

# System Requirements for Online Testing 2017–2018

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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 2017–2018 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 Connecticut Comprehensive Assessment Program portal (<http://ct.portal.airast.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 Desktop Operating Systems**

Operating systems that become available but do not appear in the following tables are not supported. Do not upgrade to new operating systems on computers that will be used to administer online assessments without ensuring the updates meet the required specifications.

## 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  | Recommended Specifications  |
|--|---|---|
| <b>Windows</b><br>7 (Professional and Enterprise)<br>8.0 (Professional and Enterprise)<br>8.1 (Professional and Enterprise)<br>10 (Professional, Educational, and Enterprise)<br>Server 2008, 2012, 2016 (thin client) | 1.1 GHZ Processor<br>512 MB of RAM<br>200 MB hard drive space | 1.4 GHZ Processor<br>2 or more GB RAM<br>16 or more GB hard drive space |
| <b>Mac OS X</b><br>10.7–10.12<br>10.13 <sup>b</sup>  | 1.1 GHZ Processor<br>512 MB of RAM<br>200 MB hard drive space | 1.4 GHZ Processor<br>2 or more GB RAM<br>16 or more GB hard drive       |

| Supported Operating Systems  | Minimum Requirements  | Recommended Specifications  |
|--|---|---|
| <b>Linux</b><br>Fedora 25-26 <sup>a</sup> LTS (Gnome)<br>Red Hat Enterprise 6.5<br>Ubuntu 14.04, 16.04 LTS (Gnome) | 1.1 GHZ Processor<br>512 MB of RAM<br>200 MB hard drive space<br>Required libraries/packages: <ul style="list-style-type: none"> <li>• GTK+ 2.18 or higher</li> <li>• GLib 2.22 or higher</li> <li>• Pango 1.14 or higher</li> <li>• X.Org 1.0 or higher (1.7+ recommended)</li> <li>• libstdc++ 4.3 or higher</li> <li>• libreadline6:i386 (required for Ubuntu only)</li> <li>• GNOME 2.16 or higher</li> </ul> | 1.4 GHZ Processor<br>2 or more GB RAM<br>16 or more GB hard drive space<br>Recommended libraries/packages:<br>In addition to the required libraries listed under minimum requirements, the following should be installed: <ul style="list-style-type: none"> <li>• NetworkManager 0.7 or higher</li> <li>• Dbus 1.0 or higher</li> <li>• HAL 0.5.8 or higher</li> </ul> |

<sup>a</sup> Support for this version will begin upon its release.

<sup>b</sup> Support for this version is anticipated upon the completion of testing following its release.

## 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  |
|---|--|
| <b>iOS (iPads)</b><br>9.2, 9.3, 10, 11 <sup>a</sup>       | iPad 2<br>iPad 3<br>4 <sup>th</sup> Generation (Retina Display)<br>5 <sup>th</sup> Generation (Retina Display)<br>iPad Air<br>iPad Air 2 |
| <b>Android<sup>b</sup></b><br>5.0, 5.1, 6.0, 7.0 (Nougat) | Google Nexus 10<br>Asus Transformer Pad<br>Asus Memo Pad<br>Dell Venue 10<br>HP Pro Slate 10<br>Samsung Galaxy Tab 4 Education           |

| Supported Operating Systems  | Supported Tablets   |
|--|---|
| <b>Windows</b><br>8.0 (Professional and Enterprise)<br>8.1 (Professional and Enterprise)<br>10 (Professional, Educational, and 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. |

<sup>a</sup> Support for this version is anticipated upon the completion of testing following its release.

<sup>b</sup> For a complete list of supported tablets, go to <https://support.google.com/chrome/a/answer/6220366?hl=en>

## Chromebooks and Chromebases

[Table 3](#) lists the supported operating systems for Chromebooks and Chromebases. 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>.



### 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         | Related Requirements   |
|-------------------------------------|--|
| <b>Chrome OS</b><br>60 <sup>a</sup> | See the <i>Secure Browser Installation Manual</i> for information about installing the secure browser in kiosk mode, a requirement for online testing. |

<sup>a</sup> Support for this version will begin upon its release.

