Overview

What is Apple Service Toolkit 2?

Apple Service Toolkit 2 (AST 2) is a cloud-based diagnostic system to help technicians triage and verify repairs for Mac computers and iOS devices. AST 2 is accessed through GSX. Refer to articles TP1279: AST 2: Supported Products and Tests and TP1266: AST 2 for iOS Reference Guide   Page   - Overview for more information.

Note: AST 2 supports iMac (21.5-inch, Mid 2014), all Late 2014 Mac computers, and any subsequently released Mac computers. MacBook Pro (Mid 2014) and all earlier models still use AST 1.5.x for triage and repair verification.

What's New?

With AST 2, technicians will be able to initiate diagnostics wirelessly on a customer's device using a Diagnostic Console (a web application on a Mac or iPad). Technicians will be able to view diagnostic results on the Diagnostic Console. **Note:** You must log into GSX first and click the Request Diagnostics button at the top of the screen in order to be taken to the Diagnostics Console.

Diagnostic Console Running on a MacBook Pro

### Diagnostic Console Running on an iPad

AST 2 diagnostic suites are "pushed" from the cloud to the device using the Diagnostic Console. In the original Apple Service Toolkit (AST), the diagnostics are "pulled" to the device (using the device itself) from the local Diagnostic Gateway server. In AST 2, the device under test communicates directly with the Diagnostic Console over the cloud. Every time you run a diagnostic, you will get the latest version.

AST 2 incorporates AST and Apple Service Diagnostic (ASD) into a single diagnostic platform. Supported products connect to and run diagnostics from the AST 2 cloud server. The device under test communicates with the cloud-based server and diagnostic results appear on the technician's Diagnostic Console.

AST 2 Components

1. Diagnostic Console (a Mac or iPad)
2. Internet access to the AST 2 cloud-based server
3. AST 2 compatible Mac with power and a working Ethernet port or Wi-Fi connection
4. Local NetBoot Server (with OS-based diagnostics)⌞SEP⌟
   Note: All AST 2 components function via Ethernet or Wi-Fi.
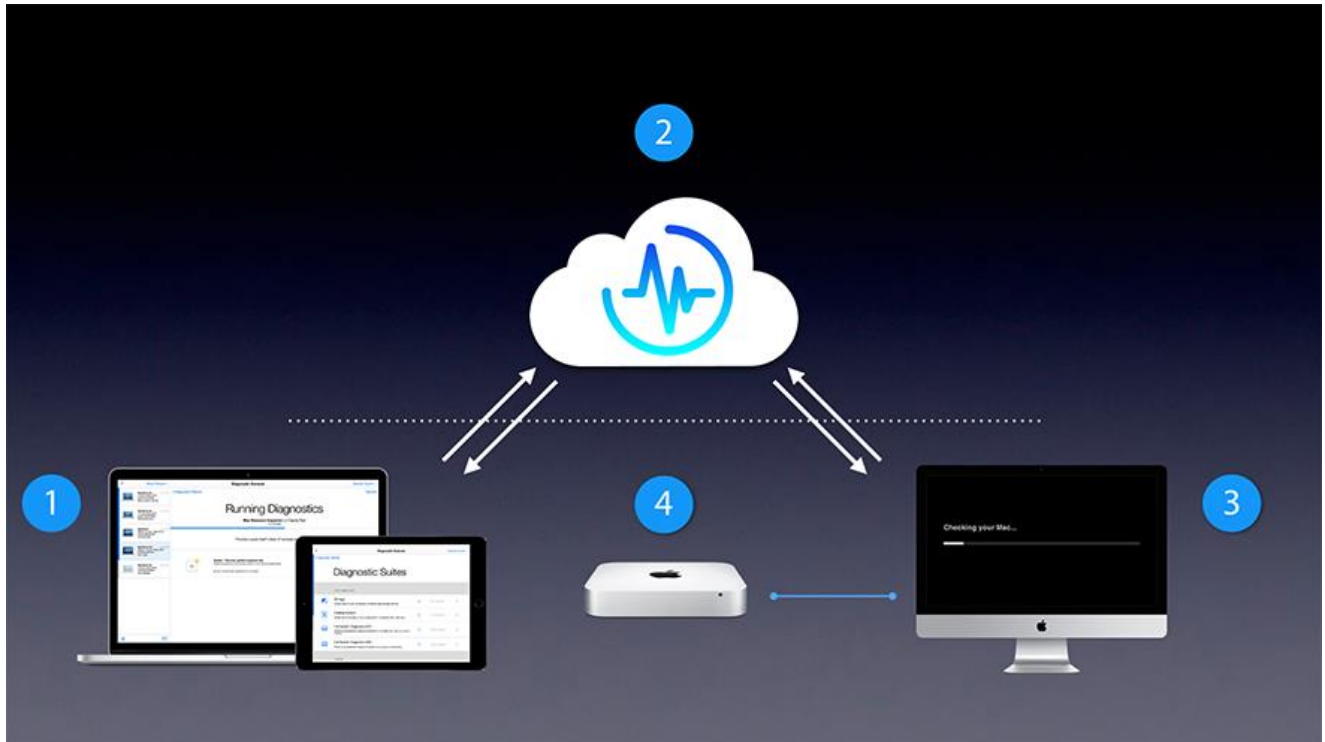
No new server infrastructure is required to support AST 2. AST 2 will run on your existing AST server infrastructure. However, all service locations will need to maintain a local NetBoot server for the following reasons:
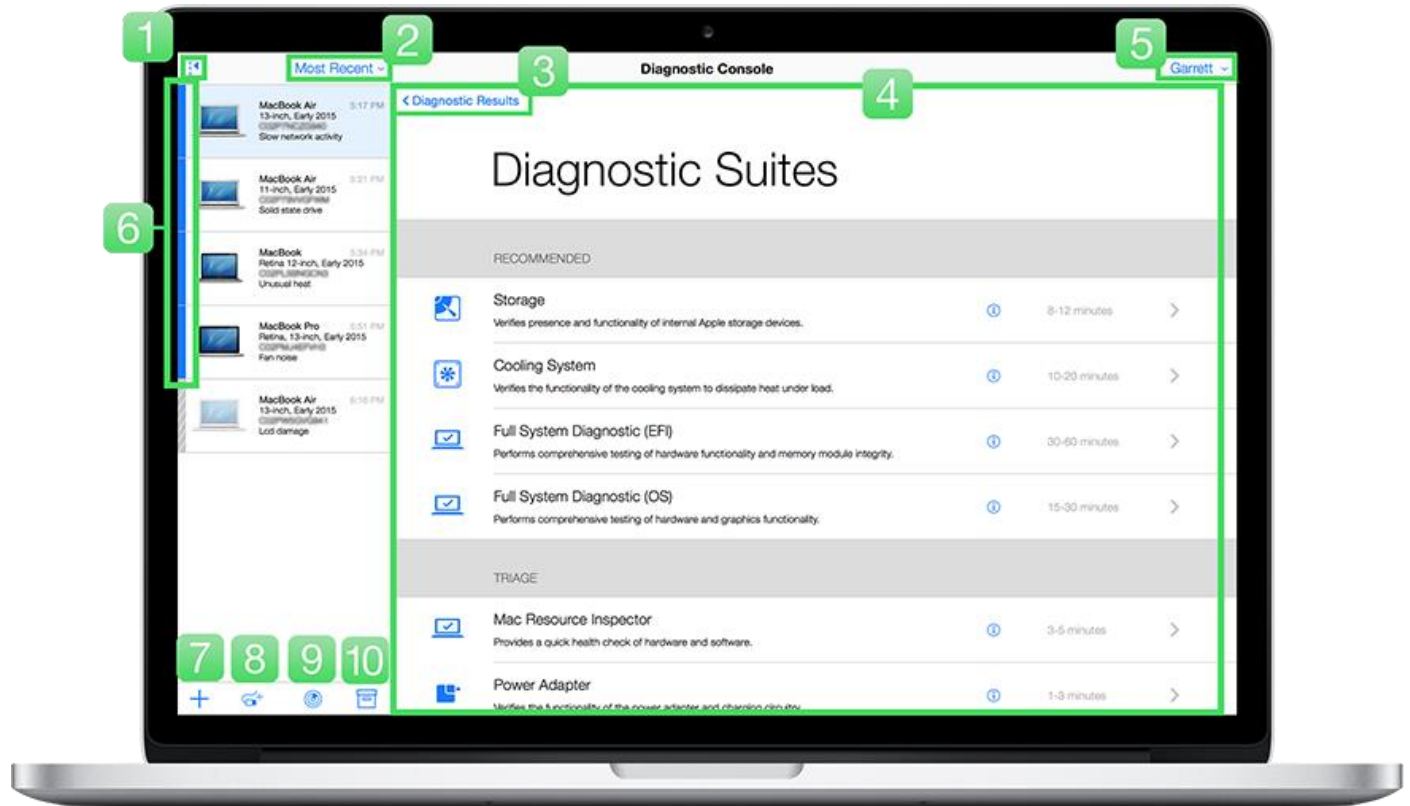
1. <u>OS-based diagnostics are large</u>⌞SEP⌟
   OS-based diagnostics are not deployed over the Internet due to their large size (approximately 3 GB). OS images must start up the device under test from a local NetBoot server. In this case, "local" means the local network (LAN) at the service location, not the wider Internet. AST 2 OS images can be deployed to devices via local Wi-Fi or wired Ethernet LAN within the service location only. AST 2 EFI diagnostics can be deployed over the wider Internet, not just the local LAN.
2. <u>To test unsupported products</u>
   Technicians will still need to maintain an AST Gateway to run AST on earlier products not supported by AST 2. Since an AST Gateway Mac is also a NetBoot server, it can do double duty and host both AST and AST 2 OS NetBoot images.

