

Malwarebytes Toolset Issue Scanner Reference

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Sample Code in Documentation

The sample code described herein is provided on an "as is" basis, without warranty of any kind, to the fullest extent permitted by law. Malwarebytes does not warrant or guarantee the individual success developers may have in implementing the sample code on their development platforms. You are solely responsible for testing and maintaining all scripts.

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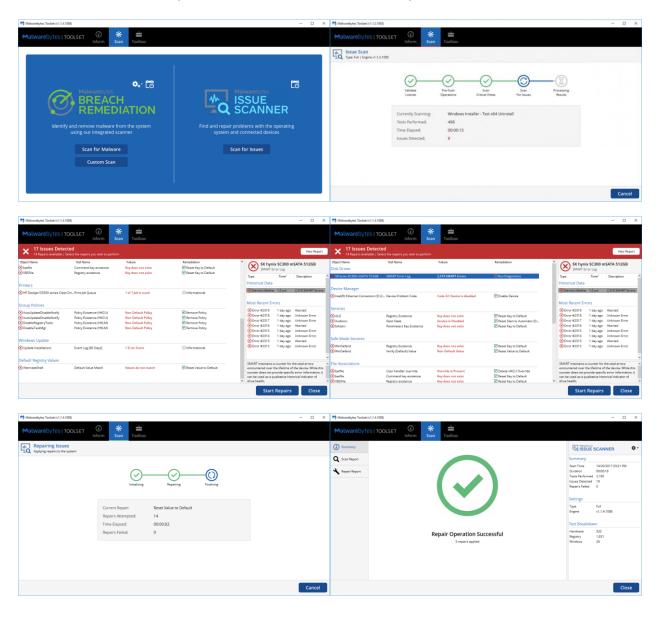
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Introduction

The Malwarebytes Issue Scanner performs quick in-depth tests to identify and repair device issues. This can range from operating system issues to impending hardware failure. Depending on the issue scanner's capabilities, identified issues will have an associated automated repair OR provide detailed informational content so you can make an informed decision on next steps.

To run the Malwarebytes Issue Scanner, just open the latest version of the Malwarebytes Toolset and go to the Scan component. Then click Scan for Issues. A complete issue scan takes about one minute to complete.



Supported Operating Systems

As of MBTS v1.1.2, the Malwarebytes Issue Scanner will run on any version of Windows but some will be skipped if we do not have OS profile data (e.g. Windows XP, Server, and Insider Preview builds) or if there is a technical limitation (e.g. .NET framework is missing but required, hardware doesn't support SMART, etc.). In general, we support the following operating systems with all issue scanners (except when technical limitations occur):

- Windows Vista
- Windows 7
- Windows 8/8.1
- Windows 10

In general, the following operating systems will be limited to Hardware and a few Windows Issue Scanners (except when technical limitations occur):

- Windows XP
- Windows Server
- Windows Insider Preview

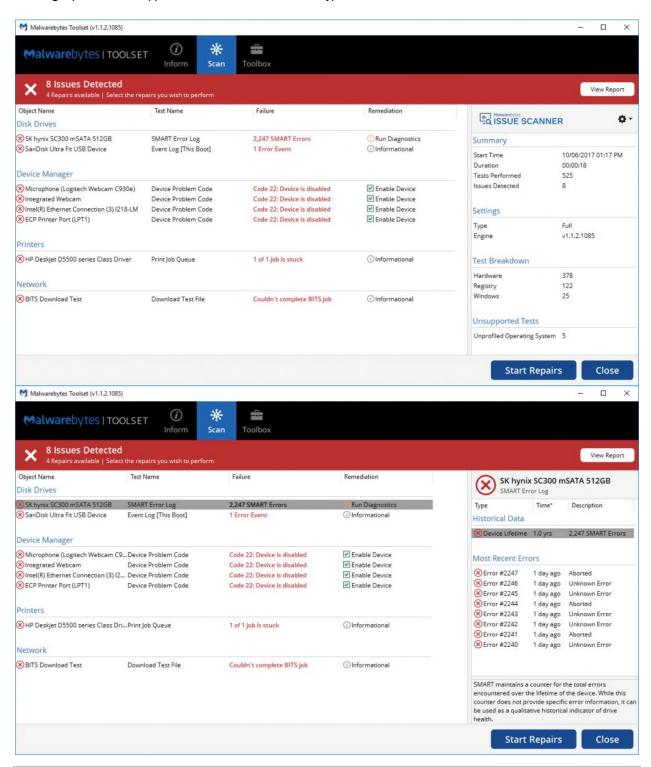
Technical Limitations

The following is a list of current technical limitations of some of our issue Scanners:

- The following issue scanners will be skipped if .NET 4.x is missing or corrupt:
 - Network Issue Scanner
 - Default Registry Values Issue Scanner
 - Windows Installer Issue Scanner
- SMART Attributes may be skipped on disk drives for one or more of the following reasons due to technical limitations:
 - o The disk drive does not support SMART
 - The disk drive does not support a particular SMART Attribute
 - o External storage device that does not provide SMART Passthrough
 - o The disk drive uses NVMe
- The following issue scanners will be skipped if the operating system is Windows XP, Server, or Insider Preview:
 - Services Issue Scanner
 - Safe Mode Services Issue Scanner
 - File Associations Issue Scanner
 - Default Registry Values Issue Scanner
 - Winsock Issue Scanner

Hardware Issue Scanners

These Issue Scanners detect hardware related problems then provide detailed data to help one make an informed decision on next steps. Most will report back Informational content instead of offering an automated repair operation. Below are examples of a device with hardware issues. The first one shows the default results view while the second one shows an example of the SMART Error Log capabilities that appear in the Details Pane when that type of issue is found.



Disk Drive Issue Scanner

This will detect the following for currently attached disk drives and provide Informational guidance based results:

- SMART Status
- SMART Attributes/Errors
 - 5 Reallcoated Sector Count

A total count of sectors marked as "reallocated" or remapped. This marking occurs when a read/write/verification error is encountered and the data is remapped to a special reserved/spare area of the disk. This is may indicate impending drive failure. Back up data and run additional drive diagnostics immediately. Hardware replacement may be required.

- 187 Reported Uncorrectable Errors
 A total count of errors that could not be corrected or recovered using hardware Error Correcting Code (ECC).
 This is may indicate impending drive failure. Back up data and run additional drive diagnostics immediately.
 Hardware replacement may be required.
- o 196 Reallocation Event Count
 - A total count of "reallocated" or remapped sector operations performed (successful and unsuccessful). If this value exceeds the Reallocated Sector Count (Error 5) that may indicate sector reallocation/remapping failures.
- o 197 Current Pending Sector Count
 - A total count of sectors waiting to be remapped due to a read/write/verification error. This is may indicate impending drive failure. Back up data and run additional drive diagnostics immediately. Hardware replacement may be required.
- o 198 Uncorrectable Sector Count
 - A total count of uncorrectable errors when reading/writing a sector.
- SMART Error Log (Historical Data Device Lifetime)
 - A count of all SMART Errors stored in the SMART Error Log and the length of time these errors occurred over. The time is based on device power-on time, not calendar time due to the technical limitations of SMART. While this does not provide specific error information, it can be used as a qualitative historical indicator of drive health.
- SMART Error Log (Most Recent Errors)
 A detailed list of the most recent SMART Errors stored in the SMART Error Log and the time they occurred. The time is based on device power-on time, not calendar time due to the technical limitations of SMART. Selecting one of these errors in the Details pane will display the full error details that are stored in the SMART Error Log. Due to technical limitations of SMART, only a limited number of detailed errors are stored in the SMART Error Log.
- Volume Dirty Bit
- Disk Free Space
- NTFS and Disk errors in Event Log (This Boot External and Last 60 Days Internal)
- Windows Failure Prediction Status

WHEA Issue Scanner

This will parse the Kernel-WHEA Event Log for hardware related failure that have occurred over the last 60 days and provide Informational based results.

Device Manager Issue Scanner

This will parse Device Manager Problem Codes and the Event Log for the Last 60 Days and report back any errors identified for all currently installed devices. If the Device Problem Code result is Device Disabled, you will be presented with the option to reenable the device. All other results provided by this Issue Scanner is Informational only.

Network Issue Scanner

This will attempt to identify issues with network adapters and internet connectivity by doing the following and provide Informational based results:

