



Tungsten eCopy ShareScan High Availability Deployment Guide

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Table of Contents

Preface	5
Product documentation.....	5
Training.....	6
Getting help with Tungsten Automation products.....	6
Chapter 1: Introduction	8
About eCopy ShareScan.....	8
Load balancing across multiple ShareScan servers.....	9
Chapter 2: Cluster and host topology	10
Reference setup of Citrix Netscaler with policy-based routing.....	12
Failure trigger events.....	16
System failure operation.....	16
Failure symptoms.....	16
Configuration checklist.....	17
System requirements.....	17
ShareScan requirements.....	19
Capture server monitor requirements.....	20
Network environment recommendations (in case of MS NLB).....	20
General recommendations to support high availability.....	20
Benefits of an eCopy ShareScan high availability deployment.....	21
Chapter 3: Deployment overview	22
MFP fleet.....	22
Server setup.....	22
MSNLB cluster setup for high availability.....	22
NLB environment setup when using a hardware load balancer.....	24
Upgrade eCopy ShareScan in a high availability environment.....	24
HTTPS communication on web-based devices.....	25
Creating self-signed server certificates.....	25
Certificate Manager.....	25
Create HTTPS certificates for your high availability setup.....	26
Generate a certificate and install it under Tomcat.....	26
Install the certificate on the ShareScan Manager computer.....	29
Chapter 4: Certificate creation for ShareScan	32
XCA software installation.....	32
Create the CA certification.....	32

Create a certificate for the ShareScan Manager.....	34
Export a certificate for the ShareScan Manager.....	37
Export CA.....	38
Chapter 5: High availability considerations.....	39
Hardware failure.....	39
Software failure.....	39
Risk and limitations.....	40
Chapter 6: Load balancing across multiple ShareScan servers.....	41
Chapter 7: Configuration, troubleshooting, and testing.....	44
Verify the high availability setups with the ShareScan Troubleshooter.....	45
Determine actual device request.....	46
Exporting trace in a high availability environment.....	47
Using the ShareScan Troubleshooter tool with hardware load balancers.....	47
Chapter 8: How to install and configure NLB cluster on Windows server.....	49
Install NLB feature on all NLB nodes.....	49
Configure NLB on NODE 1 (PL2008-01).....	49
Unicast vs Multicast.....	50
In the unicast method.....	51
In the multicast method.....	51
Port rules.....	51
Configure NLB for NODE 2 (PL2008-02).....	53
Testing.....	53
Chapter 9: Frequently asked questions.....	55
Chapter 10: Glossary.....	56
Capture Server Monitor.....	56
Cluster.....	56
Convergence.....	56
Drainstop.....	56
Heartbeat.....	56
High availability support.....	57
Load balancing support.....	57
Node.....	57
Virtual device.....	57

Preface

The Tungsten eCopy ShareScan software extends the capabilities of digital copiers and scanners. When installing and setting up a eCopy ShareScan system, you must be familiar with the scanning device that you will use with eCopy ShareScan, the eCopy ShareScan software components, and the basic installation and configuration workflow.

This guide is intended for administrators responsible for the initial installation, configuration, and licensing of eCopy ShareScan. For information pertaining to the eCopy ShareScan pre-installation, see *Tungsten eCopy ShareScan Pre-Installation Checklist*. For configuration and Administration Console usage, see the Online Help (accessible via pressing F1 on the Administration Console).


This document is written under the assumption that readers are familiar with working within a server-client architecture and environment.

Product documentation

The full documentation set for Tungsten eCopy ShareScan is available online:

<https://docshield.tungstenautomation.com/Portal/Products/eCopy/6.7.0-u94fwgig3l/eCopy.htm>

The Tungsten eCopy ShareScan documentation set includes the items listed in the following table.

Guide	Description
Tungsten eCopy ShareScan Pre-installation Checklist (PDF)	Provides information on the issues to be addressed before deploying Tungsten eCopy ShareScan.
Tungsten eCopy ShareScan Installation Guide (PDF)	Provides information on how to install and upgrade Tungsten eCopy ShareScan, along with hardware and software prerequisites.
Tungsten eCopy ShareScan Online Help	The integrated help of the application, covering the use of Tungsten eCopy ShareScan beyond installation, including configuration information.  The help is accessible by pressing F1 on the eCopy ShareScan Administration Console.

Guide	Description
Tungsten eCopy ShareScan Troubleshooter User Guide (PDF)	Provides information on how to use the eCopy ShareScan Troubleshooter, a built-in diagnostic tool.
Tungsten eCopy ShareScan Release Notes (PDF)	Provides an overview of late-breaking details for the current product release.
Tungsten eCopy ShareScan High Availability Deployment Guide (PDF)	Provides guidance on how to deploy eCopy ShareScan to function in high availability mode.
Tungsten eCopy ShareScan Glossary Editor Recommendations (PDF)	Contains information on proper use of the Glossary Editor Tool.

Training

Tungsten Automation offers both classroom and computer-based training to help you make the most of your eCopy ShareScan solution. Visit the Tungsten Automation website at www.tungstenautomation.com for details about the available training options and schedules.

Getting help with Tungsten Automation products

The **Tungsten Automation Knowledge Base** repository contains articles that are updated on a regular basis to keep you informed about Tungsten Automation products. We encourage you to use the Knowledge Base to obtain answers to your product questions.

To access the **Tungsten Automation Knowledge Base**, go to the [Tungsten Automation website](#) and select **Support** on the home page.

 The **Tungsten Automation Knowledge Base** is optimized for use with Google Chrome, Mozilla Firefox or Microsoft Edge.

The **Tungsten Automation Knowledge Base** provides:

- Powerful search capabilities to help you quickly locate the information you need.
Type your search terms or phrase into the **Search** box, and then click the search icon.
- Product information, configuration details and documentation, including release news.
Scroll through the **Tungsten Automation Knowledge Base** home page to locate a product family. Then click a product family name to view a list of related articles. Please note that some product families require a valid Tungsten Automation Portal login to view related articles.
- Access to the **Tungsten Automation Customer Portal** (for eligible customers).
Click the **Customer Support** link at the top of the page, and then click **Log in to the Customer Portal**.
- Access to the Tungsten Automation Partner Portal (for eligible partners).

Click the **Partner Support** link at the top of the page, and then click **Log in to the Partner Portal**.

- Access to Tungsten Automation support commitments, lifecycle policies, electronic fulfillment details, and self-service tools.

Scroll to the **General Support** section, click **Support Details**, and then select the appropriate tab.

Chapter 1

Introduction

This document describes how to deploy eCopy ShareScan to achieve high availability and load balancing, or both, and details its advantages.

For information about setting up a load balanced cluster, refer to:

- the relevant Microsoft Knowledge Base articles when using Microsoft Network Load Balancer (<https://learn.microsoft.com/en-us/windows-server/networking/technologies/network-load-balancing>)
- the installation and configuration guide of your hardware load balancer when using a hardware load balancer or other solution hosted in a server other than the ShareScan servers.

⚠ Different network appliances offering load balancer features have plenty of modes and options to configure, and they are also affected by the circumstances and policies of the hosting IT infrastructure. To find a way for enabling the installation of ShareScan behind a (hardware) load balancer, we provide compatibility testing of ShareScan in a certain configuration, enabling proper ShareScan operation. This testing and compatibility declaration does not cover all the modes and features of the load balancer (network appliance), but until the necessary requirements are met, an expert administrator of the given network appliance will likely be able to configure the system in other ways.

The basic features ShareScan requires from a load balancer:

- TCP requests (including HTTPS request) reaching the ShareScan server nodes behind the load balancer must preserve the source IP address of the client initiating the request.
- TCP connections must be persisted in a client IP basis.

About eCopy ShareScan

eCopy ShareScan is an MFP document capture solution that enables MFP users to engage their business systems and processes by completely automating document capture processes. As a result, eCopy ShareScan simplifies MFP capture workflows and enables users with advanced imaging capabilities.

The eCopy ShareScan software extends the capabilities of digital copiers and scanners. When installing and setting up a ShareScan system, you must be familiar with the scanning devices that you will use with ShareScan, the ShareScan software components, and the basic installation and configuration workflow.

This document is written under the assumption that you are familiar with working in a server-client architecture and environment.

If you are about to install or upgrade to ShareScan, consult the *Tungsten eCopy ShareScan Installation Guide*.

Load balancing across multiple ShareScan servers

Multiple ShareScan servers with a common database and a shared work folder can be configured (as part of a NLB Cluster or without it) to provide load balancing features, regarding the document building and OCR phases of the workflow.

This guide is intended for system administrators who are responsible for carrying out such a deployment.

Chapter 2

Cluster and host topology

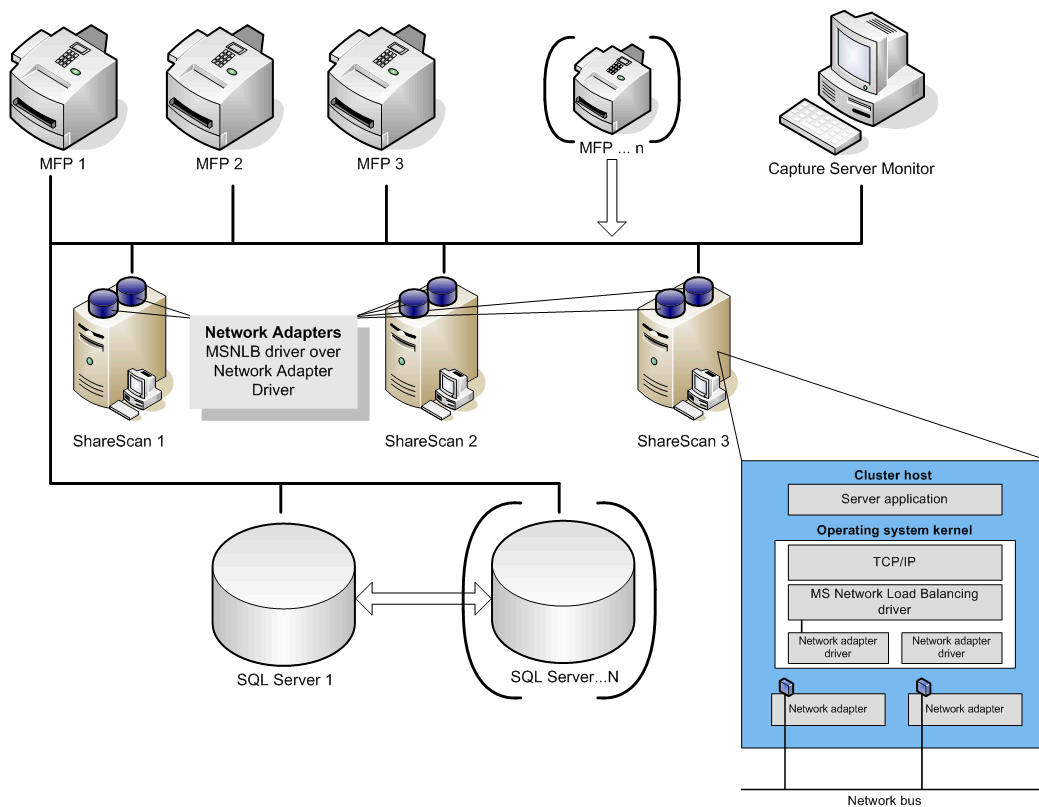


Figure 1: System diagram with MS NLB

The same figure properly depicts the different supported scenarios from the point of view of high availability and load balancing, because the server/network topology is the same, but different configuration settings are applied to achieve the desired behavior.

If a hardware load balancer is used instead of MS NLB, the system diagram changes as shown below:

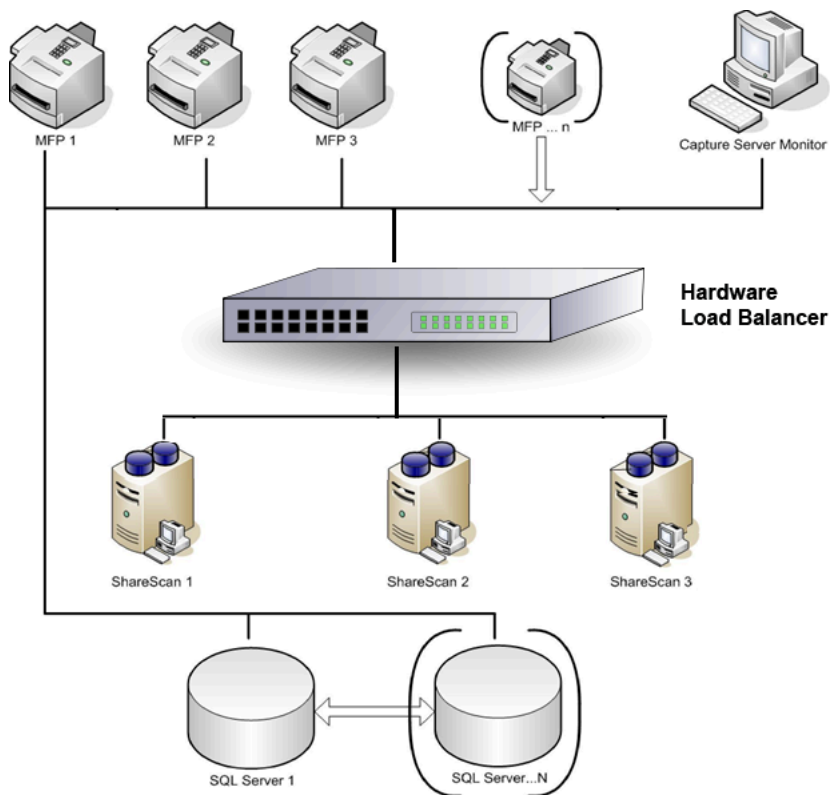


Figure 2: System diagram with a hardware load balancer

The SQL Server Cluster (SQL Server 1, SQL Server N) is visible to the ShareScan servers as a single SQL Server. See the Microsoft SQL Server documentation for details.

