

# Student Printing in a Mobile Computing Environment

Access to Wireless Printing on Campus



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**93.4% of students said they regularly use the college/university library website.**

**(Educause Center for Applied Research)**

**More than 95% of undergraduate students own a computer and 80% own a laptop.**

**(Educause Center for Applied Research)**

## 1. Introduction

The growth of mobile computing on school campuses is creating tremendous benefits, but also spawning a new suite of concerns for campus computing. One of these developing problem areas is printing. Long thought to be well understood and under control, the new generation of mobile notebook computers, in a mobile environment with wireless networks, has broken many of the accepted print management practices.

This paper will outline many of the known printing concerns, highlight how some attempted solutions have fallen short, and present a novel approach that addresses many of the known issues related to printing for users of mobile notebook computers.

## 2. Problem History

Until recently, printing in a campus environment was a simple proposition. Computers would be installed in labs or libraries. The print driver for the nearest printer would be installed and configured on the computer. If print management systems were installed for cost recovery, then any additional software necessary for print management would also be installed, such as a print "pop-up" to capture user information. The computer would likely then be "locked down" to prevent tampering with the basic configuration.

This was a very basic situation. Students did not need help, since the computers were pre-configured to print correctly.

So why is printing suddenly a concern for the college or university environment? Essentially, everything about the printing environment has changed.

- The computers are now owned by the students. There are thousands of them, instead of hundreds. Information Technology (I.T.) staff cannot possibly install and configure the right print drivers on each one.

- Students are not as adept as I.T. staff at correctly setting up print drivers and print management pop-up software on their computers. This has resulted in a dramatic increase in the involvement of the help desk.

- Which printer? The students want to use the printers closest to them. Every time the student wants to use a different printer, the problem recurs.

- Many wireless networks are segregated from the backbones to which the printing services are attached. This can introduce a network communication and print data transport obstacle to the basic printing requirement.

- It is not uncommon for libraries and faculties to use different print management / cost recovery solutions. This may result in even more variations of software and print configuration setup on each computer.

The net result is not good. Students have a difficult time setting up their computers to print. This introduces frustration and delays, or worse - overloading the computing help desk. In the worst-case scenario, printing becomes impossible because of the "can't get there from here" network isolation or incompatible print management interfaces.

*13.4% of students identified "lack of access to printers" as a barrier to the use of IT in the classroom.*

*(Educause Center for Applied Research)*

### 3. Alternatives

Various institutions have tried a range of possible solutions. Some are stuck with them in the short term for budgetary reasons, others learned from their experiences and have moved on. A sample of the possibilities includes:

#### Documentation

At many campuses, the help desk or I.T. staff have attempted to ameliorate the problems through rigorous documentation. It is not uncommon to find instructions five pages long that are intended to help students set up their computer to use a specific printer.

Unfortunately, the five pages of instructions for the library printer are often completely different from the simple four page instructions for using the printer in the residence, or the printers in labs throughout campus. This is not a solution, it is an attempt at damage control, and is often a key component of other alternatives.

#### Printer Clones

Another approach that is occasionally adopted is to deploy identical printers everywhere. The theory is that you only need one print driver.

It is far from perfect - it only mitigates one step. Having the print driver handy is not the same as having a printer configured. You still need to differentiate which physical printer is being used. You are also locked into a very inflexible arrangement of printing capabilities (color versus monochrome, single versus double sided, and so forth). Printers have a market life of approximately 18 months. When a printer breaks and needs replacement, what are your options when your specific model is no longer available?

#### Training

This goes hand in hand with documentation. As an example, the library staff at one school held one-hour training and support sessions twice a week. The entire sessions were dedicated to helping stu-

dents configure their computers to use the printers in the library.

This type of approach is very expensive, but may be less expensive than responding to requests for help on an as-needed basis.

#### Internet Printing Protocol (IPP)

In situations where network topology is a key concern, some institutions have implemented the Internet Printing Protocol as a means of moving print data to remote locations or across network segments.

