

Company – Qualified Platform Identification		
VMware	VMware Horizon Air Desktops & TestNav 7.5 with Chromebooks	TestNav 7.5.x

## District Technical Information

This document provides guidance for districts and schools that choose to use the qualified product(s) with the TestNav version indicated.

VMware completed the TestNav qualification process for the specific products described in the **Qualified Products** table. The technology and setup requirements must be followed and all clients or workstations used to access TestNav must comply in order for the solution to remain in qualified status. In addition, please review all “Additional Recommendations” listed.

## Qualification Standards

TESTNAV QUALIFIED mark and logo are certification marks owned by NCS Pearson, Inc. (the “TESTNAV QUALIFIED Marks”). The TESTNAV QUALIFIED Marks may only be used by entities who have executed Pearson’s TESTNAV QUALIFIED Certification Mark Agreement, and in the manner prescribed in the Pearson Certification Mark Usage Guidelines (the “Usage Guidelines”). Both documents are available online at <http://www.testnavqualified.com>; Vendor Qualification.

The Qualification Standards used to certify this solution are outlined in this document in the “**Appendix**” section of this document.

## Qualified Products & Solutions Table – TestNav 7.5

Pearson and VMware jointly tested the VMware Horizon Air Desktops hosted solution for use with **TestNav 7.5 and Chromebooks**.

### PERFORMANCE TESTING OVERVIEW

Performance testing has been completed by running all performance tests using the VMware Horizon Air Desktops & TestNav 7.5 solution with multiple Chromebook makes and models. Note that Network Bandwidth Requirements and Chromebook Minimum Requirements are dependencies that must be met for the solution to remain certified. *Please see page 2 for details.*

VMware Horizon Air Desktops & TestNav 7.5 with Chromebooks	
TestNav Version	TestNav <b>7.5.x</b>
Qualified Solution	VMware Horizon Air Desktops with TestNav 7.5 and Chromebooks
End-point/clients supported DEPENDENCIES	Dependencies: 1. Minimum bandwidth (page 2) 2. Chromebook minimum standards (page 2)
Minimum Network Speed FORMULA	150kbps x (number of Chromebooks in the testing session) = (required minimum bandwidth allocation)
Maximum # of Clients BASED ON DEPENDENCIES	Determined based on all minimum Chromebook standards + minimum network speed standards
Minimum Encryption	128bit AES encryption
Operating System	Hosted Solution using Windows 7

## Requirements

### REQUIRED / RECOMMENDED / NOT QUALIFIED

Qualification testing confirmed that differences between specific make and models of Chromebooks exist and those differences are significant enough to impact system usability and performance while using TestNav 7.5 and the VMware Horizon Air Desktops solution. Please carefully review the requirements and recommendations that follow, and confirm any questions with your VMware representative.

### TESTNAV 7.5 SCREEN SIZE AND RESOLUTION - MINIMUM REQUIREMENTS

- Screen size must be **9.7" minimum**.
- Resolution must meet a **1024 x 768 minimum** to launch TestNav 7.5

### SCREEN SIZE, RESOLUTION, PROCESSOR, PROCESSOR SPEED

REQUIRED OR RECOMMENDED	Screen Size	Resolution <sup>1</sup>	Processor <sup>2</sup>	Processor Speed
<b>PREFERRED RECOMMENDED</b>	13.3"	1366 x 768 1440 x 900 1536 x 864	Intel Celeron	2.21 GHz + 4 GB available RAM
<b>QUALIFIED</b>	(must be 9.7" minimum)	1366 x 768 1440 x 900 1536 x 864	Celeron + <b>4 GB RAM</b> Intel Atom + <b>4 GB RAM</b> Exynos 5 + <b>4 GB RAM</b>	1.30 GHz minimum + 4 GB available RAM

**1** Resolution to select for implementation will depend on the Chromebook make and model

**2** Qualified processors include required processor type, speed, + available RAM

### NETWORK BANDWIDTH REQUIREMENTS

A Wired Network Connection or a Wireless Connection can be used to deliver TestNav 7.5 to a Google Chromebook – however, each desktop session requires 150kbps of RELIABLE DEDICATED network bandwidth.

