System Requirements for Online Testing
2018–2019

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Section I. Introduction

This document contains basic technology requirements for online testing using American Institutes for Research's (AIR) systems for the 2018–2019 test administration.

Organization of this Manual

This document contains the following sections:

- [Supported Operating Systems for Student Testing](#)

- [Supported Web Browsers for Online Systems](#)

- [Requirements for Peripheral Equipment](#)

Other Resources

The following publications provide additional information:

- For information about installing secure browsers, refer to the *Secure Browser Installation Manual*.

- For information about network and Internet requirements, general peripheral and software requirements, and configuring text-to-speech settings, see the *Technical Specifications Manual for Online Testing*.

- For information about securing a computer before a test session, see the *Test Administrator User Guide*.

- For information about supported hardware and software for Braille testing as well as information about configuring JAWS, refer to the *Braille Requirements and Testing Manual*.

The above resources, as well as secure browsers and user guides for other systems, are available on the Wyoming Test of Proficiency and Progress portal (http://wyoassessment.org).

Section II. Supported Operating Systems for Student Testing

This section describes the supported operating systems for online testing. For optimal performance, AIR expects all systems to have the latest minor updates and patches installed. Major updates including new versions require review and testing.

⚠️ **Warning: Support for New Major Versions of Supported Operating Systems**

New major versions of supported operating systems must be tested by AIR before they can be used for online testing. Do not upgrade to new major versions before support is officially announced. AIR also recommends you disable auto-updates to keep systems from upgrading automatically.

Desktops and Laptops

Table 1 lists the operating systems and hardware required for student testing. Online testing functions effectively with the minimum requirements listed. However, the recommended specifications provide improved performance.

Table 1. Supported Desktop Operating Systems

Supported Operating Systems	Minimum Requirements[b]	Recommended Specifications
Windows 7 SP1 (Professional & Enterprise) 8 (Professional & Enterprise) 8.1 (Professional & Enterprise) 10, 10 in S mode (Educational, Professional & Enterprise) (Versions 1507-1803, 1809[a]) Server 2008 R2, 2012 R2, 2016 R2 (thin client)	1 GHZ Processor 1 GB RAM (32-bit) 2 GB RAM (64-bit) 16 GB hard drive (32-bit) 20 GB hard drive (64-bit)	1.4 GHZ Processor 2 or more GB RAM 16 or more GB hard drive space
Mac 10.9-10.14[a]	1 GHZ Processor 1 GB RAM (32-bit) 2 GB RAM (64-bit) 16 GB hard drive (32-bit) 20 GB hard drive (64-bit)	1.4 GHZ Processor 2 or more GB RAM 16 or more GB hard drive space

Supported Operating Systems	Minimum Requirements[b]	Recommended Specifications
Linux (64-bit or 32-bit) Fedora 27-28 LTS (Gnome) Ubuntu 14.04, 16.04 LTS (Gnome)	1 GHZ Processor 1 GB RAM (32-bit) 2 GB RAM (64-bit) 16 GB hard drive (32-bit) 20 GB hard drive (64-bit) Required libraries/packages: - GTK+ 2.18 or higher - GLib 2.22 or higher - Pango 1.14 or higher - X.Org 1.0 or higher (1.7+ recommended) - libstdc++ 4.3 or higher - libreadline6:i386 (required for Ubuntu only) - GNOME 2.16 or higher	1.4 GHZ Processor 2 or more GB RAM 16 or more GB hard drive space Recommended libraries/ packages: In addition to the required libraries listed under minimum requirements, the following should be installed: - NetworkManager 0.7 or higher - DBus 1.0 or higher - HAL 0.5.8 or higher
Linux (64-bit only) Ubuntu 18.04 LTS (Gnome)	1 GHZ Processor 2 GB RAM 20 GB hard drive In addition to all libraries and packages listed above, Ubuntu 18.04 LTS (Gnome) also requires the following libraries: - Sox - Net-tools	1.4 GHZ Processor 2 or more GB RAM 16 or more GB hard drive space

[a] Support for this version is anticipated upon the completion of testing following its release.

[b] ARM-powered devices such as the Raspberry Pi are not supported for online testing.

Tablets

[Table 2](#) lists the supported tablets, operating systems, and related requirements. See the *Technical Specifications Manual for Online Testing* for information about configuring these devices for online testing.

