# Administrators Guide Fault tolerant Hot Standby



#### Directory

Phone Directory Jabber UDS Server Web Directory IPS Popup / Reverse Lookup Personal Directory H350 Video Conf directory Corporate Speed Dials ClickNDial Alerting Voice Alert **IPS** Pager Admin tools Morning Check Phone Remote Phone Robot Provisioning Phone Deployment CMS Admin & Selfcare Extension Mobility Report Manager Assistant IP Phone / Jabber Interface

**Productivity tools IPS Phone Config** IPS Alarm Callback **IPS Lock** Wakeup Call Missed Call Alerter **Conference** Center Busy Alerter Callback Desktop Popup Finesse Gadgets Spark Bot Attendant Console / IVR / Group Tannounce Line Group Manager Silent Monitoring **Extension Mobility tools** TSSO Delog / Relog Pin & Password Manager Recording Call Recording **Recording Notification** 

Version: 7.x

SUPPORT@TELISCA.COM TEL. +331 4645 0512



### HELP

Open a ticket with your logs on <u>http://support.telisca.com</u> for a prompt and efficient response! Server: <u>MENU>Support>Zip Logs</u>

# Summary

	1	OVERVIEW	.3
	2	PRE-REQUISITES, INSTALLATION	. 5
	3	ADMINISTRATION	. 6
3.1.1		Steps to configure the hot standby	6
3.1.2	?	Administration tab fields	6
3.1.3	3 (	Change CTI service settings on backup server	7
3.2	Def	PLOYING THE FAULT TOLERANCE	8
3.3	Cor	ISIDERATIONS	8
			0
	4	ENABLING WINDOWS NETWORK LOAD BALANCER	.9
4.1	Net	WORK PREREQUISITES	9
4.2	Net	WORK CARDS CONSIDERATIONS	9
4.3	Аст	IVATE THE NETWORK LOAD BALANCER FEATURE	9
4.4	CLU	STER CREATION	10
4.4.1	. (	Connect first host	10
4.4.2	? .	Set the parameters of the primary	11
4.4.3	3 1	Parameters of the virtual IP address.	11
4.4.4	4 (	Cluster parameters	12
4.4.5	5 (	Cluster Port Rules	13
4.5	ADE	DING THE SECONDARY NODE	13
4.5.1		Enter secondary server IP	14
4.5.2	2	Warning message	14
4.5.3	3, 1	Final result	15
4.6	VER	IFYING THE SETUP	15
	5	CONFIGURING EXTERNAL LOAD BALANCER	L6
5.1	TES	T VIP ADDRESS DESTINATION	17
5.2	FAI	LOVER PARAMETERS	17
5.2.1	!	First server auto restarts as primary	17
5.2.2	? /	Heart beat interval and consecutive failures	17
	6		10
	U		19
6.1	TES	T HOT STANDBY PROCESS	19
6.1.1		Stopping the primary server	19
6.1.2	? (	Check the switchover process	20
6.1.3	، <sub>_</sub> ،	Rollback to primary server	21
6.2	EXP	ECTED DELAY IN FAILOVER	21
6.3	DET		22
6.3.1		Failover initiated by alternate server on active server failure	22
6.3.2	<u> </u>	Rollback Initiated by primary server	23
6.3.3	ز کر ا	Avoid two servers are in Active mode	23
6.3.4	+ /	Active server alsconnected from the LAN	24



### **1** Overview

The telisca framework can synchronise its configuration settings with a back-up server out of the box. An IP redirection can be put in place with a load balancer to point to the backup server when the primary fails. However when the applications require CTI functions, **the Hot Standby module provides a mechanism to control which of the telisca CTI service (on the primary or backup server) will be active**.

This document explains which applications can be made fault tolerant with the module Hot Standby, how to configure it and how to create Load Balancing using the Windows Load Balancer or External Load Balancer and some guidance on how to configure an existing setup to work with Fault Tolerance.

#### 1.1.1.1 Redundancy architecture

An optional module allows IPS Framework & Administration and telisca CTI Server to work in Hot Standby mode. On normal process, primary server is running and backup server is idle. An automatic mechanism starts the backup server when the primary server fails.

In this mode, an IP Balancer must be used to redirect the http requests from the IP Phones. Normally, the IP Phones are not configured to use DNS and the http service is called using an IP address. This address must by default be directed to the primary tellsca server.

IPS Administration synchronizes the system configuration on the two servers natively, this module is only needed for CTI based applications.

This mode if only supported if a specific license (IPSFT\_lic.xml) have been uploaded from IPS Administration. This license is independent of the number of phones/users.

This option is supported with the following applications:

- TAnnounce
- Attendant Console
- Busy Alerter
- Wake Up Call
- Voice Callback
- Voice Alert
- Conference Center
- TSSO

- IPS Popup
- IPS Manager Assistant
- IPS Pager
- IPS Phone Config
- IPS Alarm Callback
- Desktop Popup
- Missed Calls Email Alerter
- Morning Check
- Silent Monitoring



#### 1.1.1.2 Load Balancer architecture



Fault tolerance, architecture for IPSMA (same principle as other apps)

The IP Balancer will check periodically that the primary server is available (ping) and eventually answer to a monitor http URL without http error. After several consecutive errors the IP Balancer must redirect all http requests to the backup server.

In the meantime, the IPS Startup Service on the backup server periodically checks the primary server monitor URL as well. After the same number of consecutive errors he forces the primary server to switch to idle mode and the backup server to run mode. This starts the CTI Server which connects to the CUCM CTI Manager.

