XEROX®

Technology | Document Management | Consulting Services

What is the true Office Productivity?

- Eliminating the confusion over multiple vendors' conflicting network printing productivity and performance claims
- Factors affecting MFP performance

Understanding Network Printing Productivity

What is everyone saying?
Why are the test results different?

The following exchange addresses the buzz around network office productivity, exploring the elements that impact network office printing performance and providing testing recommendations.

Q: Rated Speed; Vendor Claims; Consultant Test Reports – all with different results! Confusing?

A: If you look at product brochures, advertising claims, and third party test results, you are probably confused as to why there is a large difference in the productivity results for the same product. Historically, the rated speed for a copier was close to the actual output of the copier. When you are printing documents in a busy office environment, you will see significantly different results between the rated speed of the device and actual throughput.

In all cases, vendors claim a rated speed for their product. Industry standard rated speed can be determined by placing an original on the device platen. Select 100 pages and press start. After the first page is out of the system and into the output tray, a certain number of pages will be produced in the next sixty seconds. For example, a device with a rated speed of 50 pages per minute (PPM) will produce 50 pages in the next sixty seconds after the first copy is produced. However, when printing documents, a system with a rated speed of 50 PPM may have print at speeds that are less than 50% of the rated speed.

Q: What do the consultants say?

A: There are a number of independent consulting companies that perform printing testing and analysis of multifunctional systems. They all test systems with their own test methodology. Each firm ends up with different test results for the same products. The test results are accurate for what is tested, but vary because each company uses a different test suite. In lieu of commenting on each company's test suite and methodology, we will discuss the factors affecting any test results that should be considered when analyzing the data and overall report conclusions.

Q: What impacts productivity?

A: Two key areas that impact productivity are as follows:

1. What documents are primarily printed?

   a) Are documents primarily stapled, unstapled, or a mixture or stapled/unstapled output?
   b) Are the documents primarily small (e.g., 1, 2, or 3 pages) or larger documents?
   c) Is printing done in a production environment (long run lengths, multiple sets) or office environment (typically small documents with very short run lengths)?
   d) Are documents simple or complex documents (i.e., containing embedded graphics)?
   e) What are the primary printed applications (e.g., Microsoft® Word, PowerPoint, Excel, email notes, PDF files, etc.)?
   f) In the case of color capable multifunction systems, what type of engine is used (i.e. four pass vs. single pass), and is there a significant difference between the color speed and the monochrome speed?
   g) Does the color device pause often to calibrate, replenish toner, or other system checks?

2. What is the workgroup size?

   a) How many users are printing to the system (e.g., do you have a small workgroup of 3 – 4 people or larger workgroups of 10 or more people)?

Let's now look at how each of these factors affects productivity.

Q: What is the impact of stapled and unstapled output?

A: A critical factor in determining the effectiveness of the system is to see how it behaves when handling a mix of stapled and unstapled output. Some systems can effectively print documents that are all unstapled or all stapled documents. In the office environment, however, the job mix probably contains a mix of stapled and unstapled output. For example, you may have a one page mail note followed by a stapled attachment. As the finisher is the most commonly ordered accessory for multifunction systems, it is important to understand the impact on productivity when you have this type of environment.

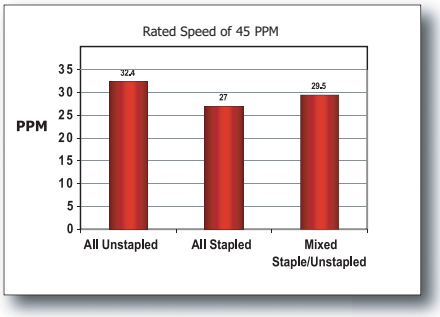
A simple test using six documents that are three pages each will illustrate the impact of stapling.