1. If utilizing a wireless network, please ensure that there are no other outside wireless devices that have access during the testing phase.
2. The required bandwidth can be determined by the following formula:

$$150\text{kbps} \times (\text{number of Chromebooks in the testing session}) = (\text{required bandwidth allocation})$$

3. Please carefully review the requirements and confirm any questions with your VMware representative

### SRF FILES

Because the VMware Horizon Air Desktops environment is hosted, the student desktops are actually part of the hosted environment. The SRF default to the student home folder would then automatically be created on the hosted server. **Districts and schools will need to reset their primary SRF default and create a secondary SRF file location to point to a school or district-specific path. Work with your VMware representative to confirm the SRF set up. An infrastructure test will be completed prior to starting actual assessment testing sessions.**

1. **Hosted Caching Server:** It is possible to point the SRF files to the hosted proctor cached server, if the hosting option is chosen.

## PROCTOR CACHING

Proctor Caching can be set up as hosted via the VMware Horizon Air Desktops solution, or you can set up proctor caching as you would normally. Your district or school will be granted access to the hosted proctor cache server so content caching and all other normal tasks can be completed.

## TESTNAV 7.5 MINIMUM REQUIREMENTS

The **VMware Horizon Air Desktops Solution** provides for the minimum standards for the Hardware, Software, and Browser Dependencies as defined for TestNav 7.5.x as part of the hosted solution. All minimum requirements are based on the published requirements page:

<http://www.pearsononlinetesting.com/TestNav/7/>

District and schools that implement the VMware Horizon Air Desktops solution must comply with the TestNav version, Chromebook, network, and SRF requirements as outlined in this implementation document. Additionally, districts and schools will need to follow their standard Proctor Caching and System Check processes.

## SYSTEM CHECK

The standard Pearson process running SystemCheck should be followed to confirm final concurrent user counts for implementation purposes.

## ADDITIONAL RECOMMENDATIONS

A pilot using all qualified Chromebook models to confirm performance is recommended.

## SUPPORT

VMware Sales Support Number:

Dial **877-486-9273** and ask for Sales Assistance,

or

on the web at [http://www.vmware.com/company/contact\\_sales.html](http://www.vmware.com/company/contact_sales.html)

VMWare Global Technical Support Contact Number for Current VMware Customers:

**877-486-9273**

# VMware Horizon Air Desktops Solution – Set Up Steps

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## Set Up Steps

### SCREEN SIZE & DISPLAY RESOLUTION – MANUAL SETTING DETAILS\*

1. Chromebooks with smaller screen sizes may default to a lower resolution than is required by TestNav 7.5's launch process (1024 x 768). If the Chromebook defaults to a lower resolution setting, TestNav will not complete the launch process. As part of the set up for testing, the resolution for each Chromebook may need to be changed manually **prior to launching TestNav**.
  - a. Instructions for manually changing the default resolution are included in the *TestNav 7.5 Set Up* section.
  - b. Screen resolutions that require manual adjustment before TestNav launch may fit in full-screen mode with a smaller or larger **live test** area than normal. The live test area can then be zoomed in and out by a student using the CTL + / - to adjust for readability and/or navigational scrolling. As noted, adjusting the view requires an extra step by the user. Pre-testing to confirm the view ratio for each Chromebook make and model is recommended, as student instructions can then be confirmed for test-taking.

### PROCESSORS DETAILS

1. The best performance can be ensured by Chromebooks that use a faster GHz processor. The **Intel Celeron with 2.21 GHz** performed well whether with 2 GB or 4 GB RAM.
2. Performance issues and some lag in user action responses were identified during baseline testing were seen when using devices with the following processor families. Adding RAM to increase the total available to 4 GB is required if using Chromebooks with the processors defined below:
  - a. Celeron (must be minimum of 1.3 GHz or above)
  - b. Intel Atom
  - c. Exynos 5
3. Additionally, completing confirmation testing using a large baseline sample test is recommended.