While this can solve the communications problem for these scenarios, it is not a complete solution. The installation and configuration of print drivers and selection of printers still needs to be managed. The IPP clients often represent an additional piece of software that must be installed. Communications are addressed, but at the expense of making the rest of the puzzle even more complex. While many IPP clients or servers are free, you must also ensure that they are compatible with your particular printing infrastructure.

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## 4. In a Perfect World

We know that traditional approaches to printing for a mobile environment are not effective. And most of the alternatives are far from perfect. If you could assemble a wish list for a solution that was tailored for students in a mobile or wireless campus environment, what would be on the list?

Some key features to consider:

### **Minimize Student Configuration**

You only want to install the printing software on a student computer once - and that should be easy. It should then work for ALL of the printers, even if they are radically different in terms of features and capabilities. It should even continue working correctly if you change your printing environment by adding or removing printers, or replacing them with different devices.

### **Nothing to Install**

Take it one step further. For occasional print users, it would be nice if they didn't have to install anything on their comput-

er. This would allow printing from any platform - Windows, Macintosh or Linux.

### **Print Management Compatibility**

The solution should work with print management systems. If you have multiple systems, it should be compatible with them all. Even if print release stations are installed for privacy or to minimize print waste.

### **Print Confirmation**

In general, students print too much. The ideal solution should challenge the student to confirm the number of pages and the printer they are using. Even display the cost of printing if there is a cost recovery system in place.

### **Print From Anywhere**

For a mobile solution, the student should be able to print anytime they are connected. It would be a real value-add if a student could print from home or residence, then pick-up their print jobs in the library or lab.

## 5. The PrinterOn Alternative

PrinterOn has created a printing system specifically tailored to meet the needs of the student in a mobile campus environment, called the PrinterOn Campus Printing System (CPS). CPS provides the following basic benefits:

1. Students reduce their frustration and delays by having access to simple solutions for printing on any of the available campus printers, from any place they can get a network connection.
2. Help desks can reduce their total cost of operation by dramatically curtailing the number and complexity of printing support incidents.

3. I.T. staff can configure secure, safe mobile printing solutions that can navigate complex networks and integrate with their established authentication and print management solutions.

4. The institution can increase their value to the student through new services, including printing at school, from home or residence from wired or wireless computers.

## 6. How it Works

The Campus Printing System is comprised of a number of technologies that work with one another to give users the simplest possible printing experience. In addition to the various printing applications and administration elements, the key components are:

### PrintWhere - The Universal Print Driver

This print driver is designed to automatically reconfigure itself as the user selects new print destinations. It is the only Windows print driver they will need. It has a pop-up challenge to confirm page counts and destination, and some unique capabilities designed specifically to facilitate printing in a mobile environment.

*The pop-up confirmation dialog in PrintWhere helps to reduce waste and ensures that students understand and accept their print quantities.*



- A Discovery feature examines the local network segment to determine if there are any printers currently configured for use with CPS.

- A Search capability allows the user to quickly isolate the printer they want to use through simple keyword entry.

- A History list gives the user quick access to recently used printers.

- Automatic configuration ensures that the appropriate print driver technology and user restrictions - such as paper size or duplexing - are enforced.

### Intranet Print Service

The key component is the Campus Print Server. This is an Intranet Web service that allows your users to upload a document for printing. There is nothing to install on their computer, making it compatible with any platform that has a robust Web browser. Simply follow the instructions for selecting a document, choosing a printer, and setting your print options.

