

TECHNICAL AND ORGANISATIONAL PREREQUISITES

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1. INTRODUCTION

1.1. Purpose of this manual

This document provides the technical and organisational prerequisites needed to install Watchdoc® V5.3.

1.2. Intended audience

This manual is intended for the decision-maker and the IT specialists in charge of validating the technical environment before installing Watchdoc®.

1.3. Symbols used



Information: highlights important information required to fine tune the installation or configuration of the solution.



Light bulb: highlights any information that may be useful for a better understanding or knowledge of a notion or a function of the tool, or provides a specific case of use of this tool.

1.4. Contact Doxense®

Doxense's technical assistance service is reserved for certified, technical partners and can be contacted via [Connect](#), customer portal dedicated to partners.



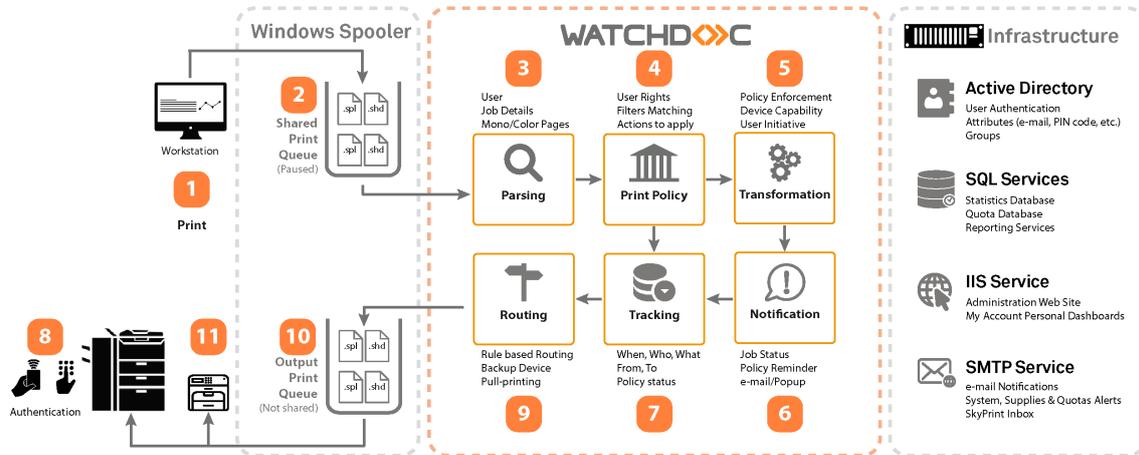
For all other questions, please contact your Doxense® consultant or send us an email at contact@doxense.com

1.5. Versions

Date	Description
10/09/2019	update for the 5.3 version.
28/02/2019	update for the 5.2 version.
18/06/2018	update for warning about multiple directories management.
07/09/2017	update for Microsoft Server version
27/07/2017	update for SQL Server version
20/04/2017	update for 5.1 version
09/27/2016	Graphical Update of the version
09/11/2015	Second version
11/02/2015	correction about .NET Framework version
01/08/2015	correction about .NET Framework version
01/04/2015	First version

2. SCHEMAS

2.1. Printing flow



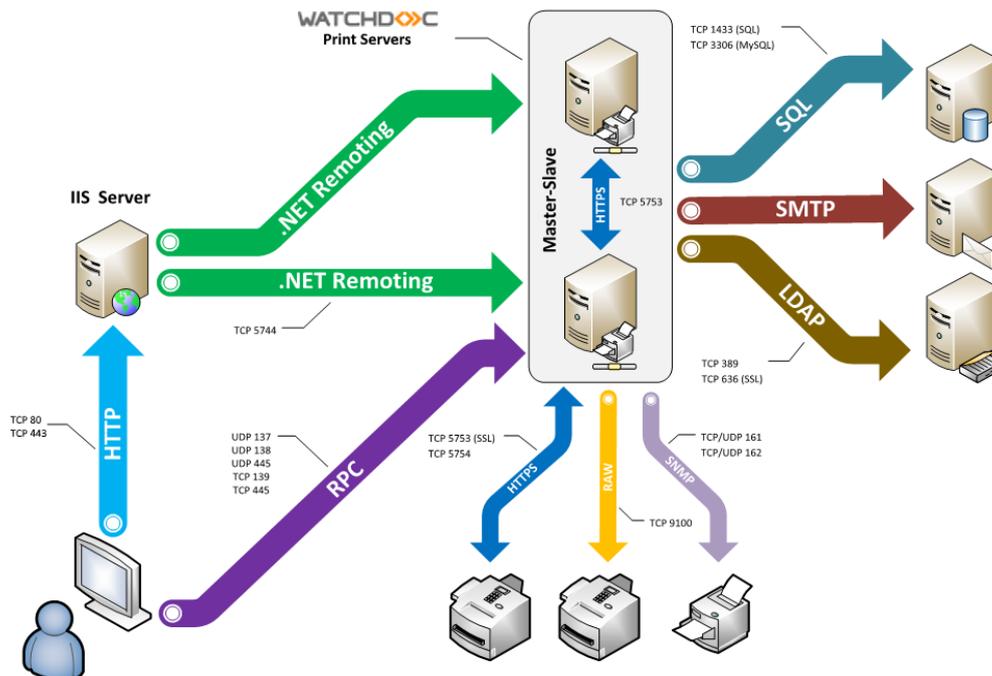
1. The user launch a print-job from his workstation.
2. The user workstation uses the standard print queues shared by the Print server as usual. The only difference is that the visible print queues on the server appear as being "Paused". When the print job is submitted from a workstation, the spool file is put on hold in the server print queue.
3. Watchdoc[®] analyses the print job information to get the job details and parse the spool file to determine the print job characteristics (actual black & white or colour pages...).
4. Watchdoc compares the job characteristics and user profile with the validation rules, that may have been set to check if any specific action has to be taken (user notification, blocking etc.). In the default mode (Accounting mode), the job will be ready for printing immediately. In a Print-on-Demand configuration (Validation mode), the print job will be held securely until the user releases it by signing or badging on a device and selecting the print job to release.
5. If the spools transformation feature is activated (after verifying the device compatibility) and enabled, it is applied : according to the set parameters, Watchdoc[®] suggests or forces the user to modify his initial printing choices to adopt more economical and eco-friendly print choices: duplex (rather than simplex printing), black&white rather than colour, reduction of the number of copies.
6. If needed, the user will be notified that his print job is on hold or does not meet the print policy guidelines.