1. High availability is enabled via a network load balancing cluster

In this case, servers ShareScan 1...N ([node](#)) form a network load balancing cluster.

This basically means that the cluster is seen by the devices behind the same cluster IP address (in terminology of different vendors it is often referred as Virtual IP) and the ShareScan configuration database contains only a single ShareScan Manager entry - all the ShareScan Managers (1...N) use the same configuration data.

When an MFP is added to the system, its configuration points to the common cluster IP address; when the ShareScan application is started on the MFP, the requests are sent to the cluster IP address.

With the proper configuration option used (in MS NLB it is called single node affinity mode) for the particular communication ports, NLB Cluster makes a static assignment between the MFP and one of the ShareScan servers (1..N), based on its internal algorithm, aiming to evenly distribute the devices across the nodes.

This assignment is in effect until a node is taken away from the cluster or a node is added (back) to the cluster.

A node is taken away, for example, when the load balancer or the Capture Server Monitor detects that the OS, the network or ShareScan is non-functional on a particular node.

Also, this setup enables simplified management of a bigger fleet of MFP devices: since the cluster is stored as a single Manager in the ShareScan database, all the devices connected to the multi-manager cluster can be managed in a single Administration Console.

2. ShareScan Document creator and OCR Load Balancing

This feature ensures that the document creation and OCR processes are executed on multiple servers, distributing the jobs across all the available ShareScan Manager Computers. This happens via using a common job queue and a shared work folder. This feature can be enabled in any case when multiple Managers are connecting to the same SQL Server Database.

Whenever a workflow execution reaches the point when the final document (PDF, DOC, DOCX, and so on) is to be produced, data describing the document (source file paths, metadata, document format, and so on) are put into a job queue, stored in the database, and a notification is sent to the Managers in the system. One of the Managers with a free document creator fetches a job from the database job queue, processes it and then it sends a notification to the originator about the job completion.

i The Shared Output Creator does not work in a Workgroup environment. This scenario is not supported due to the limitations of the Windows operating system when used in a workgroup.

3. Both #1 and #2 are enabled

This setup is able to provide high availability and optimal usage at the same time.

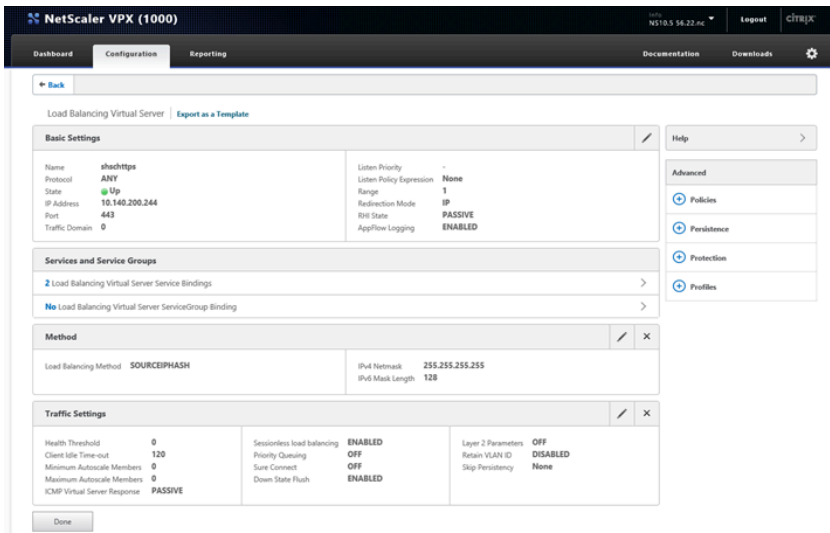
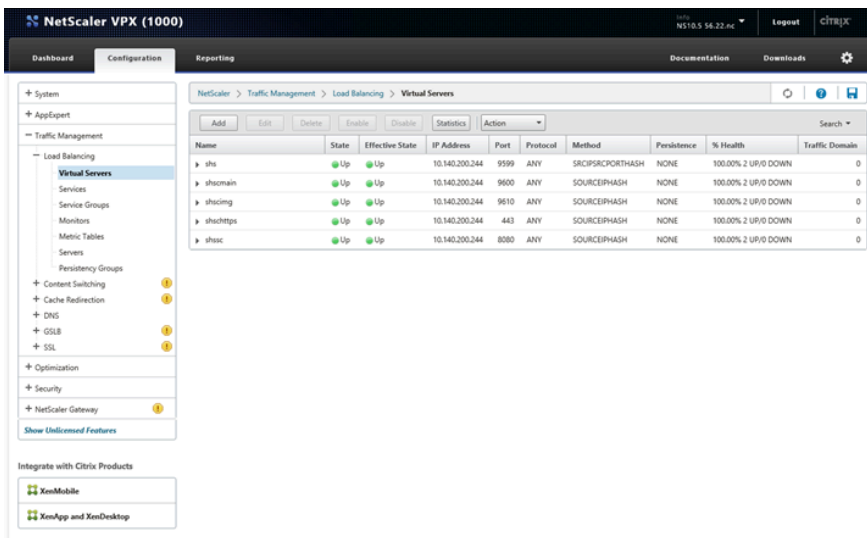
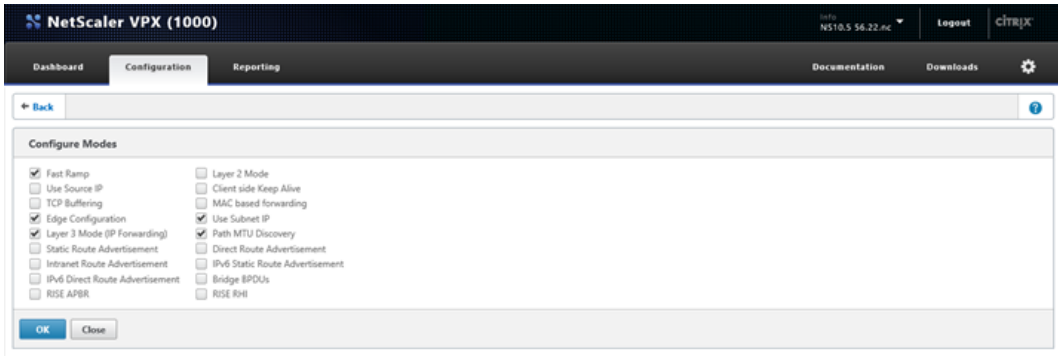
Reference setup of Citrix Netscaler with policy-based routing

The basic feature / mode ShareScan requires from a load balancer:

- TCP requests (including HTTPS request) reaching the ShareScan server nodes behind the load balancer must preserve the source IP address of the client initiating the request.
- TCP connections must be persisted on a client IP basis. (This means that until the number of ShareScan server nodes is the same, TCP connections from a given client should go to a certain ShareScan server node – this method is called SOURCEIPHASH in the Netscaler terminology.) It is not a requirement that the “Persistence” feature of NetScaler or any other load balancer should be used.

The following sample screens indicate the settings used in the reference environment:

(These settings are about the service called ‘shshttps’ on port 443, and this is enough to be used for a web based – like HP - device when the secure communication is enabled, but the other services on other ports have the same settings.) For the complete port list necessary to configure for a particular device vendor, consult the particular device vendor *Tungsten eCopy ShareScan Installation Guide*.



NetScaler > Traffic Management > Load Balancing > Services > Services

Name	State	IP Address/Domain Name	Port	Protocol	Max Clients	Max Requests	Cache Type	Traffic Domain
nlbtest	Up	172.16.0.247	9599	ANY	0	0	SERVER	0
nlbtest2	Up	172.16.0.248	9599	ANY	0	0	SERVER	0
nlbmain	Up	172.16.0.247	9600	ANY	0	0	SERVER	0
nlbmain2	Up	172.16.0.248	9600	ANY	0	0	SERVER	0
nlbimg	Up	172.16.0.247	9610	ANY	0	0	SERVER	0
nlbimg2	Up	172.16.0.248	9610	ANY	0	0	SERVER	0
nlbhttps	Up	172.16.0.247	443	ANY	0	0	SERVER	0
nlbhttps2	Up	172.16.0.248	443	ANY	0	0	SERVER	0
nlbhttp	Up	172.16.0.247	8080	ANY	0	0	SERVER	0
nlbhttp2	Up	172.16.0.248	8080	ANY	0	0	SERVER	0

Load Balancing Service

Service Name: nlbhttps
 Server Name: 172.16.0.247
 IP Address: 172.16.0.247
 Server State: Up
 Protocol: ANY
 Port: 443

Traffic Domain: 0
 Number of Active Connections: 0
 Hash ID: -
 Server ID: None
 Cache Type: SERVER
 Cacheable: NO
 Health Monitoring: YES
 AppFlow Logging: ENABLED

Thresholds & Timeouts

Maximum Bandwidth (Kbps): 0
 Monitor Threshold: 0
 Max Requests: 0
 Max Clients: 0

Client Idle Time-out: 120
 Server Idle Time-out: 120

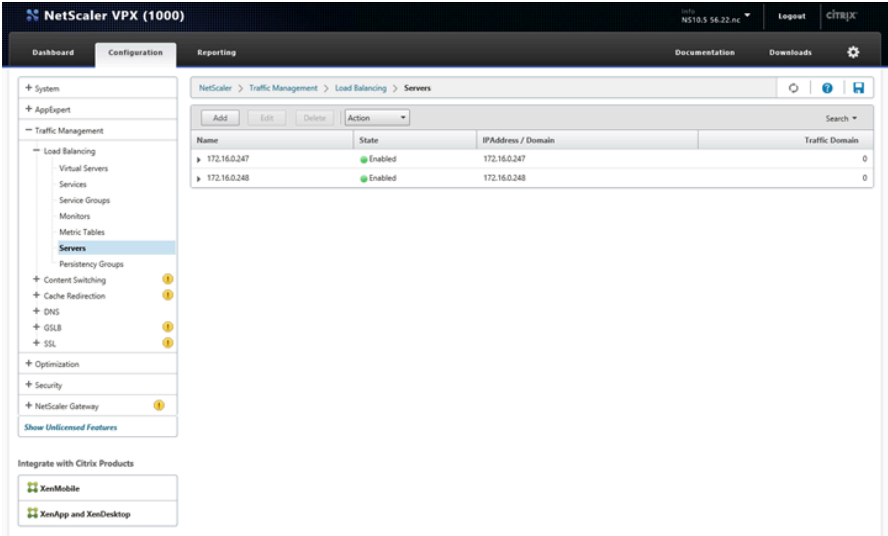
Settings

Secure Connect: OFF
 Surge Protection: OFF
 Use Proxy Port: NO
 Down State Flush: ENABLED
 Access Down: NO

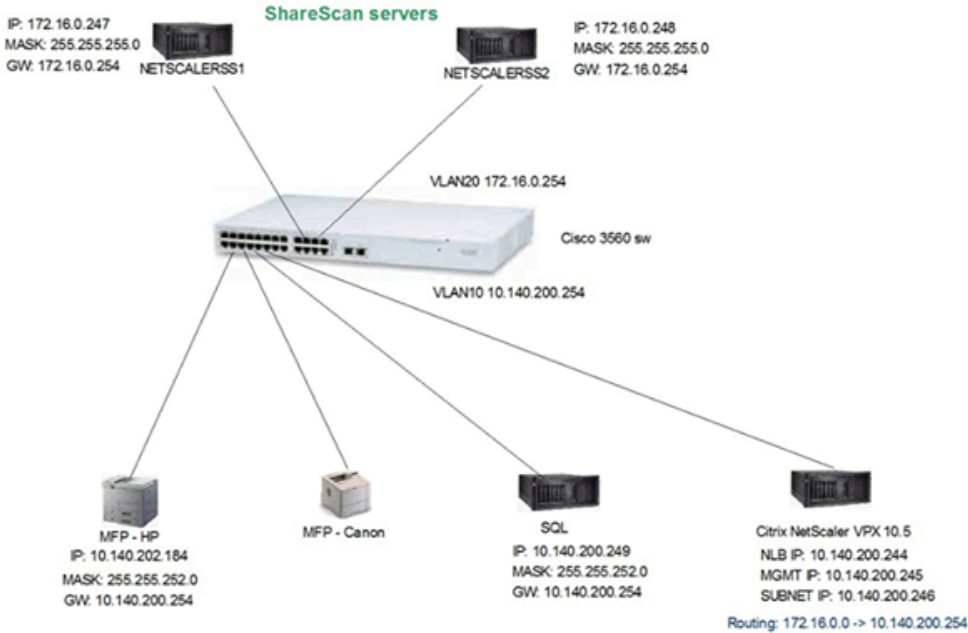
Use Source IP: YES
 Client Keep-Alive: NO
 TCP Buffering: NO
 Client IP: DISABLED
 Header: Client-IP

Monitors

1 Service to Load Balancing Monitor Binding



Load balancing with Citrix NetScaler (ADC) VPX Policy based routing network topology



Failure trigger events

MS NLB detects the hardware, OS, and network level issues basically by sending and checking internal network messages to the cluster nodes (so-called heartbeat messages). In case of not receiving the proper messages, it brings the failing node offline (Stopped state).