Table 2. Supported Tablets and Operating Systems

Supported Operating Systems	Supported Tablets
iOS (iPads) 10.3, 11.4, 12[a]	4th Generation (Retina Display) 5th Generation (Retina Display) 6th Generation (Retina Display) iPad Air iPad Air 2 iPad Pro
Android[b] 7.1, 8.1, 9[a]	Lenovo Yoga Tab 3 10 Samsung Galaxy Tab S3 Asus ZenPad Z10
Windows 8 (Professional & Enterprise) 8.1 (Professional & Enterprise 10 (Educational, Professional, & Enterprise)	AIR supports any tablet running these versions of Windows, but has done extensive testing only on Surface Pro, Surface Pro 3, Asus Transformer, and Dell Venue.

[a] Support for this version is anticipated upon the completion of testing following its release.

[b] Amazon Fire tablets are not supported for online testing.

Chromebooks and Chromebases

Table 3 lists the supported operating systems for Chromebooks and Chromebases.

About Chrome OS and Automatic Updates

While AIR actively works to support new versions of the Chrome operating system as they come out, we recommend disabling automatic updates until new versions are listed as supported. Disabling automatic updates allows AIR to review changes and address any updates that pose a potential risk to student testing.

Automatic update settings are configured in Google's admin console.

Table 3. Supported Chromebooks

Supported Operating Systems	Supported Chromebooks
Chrome OS 67+	AIR will support any device that Google actively supports for auto-update. AIR will not support any device that Google does not support for auto-update. Information on Google's auto-update policy, including currently supported devices, can be found at https://support.google.com/edu/android/answer/6220366.

Chromebooks Manufactured in 2017 or later

Due to recent changes by Google, users with Chromebooks manufactured in 2017 or later who do not have an Enterprise or Education license **will not** be able to use those machines for assessments. Google no longer allows users without these licenses to set up kiosk mode, which is necessary to run the AIR Secure Browser.

This change restricting kiosk mode does not affect the Chrome operating system. You can still use any version of Chrome OS on hardware manufactured in 2016 or earlier.

Warning: Chrome OS Tablet Mode Not Supported

Chrome OS includes a feature called tablet mode, which offers a touchscreen environment for supported Chromebooks and for Chrome OS tablets. AIR does not support the use of tablet mode for testing but does support touchscreen features on Chromebooks when available.

Thin Clients: NComputing and Terminal Servers for Windows

NComputing

Table 4 lists the supported hardware and software for NComputing solutions.

Table 4. Supported NComputing solutions

Supported Server Host	Supported Server Software	Supported Terminal
Windows Server 2008 R2	vSpace Server 8.4	L300, firmware version 1.12.xx
Windows Server 2012 R2 Windows Server 2016 R2 Windows 10	vSpace PRO 10	L300, L350, M300, firmware version 1.13.xx

Terminal Servers

lists the supported terminal servers for use with a thin client machine.

Table 5. Supported terminal servers

Supported Terminal Servers	Supported Thin Client
Windows Server 2008 R2, 2012 R2, 2016 R2	Any thin client that supports a Windows Server.

Warning: Security Issues with Terminal Services or Remote Desktop Connections to Servers

Using a terminal services or remote desktop connection to access a Windows Server or workstation that has the secure browser installed is typically not a secure test environment.

Section III. Supported Web Browsers for Online Systems

This section lists the supported web browsers for the 2018–2019 test year. It also addresses AIR's secure browsers for student testing.

Supported Web Browsers by Operating System

Table 6 lists the supported operating systems and corresponding web browsers for each AIR application. AIR recommends using recent versions of supported web browsers. Each application requires disabling pop-up blocking software and enabling JavaScript. Be sure to use the correct combination of operating system and web browser. For example, Windows 10 requires Chrome 67+, Firefox 52+, or Edge.