7. The print activity will be logged into the statistics database.
8. In "validation mode", the user authenticates himself on the printing device he choose.
9. Watchdoc directs the print job to the choosen device and collects the data provided by the device.
10. When the print job is released, Watchdoc® moves it to the corresponding shadow queue to which the printing device is actually connected.
11. The job will be printed on the target device.



- **Print-on-demand mode** : in this configuration, the print job is held securely until the user releases it by signing in or badging on a device and selecting the print job to release. The user can release the print jobs from a web interface (WES, WXS ou web) or a terminal like CopiCode-IP¹ (previous NetPOD /DSP)
- **Accounting mode** : in this default mode, the job is ready to be printed immediately, without any validation of the user.

2.2. Network ports and protocols



¹Terminal (sold by Cartadis) connected to a print device and allowing to enter a PUK code or a badge reader in order to release the on hold print job.

2.3. Network flow matrix

The network ports to open are the following:

Source	Port	Protocol	Target
Watchdoc® web site (IIS)	TCP 5744	Dotnet protocol	Watchdoc® service (core) - print server The local agent may also use this port.
Watchdoc Embedded Solution (WES)	TCP 5753	HTTPS	Watchdoc® Service (core - print server) and master-slave
	or 5754	HTTP	
Web Browsers : web interfaces	TVP 80	HTTP	Watchdoc® web site (IIS)
	or 443	HTTPS	
Watchdoc® Service (core print server)	TCP 1433	SQL	DataBase server Microsoft SQL®
	TCP 3306		MySQL®
Watchdoc® Service (core - print server)	TCP 161	SNMP	Printers
Watchdoc® Service (core - print server)	TCP 389	LDAP Pro- tocol	Users Directory Server
	TCP 636	SSL	
Watchdoc® Service (core - print server) or user browser	TCP 5756	HTTPS	Watchdoc® Supervision Consol (WSC)
Watchdoc Notification Server®	TCP 445	SMB	Users workstations



As part of the implementation of the inter-server printing feature, other ports must be opened (see *How to? document - Configuring inter-server printing*).



If there is a firewall in the infrastructure, this firewall must allow accesses to the server on which Watchdoc[®] is installed.

WSD (Web Services for Devices) technology is not supported by Watchdoc[®] V5.

3. SERVER ARCHITECTURE

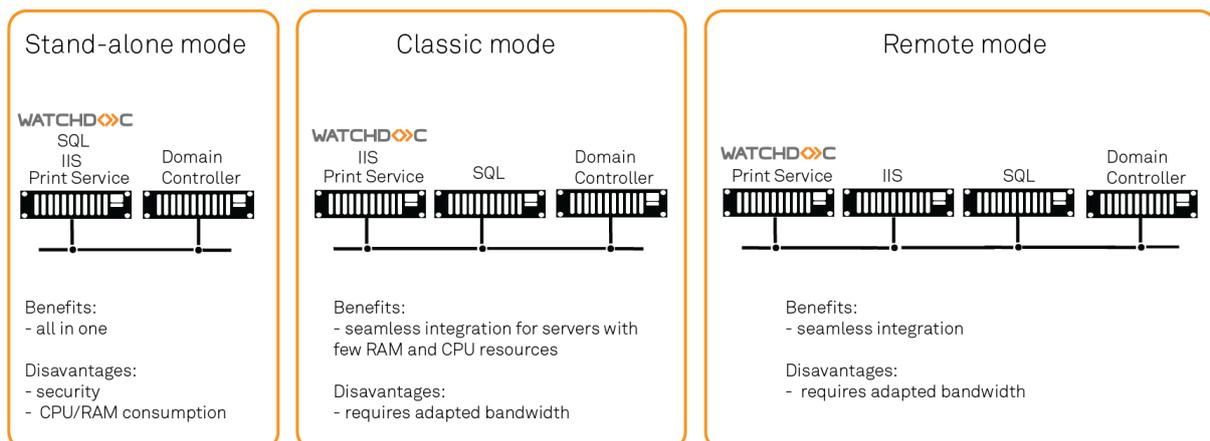
3.1. Architecture overview

To operate, Watchdoc® needs four Windows services:

- Watchdoc core running on a print server;
- a directory on a domain controller;
- a website on a dedicated web server;
- databases on a SQL server.

These four services can be installed on one or more physical machines:

- stand-alone mode;
- classic mode;
- remote mode.



In **stand-alone mode** and in **classic mode**, the Watchdoc® core and the web site are installed onto the same server (cf. How to install Watchdoc in stand-alone or classic modes).

In **remote mode**, the Watchdoc® core and the web site are installed into two separate servers (cf. How to install the Watchdoc® core and How to install the Watchdoc® web site).

Watchdoc® administration and end-user interfaces are fully web based and they are compatible with the following browsers:

- Internet Explorer (10 minimum and 11 recommended);
- Internet Explorer Edge;
- Mozilla Firefox (versions up to 2 years old compared to the Watchdoc® version);

- Google Chrome (versions up to 2 years old compared to the Watchdoc® version);
- Safari.

Each component needs to interact with the others, either locally or over the network. When networked, it is important to know what are the necessary ports for proper operation.

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- Internet Explorer Edge;
- Mozilla Firefox (versions up to 2 years old compared to the Watchdoc® version);
- Google Chrome (versions up to 2 years old compared to the Watchdoc® version);
- Safari.

3.2. Print Server

3.2.1. Compatible Windows Server® Editions

- MS Windows Server® 2008 R2 SP1 (with Watchdoc® Standard setup only, not supported with Watchdoc® Express setup);
- MS Windows Server® 2012 x64 with updates (V3 print drivers only);
- MS Windows Server® 2012 R2 avec Update 1 (KB2919355) (V3 print drivers only);
- MS Windows Server® 2016;
- MS Windows Server® 2019.
- Watchdoc® is also compatible with virtualization software (VMware, Hyper-V, etc.).



The Core version of MS Windows Server® is not supported.

Microsoft Visual® C++ 2013 is mandatory.

Microsoft® .NET Framework 4.6.1 4.7.2 is mandatory (included in the Microsoft Windows Server® 2016 standard).

3.2.2. Analysed languages

Watchdoc® analyses the following languages:

- PDL
- PCL : 5c/e et 6 (PCL-XL)

- HPGL2
- Postscript DSC (Document Structuring Conventions)
- ESC/P 2
- EMF
- XPS



The preview features are only available with the EMF and PCL6 datastreams. Removal of pages within a print document is only possible with prints made with PCL6 drivers.

Redirection of print jobs can only be used with printers:

- using the same language;
- having compatible print files.

3.2.3. Notifications d'impression

If the workstations are running Vista[®] / Seven[®] / 8[®], we recommend that you change the value of the following registry key from 1 to 0:

HKEY_CURRENT_USERS

Printers\Settings\EnableBalloonNotificationsRemote

This action will disable tooltips for the printouts sent to the print server.

3.2.4. Antimalware, antivirus

The server antivirus or antimalware tools (like Windows Defender[®], Bit Defender[®], Kaspersky[®], Mac Afee[®], for example), must exclude the spools directory and the Watchdoc[®] installation directory. If not, slowness occurs, generated by the security tool analysis.

3.3. Application server

Watchdoc[®] runs under a Internet Information Server (IIS) server. Required IIS components are:

- Web-Server
- Web-ASP
- Web-Metabase,
- Web-Windows-Auth



Microsoft® .NET Framework 4.6.2 4.7.2 mandatory

3.4. Directory Server

One or more of these directories are compatible:

- Active Directory®
- Open LDAP®: validated set up required
- MS SQL® database
- XML file
- Proxy Directory : correspondence between user login and badge number or between the name or user login known on the device (data via SNMP, copiCodeIP).



For any other type of directory, please contact us.



Watchdoc is able to manage multiple directories, provided that there are no homonyms between them.

3.5. Database Server

Watchdoc® registers statistics and the users's Virtual Purses in two databases. Compatible Database servers are the following:

- MS SQL Server® (Express/Standard/Enterprise) 2012, 2014 or 2016 and, from the Watchdoc 5.2 version, the MS SQL Server 2017, with following prerequisites:
 - Mixed mode;
 - SQL browser (if remote SQL with a named instance).