The IP Load Balancer and the backup server must switch in approximately the same time frame so that the application is already up and running on the backup server when the IP Load Balancer redirects the http request from the IP Phones to the backup server.

Returning to the normal configuration is a manual process done from the administration, unless the primary server has the option 'First server auto-start Primary/Active'.

When a server restarts and finds that the other server is already running, it synchronizes its configuration from the first one and run-in idle mode. When both servers are restarting at the same time (auto restart during night) a mechanism forces the primary the server to run and the backup to idle.

**Important!** When using fault tolerance, the two servers must be configured with the same NTP time server. This is because the synchronisation of configuration files is based on timestamps.



### 2 Pre-requisites, installation

Supported Cisco CUCM:

• CUCM version 10.5, 11.5, 12, 12.5, 14

Windows servers supported:

- Windows Server 2012 R2 Essentials or Standard
- Windows Server 2016 Essentials or Standard
- Windows Server 2019 Essentials or Standard
- Windows Server 2022 Standard
- Minimum configuration: 1 vCPU, 4GB RAM, 70GB disk
- Virtual Machine VMware vSphere, Hyper-V or Cisco UCS, Cisco UCS-E
- Cloud ready

#### 2.1.1.1 <u>Network prerequisites</u>

You have to make sure that the following ports and protocols are allowed on the network for Fault Tolerance, please refer to the telisca framework guide for the base installation requirements.

Source	Destination	Protocols/ports	Delay max RTT
telisca server	telisca server (IPS Startup)	TCP 2011	1000ms
telisca server	telisca server (IPS Framework)	http 80 or https 443	1000ms

Ports and Protocols used by the Fault Tolerance mechanism (all port numbers are configurable)

Example of transaction data transfer:

Operation description	Source-destination	Data transfer per operation
Fault tolerance keep- alive	telisca server -> telisca server	180 kB / hour



### 3 Administration

The fault tolerant configuration is defined in Global / Parameters screen.

It is available only if Fault Tolerant license IPSFT\_lic.xml license file has been loaded.

Home / Global configuration / Hot Standby		
IP Address of this server	192.168.128.1	0
Server IP Address #1	192.168.128.1	Status: Active (Primary)
Server IP Address #2	10.1.1.220	Status: Error
Enable Hot Standby mode	<ul><li>✓ (2)</li></ul>	
IP Balancer VIP address		0
Test VIP address IP destination	0	
Use VIP address to build URLs		
Switch server on application error		
First server auto restart as Active	Image: A state of the state	
Heartbeat timeout(s)	10 😮	
Heartbeat interval(s)	30	
# of consecutives failures/success to switch	5	
Fault tolerant logs	~	

The Hot Standby configuration screen

#### 3.1.1 Steps to configure the hot standby

See <u>here</u> if using Windows NLB, the features required to be setup on both servers.

The two servers must have the same telisca applications installed.

On each server:

• Enter the local IP address

On server one:

- Enter Server IP address #1
- Enter Server IP address #2
- Check 'Enable Hot Standby mode'.
- Optionally, enter the IP address of the IP Load Balancer. It is used to build URL pushed to IP Phone. Do not define it if using Windows Load Balancer.
- Validate

The configuration will be replicated on the secondary server (if not done automatically, validate one of the configuration screens on primary to force the synchronisation, for IPS Global Directory for instance).

#### **3.1.2 Administration tab fields**

#### 3.1.2.1 <u>Test VIP address destination</u>

You can optionally enter the IP address of the IP Load Balancer that is redirecting the IP Phone http request to the running server. If this option is enabled, the Hot Standby Module will check the destination of the VIP address by sending http request to the VIP address. The Hot Standby module will switch the server which is the destination of the VIP address, after the number of failures defined, to Primary mode.



#### 3.1.2.2 Switch server on application error

If the choice 'Switching on application error' is checked, the backup server will analyze the response of the URL IPSCFG/admin/Monitor.aspx to detect errors (and not only http errors). This option can be selected only if the IP Load Balancer is able to analyze the http response as well and detect that it do not contain an 'OK' answer. Do not use if using Windows Load Balancer.

**Note**: we do not recommend using this feature as sometimes, minor errors can trigger too many unnecessary switches.

#### 3.1.2.3 First server auto-restart as active/primary

The server #1, will actively try to regain active status when it is restarted or healthy again. If the monitor's URL answers fine for the `number of failures' defined.

#### 3.1.2.4 <u>Heartbeat timeout</u>

Defines how long IPS Startup will wait for a reply when requesting monitor.aspx URL. By default 10 seconds. The timeout must take into account AXL timeout because when monitor URL is queried an AXL read can be executed. Heart beat timeout shou\_ld be equal to AXL timeout (default 7s) + 3s. AXL timeout is defined in menu Global Config, Config CUCM folders, advanced parameters.

#### 3.1.2.5 <u>Heartbeat interval</u>

Defines the period (in seconds) IPS Startup will check the monitor.aspx URL on the alternate server or the local server in some case. By default every 30 seconds.

#### 3.1.2.6 <u>Number of failures to switch</u>

The backup server will become primary after the number of consecutive failures of the primary server. If option 'First server auto restart primary' is enabled the first server will become primary again after the number of consecutives success. The minimum value -  $1 \times$  heartbeat interval should be greater than IPS Framework & Administration restart time, which is generally around 60s. Default value is  $5 \times 30$ s.

**Important:** the IP Load Balancer switching parameters must match the number of failures and the heartbeat interval to switch times the interval between heartbeats.

