Xerox® Print Advisor
Administration Guide

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About Xerox® Print Advisor

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Print Advisor Architecture

Delivered as a hosted service, there are two components that make up Xerox® Print Advisor. These components include the Xerox® Print Advisor Client, which is deployed within your organization, and the Xerox® Print Advisor Application Server (hosted by Xerox®). The components communicate over the Internet. To ensure the highest level of security, all communication is encrypted using SSL (Secure Sockets Layer).

Xerox® Print Advisor Client

The Xerox® Print Advisor Client is deployed in your organization and is used to track print activity. When a user prints, Xerox® Print Advisor tracks the print and analyzes it, determining the number of pages, pages printed in color, tiered billing that each page falls in, application, printer used, duplex selection, etc. Based on the information about the print job, Xerox® Print Advisor may or may not display a user notification.

> Note: The print job NEVER leaves your organization's network. Xerox® Print Advisor analyzes the print job internally and only gathers the print job attributes or meta-data.

To address the different print architectures, Xerox® Print Advisor offers several different deployment options. To learn more, see the "Planning Xerox® Print Advisor Deployment" section later in this guide.

Xerox® Print Advisor Application Server

The Xerox® Print Advisor Application Server is hosted by Xerox®. It is responsible for delivering the administration portal as well as storing the meta-data about each print job. This architecture allows for the fast deployment of Xerox® Print Advisor into your organization.

> Note: The availability of the Xerox® Print Advisor Application Server in no way affects your organization's printing. For example, if the Xerox® hosting service is not available, printing will continue within your organization.

Xerox® Print Advisor's Impact on your Existing Print Environment

Xerox® Print Advisor is very simple to install and can start tracking printING without the need to change any part of your existing print infrastructure. Xerox® Print Advisor does not interfere with or change your existing print environment.

> Note: Xerox® Print Advisor DOES NOT alter or change your existing print infrastructure.

Unlike other print-management solutions, Xerox® Print Advisor does NOT require you to:

- Deploy a custom print driver.
- Change print drivers, print processors, port monitors or any print environment setting.
- Alter or redefine print queues.
- Add a new print spooler-environment.
- Add additional hardware or software.

The benefits of the Xerox® Print Advisor architecture include:

- Rapid deployment.
- No additional hardware or software.
- No single point of failure.

Xerox® Print Advisor offers customers the ability to capture print-data attributes without the risk of negatively impacting your existing print environment.

Xerox® Print Advisor Data Security

Xerox® and Xerox® Print Advisor use a comprehensive range of security measures to ensure the safe storage and transmission of your organization's print meta-data. Xerox® Print Advisor transmits only data that is relevant to your print jobs and your print environment. All data that is transmitted between the Xerox® Print Advisor Clients within your organization and the Xerox® Print Advisor Application Server is secured using SSL (Secured Sockets Layer), the same level of security used by banks. In addition, temporary data stored by the Xerox® Print Advisor Client within your organization is encrypted.

In addition to the data transmission security, there is comprehensive physical securing of the Xerox® Print Advisor Application Server. This includes limited access to the facility through biometric access.

To learn more about security, see the Understanding Xerox® Print Advisor Security section later in this guide.

Xerox® Print Advisor Application Server Availability

The Xerox® Print Advisor Application Server is hosted in a facility that offers broad network availability. In the unlikely event that there is a network outage, or the Application Server is not available for a period of time during maintenance windows, this will have no impact on your organization's ability to print. Xerox® Print Advisor will continue to operate within your organization's print environment, securely caching the print meta-data that is captured during the network outage. When the network connectivity is restored, the Xerox® Print Advisor Client transmits the cached information to the Xerox® Print Advisor Application Server.

Your organization's print is not impacted by a loss of network connectivity.