Watchdoc® v 5.1 works with SQL Server 2008, but its new features (billing codes, print-job transformations, etc.) require SQL Server 2012 or later. In addition we recommend that you make sure that your [SQL Server version](#) is always supported.

- MySQL® 5.X
 - ODBC connector 5.1/6.0

- PostgreSQL® 8 / 9 (no support on settings).



Watchdoc® isn't compatible with Oracle® Database.
In the case of using "Report Services for Watchdoc" (to generate comprehensive printing activity reports), Reporting Services (included in MS SQL Server) must be installed.
Minimum version of SQL: 2008 R2

The on-demand inter-server printing feature supported by Watchdoc® V5.2 is based on a database that may be:

- either MS SQL® (see prerequisites above) ;
- or FoundationDB (<https://www.foundationdb.org/download/>" consult us for more recommendations)

3.6. Notifications

The notification feature of Watchdoc® uses the SMTP protocol.

The following services must be activativ:

- MSG.exe to display messages;
- on the workstations, the value of the following key must be 1: HKLM\SYSTEM\CurrentControlSet\Control\TerminalServer

4. CAPACITY PLANNING

For more information, see Microsoft® [Print Server Scalability and Capacity Planning](#).

As stated in this Microsoft® document, it may be difficult to size a print server, as there are many parameters to consider: number of printers, type and number of client workstations, type and size of spool files, network interface.

4.1. CPU and Memory

For resources to be allocated to Watchdoc®, here are our recommendations:

- Less than 200 print queues: 2 CPU cores as a minimum with 512 MB of available RAM.
- Between 200 and 1'000 print queues: 4 CPU cores as a minimum with 1 GB of available RAM.

4.2. SNMP Network Monitoring Traffic

Examples measured on Doxense network:

- Xerox WorkCentre 24 (Internal Auditron enabled with 80 accounts) : 30 MB/day
- Xerox WorkCentre 24 (Internal Auditron enabled with 80 accounts) : 30 MB/day
- Kyocera Mita KM-4035 : 18,5 MB/day
- Dell 5100cn : 10,8 MB/day
- Lexmark T420 : 10,4 MB/day

4.3. Local Agent Network Traffic

For each document printed on a local printer, the agent sends a message to the Watchdoc server. Its actual size depends on the protocol being used:

- .NET Remoting (TCP sur le port 5744) : 2,5 kB (kiloBytes) per transaction ;
- HTTP : 3,5 kB (kiloBytes) per transaction.

4.4. Database storage requirements

In the database, each printed document needs 2,5 kB.

For monitored network printers and MFP:

- Incidents : 1 kB per incident on connected devices (if SNMP is active);

- Supplies and counters: 600 bytes/device/hour or 5,2 MB/device/year;
- Server counters (RAM, CPU...): 200 bytes/server/hour or 1,8 MB/server/year.



Windows Vista/7/8 workstation as a server

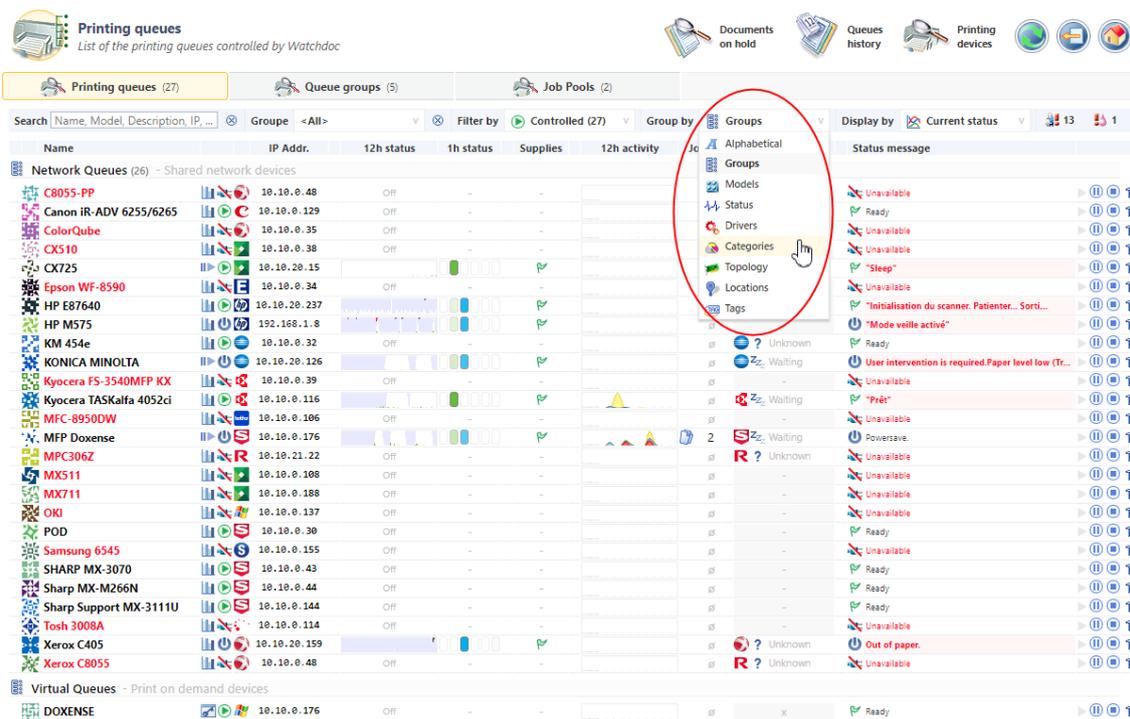
Note that Microsoft® does not support workstations with desktop OS as a production server.

