

Table of Contents

Introduction	1
Audience	1
Determining an Appropriate Deployment Style	1
Small Networks	1
Example.....	2
Mid-size networks.....	4
Example.....	4
Large Networks	6
Example.....	7
Multiple Sites with no Centralized Reporting	8
Example.....	9
Multiple Sites with Centralized Reporting	10
Option 1: Multiple Databases with Periodic Data Merging	10
Example:	11
Option 2: Single Database with Clients Connecting over a WAN	12
Example	13

Introduction

This whitepaper provides recommendations for deploying Print Audit 5 to various types and sizes of networks. The recommendations are based on the design of the software as well as testing conducted in Print Audit's development labs.

Please note that this whitepaper mentions the use of the Print Audit Setup Program, but only provides very high-level descriptions of its usage. For detailed information on using the setup program, please refer to <http://www.printaudit.com/installationguides.asp>

Audience

This whitepaper was written for people responsible for deploying Print Audit 5 to a Windows-based network.

Determining an Appropriate Deployment Style

There are four main factors which influence the way Print Audit 5 should be deployed to a network to ensure that the software functions correctly and provides the best performance possible:

1. Size of Network. How many workstations need to be tracked?
2. Physical network layout. Is there a single Local Area Network (LAN), or are there several LANs? Are multiple local networks connected by a private Wide-Area Network (WAN)?
3. Desired reporting characteristics. Is it important to be able to report on all the data for the entire organization from a single point, or is reporting by site enough?
4. IT staff availability. Is there a dedicated IT staff responsible for the network, or is IT a secondary responsibility of one or more employees with other primary responsibilities?

The remainder of this whitepaper recommends deployment styles based on these four main factors. While these recommendations are designed for the majority of cases, some tailoring may be required for your specific network environment. Please contact us for assistance with deployment if you have questions or specific requirements not covered in this whitepaper.

Small Networks

For small, simple networks, it is usually easiest to deploy Print Audit using the Access Database backend. This type of deployment is very simple to do, and requires only general IT knowledge.

This deployment style is ideally suited to the following situation

- There is a single network with less than 100 workstations
- There may or may not be dedicated IT staff responsible for the network

In this deployment style, all of the data will be tracked to a single database, and can be reported on from a single source.

The basic deployment steps are as follows:

- 1) Install all Print Audit 5 Components to one computer, using the Quick Install feature of the Print Audit 5 Setup program. This machine will host the database and client communicator, which other computers will talk to whenever they print. This can be any computer on the network, so long as it is always turned on when people will be printing. If you need to use the Administrator or the Job Manager from other computers, share out the directory containing the database to the network.
- 2) Install the Print Audit 5 Client, but no other features, to every other workstation that you want to track printing from.
- 3) If required, install additional Print Audit 5 Tools (the Administration tools and the Job Manager) to specific desktops, for users who will be using their functionality.

This deployment uses a Microsoft Access database to store data, which should provide adequate performance for 100 or fewer workstations on a simple network. For performance reasons, we recommend that the Client communicator and Database be on the same computer. This is the default when using the Quick Install feature of the Print Audit 5 installer.

You can also put the database on a different computer than the client communicator, and access it using a file share, but this is **not** recommended as it may result in poor performance and additional network traffic.

Example

Suppose that Alice is the primary person who will administer Print Audit, and that her computer is never turned off. Bob, the accountant, needs to use the Print Audit data every month to generate client invoices, and Christine will be responsible for administering Print Audit while Alice is on vacation.

Figure 1 (below) shows the recommended deployment for this example.