The IP Phones query the servers through the IP load balancer. You must then make sure that the IP Phone Service URL is based on the IP load balancer virtual IP address.

The load balancer should work in failover mode and redirect the queries in priority to the primary server. It will redirect the queries on the backup server after server when several consecutives http queries fail on the primary server.

#### 3.1.3 Change CTI service settings on backup server

Since May 13th 2013, the CTI Server 2.6.0 must stay on Automatic start and be running, so no need to follow the steps below.





### 3.2 Deploying the Fault Tolerance

The Phone services definitions for the telisca applications must use the VIP address and the subscriptions must be updated.

#### 3.3 Considerations

The Hot Standby module mainly ensures correct switchover of the telisca CTI server. Depending on which application uses this module some things need to be remembered:

- Special User accounts need to be created/configured identically on both servers
- Same for special folder permissions
- Replicated directories of IPS Global Directory are copied to each telisca server independently according to their import schedule, when testing, manual import of the directories should be ran if they haven't been automatically imported yet



### 4 Enabling Windows Network Load Balancer

Here are the instructions to set up Windows Network Load Balancing in a basic configuration. The Network Load Balancing (NLB) feature is installed on two servers, we use the NLB Manager on the primary to configure it, the settings are replicated on the secondary automatically. Then the active tellsca server can be accessed using this new virtual IP from the phones and the web interfaces. The Balancing is done when the Primary server returns an error to the Windows Load Balancer.

#### 4.1 Network prerequisites

- 1. Switch (layers 2 and 3): must accept the multicast packets.
- 2. Router: ARP association between IPv4 virtual unicast address and physical multicast mac address.
- 3. Both servers must be on the same subnet with the same vlan configuration.

#### 4.2 Network cards considerations

NLB does not require more than one network card per host. However, there are several scenarios in which a user may prefer to add another network card:

#### • Inter-host communication in unicast mode

In unicast mode, each host in the cluster has the same IP Address and the same MAC Address making them look identical from a networking perspective. So, unicast mode has the side effect of disabling communication among the hosts of the cluster.

#### Separating the front-end traffic from the back-end traffic

The network adapter that has NLB bound to it can be used to handle incoming connections and connections to a bank-end database, for example, can be made from a separate back-end network adapter.

Further information can be found here: <u>http://technet.microsoft.com/en-us/library/cc783135(v=ws.10).aspx</u>

The steps below are made with a unique network card.

#### 4.3 Activate the Network Load Balancer feature

The feature needs to be enabled on both servers: primary and backup.

Launch 'Server Manager', select Local Server, Manage and add Roles and Features.



Then click on Features and select Network Load Balancing.

📥 Server Manage	r		
€∋∙	Server Manager	Local Server	- 🗊   🏴 Manage Tool
<ul> <li>Dashboard</li> <li>Local Serv</li> <li>All Servers</li> <li>File and St</li> <li>IIS</li> </ul>	Add Roles and Features Wizard Select features Before You Begin Installation Type Server Selection Server Roles Features Confirmation	Select one or more features to install on the selected server.  Features  I H Address Management (HAMI) Server  I SNS Server service  L PR Port Monitor  Management OData IIS Extension  Media Foundation  Mescane Queuing	
	Results	Intersaty Colomy         Intersaty Colomy         Intersaty Colomy         Multipath I/O         Intersaty Multipath I/O         Intersation Multipath I/O	<ul> <li>Install</li> <li>Cancel</li> </ul>

### 4.4 Cluster creation

It is recommended to use a local admin account whenever prompted, even if the servers are on a domain (unless you know what you are doing).

Launch nlbmgr from the command prompt. Then Right-click "Create new cluster"

🧐 Networ	k Load Balan	cing Manager								
File Cluste	er Host Opti	ions Help								
🛨 👷 Ne	twork Load Bala	oncina Clusters		Cluster c	Cluster configuration for all known NLB clusters					
New Cluster					ame		Cluster IP address	Cluster IP su	ubnet mask	Cluster mode
		o Existing								
Log Entry	Date	Time	Cluste	r	Host	Descrip	tion			
0001	07/01/2013	15:45:03				NLB Ma	nager session started			
0002	07/01/2013	15:45:03				Loading	l locally bound instances			
•										Þ

#### 4.4.1 Connect first host

You enter the IP Address of the primary telisca server.

<b>10.5</b>	5 <mark>.1.52</mark> - Remote Des	ktop Connection	tra	lice	-	
New C	luster : Connect					×
	nnect to one host that ist: 10.5.1.52 Connection status	is to be part of the r	new cluster and s	elect the cluster	interface Connect	
Int	erfaces available for c	onfiguring a new clu	ster			-
h	nterface name		Interface IP			, h
	ocal Area Connection		10.5.1.52			
		< Back	Next >	Cancel	Help	

#### 4.4.2 Set the parameters of the primary

IP address	Subnet mask
10.5.1.52	255.255.25.0
	Add Edit Bama
nitial host state	
Default state:	Started

#### 4.4.3 Parameters of the virtual IP address.

In this example the IPs are:

- Primary 10.5.1.52
- Secondary 10.5.1.53
- VIP 10.5.1.51

New Chuckey + Chuckey TD Addresses		
New Cluster : Cluster IP Addresses	Add IP Address	×
The cluster IP addresses are shared by The first IP address listed is considered heartbeats.	Add IPv4 address:      IPv4 address:      10 . 5 . 1 . 51 2	
Cluster IP addresses:	Subnet mask: 255 . 255 . 255 . 0	
IP address	Add IPv6 address:      IPv6 address:      Generate IPv6 addresses:      Link-local      Site-local      Global      OK      Cancel	
1 	Add Edit Remove	

#### 4.4.4 Cluster parameters

The Full Internet Name is up to you. Multicast Cluster Operation Mode must be selected.