*A*ST 2 Fe*a*tur*e*s and Benefits

- **Moving to the cloud:** Apple is able to update diagnostics quickly and centrally. Every time you run a diagnostic, you will run the most up-to-date version.
- **Cutting the cord:** Diagnostics can be deployed over Ethernet or Wi-Fi. EFI diagnostics like Mac Resource Inspector (MRI) can run anywhere there is an Internet connection; no NetBoot server is required. Running OS diagnostics still requires a local NetBoot server for a known-good OS environment during testing.
- **Combining diagnostics into one system:** For supported products, technicians can run all AST diagnostics (like MRI, Storage Diagnostic, Cooling System Diagnostic) and Apple Service Diagnostics (ASD) using AST 2. More ASD tests will be incorporated into AST 2 in the future.
- **Testing many devices through one interface:** Using the Diagnostic Console (a web application on a Mac or iPad; see images below), technicians are able to run diagnostics wirelessly on many devices at the same time. Technicians can see the live status of all units under test and share diagnostic results as they complete. Having diagnostic results on their Diagnostic Console also means that technicians can run diagnostics on devices with no video.
- **Localized diagnostic results:** The Diagnostic Console can display test results in 14 languages and technicians may choose their preferred language. Simple diagnostic status messages can be displayed on the unit under test in 32 languages.
- **Detailed diagnostic results:** Diagnostic results are more informative. They tell you about the test, what the test found, and in many cases include the next steps on your troubleshooting process.
- **Sharing the results:** Technicians can click the information icon (lower case "i" in a circle) on any diagnostic results for an interactive result. This simplified view is designed to facilitate conversations with customers about the diagnostic results and service options.

Diagn*o*stic C*o*nsole

The Diagn*o*s*t*ic Console (DC) is the te*c*hnician's interf*ac*e with AST 2 and the device und*e*r test. All t*e*st re*s*ults and detailed inform*a*tion are di*s*played on the Diagnos*t*ic Co*n*sole.

The items identified in the Diagnostic Console graphic are described below:

Number	Item	Function
1	Blue arrow	Hides or expands the list of devices in the sidebar.
2	Most Recent	Menu that sorts the devices by product or testing status.
3	Diagnostic Results	Displays the test results for the selected unit under test.
4	Diagnostic Suites	Diagnostic test suites available for the selected device. Diagnostic suites may vary slightly by model and configuration.
5	Technician name	Identifies the technician who is currently logged in. Use this menu to log in, log out, or select a different language.
6	Colored bars in sidebar	Each unit under test has a colored bar (solid blue, pulsing blue, or gray) next to it indicating its status: • A solid blue bar indicates that a device is currently online and ready for diagnostics. • A pulsing blue bar indicates a new diagnostic result, that a technician has not yet viewed the device's diagnostic result, or that a test needs attention. • A gray bar indicates that the device is offline and no longer connected to Diagnostic Console. To remove the device from

|		
		the list, the technician can select the device and archive the results. • A pulsing orange bar indicates that the device under test is restarting to an OS-based diagnostic.
7	"+" icon	Add a device to test.
8	USB connector	Displays HDI Tools.
9	Radar icon	Identifies devices connected to AST 2.
10	Archive icon (file cabinet)	Archive results, remove the device from the sidebar, and end the diagnostic session.

Using AST 2

Apple Service Toolkit 2 (*AST* 2) is a cloud-based diagnostic system to help technicians triage and verify repairs for Mac computers. AST 2 supports iMac (21.5-inch, Mid 2014), all Late 2014 Mac computers, and any subsequently released Mac computers. MacBook Pro (Mid 2014) and all earlier models still use AST 1.5.x for triage and repair verification.

For a complete list of supported devices, refer to article TP1279: AST 2: Supported Products and Tools.

AST 2 Components

1. Diagnostic Console (Mac or iPad)
2. Internet access to the AST 2 cloud-based server
3. AST 2-supported device with power and a working Ethernet port or Wi-Fi connection
4. Local NetBoot Server (with OS-based diagnostics)
   Note: All AST 2 components function via Ethernet or Wi-Fi.
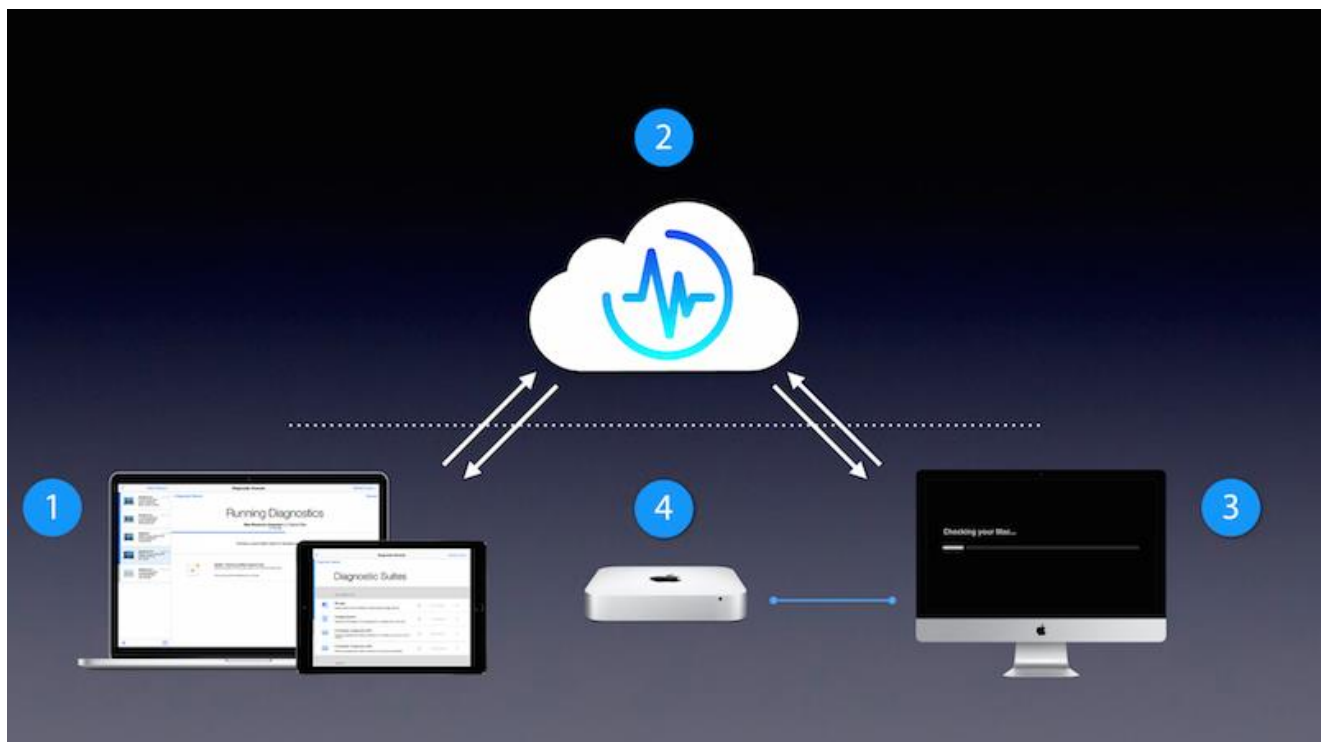
Using AST 2

1. In GSX, enter an eligible device serial number and click the Request Diagnostics button at the top of the screen.

NOTE: If the next screen does not appear, see if the link is being blocked. More than not, this has been happening on Tom's iMAC due to other apps interfering.