1. Pause the print queue. At the PC that you will use for the job submission, select "start", select "Printers/Faxes", right click on the desired printer, and select "Pause Printing." (This process is for Microsoft® Windows XP users. Other operating systems may vary on how you pause the print queue).
2. Send three stapled documents to the paused printer followed by three unstapled jobs.
3. Release the paused printer and record the amount of time it takes to print the six documents.
4. Pause the printer again.
5. Using the same documents, send the stapled job to the paused printer followed by a three page unstapled job. Repeat the process until you have the six jobs in the queue, with every other job stapled followed by an unstapled job.
6. Release the paused printer and record the amount of time it takes to print the six documents. Although you may assume that the productivity of the systems would be the same for either all unstapled documents or in the mixed staple/unstapled environment, you will likely see significantly different results than you expected.

You may see more than a 50% reduction in productivity when doing this simple test depending on the system that is being tested.

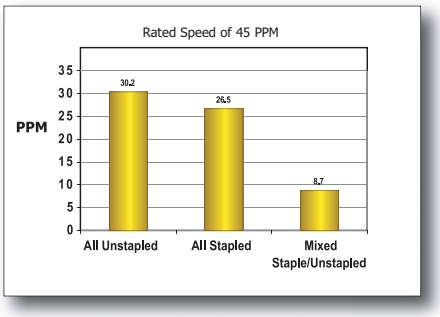
We tested the Xerox WorkCentre® Pro 245 vs. a competitive 45-PPM system. The results of the testing for the Xerox and competitive systems are posted below. You may be surprised to know how much the productivity can be impacted when your jobs are mixed staple and unstapled jobs!

Xerox WorkCentre Pro 245



Note that the Xerox WorkCentre Pro 245 print speed did not vary significantly when printing the unstapled, stapled, or mixed output.

Competitive System



The competitive vendor produced the jobs at a low of 8.7 PPM to a maximum of 30.2 PPM. Simply mixing the output reduced the productivity by more than 2/3. A busy office environment, printing documents that have both stapled and unstapled output will be significantly impacted when job output is mixed.

Q: Why is the size of a document important?

A: Productivity is impacted with many systems when you are printing a large number of small documents. Some systems will have a noticeable delay between print jobs. When you have a large number of these jobs, as is often times found in the office environment, many competitive systems may have a significant impact on the productivity of the system.

Q: Why will there be a difference in productivity between an office environment and a production environment?

A: In a production environment, you generally have longer run lengths than in the office environment, resulting in the printing of multiple sets. As the number of sets increases, the productivity of all systems will also increase.

Several years ago, you may have created multiple sets of documents for a meeting. Today you may send out the document electronically with each user printing a single set of the document to take to the meeting. Also, when you print a mail note, memo, or report in the office environment, you generally only print a single set of the document. In many cases, we have gone from print and distribute to distribute and print. Instead of multiple sets we are producing individual sets. In the office, where there are a lot of jobs being printed with one or only a few sets made, the system may achieve only a fraction of the rated speed of the system.

Q: How does the document complexity impact productivity?

A: All documents must be prepared for printing. This starts at the PC where a Page Description Language is created and then sent to the device. At the device, the print controller creates a raster image (RIP) with the appropriate commands such as stapling, duplex, assigning appropriate fonts, and document data. The raster image can now be processed and printed by the device. As the jobs become more complex, for example a PowerPoint® document with embedded graphics, the process takes longer because there is more data that must be analyzed and prepared for printing.

Generally, systems with more powerful print processors and memory will create the raster image faster than if you have a slow processor. Some systems will also allow the print controller to RIP one job while another job is being printed. When the previous job finishes printing, the next job is already prepared for printing, reducing time between jobs to print. Systems that do not allow you to RIP documents while printing other documents will have reduced productivity as the system may have to wait for the next job to be RIP'd before printing it.

Q. With color MFP's, why does the engine type make a difference?

A: There are three types of engines that are used in most of the color MFP and printer devices manufactured today. A four-pass color engine's productivity (capable of printing, for example, 20 pages per minute (PPM) for black text but slowing to 5 PPM when layering black, cyan, magenta and yellow for color jobs) will be greatly affected if a document has color and monochrome pages mixed throughout the job.