Cluster IP configuration -	10.5.1.51	¥
Subnet mask: Full Internet name:	255 . 255 . 255 . 0	
Network address:	03-bf-0a-05-01-33	
C Unicast		
<ul> <li>Multicast</li> <li>C IGMP multicast</li> </ul>		
	< Back Next > Cance	el Help

**Important:** some routers may prevent the use of an IPv4 address for Multicast. A special config must be added to the router.

- In this case, arp entry must be configured on vlan gateway of telisca server, to be able to reach VIP from network other than telisca server subnet.
- This arp entry will match unicast IPv4 VIP address (10.5.1.51) and multicast mac-address (03-bf-0a-05-01-33).

**Important:** Full Internet name must be provided even if it is not used explicitly anywhere.

#### 4.4.5 Cluster Port Rules

Cluster IP address	Start End F	Prot Mode	Priority Load	Affinity	Add/Edit Port Rule
All	0 65535 8	Both Multiple		Single	Cluster IP address
					Port range
					From: 0 🔹 To: 65535 🔹
•				·	Protocols
		Add	Edit	Remove	C TCP C UDP   Both
Port rule description	n	Add	Edit	Remove	C TCP C UDP C Both
Port rule description TCP and UDP traff 65535 is balanced of each member.Cl	n ic directed to any cl across multiple men ient IP addresses ar	Add uster IP address that nbers of the cluster e used to assign cli	Edit at arrives on port according to the ent connections	Remove s 0 through load weight to a specific	C TCP O UDP © Both Filtering mode O Multiple host Affinity: O None © Single O Networ
Port rule description TCP and UDP traff 65535 is balanced of each member.Cl cluster host.	n ic directed to any cl across multiple mem ient IP addresses ar	Add uster IP address the nbers of the cluster e used to assign cli	Edit at arrives on port according to the ent connections	Remove s 0 through load weight to a specific	C TCP O UDP C Both Filtering mode Multiple host Affinity: O None O Single O Networ Timeout(in minutes): 0
Port rule description TCP and UDP traff 65535 is balanced of each member.Cl cluster host.	n ic directed to any cl across multiple mer ient IP addresses an	Add uster IP address the abers of the cluster e used to assign cli	Edit at arrives on port according to the ent connections	Remove s 0 through load weight to a specific	C TCP O UDP © Both Filtering mode Multiple host Affinity: O None O Single O Networ Timeout(in minutes): 0 ==
Port rule description TCP and UDP traff 65535 is balanced of each member.Cl cluster host.	n ic directed to any cl across multiple mem ient IP addresses ar ient IP addresses ar < Back	Add uster IP address thin nbers of the cluster e used to assign cli Finish	Edit at arrives on port according to the ent connections	Remove s 0 through load weight to a specific Help	C TCP C UDP C Both  Filtering mode C Multiple host Affinity: C None C Single C Networ  Timeout(in minutes): 0 == C Single host

Click Finish.

#### 4.5 Adding the secondary Node



#### 4.5.1 Enter secondary server IP

d Host to Cluster : Cor Connect to the host that i	nect s to be added to th	ie existing clus	ter	×
Host: 10.5.1.53	1		2	Connect
Interfaces available for co	onfiguring the clust	er		
Interface name		Interface IP		
,				
	< Back	Next >	Cancel	Help

#### Set priority 2

Priority (unique host ic - Dedicated IP addre	lentifier):			
IP address		S	ibnet mask	
10.5.1.53		25	5.255.255.0	
	[	Add	E dit	Remove
Initial host state	[	Add	Edit	Remove
- Initial host state	Started	Add	Edit	Remove
-Initial host state Default state: □ Retain suspend	Started	Add	Edit	Remove
Initial host state Default state: Retain suspend	Started	Add	Edit	Remove
Initial host state Default state: Retain suspend	Started	Add	Edit	Remove

Next and Finish.

#### 4.5.2 Warning message

When configuring NLB, you may see this message. It is only a Warning that tells that you need to support multicast to operate NLB, which is the case with the instructions provided above.





#### 4.5.3 Final result

🧐 Network Load Balancing Manager								
File Cluster Host Options Help								
Network Load Balancing Clusters	Host configuration information for hosts in cluster VIPTELISCA (10.5.1.51)							
E- Se VIPTELISCA (10.5.1.51)	Host (Interface)	Status	Dedicated IP address	Dedicated IP subnet mask	Host priority	Initial host state		
W2008R(Local Area Connection)	🚇 W2008A(Local Area Connection)	Converged	10.5.1.52	255.255.255.0	1	started		
w2000b(Local Area Connection)	🖳 W2008B(Local Area Connection)	Converged	10.5.1.53	255.255.255.0	2	started		

**Important: reboot!** it is recommended to reboot the whole server after NLB has been installed, you can experience very slow performance on IIS and network access to the backup server if not restarted.

Further information on how to setup a network load balancer on Windows http://www.techotopia.com/index.php/Building a Windows Server 2008 R2 Network Load Balancing Cluster

#### 4.6 Verifying the setup

We can now test if we access the server using the VIP. Go to:  ${\tt http://[VIP]/IPSCFG/admin}$ 

And check the Hot Standby Tab, it should display the local IP for the active/primary server.

## 5 Configuring external Load Balancer

If the company has an external load balancer solution available, it may be used with telisca's applications. It must be configured in Failover mode.