2. AST 2 loads on the Diagnostic Console (Mac or iPad).
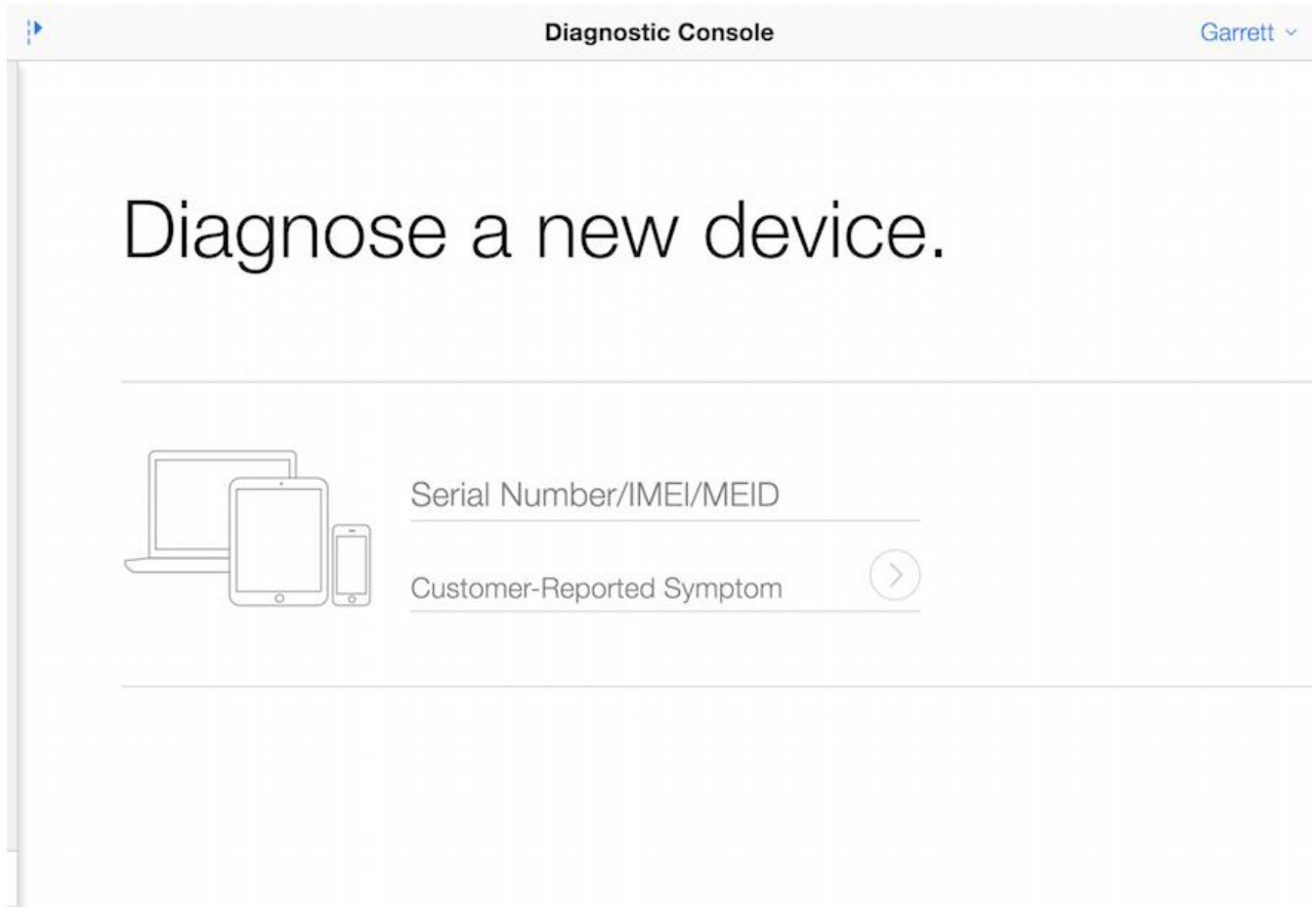
3. To run the AST 2 Diagnostic Console in your local language, use the language selector under Your Name > Account Settings, in the top right corner.

Note: The device under test also has a language selector for the customer, which appears when first booting to the AST 2 server.

Diagnostic Console language selector

4. On the Diagnostic Console, enter the device's serial number and customer-reported symptom or pick a symptom from the pop-up menu as you type. You may see a list of devices in the sidebar if you are testing other devices or if other devices have been tested. Tap the right arrow next to the symptom description to proceed.

Note: You can press Command-I on the device under test to display the serial number on the Diagnostic Console.

5. At this point, start up the customer's device while holding down Option-D. **Note:** If you do not enroll the device in the Diagnostic Console within the first few minutes, the device will start running Apple Diagnostics.

Important Tips for Desktop Devices:

- Connect a known-good wired Apple USB keyboard and a known-good wired Apple USB mouse to any available USB ports on the device.
- Do not use a third-party USB keyboard or mouse with either version of AST. Third-party devices may require drivers that would be unavailable in the EFI environment and may cause AST to stop responding.
- If the device stops responding while starting AST 2, press the device's power button for 10 seconds to shut down, then retry.

6. The device connects to the AST 2 cloud-based server and loads the Informed Consent dialog within several seconds. Obtain the customer's permission to proceed with the diagnostic. Explain

that only the hardware diagnostic data and computer serial number are collected; no personal information is collected.

- If the customer agrees to send this information, click "I agree" or press the Return key to proceed.


- If the customer does not agree to send the hardware diagnostic data and computer serial number to Apple, press Escape or click "Run offline" to proceed. Apple Diagnostics will

run on the device as shown in the next image.