The second type, a single pass engine (lays the color and black toner down in one pass) will handle a mixed color and monochrome document better than a four pass because it is not having to pass the pages through the system multiple times.

The third type of engine is one that is a hybrid of single pass and four pass. These engines have the black toner separate from the color toners. When a monochrome only page passes through the system the color toners are "disengaged" from the print path. However, if a document has color pages mixed in it, the color toners have to be "re-engaged" into the print path so the color can be added to the page. Often this process of engaging and disengaging the toners can take anywhere from 30 seconds to a minute to occur. Now imagine this having to happen multiple times in one job.

Q: Why are job types important?

A: Job types will often vary as to the length and complexity of the job. For example, PowerPoint documents will tend to be longer documents than an email note or short memo. If you have a majority of short jobs, the performance may be affected in two ways. There may be reduced productivity because the system does not effectively handle a larger network queue created by the series of smaller jobs. Longer jobs will also allow the system to focus on printing the job rather than managing the job queue, resulting in increased productivity. The complexity of the jobs may also vary by job type, which can affect productivity.

On a color system, the job type is important as a gauge to how much color is on the pages. Many competitive color devices have to pause to calibrate, adjust the fuser temperature, or replenish the toner if the job contains a lot of color. These pauses can take up to two minutes to complete, and often happen in the middle of the job.

Q: Why does the workgroup size make a difference?

A: An effective multifunctional system can reduce or eliminate expensive personal or small shared printers. The system becomes even more cost effective as the size of the workgroup increases. As the workgroup size increases, the number of jobs that are printed during the day also increases.

You will probably encounter peaks and valleys in your workload. For example, when you arrive at your desk first thing in the morning, what do you do? Many people open their email and either read documents on line or print email notes and attachments. It is estimated that it is 30% faster to read a hard copy document versus an electronic document. Many users also take the hard copy to meetings and review during the meetings.

Performance testing should replicate the busy office environment where multiple people are printing documents at the same time. When this happens, the system uses a print queue. The effectiveness of the network controller and system's ability to manage the print queue should be tested. That is, how quickly can the system RIP the next document in queue while printing the current job? Does the system minimize the time between jobs or does it cycle down between print jobs?

A small workgroup may have different test considerations. For example, if you are sharing a device with two or three other people, you will not encounter the same type of problems with multiple jobs in queue, as you will in the busy workgroup environment where multiple people are sharing a single device.

In this test, you should again replicate the type of jobs that you print and the number of sets that you will produce. Your requirement may also be how quickly you can get your individual job completed. In this case, you may want to simply test "Click to Clunk" whereby you print a single job and determine how long it takes to print the single job. If you encounter job queues, you should consider a similar test as described above for the busy workgroup environment.

Q: Why are separator or banner sheets important?

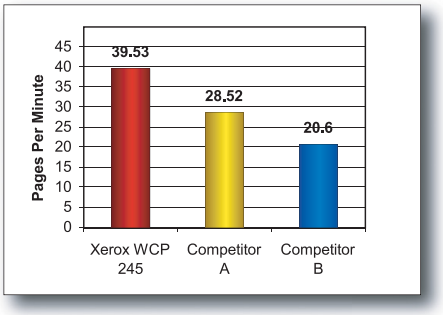
A: A banner or separator sheet is a piece of paper that is placed between print jobs. The banner makes it very easy to identify the user who printed the job. We believe that a separator sheet is critical to support a large workgroup. If you cannot easily find your job, many people reprint the job, resulting in wasted productivity, increased costs and waste at the end of the day.

If the end user community is unhappy with the system implementation because they cannot easily find their job or the system is too slow for their environment, you may end up purchasing more systems than you originally planned.

Q: Will using a separator or banner sheet to identify print jobs affect productivity?