Hardware load balancer systems are able to detect the network issues and often able to perform basic level check, such as opening a port on the monitored server or sending a test request and check the response.

The Capture Server Monitor (if installed) performs a basic level functional check of the ShareScan Manager Service, by executing simple simulated scanning and document creation workflow and storing the result document in a local folder.

It is not able to detect any issues with the following:

- Session Logon Service (for example, domain controlled or AD problem)
- Cost Recovery or ID services
- Any issues with connecting backend systems (for example, a document management backend or Exchange server being down)

System failure operation

When the system fails on a node, another node takes over its role. The failed node does not automatically return to the cluster, but the administrator must manually set it back online in the administrative tool of the network load balancer.

Detection of the failure can happen by:

- The network load balancer system itself (network errors, in case of MS NLB, sever OS level errors)
- If the load balancer has some monitoring features, it can detect if a service behind a port is not responding properly
- CSM, as it is able to perform basic level ShareScan functional test. If ShareScan services are not responding in a timely manner or errors are detected, this triggers the failure event.

Failure symptoms

Failure symptoms on the device connected to a server that has a problem include:

- Stopped scanning
- Device screen refreshed to Main screen
- Device screen refreshed to the Session Logon Screen (if SSO is enabled)
- Displaying ShareScan error messages
- Displaying a Connection Error or Communication Error screen

Any error messages that appear need to be acknowledged by clicking the **Connect** button, which causes a device to reconnect to a properly working server node.

Successful reconnection can be completed if the failing node is detected and brought offline by the Capture Server Monitor (if installed) or by the network load balancer.

This detection process may take some time (from 10 seconds to several minutes), so repeated clicks on the **Connect** button may be necessary.

Occasionally, all data processed on the particular server regarding the currently processed job may be lost, depending on workflow phase where the failure happened.

If Cost Recovery or ID Services integration is also in place, a system failure may trigger an automatic logoff and a repeated login process and workflow restart may be necessary.

Functional advantages

- Even distribution of the MFP devices across multiple managers, providing static load balancing
- Single Administration Console to manage the whole fleet connected to the cluster, no need to maintain several Managers separately
- Capture server monitor installation and configuration inside / outside the cluster
- Convergence time insured by NLB driver to complete ongoing jobs


Configuration checklist

The following high availability function requirements must be fulfilled for proper operation:

1. An installed and configured NLB Cluster.
2. An installed and configured ShareScan in cluster mode.
3. **Recommended:** An installed and configured Capture Server Monitor to ensure that the whole ShareScan server is verified periodically, and with at least one CSM Agent outside the cluster.

System requirements

At least two server machines with supported server operating systems (same version on all nodes) with MSNLB Cluster support.

 High availability functionalities do not work if the server operating systems are hosted in VMware Workstation.

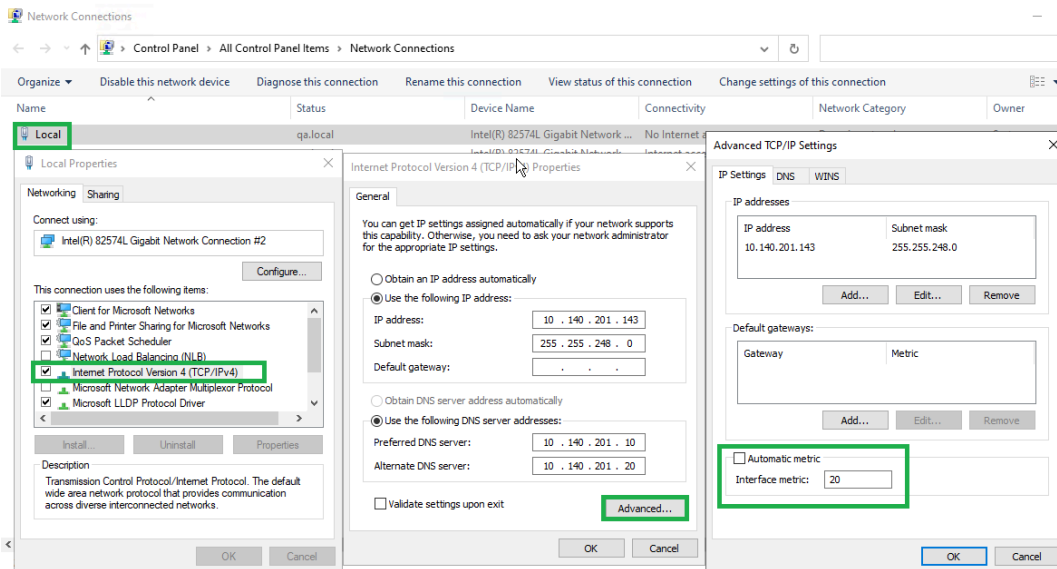
When MS NLB is used:

- Two Network Interface Cards - unicast/multicast mode (multicast is the preferred protocol); single NIC is not supported.
- IPv4 is supported only (IPv6 is recommended to be disabled on all network adapters used for the cluster) QoS is recommended to be disabled on all network adapters used for the cluster purposes.
- MSNLB Cluster driver must be installed over the network adapter driver (that is, the MSNLB Cluster feature must be enabled in the Windows Server OS).

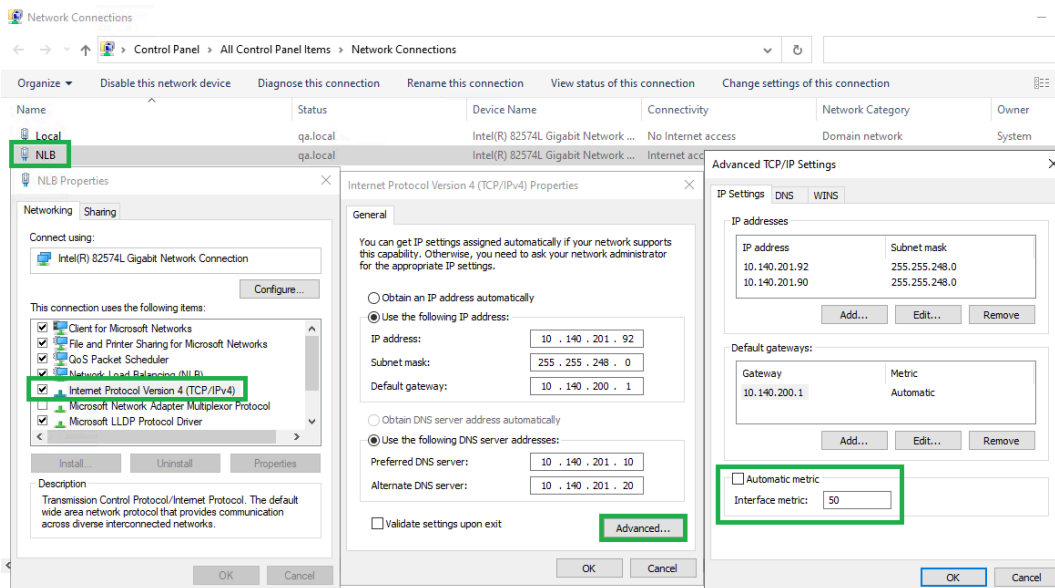
- MSNLB Cluster can be configured by Network Load Balancing Manager tool that is part of the Windows server OS.
- When the Capture Server Monitor is installed onto a cluster node, additional static IP addresses will be necessary on the NIC used for non-cluster purposes (2nd NIC). For details, see the Capture Server Monitor Configuration Guide.
- After the MSNLB Cluster setup is ready, the IP / name of the cluster shall be added to the DNS as well.
- Having a proper DNS entry for the fixed IPs of the nodes used on the NIC which is used for the cluster.

The following interface metric values must be specified in Microsoft Windows NLB server environments:

NON-NLB – 'LOCAL' connection: Interface metric=20



NLB – 'NLB' connection: Interface metric=50



- Changing MSNLB Cluster properties may cause unexpected results and full system unavailability. In case of any change, make sure the new settings are supported, and in case of unexpected behavior the original values can be reset. Some of the cluster setting changes may take effect only after some minutes of delay.
- Make sure you add the cluster IP or name to the DNS after the cluster configuration, as it may cause issues in the process. Registering the cluster by its name to DNS is optional, because ShareScan uses only the IP address of the cluster.

ShareScan requirements

The same ShareScan version must be installed on all nodes.

Centralized common SQL database residing on a server which is not functioning as a ShareScan Manager node in the cluster. For information on supported SQL database versions, see the *eCopy ShareScan Installation Guide* or *eCopy ShareScan Technical Specifications*.



- It is recommended to have a SQL cluster instead of a single SQL server, as a single SQL server would be a single point of failure. For full system high availability, a SQL cluster is required (but it is not enforced by ShareScan; for testing purposes a single SQL server is appropriate). ShareScan is able to support MS SQL clusters, with no limitation.
- Parallel editing of Administration Console data from several Manager computers connecting to the same database is not recommended. Since all the configuration settings are stored for the 'virtual server' represented by the cluster IP (and cluster host name) all the Administration Consoles (on the distinct server nodes) manage the same settings. Therefore, there is no point to manage the settings from multiple Administration Consoles.

Capture server monitor requirements

For details, see the *Capture Server Monitor Configuration Guide*.

Network environment recommendations (in case of MS NLB)

The network switch the cluster nodes directly connect to should be able to handle the amount of network traffic caused by the image transfer between the MFPs and the cluster nodes.

If the number of cluster nodes is higher and the MFPs are used intensively (concurrently), a proper network system design is recommended to avoid packet flooding (or switch flooding). Depending on the selected NLB setup, packet flooding can be avoided by:

- Adding a network hub between the switch port and the NLB server nodes (when Unicast mode is used)
- In case of Multicast (preferred), different network devices or vendors have specific recommendations to configure their devices properly for this type of usage.

In any case, consult the network switch documentation and the vendor's recommendations for the Microsoft NLB setup.



- On the actual switch it may be necessary to enable Multicast mode. Consult your network device documentation and involve the network administrator of your system in the planning of the cluster deployment.
- High availability for Fujifilm devices is only supported with Unicast enabled.

General recommendations to support high availability

For a high availability implementation, a fully set up and configured MS SQL cluster environment is recommended.

In Windows Service Control Manager, you can enable different actions for the ShareScan Manager and ShareScan Agent service (On the **Recovery** tab of the dialog opening when you right-click the service and select **Properties**). While unexpected service stoppage is not a probable scenario, it is recommended to enable the automatic service restart in case of a failure with a 1 minute delay since the services are highly fault-tolerant.

In concordance with your system policy, you may decide also to use the **Run a program** option of the **Recovery** tab (for example, to send a notification email or to perform other action).

Benefits of an eCopy ShareScan high availability deployment

Deploying eCopy ShareScan with a high availability has a number of advantageous functions:

- In case of failure, no immediate manual intervention is needed; failing servers are automatically put offline
- With the CSM installed:
 - Automatic notification of server failure
 - Possibility of integration with system management software (via action command scripts) features become available as well.

i The high availability setup in a NLB environment does not ensure that the jobs being processed at the time of the failure will be recovered and finished after the successful failover. However, scanned files are preserved for these incomplete jobs to prevent data loss, and can be accessed via the Job Monitor web application.

Chapter 3

Deployment overview

The following chapter contains information on the various tasks associated with installing ShareScan.

MFP fleet

Before you start, ensure that MFP devices in your fleet are supported by ShareScan.

Ensure that your MFP fleet is ready for an ShareScan deployment. Determine what device vendors are represented in your fleet and consult the *eCopy ShareScan Pre-Installation Checklist*. Depending on your models, a Device Configuration Guide may also be available to help you prepare your MFPs for working with ShareScan.


Server setup

MSNLB cluster setup for high availability

1. Ensure that you have the eCopy ShareScan installer ready with the proper licenses.
2. Have at least two physically different computers ready for a ShareScan installation in a standard MSNLB Cluster environment with unique, fixed IP addresses. These machines (your dedicated ShareScan Manager Computers) must meet the following requirements:
 - ShareScan deployment / system requirements, since they make up the nodes in your cluster.
 - MSNLB Cluster Computer requirements (<http://technet.microsoft.com/en-us/library/hh831698.aspx>).

i For more information on clusters, see the relevant Microsoft resources and guidance: <http://technet.microsoft.com/en-us/library/cc770558.aspx>. For information on ShareScan system requirements, see either the *eCopy ShareScan Pre-Installation Checklist* or the *eCopy ShareScan Installation Guide*.

i If the virtual server nodes of the cluster reside on the same physical host (VMWare or Hyper-V) the setup is possible and the system will be operational. However, in case of a hardware failure it may happen that all nodes hosted on the same hardware stop, resulting in an inoperable system. For that reason it is recommended to have nodes at least on two physical hardware.

