ш		>
	 Job Highlights 			
	Name: GCSSer	ver to GCSHostB		
	Target data state:	Additional informa	tion:	
	Mirror remaining:	Connecting to	virtual disk	

14. Swap over to Hyper V Console and verify the Target server instance was created as intended. Target state should be "off".

			Hyper-V Mana	iger			_ D X	
<u>File Action View I</u>	<u>l</u> elp							
Hyper-V Manager	Virtual Machines					Actions		
GCSHOSTA							CSHOSTB 🔺	
	Name	State CPU Usage		Assigned Memory	Uptime	-	New	
						-	Import Virtual Machin	
					2-	Hyper-V Settings		
						2	Virtual Switch Manage	
							Virtual SAN Manager	
						1	Edit Disk	
					0		Inspect Disk	
		No vi	tual machine selected	l.			Stop Service	
						X	Remove Server	
						0	Refresh	

15. Return to the Replication Console to monitor the activity status of the new replication job.

The synchronization is complete when the job indicates "Protecting", and Data State is "OK".

•			Carbonite Rep	lication Console			_ 0 ×
File Edit View Go Tools I	Help						
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Jobs							
2 % 前 🕅 🍳 🕨		📕 📜 ڭ	s 🗯 🍣 🖉 🖡	Filter: All jobs	- S	earch:	Ŧ
🤰 Jobs on All Servers	>	Job	Source Server	Target Server	Job Type	Activity	Mirror Status
Jobs on My Servers	erver Groups	ocaseiver to ocariosi	B GC33erver	GCSHOSID	run seiver to nyper	V Protecting	idie
		<	1	11			>
		 Job Highlights 					
		Name: Target data state: Mirror remaining: Mirror skipped: Replication queue: Disk queue: Recovery point latency: Bytes sent: Bytes sent: Sytes sent: Connected since: <u>Recent activity:</u>	GCSServer to GCSHostB OK 0 b 71 0 bytes 0 bytes 0:00:00 34.5 GB 34.5 GB 34.5 GB 11/1/2017 11:51:03 AM © Start	Additional informati (None)	ion:		
						1 Jobs with warnings 0	3 Jobs with errors 0
	b	1				P	1:41 PM 11/1/2017

16. In Hyper-V Console, verify the states of both Hyper-V sessions

- a. the Primary (live/host) HYPER-V session should be "running".
- b. the Standby/Target HYPER-V session should be "off"

Primary (live) H	lyper-V Session							
		ł	Hyper-V Mana	ager				x
<u>File Action View</u>	<u>⊣</u> elp ▶≣							_
Hyper-V Manager	Hyper-V Manager GCSHOSTA Virtual Machines							• ^
GCSHOSTB	Name CCS Virtual Server	State Running	CPU Usage 0 %	Assigned Memory 16384 MB	Uptime 03:11:24 >		New I Import Virtual Mac Hyper-V Settings Virtual Switch Man Virtual SAN Manag Edit Disk Inspect Disk	

Target (standby) Hyper-V Session

	Hyper-V Manager								
<u>F</u> ile <u>A</u> ction <u>V</u> iew <u>H</u>	lelp								
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📑 Hyper-V Manager	Act	tions							
	Virtual Machines					GC	CSHOSTB 🔺 📥		
E GCSHOSIE	Name	State	CPU Usage	Assigned Memory	Uptime		New 🕨		
	GCSServer_Replica_HostB	Off					Import Virtual Mac		
						-	Hyper-V Settings		
						2	Virtual Switch Man		
	<				>	1	Virtual SAN Manag		
	Chasknoints					1	Edit Disk		
					0		Inspect Disk		

VIEW THE 'HEALTH' OF A REPLICATION JOB

1. Go to the Target Server's host OS: Double-click the Replication Console desktop icon to open Double-Take Console.



- **2.** Click the **I** JOBS button on the main toolbar.
- **3.** List of Jobs Panel: When data is actively replicating, the Job status indicates a **green arrow** and the Activity column displays **"Protecting"**.
- 4. Job Highlights Panel: The Target Data State should indicate "OK"



IDENTIFY A REPLICATION FAILURE (IN JOBS VIEW)

A replication failure at the source server will interrupt the source server's ability to continue protecting the system. The failure will be reported through emails and status changes. You will go to the Target Server to confirm the failure.

1. Go to the Target Server's host operating system and double-click the Carbonite Replication Console startup icon on the desktop to open Replication Console.