5. SNMP

5.1. General overview

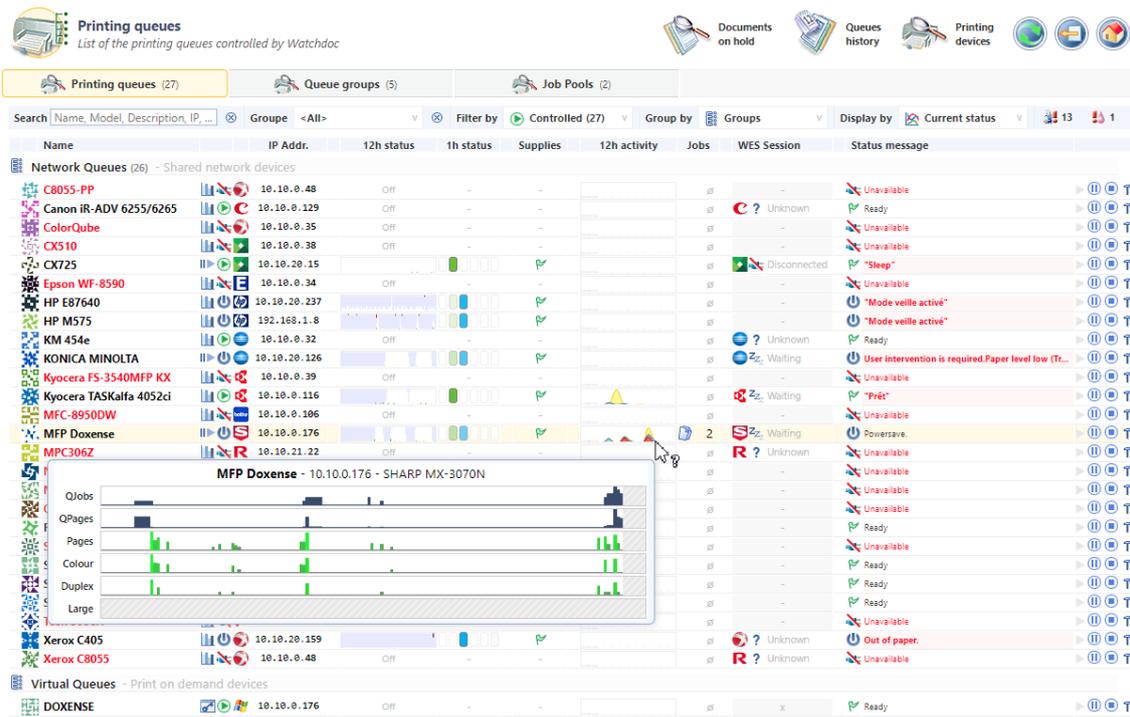
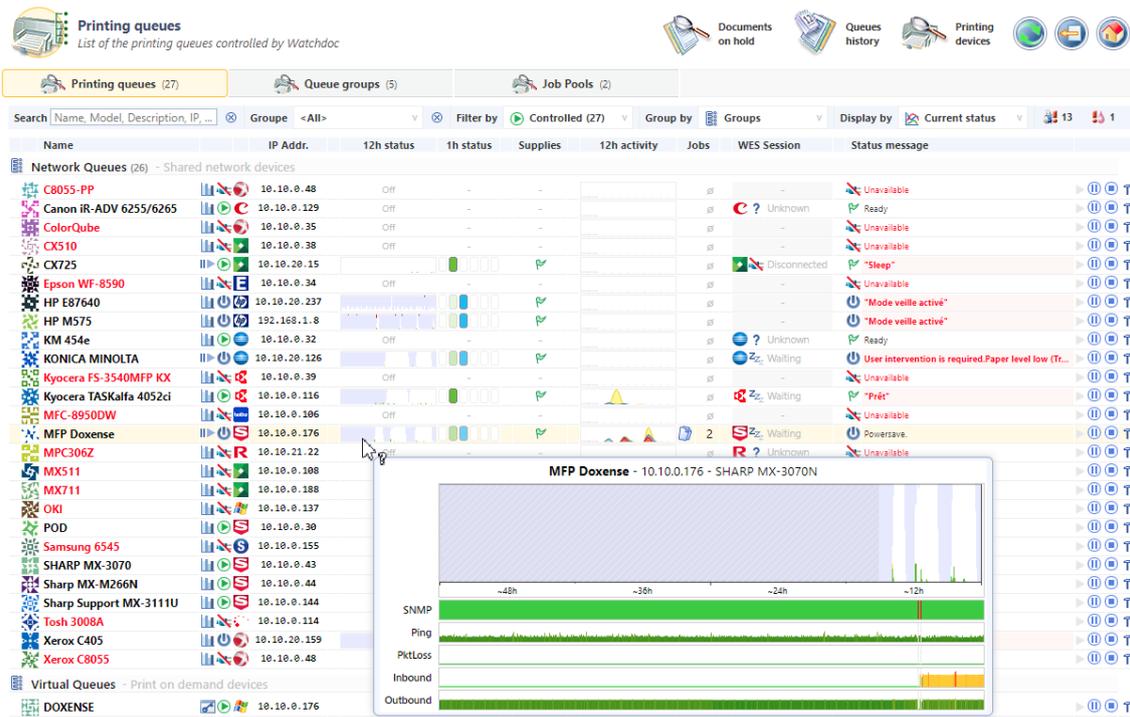
Watchdoc[®] can retrieve information about the printer or multifunction via SNMP¹:

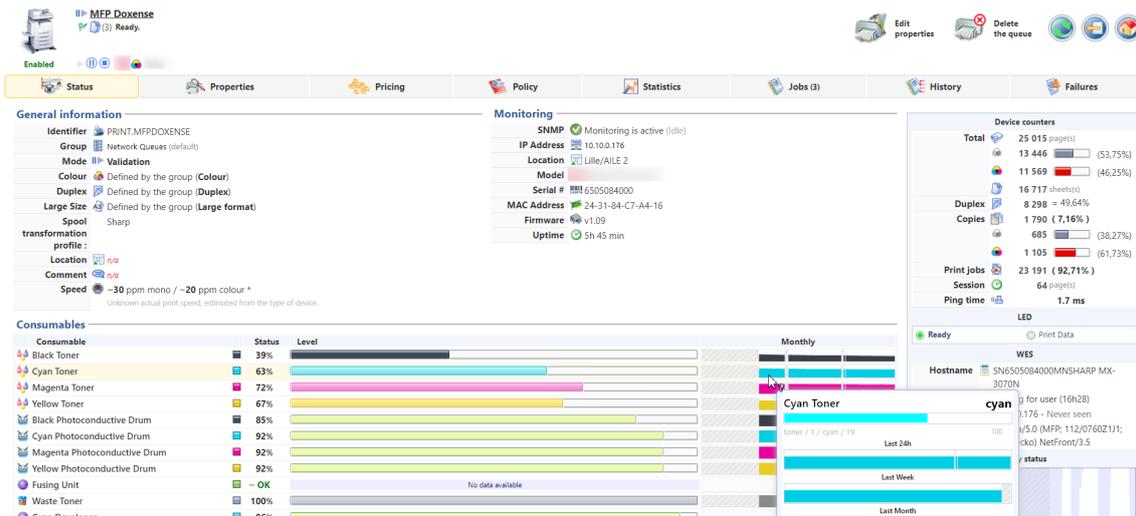
- information on consumables: paper, ink, toner, staples etc.;
- information on device status in the administration site: LCD display messages, LED Status, errors and warnings;
- collection of counters: prints, copies, 'scan to disk "or" scan to mail " operations...



The screenshot displays the 'Printing queues' section of the Watchdoc interface. It shows a table of network queues with columns for Name, IP Address, 12h status, 1h status, Supplies, 12h activity, and Groups. A red circle highlights the 'Groups' dropdown menu, which is currently open, showing options: Alphabetical, Groups, Models, Status, Drivers, Categories, Topology, Locations, and Tags. The table lists various printer models such as Canon IR-ADV 6255/6265, Epson WF-8590, HP E87640, and Xerox C405.

¹Simple Network Management Protocol (SNMP) is an Internet-standard protocol for collecting and organising information about managed devices on IP networks and for modifying that information to change device behaviour. Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks and more. SNMP is widely used in network management for network monitoring. SNMP exposes management data in the form of variables on the managed systems organised in a management information base which describes the system status and configuration.





5.2. Print Device Compatibility

The list of certified device manufacturers WCV (Watchdoc Certified Vendors) can be found on Doxense website at: http://www.doxense.com/?page_id=90

For these manufacturers, a partnership has been established to maximise the compatibility of Watchdoc with their devices.

For the other manufacturers, Watchdoc uses standard SNMP protocol to collect data (common MIB) and analyse the print files (PCL 5/6 and PS).

Within the Watchdoc package, we provide tools for you to validate the Watchdoc application in the customer's environment and check drivers and data stream compatibility.



6. CLIENT WORKSTATION

6.1. General overview

By default, there is no installation required on the client workstation.

The user must print to the shared printer queues on the print server. The printer is installed as a network printer either manually or using tools like the Microsoft® Group Policy (GPO) or other utilities.