### MEMORY RECOMMENDATIONS (RAM) –

Increasing the amount of memory to 4GB ensures better performance when using the VMware Horizon Air Desktops platform.

## SET UP CHROMEBOOKS IN GOOGLE ADMIN PANEL

The Chromebooks need to be **set up as managed** so specific device settings can be established and enforced across all devices.

1. Setup/Install the Chrome for Business and Education Management software. Information on the management console is provided in the link below:  
[http://www.google.com/intl/en\\_us/chrome/education/devices/features-management-console.html](http://www.google.com/intl/en_us/chrome/education/devices/features-management-console.html)
2. The information to setup the specific environment can be found via the links below:  
<https://support.google.com/chrome/a/?hl=en#topic=4386908> and  
<https://support.google.com/chrome/a/answer/3273084?hl=en> (Scenario 3)

## GOOGLE ADMIN PANEL SETTINGS – GENERAL OVERVIEW

The Google Admin Panel Settings need to be configured specifically to work with VMware Horizon Air Desktops and TestNav 7.5. The requirements are associated with test security, and system performance. The management configuration areas are listed below. Please see the specific instructions for each area. Additionally, the Chromebook display resolution needs to be confirmed and may need to be set manually for each Chromebook, prior to testing.

### 1. Chromebook Display Resolution

- a. Chromebooks will need to be running at one of the higher resolutions (1536 x 864 or 1440 x 900) to get the optimum test environment without the need to scroll. Depending on the Chromebook model, the screen resolution may need to be manually set.

### 2. Enrolling Devices

### 3. Enabling Public Sessions Mode and Public Sessions Kiosk Mode

### 4. User Data, Power Management, Sign In Screen

### 5. Website Whitelist/Blacklist – to restrict web browsing

### 1. Locking down wired/wireless access lists

## CHROMEBOOK DISPLAY RESOLUTION

Before each test session is delivered, the local **On-Site IT Administrator** must ensure that the screen resolution on each Chromebook is set to a resolution higher than 1024x768. Setting the screen resolution is essential, as TestNav 7.5 will fail to launch if it is not set correctly. **This must be completed per Chromebook for any that does not default to a resolution higher than 1024 x 768.**

Select the following minimum resolution setting, based on availability **by Chromebook make and model**:

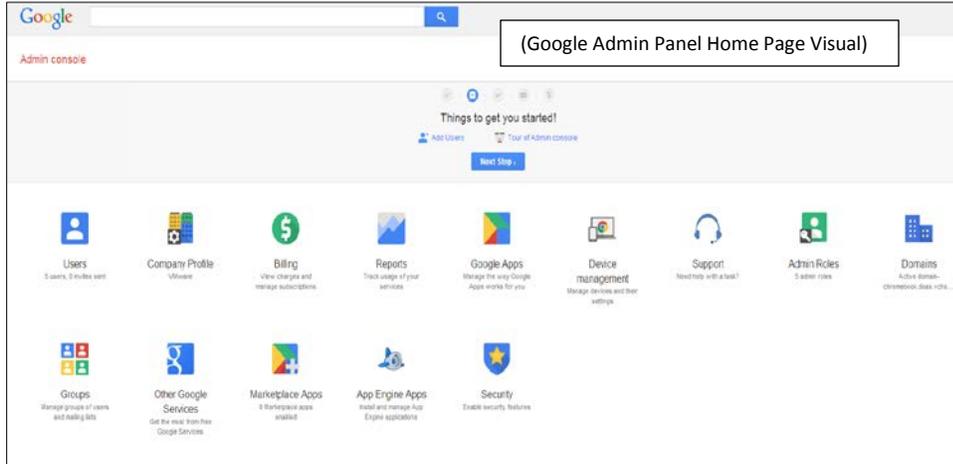
- a. 1366 x 768
- b. 1440 x 900
- c. 1536 x 864

The screen resolution can be changed by logging into your user account and then executing the following key combinations.