Checking your Mac...   About 1 minute remaining

Restart   Shut Down
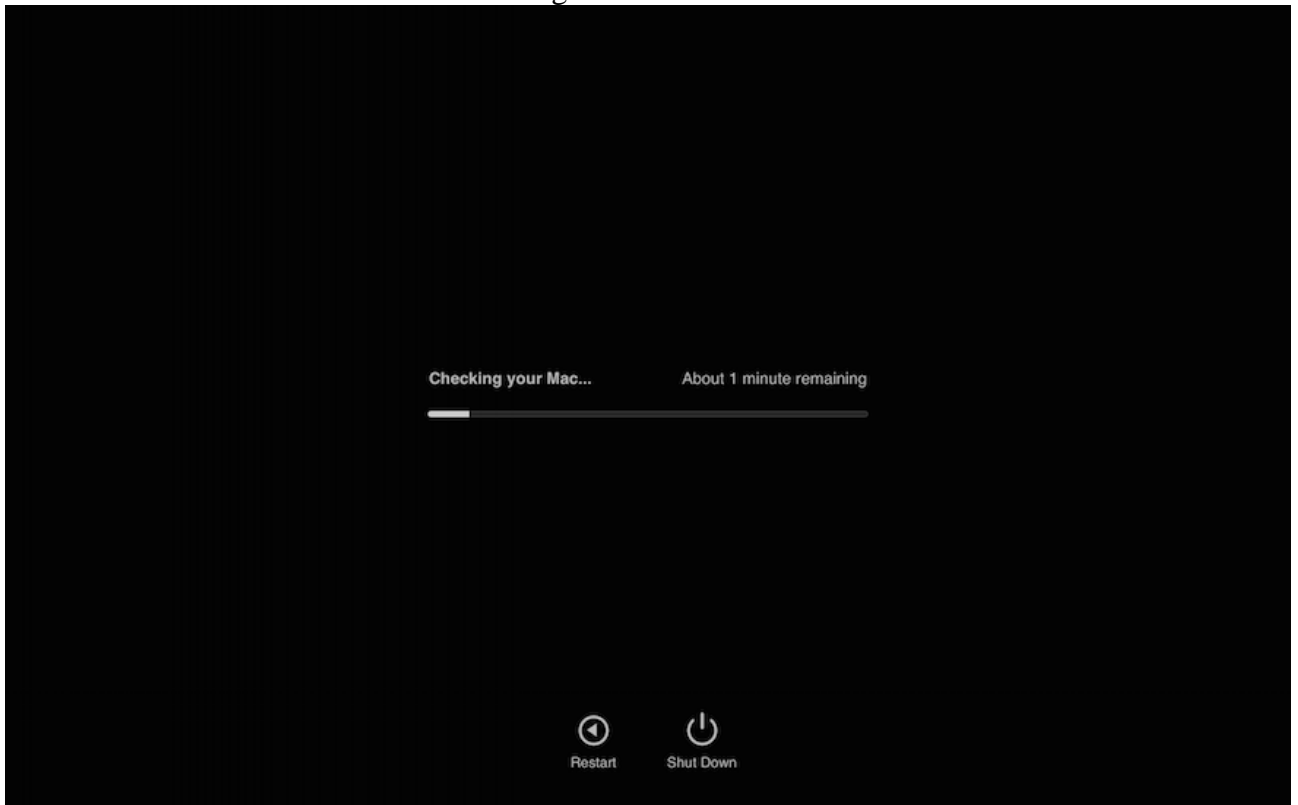
- If an issue is found, Apple Diagnostics produces an error code. The error code, along with a description, gives the customer more information about the issue. The customer

can get further support from the Genius Bar or from Apple phone support.
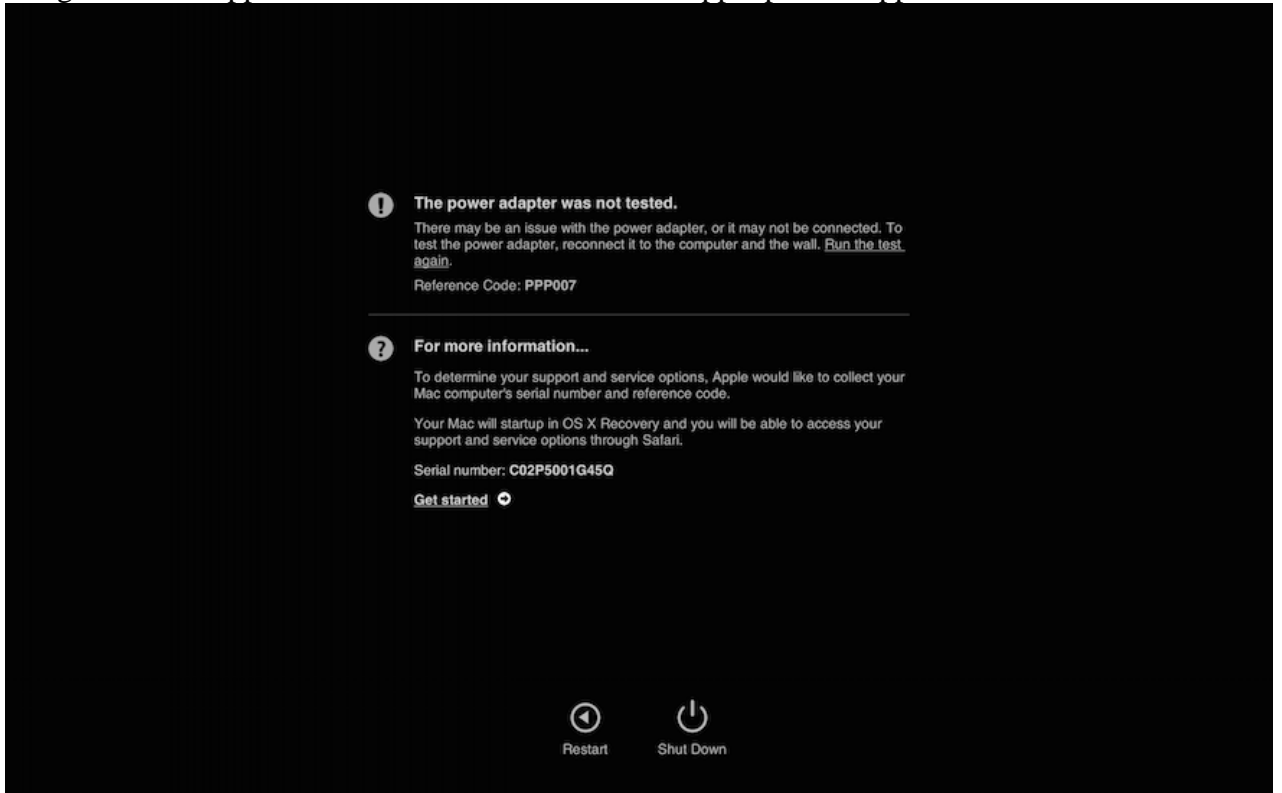
For more information on Apple Diagnostics, refer to article HT202731: How to use Apple Diagnostics on your Mac.

7. The colored bars next to the device in the Diagnostic Console indicate the following:

- A blue bar indicates that a device is currently online and ready for diagnostics.

- A pulsing blue bar indicates two things:
    1. The device or Diagnostic Console may need the technician's attention. For example, it may be running an interactive diagnostic like Display Anomalies, where the technician must view the device's screen and answer a question on the Diagnostic Console before the diagnostic can proceed on to the next step.
    2. The technician has not yet viewed the device's diagnostic result.

- A gray striped bar indicates that the device is no longer connected to the Diagnostic Console. To remove the device from the list, click or tap on the device under test and then tap on the archive icon (file cabinet) to archive the results (see step 13). ⸤⸢SEP⸣⸥
- A pulsing orange bar indicates that the device under test is restarting to an OS-based diagnostic.

	iMac	3:33 PM
	Retina 5K, 27-inch, Late 201…	
	Mechanism	

	iPhone 5c	3:34 PM
	Yellow, 16GB, GSM	
	System time	

	Apple Watch	3:57 PM
	iPhone 6 Plus	
	Back camera	

	MacBook	2:16 PM
	Retina 12-inch, Early 2015	
	Trackpad	

If the device is not showing as blue (*online*) in the sidebar:

- Network disconnection: Check network connections, such as the Wi-Fi or the Ethernet cable. The device could also have a network issue as part of its overall issues. Try another network interface (if using wired Ethernet, try Wi-Fi; if using Wi-Fi, try wired Ethernet). Also check that Internet access is not blocked by firewalls or proxy servers (common in education environments).
- If the device is not connecting to the Diagnostic Console, restart the device while holding down Option-D. Also, if using Wi-Fi, note that the device must join the correct Wi-Fi network during EFI startup.

8. AST 2 diagnostic suites load to the Diagnostic Console, allowing you to select which diagnostics to run. A complete list of diagnostics that are appropriate for that device will appear.