A: Xerox WorkCentre systems provide virtually the same performance with or without a banner sheet. Competitive systems' performance will improve when not using banners. In all the systems that were tested, Xerox WorkCentre systems were significantly faster without banners, ranging from 1.4 to 1.9 times faster than the respective competitors. For example, the following chart compares the Xerox WorkCentre Pro 245, with a rated speed of 45 PPM, versus two competitors who also had a rated speed of 45 PPM. All three systems used a test suite that represents a mix of jobs that are typically printed in an office environment.

Some systems do not have a system generated banner page, so they rely on separator sheets created by the driver. This impacts productivity in that a separator sheet is processed by the device as a separate job.



Q: What test suite should I use for my office?

A: We would encourage you to use documents that you print daily within your organization. This will give you the best data to understand how the product will behave in your organization. We also suggest that you replicate the environment that you will be using the system, as the productivity of tested systems will vary widely depending on the job mix. For instance, if you have a large workgroup, insure that you have multiple jobs in the queue, representing the busy office environment. If you have stapling requirements, insure that you have a mix of both stapled and unstapled jobs.

If you are testing a color MFP device, be sure to use a document that requires the system to switch between color and monochrome pages to see how the engine handles it. Also add pages that are heavy in color to see if the system can keep up with the demand without having to pause.

If you would like to use a test suite of jobs that has already been prepared, your Xerox representative can also provide the suite to you. It is designed to represent the busy office environment with a variety of different job types.

Q: Are there other productivity considerations?

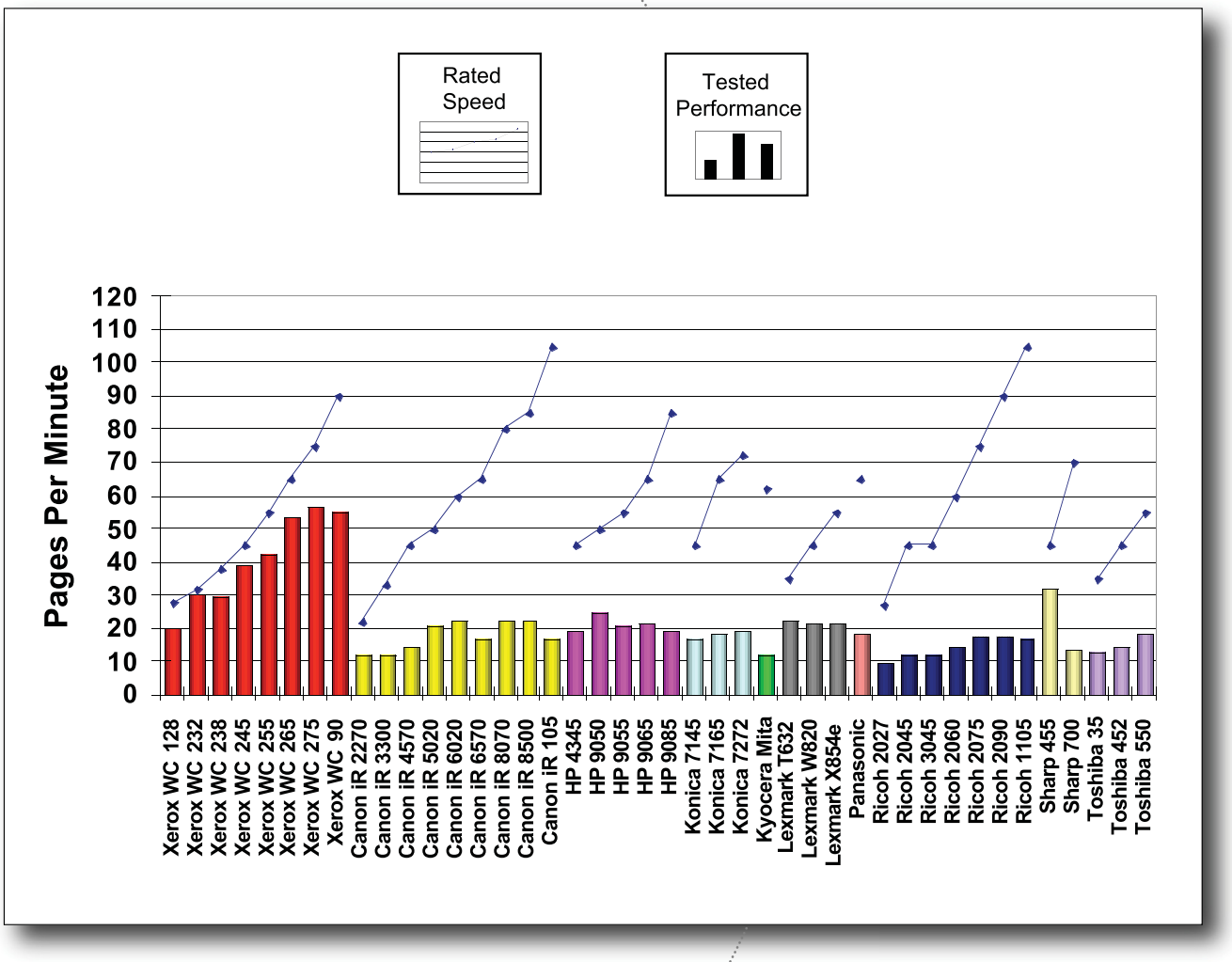
A: Although printing accounts for about 2/3 of the output of many organizations, there are other factors that will affect your system's performance. If you are using a multifunctional system that can copy, print, scan and fax, there are other factors that will affect the overall productivity of the system. Attached is a white paper that addresses these factors.