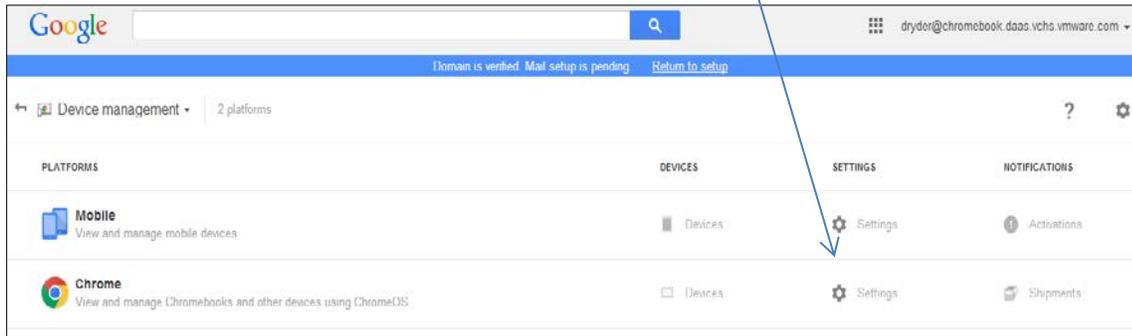
**CTRL + SHIFT + (+ or – key)**

## GOOGLE ADMIN PANEL SETTINGS – STEP-BY-STEP INSTRUCTIONS

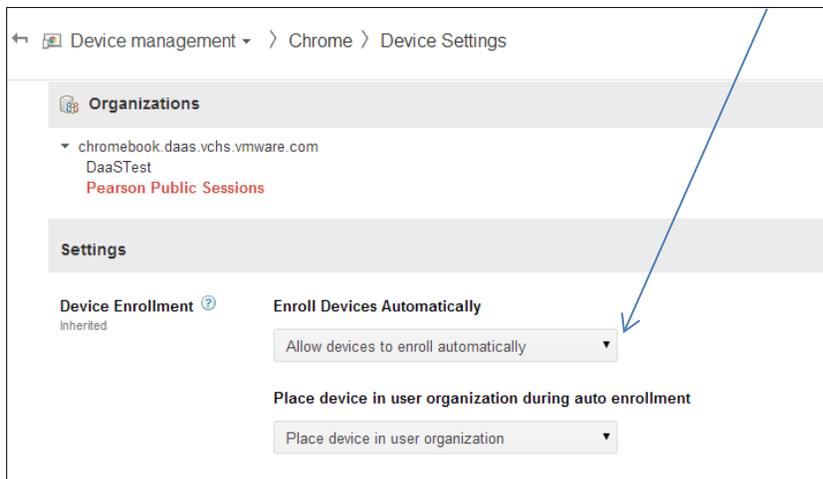
1. Log in as Administrator and setup your Google Admin Panel on your network to manage the Chromebooks. This requires setting up your organizational hierarchy.



2. You will need to enroll the Chromebook devices into your organization before you can manage them through the console. Instructions on how to do this can be found here: <https://support.google.com/chrome/a/answer/1360534?hl=en>
3. Enroll your Chromebook devices. You do this by going to: Device Management – Device Settings



