WHITE PAPER

Chromebooks and BYOD Success in Education

Access to Windows Applications and Virtual Desktops—from any device

Ericom Software
www.ericom.com
April 2012

Table of Contents

Introduction

Today's educators and school IT staff face a dynamic environment of exploding content sources and education applications. Schools are being asked to achieve 'more with less' and to enable students and staff to access information and applications from any location, using any device.

These developments are compounded by an unclear economic climate, forcing educational institutions to look for less complex and more cost effective methods of providing students, teachers, and staff with access to computing resources.

In response to these challenges, Chromebooks have proven to be an innovative solution for schools that need to cut costs while also making teaching and learning resources (for example, applications, desktops, websites) more easily accessible. This paper examines the challenges that IT professionals face in academic environments and discusses the ways in which Chromebooks directly address those challenges. This paper also presents a case study of one of the school districts that have begun transitioning from PCs to Chromebooks.

The Challenges of IT in Education

The unique needs of educational users present a number of challenges for IT professionals tasked with providing access to applications and content in a wide variety of formats. Perhaps the biggest of these challenges is the sheer magnitude of school IT departments' responsibilities. Schools tend to have very small IT staff, which are typically responsible for managing huge numbers of teacher and student user accounts as well as a seemingly endless array of computers, laptops, tablets, smart phones, and other devices.

Finding ways to ease the burden of user device management and maintenance along with IT resources is essential to ensuring that already overworked IT staff members are able to keep pace with the demands placed on them, and to provide students and staff with access to computing and learning resources from home, school, lab, library, or the field.

Application & Desktop Management

One of the most challenging tasks for IT administrators in schools is application and /or desktop deployment and maintenance. Provisioning student and faculty computers with the required applications is no small feat and is further complicated by the need for ongoing patch and configuration management.

Hardware Distribution

IT departments in schools also face challenges related to providing and managing end-user devices (PCs, netbooks, tablets, etc.). These challenges can be difficult to overcome, especially in light of ever-shrinking IT budgets. Unfortunately, hardware acquisitions are rarely a one-time expenditure for schools**.**

Computer hardware by its very nature tends to become obsolete relatively quickly, and must typically be replaced every few years. Furthermore, some students tend to abuse the computers that are issued to them, requiring the school to incur replacement costs for lost, stolen, or heavily damaged computers, not to mention corrupt files, viruses and unsupported applications installed by students. As such, improving hardware longevity and security could go a long way toward stretching the IT budget.

Cyber Security

Although it is tempting to view the loss of student laptops purely as a financial loss, there are also security implications that must be considered. Depending on how the computer was used, the hard drive might contain personally identifiable information, or even cached passwords or other information that could potentially be used by a hacker to gain access to the school's network.

Another challenge that is somewhat unique to Education is that schools can be one of the most hostile environments imaginable. In almost every academic institution there will be a few aspiring hackers who seek to use their knowledge for malicious purposes. It is therefore critical for administrators to configure student issued computers in a way that makes them resistant to tampering.

Even if students have no malicious intent, security is still a major concern. Students are notorious for visiting all manner of Web sites and downloading content from questionable sources. Such activities inevitably lead to malware infestations.

Chromebooks as a Solution

Although the challenges of providing IT services in an educational institution can be daunting, there is a surprisingly simple solution – Google Chromebooks. When Chromebooks' native capabilities of accessing and using Web / Google apps are combined with the ability to access hosted Windows resources and services, they can readily address all of the previously discussed challenges.

Chromebooks offer Education a simple solution for fast and seamless access to rich content, encourage collaboration, and enrich learning activities via Google apps and educational web resources.

What's more, they require very little setup. Chromebooks are optimized for the Web and are simple, scalable and affordable; streamlining IT staff workload and support budget. These characteristics truly enable taking 1:1 learning from theory to practice – both during and after school hours, in classes, labs or at home.