Icons on the Diagnostic Suites screen:
i = Click or tap the info button (i) for a description or more information about the test suite.
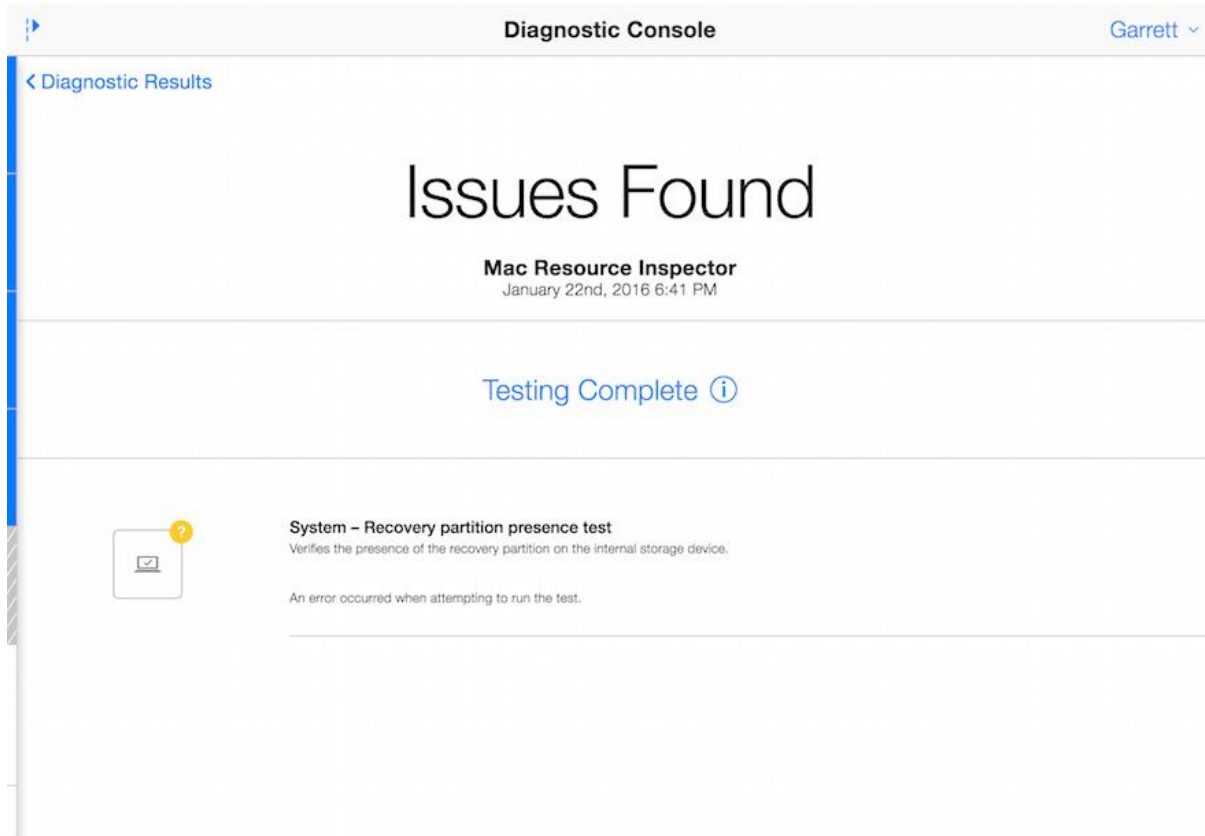> = Click or tap the arrow button (>) to begin a diagnostic test.

9. When you click or tap the arrow button (>), the selected diagnostic is pushed to the device and the test information is displayed on the Diagnostic Console. In the graphic below, Mac Resource Inspector (MRI) was selected and is running on the device under test. The blue progress bar indicates the time remaining to complete the diagnostic.
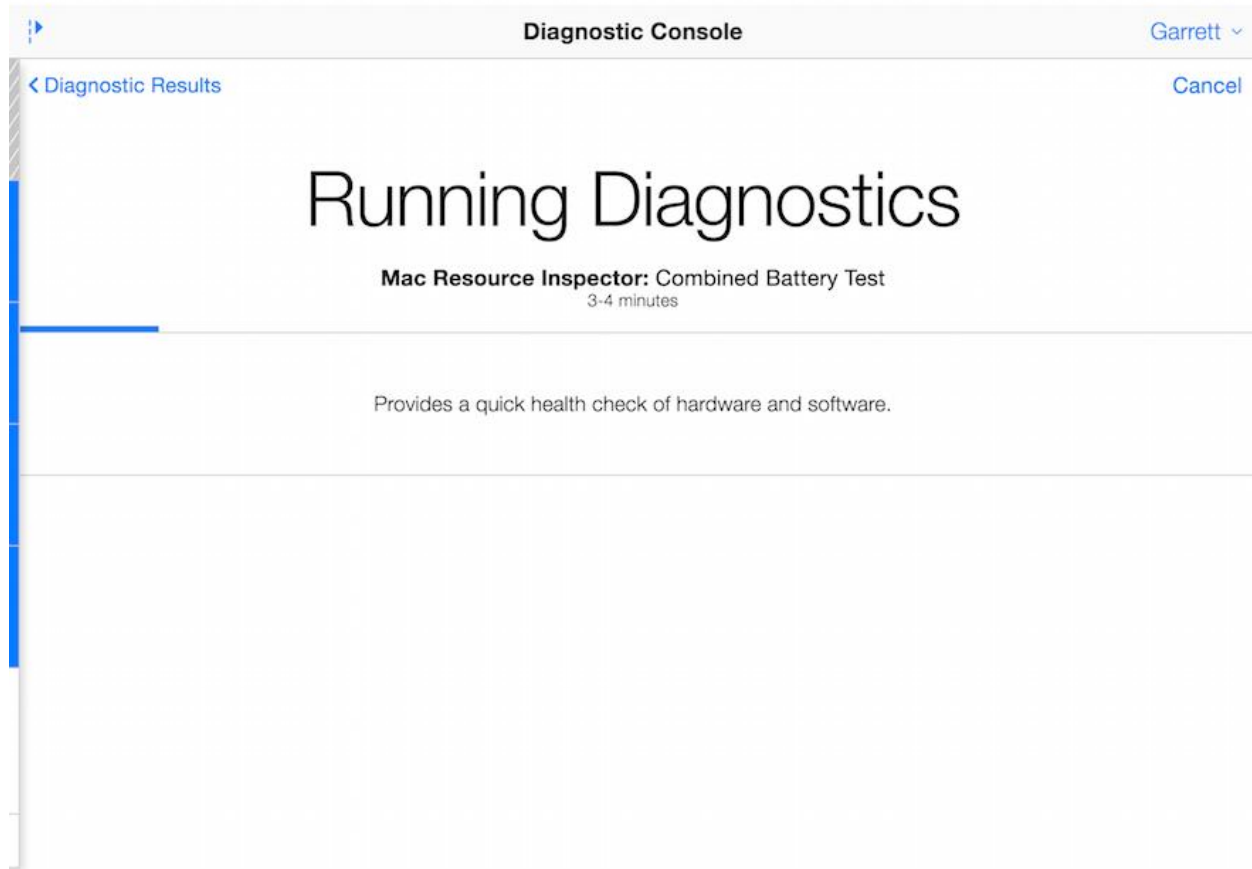
10. When the diagnostic is finished, the technician view is displayed in the Diagnostic Console. Click or tap the Info button (i) next to Testing Complete to bring up the customer-shareable diagnostic results (see next step). The graphic below shows the MRI results.

Note: The test results are sent to Global Diagnostic Exchange (GDX) after each test suite completes. GDX results populate within GSX.