Office Printing Productivity Summary

Not all systems are created equally! The Xerox WorkCentre is optimized for the busy office environment. Xerox has been producing printing systems since the 1970's. The experience with our printing systems and DocuTech® solutions taught us how to maximize the system's productivity. Multiple jobs continue to print with little or not hesitation between jobs. We strive to keep the paper path full at all times, resulting in output speed that approaches the rated speed of the device.

To understand how products perform in this environment, Xerox Corporation hired BLI who determined test methodology and developed a test suite that includes banners with a mix of jobs that are typically printed in an office environment. The results of the testing for the BLI test suite are displayed on the next page. Note that as the rated speed of the Xerox system increases, so does the corresponding performance. In the case of the competitive systems, the tested performance leveled off and did not increase with the corresponding rated speed.

Buyers Laboratory, Inc. Network Printing Test Results



BUYERS LABORATORY INC. OVER 40 Years of Service Since 1961

*Note: Print productivity was conducted by Buyers Laboratory Inc. (BLI), with each product operating in default mode and resolution set at 600 dpi. Multiple jobs from a BLI test suite were sent in series to each device with output consisting of a mix of single and multiple stapled sets with a banner page for each job. The order in which jobs were sent was randomly selected and was the same for each model.

Factors Affecting MFP Performance

Xerox WorkCentre Systems Versus competitive products

All businesses have the need to continually increase the productivity and value of their workforce. Technology in the work environment has had, and will continue to have, a profound effect on worker productivity.

From a document management perspective, less time spent on critical document tasks means more time available for productive work and more output per person in an enterprise. There are multiple factors that affect the productivity of multifunctional devices. We will examine each of the following items and their impact on the system's productivity. These factors include:

- How well it manages the system's job queue
- The types of functions supported by the system (e.g., copy, print, fax, scan)
- The intelligence of the system

Each of these factors will affect your total productivity and determine how much work you can perform in a finite period of time. The Xerox WorkCentre systems are designed to maximize productivity in each of these areas. The following describes the systems architecture and the benefits to the user for each of the areas.

Job Queue Management

With multiple users printing in a busy workgroup environment, you generally will have a large number of queued jobs. Print jobs can be sent to the Print Controller and are spooled to the hard disk, which enables the system to manage the entire job queue. The Xerox systems have full job queue management, allowing the user to determine the status of their print job. For example, when the job suite from the BLI test suite is sent to the Xerox WorkCentre, all 15 jobs in the suite will appear in the job queue. Jobs can be promoted when needed immediately or held as required, as the full queue is visible to the user. Copy, fax, and scan jobs are also integrated with the print queue, providing total queue management.