Chromebooks further enable:

- Web access with simple and easy to use access to apps and content from anywhere
- Long battery life ensuring availability during school hours
- No-hassle, secure end-user device sharing among students and staff
- Freedom from relying on school networks for internet connectivity
- Teachers and students can collaborate at all times – just by signing in
- Free IT staff from the need to assign, configure and manage a machine per student every year (eliminates the hassle of computer cart machine sharing)

Ease of Administration

By issuing Chromebooks to students and faculty, administrators are no longer burdened by individual user-device configuration and maintenance; as soon as someone logs into their Chromebook and connects to the Internet, the latest updates are automatically pushed to the Chromebook. This is something that Google does automatically without the need for any administrative action. Hence,

schools that decide to adopt Chromebooks will never have to worry about keeping the Chromebook up to date or upgrading a Chromebook to the latest operating system—Chromebooks always run the latest operating system.

Full Device Management

While making the transition to non-managed end-user devices should help to decrease the overall administrative and help-desk workload, there may be some administrators who wish to maintain a high degree of control over the devices that have been issued to students. Administrators requiring a fully managed end-user device environment have the option of using Google's Web-based Chromebook Management Console (http://www.google.com/chromebook/business-education-management.html). This console allows for the enforcement of device policies, inventory collection, and browser setting management.

Hardware Longevity

As previously stated, hardware acquisition costs can be a major issue for budget-strapped schools. Because hardware purchases represent a significant expenditure, it is important for schools to take steps to maximize the hardware's longevity. Academic institutions need to be sure that the computers that they purchase today are not going to be obsolete by the next school year. Historically this has often meant paying a premium price for cutting edge systems in the hope of fending off hardware obsolescence for a few years.

With a price point of around $20/month or $449, Chromebooks are priced on par with commodity laptops, which quickly become obsolete as technology evolves. Chromebooks can have a much longer useful lifespan as they can also be used to access hosted Windows applications or desktops, in addition to web applications.

Hosted Windows desktops and applications are usually implemented using technologies such as virtual desktops (VDI), or Windows Terminal Servers (RDS) *See below.* In these environments, a user's desktop operating system and applications run on a host server, not on the client computer. As such, administrators will never have to worry about whether a Chromebook that is being used as an RDP client has sufficient hardware resources to run a particular application. In fact, hardware compatibility nearly ceases to be an issue altogether.

Hosting Environments

Many organizations are currently evaluating various VDI solutions, and plan to use either VDI or Remote Desktop Services (RDS or Windows Terminal Services). Both technologies have merits which are widely discussed, though not within the scope of this paper. The main difference between the two technologies is that VDI involves hosting a number of virtual machines running entire desktop operating systems, whereas RDS, or WTS, can run virtual desktops or applications within lightweight virtual containers having a single operating system shared among multiple users. While VDI is a robust solution, the server hardware costs, software license fees, and maintenance of RDS and WTS are significantly lower.

Chromebook Access to Windows Applications and Desktops

Chromebooks offer easy application management because applications are not installed directly on the device. Instead, students and faculty can access any number of cloud based applications such as Google Apps, and with third-party solutions they can access Microsoft Windows applications.

In many school environments there are quite a few widely used Windows applications, for which there are no Web apps replacements. This includes Microsoft Office suite and applications that are education-specific, or general-purpose, such as Adobe's Creative Suite or Rosetta Stone.

Although Chromebooks do not natively run Windows applications, it is possible to enable Chromebooks to access hosted Windows desktops and Windows applications by establishing an RDP session to a Windows host - a terminal server or a virtual desktop (VDI) platform.

One such solution is Ericom AccessNow—an HTML5-based RDP solution that is client-less (requires no installation on end-user devices) and runs within the Chrome browser. Unlike traditional RDP clients, AccessNow is deployed on the server side only (client-less, or zero client) so there is nothing for the IT administrator to configure on the individual end-user devices. Ericom AccessNow allows students and faculty to establish an RDP session through the Web browser that is natively included with the Chromebook, and thus connect to their hosted Windows environment resources.

In addition, there are Web applications not supported by Chromebooks, such as those that require Java, ActiveX or Silverlight. Ericom AccessNow enables students and teachers to use Internet Explorer (within the Chrome browser) to access these applications.