*1*1. Share the te*s*t results with the cust*o*me*r*. Result status c*a*n be quickly identified by the f*ollo*wing badge icon*s*:

- Green check mark = Test passed
- `SEP`Yellow question mark = Test requires technician attention`SEP`
- Red exclamation mark = Test failed, device requires further attention or diagnosis
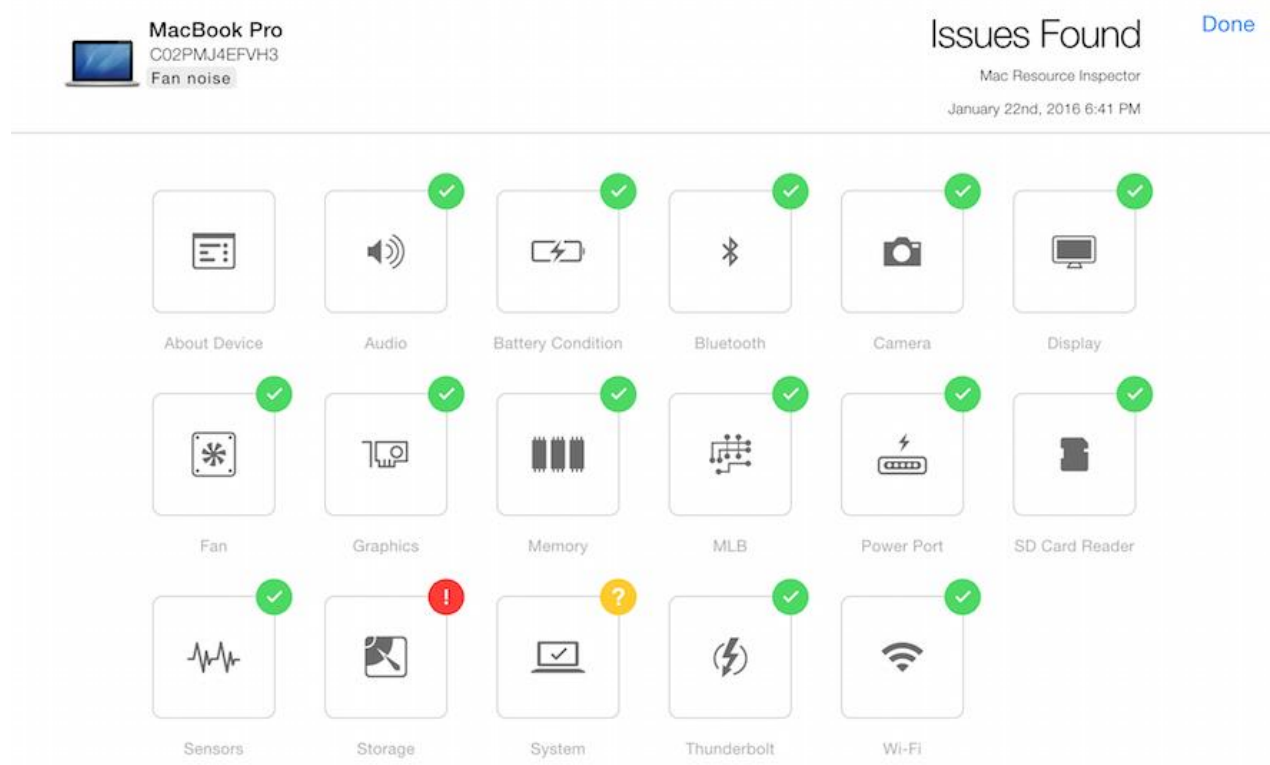
12. Click or tap on each icon for detailed test results. Depending on the MRI diagnostic results, you may want to continue with other test suites. Otherwise, after reviewing the diagnostic results with the customer, you can archive the device's test results.
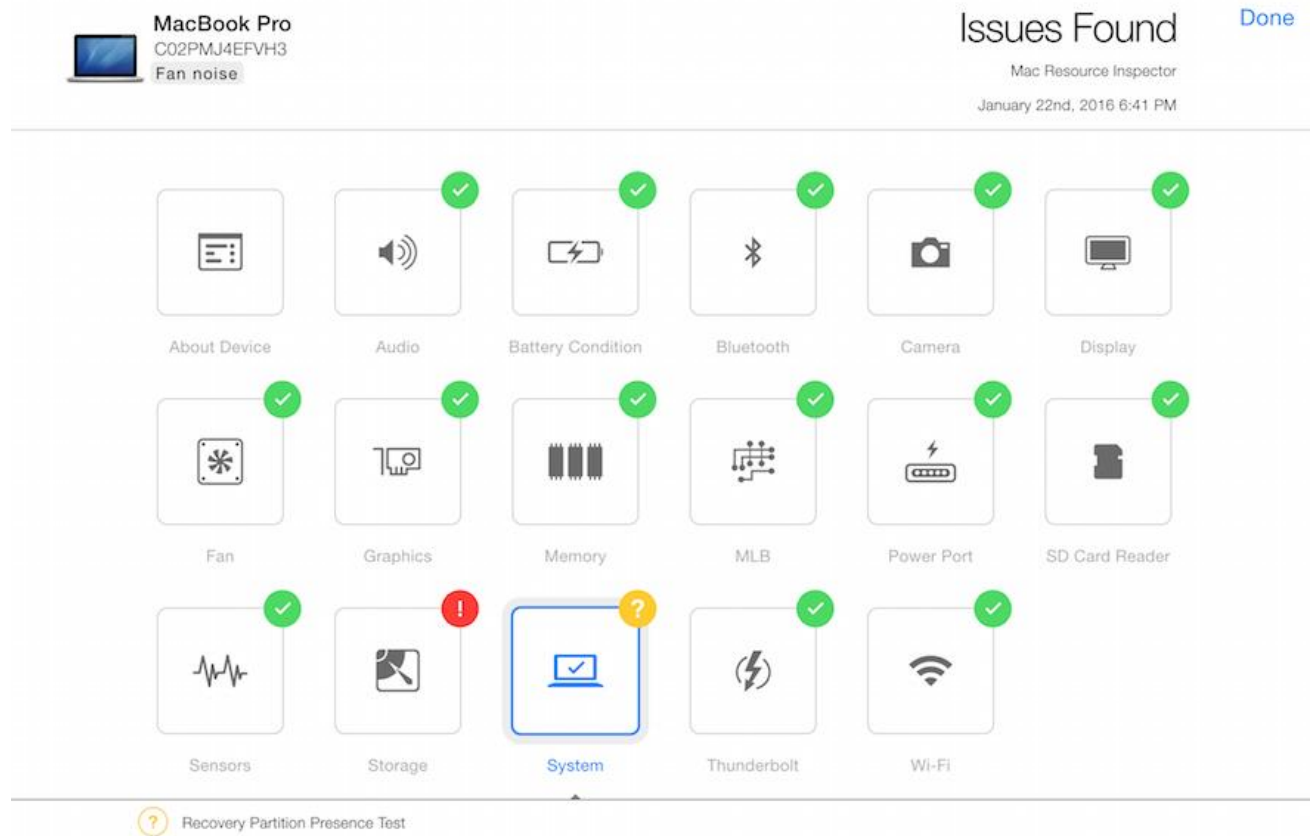
13. To archive a diagnostic session, click or tap on the device in the sidebar and then click or tap the Archive icon (file cabinet) at the bottom of the sidebar. Or, swipe next to the product name and the Archive icon (file cabinet) will appear.

Archiving the device's test results will shut down the device and remove it from the sidebar. To review the test results of a device after archiving, enter the device's serial number on the Diagnostic Console.

14. When you are finished testing the unit, disconnect the Ethernet cable from the device if connected. Then take appropriate action according to the results, such as a hardware repair, software repair, or education. Repair the unit or return it to the customer.

Tip: Running diagnostics with no video

AST 2 Diagnostics: If the device has no video, the following sequence can be taken to run AST 2 Diagnostics. AST 2 will not proceed beyond the Informed Consent dialog automatically.

- Press the Return key to default to English on the language select screen, then press the Return key again to agree to the Informed Consent dialog. The device will wait for instructions from the AST 2 Diagnostic Console.

Apple Diagnostics: If the customer does not agree to send hardware diagnostic data and computer serial number to Apple, the following sequence can be taken to run Apple Diagnostics:

- Press the Return key to default to English on the language select screen, then press Escape to decline the Informed Consent dialog. The device will run offline Apple Diagnostics.

Once diagnostic tests are complete, the device can be shut down or restarted by the following sequence:

- Shut Down: Press S, then press the Return key.
- Restart: Press R, then press the Return key

Basic Workflow

An overview of the AST 2 workflow is described below.

1. Log in to GSX on a Mac or iPad. Click the Request Diagnostic button.
2. Enter the device's serial number and customer-reported symptom on the Diagnostic Console.
3. In the Diagnostic Console, select the appropriate diagnostic test.
4. Connect the device under test via Ethernet or Wi-Fi. If the device is not connected to Ethernet, the device will ask you to select a Wi-Fi network and may require a password.
5. Turn on the device under test while holding Option-D.
6. AST 2 diagnostics run on the device and are pushed from the cloud-based server to the device using the Diagnostic Console. When you are done running AST 2, review the results with the customer.