If the system cannot produce jobs on a timely basis, the user may reprint the job, as it may not there when the user expects it, wasting both time and money.

Competitive Observations: *Some competitive systems do not spool all jobs to the device for storage on the device's hard drive. Rather, the jobs are stored on the client workstation or print server if used and released as memory is freed up to take additional jobs. This results in a very limited number of jobs in the queue at any one time. In some cases, there is not even a visible job queue at the device, eliminating the ability to promote urgent jobs. Because you cannot see if your job has printed, the job may be reprinted as the user may assume that someone else took their job or that the system failed to print their job, resulting in loss of productivity, increased printing costs, and increased waste.*

Functions performed

Multitasking

Depending on the system, multiple capabilities can be consolidated on a single multifunction system. For example, copy, print, scan and fax functions may be available on a single device. The Xerox WorkCentre provides dedicated resources to the two primary functions of the system: copying and printing. Each function has its own dedicated memory and dedicated processor. This allows the system to maximize performance when switching between functions. For example, if the system is currently printing multiple print jobs, a well designed system should allow you to copy a job and not have to slow down when switching between the copy and print functions.

Competitive Observations: *Many competitive systems share memory and the hard disk drive that may impact productivity. They also may have a significant productivity impact when switching between the copy and print functions.*

FAX Functionality

Fax is supported through an additional embedded FAX hardware card that is integrated with the copy controller module. The FAX subsystem handles all phone network interactions independent of the copy controller functions. If the system supports PC fax, the fax functionality is also integrated within the print driver, eliminating the need to go to a separate fax driver to send out faxes.

Competitive Observations: *Many competitive systems support only a single phone line, allowing only for outbound or incoming faxes at one time. In a busy fax environment, you may end up waiting for an important fax document because the system is tied up with an outbound fax. Most competitive systems also do not integrate the fax functionality within the print driver. A separate fax driver must be used to fax documents from your desktop.*

Copy Functionality

When working with a multifunctional system, you will probably have multiple people sharing a single device. The device may no longer be within a few feet of the user, but may be 40 or 50 feet away. Users may bring multiple jobs to scan and copy. Once the documents are scanned in, the user may or may not wait for the output. The Xerox WorkCentre systems have virtually unlimited scan ahead capabilities, limited only to the memory of the system. As soon as the first job starts to scan the document, the user can start programming and scan the next and remaining jobs into memory, including changing functions. For example, if the current job is in the document feeder, you can immediately program the system's functionality to a network scanning, fax, copy or email job. This significantly increases productivity at the device and allows you to get more work done in a finite period of time.

Another example of copy productivity is the ability to "build" a complex job at the device. For example you may have multiple single sided originals but want a document that combines simplex and duplex output, covers, inserts, etc. The unique "Build Job" feature of the WorkCentre systems allows you to create the job in memory and then print out multiple sets of the job. If the user makes a mistake while creating the document, he or she can print the last segment of the job, delete it if it is not correct, and rescan the segment. For example, if you wanted an appendix to be on colored paper, but you forgot to select the colored stock, you can simply delete that segment and rescan the document with the correct stock.

Competitive Observations: *Most competitive systems do not allow you to access the control panel once you have started to feed documents into the document feeder. You must wait until the entire set of originals has fed into the feeder before you can begin to program your next job. You do not have the ability to program the next job or to change functions. For example, if you are copying a job, you may not be able to move to a scanning job until all the documents have been fed into the system's memory. In some cases, you will even have to wait until the entire task is finished before you can start a new one. Another example is when you are scanning a document to the network, you may have to wait until the entire document has been scanned and sent from the device before you could start a copy a job.*

Copying multiple jobs is generally limited with competitive systems. Depending on the competitive vendor and system, generally only one, five, or ten jobs may be scanned ahead. In some cases the same memory used for printed jobs is also used for the scanned copy jobs. In this case, you may not even be able to scan ahead any jobs!