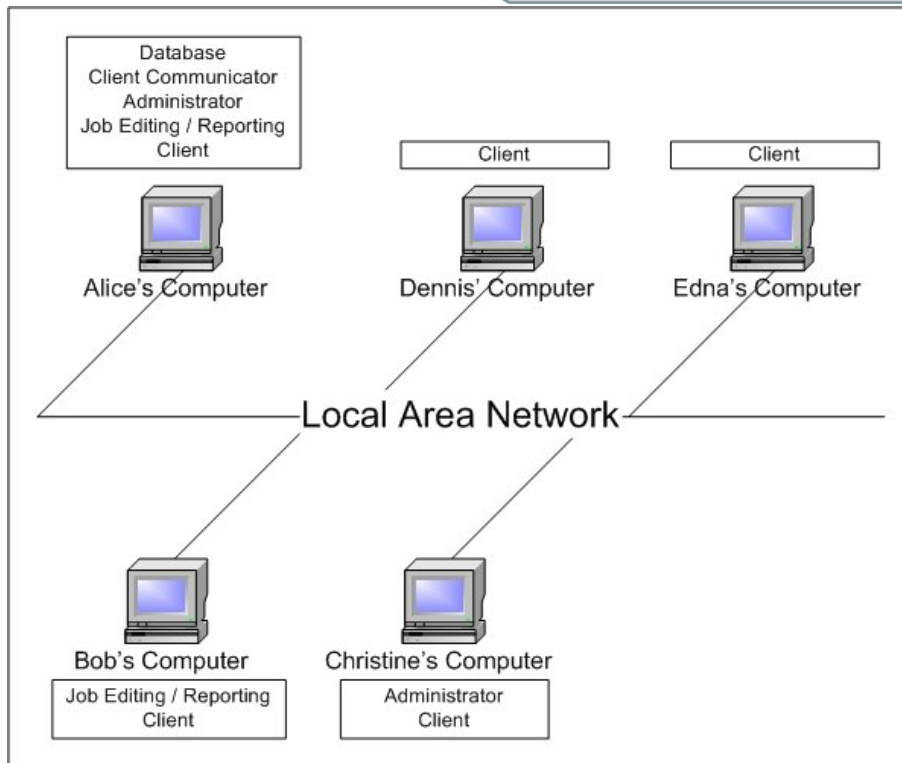


Figure 1: Example deployment to a small network

To deploy Print Audit as depicted in Figure 1, the following steps are required:

- 1) Alice installs all of the Print Audit 5 components to her own computer, using the Quick Install feature of the Print Audit 5 setup program. She shares out the directory containing the Print Audit 5 database, and ensures Bob and Christine have access to it over the network.
- 2) Alice installs the Print Audit 5 Client, Job Editing and Reporting tools to Bob's computer, using the step-by-step installation method in the setup program.
- 3) Alice installs the Print Audit 5 Client and Administration tools to Christine's computer, using the step-by-step installation method in the setup program.
- 4) Alice installs the Print Audit 5 Client to Dennis' and Edna's computers, using the Client Only Install feature of the setup program on each of them.
- 5) Alice uses the Print Audit 5 Administration tool from her computer to ensure that Bob and Christine have the appropriate security access to Print Audit 5 to do the required accounting reports and administer Print Audit, respectively.

Mid-size networks

For mid-sized networks consisting of one or more servers and 100-1000 workstations, we recommend a deployment very similar to the deployment for small networks, but which requires slightly more IT knowledge.

This deployment style is ideally suited to the following situation

- There is a single network with 100 – 1000 workstations
- There is a dedicated IT staff responsible for the network

In this deployment style, all of the data will be tracked to a single database, and can be reported on from a single source.

The basic deployment steps are as follows:

- 1) Determine a location to store the Print Audit Database. For this deployment style, we **strongly** recommend using either SQL Server or the Microsoft SQL Server 2005 Express Edition. If you already have SQL Server installed on your network, you may use that database server for the Print Audit Database. If not, we recommend downloading SQL Server 2005 Express Edition from Microsoft, which is available free of charge.
- 2) Install the Client Communicator to a computer that will always be turned on. This could be the same computer as the database server is running on, or another computer on the network.
- 3) Use the Network Install feature of the Print Audit 5 setup program to create a client-only network installation.
- 4) Use a network rollout method such as logon scripts, Active Directory, or the Client Status & Deployment tool to install the Print Audit client to the other computers on the network.
- 5) Install the Administration and Job Editing and Reporting components to those computers that require these tools.

For 1000 or fewer workstations, SQL Server 2005 Express Edition should provide adequate performance in most cases. If you experience performance issues with Print Audit, you may want to consider using SQL Server instead of SQL Server 2005 Express Edition.

Example

Suppose that there are 200 computers in your office. Andrew, who works in the Information Technology department, will be responsible for setting up and maintaining Print Audit for the office. Bernice is responsible for the print cost reduction project, and needs to be able create reports every month to track the progress of the project.

Figure 2 (below) shows the recommended deployment for this example.