3. Have a failover-capable Microsoft SQL cluster (recommended) ready to provide the database for your ShareScan installation (a single SQL server instance with proper backup can be sufficient for disaster recovery solutions, but for a hot failover solution you may need a SQL cluster with at least 2 nodes).
 4. Ensure that the MSNLB Cluster server feature is installed on all would-be nodes (servers). (This is an essential part of the supported Windows Server versions.)
 5. Set up your cluster in a standard way using the MSNLB Cluster server feature. Consult the MSNLB Cluster product documentation on how to do this: <http://technet.microsoft.com/en-us/library/cc732149.aspx>.
 6. **Recommended:** Use the ShareScan Troubleshooter Tool to run a pre-installation check on all (would-be) Manager Computers.
 7. Install eCopy ShareScan on each server.
 8. After a successful installation, you have to specify three registry settings for eCopy ShareScan on each node to work in cluster mode:
 - Create a new 'ClusterName' string value under the HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan\ShareScan Manager registry hive, and specify the Fully Qualified Domain Name (FQDN) of the cluster (eg. eCopyNLB.MyDomain.local). This must be the same on each node.
 - Change the 'ManagerIP' registry value under the HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan registry hive to common IP address of the cluster: 10.145.100.200. This must be the same on each node.
 - Create a new 'ClusterNodeIP' string value under the HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan registry hive, and specify the IP address of the node (eg. 10.145.100.201). This must be different on each node.
 9. Recommended: Configure the AutoRestartOffsetMinutes registry setting with different values on all nodes to facilitate non-simultaneous ShareScan Manager restarts. The setting defines a time interval in minutes that determines the time offset of the automatic ShareScan Manager restart relative to the "Auto restart ShareScan Manager" timer setting.
 - Key name: HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan\ShareScanManager
 - Value name: AutoRestartOffsetMinutes
 - Type: string
 - Possible values: integer numbers with "+" or "-" prefix. "+" can be omitted.
If the calculated restart time is not on the same day as defined by the "Auto restart ShareScan Manager" timer setting, then the value is ignored.
- 
 - In order for ShareScan to observe the changed values of the "AutoRestartOffsetMinutes" registry setting or the "Auto restart ShareScan Manager" timer setting, the ShareScan Agent service must be restarted on each node after modifying one of these settings.
 - If "Auto restart ShareScan Manager" setting is set with "Every <name of weekday>" frequency, the first restart happens only after the first elapsed Sunday.
10. Click **Finish** when the Install Shield Wizard Completed screen appears.

Hints

To change cluster IP (in MS NLB), the recommended process is the following:

1. Delete all the devices from ShareScan.
2. Stop all ShareScan related services.
3. Change the IP in the MS NLB Manager, and in the ManagerIP registry setting.
4. Without starting any of the ShareScan services, start the Administration Console, and confirm that there was an IP change.
5. Perform the necessary modifications in the network device (switch) configurations, if needed.
6. Re-add the devices to ShareScan.

As the process is complex, we recommend performing a fleet deployment only if the cluster IP is decided and considered to be final.

NLB environment setup when using a hardware load balancer

Consult the installation and configuration guide of your hardware load balancer and check the basic features that ShareScan requires from a load balancer in this guide.

Upgrade eCopy ShareScan in a high availability environment

If you want to upgrade eCopy ShareScan in a high availability environment without any down time, follow these directions:

1. Step 1
 - Choose a time period when the ShareScan system is not heavily loaded.
 - Use the node drain stop (or equivalent) option in the NLB manager tool to take the selected node offline.
 - Make sure that all jobs are successfully completed (by using the ShareScan Job Monitor web application).
 - Stop all ShareScan services.
 - Upgrade via the Copy current catalog to perform the upgrade on the following one: option of the installer on the current node and specify a name for the new ShareScan database (for example, eCopyShareScan_).
 - Test functionality with the local simulator.
 - Do not bring the node in the NLB Manager tool online/active.
2. Step 2
 - Use the node drain stop (or equivalent) option in the NLB Manager tool to take the selected node offline.
 - Make sure that all jobs are successfully completed (by using the ShareScan Job Monitor web application).
 - Stop all ShareScan services.

- Upgrade via the Use a different existing ShareScan catalog option of the installer on the current node and select the catalog name specified during the upgrade of the first node (from the step 1).
- Test functionality with the local simulator.
- Do not bring the node in the MS NLB Manager tool online/active.

Repeat Step 2 on the remaining nodes until half of the nodes are upgraded to this ShareScan version.

If the first half of the nodes are upgraded, the old nodes (still on an earlier ShareScan version) should be stopped via node drain stop (in MS NLB Manager tool). When all earlier ShareScan version nodes are in drainstop/stopped state, turn on the nodes, making sure that each of them works without any issues.

HTTPS communication on web-based devices

For successful HTTPS communication on web-based devices, a self-signed server certificate must be generated, exported, and imported on all other nodes.

Creating self-signed server certificates

Since ShareScan uses a self-signed server certificate based on the IP address of the server and this certificate is of an unknown Certification Authority, certain vendor MFPs may display warning messages after an SSL Communication is initiated. To avoid these messages, create a self-signed certificate based on the Fully Qualified Domain Name (FQDN) of the server and install it as a root certificate on the MFP device.

Certificate Manager

The Certificate Manager is an add-on tool for eCopy ShareScan, which allows you to manage the certificates required by some web-based devices.

The Certificate Manager tool is installed in the Tools folder of the ShareScan installation (%programfiles(x86)%\Tungsten\ShareScan\Server\Tools when using the default installation path), and can be launched by double-clicking on the CertificateManager.exe file.

When started, the Certificate Manager displays the following buttons in its window; depending on your configuration, the first option (Configure Tomcat server.xml may not be available):

- **Configure Tomcat server.xml:** This option allows you to customize the cryptographic protocols and ciphers used by ShareScan on a port-by-port basis via editing the server.xml file used by the Tomcat component of eCopy ShareScan. Clicking this button displays a new window, listing all ports currently used by eCopy ShareScan, and the cryptographic protocols assigned for the specific port, if that port uses SSL or TLS. You can use the server.xml item in the top-left corner to create a backup of the server.xml file you are using, or you can load a previously saved server.xml.

To modify the protocols and ciphers assigned to a port, do the following:

1. Click on the port whose properties you want to modify.

2. Click the **Edit** button on the upper-right part of the window. A new screen is displayed, showing the currently used protocols and ciphers.
 3. Under Enabled protocols, select the cryptographic protocols you want to use.
 4. Under Enabled Ciphers, select the ciphers you want to use. For ease of use, a number of filter options are included with the tool, and can be accessed via button push (for example, Remove weak ciphers, Select Java 6 ciphers, Remove ciphers using CBC encoding, and so forth).
 5. Click **OK** to save the changes.
- **Re-generate certificate:** This option allows you to recreate your digital certificate. To create the certificate, you have to enter either the IP address (Discover IP button) or Fully Qualified Domain Name (Discover FQDN button) to the displayed field under Certificate Common Name, and to select the signing algorithm from the Algorithm list (SHA256 or SHA1), and then click the **Generate** button on the lower-right part of the window.
 - **Backup certificate:** Click this button to create a backup of your existing certificate. A Browse window is displayed, where you can select the location and filename of the certificate to be saved. Back up your certificates if you have imported your certificates manually to your Konica Minolta devices (to prevent the warning from popping up), and do not want to repeat the process. Also, the recommended workflow when upgrading from an earlier ShareScan version is to back up your certificate, perform the upgrade of ShareScan, then restore the certificate.
 - **Restore certificate:** Click this button to restore a certificate. A Browse window is displayed, where you can locate the certificate to be restored.

Create HTTPS certificates for your high availability setup

1. Perform the following steps on one of the ShareScan nodes:
 - a. Use the **Re-Generate Certificate** option of the Certificate Manager tool. Use the MS NLB cluster IP or the FQDN that is registered in the DNS for the cluster.
 - b. Use the **Backup certificate** option to save the newly created certificate.
 - c. Restart the Apache Tomcat service.
 - d. Copy the created backup file to all the other ShareScan nodes or to a shared network folder accessible from all the other nodes.
2. Perform the following steps on the remaining ShareScan nodes:
 - a. Use the **Restore certificate** feature of the Certificate Manager tool.
 - b. Restart the Apache Tomcat service.
3. With these steps, the same certificate will be installed on all ShareScan nodes.

Generate a certificate and install it under Tomcat

1. Generate your Certification Authority (CA):
 - Create a 2048-bit key to be used when creating your CA.
 - In a command prompt, type `openssl genrsa -des3 -out ca.key 2048`

```
C:\OpenSSL-Win32\bin>openssl genrsa -des3 -out ca.key 2048
Generating RSA private key, 2048 bit long modulus
.....+++
.....+++
e is 65537 (0x10001)
Enter pass phrase for ca.key:
```

- Supply a pass phrase for ca.key. The pass phrase is requested whenever you use the CA certificate.
- This creates a file called ca.key, containing your certificate authority private key.
- Create the CA certificate request.
 - In a command prompt, type `openssl req -new -x509 -days 4000 -key ca.key -out ca.cer`

```
C:\OpenSSL-Win32\bin>openssl req -new -x509 -days 4000 -key cert/ca.key -out cert/ca.cer
Enter pass phrase for cert/ca.key:
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name <2 letter code> [AU]:_
```

- Enter the pass phrase you used in the previous step. Also, you are prompted to complete certain fields, for example, country and locality name. Ensure that you complete the Common Name field, which must be an FQDN (Fully Qualified Domain Name).
 - The output CA certificate is generated in the ca.cer file.
2. Generate a Server Certificate:


- Create a 2048-bit key to be used when creating server (Tomcat) certificate.
- In a command prompt, type `openssl genrsa -des3 -out server.key 2048`

```
C:\OpenSSL-Win32\bin>openssl genrsa -des3 -out cert/server.key 2048
Generating RSA private key, 2048 bit long modulus
.....+++
.....+++
e is 65537 (0x10001)
```

- Supply a pass phrase. The pass phrase is requested whenever you use this certificate so make sure you remember it.
- This creates a file called server.key containing your server private key.
- Create the server certificate request.
 - In a command prompt, type `openssl req -extensions ssl_server -new -key server.key -extensions usr_cert -out server.csr`

```
C:\OpenSSL-Win32\bin>openssl req -extensions ssl_server -new -key cert/server.key -extensions usr_cert -out cert/server.csr
Enter pass phrase for cert/server.key:
```

- Enter the pass phrase for the server.key that you used in step 1.

-  The Common Name must match the FQDN/IP of the web server.
 - This openssl command creates the server certificate request server.csr
 - Sign the certificate signing request with the self-created certificate authority that you made earlier.
 - In a command prompt, type `openssl x509 -req -startdate -days 365 -in server.csr -CA ca.cer -CAkey ca.key -extensions usr_cert -out server.crt -CAcreateserial -CAserial ca.srl`

```
C:\OpenSSL-Win32\bin>openssl x509 -req -startdate -days 365 -in cert\server.csr
-CA cert\ca.cer -CAkey cert\ca.key -extensions usr_cert -out cert\server.crt -CA
createserial -CAserial cert\ca.srl
```

 - Enter the pass phrase for ca.key that you used in step 1.
 - This creates the server certificate server.crt.
 - The first time you use your CA to sign a certificate, you can use the -CAcreateserial option. This option creates a file (ca.srl) containing a serial number. You are probably going to create more certificates, and the next time you will have to do that use the -CAserial option (and no more -CAcreateserial) followed by the name of the file containing your serial number. This file is incremented each time you sign a new certificate. This serial number will be readable using a browser (once the certificate is imported to a pkcs12 format). And we can have an idea of the number of certificate created by a CA.
 - Important:** By using the -startdate parameter, you are signing the certificate against the current date and time. Make sure that your environment has the correct date, time, and timezone setup.
 - Generate a .PFX file / PKCS#12 certificate.
 - In a command prompt, type `openssl pkcs12 -export -in server.crt -inkey server.key -certfile ca.cer -name FQDN/IP defined in the server Common Name field -out serverCert.pfx`

```
C:\OpenSSL-Win32\bin>openssl pkcs12 -export -in cert\server.crt -inkey cert\serv
er.key -certfile cert\ca.cer -name 10.140.26.200 -out cert\serverCert.pfx
Enter pass phrase for cert\server.key:
Enter Export Password:
Verifying - Enter Export Password:
```

 - Enter enter the pass phrase for server.key that you used in step 1.
 - Enter an export password.
 - This creates the serverCert.pfx file.
- 3. Install the Server Certificate in Tomcat:**
- Copy the serverCert.pfx under Tomcat9\conf directory.
 - Convert pfx file to jks file.