Also, most competitive systems do not allow you to easily build the complex job. They have no way to sample and delete the last segment. Rather, the user would have to start the process all over again. They also do not generally allow you to combine simplex and duplex (one sided and two sided output) within the same document.

Print and Copy Concurrency

The WorkCentre generally keeps the paper path full, even when switching functions. For example, if the system is printing a job and the user makes a copy, the copy job will immediately follow the print job without hesitation. When observing the output tray, you will see the copy job as the very next piece of paper in the paper path immediately following the print job.

Competitive Observations: *Competitive systems generally have a single processor that is shared between functions such as printing, copying, and faxing. This can impact the performance, as the processor and memory is not dedicated to the specific task. Additionally, certain combinations of output may not be able to be performed. For example, if you are printing or copying stapled jobs, and want to interrupt with another stapled jobs, some systems will not allow it. Because the stapler is in use for another function, the system will only let you interrupt with unstapled output.*

Scanning Concurrency

The Xerox WorkCentre's SMARTsend™ scanning software option lets you send documents to multiple destinations, including email, folders, desktop or other devices, from a single scan, using a pre-set workflow. When using email, you can also integrate with your local address book or via LDAP. Scanning can automate many tasks within your organization, reducing the time it takes to manually do the same tasks today. Users can also be authenticated using most common network authentication methods. Once authenticated, the "From" field is automatically populated with the user's name, which cannot be changed.

Competitive Observations: *Many competitive systems do not allow you to automate the work process. You may have to scan documents multiple times to scan to multiple types of destinations (e.g., email, desktop, other devices, etc.), increasing the amount of time it takes at the device. We recommend that you ask the vendor if their solution can do this application. You may also want to know if they support LDAP directory lookup and network authentication.*

System Intelligence

SMart Controller

In a networked, digital multifunction environment, throughput of devices is a much more accurate indicator of productivity and performance than traditional copier "page-per-minute" (PPM) ratings. The fastest rated-speed system in the marketplace can be dramatically slower in the office, depending on the type of job and workflow.

The Xerox systems use the SMart Controller, an intelligent controller that is dedicated to the printing task. It is not shared with other functions such as copying. The intelligent controller is a high-performance computer that uses a state-of-the-art processor that effectively manages multiple tasks and simple or complex documents. While jobs are printing, other jobs are being ripped. When multiple jobs are in the print queue, the controller manages five concurrent printing tasks including processing, formatting, scheduling, waiting for print, and printing.

Banner/separator sheets can be printed at the device with the job and without hesitation between jobs. Combined with the ability to keep the paper path full at all times, this means that multiple users in larger workgroups can successfully send their work to the device and most likely have their printed output waiting for them at the system.

Print jobs are stored on the WorkCentre's dedicated hard drive, not held at the print server until memory is available to move the job to the device. The customer advantage is two-fold. First, the print server requirements are minimized as the jobs are quickly moved to the device where the controller manages the multiple states of the print queue. The ability to see all jobs in queue, including jobs that have been printed, allows the user to see the status of their job and avoid reprinting the job if the job is not at the device. Secondly, with the full job queue, all the print jobs are visible to the user. If the user needs to prioritize a print job, (i.e., to attend a meeting or make a flight), they can promote the job to the top of the queue.

Additionally, printing of multiple page documents begins as soon as the first page is RIP'd, not after the entire file is processed. This greatly improves overall output speed.