Impact on Networks

We understand your network is a critical resource within your organization. Xerox® Print Advisor takes a variety of measures to ensure that it will deliver maximum value with minimal impact to your infrastructure. Relative to the network traffic generated within your organization from users printing, Xerox® Print Advisor increases this print-related network traffic only marginally. Putting this in perspective; the network traffic generated by Xerox® Print Advisor for each user per day is approximately 50 KB. This is less traffic than you would see for an average web page.

To learn more about network impact, see Assessing Network Impact later in this guide.

Ease of Installation

Xerox® Print Advisor is as easy to deploy as any standard software. The installation takes only a few minutes. Xerox® Print Advisor is delivered through a standard MSI (Microsoft® Installer) package and can easily be bundled into an SMS (Short Message Service) package or other push technology and rolled out to the enterprise. Once installed, Xerox® Print Advisor does not require a reboot and only requires 25 MB of disk space.

To learn more, please see the Xerox® Print Advisor *Installation Guide*.

Administration Requirements

Delivered as a turnkey solution, Xerox® Print Advisor does not require any administration to get started. Once deployed, there are minimal administration requirements unless there is a need to change a system parameter or request a report.

Xerox® Print Advisor does not require print administrators to administer print queues or printer information within the product. Xerox® Print Advisor detects new users to the system and automatically adds them to the database. In addition, it discovers newly added printers that are connected to Xerox® Print Advisor-monitored workstations or print servers, and starts tracking prints to these printers immediately.

Installing Xerox® Print Advisor

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This section describes the system requirements and impact on workstations and print servers, as well as the planning steps you need to take for installing Xerox® Print Advisor.

System Requirements

The following are the system requirements for both the print server and workstations:

System	Requirements
Operating System	Microsoft Windows® 2000 Professional (SP4 or later) or Microsoft Windows® XP Professional (SP2 or later) or Microsoft Windows® Server 2003 (32-bit and 64-bit) or Microsoft Windows® Vista (32-bit and 64-bit) or Microsoft Windows® 2008 Server (32-bit and 64-bit)
System Software	Microsoft Windows® .NET Framework (2.0 or later)
Disk Space	25 MB
Internet and Firewall	Internet access over SSL (Secure Sockets Layer) port 443. Name resolution between Xerox® Print Advisor-monitored print servers and workstations. Port 49218 to 49219 or alternative ports opened internally for communication between Xerox® Print Advisor monitored print server and workstations. Note: This is the recommended default configuration when installing Xerox® Print Advisor on print servers and workstations. Other configurations are also supported. Please contact Technical Support for additional information.
Directory	All workstation user logins must be to an Active Directory domain within the organization. Note: The same software is installed on both the workstations and print server.

Supported Platforms

Along with the basic Windows Operating Systems, Xerox® Print Advisor also supports the following Windows-based platforms:

- Print Clusters (Active/Passive)
- Terminal Server
- Citrix

> Note: At this time Active / Active print clusters are not supported.

Using a Proxy Server

If your organization uses a proxy server, it is highly recommended that the Xerox® Print Advisor service run as a Domain Service Account (DSA). While Xerox® Print Advisor can run as the Network Service account it rarely has sufficient authorization to navigate an organization's proxy server.

Using a Domain Service Account (DSA) with a proxy server creates many advantages:

- Communicates through the proxy server to the hosted Xerox® Print Advisor Application Server.
- Eestricts communication to a known IP address range.
- Non-expiring password.
- Locked down with just the permissions needed to run Xerox® Print Advisor.
- Centrally controlled.

> Note: The account you select for Xerox® Print Advisor must have the ability to navigate through your proxy server.

Some proxy servers can restrict traffic as to which processes are allowed to communicate to the Internet and to which IP addresses they can contact. If your organization implements these server settings, you can apply the following:

For process names prprn.exe and prprnct.exe:

- Allow access to port 443
- Allow access to printelligence.preosoftware.com
- Allow access to printadvisor.corp.xerox.com

Using a Domain Service Account

If a Domain Service account is used for Xerox® Print Advisor, it must be able to communicate to the hosted Xerox® Print Advisor Application Server over port 443 (SSL).