**Device Enrollment Setting:** You can select "Allow devices to enroll automatically."



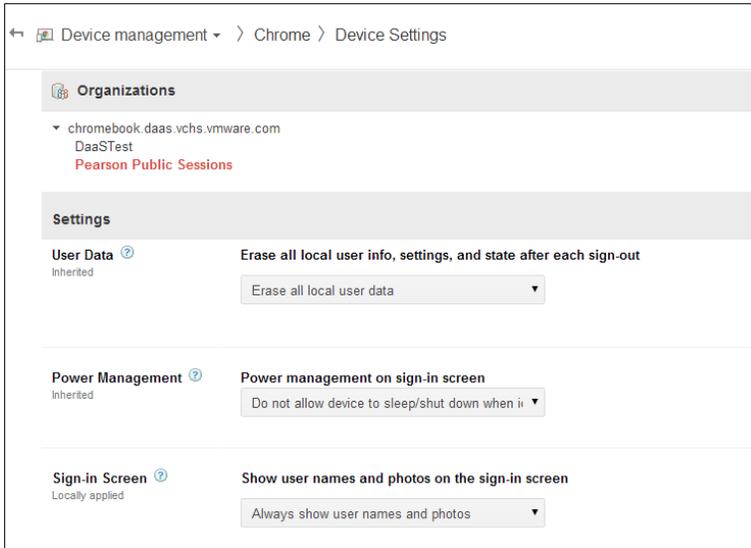
## USERS

User accounts can be set up for each Chromebook in your lab. This allows you to administrate the screen resolution and any other manual, local settings as required.

## DEVICE SETTINGS - USER DATA, POWER MANAGEMENT, SIGN-IN SCREEN

Under the following, configure as defined via the available pull down options:

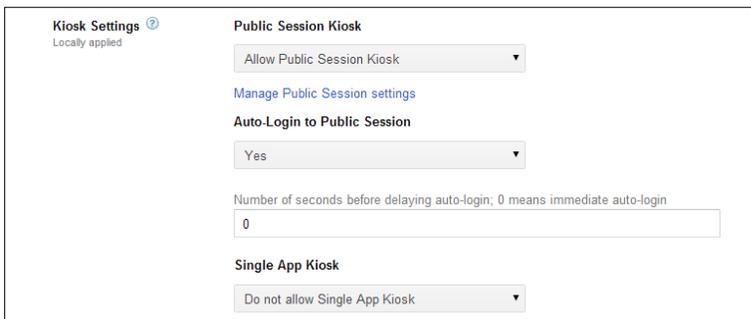
1. **User Data** - Erase all local user data
2. **Power Management** – Do not allow device to sleep/shut down when idle on sign-in screen
3. **Sign-in Screen** – Always show user names and photos



## DEVICE SETTINGS - KIOSK SETTINGS

Under the following, configure as defined via the available pull down options:

1. **Kiosk Settings:**
  - a. Public Session Kiosk / **Allow Public Session Kiosk**
  - b. Auto-Log in to Public Session / **Yes**
  - c. Number of seconds delaying auto-login / **0 = 0**
  - d. Single App Kiosk / **Do not allow Single App Mode**



## PUBLIC SESSION SETTINGS

Navigate to the correct Organization -> Device Management and then to Public Session Settings

**General Settings** - Under the following, configure as defined via the available pull down options:

1. Session Display Name / **Name your Session**
2. Maximum User Session Length / **this should be longer than your longest test session timeframe**
3. Logout on idle after / **This can be empty or 30 minutes as noted for security**

General ?	
Session Display Name <small>Locally applied</small>	PearsonPUB
Maximum User Session Length <small>Locally applied</small>	1 - 1440 minutes; leave empty for unlimited sessions 180
Logout on Idle after <small>Locally applied</small>	1 - 1440 minutes; leave empty to never logout 30