## 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 1.11.xx |
| Windows Server 2012 R2 | vSpace PRO 10             |                                |
| Windows Server 2016 R2 |                           |                                |
| Windows 10             |                           |                                |

### Terminal Servers

[Table 5](#) 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, 2012, 2016 | Any thin client that supports a Windows Server. |



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

Using a terminal server 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 2017–2018 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 Internet Explorer 11 or Edge.

Table 6. Supported Web Browsers by Operating System

| Operating Systems  | Browsers                   | TA Sites, Student Practice Tests, DEI, AVA, THSS, AIR Ways | TIDE, ORS |
|--|----------------------------|--|-----------|
| <b>Windows</b>   |                            |  |           |
| 7 (Professional and Enterprise)  | Chrome 60 <sup>a</sup> +   | ✓  | ✓         |
|  | Firefox 52+                | ✓  | ✓         |
|  | Internet Explorer 11       | ✓  | ✓         |
| 8.0 (Professional and Enterprise)<br>8.1 (Professional and Enterprise) | Chrome 60 <sup>a</sup> +   | ✓  | ✓         |
|  | Firefox 52+                | ✓  | ✓         |
|  | Internet Explorer 11       | ✓  | ✓         |
| 8.0 RT   | Internet Explorer 11       | ✓  |           |
| 10 (Professional, Educational, and Enterprise)                         | Chrome 60 <sup>a</sup> +   | ✓  | ✓         |
|  | Firefox 52+                | ✓  | ✓         |
|  | Internet Explorer 11, Edge | ✓  | ✓         |
| <b>Mac OS X</b>  |                            |  |           |
| 10.7-10.8  | Chrome 60 <sup>a</sup> +   | ✓  | ✓         |
|  | Firefox 45+                | ✓  | ✓         |
|  | Safari 7+                  | ✓  | ✓         |
| 10.9-10.12   | Chrome 60 <sup>a</sup> +   | ✓  | ✓         |
|  | Firefox 52+                | ✓  | ✓         |
|  | Safari 7+                  | ✓  | ✓         |



| Operating Systems                     | Browsers                 | TA Sites, Student Practice Tests, DEI, AVA, THSS, AIR Ways | TIDE, ORS |
|---------------------------------------|--------------------------|--|-----------|
| <b>Linux</b>                          |                          |  |           |
| Fedora 25–26 <sup>a</sup> LTS (Gnome) | Chrome 60 <sup>a</sup> + | ✓  | ✓         |
|                                       | Firefox 52+              | ✓  | ✓         |
| Red Hat Enterprise 6.5                | Chrome 60 <sup>a</sup> + | ✓  | ✓         |
|                                       | Firefox 52+              | ✓  | ✓         |
| Ubuntu 14.04, 16.04 LTS (Gnome)       | Chrome 60 <sup>a</sup> + | ✓  | ✓         |
|                                       | Firefox 52+              | ✓  | ✓         |
| <b>iOS (iPads)</b>                    |                          |  |           |
| 9.2, 9.3                              | Safari 9                 | ✓  |           |
| 10.0, 10.2                            | Safari 10                | ✓  |           |
| 11 <sup>a</sup>                       | Safari 11 <sup>a</sup>   | ✓  |           |
| <b>Android</b>                        |                          |  |           |
| 5.0, 5.1, 6.0, 7.0 (Nougat)           | Chrome 60 <sup>a</sup> + | ✓  |           |
| <b>Chrome OS</b>                      |                          |  |           |
| 60 <sup>a</sup>                       | Chrome 60 <sup>a</sup> + | ✓  |           |

<sup>a</sup> Support for this version will begin upon 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 2017–2018 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 |
|--|----------------|
| <b>Windows</b><br>7 (Professional and Enterprise)<br>8.0 (Professional and Enterprise)<br>8.1 (Professional and Enterprise)<br>10 (Professional, Educational, and Enterprise)<br>Server 2008, 2012, 2016 (thin client) | 10             |

| Operating Systems  | Secure Browser                      |
|--|-------------------------------------|
| <b>Mac OS X</b><br>10.7–10.8<br>10.9–10.12   | 9.5<br>10                           |
| <b>Linux</b><br>Fedora 25–26 <sup>a</sup> LTS (Gnome)<br>Red Hat Enterprise 6.5<br>Ubuntu 14.04, 16.04 LTS (Gnome) | 10                                  |
| <b>iOS (iPads)</b><br>9.2, 9.3<br>10.0, 10.2<br>11 <sup>a</sup>  | AIRSecureTest Mobile Secure Browser |
| <b>Android</b><br>5.0, 5.1, 6.0, 7.0 (Nougat)  | AIRSecureTest Mobile Secure Browser |
| <b>Chrome OS</b><br>60 <sup>a</sup>  | AIRSecureTest kiosk application     |