For more step-by-step instructions on using AST 2, refer to article [TP1107: AST 2 Reference Guide   Page   - Using AST 2](#).

Frequently Asked Questions

H*o*w do I prepare f*o*r AST 2?

- Review the AST 2 articles. Refer to article [TP1105: AST 2 Reference Guide Page   - Table of Contents](#).
- Ensure that you have an Internet connection and a NetBoot server with a cache of OS X-based diagnostics for testing in a known-good environment. AST and AST 2 diagnostics can be run from the same NetBoot server. If you need to review AST setup, refer to article [TP586: AST Reference Guide   Page   Table of Contents](#).
- Review the AST 2 training material located online at [atlaslms.apple.com](#). Sign in to the Apple Technical Learning Administration System (ATLAS) with your Apple ID and password and search for "AST 2."

How is AST different from AST 2?

- AST 2 is moving to the cloud. AST 2 diagnostic suites are "pushed" from the cloud to the device using a Diagnostic Console (an iPad or Mac). With AST, the diagnostics are "pulled" to the device from the local Diagnostic Gateway server using the device itself.
- With AST 2, technicians will be able to initiate diagnostics wirelessly on a customer's device using a Diagnostic Console. The technician no longer needs to be tethered to Ethernet.
- The Diagnostic Console allows technicians to manage multiple devices at one time, keep a live status of every device, share the diagnostic results as they complete, and review previous test results (on the same device) completed by other channels, such as an Apple Retail Store, an AASP, or depot.
- AST 2 can run diagnostics anywhere in the world, as long as there is an Internet connection.
- AST 2 has a new graphical interface. The technician can share rich, detailed diagnostic results with the customer. The results show the status of the device and can be easily understood by the customer.
- The Diagnostic Console can be used in all service languages and technicians may choose a preferred language.
- Troubleshooting is integrated into the diagnostic results. AST 2 guides the technician to the next step, which is helpful for a new technician.
- Error codes have been replaced by rich, detailed diagnostic results in AST 2.

H*o*w do I acc*e*ss AST 2?

Refer to article [TP1107: AST 2 Reference Guide   Page   - Using AST 2](#).

Wh*a*t is the Dia*g*nostic Cons*o*le?

- The Diagnostic Console is a web application running on a Mac or iPad that is used to run diagnostic suites and view diagnostic results. The Diagnostic Console provides

technician-facing and customer-facing information. AST 2 diagnostic suites are pushed from the cloud server to the device under test using the Diagnostic Console.

- Interactions are now performed on the Diagnostic Console (not on the customer's device), unless you are running certain tests like the Display Anomalies or the Keyboard tests which require technician or customer input.
- The Diagnostic Console is used to manage multiple devices.
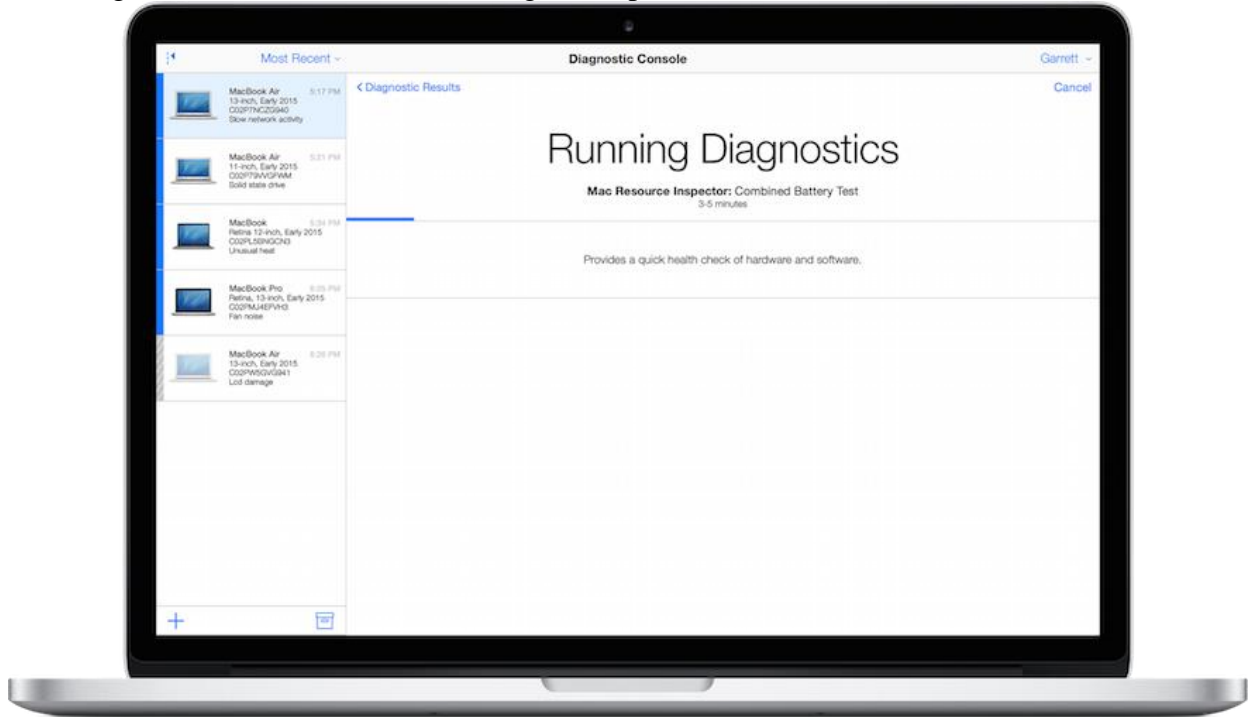
Is the Diagnostic Console supported on mobile devices?

- Yes, on iOS devices running iOS 7 or later.

What browsers are compatible with the Diagnostic Console?

- The Diagnostic Console will work on a Mac that is running OS X version 10.7.4 or later with Safari 6.0 or later. It will also work on a PC that is running Windows XP, 7, or 8 with Firefox 23 or and later and Chrome 29 or later.

Where can I view diagnostic result history?

- Diagnostic results that have been run in the last 60 days are displayed directly after enrolling a device in the Diagnostic Console.

Can AST 2 be used over Wi-Fi? Ethernet?

- Both the Diagnostic Console and the customer's devices can be run in a Wi-Fi environment or over an Ethernet cable. Ethernet is preferable when running OS based diagnostics, as they are quite large and will take additional time to initialize over Wi-Fi.

Does AST 2 replace Apple Service Diagnostic (ASD)?

- AST 2 replaces ASD for supported products.

Do I still need the AST server?

- Yes, AST will still be used to triage legacy products released prior to AST 2 and to provide the NetBoot images for AST 2 OS-based diagnostics.

What languages are supported in AST 2?

- The Diagnostic Console can be used in all service languages and technicians may choose a preferred language.

Why am I unable to see all the languages on the customer's device when I start Apple Diagnostics?

- Some languages require fonts within a working recovery partition. If the required font is unavailable, the language is not displayed.

How do I differentiate between Apple Diagnostics and AST 2?