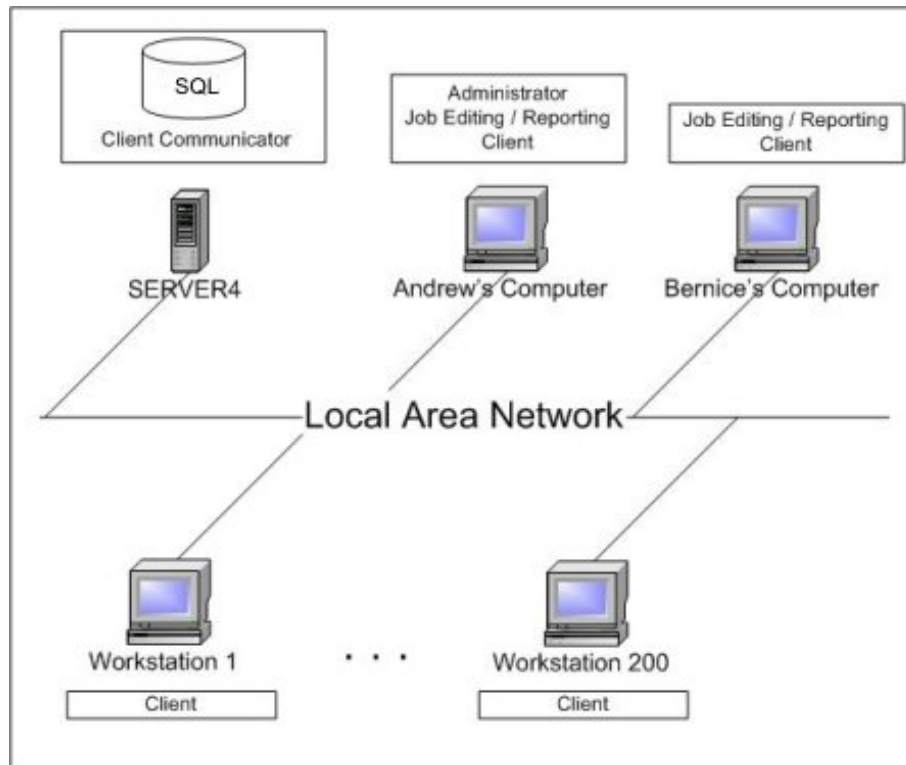


Figure 2: Example deployment to a mid-size network

To deploy Print Audit as depicted in Figure 2, the following steps are required:

- 1) Andrew downloads SQL Server 2005 Express Edition from Microsoft's web site, and installs it on SERVER4.
- 2) Andrew uses the Step-By-Step installation to install Print Audit to SERVER4, selecting SQL Server as the database Type. He also chooses to create a new database and install the Client Communicator.
- 3) Andrew creates a new database for Print Audit as prompted after the installation completes, and configures the client communicator to connect to the newly-created database.
- 4) Andrew uses the Step-By-Step installation to install Print Audit to his own computer, selecting SQL Server as the database type. He opts not to create a new database, and not to install the Client Communicator, but installs all the other features.
- 5) Andrew tests the setup by doing a print job from his computer, and using the Job Manager to ensure it was tracked correctly.
- 6) Andrew uses the Network Install feature of the setup program to create a Network Installation package that installs only the Print Audit Client.
- 7) Andrew uses Active Directory to rollout the network installation package to all workstations on the network, the same way as he would for any other software installation.

- 8) Andrew uses the step-by-step install feature of the setup program to install the Client and Job Editing and Reporting tools to Bernice's computer.
- 9) Andrew uses the Print Audit Administrator on his own computer to give Bernice the necessary permissions to run the reports she needs.

Large Networks

For large networks consisting of one or more servers and 1000 or more workstations, we recommend a deployment very similar to the deployment for mid-size networks, but which requires slightly more IT knowledge.

This deployment style is ideally suited to the following situation

- There is a single network with 1000 or more workstations
- There is a dedicated IT staff responsible for the network
- The network already contains one or more servers running Microsoft SQL Server, or IT staff members are familiar with Microsoft SQL Server and comfortable setting it up

In this deployment style, all of the data will be tracked to a single database, and can be reported on from a single source.

The basic deployment steps are as follows:

- 1) Determine a location to store the Print Audit Database. For this deployment, we **strongly** recommend using Microsoft SQL Server. Though it is possible to use the Microsoft SQL Server 2005 Express Edition, we do **not** recommend it; it will provide reduced performance, and you will be limited to a 2GB maximum database size. If you already have SQL Server installed on your network, you may use that server for the Print Audit Database. Ensure you have SQL Server installed and running before proceeding.
- 2) Install the Client Communicator to a computer that will always be turned on. This could be the same computer as the database server is running on, or another computer on the network.
- 3) Install the Client Communicator on several other computers. As a rough rule of thumb, you will need 1 Client Communicator for every 1000 workstations you want to track.
- 4) Use the Network Install feature of the setup program to create one client-only network installation for each client communicator.
- 5) Use a network rollout method such as logon scripts, Active Directory, or the Client Status & Deployment tool to install the Print Audit client to the other computers on the network. Roll out one network install package to the first 1000 computers, the second network install package to the next 1000 computers, and so on.
- 6) Install the Administration and Job Editing and Reporting components to those computers that require these tools.

This deployment can scale to meet the demands of the largest networks. To ensure continued high performance, we recommend maintaining a 1:1000 ratio (or better) between Client Communicators and workstations as your network grows.

Example

Suppose that your office has 1500 computers spread over four floors of a building. Brian is spearheading a print analysis effort to reduce costs in your organization. He will be administering Print Audit after it is installed, and his coworker Cameron will be responsible for producing biweekly reports of the collected data.

Agnes, who works for Information Services, is responsible for managing the standard workstation image that is deployed to all 1500 workstations. She uses Active Directory to push out updates as required. Dianne manages the network servers. They will be working together to get Print Audit installed on the network.