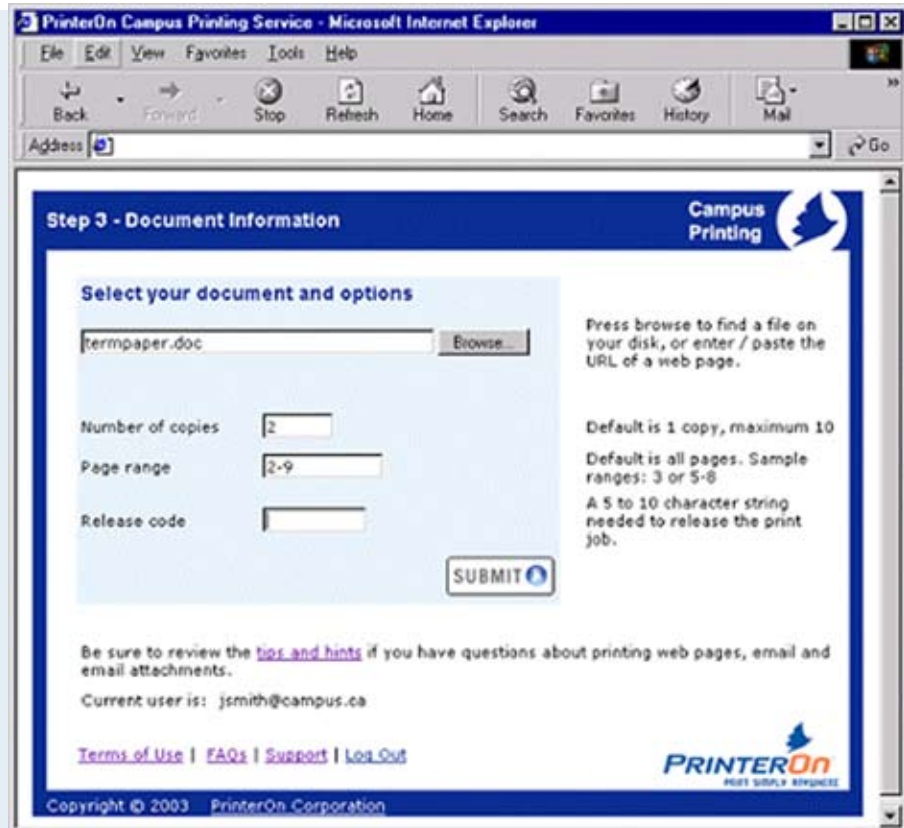
of usage and configuration rules. The CPS Web service can be installed on a computer hosted by the campus.

The source HTML and JSP code for the Web service is available as part of the package. This allows you to modify the user experience or integrate to systems such as a custom WebAuthorization single sign-on.

The web printing technology can be linked to authentication services such as LDAP, and is compatible with most print management solutions. The CPS Web site services the same printers as PrintWhere, and shares a common set



*The Intranet web service allows simple document printing using nothing but a web browser, from Windows, Macintosh or Linux clients. No print drivers, nothing to install.*



### Print Delivery Station (PDS)

PDS is the PrinterOn "destination" software. It is capable of accepting print data from the Web service or PrintWhere. It can accept jobs from local sources, or using Internet technologies from remote locations. PDS can print documents directly to devices, be used as a simple release station, or pass the print jobs to other printing services for spooling, print management and cost recovery purposes.

### General Features

The various components of the Campus Printing System share common features. Wherever possible, strong encryption is used to protect the privacy of docu-

ments. Print data is compressed between components to make the most efficient use of your network bandwidth. Internet and web service concepts are employed to give you the deployment flexibility. Programming interfaces are available so that you can customize or integrate the solution to meet your special needs. And server components can be scaled and load balanced if you have mission-critical requirements.

## 7. Conclusion

As an I.T. administrator, saving time is saving money. PrinterOn's comprehensive, integrated and customizable printing solution allows campus I.T. to leverage assets already on hand and provides the flexibility to build a solution that addresses students' needs now and into the future.

The Campus Printing Service can provide students with the best value for their technology fees by making printing accessible and convenient at all times on or off campus. The technology is here now for better access to mobile printing on campuses and just waiting to be embraced by technology administrators.

**For further information on how you can deploy Wireless Remote Printing at your Campus, contact sales at PrinterOn Corporation.**

**(519) 748-2848**

**[www.printeron.net/campus](http://www.printeron.net/campus)**

**[sales@printeron.com](mailto:sales@printeron.com)**

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