> Note: Be sure to set up the Domain Service Account PRIOR to starting your installation. Altering the account information after installation is difficult and time consuming if you have installed Xerox® Print Advisor on all your organization's workstations.

Assessing Network Impact

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This section outlines in detail the network impact of Xerox® Print Advisor on your organization. As a managed service, there will be some network impact, although it is relatively minimal. Fully deployed, Xerox® Print Advisor accounts for less than 1 % of the total for print-related network traffic.

As a managed service, data moves between an organization's infrastructure and the Xerox® Print Advisor Application Server. The amount of data that is transmitted is dependent on the following key factors:

- Number of Users
- Number of Printers
- Number of Print Jobs

> Note: All network traffic is initiated by requests from within the clients' firewall. At no time does the Xerox® Print Advisor Application Server "push" information to clients.

Network Traffic Generated by Xerox® Print Advisor

The average network traffic that is generated by Xerox® Print Advisor during normal print activity can be broken down into five actions. The following table outlines the different actions and the amount of network traffic generated for each action.

Action	Network Traffic
Workstation / Print Server Start Up	23 KB
User Login (Authentication)	5 KB
Print Job Meta-Data Transmission	4 KB
Workstation / Print Server Shutdown	2 KB
Printer Inventory Information	0.3 KB

The following table illustrates the network impact for one user per day if the user prints an average of five print jobs per day.

Action	Quantity	Network Traffic
Workstation / Print Server Start Up	1	23 KB
User Login (Authentication)	1	5 KB
Print Job Meta-Data Transmission	5	5 x 4 KB = 20 KB
Workstation / Print Server Shutdown	1	2 KB
		Total Per Day/Per User = 50 KB

Network Impact – Daily Print Volumes

Based on the network traffic generated, the section below outlines a typical scenario for one day of print for an organization. Using this information, you can determine the network traffic generated by Xerox® Print Advisor.

For example, in an organization that has the following infrastructure, the total per day network traffic is 146.7 MB:

- 5 print servers
- 3000 workstations / users
- 100 multifunction devices
- 500 locally attached printers
- 5 print jobs / user
- Xerox® Print Advisor is deployed to all workstations and print servers

The network impact looks like this:

Action	Quantity	Network Traffic
Workstation / Print Server Start Up	3000	3000 x 23 KB = 67.4 MB
User Login (Authentication)	3000	3000 x 5 KB = 14.6 MB
Print Job Meta-Data Transmission	5 / User	5 x 3000 x 4 KB = 58.6 MB
Workstation / Print Server Shutdown	3000	3000 x 2 KB = 5.9 MB
Printer Inventory Information	600	600 x 0.3 KB = 0.2 MB
		Total Per Day = 146.7 MB

Putting Network Impact into Perspective

- The average print job spools to ~1 MB.

- Given the average of ~1 MB / Print Job, the act of printing in this scenario potentially generates ~15 Gbytes of network traffic per day. Xerox® Print Advisor would account for less than 1 % of the total traffic related to print.

- The network traffic generated by Xerox® Print Advisor is roughly one tenth that of a request to the www.cnn.com home page.

Planning Xerox® Print Advisor Deployment

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Deployment Overview

There are several options available to you for deploying Xerox® Print Advisor in your organization. When deciding on a deployment strategy, you need to consider the following:

- Your assessment goals.
- Your corporate IT environment.
- How your print infrastructure is configured.

Once you have considered each of these factors, you can select the deployment option that works with these considerations. Then you can review multiple deployment scenarios that will show you how to move from a limited pilot to full deployment and all the steps required for you to build your own project plan.

Setting Your Assessment Goals

Before deploying Xerox® Print Advisor, you need to set your assessment goals. Your assessment goals dictate which deployment options you must consider. For example:

- Are you trying to assess all organizational print or is the assessment limited to a floor, a department, or a building?
- Does your organization use print servers? Should they be included in the assessment?
- Does your organization perform Direct IP printing to network printers?
- Are locally attached printers part of the assessment?
- Does your organization use Citrix application servers? Is printing from Citrix-hosted applications of sufficient volume to be included in the assessment?