Table 6. Supported Web Browsers by Operating System

Operating Systems	Browsers	TA Sites, Student Practice Tests (non-ELPA21), DEI (non-ELPA21), AVA (non-ELPA21), THSS, AIR Ways Reporting	ELPA21 Student Practice Tests, ELPA21 DEI	TIDE, ORS
Windows				
7 SP1 (Professional & Enterprise)	Chrome 67+	✓	✓	✓
	Firefox 52+	✓	✓	✓
8 (Professional & Enterprise) 8.1 (Professional & Enterprise)	Chrome 67+	✓	✓	✓
	Firefox 52+	✓	✓	✓
10 (Educational, Professional, & Enterprise) (Versions 1507-1803, 1809[a])	Chrome 67+	✓	✓	✓
	Firefox 52+	✓	✓	✓
	Edge	✓		✓
10 in S mode (Educational, Professional, & Enterprise) (Versions 1507-1803, 1809[a])	Edge	✓		✓
Mac				
10.9-10.14[a]	Chrome 67+	✓	✓	✓
	Firefox 52+	✓	✓	✓
	Safari 9+	✓		✓

Operating Systems	Browsers	TA Sites, Student Practice Tests (non-ELPA21), DEI (non-ELPA21), AVA (non-ELPA21), THSS, AIR Ways Reporting	ELPA21 Student Practice Tests, ELPA21 DEI	TIDE, ORS
Linux				
Fedora 27-28 LTS (Gnome)	Chrome 67+	✔	✔	✔
	Firefox 52+	✔	✔	✔
Ubuntu 14.04, 16.04, 18.04 LTS (Gnome)	Chrome 67+	✔	✔	✔
	Firefox 52+	✔	✔	✔
iOS				
10.3	Safari 10	✔		
11.4	Safari 11	✔		
12[a]	Safari 12[a]	✔		
Android				
7.1, 8.1, 9[a]	Chrome 67+	✔		
Chrome OS				
67+	Chrome 67+	✔	✔	

[a] Support for this version is anticipated upon the completion of testing following its release.

Secure Browsers for Online Testing

Table 7 lists the AIR secure browsers for each operating system. A secure browser must be downloaded and installed on each computer used for student testing. **Districts that installed a secure browser with a version older than the versions listed below must uninstall it before installing the secure browser for the 2018–2019 school year**. For instructions on downloading and installing the secure browsers, refer to the *Secure Browser Installation Manual*.

Table 7. Secure Browsers by Operating System

Operating Systems	Secure Browser
Windows 7 SP1 (Professional & Enterprise) 8 (Professional & Enterprise) 8.1 (Professional & Enterprise) 10 (Educational, Professional, & Enterprise) (Versions 1507-1803, 1809[a]) Server 2008 R2, 2012 R2, 2016 R2 (thin client)	10.4
Windows 10, 10 in S mode (Educational, Professional, & Enterprise) (Versions 1507-1803, 1809[a])	Take a Test app
Mac 10.9-10.14[a]	10.4
Linux Fedora 27-28 LTS (Gnome) Ubuntu 14.04, 16.04, 18.04 LTS (Gnome)	10.4
iOS (iPads) 10.3, 11.4, 12[a]	AIRSecureTest Mobile Secure Browser 5
Android 7.1, 8.1, 9[a]	AIRSecureTest Mobile Secure Browser 5
Chrome OS 67+	AIRSecureTest kiosk application 5

[a] Support for this version is anticipated upon the completion of testing following its release.

Delaying Firefox Updates

AIR conducts quality assurance on the most recent Firefox versions for each system except the Student Testing Site (which requires the secure browser). You should wait before installing new versions of Firefox, which could impact system performance. Delaying updates allows AIR time to review changes and verify each system works correctly with the new version.

To learn how to disable auto-updates for Firefox, see https://support.mozilla.org/en-US/kb/forum-response-turning-auto-update. You may need to disable auto-updates again after installing a newer version.

Available Audio Settings by Browser

Some test items play audio files, and some students have the text-to-speech (TTS) accommodation. In either case, the student should be able to adjust the audio settings for those items. Table 8 lists the browsers and their associated capability to modify such settings. Use Table 8 to ensure that you deploy a browser with the required capability.