In a command prompt, type `keytool -importkeystore -srckeystore serverCert.pfx -srcstoretype pkcs12 -destkeystore eCopy.key -deststoretype JKS`

```
c:\Program Files (x86)\Tungsten\Tomcat9\conf>keytool -importkeystore -srckeystore serverCert.pfx  
-srcstoretype pkcs12 -destkeystore eCopy.key -deststoretype JKS
```

- Create a certificate.
 - In a command prompt, type `keytool -export -alias <the Common Name used in 2.b> -keystore eCopy.key -file "..\webapps\ROOT\eCopy.cer"`

```
c:\Program Files (x86)\Tungsten\Tomcat9\conf>keytool -export -alias <the Common Name used in 2.b>  
-keystore eCopy.key -file "..\webapps\ROOT\eCopy.cer"
```

- Then type `keytool -export -alias <the Common Name used in 2.b> -keystore eCopy.key -file "..\webapps\ROOT\eCopy.der"`
- Finally type `keytool -export -alias <the Common Name used in 2.b> -keystore eCopy.key -rfc -file "..\webapps\ROOT\eCopy.pem"`

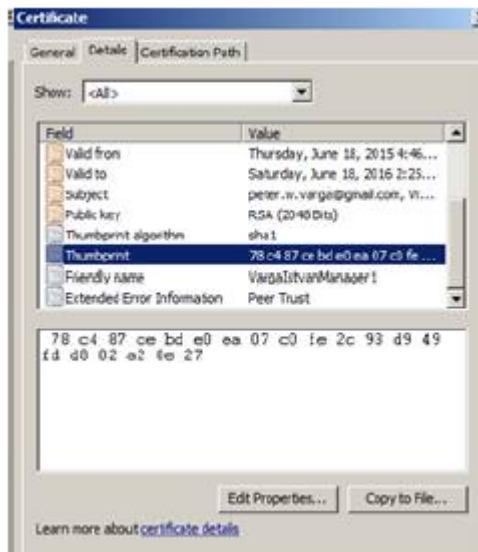
Install the certificate on the ShareScan Manager computer

Verify that you have completed the following prerequisites:

- Certificate for ShareScan manager computer.
- CA certificate.
- Server certificate file (Manager-hostname.p12) – and password for accessing the private key.
- WinHTTP Certificate config tool installer, winhttpcertcfg.msi, downloadable from Microsoft.
- winhttpcertcfg.msi
- <https://www.microsoft.com/en-us/download/details.aspx?id=19801>.

1. Install the ShareScan Manager certificate on the ShareScan Manager computer:
 - a. Start MMC.
 - b. Select **File > Add/Remove snap-in** .
 - c. Select **Certificates**, then press **Add**.
 - d. On the **Certificates snap-in** panel, select **Computer account**.
 - e. On **Select Computer** panel, select **Local computer: (the computer this console is running on)**, then **Finish**.
Import CA certificate
 - f. Select the **Trusted Root Certification Authorities** container.
 - g. Click on the **Certificates** sub-container.
 - h. Right-click on **All tasks > Import** .
 - i. Select **CA certificate**, then click **Next > Next > Finish** .
 - j. Do not change the "Certificate store" = "Trusted Root Certification Authorities".
 - k. Finish adding the certificate and click **OK** on the notification popup.
Import Server certificate file (for example, "managename.qa.local.p12")
 - l. Select the **Trusted People** container.

- m. Right-click on **All tasks > Import**.
 - n. Select the **Server** certificate file.
 - o. Enter the password of the certificate.
 - p. Do not change the "Certificate store" = "Trusted People".
 - q. Finish adding the certificate and click **OK** on the notification popup.
2. Create a registry setting called "SslCertificateThumbprint" for ShareScan, with the certificate's thumbprint. The SslCertificateThumbprint identifies the certificate which the ShareScan manager should use. Obtain server certificate thumbprint.
- a. Using MMC, go to **Trusted People > certificates** container.
 - b. Click on the certificate, which you imported in step 1.
 - c. Select the **Details** tab.
 - d. Click on the **Thumbprint** field.



- e. Copy the Thumbprint value.
 - f. Paste to a text editor and remove all spaces from the thumbprint value (replace all spaces to "nothing").
 - g. Start Regedit.
 - h. Go to HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan\ShareScanManager.
 - i. Create new string value: Name = SslCertificateThumbprint.
 - j. Set Value= Thumbprint_value, without spaces.
3. Grant access right to certificate, for "Network Service" or for the account, which runs the ShareScan Manager service.
- a. Install winhttpcertcfg.msi.

- b.** Open a command prompt as an administrator.
- c.** Go to C:\Program Files (x86)\Windows Resource Kits\Tools\.
- d.** Run the following command: `WinHttpcertCfg.exe -g -c LOCAL_MACHINE \TrustedPeople -s "SS server hostname FQDN" -a "Network Service".` Or if the ShareScan Manager service running account is customized, for example, "Domain \SSManager", then use this account name in the command: `WinHttpcertCfg.exe -g -c LOCAL_MACHINE\TrustedPeople -s "ShareScan-XY-QA.qa.local" -a "Domain \SSManager".`
- e.** Restart ShareScan Manager.

Chapter 4

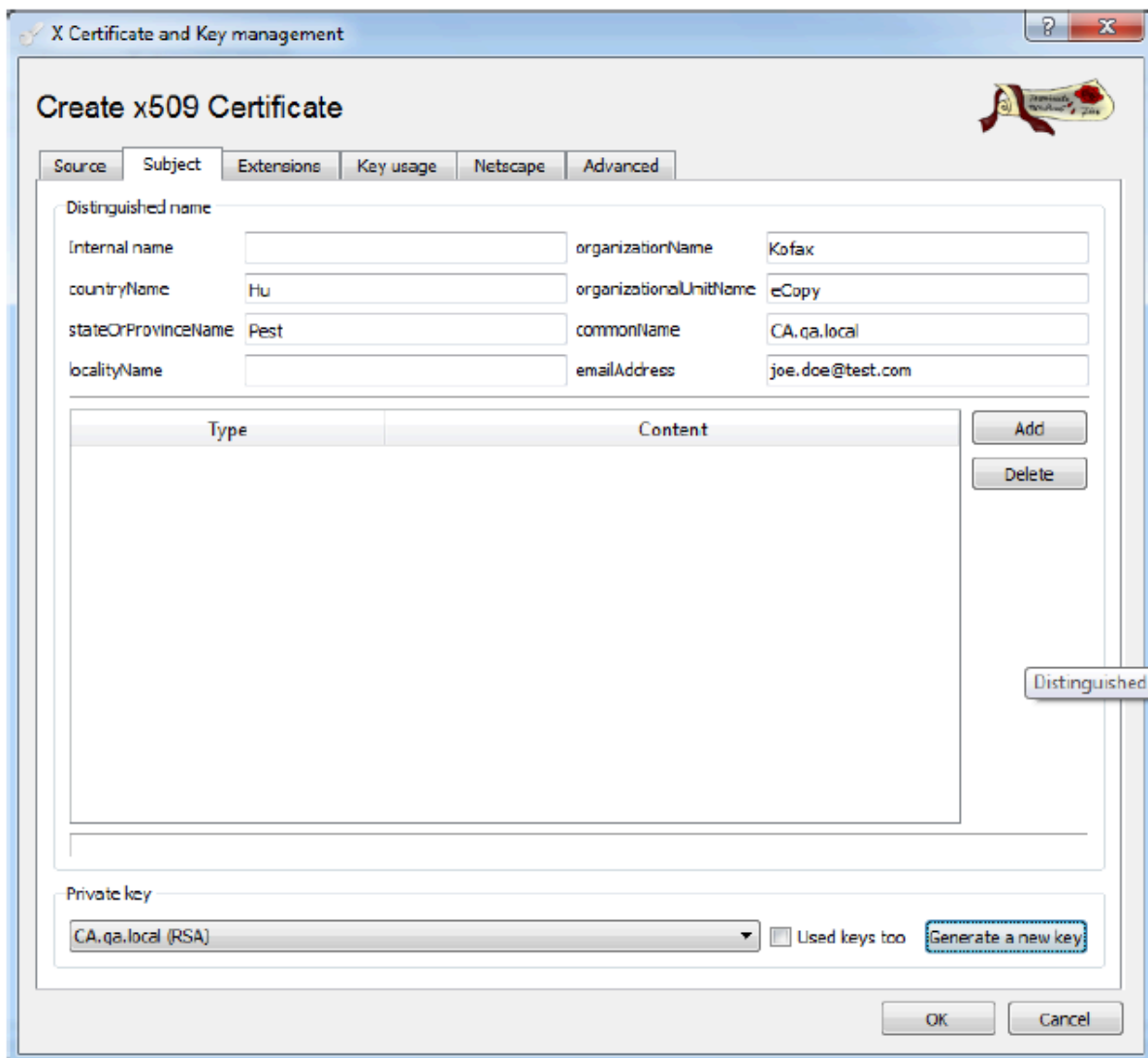
Certificate creation for ShareScan

XCA software installation

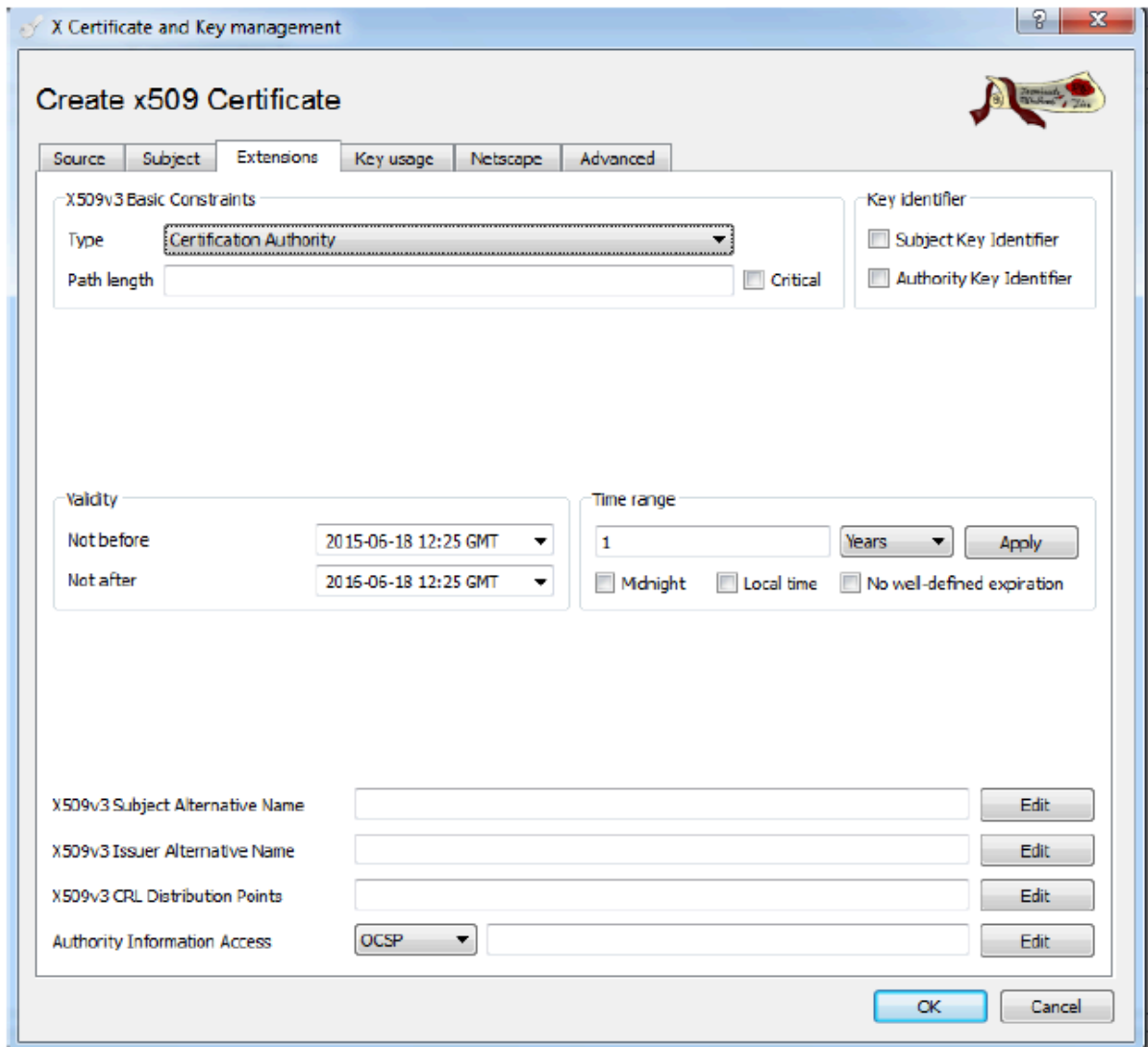
1. Install the XCA software (<http://sourceforge.net/projects/xca/>).
2. Launch XCA.
3. Create a new database.

Create the CA certification

1. Select **Certificates** tab.
2. Select **New certificate**.
3. Fill the following fields.
4. Click the **Generate a New Key** button (RSA, 2048 bit).