Understanding Your Corporate IT Environment

Your corporate IT environment may range from simple to highly complex, and may be located and managed from a central site or it may be completely distributed. Regardless of the complexity, you will need to understand the security standards, platform deployments, and computing policies of your organization:

- Are proxy servers and internal firewalls part of your infrastructure?
- How does your organization grant access to the Internet to enterprise applications like Xerox® Print Advisor?
- Are special user accounts required to run services for enterprise applications?
- Does your organization use application platforms such as Citrix?

- What are the corporate policies around the installation and maintenance of web-hosted applications?
- Is your organization's computing infrastructure heavily locked down? Is the release of software to workstations scheduled for particular dates and times?

Understanding How Your Print Infrastructure is Configured

An organization's print infrastructure can be centrally managed, fully distributed, or a mixture of both. A full understanding of your print infrastructure is critical to the proper implementation of Xerox® Print Advisor.

- Does your organization use central print servers?
- Are users allowed to install and print to locally attached printers?
- Does your organization use Direct IP printing to network printers?
- Are universal print drivers used in your organization, or are there a wide variety of drivers downloaded and deployed?
- Are print clusters used in your organization? Are they configured for "active/passive" or "active/active" failover?

Choosing your Deployment Options

Xerox® Print Advisor offers three deployment options:

- Print Server Only
- Print Server and Workstation
- Workstation Only (Direct IP printing environments)

In addition, you can deploy Xerox® Print Advisor into these environments:

- Citrix or Terminal Servers
- Print clusters

The deployment option you select will be dependent on your organization's print environment and print assessment goals. See the next section, Deployment Scenarios, to learn more about the deployment options for your organization.

> Note: The software that is installed on the print server is the same software installed on the workstation, Citrix, Terminal Server, and print clusters.

Print Server-only Deployment

In this deployment, Xerox® Print Advisor is installed on one or more print servers. If your organization prints mostly through print servers, this is the most efficient way to track the greatest volume of printing. A server-only deployment can be achieved in less than a day and you can track printing immediately.

Installation to print servers does not preclude a future installation to workstations. You can start tracking printing to servers today and roll out to workstations at any time without needing to change Xerox® Print Advisor in any way.

While deployment to print servers is very fast, the downside is you cannot 'see' local printers or implement user notifications on the desktop. Xerox® Print Advisor must be installed on the desktop to implement user notifications or to track local devices.

In this example below, Xerox® Print Advisor is installed on Print Server 1 and the Print Cluster:

A User who Prints from…	Gets this Result…
Workstation 1 to Print Server 1	The print job is captured by Xerox® Print Advisor on Print Server 1.
Workstation 2 to Print Server 2	The print job will NOT be captured.
Workstation 3 to Print Server 2	The print job will NOT be captured.
Workstation 3 to Print Cluster	The print job is captured by Xerox® Print Advisor on the Print Cluster.

Note: If an organization wishes to get an accurate indication of the number of print jobs that occur within their organization, they must install on all the print servers.

Print Server Only Deployment - Advantages and Disadvantages

Advantages	Disadvantages
Appropriate for organizations that have central print servers.	Tracking printing to local printers is not performed.
Easy deployment, few target machines.	User notifications are not displayed to user.
Start tracking enterprise print within minutes of installation.	
Good start if you want to stage Xerox® Print Advisor's introduction into the enterprise.	

Installing Xerox® Print Advisor to Workstations only (Direct IP Environments)

In this deployment, Xerox® Print Advisor is installed on the organization's workstations. If your organization does not use print servers, this is the only way to track printing activity.

In the example below, Xerox® Print Advisor is installed on Workstations 1 and 3. Printers A and B are Direct IP printers:

A User who Prints from…	Gets this Result…
Workstation 1 to Printer A	The print job is captured by Xerox® Print Advisor on Workstation 1.
Workstation 2 to Printer A	The print job will NOT be captured.
Workstation 2 to Printer B	The print job will NOT be captured.
Workstation 3 to Printer B	The print job is captured by Xerox® Print Advisor on Workstation 3.
Any Workstation to Print Server	The print job is NOT captured.