Table 8. Available Audio Settings by Browser

Operating System	Browser	System Volume	TTS Volume	TTS Pitch	TTS Rate	Pause	Resume
Windows	Secure browser	Y	Y	Y	Y	Y	Y
	Edge	N	N	N	N	N	N
	Chrome[a]	Y	Y	Y	Y	N	N
	Firefox	N	Y	Y	Y	N	N
Mac	Secure browser	Y	Y	Y	Y	Y	Y
	Safari	N	N	N	N	N	N
	Chrome[a]	Y	Y	Y	Y	N	N
Linux[Error! Reference source not found.]	Secure browser	Y	Y	Y	Y	Y	Y
	Firefox	N	N	N	N	N	N
	Chrome[a]	Y	Y	Y	Y	N	N
iOS	Mobile secure browser	N	Y	Y	Y	N	N
	Safari	N	N	N	N	N	N
Android	Mobile secure browser	N	N	N	N	N	N
	Chrome[a]	Y	Y	Y	Y	N	N

Operating System	Browser	System Volume	TTS Volume	TTS Pitch	TTS Rate	Pause	Resume
Chromebook	Secure browser	N	Y	Y	Y	N	N
	Chrome[a]	Y	Y	Y	Y	N	N

[a] TTS features for practice tests are available on Chrome only if the client explicitly enables them.

[b] TTS Tracking is not available on Linux.

Section IV. Requirements for Peripheral Equipment

This section describes the requirements for peripheral equipment: monitors, screens, keyboards, and headphones.

Monitors and Screen Display Requirements

All supported computers, laptops, and tablets must meet the following requirements.

Screen Dimensions

Screen dimensions must be 10" or larger (iPads with a 9.7" display are included). This means the following devices are **not** supported:

- Apple iPad Mini

- Google Nexus 7 and similar-sized Android tablets

Screen Resolution

All devices must meet the following minimum resolution. Larger resolutions can be applied as appropriate for the monitor or screen being used.

- Desktops, laptops, and tablets: 1024 × 768

Depending on the screen size, students may need to use vertical or horizontal scroll bars to view all test-related information. Students may also use the Zoom tool in the online test to enlarge the content on the screen.

Keyboards

We highly recommend an external keyboard is used with tablets. Wireless or Bluetooth keyboards are not supported. Some external keyboards have additional "shortcut" buttons that can create security issues. These buttons may allow students to open another application or the tablet's default on-screen keyboard. AIR strongly cautions against using keyboards that have these shortcut buttons.

Keyboards with Android

The Android mobile secure browser requires the secure browser keyboard to disable predictive text. Therefore, any external keyboard that has a shortcut button to open the tablet's default keyboard is not permitted, as this default keyboard will override the mobile secure browser keyboard.

AIR has determined that the EZOWare Slim Full Size Keyboard contains a shortcut button that opens the default keyboard and should NOT be used with Android tablets.

Mice

Mice on mobile devices are not supported. Wired two- or three-buttoned mice that are compatible with the operating system on desktops and laptops are supported. No other mice should be used, especially mice equipped with a "browser back" button that could potentially kick users out of a test.

Headsets and Headphones

Students may need headphones to listen to audio in online assessments, and may use headsets to record answers to tests. Below are some scenarios that require headphones or headsets.

- Students with the text-to-speech accommodation can use headphones to listen to stimuli or to test items being read aloud.

- Students in grades K-2 will have an assortment of audio items that can use headphones to listen to items.

- Students in grades 3-10 with listening items in their assessment can use headphones to listen to stimuli or items with audio associated.

- Each NComputing terminal must have a USB headphone or headset when used for tests that require students to record or listen to audio.

Test Coordinators should determine how many students will need headphones to ensure that there are enough available at the time of a test.

Table 9 lists the supported headphones and headsets.

Table 9. Supported Headphones and Headsets

Model	Connector	Microphone Included	Hardware
Logitech 390	USB (wired)	Yes	All supported desktops, laptops, and Chromebases with USB port.
Panasonic RP-HT21	XBS	No	All supported desktops, laptops, and Chromebases with XBS port.
Logitech analog	3.5 mm	No	iOS, Android tablets with 3.5 mm port.
Plantronics 326	3.5 mm*	Yes	All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals.
Sennheiser PC 151	3.5 mm*	Yes	All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals.

Plantronics 355	3.5 mm*	Yes	All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals.
Generic headphones	3.5 mm	No	All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals.
Generic headphones	USB (wired)	No	All supported desktops, laptops, and Chromebases with USB port.

*These models have two connectors, one each for headphone and microphone. They require a 3.5 mm headphone splitter when used with a computer having a single speaker-microphone port.