The Load Balancer should check periodically that the primary server is available (ping) and eventually answer to a monitor http URL without http error. After several consecutives errors the Load Balancer must redirect all http requests to the backup server.

In the meantime, the IPS Startup Service on the backup server periodically checks the primary server monitor URL as well. After the same number of consecutive errors he forces the primary server to switch to idle mode and the backup server to run mode.

When a server restarts and finds out that the other server is already running, it synchronizes its configuration from the first one and run in idle mode. When both servers are restarting at the same time (auto restart during night) a mechanism forces the primary the server to run and the backup to idle.

Enable Hot Standby mode	V
IP Address of this server	192.168.0.117
Server IP Address #1	192.168.0.117
Server IP Address #2	192.168.0.132
IP Balancer VIP address	10.1.1.245
Test VIP address IP destination	✓ ?
Switch server on application error	
First server auto restart as Primary	
Heartbeat timeout(s)	10
Heartbeat interval(s)	15
Number of failure to switch	4
Fault tolerant logs	✓ View



#### 5.1 Test VIP address destination

If a the Virtual IP (VIP) address of the Load Balancer is defined, and the parameter 'Test VIP address IP destination' is checked, the application will use it to check on which server the load balancer is redirecting the http requests. Then IPS Startup will switch the active server to match the one that receives the requests. This option may be useful to accelerate the failover in some case. However, if the load balancer switch to often, it will make telisca application switch to often as well.

#### 5.2 Failover parameters

It is important that the Load Balancer and IPS Startup behave the same on failover, so the different parameters set in IPS Administration should be in balanced with Load Balancer's parameters.

If 'Switch server on application error' is set to false, the load balancer will check the server is running fine by calling the URL : <u>http://host/IPSCFG/admin/monitor.aspx?mod=NONE</u> (replace by https, if SSL is enabled). It should then test that there is an answer (no timeout) and no http error (HTTP 200).

If 'Switch server on application error' has been enabled in Hot Standby configuration, the load balancer will check the server is running fine by calling the URL: <u>http://host/IPSCFG/admin/monitor.aspx?mod=IPSWS</u> (replace by https, if SSL is enabled). The Load Balancer should then check that the value returned is IPSWS=OK.

If the load balancer checks which server is ACTIVE, it should call the URL: <u>http://host/IPSCFG/admin/monitor.aspx?mod=FT</u> (replace by https, if SSL is enabled). It should then test that there is an answer is ACTIVE and not STANDBY.

#### 5.2.1 First server auto restarts as primary

If the load balancer after a failover continues to check the primary server and redirect the http request again as soon as it answers correctly to several consecutive request, the you must check the option 'First server auto restarts as primary' in IPS Administration. You should also make sure that the rollback condition (number of consecutive errors, heart beat) are set the same as for the failover.

#### 5.2.2 Heart beat interval and consecutive failures

The Load Balancer and IPS Startup service must switch in approximately the same delay so that the application is already up and running on the backup server when the Load Balancer redirects the http request to the backup server. The minimum time to switch to backup server is 60s as it takes usually 60s to start IPS Framework & Administration. However it may take more time depending of server or VM sizing and other VM installed on the same server . It also leaves the time to CUCM's CTI Manager to unregister the CTI Route Points and CTI Ports used by the application (around 60s). Depending of the time the check is initiated it is necessary to make sure that the time to make n-1 consecutive checks is longer than the maximum time it takes for the server to restart. Default values are 5 consecutives check every 30s.



#### Heart beat 30s, 5 consevutive failures

## 6 Appendix

#### 6.1 Test Hot Standby process

This chapter describes a process to test the Hot Standby mechanism. How to simulate the primary server failover, so that the backup server switch from standby mode to active mode.

#### 6.1.1 Stopping the primary server

In order to simulate the primary server, you can do different things:

- Stop the Virtual Machine on which the telisca applications is running. This can be done from the Virtual Machine administration, for example from VSphere (for VmWare).
- OR Disconnect the Virtual Machine from the network. This can be done from the Virtual Machine administration, for example from VSphere (for VmWare).
- OR Stop IIS Server. This can be done by stopping the Windows Service 'World Wide Web Publishing Service'.

windows store service (wsservice)	Provides Int		ivianuai (Trig	Local Syste
😪 Windows Time	Maintains d		Manual (Trig	Local Service
🔅 Windows Update	Enables the		Manual (Trig	Local Syste
WinHTTP Web Proxy Auto-Discovery Service	WinHTTP i	Running	Manual	Local Service
🖓 Wired AutoConfig	The Wired		Manual	Local Syste
🔅 WMI Performance Adapter	Provides pe		Manual	Local Syste
🔍 Workstation	Creates and	Running	Automatic	Network S
😘 World Wide Web Publishing Service	Provides W	Running	Automatic	Local Syste
Extended Standard				

If several telisca instances are installed on the same server (same Virtual Machine), you may want to stop one instance, without stopping the other one. In this case, you should only stop the main telisca IIS Application Pool from IIS Administration. The application pool name is teliscaPoolDotNet2 for the default instance and teliscaPoolDotNet-XXX where XXX is the instance prefix (by default 02) for the additional instances.