6.1.1. Client Operating Systems

Watchdoc® works on the following systems:

- Windows® 2000 / XP / Vista / 7 / 8 / 8.1 / 10, with or without client popup;
- Mac OS® X / Linux : printing via Samba or via Line Printer Daemon Protocol(LPR).
Possible loss of identity of the user.



For imprints Unix® via LPR Protocol (Mainframe® for example), validation is needed. However, under this configuration, no information about imprints's applicant is available.

6.2. Release station

In a Pay-for-Print environment where users pay by card for the printing of documents, it is necessary to install an ActiveX control on the workstation acting as a Release station.

The Release station requires a Watchdoc® Embedded Solution WES PC license.

Compatible cards readers:

- Cartadis TC11RS
- Cartax 8253, 8501, 8552
- Gemclub Memo
- Intercard
- Sedeco Secu

6.3. Local Printers (Watchdoc[®] Agent)

When printers are not connected to print servers, Watchdoc[®] Agent enables to remove the accounting of print jobs from the client workstations on these non-connected printers.

The agent gather the print statistics about local printers. The information is obtained from the Windows[®] Spooler as the agent does not analyse the spool files themselves. The following information are captured:

- title,
- number of pages
- duplex,
- Windows[®] user,
- date.

This agent sends the collected data to a Watchdoc server on port 80 or 5744.

Since it does not parse the spool file, the agent cannot accurately count separately the number of colour or monochrome pages of a document ; it only advises if the document is printed in colour or grey scale mode.



The agent will not take any action on print the job, it cannot block, delete or transfer the printed document.

The prerequisites to be respected to install a Watchdoc[®] Agent on each workstation are the following:

- Workstations running Windows XP SP2, Windows Vista (Business, Enterprise & Ultimate Editions), Windows 7, Windows 8 ;
- Microsoft .NET Framework 1.1 or 2.0 installed and functional

6.4. Applications

The Watchdoc[®] analysis capabilities are regularly tested with the most common applications (Microsoft[®] Office Suite, Adobe Reader, Photoshop, web pages...)

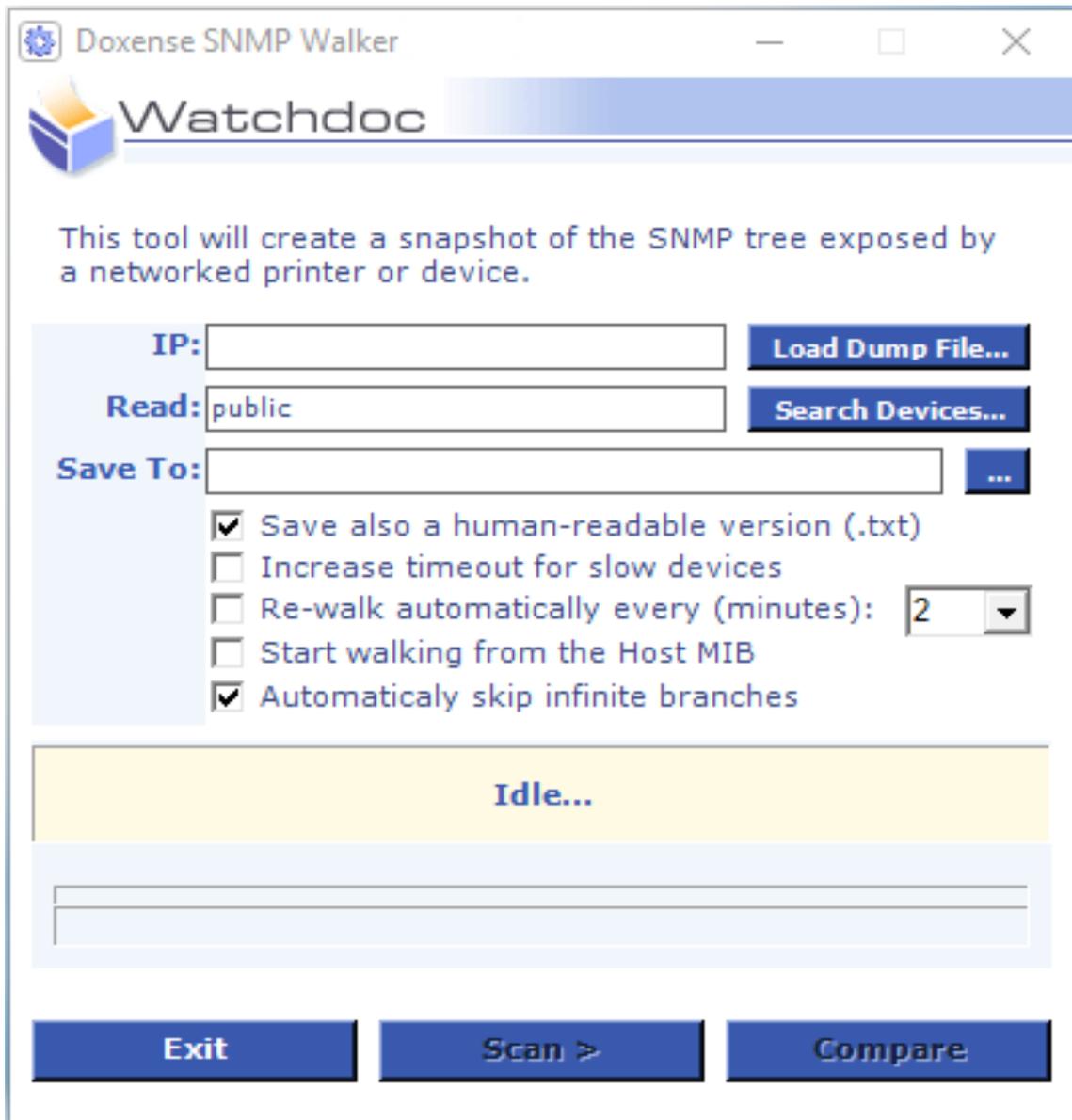
For custom applications (e.g. generated in a UNIX[®] environment), if the client generates themselves their print file (Postscript[®] for example), it is recommended to get some print files for compatibility testing.