Figure 3 (below) shows the recommended deployment for this example.

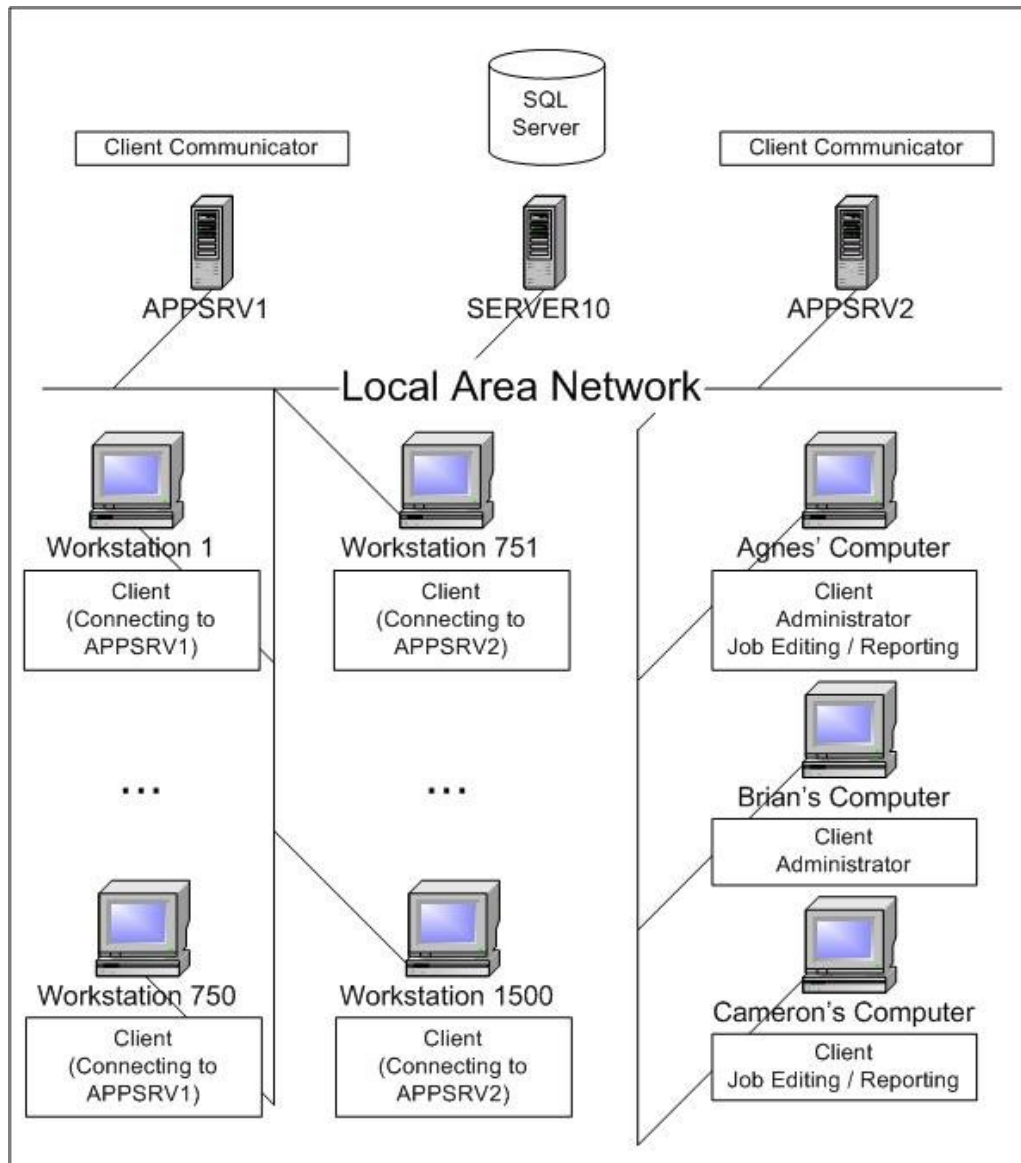


Figure 3: Example deployment to a large network

To deploy Print Audit as depicted in Figure 3, the following steps are required:

- 1) Dianne determines that the existing SQL Server infrastructure on SERVER10 has the appropriate capacity to handle Print Audit in addition to its current workload, so there is no need to install a new SQL Server instance.
- 2) To support 1500 workstations, Dianne decides to install two client communicators, choosing APPSRV1 and APPSRV2 as the computers they will be installed to.
- 3) Dianne uses the Step-By-Step install to install Print Audit 5 on APPSRV1, selecting SQL Server as the database type. She also chooses to create a new database and install the client communicator.
- 4) Dianne creates a new database for Print Audit as prompted after the installation completes, and configures the client communicator to connect to the newly-created database.
- 5) Dianne uses the Step-by-Step install to install Print Audit 5 on APPSRV2, again selecting SQL Server as the database type. She chooses **not** to create a new database, but again chooses to install the client communicator.
- 6) Dianne configures the second client communicator to connect to the database.
- 7) Agnes uses the step-by-step install feature to install all the features except the Client Communicator on her own computer, so she can test the software and make sure it works with the standard workstation configuration.
- 8) Agnes uses the Network Install feature to create a client-only network install that will communicate with the Client Communicator on APPSRV1.
- 9) Agnes uses Active Directory to install this network installation package to the roughly 750 computers on the lower two floors of the building.
- 10) Agnes uses the Network Install feature again to create a second client-only network install, this time configured for the Client Communicator on APPSRV2.
- 11) Agnes uses Active Directory to install this second network installation package to the roughly 750 computers on the upper two floors of the building.
- 12) Agnes uses the step-by-step install feature of the setup program to install the Client and Job Editing and Reporting tools to Cameron's computer.
- 13) Agnes uses the step-by-step install feature of the setup program to install the Client and Administration tools to Brian's computer.
- 14) Agnes uses the Administration tool on her computer to give Brian Administrator access to Print Audit, so he can do his job.
- 15) Brian uses the Administration tool on his computer to give Cameron the appropriate access to create the required reports.

Multiple Sites with no Centralized Reporting

When deploying Print Audit to multiple sites where centralized reporting is **not** a requirement, the simplest way is to treat each site as a totally separate installation, and deploy Print Audit 5 to each site according to the appropriate recommendations for that site.

This deployment style is ideally suited to the following situation

- There are multiple sites, each with its own network

- Centralized reporting is not a requirement

The basic deployment steps are as follows:

- 1) For each site, determine the appropriate deployment style. Often, you can follow the styles for Small, Mid-Size and Large Networks described in previous sections.
- 2) Deploy to each site individually.

In this type of deployment, data for each site will be stored independently from the data for other sites. Centralized reporting will not be possible.

Example

Suppose that your company has three offices. The head office with roughly 200 computers is in Calgary, Alberta, and there are smaller offices in Toronto, Ontario and Vancouver, British Columbia, each with roughly 50 computers.

Each site has its own printing budget and its own IT person who will be responsible for maintaining Print Audit. Since Print Audit is being used for cost reduction in this case, there is no need for centralized reporting.

Aaron is responsible for rolling out to Calgary, Betty will roll out to Vancouver, and Chris will roll out to Toronto.

Figure 4 (below) shows the recommended deployment for this example.

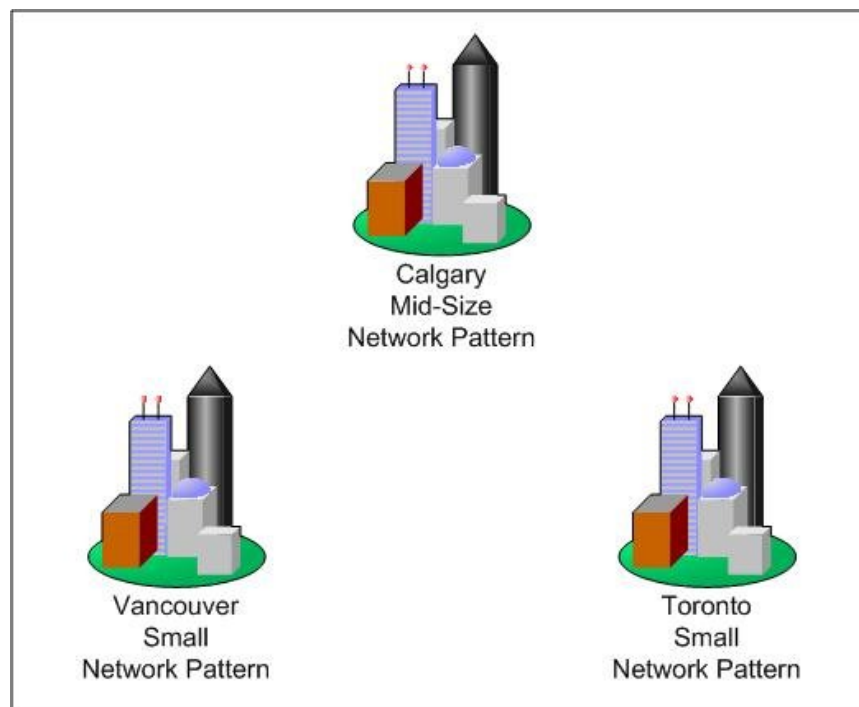


Figure 4: Example deployment to multiple sites with no centralized reporting

To deploy Print Audit as depicted in Figure 4, the following steps are required:

- 1) Aaron, Betty, and Chris determine in a planning meeting that the rollout to Calgary will follow the Mid-Size Network style, while the rollouts to Vancouver and Toronto will follow the style for Small Networks.
- 2) Aaron deploys Print Audit to the Calgary, following the style for Mid-Size Networks.
- 3) Betty deploys Print Audit to the Vancouver office, following the style for Small Networks.
- 4) Chris deploys Print Audit to the Toronto office, following the style for Small Networks.