Connections	0-							
🔍 - 🗐 🖄 😣	A 199	Application Pools						
Start Page SRV6 (SRV6\Administrator) Application Pools Sites	This page different a Filter:	lets you view and manage the pplications.	e list of applicati	ion pools on th	e server. Applica	tion pools are asso	ciated with worker proc	cesses, conta
p Jues	Name	×		Status		Managed Pipel	Identity	Application
	NET W	4 5		Started	v4.0	Integrated	ApplicationPoolId	0
	INFT W	4.5 Classic		Started	v4.0	Classic	ApplicationPoolId	0
	Default	tAppPool		Started	v4.0	Integrated	ApplicationPoolld	1
	<b>R</b> telisca	PoolDotNet2		Started	v4.0	Integrated	NetworkService	16
	telisca	PoolIPSGDir		Started	v4.0	Integrated	NetworkService	18
	telisca	PoolIPSMA		Started	v4.0	Integrated	NetworkService	1
	a telisca	PoolOTHER		Started	v4.0	Integrated	NetworkService	10
Connexions 🔍 - 📊   🖄   象	•	Pools d'appl	ications					
Connexions	ur) Ce	<b>Pools d'appl</b> ette page permet de consult	ications :er et de gérer	la liste des po	ols d'application	is sur le serveur. I	.es pools d'application	sont
Connexions Connexions Page de démarrage SRV3 (SRV3\Administrateu Pools d'applications Connexions	ur) Ce	Pools d'appl ette page permet de consult iltrer :	ications er et de gérer	la liste des po	ols d'application	is sur le serveur. L Regrouper par : 4	es pools d'application	sont
Connexions Connexions Page de démarrage SRV3 (SRV3\Administrateu Cols d'applications Cols d'applications Cols d'applications Cols d'applications	ur) Ce N	Pools d'appl ette page permet de consult iltrer :	ications er et de gérer • M Attei État	la liste des por ndre → 🔙 A Version du	ols d'application fficher tout   F .   Mode pipeli	is sur le serveur, l Regrouper par : / ne g Identité	.es pools d'application Aucun regroupement : Appl	i sont
Connexions	ur) Ce	Pools d'appl ette page permet de consult illtrer : lom ~ 2 teliscaPoolOTHER-03	ications er et de gérer • 00 Attei État Démarré	la liste des po ndre → 🐙 A Version du v4.0	ols d'application fficher tout   F .   Mode pipeli Intégré	is sur le serveur, l Regrouper par : ne g   Identité Networł	.es pools d'application Aucun regroupement : Appl Gervice 9	i sont
Connexions	ur) Ce	Pools d'appl ette page permet de consult illtrer : lom • teliscaPoolOTHER-03 teliscaPoolOTHER-02	ications er et de gérer Cate État Démarré Démarré	la liste des po ndre	ols d'application fficher tout   F .   Mode pipeli Intégré Intégré	is sur le serveur. L Regrouper par : 4 ne g Identité Network Network	es pools d'application Aucun regroupement Mervice 9 Service 9	i sont
Connexions	ur) Ce	Pools d'appl ette page permet de consult iltrer : lom • teliscaPoolOTHER-03 teliscaPoolOTHER-02 teliscaPoolOTHER	ications er et de gérer Cara Attei État Démarré Démarré Démarré	la liste des por ndre → ⊊ A Version du v4.0 v4.0 v4.0 v4.0	ols d'application fficher tout   F . <u>Mode pipeli</u> Intégré Intégré Intégré	is sur le serveur. I Regrouper par : 4 ne g Identité Network Network	es pools d'application Aucun regroupement Mervice 9 Service 9 Service 14	i sont
Connexions	ur) Ce N	Pools d'appl ette page permet de consult iltrer : teliscaPoolOTHER-03 teliscaPoolOTHER-02 teliscaPoolOTHER teliscaPoolOTHER teliscaPoolOTHER	ications er et de gérer Canada Attei État Démarré Démarré Démarré Démarré	la liste des por ndre – v an A Version du v4.0 v4.0 v4.0 v4.0 v4.0	ols d'application fficher tout   F . <u>Mode pipeli</u> Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : 4 ne g Identité Network Network Network	es pools d'application Aucun regroupement Service 9 Service 9 Service 14 Service 1	i sont
Connexions	ur) Ce N	Pools d'appl ette page permet de consult iltrer : Iom teliscaPoolOTHER-03 teliscaPoolOTHER teliscaPoolOTHER teliscaPoolOTHER teliscaPoolOIPSMA-03 teliscaPoolIPSMA-02	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré	la liste des por ndre Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v	ols d'application fficher tout   F . <u>Mode pipeli</u> Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : 4 ne g   Identité Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1	i sont
Connexions	ur) Ce N	Pools d'appl ette page permet de consult iltrer : Iom teliscaPoolOTHER-03 teliscaPoolOTHER teliscaPoolOTHER teliscaPoolOTHER teliscaPoolIPSMA-03 teliscaPoolIPSMA	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre – Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v	ols d'application fficher tout   F Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : 4 Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 1	i sont
Connexions	ur) Ce	Pools d'appl atte page permet de consult iltrer : teliscaPoolOTHER-03 teliscaPoolOTHER-02 teliscaPoolOTHER teliscaPoolIPSMA-03 teliscaPooIIPSMA-02 teliscaPooIIPSMA teliscaPooIIPSMA	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre → 💽 A Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v	ols d'application fficher tout   F Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : Network Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 1 Service 1	i sont
Connexions	ur) Ce	Pools d'appl ette page permet de consult iltrer : lom teliscaPoolOTHER-02 teliscaPoolOTHER teliscaPoolOTHER teliscaPoolIPSMA-03 teliscaPooIIPSMA teliscaPooIIPSMA teliscaPooIIPSMA teliscaPooIIPSGDir-03 teliscaPooIIPSGDir-02	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre → 💽 A Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v	ols d'application fficher tout   F Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : Network Network Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 1 Service 1 Service 18 Service 18	i sont
Connexions	ur) Co	Pools d'appl ette page permet de consult iltrer : Iom teliscaPoolOTHER-03 teliscaPoolOTHER teliscaPoolIPSMA-03 teliscaPooIIPSMA-03 teliscaPooIIPSMA teliscaPooIIPSMA teliscaPooIIPSMA teliscaPooIIPSGDir-03 teliscaPooIIPSGDir-02 teliscaPooIIPSGDir-02	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre → 💽 A Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4	ols d'application fficher tout   F Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : 7 Network Network Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 1 Service 18 Service 18 Service 18	i sont
Connexions	ur) Co	Pools d'appl atte page permet de consult iltrer : Iom teliscaPoolOTHER-03 teliscaPoolOTHER-02 teliscaPoolIPSMA-03 teliscaPooIIPSMA-03 teliscaPooIIPSMA teliscaPooIIPSMA teliscaPooIIPSGDir-03 teliscaPooIIPSGDir-02 teliscaPooIIPSGDir-02 teliscaPooIIPSGDir-02 teliscaPooIIPSGDir-02	ications er et de gérer État Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre → ↓ A Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4	ols d'application fficher tout F Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : / Network Network Network Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 1 Service 18 Service 18 Service 18 Service 18	i sont
Connexions	ur) Ca	Pools d'appl atte page permet de consult iltrer : iltrer : ident de consult iltrer : ident de consult ident de	ications er et de gérer é é attei bémarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré Démarré	la liste des por ndre → 🥁 A Version du v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4.0 v4	ols d'application fficher tout F Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré Intégré	is sur le serveur. I Regrouper par : ne g Identité Network Network Network Network Network Network Network Network	Les pools d'application Aucun regroupement Service 9 Service 14 Service 1 Service 1 Service 1 Service 18 Service 18 Service 18 Service 18 Service 16	i sont