- 2. Click the 🖼 JOBS button.
 - a. The replication job may display a Red-X (it depends on the reason for failure)
 - b. You should get email(s) for a failure if you are properly set up to receive notifications.
 - c. Job Highlights panel may also show a red-X or caution symbol indicating the failure.
 - d. The FAILOVER button will be enabled/ON at the target server.
 - e. When a failure condition occurs, you may or may not be able to View Server Events for the source server. However, you may still be able to see Job Logs both the target and source server during a failure condition.

•		Carbonite Rep	lication Console	e		- 0 X
File Edit View Go Tools Help	e Inventory Options				C	
Jobs						
2 🔧 前 👯 🧕 🕨 I	I 🔳 🗏 🛢 🖓 🕻	0280	Filter: All jobs	- Se	sarch:	
Jobs on All Servers	Job	Source Server	Target Server	Job Type	Activity	Mirror Status
Jobs on My Servers	GCSServer to GCSHost	18 GCSServer	GCSHost8	Full Server to Hyper-	V Server Communic	ation Error Unknown
	<					>
	 Job Highlights 					
	Name: Target data state: Mirror remaining: Mirror skipped: Replication queue: Disk queue: Recovery point latency: Bytes sent: Bytes sent (compressed):	GCSServer to GCSHostB OK 0 bytes 0 bytes 0 bytes 0 bytes 0 bytes 0 bytes 0 bytes 0 bytes	Additional inform The target ma The failover m	nation: anagement service cann nonitor query has failed	ot communicate with the s 1 times. A failover conditio	ource management service on will be met in approxima
	Connected since: Recent activity:	11/1/2017 11:51:04 AM	<		8	>
					1 Jobs with warnings	2 <u>Jobs with errors</u> 1 2:11 PM 11/1/2017

ABOUT PERFORMING A 'TEST FAILOVER'

Performing a "test failover" validates the ability of your system to failover (or cutover) when a 'condition for failure' is met. You do not have to induce an actual failure in order to perform a test failover.

The process for performing a test failover is similar to performing a manual failover, except without a network connection present.

Refer to the Carbonite documentation for the appropriate steps.

The initial test failovers will be done when the system is initialized, and the appropriate team support is present. After that, test failovers are not necessarily recommended. You should schedule test failovers with the proper planning and field support teams' approvals and available or onsite.

PERFORM A MANUAL FAILOVER

NOTICE: In case of a complete hardware failure on the source server, contact Galaxy technical support. Return the failed server to Galaxy to be repaired / rebuilt.

NOTICE: In the case of other failures, you will restore your network connection as soon as possible

NOTICE: Once the failover is complete on the TARGET machine, all System Galaxy updates/changes will start being committed to the Target server which becomes the Primary Live Host – System Galaxy will resume normal operation. Panels will transmit their event buffers.

WARNING: you must resume data replication manually to restore protected state!

1. Go to the **Target Server's** host operating system and double-click the **Double-Take Console** startup icon on the desktop to open DT Console.



- **2.** Click the 🔜 JOBS button.
- **3.** On the Jobs toolbar, either click the **•** FAILOVER button OR select the 'failover' option from the shortcut menu.



- 4. When the Failover dialog opens ...
 - a. choose Failover to Live Data option
 - b. select the 'Apply data in the target ques before failover /cutover
 - c. click FAILOVER button.

•	Failover and Cut	tover	-		x
	poose how to perform failover. Failover to live <u>d</u> ata Perform <u>t</u> est failover Failover to a <u>s</u> napshot S <u>n</u> apshot:				
	Date Taken ▼ This job has no	Type snapshots.			
	pply targ <u>e</u> t data: pply data in the target queues before	failover or cutover Failover		<u>C</u> ano	▼ zel

5. The Double-Take Job ACTIVITY status will change to 'Failing Over'

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Jobs								
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Jobs on All Servers	>	Job	Source Server	Target Server	Job Type	Activi	ity	Mirror Status
Jobs on My Servers	Se	🔥 GCSServer to GCSHost	B GCSServer	GCSHostB	Full Server to Hy	per-V Failing	g over	
	ver Groups							
		<	I	I				>
		 Job Highlights 						
		Name:	GCSServer to GCSHostB					
		Target data state:		Additional informa	ition:			
		Mirror remaining: Mirror skipped: Replication queue: Disk queue: Recovery point latency: Bytes sent: Bytes sent (compressed):		Failing Over: D	isconnecting from l	Double-Take		
		Connected since:						
		Recent activity:	C Failover					
						1 Jobs with	warnings 1 🛛 🕴 Jobs	with errors 0
	b	0					P 🖯 🕼	2:22 PM 11/1/2017

6. The Double-Take Job ACTIVITY status will change to 'Failed Over' when the failover process is complete.



IMPORTANT: System Galaxy hardware will continue to be fully operational during the failover. The System Galaxy software is fully operational on the Target server's Hyper-V session – see steps on the next page.