> Note: Print jobs are not captured on print servers if Xerox® Print Advisor is only deployed to workstations. Local printing is not captured from any workstation that does not have Xerox® Print Advisor installed.

Workstation Only Deployment Advantages and Disadvantages

Advantages	Disadvantages
Appropriate for organizations that tend to use Direct IP printing and have limited or no deployment of print servers.	May have to wait for workstation software deployment windows.
Track printing to any workstation's locally attached printers.	Print to network printers hosted on print servers will not be tracked.
Track Direct IP printing from a workstation.	
Can deploy user notifications and start interactively educating the user on the cost of print and the organization's printing strategy.	

Workstation and Print Server Deployment

In this deployment, Xerox® Print Advisor is installed on one or more print servers and also on some or all of the organization's workstations. If your organization prints to print servers, but also permits workstations to print to local or Direct IP printers, this is the most efficient way to track your organization's printing.

Deployment to print servers and workstations gives you the opportunity to implement user notifications across the organization, whether printing to print servers, local printers, or Direct IP printers.

In the example below, Xerox® Print Advisor is installed on Workstation 1 and 3, Printer Server 1 and Print Cluster. Printer A and Printer B are Direct IP printers:

A User who Prints from…	Gets this Result…
Workstation 1 to Printer A	The print job is captured by Xerox® Print Advisor on Workstation 1.
Workstation 2 to Printer A	The print job will NOT be captured.
Workstation 2 to Printer B	The print job will NOT be captured.
Workstation 3 to Printer B	The print job is captured by Xerox® Print Advisor on Workstation 3.
Workstation 1 to Print Server 1	The print job is captured by Xerox® Print Advisor on Print Server 1.
Workstation 2 to Print Server 2	The print job will NOT be captured.
Workstation 3 to Print Server 2	The print job will NOT be captured.
Workstation 3 to Print Cluster	The print job is captured by Xerox® Print Advisor on the Print Cluster.

Note: If a workstation is left out of deployment, it can continue to print to local printers and printing will not be captured.

If a print server is left out of deployment, any print sent to it will not be captured, even if Xerox® Print Advisor was installed on the workstation sending the print job.

Workstation and Printer Server Deployment Advantages and Disadvantages

Advantages	Disadvantages
Appropriate for organizations that have a mix of central print servers, locally attached printers, and/or direct IP printing from the desktop.	May have to wait for workstation software deployment windows.
Uniform deployment: the same software package is installed on workstations and servers.	
Tracks all printing conducted in an organization, regardless of how or where the user prints.	
You can deploy user notifications to appear on the desktop.	

Installing Xerox® Print Advisor on Print Clusters

If your organization has pooled print servers into one or more print clusters, you can install Xerox® Print Advisor on print clusters that are set up in "active/passive" configuration. There is a slight difference in how Xerox® Print Advisor installs on print clusters. The same Xerox® Print Advisor code is used on print clusters as on print servers, workstations and Citrix/Terminal Servers. Please see the Xerox® Print Advisor *Installation Guide* for more information on installing Xerox® Print Advisor on Print Clusters.

Installing Xerox® Print Advisor on Citrix and Terminal Servers

Xerox® Print Advisor can be installed on Citrix servers or Microsoft® Terminal Servers. If the organization routinely uses Citrix or Terminal Servers to host applications, install Xerox® Print Advisor on these servers to ensure printing is tracked. Xerox® Print Advisor is highly optimized for running on Citrix or Terminal Servers, only one Xerox® Print Advisor Service is started per server and is shared with all user sessions.

The advantages to installing Xerox® Print Advisor on Citrix or Terminal Servers are as follows:

- Printing to a user's session printer is tracked even if Xerox® Print Advisor has not been installed on the user's workstation.
- Printing to Citrix/Terminal Server's local and Direct IP printers istracked.