If the format is not standard, it may be necessary to develop a specific component dedicated to the analysis of print jobs from the application.

7. TOOLS

7.1. SNMPWalker

SNMPWalker is a Watchdoc[®] tool to search and capture the status of the SNMP compliant printers on the network. It will dump in a binary and a text file the results from SNMP walks on the device:

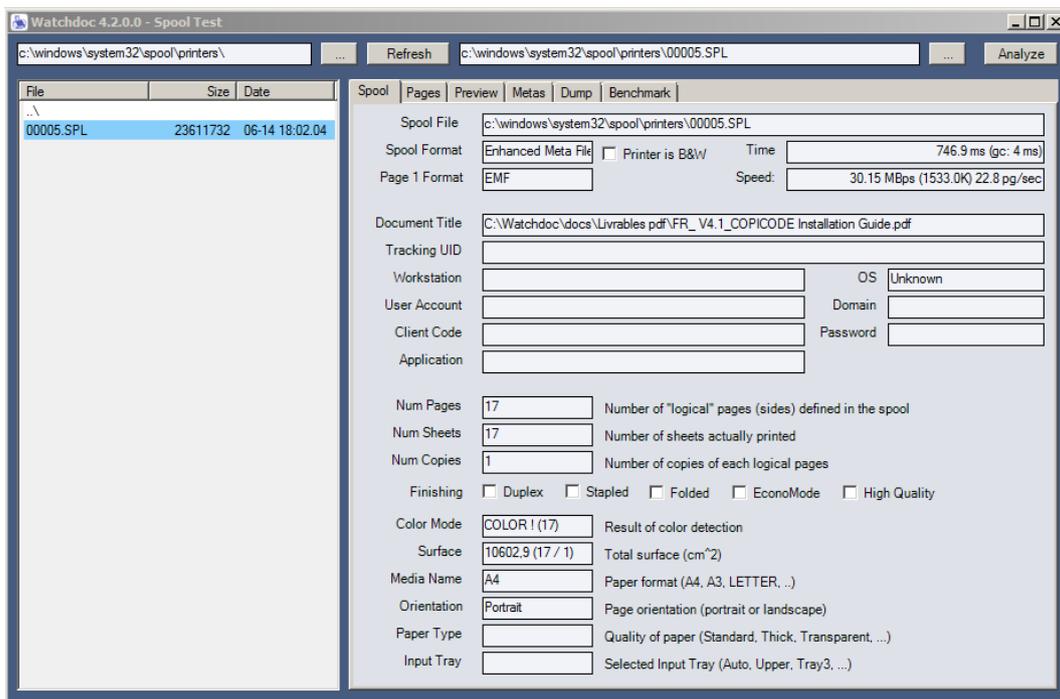


This Watchdoc[®] tool helps analyse the printer spool files as would the Watchdoc[®] service.

It allows to analyse the spool sent by a customer when a problem is encountered, or to see if Watchdoc supports such a printer, copier or such application.

Here are the steps to test the Watchdoc[®] compatibility:

1. pause the printing queue for the printer that you want to test,;
2. print a set of test documents while taking note of the print order and a description of the document (Example: Word document of 145 pages) and the type of printing made (example: colour printing, 4 pages in 1, in duplex, with stapled finishing with two staples),;
3. in the directory `%windir%\system32\spool\PRINTERS`, retrieve the print jobs files (SPL and SHD files),;
4. on the server where Watchdoc[®] is installed, run the **LanguageTest.exe** tool and select the directory where the spool files are located;
5. double-click on each SPL file listed on the left pane and ensure that the tool displays the right information. For a PCL6 print job, the Preview tab normally displays the document as it should print
6. in case of problems, install the latest driver for the installed device. If multiple drivers are available, select the PCL6 driver whenever possible.



Testing a spool file with LanguageTest.exe