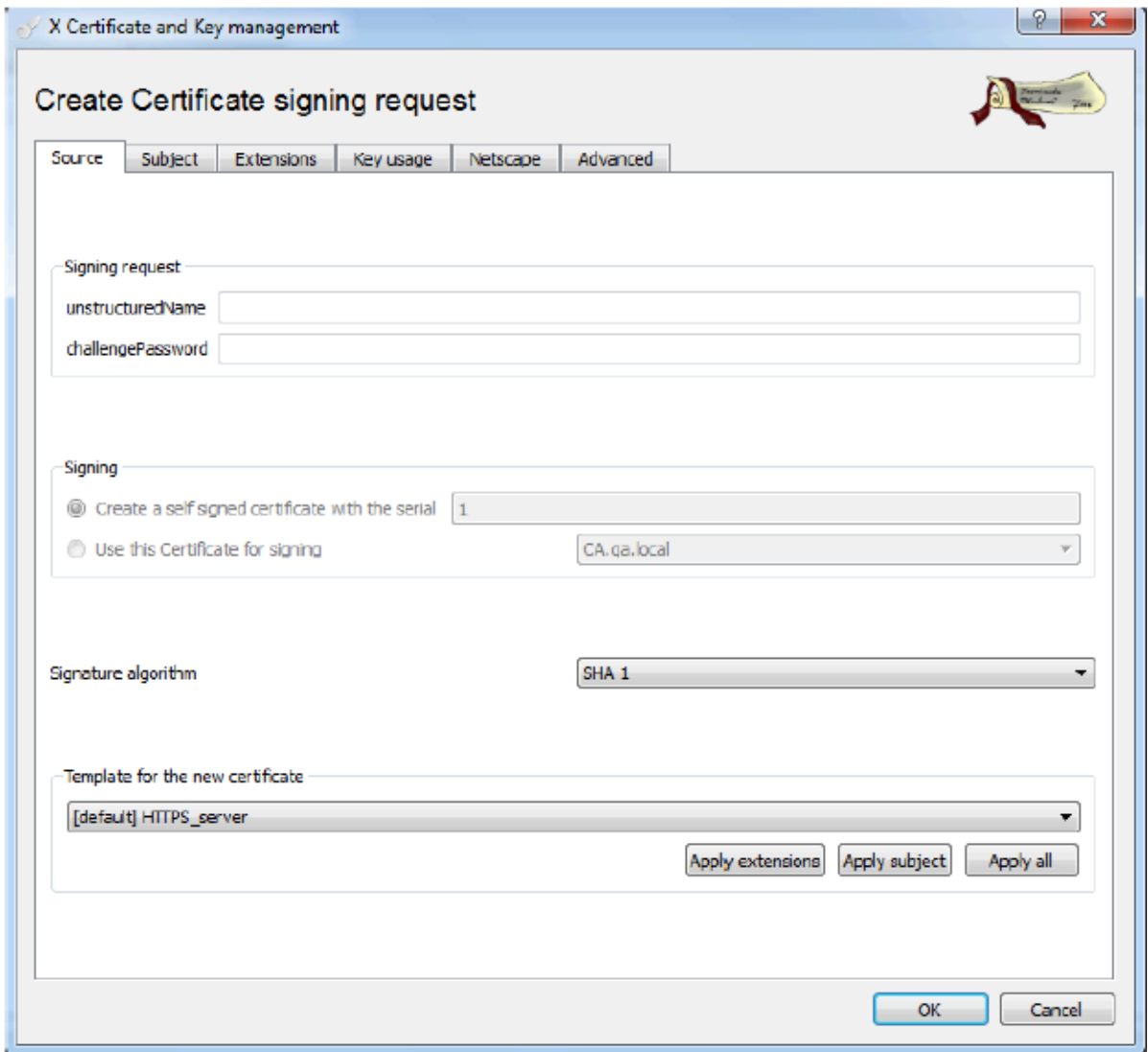
5. Select **Extensions** tab.
6. Select **Certification Authority** as **Type**.



7. Click **OK**.

Create a certificate for the ShareScan Manager

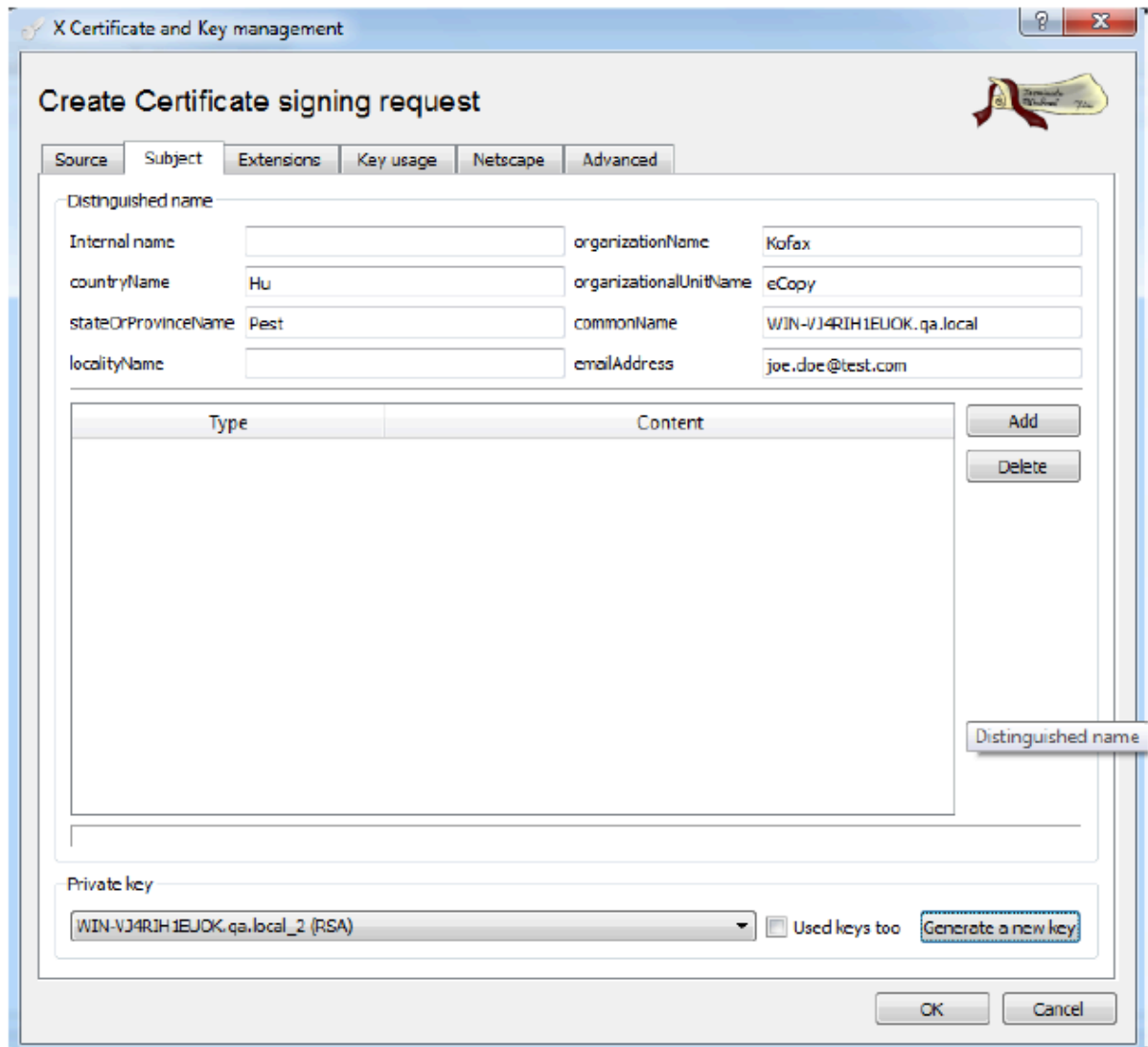
1. Go to the **Certificate signing requests** tab.
2. Click **New Request**.
3. Select **HTTPS_Server** as **Template for the new certificate** on the **Source**.



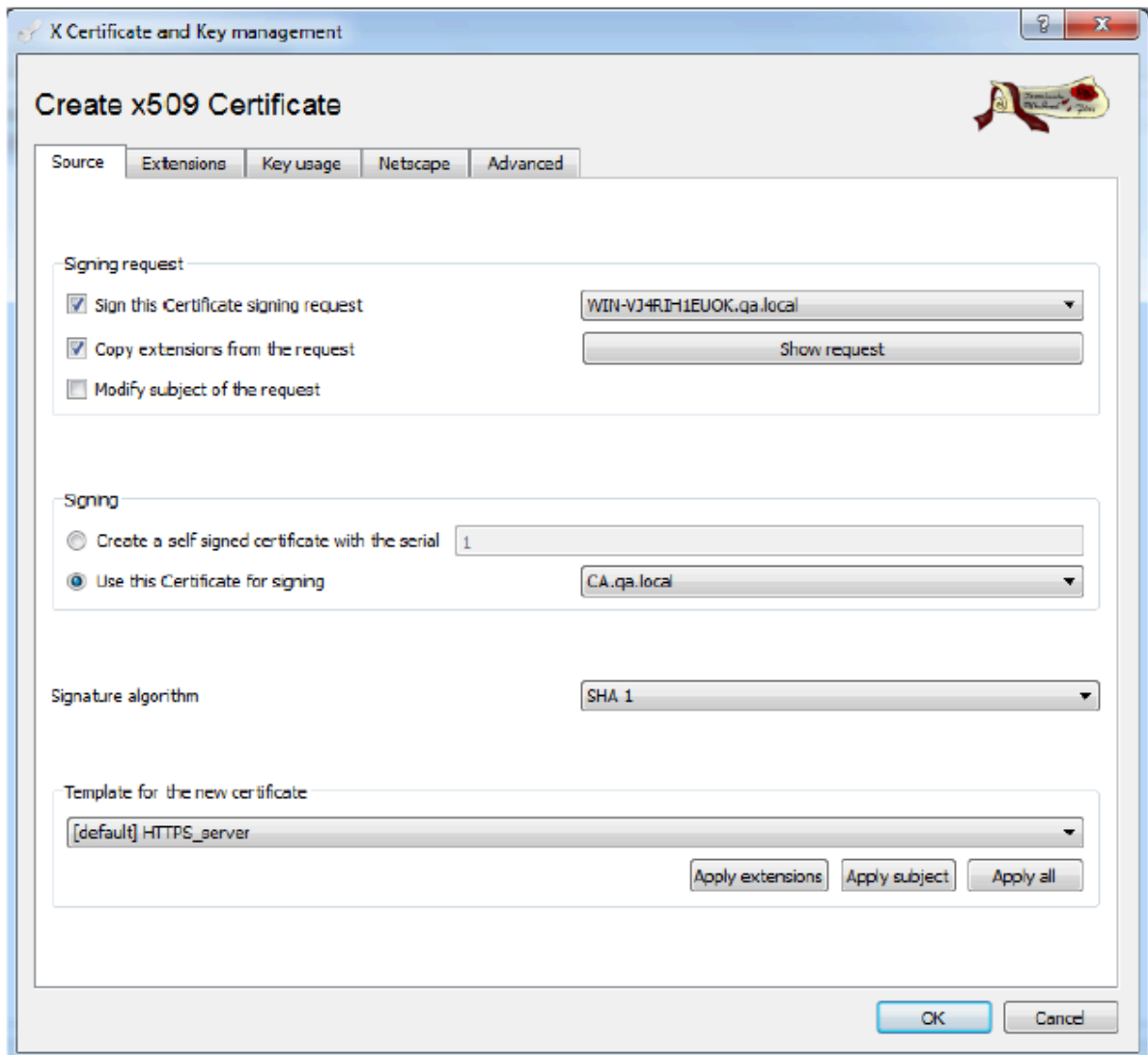
4. Fill the following fields.

! You have to define the computer host name in the commonName field (where the ShareScan manager runs).

5. Click the **Generate a New Key** button (RSA, 2048 bit).



6. Click **OK**.
7. The certificate appears in the **Certification signing request** window.
8. Right-click on that and choose **Sign**.



9. Select **HTTPS_server** Template and select your CA for signing (**Use this Certificate for signing**).
10. Your signed certification will appear in the **Certificates** window as well (Under your CA).

Export a certificate for the ShareScan Manager

1. Go to the **Certifications** tab.
2. Select your certificate for the ShareScan Manager (created in steps 11 – 21).
3. Click **Export**.
4. Select a destination folder and use PKCS #12 export format.
5. Enter a password for using the private key. You will need this password when the certificate is imported to the ShareScan machine.

Export CA

1. Go to the **Certifications** tab again.
2. Select your CA certificate.
3. Click **Export**.
4. Select a destination folder and use DER export format.

Chapter 5

High availability considerations

In case of eCopy ShareScan deployment with a high availability support, hardware and software failures are the two major failure categories.

Hardware failure

Hardware failures prevent the network card from sending heartbeat messages to the cluster. Typical hardware failure scenarios include electric power loss, mainboard or CPU malfunction, memory error and so on. These types of issues are detected by the MSNLB Cluster technology through the loss of network connectivity.

When a node misses five consecutive heartbeat messages, the MSNLB Cluster manager detects the lack of signal and starts a convergence process. During convergence, the MSNLB Cluster re-assigns all connections between the healthy nodes and clients, the same way it happens when a client wants to connect to a node for the first time. The state of all the servers in MSNLB Cluster Configuration Utility is changed to 'Convergence' which means that distribution procedure of devices is started from scratch. This is an automatic process.

When convergence is finished, users can continue working.

To ensure that the operations and workflows happen (on healthy nodes) at the very moment of the convergence process, there is a configurable delay preserving connections. Only after the pre-set delay is configured are the active connections re-arranged. (The setting referred is on the **Port rule** dialog, and the recommended value is 5 minutes.)