<sup>a</sup> Support for this version will begin upon 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      |
|                  | IE 11                 | N             | N              | N              | N              | N     | N      |
|                  | Edge                  | N             | N              | N              | N              | N     | N      |
|                  | Chrome <sup>a</sup>   | Y             | Y              | Y              | Y              | N     | N      |
|                  | Firefox               | N             | N              | N              | N              | N     | N      |
| Mac OS X         | Secure browser        | Y             | Y              | Y              | Y              | Y     | Y      |
|                  | Safari                | N             | N              | N              | N              | N     | N      |
|                  | Chrome <sup>a</sup>   | Y             | Y              | Y              | Y              | N     | N      |
| Linux            | Secure browser        | Y             | Y              | Y              | Y              | Y     | Y      |
|                  | Firefox               | N             | N              | N              | N              | N     | N      |
|                  | Chrome <sup>a</sup>   | Y             | Y              | Y              | Y              | N     | N      |
| iOS (iPads)      | Mobile secure browser | N             | Y <sup>b</sup> | Y <sup>b</sup> | Y <sup>b</sup> | N     | N      |
|                  | Safari                | N             | N              | N              | N              | N     | N      |
| Android          | Mobile secure browser | N             | N              | N              | N              | N     | N      |
|                  | Chrome <sup>a</sup>   | Y             | Y              | Y              | Y              | N     | N      |

| <b>Operating System</b> | <b>Browser</b>      | <b>System Volume</b> | <b>TTS Volume</b> | <b>TTS Pitch</b> | <b>TTS Rate</b> | <b>Pause</b> | <b>Resume</b> |
|-------------------------|---------------------|----------------------|-------------------|------------------|-----------------|--------------|---------------|
| Chromebook              | Secure browser      | N                    | Y                 | Y                | Y               | N            | N             |
|                         | Chrome <sup>a</sup> | Y                    | Y                 | Y                | Y               | N            | N             |

<sup>a</sup> TTS features for practice tests are available on Chrome only if the client explicitly enables them.

<sup>b</sup> Available for mobile secure browser version 3.1 or later.

## **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, netbooks, 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
- Netbooks with screen dimensions smaller than 10"

#### **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
- Netbooks: 1024 × 600

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

External keyboards are strongly recommended for tablets used for testing, and some states require external keyboards for such devices. Students may use mechanical, manual, and Bluetooth-based keyboards. 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 the 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.

## 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 with the enhanced accessibility accommodation can use headphones along with Job Access with Speech (JAWS®) or other screen reading software to complete online tests.
- 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 <sup>x</sup> | Yes | All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals. |
| Sennheiser PC 151  | 3.5 mm <sup>x</sup> | Yes | All supported desktops, laptops, and Chromebases with 3.5 mm port—except NComputing terminals. |
| Plantronics 355    | 3.5 mm <sup>x</sup> | 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.                                |

<sup>x</sup> 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.

## Mice

Mice on mobile devices are not supported. Wireless or 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.

## **Appendix A. User Support**

If this document does not answer your questions, please contact the Connecticut Comprehensive Assessment Program Help Desk.

The Help Desk will be open Monday–Friday from 7:00 a.m. to 7:00 p.m. ET during the summative testing window and Monday–Friday from 7:00 a.m. to 4:00 p.m. ET outside of the summative testing window (except holidays).

### **Connecticut Comprehensive Assessment Program Help Desk**

Toll-Free Phone Support: 1-844-202-7583

Email Support: [cthelpdesk@air.org](mailto:cthelpdesk@air.org)



## Appendix B. Change Log

| Change | Section | Date |
|--------|---------|------|
|        |         |      |