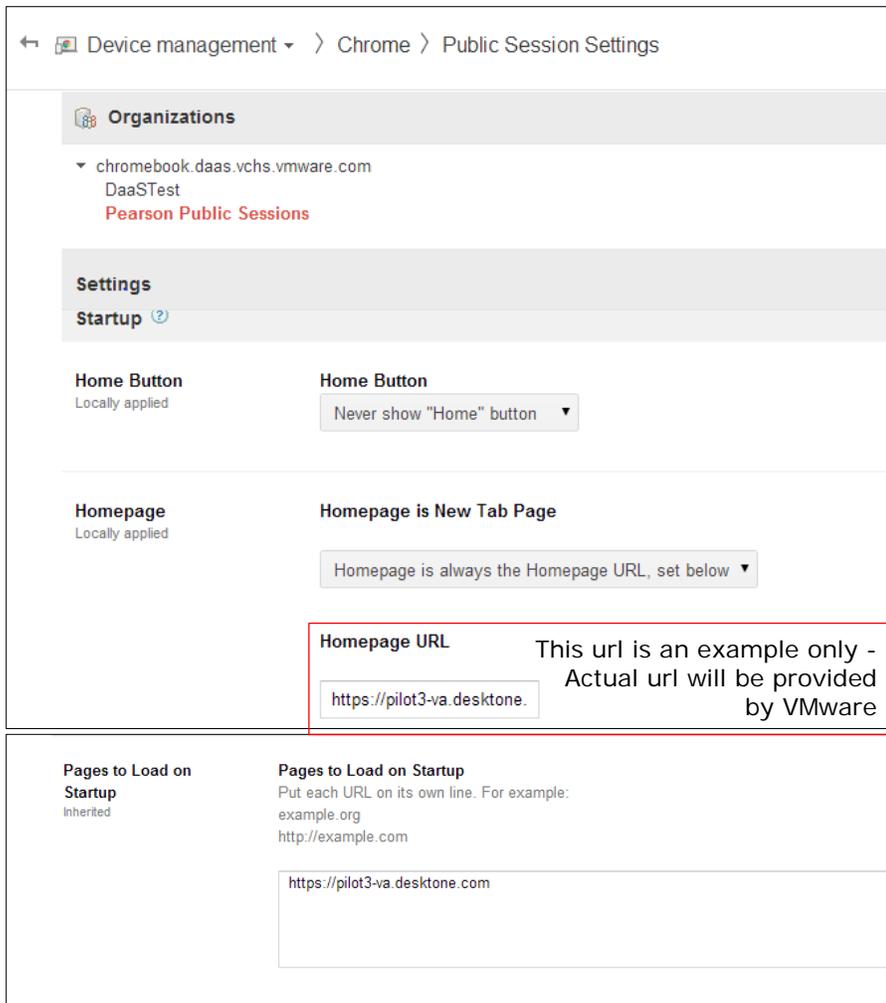
**Security Settings** - Under the following, configure as defined via the available pull down options:

1. Incognito Mode / **Disallow incognito mode**
2. Browser History / **Never save browser history**
3. Safe Browsing / **Always enable Safe Browsing**

Security ?	
Incognito Mode <small>Locally applied</small>	Incognito Mode Disallow incognito mode ▼
Browser History <small>Inherited</small>	Never save browser history ▼
Safe Browsing <small>Inherited</small>	Safe Browsing Always enable Safe Browsing ▼

**Startup Settings** - Under the following, configure as defined via the available pull down options:

1. Home Button / **Never show "Home" button**
2. Homepage is a New Tab Page / **Homepage is always the Homepage URL set below**
3. Homepage URL / **This will be set specifically for your environment, and provided by VMware**



**Content Settings** - Under the following, configure as defined via the available pull down options:

1. Safe Search / **Never show "Home" button**
2. Screenshot / **Homepage is always the Homepage URL set below**
3. Pop-ups / **Allow all pop-ups**
4. Allow Pop-ups on These Sites / **"\*" = specific testing url for production and training site associated with the location**

URL:Port
*.testnav.com: 80
*.testnav.com: 443
*.pearsonaccess.com: 80
*.pearsonaccess.com: 443

5. URL Blocking – URL Blacklist / **\*.\***

6. URL Blacklist Exception / "\*" = specific testing url for production and training site associated with the location

URL:Port
*.testnav.com: 80
*.testnav.com: 443
*.pearsonaccess.com: 80
*.pearsonaccess.com: 443

**Screenshot**  
Locally applied

Screenshot Disable screenshot ▼

**Pop-ups**  
Locally applied

Pop-ups Allow all pop-ups ▼

Allow Pop-ups on These Sites  
Put one pattern on each line.

https://pilot3-va.desktone.com

Block Pop-ups on These Sites  
Put one pattern on each line.