Similarly, hardware load balancers are able to detect the basic availability of the server hardware and networking infrastructure by pinging the server and opening TCP connections, as configured in the load balancer (typically these checks are called 'monitoring').

Software failure


Software failures are ShareScan related errors: network load balancers (both MS NLB and hardware load balancers) are unable to detect higher software (ShareScan) level errors, hence the need for the Capture Server Monitor (CSM), which is able to send commands to the MS NLB Cluster and alert the administrator through email.

When using a hardware load balancer, the CSM enables integration with these (to let CSM turn off a server node if necessary) is possible by running a custom command script.

Risk and limitations

eCopy ShareScan has the following limitations:

Folder or Email watch*	Not Supported via Capture Server Monitor
ScanStation**	Not Supported for HA; LB (without HA) is supported on ScanStation
High Availability via NLB clustering	Not supported if Cost Recovery v2 integration is used

 * Watcher workflows are fail-safe by design, if more than one ShareScan Managers are installed and watching the same folder or email inbox. In this setup, jobs are restarted when they are not completed within a preset time window.

** ScanStation is not supported in cluster environment

Chapter 6

Load balancing across multiple ShareScan servers

Document creation and OCR are the most resource-consuming phases in a scanning, document processing and storing workflow.

To ensure the shortest delivery time of the documents, distribution of the document processing tasks on multiple servers is a recommended technique, also called load balancing.

To enable this feature in ShareScan, do the following:

i It is recommended that you install ShareScan in a custom installation mode, specifying custom accounts to run the Manager and the Agent services. If you do so, you can avoid the step 2; you only have to follow the instructions in step 1, and grant full read/write access to these custom (domain) accounts on the shared work folder specified in the ScannedFilesLocation advanced setting (detailed below).

1. Launch the **ShareScan Administration Console** application. For the particular configuration tasks your deployment requires, press F1 in the Console window to access product Help. Should you wish to take advantage of load balancing capabilities, specify the following three advanced settings:
 - a. Select the **Home** tab in the Administration Console and click **Settings** in the **System** group.
 - b. Click **Advanced settings** to open the Advanced ShareScan Settings dialog box.
 - c. Click **OK** in the Warning window and proceed with care.
 - d. Expand the node **Shared manager settings**. Locate the setting **WorkerQueueManagerShareJobs**, and set its value to **TRUE** (if set to **TRUE**, all the Managers running on different servers check the common job queue, stored in the shared database if there is a document to process / OCR. Click **Save and close** and then **OK** on the warning message.
 - e. Collapse this node and expand the one that shows the name and IP address of the Manager. Locate the setting **ScannedFilesLocation** and specify a valid path. Specify a UNC path representing a shared network folder. Mapped drives (with a drive letter) are not possible to use here. All servers in system must have access to this shared folder (Read/Write access for the account running the ShareScan Manager and Agent service). To change the default (local) service accounts to a domain account, see next list item.
 - f. Locate the **OutputCreatorReuseWorkerProcess** setting, which should be set to **False**. You might also want to review or set the **MaxNumberOfOutputCreators** value. Its value can be an integer number to specify how many parallel processes can be used for OCR/document

creation. The scaling and recommended hardware documentation has some proposed values for different configurations. If not specified by this registry setting, the default values are the following (Number of CPU Cores - Number of output creators): 1 - 1, 2 - 2, 4 - 6, 8 - 12.

i Once these three advanced settings are specified, the services (Agent and Manager) must be restarted on all the servers/nodes.

2. Follow these steps only if your installation uses the default NETWORK SERVICE and Local System accounts to run the ShareScan Manager and the ShareScan Agent services. If you have an installation with custom (domain) account to run these services, then see the [Note](#). To run the ShareScan Manager as a non-local (domain) user, you need to:
 - a. Create a domain user with the same privileges as the NETWORK SERVICE built-in account (see the privileges listed in Local Policy Editor, User rights Assignment), such as:
 - Bypass traverse checking
 - Create global objects
 - Impersonate a client after authentication
 - Log on as service
 - b. The account must have full (read/write) access to the network share used as a shared work folder.
 - c. The account must have read access to the local ShareScan installation folder.
 - d. The account must have full control to the ProgramData\Tungsten\ShareScan folder (usually on drive C:\).
 - e. The account must have full control to the registry hive.
 - f. Start the Windows Service Control Manager.
 - g. Stop the ShareScan Manager service and double click the service in the list. On the opening dialog, click on the **Log On** tab.
 - h. Select **This account:** and specify the account name and the corresponding password.
 - i. Click **OK**.
3. If you plan to use Folder or Email watcher features or the Scan To Desktop connector, the service account needs to be changed in the same way as it is described for the ShareScan Manager.
4. Similarly to the change of the account running the Manager Service, you also need to change service account of the ShareScan Agent Service. As this service performs some system-level operations, it requires different privileges than the ShareScan Manager Service. To run the ShareScan Agent as a non-local but domain user you need to:
 - a. Create a domain user with the same privileges as the Local System built-in account (see the privileges listed in Local Policy Editor, User rights Assignment), such as:
 - Generate security audits
 - Bypass traverse checking
 - Create global objects
 - Create page file
 - Create permanent shared objects

- Impersonate a client after authentication
 - Increase scheduling priority
 - Lock pages in memory
 - Act as part of the operating system
 - Log on as service
- b. The account must have full (read/write) access to the network share used as a shared work folder.
 - c. The account must have read access to the local ShareScan installation folder.
 - d. The account must have full control to the `ProgramData\Tungsten\ShareScan` folder (usually on the C:\ drive).
 - e. The account must have full control to the registry hive.
 - f. Start the Windows Service Control Manager.
 - g. Stop the ShareScan Manager service and double click the service in the list. On the opening dialog, click on the **Log On** tab.
 - h. Select **This account:** and specify the account name and the corresponding password.
 - i. Click **OK**.
5. Make sure the service account is changed to the domain account on all server nodes.
 6. Once these two advanced settings are specified and the service accounts are changed to the domain accounts, the ShareScan services (Agent and Manager, and optionally the ShareScan Watcher Service, if you use email or folder watcher functionality) must be restarted on all the servers/nodes.
 7. Pay particular attention to specifying the same ScannedFilesLocation folder for all server nodes in the Advanced Setting editor.
 8. Add devices to managers:
 - If a high availability setup is used, it is recommended to use one Administration Console and then there is only one clustered virtual Manager in the system. Devices can be added to the system in that one Administration Console.
 - If only Document Building/OCR Load Balancing is configured as in [NLB environment setup when using a hardware load balancer](#), then there is no Manager clustering, only separate Managers. This time adding devices to the Managers must happen separately. It is recommended to connect to every Windows Server via Remote Desktop and add the devices in the given Manager Administration Console or use the Remote Management feature of the Administration Console. This Document Building/OCR Load Balancing feature is independent from the high availability setup implemented on the MSNLB Cluster - they can also be used together or any of them can be used on its own.

Chapter 7

Configuration, troubleshooting, and testing

Always complete a successful and working setup before enabling Capture Server Monitor. If a high availability setup is created, make sure that the MS NLB system works properly with ShareScan, for example, when different MFP devices are connected to different server nodes.

i As the MS NLB system uses its own internal algorithm to assign devices to servers, it is not guaranteed that randomly selected two devices connect to different server nodes. However, this algorithm is designed to ensure that in case of a high number of connections (devices), the distribution is close to the even distribution.

To test whether multiple different devices connect to different ShareScan server nodes, the easiest way is to create a ScanToFile connector profile with a local folder destination. This saves the output document into a local folder on the node that handles the actual device connection.

By checking the content of the folders in Windows Explorer on all the nodes, you should see that by using multiple devices, the output documents keep appearing on different servers. Note that a scan initiated on a particular device results in an output document always on the same server until the number of the server nodes changes (server node was taken away because of failure or if a new node is added or a node is added back to the cluster). To perform this test, you have to use as many multiple devices as you can.

1. Enable Capture Server Monitor server only after the proper functionality is tested. Make sure the time windows the Capture Server Monitor uses are specified correctly, as too short windows may result in false alerts or false failure triggers (turning off a node). It is recommended not to enable the high availability mode in the CSM immediately, but only the email alerts. After some time of normal system usage, the CSM settings (testing interval and evaluation window) can be tuned to ensure that no false failure email alerts are sent. Afterwards the high availability mode can be enabled (with evaluation window not shorter than the email alert evaluation window).
2. In you are using the high availability deployment option and integrating with a Cost Recovery server or ID Services server, the cluster IP should be used when you configure the ShareScan server IP in the CR or ID service software.
3. After configuring MS NLB for ShareScan high availability mode:
 - a. Make sure the MS NLB Manager indicates that all the cluster nodes are marked with a green icon
 - b. Use a computer that is on the same subnet as the MFP devices, open a command window, and issue the following commands:
 - `arp -d`
 - `ping cluster IP` (ICMP protocol should be enabled on the computers, networks, and firewalls)

- ping should succeed
 - `arp -a`
- c. Use the ShareScan Troubleshooter tool to test the core MS NLB functionality.

Verify the high availability setups with the ShareScan Troubleshooter

The ShareScan Troubleshooter has the following options to help verify and troubleshoot the high availability setups built on the Microsoft Network Load Balancing infrastructure.

Before testing, make sure the MS NLB and the ShareScan registry settings are set properly, in accordance with the *High Availability and Load Balancing Deployment Guide*.

Full Check

The **Full Check** option (started by the **Start check** button) on the menu bar performs a check to determine if the MS NLB based cluster is configured. The checker adds a last section to the report, with a section named High Availability setup via MS NLB.

If there is an inconsistency or missing item in the configuration settings (ManagerIP, ClusterName and ClusterNodeIP settings in the registry) or if these are not in sync with the actual settings of the Microsoft NLB system or the network adapters, then alert lines in red appear in this section.

MS NLB cluster network test

This test is available in the **Advanced > Network tests** menu, and it is a client-server communication test, to see if MS NLB is set up properly and the requests from the outside of the cluster (the part of the network where the devices exist) are dispatched to one of the server nodes in the cluster. During multiple repeated connection tests, the routing of the individual request should vary sometimes (once the response should arrive from server node X, next time from server node Y, and so on), proving that NLB 'spreads' the requests across the server nodes.



- This test is performed on TCP port 9599, which should be configured with Node affinity: None option in the Port Rule editor of the MS NLB Manager as it is documented in the *High Availability and Load Balancing Deployment Guide*, allowing the new TCP connections to assign to a server node randomly. This mode is not used for the normal ShareScan device-server connections, but for Cost Recovery and Identification services. However, the test is useful to prove the proper configuration of the MS NLB system.
- As mentioned previously, the ShareScan Load Balancing feature does not rely on the load balancing capability of MSNLB (that is, it is able to dispatch the requests to different nodes to enable even load); we use MSNLB only for High Availability. However, to test if MSNLB functions properly, we test the dispatching feature on port 9599, configured specially for this type of test.

Set up and perform a test:

1. Start the ShareScan Troubleshooter tool on all of the tested cluster nodes. These instances of the Troubleshooter tool will be called “server agents”.
2. Copy the following files to a folder on a Computer connecting to the same network to which the MFP devices are connected (or will be connected), and launch the ShareScan Troubleshooter tool. This instance is called “client agent”.
3. Select the MS NLB cluster network test menu option (on all nodes).
4. On the dialog, click the **Start listening** button on the dialog on all the “server agents”.
5. On the “client agent” instance enter the IP address of the cluster (the IP address used in the ManagerIP registry entry) into the text field.
6. Click the **Connect** button on the “client agent”.
7. If the request sending / response receiving is successful, then you should see 3 lines:
 - Local / Connect / Cluster IP:9599 (in green)
 - Cluster IP:9599 / Received / Hey, it's X or Hi, I'm X or Hello, this is X (in blue), where X is the ClusterNode IP of the responding server node
 - Local / Disconnected / ClusterIP:port
8. In the console of the “server agents” (always only in the instance that actually gets the request) you should see lines appearing saying IP:port Connected in blue, where IP:port should correspond to the “client agent”.

If you click Connect several times (wait until all the three lines are listed), you should see different IP addresses in place of X, representing the different server nodes.

If you can see the ClusterNodeIP of all of the nodes at least once, then the entire test is successful.

i The server nodes are not hit by the requests in a round-robin manner. As the TCP connection-server node assignment is decided by the MS NLB based on the client IP and the source port (which is selected randomly by the “client agent”) it is not guaranteed that the next server node is hit next, nor that the requests are spread evenly. This is out of scope for this simple test tool.

Determine actual device request

To check which Manager serves the actual device request, a diagnostic feature is included.

If you create a registry setting: `HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Tungsten\ShareScan\ShowClusterNodeIP` (string value, true/false) then the ClusterNodeIP value (which can be used to uniquely identify the Manager, and is set by the registry settings at `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Tungsten\ShareScan\ClusterNodeIP`) of the Manager serving the request will be displayed on the Main screen, in the section where usually the **“Place a document into the feeder...”** instruction appears. This can determine if the devices are connected to a specific Manager.