The combination of Chromebooks and Ericom AccessNow makes new hardware deployment a straightforward and quick process that generally involves only minimal configuration. A new Chromebook can literally be removed from the box and powered up. As soon as the Chromebook connects to the Internet all of the latest updates are automatically applied and the student can immediately use the new machine to access Windows applications or desktops via an RDP session.

Bring Your Own Device

Ericom AccessNow's unique approach to RDP connectivity works well in schools that use Chromebooks. In fact, with AccessNow, any laptop, smart phone, or tablet with a compatible Web browser (iPad, iPhone, Android, Mac) can run Windows applications and there's no need to download, install and maintain any software. Thus AccessNow makes it practical for schools to officially support and implement Bring Your Own Device (BYOD) policies. Historically, most schools have avoided BYOD because it is a support and security nightmare. Using AccessNow, IT Staff is freed from the burden of having to support individual devices. Instead they can focus on ensuring that the backend infrastructure is functioning properly.

Case Study: Richland County Schools

Although it is easy to make a case for using Chromebooks in an educational environment, there is little doubt that doing so represents a departure from the usual way of doing things. A number of school districts have already begun making the transition from PCs to Chromebooks. One such school is the Richland County School District Two, which has adopted Chromebooks as a part of their 1 to 1

Computing Initiative. The Richland County school district consists of thirty-five K-12 schools in which a total of approximately 26,000 students and 4,000 faculty members.

One of the goals of the 1 to 1 Computing Initiative is to provide students with a computing experience that is affordable, productive, supportable, and most importantly functional. The school district's options were largely limited by their application set, spanning across both Web apps and Windows apps. Aside from the usual office productivity applications, Richland County Schools also needed to be able to run Internet Explorer with Java plug-ins and specific applications such as exams from End of Course Testing (Pearson). Additionally, Richland County Schools subscribes to several Web sites that all require the use of Internet Explorer.

To address the district's requirement to access mission critical applications that would only run on the Windows platform, they needed to find a way to reduce costs while also making the applications available on a cross platform basis. Implementing virtual desktops (VDI) seemed to be a good solution to achieving these goals.

The school district's IT staff considered various VDI solutions, and ultimately decided to base their VDI solution on VMware as it matched their specific requirements. While deciding on a VDI vendor was relatively easy, the question of client connectivity remained. The original plan was to provide user connectivity through a VMware View client. This initially seemed like a practical solution since VMware View clients are available on a variety of platforms including Windows, iPad, and Android. Ultimately however, this solution presented several support and cost challenges.

One of the first problems with using VMware View was the requirement for the client to be installed on each PC. The administrative IT staff would ultimately be responsible for making sure that each of the 26,000 students and 4,000 of the teachers and other staff members had a copy of the client component installed. Another potential issue with using the VMware View client was that of maintenance. Like most other software publishers, VMware periodically releases updates. The IT staff would have to come up with a solution for deploying client updates to many thousands of client devices on a large, distributed network.

In addition, students and teachers simply do not use the same computer all the time. A student might use one computer at school, another at home, and yet another at the library. Provisioning every computer that a student or a teacher might use to access the school's network resources with an up to date copy of VMware View proved to be impractical. Finally, there were some concerns about compatibility. Although versions of VMware View exist for the most popular operating systems, installing the View client on smartphones, and other devices simply was not an option. Chromebooks of course do not enable the installation of a client.

Rather than having to install a VMware View client onto each end-user device, Richland County Schools chose instead to use Ericom AccessNow for VMware View. Because this solution does not require any software (beyond a simple Web browser) to be installed on the client, users can access their Remote Windows desktop on an impromptu basis from any device with a compatible Web browser. Ericom AccessNow is a zero client solution – it does not require anything (including various plug-ins) to be installed on the user device, making it an ideal solution for this use case.