**URL Blocking**  
Inherited

**URL Blacklist**  
Any URL in the URL blacklist will be blocked, unless it also appears in the URL blacklist exception list. Put each URL on its own line. For example:  
example.org  
http://example.com  
(Google Chrome Build 15.0.874.12+)

**URL Blacklist Exception**  
Any URL in the blacklist exception list will be allowed, even if it appears in the URL blacklist. "" is not allowed. Put each URL on its own line. For example,  
sites.example.org  
http://mail.example.com

Remaining configuration information does not include screenshots

**Printing / User Experience** - Configure as defined via the available pull down options:

1. Printing / **Disable Printing**
2. User Experience / **Disable the spell check web service**
3. Google Translate / **Never offer translation**
4. Developer Tools / **Never allow use of built-in developer tools**
5. Form Auto-fill / **Never auto-fill forms**

**Omnibox Search Provider** - Configure as defined via the available pull down options:

1. Search Suggest / **Never allow users to Search Suggest**
2. Omnibox Search Provider / **Allow user to select the Omnibox Search Provider** (note that TestNav will lock down the home screen so the allow in this instance will not affect test security)

**Hardware** - Configure as defined via the available pull down options:

1. Secure Digital (SD) Cards and USB Flash Drive Devices / **Disallow external storage devices**
2. Microphone and Audio Input / **Prompt user to allow each time**
3. Speakers and Audio Output / **Enable audio output** (depends on the form. If no audio is required, disable)
4. Video Input / **Disable video input**

#### **SETTING THE CHROMEBOOKS TO TESTNAV LAUNCH PAGE**

1. The Chromebooks can be set to the TestNav log in page as follows:
  - a. Log in to the Chromebooks with your administrative user(s) account.
  - b. If your TestNav launch page is set as the default home page in your Chromebook Google Admin Panel, launching the browser will automatically take you to the TestNav 7.5 log in screen.

## Appendix A - Qualification Standards

The Qualification Standards used to certify this solution are outlined below:

A virtual client machine should provide the same experience as a client machine in a non-virtual environment. A baseline Electronic Practice Test (ePAT) provided by Pearson during the qualification process was used for comparison. The ePAT provided is specific for the TestNav version being qualified.

### Virtualization Setup Requirements

1. Testing environment must be set up using proctor caching
2. All cache must be cleared prior to testing including Java cache. For instructions on clearing java cache, please access the following link:  
[http://www.java.com/en/download/help/plugin\\_cache.xml](http://www.java.com/en/download/help/plugin_cache.xml).
3. Once setup the testing environment should use the SystemCheck tool successfully

### Virtualization Qualification Standards

Qualified Products must meet all of the following criteria:

#### ***Critical Security Standards for TestNav®***

1. From selection of the test to “submit test” the desktop is secure and the system does not allow access to any application, content, or other service beyond the TestNav test assessment delivery system
2. From selection of the test to “submit test” the system does not allow any screen captures, printing, saving or other electronic replication or duplication of the display screen, source code or content of the test
3. All data is encrypted between client and server for the entirety of the usage period. The data encryption must be AES 128 or higher.

#### ***Critical Performance Standards for TestNav®***

1. While logging in concurrently, no error messages are received
2. The first test item/question of the tests loads fully at the same speed as the baseline amount of less than 45 seconds
3. While interacting with all test items/questions there are no noticeable curser lags, input lags or delays in tool engagement as compared to the baseline ePAT
4. While interacting with video, audio, and Technology Enhanced Items (TEI) there are no significant lags or delays experienced as compared to baseline ePAT
5. There is no noticeable delay when navigating from test item/question to test item/question
6. All tools work correctly as demonstrated in the baseline ePAT
7. At submit, no error message is received
8. When hitting submit the system acceptance response is at the same speed as the baseline ePAT submit speed, with a maximum of 10 seconds