. .



#### 6.1.2 Check the switchover process

Connect to the backup server administration (<u>http://backup-host/IPSCFG/admin</u>), then select Global Configuration menu and Hot Standby Config tab. In the normal mode, the primary server (IP Address #1) is Active and the backup server (IP Address #2) is Standby.

telisca - CUCM Config Parameters	Hot Standby config	Install Services	CTI config CTI control
Global configuration Validate Cancel			
IP Address of this server	10.1.1.220	0	
Server IP Address #1	10.1.5.14	0	Status: Active (Primary)
Server IP Address #2	10.1.1.220		Status: Standby (Backup)
Enable Hot Standby mode	<ul><li>✓ ⑦</li></ul>		
IP Balancer VIP address		0	
Test VIP address IP destination			
Use VIP address to build URLs			
Switch server on application error			
First server auto restart as Active/Primary	☑ ⑦		
Heartbeat timeout(s)	10 🕐		
Heartbeat interval(s)	20		
Number of consecutives failures/success to switch	3 🕐		
Fault tolerant logs		$\checkmark$	

After stopping the primary server, temporarily, the primary server status is error and backup server still standby mode. You need to refresh the page by clicking on Hot Standby config tab.

telisca 🗸	CUCM Config	Parameters	Hot Standby config	Install Services	CTI config	CTI control
Global config	uration Validat	e <u>Cancel</u>				
	IP Addres	ss of this serve	<b>r</b> 10.1.1.220	0		
	Serve	er IP Address #	1 10.1.5.14	0	Status: Error	
	Serve	er IP Address #	2 10.1.1.220		Status: Stand	lby (Backup)
	Enable Ho	t Standby mode	• 🔽 🕐			
	IP Balar	ncer VIP addres	s	0		
	Test VIP addre	ess IP destination	n 🗌 🕐			
	Use VIP addre	ess to build URL	s 🗌 🕐			
	Switch server on	application erro	or 🗌 🕐			
First s	erver auto restart a	as Active/Primar	/ 🔽 🕐			
	Hea	artbeat timeout(s	) 10 🕐			
	Hea	irtbeat interval(s	) 20			
Number of cons	secutives failures/s	success to switch	3 🕐			
	F	ault tolerant log	5	~		

After 2 or 3 minutes, the backup server switch to Active mode. You need to refresh the page by clicking on Hot Standby config tab.

telisca 🗸	CUCM Config	Parameters	Hot Standby config	Install Services	CTI config	CTI control
Global configu	uration Validat	te Cancel				
	IP Addre	ss of this serve	er 10.1.1.220	0		
	Serve	er IP Address #	<b>1</b> 10.1.5.14	0	Status: Error	
	Serve	er IP Address #	<b>2</b> 10.1.1.220		Status: Active	(Primary)
	Enable Ho	t Standby mod	e 🗸 🕐			
	IP Bala	ncer VIP addres	s	0		
	Test VIP addre	ess IP destinatio	n 🗌 🕐			
	Use VIP addre	ess to build URL	s 🗌 🕐			
	Switch server on	application erro	or 🗌 🕐			
First se	erver auto restart a	as Active/Primar	У 🔽 🕐			
	Hea	artbeat timeout(s	;) 10 7			
	Hea	artbeat interval(s	) 20			
Number of cons	ecutives failures/s	success to switc	h 3 🕐			
	F	ault tolerant log	s	$\checkmark$		

You can check the hot standby process by selecting the last Fault tolerant log

Fault tolerant logs FT\_REPORT\_180824.txt V

2018/08/24\_14:40:47:073 IPSWS : Switch this host(10.1.1.220) to BACKUP 2018/08/24\_14:47:47:377 Check primary server : Application error detected, count = 1 2018/08/24\_14:48:07:579 Check primary server : Application error detected, count = 2 2018/08/24\_14:48:27:734 Check primary server : Application error detected, count = 3 2018/08/24\_14:48:27:734 IPSWS : Switch this host(10.1.1.220) to PRIMARY 2018/08/24\_14:48:27:734 IPS startup : SWITCH THIS SERVER TO PRIMARY, maximun heart beat fails

#### 6.1.3 Rollback to primary server

If the parameter 'First server auto restart as Active/Primary' is checked, the rollback will be automatic as soon as the primary server is available again (by undoing the stopping operation chosen).