During a failover, the data replication is interrupted and redundancy is not ensured. After you have repaired or corrected the failure condition, you must recreate the replication job to re-establish redundancy and data duplication.

7. Verify the system is running by opening the Hyper-V Manager at the Target Server. Go to the target server's host operating system and double-click the Hyper-V Manager startup icon on the desktop to open Hyper-V.



8. The Hyper-V Manager on the Primary machine will show the VM status of OFF and the Target server will be 'Running' once the cutover is completed.

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File Action View Help										
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🚆 Hyper-V Manager							A	ctions		
GCSHOSTA	Virtual Machines							GCSHOSTA 🔺		
GCSHOSIB	Name	*	State	CPU Usage	Assigned Memory	Uptime		New	•	
	GCS Virtual Server	Off					 Import Virtual Mac Hyper-V Settings Virtual Switch Man 			

NOTE: System Galaxy hardware will continue to be fully operational during the failover. System Galaxy panels are designed to continue providing access control and remain fully functional (according to their programming) even if the System Galaxy database is offline. Events are buffered in the panel's memory until connectivity is restored. Events will begin transmitting when System Galaxy is back online on the new Primary server.

WARNING: you **must resume data replication manually** to restore protected state! SEE NEXT SECTION...

RESUME DATA REPLICATION (after Failover Completed)

Once the source server connection is restored, you must **recreate the replication job** for the new target.

CAUTION for Data Loss: If you choose to *Undo Failover*, you will lose any/all updates and changes that have occurred on the TARGET server's Virtual Machine since the initiation of the failover. When a real-time failover occurs, the target server takes over the live support of the System Galaxy operational updates - all changes will be lost if you undo failover.

IMPORTANT: Make sure to put the duplicate *protected copy* on the Machine where it is **NOT** running.

- **1.** Click I JOBS from the Target Server toolbar.
- 2. Right-clicking the Backup server (Hyper-V) and choose "Shut Down" on the menu.

		Нуре	er-V Manager					
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Hyper-V Manager						Actions		
GCSHOSTA	Virtual Machines					GCSHO	STB 🔺 🗖	^
CSHOSTB	Name •	State CPU Usage	Assigned Memory	Uptime	Status	New	•	
	GCSServer_Replica_HostB	Running 0%	16384 MB	00:07:03	Connect		Virtual Mac	
					Settings		V Settings	
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	Checknoints				Reset		rvice	
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		The selected virtual mac	hine has no checkpoints.		Мака			
	Move							
					Rename			
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						Settin	igs	
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	GCSServer_Replica_Ho	STD				Shut	Down	
	Created:	11/1/2017 11:50:14 AM	Cluster	ed: No		🕘 Save		
	Version:	5.0	Heartb	eat: OK (Applicat	ions Healthy)	Pause	2	
	Generation	n: 2	Integra Service	ation Up to date		Reset		
	Notes:	None				b Chec	kpoint	۲
						Move	·	
	Summary Memory Networkin	g Replication				🔊 Expor	t	
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I ells the operating system	within the selected virtual mach	ine to shut down.					2.20 PM	_
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3. Select the Primary Server and right-click the server and choose "Start" from the menu.

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📑 Hyper-V Manager							A	ctions
GCSHOSTA	Virtual Machines						G	SCSHOSTA 🔺
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			Help					View
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							G	SCS Virtual Server
								Connect
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4. Delete the *GCS Host B* replication job from the job queue by right-clicking the job and selecting "Delete" from the shortcut menu.



5. Now delete Replica Host (the one that is not running).

			Hyper-	-V Manager				_ 0 ×
File Action View H	lelp							
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🔡 Hyper-V Manager		Actio	ons					
GCSHOSTA	Virtual Machines	GC	SHOSTB 🔺					
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	GCSServer_Replica_HostB		Connect Settings Start					Import Virtual Machin
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Deletes the configuration f	or the selected virtual machine. Th	nis does not delete	e the virtual hard	disks associated	d with the virtual ma	achine.		
		1						P P (2:36 PM 11/1/2017