- Apple Diagnostics will display a progress indicator (moving bar) along with the time remaining to complete the diagnostic and display the test results on the customer's device.
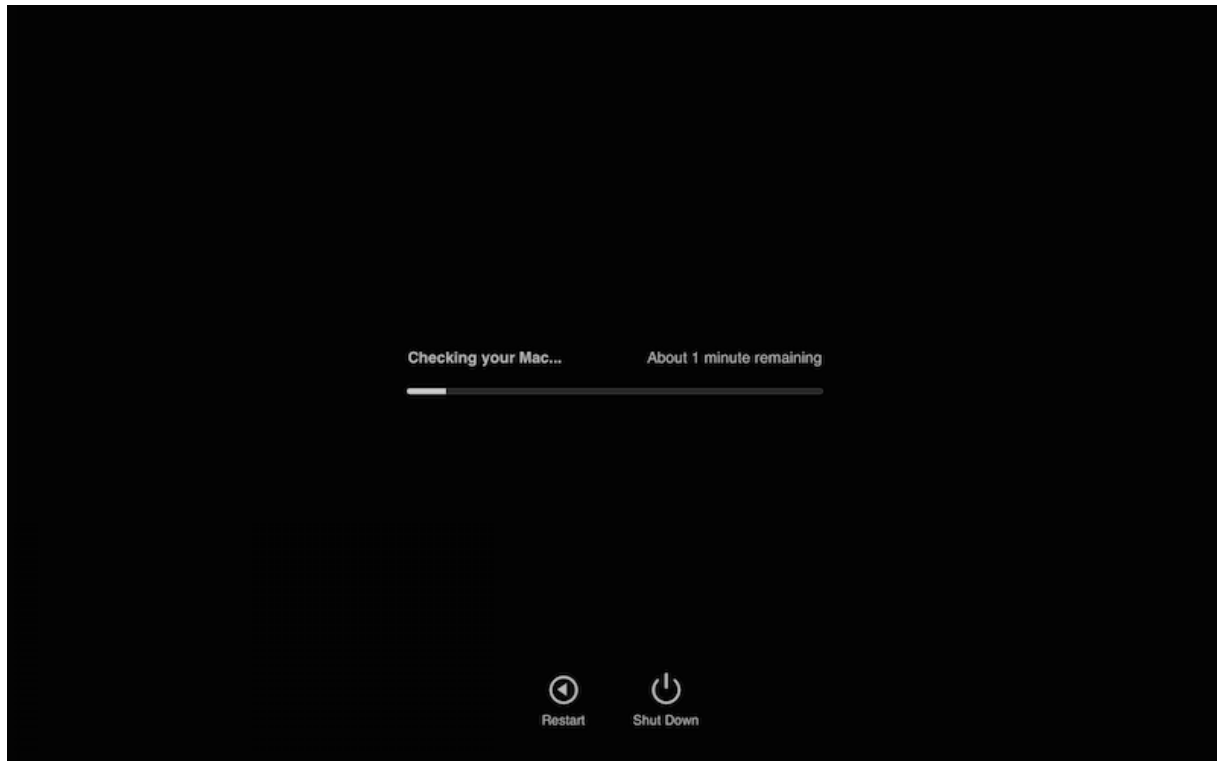
- AST 2, will display a progress indicator (moving bar) without displaying the time remaining on the customer's device. The Diagnostic Console simultaneously displays a progress indicator along with the remaining time and provides test results with rich graphics that technicians share with the customer.
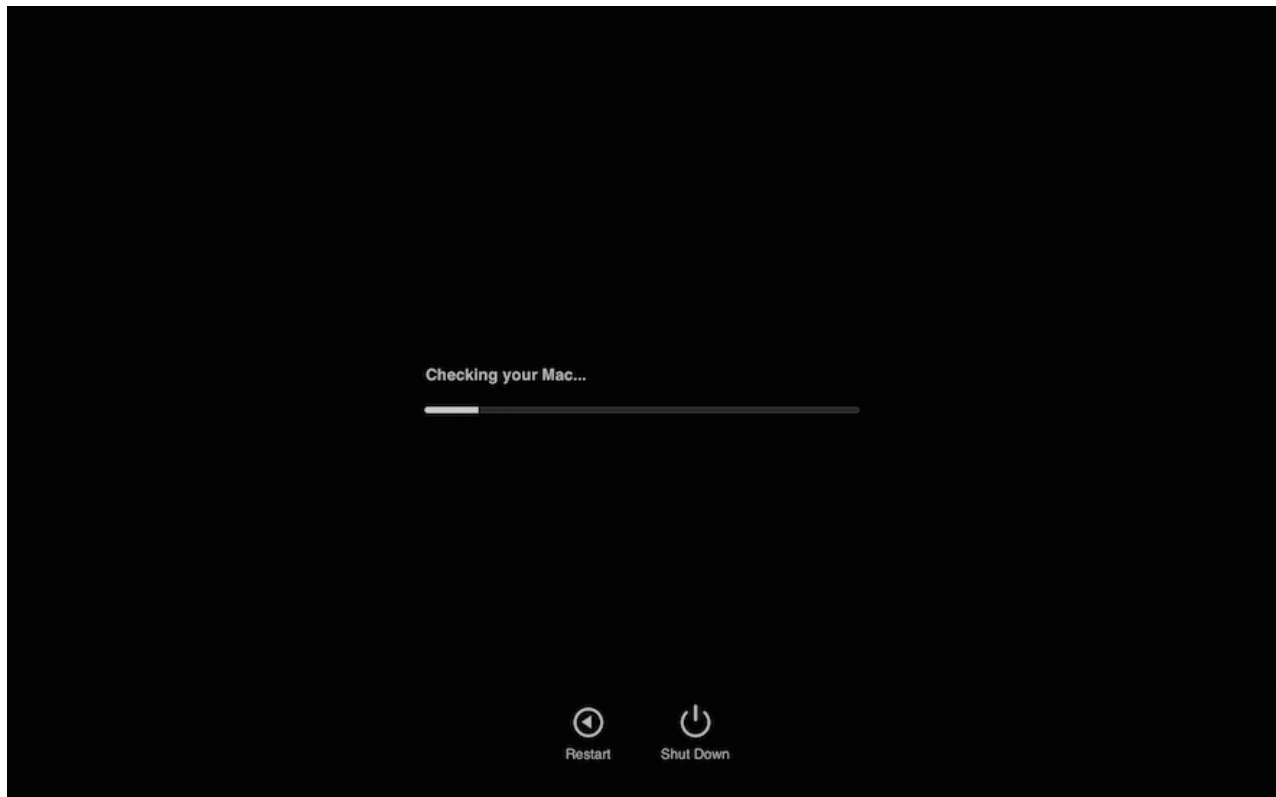
_D_oes Apple Diagnos_tic_s have to be run before AST 2 diagnos_tic_s?

- No, Apple Diagnostics does not have to be run first. Apple Diagnostics runs on the device under test only if the customer's device has not been entered into the Diagnostic Console, or if the customer declines the AST 2 Informed Consent dialog.

What do we do if the AST 2 server is down?

- No need to worry. If one server is down, another will take over to avoid downtime.

H_o_w much b_a_ndwidth is required for A_S_T 2?

- To upload data from each device under test executing AST 2 diagnostics to Apple's servers, the Internet connection requires 13 kilobits per second of available bandwidth.
- To download data to each device under test executing AST 2 diagnostics from Apple's servers, the Internet connection requires 22 kilobits per second of available bandwidth.

Are i_n_dividual accou_n_ts needed to acce_s_s A_S_T 2?

- Technicians will use their Apple ID to log in to GSX to access AST 2.

What is the cycle time for the AST 2 di_a_gn_o_sti_c_?

- AST 2 test times will vary based on the test suites chosen. The estimated times are listed next to the diagnostic suites on the Diagnostic Console.

Will AST 2 apply to both desktops and portables?

- Yes, AST 2 will support all desktop and portable products released after the launch of AST 2.

How do I connect the device to AST 2?

- Turn on the device while holding down Option-D. If connected to Ethernet, the device will automatically begin downloading the EFI diagnostic image.
- To test over Wi-Fi, the technician will be prompted on the device to connect to Wi-Fi.

How do I know the device is connected to AST 2?

- When the device connects to AST 2, a blue bar appears in the sidebar next to the device under test. If the device is offline, a gray bar appears in the sidebar next to the device.

Does AST 2 replace the original Apple Service Toolkit?

- AST 2 does not replace the original AST. Please continue to use the original AST for the products it supports.

How do I start up to other NetBoot options?

- Hold down the Option key when starting up the computer to select NetBoot options.
- Install, Restore, and Triage options may not be available for recently-released Mac models. If you do not see these options available in the Startup Manager, use Internet Recovery to perform tasks such as erasing the disk or reinstalling OS X. You can access Internet Recovery by holding down Option-Command-R at startup.