First server auto restart as Active/Primary 🔽 夜

Otherwise, after restarting the primary server, you can switch back to the primary server manually, by clicking on the '-> Active (Primary)' button in front of Server IP Address #1.

telisca 🗸	CUCM Config Para	meters Hot S	Standby config	Install Services	CTI config (	CTI control	Phone push config	Email con
Global configu	<b>ration</b> Validate Ca	ancel						
	IP Address of t	his server 10	.1.1.220	0				
	Server IP A	ddress #1 10.	.1.5.14	0	Status: Standby	(Backup)	-> Active (Pr	imary)
	Server IP A	ddress #2 10.	.1.1.220		Status: Active (F	Primary)	-> Standby (B	ackup)

#### 6.2 Expected delay in failover

The expected time for the backup server with CTI to become active depends on these parameters:

The expected delay can be calculated by adding the failover delay (the number of failures x heart beat frequency) + heartbeat timeout + CTI startup delay.

CTI startup delay is the time it takes to the CTI Server to:

- Connect to CTI Manager (normally a few seconds)
- Register and CTI Monitor CTI Ports (200ms/CTI port or more, depending of treatments)
- CTI monitor devices (200ms / device).



During failover delay, the applications may not be available or work in a specific safe mode. See applications' Administrators Guide for more information.

#### 6.3 Detailed failover/rollback algorithm

The following chapters describe the algorithm used to decide which server is active and which server is standby. It depends of the different settings defined in Hot Standby configuration screen.

#### 6.3.1 Failover initiated by alternate server on active server failure

This failover is initiated by IPS Startup Service from the standby server which send periodically http or https requests to http://host/IPSCFG/admin/monitor.aspx?mod=IPSWS to test the health of the active server. In normal mode standby server is the backup server, but can it be the primary server after having switched to standby.



Primary

Backup



If the server is in Standby mode (not active) If the server is connected to the LAN If the defined consecutive failures<sup>1</sup> has been reached Switch local IPS Startup to Active Switch local CTI Server to Active Switch local CTI Server to Active Switch remote IPS Framework to Standby Switch remote IPS Startup to Standby Switch remote CTI Server to Standby

#### 6.3.2 Rollback initiated by primary server

Rollback is initiated by IPS Startup Service from primary server which send periodically http or https requests to http://host/IPSCFG/admin/monitor.aspx?mod=IPSWS to test the status of the backup.



Primary

Backup

If First Server auto start in Active mode' option is set If primary server is in standby mode

If local server answers OK to monitor.aspx URL, the consecutive number of times defined or IPS Framework has successfully started If VIP address send request to this IP address

or if option test VIP destination is not set

Switch local IPS Startup to Active Switch local IPS Framework to Active

Switch local CTI Server to Active

Switch remote IPS Framework to Standby

Switch remote IPS Startup to Standby

Switch remote CTI Server to Standby

#### 6.3.3 Avoid two servers are in Active mode

It may happen after the LAN between the two servers has been disconnected that the two servers are active at the same time. The algorithm will decide which server should switch to standby taking into account if it is primary server or backup and to which server the VIP address send the requests.

<sup>&</sup>lt;sup>1</sup> If Switch Server on application error is enabled, then it check the answer returned is IPSWS=OK otherwise it just check an http response is returned.



# Switch local IPS Framework to Standby Switch local CTI Server to Standby

### 6.3.4 Active server disconnected from the LAN

If the Active Server is disconnected from the LAN the number of consecutive failure times defined Switch local IPS Startup to Standby Switch local IPS Framework to Standby Switch local CTI Server to Standby

#### 6.3.4.1 <u>CTI Server watchdog</u>

IPS Startup is also checking that the local CTI Server is up and running. If it stopped, it restarts the CTI Server service.

IPS Startup also stop and restarts the CTI Server at 'CTI Server Restart time' (visible in Global Config menu, Parameters folder) and calculated automatically a few minutes after IIS Application Pool has shut down and IPS Framework and Administration has been restarted by IPS Startup.

#### 6.3.4.2 Load Balancer / Hot Standby synchro

The goal is to have the Load Balancer failover and the Hot Standby failover almost at the same time to reduce the time when requests are sent to the server in standby or in error mode. So the number of consecutive ticks with failure, the ticks period and the ticks timeout should be the set the same on Load Balancer and in Hot Standby configuration. However as the tics of the Load Balancer and the hot standby are not synchronized they



may be out of synchro for the duration of a tick period. It may also happen that the requests from the Load Balancer and Hot Standby does not answer the same. There is two mechanism to minimize this situation: - The server may send an http request to the VIP address and wait for the request to hit the server, which

means that the load balancer send the requests to this server. This will accelerate the switch of the hot standby module.

- There is special feature for IPS Manager Assistant. It IPSMA user interface receives an http request when the server is in standby mode, the requests are redirected to the active server.