The only disadvantage to installing Xerox® Print Advisor on Citrix or Terminal Server is that there is a 1 MB increase in memory consumption per user session.

> Note: Xerox® Print Advisor has been optimized for installation on Citrix and Terminal Servers.

Xerox® Print Advisor Security

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Xerox® Print Advisor is an enterprise Assessment and Print-Management solution that is delivered as a Managed Service. As part of this service, a secure solution is delivered through two components:

- Xerox® Print Advisor Client
- Xerox® Print Advisor Application Server (Xerox® hosting service)

With Xerox® Print Advisor, data is gathered at the client site and passed across the internet to be stored and consolidated in a secure database in our data centre. Although an internet connection is used, no information other than Meta data is passed across the firewall, leaving your data secure within your organization.

Communication is done using an SSL (Secure Sockets Layer) connection (HTTPS on port 443).

The SSL Certificate signed by Verisign is between 1024- and 2048-bit encryption, and always defaults to the highest level the client accepts.

Xerox® Print Advisor Client Security

The Xerox® Print Advisor Client is installed within your organization to track print jobs and runs as a Windows Service on any windows workstation or print server, and does not change the configuration in any way. It can run on a Local Administrator or special-service account, as defined by your organization.

Print jobs, and their content, never leave the company's internal network. The Xerox® Print Advisor Client simply records job statistics and transmits that information via the internet web services to the Xerox® Print Advisor Application Server.

> Note: No content leaves the organization, and no content is left unsecured.

Xerox® Print Advisor securely connects through your organization's firewall and across the internet; all data is encrypted during transmission using SSL with 2048-bit encryption. In addition, all data is encrypted while being gathered, and while stored. The only personal information gathered is the user's login name, allowing Xerox® Print Advisor to report to the user level.

Xerox® Print Advisor Application Server Security

The Xerox® Print Advisor Application Server performs two tasks:

- Storing meta-data about the print job.
- Acting as the organization's central administration portal.

The Xerox® Print Advisor Application Server runs on the Xerox® web server, and is written in ASP (Active Server Pages). The data is queried from the database at run time, formatted to HTML, and delivered to the client workstation. The Xerox® Print Advisor Application Server is fully protected by login ID and registration number.

The data center can only be accessed via biometric scans and has a 24 x 7 security guard. In addition, intrusion detection systems are in place along with 24 x 7 monitoring. Finally, the hosting facility undergoes regular Nessus scans to maintain the highest level of security.

Authentication and Authorization

There are two levels of authentication:

Level	Action
User	Xerox® Print Advisor uses your organization's existing Active Directory infrastructure to authenticate users. Xerox® Print Advisor does not require separate accounts with passwords for each user. When Xerox® Print Advisor is deployed in Assessment mode, the end user is not interacted with in any way.
Administrative User	Xerox® Print Advisor Administrators are users with special access to view more detailed organizational information. Administrators must always be authenticated through Active Directory, the same as a user, to access the Client and the Administrator portal. In addition to accessing the portal through the Xerox® Print Advisor Client, an Administrator can set-up accounts to grant remote login privileges to the organization's administrative portal over the internet. Remote access authorization can only be granted to an Administrator by another Administrator. Remote access should be granted only in the most extenuating circumstances. In addition, it should be monitored closely and revoked when it is no longer required.

Port Requirements

Several port openings are required:

Port	Details
External	Each installation of Xerox® Print Advisor requires SSL port 443 to allow communication between the Xerox® Print Advisor Client and the hosted Xerox® Print Advisor Application Server.
Internal	When you deploy Xerox® Print Advisor to both workstations and print servers, you are required to provide a port range that Xerox® Print Advisor can use. Xerox® Print Advisor uses these ports for internal Xerox® Print Advisor communication purposes. During installation, the default port range is 49218 to 49219. These ports can be reassigned during installation to suit your site requirements.