In the future, if the project grows beyond simple cost reduction and centralized reporting becomes important, Chris and Betty could use the Job Merge Wizard to export data from their sites, and Aaron could use the Job Merge Wizard to import their data into the database in Calgary. This type of deployment is discussed in the next section.

Multiple Sites with Centralized Reporting

When deploying Print Audit to multiple sites where centralized reporting is a requirement, there are two deployment options:

Option 1: Multiple Databases with Periodic Data Merging

If you have multiple sites not connected by a WAN, or the WAN is not a high-speed WAN, you can periodically export data from satellite sites and import it into the database at the parent site.

This deployment style is ideally suited to the following situation

- There are multiple sites, each with its own network
- There is no WAN connecting the sites, or the WAN is not high-speed
- There is a dedicated IT staff responsible for the network
- Centralized reporting is a requirement

In this case, the basic deployment steps are as follows:

- 1) Decide which site will have the database from which you will be doing centralized reporting (the parent site). For this site, choose the appropriate deployment style. Whichever style you base the deployment on, ensure you are using a Microsoft SQL Server database (as in the Mid-Size Network and Large Network styles). We **strongly** caution against using an Access Database for this site (as in the Small Network style), as you will likely encounter performance problems.
- 2) For all the other sites (the satellite sites), determine the appropriate deployment style.
- 3) Deploy to each site individually.

In order to make centralized reporting possible, you can use the Job Merge Wizard to export the data from the satellite sites, and import it into the database at the parent site. The basic steps are as follows:

- 1) Periodically, use the Job Merge Wizard at the satellite sites to export print job data. If you wish, you can set this up to happen automatically on scheduled basis.
- 2) Transmit the exported job data from the satellite sites to the parent sites. Any transmission mechanism you would normally use to transfer files will work (e-mail, FTP, etc.). Bear in mind that the files may be quite large if there is a lot of print job data to transfer.

- 3) Periodically, Use the Job Merge Wizard at the parent site to import the data transferred from the satellite sites. If you wish, you can set this up to happen automatically, on a scheduled basis.

Any reporting that requires data from multiple sites can now be done from the database at the parent site.

Example:

Suppose that your company has hired a consulting company to help with cost reduction across your printer and photocopier fleet. Alexandra, who works at the California office, is working with the consulting company to deploy Print Audit company-wide, in order to gather data for 30 days. At the end of the 30-day period, the data will be analyzed and presented in a report to upper management.

This means rolling out Print Audit to all 4 regional offices, each with roughly 300 computers, and ensuring that all the data ends up in one place so that the reporting can be done on all the data from the entire company.

The five regional offices each have their own network which is connected to the Internet, but there is no private WAN connecting the offices.

Figure 5 (below) shows the recommended deployment for this example.

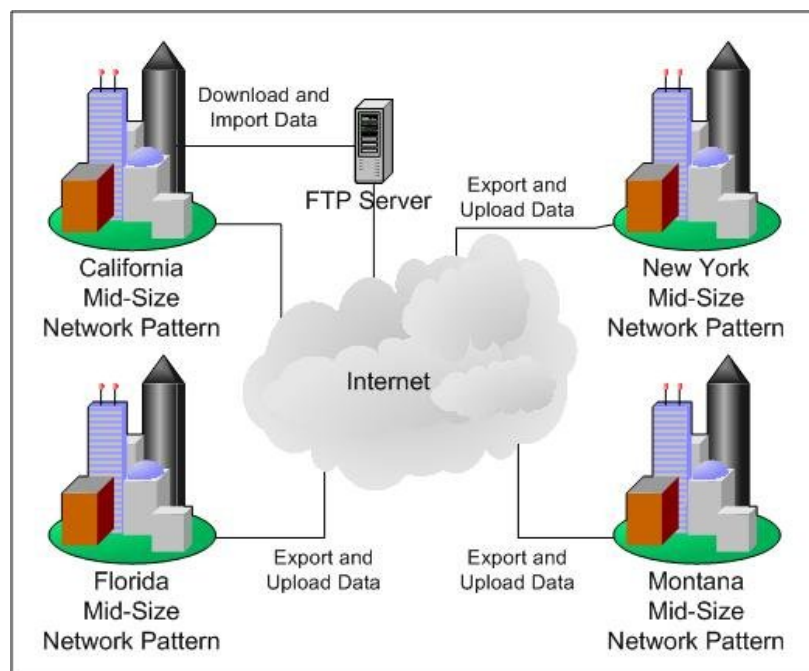


Figure 5: Example deployment to multiple sites with periodic data merging

To deploy Print Audit as depicted in Figure 5, the following steps are required:

- 1) Alexandra, working with the consultant, plans to deploy Print Audit to all 4 sites. All of the sites seem to be well-suited for the Mid-Size Network style.
- 2) Alexandra plans how the data will be merged using the Job Merge Wizard. She plans on using the location of each of the offices (California, Florida, Montana, and New York) as the “Company Names” when merging all the data into the database at her location. For simplicity, she also uses the location names as the Merge Codes.
- 3) As an initial test, Alexandra rolls out to just her computer, to ensure she understands how all the components will be deployed.
- 4) Alexandra rolls out to all the computers in the California office.
- 5) Alexandra coordinates with the IT staff at the other four offices to deploy Print Audit to their offices.

After double-checking the setup at each site, the 30-day evaluation begins. At the end of the 30 days, all the data is merged as follows:

- 1) Alexandra has the IT staff at the other three sites export their data, using their location names as their Merge Codes.
- 2) The other three sites upload their exported data to the company’s private FTP site.
- 3) Alexandra downloads the data from the FTP site.
- 4) Alexandra uses the Job Merge Wizard to merge each of the three data files into the database at her site. The first time she runs the Wizard, she configures all the Company names and Merge Codes.
- 5) The consulting company does their analysis and reporting using the database at Alexandra’s site.

Option 2: Single Database with Clients Connecting over a WAN

If you have a high-speed WAN and wish to forego the need for periodically importing and exporting data, or wish to avoid administering a database at each site, you can have the Print Audit Clients at satellite sites connect to a central site to report data.

This deployment style is ideally suited to the following situation

- There are multiple sites, each with its own network
- There is a high-speed WAN connecting all of the sites
- There is a dedicated IT staff responsible for the network
- Centralized reporting is a requirement, or you wish to avoid administering databases at each site

In this case, the basic deployment steps are as follows:

- 1) Decide which site will act as the parent site that all clients will connect to. For this site, choose an appropriate deployment style, but use the total number of workstations at **all** sites when determining the style to follow.
- 2) Deploy to this site, following the chosen style.

- 3) Ensure that TCP/IP network traffic will be able to reach the Client Communicator(s) at the parent site from each of the satellite sites. Depending on your specific network configuration, this may involve configuring additional firewall rules to allow the traffic to pass. You can configure the Client Communicator to listen on any port number. The default is to use TCP port 17520.
- 4) Using the Network Install feature of the Print Audit 5 Setup Program, create one or more network installations for the satellite sites, specifying that only the Client should be installed. Each network installation is configured with the IP address and TCP port number for a single Client Communicator. The total number of workstations you are tracking and your wide-area network configuration will determine how many different network installations you need. For instance, if the IP address you use to connect to the Client Communicator is different for each satellite site, you will need a separate network install for each site.
- 5) Deploy to each of the satellite sites, using the appropriate network installation package and whatever deployment mechanism you usually use for deploying client software to workstations.
- 6) Test the deployment by printing from each of the satellite sites, and using the Job Manager at the parent site to ensure that the print jobs are tracked to the database correctly.

In this deployment style, all the data is reported to a single database, so centralized reporting and maintenance is possible.

Example

Suppose you work in a medium-sized engineering firm, who wants to use Print Audit to accurately capture all of the printing, plotting, and photocopying done for clients. The costs of this printing will be billed back to the clients.

There are two offices for the company: one in Calgary, Alberta with about 50 computers, and one in Edmonton, Alberta with about 80 computers. For larger projects, engineers at both offices often collaborate closely, and there is a high-speed WAN connection between the two offices to facilitate this type of work.

Alan, an Information Services employee in Edmonton, manages the company's existing SQL Server databases. Brenda, also in Edmonton, manages the application servers and desktops; she will be responsible for installing the software on all the desktops across the company. Charles, who supports the WAN, will have to make any required firewall adjustments. Denise, who works in accounts receivable, is responsible for managing the client codes used for billing; Eric, also in accounts receivable, will be responsible for billing the clients.

Figure 6 (below) shows the recommended deployment for this example.