Competitive Observations: *There is significant variance in the controller design architectures of competitive systems. Most competitors use a processor that is shared between functions, for example print and copying functions. The controller is not dedicated to the task, potentially reducing productivity. Additionally, the controller may be optimized for production printing (e.g., long run lengths, complex jobs), and may not manage the common office jobs effectively, resulting in significant delays between print jobs.*

Resource Management

When working in a shared environment, it is important to make sure that the system is available to print the jobs sent to it. But what happens if the system is not configured for a required paper stock? The Xerox WorkCentre systems are intelligent enough to set aside jobs that require a specific resource. For example, if the paper tray has not been configured for 11x17 inch paper, and the user sends a job requiring 11x17 paper, the system will "Hold for Resources." It places the job in a held job queue and continues to print other jobs that do not require the resource. The next job that is sent that does not require the resource continues to print. This allows the system to continue to produce output without interruption.

Competitive Observations: *Resource management is a problem for most of the competitive systems that we have tested. When you send a print job to a system that requires a resource that has not been configured for the system, all further printing stops. In the above case when the 11x17 inch document is sent to the device, no further printing will occur until the problem is corrected.*

Intelligent Print Drivers

Our goal is to minimize the steps to get basic device information. Our print drivers allow users to see the device status, current print queue, printed document queue, and supply status, all from within the print driver. The print drivers are for the WorkCentre series, ranging from 32 to 75 page per minute systems, are designed to provide more flexibility for the user. For example, exception page selection allows the user to print inserts, tabs, or combine simplex and duplex output, all from within the print driver.

Competitive Observations: *Device status, job queue, and paper/toner status are not generally available from within the print driver. Rather, the user must go to a separate utility or even multiple utilities to find this type of information. Additionally, advanced features such as exception page selection for printing tabs and inserts, if available from the vendor, are found on high end (>50 page per minute systems) and may require the purchase of an EFI controller to support the application, which means increased costs and training requirements.*

Systems Warm-Up time

Xerox systems are manufactured to warm up quickly from off or from low power mode. Xerox WorkCentre color MFPs use technology developed for our production color devices. Emulsion Aggregate Toner (or EA toner) is chemically grown toner that does not require fuser oil. This allows the fuser to warm up quicker, and therefore the system is ready to print in less than 2 minutes. Our newest monochrome MFP systems require only 72 seconds to warm up as a result of new fuser design.

Competitive Observations: *Warm up times on some competitive monochrome devices can be as much as 6 minutes and up to 9 minutes for color MFP systems. The fuser oil needs to reach a hotter temperature. Even other competitive systems that use a chemical toner require longer warm up times because their toner requires a hotter temperature to adhere to paper.*

Summary

Whether it's job queue management, intelligent systems design, or superior feature design, including outstanding concurrency, the Xerox WorkCentre systems provide exceptional productivity.

The Xerox SMart controller manages the print queue very effectively, processing up to five different tasks at the same time, regardless of the type of job being sent to the system. We do not clear out the paper path between jobs, have virtually no delays when printing banner sheets with the job, and control resource issues which makes the system consistently available to the user. Our color systems use the latest technology in engines so they can handle any environment without a hit on productivity - one that uses a lot of color and one that uses little. Xerox color systems use SMart Kits that are quick to warm-up and ready to produce output when needed.

Full job queue management allows the user to not only see their job in queue, but also to be able to promote or hold their job as required.

And as seen with the BLI test results*, the Xerox WorkCentre systems consistently maintain a two to three time printing advantage when printing in the busy networked office environment. Unlike competitors whose performance leveled out as the rated speed increased, the Xerox systems' productivity increased significantly when the rated speed of the system increased. The Xerox systems will allow you to get your work produced effectively in the busy office environment.

*Note: Print productivity was conducted by Buyers Laboratory Inc. (BLI), with each product operating in default mode and resolution set at 600 dpi. Multiple jobs from a BLI test suite were sent in series to each device with output consisting of a mix of single and multiple stapled sets with a banner page for each job. The order in which jobs were sent was randomly selected and was the same for each model.

Prepared by:

Xerox Office Group/Office Proving Ground
1350 Jefferson Road, MS 801-19G
Rochester, New York 14623
USA

Printed in the United States of America.

610P725080 NOPWP-01UB