When asked about how the ability to access VDI resources from almost any device affects the school district's IT support policy, Tommy Carter, a Systems Engineer for Richland County Schools said, "AccessNow fits right in with our goal to provide students with a computing experience that closely matches the traditional, full desktop computing experience and is affordable, productive, supportable and highly functional. AccessNow provides us with broader reach to our expanding VDI infrastructure. With an accelerated timeframe to reach our "1 To 1" computing model goals, we tested Ericom and quickly discovered how easy AccessNow is to deploy and use. You simply log in and you have your Windows desktop. It just works."

Device Replacement, Protection and Availability

The replacement of student computing devices has historically been a major issue for academic institutions. As a general rule, computers that are issued to students tend to suffer through damage, loss, or theft. Over the course of a school year a significant percentage of devices will need to be replaced. Not only does the school incur the cost of replacement hardware, but there is also usually a significant administrative burden that goes along with provisioning the replacement hardware.

Although it is impossible to completely get away from hardware replacement costs, Chromebooks are designed to be affordable and easy to set-up if they need to be replaced. One of the reasons why Chromebooks are so easily replaceable is that applications are not installed, and data does not reside locally on the Chromebook. If the Chromebook is being used as a VDI client for example, then all of the user's applications are hosted on a VDI server and the user's data is stored on a backend file server.

It is also worth noting that because no user data is stored locally on the Chromebook, the administrative staff will never have to worry about Chromebook backups. A lost or damaged Chromebook can be replaced with a brand-new Chromebook in a matter of minutes with no data loss and no loss of functionality.

Virus and Malware Protection

Even with Web filtering in place, schools have to assume that students' online behavior will expose the school's computers to constant malware threats. Schools have traditionally struggled with hardening student computers against malware. When malware infections do occur, significant IT resources are consumed either by manually removing the infection or by re-provisioning the device from scratch. In contrast, Chromebooks are specifically designed to be resistant to malware. Each Web page and each application runs in an isolated sandbox environment. That way, if a malware attack does occur, the malware is isolated and the operating system is protected.

Chromebooks are also designed to perform a verified boot. The boot process performs an integrity check that verifies that none of the system files have been altered. If any form of tampering is detected then the operating system automatically resets itself to a pristine state. Hence, there should never be a need for an administrator to clean a malware infection from a Chromebook.

High Availability in the Classroom

The Chromebook's usefulness ultimately boils down to how effectively it performs in the classroom. One aspect of the Chromebook's design that makes it well suited to classroom environments is that the Chromebook boots in 8 seconds. Students do not have to waste classroom time waiting for their computers to startup. Furthermore, the batteries in Chromebooks are designed to last long enough to make it through an entire school day without recharging.

About Ericom

Ericom Software is a leading global provider of Application Access, Virtualization and RDP Acceleration Solutions. Since 1993, Ericom has been helping users access enterprise mission-critical applications running on a broad range of Microsoft Windows Terminal Servers, Virtual Desktops, legacy hosts and other systems. Ericom has offices in the United States, United Kingdom and EMEA. Ericom also has an extensive network of distributors and partners throughout North America, Europe, Asia and the Far East. Our expanding customer base is more than 30 thousand strong, with over 7 million installations. For more information about Ericom and its products, please visit http://www.ericom.com.

For more information on Ericom's products and services, contact us at the location nearest to you.
And visit our web site: http://www.ericom.com

North America
Ericom Software Inc.
231 Herbert Avenue, Bldg. #4
Closter, NJ 07624 USA
Tel +1 (201) 767 2210
Fax +1 (201) 767 2205
Toll-free 1 (888) 769 7876
Email info@ericom.com

UK & Western Europe
Ericom Software (UK) Ltd.
11a Victoria Square
Droitwich, Worcestershire
WR9 8DE United Kingdom
Tel +44 (0) 845 644 3597
Fax +44 (0) 845 644 3598
Email info@ericom.co.uk

International
Ericom Software Ltd.
8 Hamarpeh Street
Har Hotzvim Technology Park
Jerusalem 91450 Israel
Tel +972 (2) 591 1700
Fax +972 (2) 571 4737
Email info@ericom.com