You can also determine the MFP-Manager assignments by doing the following:

1. Turn on verbose tracing on the Manager – if the high availability system is already set up via MS NLB, then it is enough to turn on the tracing on a single Administration Console instance.
2. Use the devices.
3. Export the traces (from all server nodes).
4. Open the Trace.txt file of a given Manager, and search for `\xxx.yyy.zzz.www` where **xxx.yyy.zzz.www** is the IP address of the device you need.

If the string is found, then the MFP is served by that Manager.

i The MFP – Manager node assignment is constant only until a Manager node is removed or added to the cluster. In case of a change, the device-Manager node assignments are recalculated by MS NLB.

Exporting trace in a high availability environment

When a trace export is needed in case there are multiple nodes set up in a high availability environment, select the **Retrieve traces from the active NLB nodes** check box to display the Network share settings tab next to the Sources tab in the &Sources section of the Export traces and logs dialog.

When this check box is selected, before clicking the **Export** button, the user should configure the network share settings (by selecting the **Network share settings** tab next to the **Sources** tab). After configuration, click the **Test** button to make the **Export** button active. It becomes active only if the test is successful.

i The **Retrieve traces from the active NLB nodes** check box appears only in a Network Load Balancing environment.

This network folder is used to collect the trace export from all the server nodes.

Using the ShareScan Troubleshooter tool with hardware load balancers

You can use the ShareScan Troubleshooter tool to check environments with hardware load balancers as well, with the following differences:

- In **Full check** mode, the MS NLB test will not succeed, since it is not required when using a third-party hardware load balancer.
- For network tests and to see if the hardware load balancer is properly configured, use the **Custom network** menu option. The other test is specific to MS NLB, and may not provide useful results with a third-party load balancer.

When testing a hardware load balancer, after setting it up:

- Make sure all ShareScan services are stopped on the server nodes.
 1. Start the Custom network test of the troubleshooter tool (**Advanced** > **Network tests**) on all the servers.
 2. Specify the port you want to test and click the Start listening button (on all servers).
 3. On a Computer which is not part of the NLB cluster, start the Troubleshooter tool. (Copy the Tools folder to another computer, no installation is required. Or, you can run a Complete installation on a Computer, with a local database. This installs the Troubleshooter tool as well.)
 4. Use the Custom network test option, and enter the NLB cluster IP ('Virtual IP') into the Address field of the Remote computer panel, and specify the port you want to test (and what you specified when you started the test dialogs on the servers), and click **Connect**.
 5. If the NLB system is working correctly, the connection should be successful.
- Enter some text into the payload input field and click **Send**:
 - The message should appear in the dialog box of one of the servers.
 - To see if the failover mechanism is working, turn off the network adapter of the server where the message arrived successfully.
 - Repeat the connect/send message steps above. You should see that the connection/message arrives to another server node.

Chapter 8

How to install and configure NLB cluster on Windows server

Install NLB feature on all NLB nodes

Install the network load balancing (NLB) feature on all nodes in the NLB Cluster. In the following example, the installation is performed on two nodes: the computer (host) names are PL2008-01 and PL2008-02 and the FQDN is pintolake.net.

1. Open Server Manager on your computer.
2. Select **Features** from the Server Manager menu on the left.
3. Click **Add Features**.
4. Click **Next**.
5. Click **Install**.
Installation proceeds with copying the required components.
6. Installation succeeds. It is highly recommended that you repeat this process on all nodes in the NLB cluster at this point before continuing with configuration.
7. Click **Close**.

You can also install network load balancing from a command prompt with elevated privileges (right-click on the command prompt in the Start menu and select Run as administrator) by running the `servermanagercmd -install nlb` command.

For example:

```
C:\Windows\system32>servermanagercmd -install nlb
.....
Start Installation...
[Installation] Succeeded: [Network Load Balancing].
<100/100>
Success: Installation succeeded.
```

Configure NLB on NODE 1 (PL2008-01)

Network Load Balanced (NLB) clusters are built using the Network Load Balancing Manager.

1. Launch the Network Load Balancing Manager from the **Start > All Programs > Administrative Tools** menu or by running the `nlbmgr` command from a command prompt.
2. Under the Cluster Menu option, select **New**.

3. Enter the first node in the cluster, which is PL2008-01.
4. Click **Connect**.

- i** Before installing the cluster nodes, make sure that:
- The IP addresses are fixed (not DHCP enabled) on the 2 NIC cards you need to have in the servers.
 - The cluster IP address is registered in the network DNS server - in the sample, PL2008-01 and PL2008-02 are registered with the fixed IP of the two servers (192.168.1.180 and 192.168.1.181, respectively).

5. You can choose which network adapter you want to use; the NIC should be on the same subnet as the other servers in the NLB cluster. Click **Next**.

- i** In this example, only one Interface IP is shown, for the sake of simplicity. For a ShareScan high availability setup you need two distinct Network Interface Cards on each server, and the Interface always means the adapter that is used for the MSNLB cluster. In a real life setup, you should see two adapters, and it is important that you select the proper one as a host adapter of the cluster.

6. Select **1** as the Priority ID from the list (each node in the NLB cluster should have a UNIQUE ID).
7. Make sure the correct adapter was selected under Dedicated IP Address.
8. Select **Started for the Initial host state**. This option tells NLB whether you want this node to participate in the cluster at startup.
9. Click **Next**.
10. Click **Add**.
11. Fill in the **Cluster IP** and **Subnet mask** fields.
12. Click **OK**.
13. Make sure the Cluster IP addresses are correct. This IP address is used for all traffic from the devices to the ShareScan High Availability cluster.
14. Click **Next**.
15. Select the IP Address for this cluster from the list.
16. Enter the NLB address: `PL2008-V.pintolake.net`
17. Select **Unicast** or **Multicast** (preferred) as the Cluster operation mode, according to your preference. This value is determined by the Network Administrator of the local network system.
18. Click **Next**.

Unicast vs Multicast

Unicast or multicast determines the way the MAC address is presented to the routers for the Virtual IP (cluster IP). Multicast is preferred.

In the unicast method

The cluster adapters for all cluster hosts are assigned the same unicast MAC address.

The outgoing MAC address for each packet is modified, based on the cluster host's priority setting, to prevent upstream switches from discovering that all cluster hosts have the same MAC address.

In the multicast method

The cluster adapter for each cluster host retains the original hardware unicast MAC address (as specified by the hardware manufacture of the network adapter).

The cluster adapters for all cluster hosts are assigned a multicast MAC address.

The multicast MAC is derived from the cluster's IP address.

Communication between cluster hosts is not affected, because each cluster host retains a unique MAC address.

Click Finish.

Port rules

The port rules for the different vendors are detailed in the tables below. Each of these port numbers must be added one by one in the Port rules dialog.

Xerox (or mixed fleet, including Xerox)

Port	Protocol	Filtering mode	Timeout (in minutes)	Comment
8080	TCP	Single	5	
449	TCP	Single	5	
9325	TCP	None	0	Only required for Cost Recovery integration.
9425	TCP	None	0	Only required for ID Services integration.
9599	TCP	None	0	Only required for testing / troubleshooting purposes.
9600	TCP	Single	5	Only required if Canon / Ricoh is also in the fleet.

KM (or mixed fleet, including KM)

Port	Protocol	Filtering mode	Timeout (in minutes)	Comment
8080	TCP	Single	5	
449	TCP	Single	5	
9325	TCP	None	0	Only required for Cost Recovery integration.
9425	TCP	None	0	Only required for ID Services integration.
9599	TCP	None	0	Only required for testing / troubleshooting purposes.
9600	TCP	Single	5	Only required if Canon / Ricoh is also in the fleet.
50002	TCP	Single	5	

Other (not including Xerox or KM)

Port	Protocol	Filtering mode	Timeout (in minutes)	Comment
8080	TCP	Single	5	
449	TCP	Single	5	
9325	TCP	None	0	Only required for Cost Recovery integration.
9425	TCP	None	0	Only required for ID Services integration.
9599	TCP	None	0	Only required for testing / troubleshooting purposes.
9600	TCP	Single	5	Only required if Canon / Ricoh is also in the fleet.
9610	TCP	Single	5	Only required if Canon / Ricoh is also in the fleet.

The NLB Manager lists a number of items which lets you know whether this node successfully converged on your new PL2008- V.pintolake.net NLB Cluster.

Make sure the node's status changes to **Converged**.

Make sure you see a successful message in the log window.

Configure NLB for NODE 2 (PL2008-02)

Perform the NLB setup of the second node (PL2008-02) by logging in to that server. You need to connect to the existing cluster first.

1. Right-click the cluster name **PL2008-V.pintolake.net** and select **Add Host to Cluster**.
If you cannot see the cluster you have set up successfully on the other node, then it is likely that:
 - There is a network connectivity problem between the two would-be-nodes.
 - The two would-be-nodes are not on the same subnet.
 - You are using an account that does not have the proper administrative privileges.
2. Enter PL2008-02 in the **Host** field and click **Connect**.
3. A list of Network adapters is displayed. Select the network adapters that show up on PL2008-02.
4. Click **Next**.
5. Select **2** as the Priority ID from the list (each node in the NLB cluster should have a UNIQUE ID).
6. Make sure the correct adapter is selected under Dedicated IP Address.
7. Select **Started for the Initial host state** in the list. This tells NLB whether you want this node to participate in the cluster at startup.
8. Click **Next**.
9. Click **Finish**.

For actual port values, see [Port rules](#).

The NLB Manager lists a number of items which let you know that both nodes successfully converged on your new **PL2008- V.pintolake.net** NLB Cluster.

- Make sure that both nodes' status changes to Converged.
- Make sure each node has a unique host priority ID.
- Make sure each node shows started under initial host state.
- Make sure you see a succeeded message in the log window for the second node.

Testing

Open the command prompt, type `wlbs query` and then hit Enter; as you can see HOST 1 and HOST 2 converged successfully on the cluster.

Ping the virtual IP locally and remotely – you should do this three times from each location. If you cannot ping remotely you may need to add a static ARP entry in your switches and/or routers where the host machines reside.

1. Both nodes up
2. Node 1 down
3. Node 2 down

As a final step, a DNS record might added to allow resolving Network Load Balanced resources via a URI.

After successfully enabling NLB, configuring the cluster IP properly, it is recommended to disable DNS auto-registration.

To do this, open **Control Panel > Network and Sharing Center / Change Adapter settings**. Right-click on the network adapter exposing the cluster IP, click **Properties**. Select **Internet Protocol Version 4 (TCP/IPv4)** on the displayed dialog and click the **Properties** button. Click the **Advanced** button on the displayed dialog and click the **DNS** tab and then clear the **Register this connection's addresses in DNS**.

Since ShareScan uses IP (the cluster IP) only, the Register the cluster IP in DNS should be removed; it is better not to register the cluster into the DNS, to reduce the unnecessary traffic towards the cluster.

Chapter 9

Frequently asked questions

Q: How can I set up MFP IP addresses to ensure the device-server node assignments happen evenly?

A: It is recommended to use a continuous range, if possible. If a wider IP range is used and it is not possible to assign continuous ranges, an evenly spread random IP assignment is also a good choice. A device IP is a factor in the algorithm how the devices are assigned to a server node of the cluster, so this influences how many MFP devices are assigned to a particular node.

A strict control on the assignments is not supported due to the nature of the algorithm Microsoft NLB operation is based on.

Q: Is it possible to recover lost jobs or documents?

A: Recovering lost jobs or documents is possible via the Job Monitor Web UI. The jobs in failed state can be downloaded (scanned pages, or, if the final document creation was successful, but the storing operation failed, the final documents will be downloadable).

However, if there was a server (node) failure when the workflow was still in a processing phase, data loss might not be fully avoided.

Chapter 10

Glossary

For a full understanding of this current document, knowledge of the following terms is essential.

Capture Server Monitor

A utility that monitors the ShareScan managers, stops any node and sends email notification to a predefined email address when ShareScan stops working on a node.

Cluster

A group of nodes configured as a single server computer. A cluster consists of at least two nodes; they usually represent a server computer. For maximum level of availability and fail-safe operation, it is recommended to run the nodes on at least two physical hardware. A cluster is transparent for the user; it is represented by a separately assigned IP address on the network, different from any nodes' IPs.

Convergence

Convergence means that the MSNLB Cluster re-assigns all connections between remaining nodes and MFPs just like it happens when an MFP wants to connect to a node for the first time.

Drainstop

The drainstop command can be executed in **Network Load Balancing Manager: right-click selected node > cluster > Control Host > Drainstop**. The MSNLB Cluster manager disables the affected node when a job queue becomes empty. Due to drainstop, the MSNLB Cluster waits a specified time before shutting down the node. Waiting time can be configured between 1- 5 minutes.

Heartbeat

A message sent by the NLB driver in a cluster in regular intervals to detect node failures.

High availability support

The main purpose of this function is giving an option to keep the system alive when a node goes down (for example, memory, HDD or CPU failure, electric power loss or unrecoverable software error).

Load balancing support

The main purpose of this function is to distribute the load between available nodes in real time.

Node

A node is a computer or a virtual computer, the base unit of a cluster. Nodes are members of the cluster.

Virtual device

The state of ShareScan is monitored by the Capture Server Monitor through virtual devices. Each node has a separately registered virtual monitoring device.