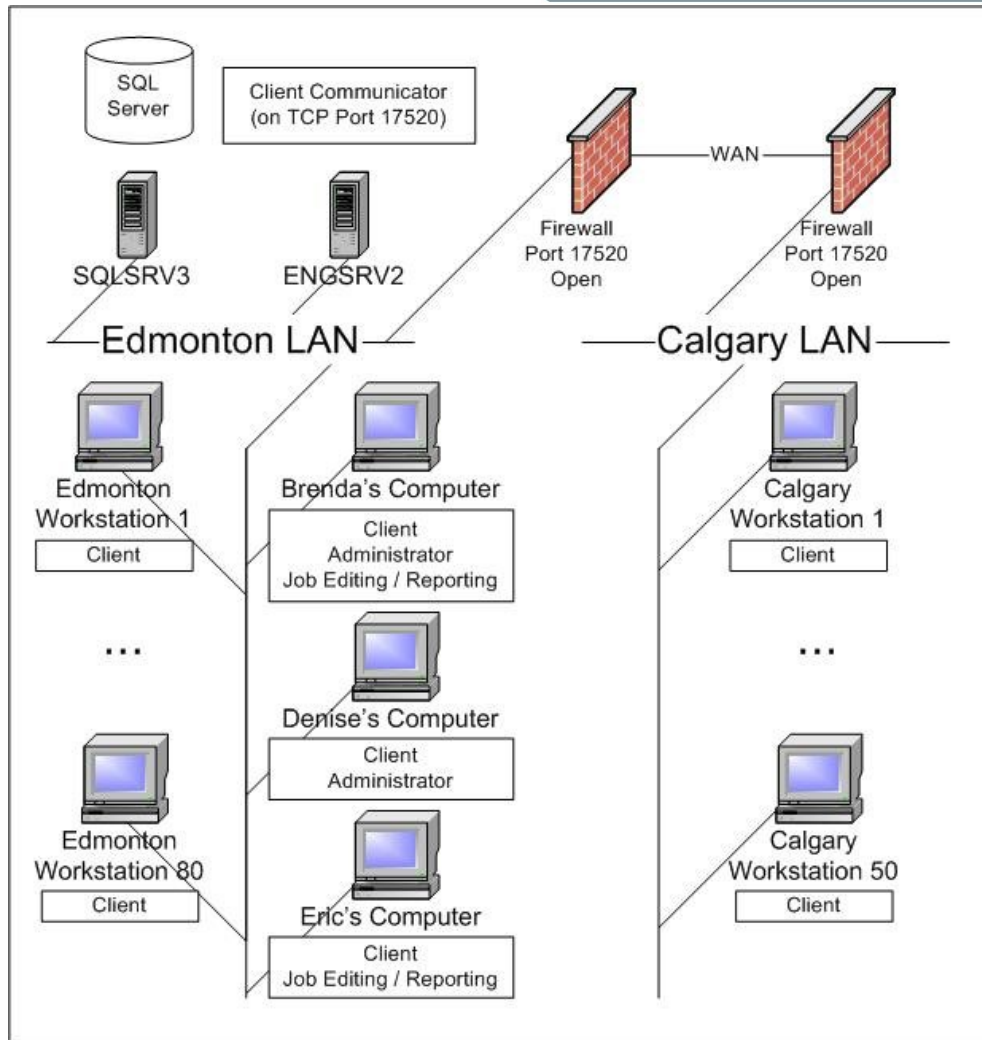


Figure 6: Example deployment to multiple sites with clients connecting over the WAN

To deploy Print Audit as depicted in Figure 6, the following steps are required:

- 1) Alan, Brenda, and Charles meet to discuss the technical aspects of the Print Audit 5 deployment. Alan knows that the existing SQL server infrastructure on SQLSRV3 is sufficient to handle the data.
- 2) Brenda and Charles think the WAN will be fast enough to handle the extra traffic of Print Audit, given the amount of printing done in Calgary; Alan would like to avoid having to administer a separate database in Calgary.
- 3) Since there are fewer than 200 workstations, Brenda decides that one client communicator will be enough for both sites to share.
- 4) Brenda uses the Step-By-Step install to install Print Audit 5 on ENGSRV2, selecting SQL Server as the database type. She also chooses to create a new database and install the Client Communicator.

- 5) Brenda has Alan create a new database for Print Audit as prompted after the installation completes.
- 6) Brenda configures the Client Communicator to connect to the newly-created database.
- 7) Brenda uses the step-by-step install feature to install all the features except the Client Communicator on her own computer, so she can test the software and make sure it works with the standard workstation configuration.
- 8) Brenda uses the Network Install feature to create a client-only network install.
- 9) Brenda uses Active Directory to install this network installation package to the roughly 130 computers across the entire network.
- 10) Charles adjusts the firewall configuration to allow traffic from Calgary to the Client Communicator in Edmonton on port 17520.
- 11) Brenda uses the step-by-step install feature of the setup program to install the Client and Job Editing and Reporting tools to Eric's computer.
- 12) Brenda uses the step-by-step install feature of the setup program to install the Client and Administration tools to Denise's computer.
- 13) Brenda uses the Administration tool on her computer to give Denise Administrator access to Print Audit, so she can do her job.
- 14) Denise uses the Administration tool on his computer to give Eric the appropriate access to export Print Audit's data so it can be imported into the accounting software, where he generates the client invoices.