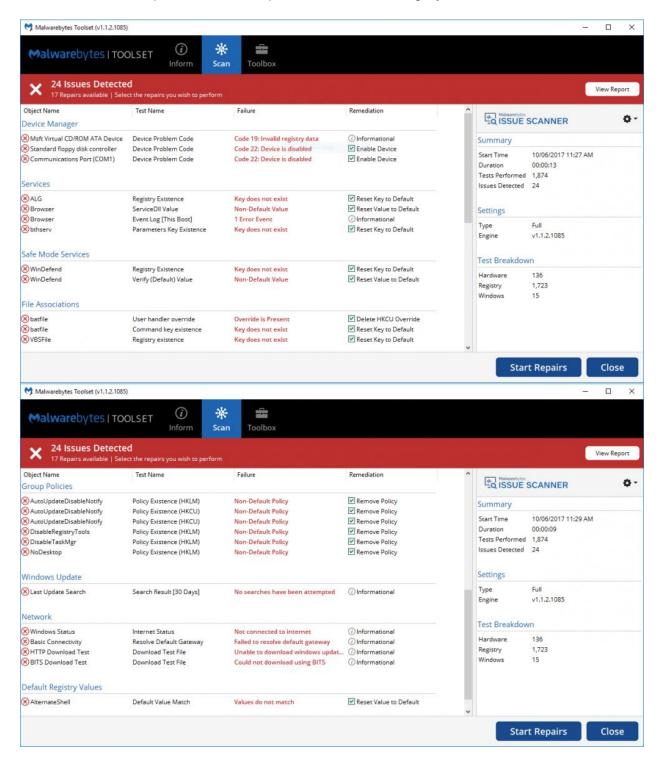
- Check Windows for the current Internet Connectivity Status
- Perform a Basic Connectivity Test
 - o Resolve the Default Gateway via IPv4 and IPv6
 - O PING the Default Gateway via IPv4 and IPv6
 - o Resolve the Host DNS via IPv4 and IPv6
 - PING the Host DNS via IPv4 and IPv6
- Perform a HTTP Download Test
 - Create a temproary file
 - o Download a test file
 - Verify file signature
 - o Delete temporary file
- Perform a BITS Download Test
 - Create a temproary file
 - o Download a test file
 - Verify file signature
 - Delete temporary file

Printer Issue Scanner

This will check for stuck or corrupted print jobs in the Print Job Queue for all installed Printers. If a stuck or corrupted job is detected, you will be presented with the option to clear the Print Queue.

Registry Issue Scanners

Registry Issue Scanners detect problems within the Windows Registry. Most will provide an automated repair, but Event Log related items will only provide informational based results. All issues identified and repaired by this Issue Scanner are OS version, edition, and build specific. Below are examples of a device with several registry and Windows OS issues.



Services Issue Scanner

We check the Services area of the registry (HKLM\CurrentControlSet\Services) for the following types of issues:

- Default Services (Services that are available by default in a base installation of Windows)
 - Registry Existence Verify the object exists in the registry and offer to restore it if missing.
 - Start State Verify this is set to the correct default setting and offer to restore it if incorrect
 - Service Type verify this is set to the correct default setting and offer to restore it if incorrect
 - Parameters Key Existence Verify the object exists in the registry and offer to restore it if missing. This will only run on Services that use this functionality.
 - ServiceDLL Value Verify this is set to the correct default setting and offer to restore it if incorrect. This will
 only run on Services that use this functionality.
 - Event Log Errors This Boot Report any errors that have occurred this boot by this Service
- Installed Services (Services that are not included by default with a base installation of Windows)
 - Event Log Errors This Boot Report any errors that have occurred this boot by this Service

Safe Mode Services Issue Scanner

We verify that the entry exists and the values are correct for all default Services that are allowed in Safe Mode with Networking. If a Service is missing or it's default value is set incorrectly, we offer to restore it.

File Associations Issue Scanner

We verify that File Associations for several default file types exist, are set to default, and do not have user overrides (commonly used by malware for hijacking).

Currently, we check the following File Extensions:

- .exe
- .bat
- .cmd
- .wsh
- .vbs

We do the following with each File Extension:

- User association override Verify no override exists and if it does offer to remove it.
- Registry existence Verify the object exists in the registry and offer to restore it if missing.
- Association Handler Verify this is set to the correct default setting and offer to restore it if incorrect.

We also check the following File Handlers:

- exefile
- batfile
- cmdfile
- WSHFile
- VBSFile

We do the following with each File Handler:

- User handler override Verify no override exists and if it does offer to remove it.
- Registry existence Verify the object exists in the registry and offer to restore it if missing.
- Command key existence Verify the object exists in the registry and offer to restore it if missing.
- Association Command Verify this is set to the correct default setting and offer to restore it if incorrect.

Group Policies Issue Scanner

We check to see if any Group Polices are active that are commonly used by malware to prevent access to critical OS components and features. These are all Group Policies that are not enabled by default on a base installation of Windows. If we detect one is enabled, we offer to remove it. Please be mindful of these results on a PC in a controlled enterprise or business environment as some group polices may be in place legitimately.

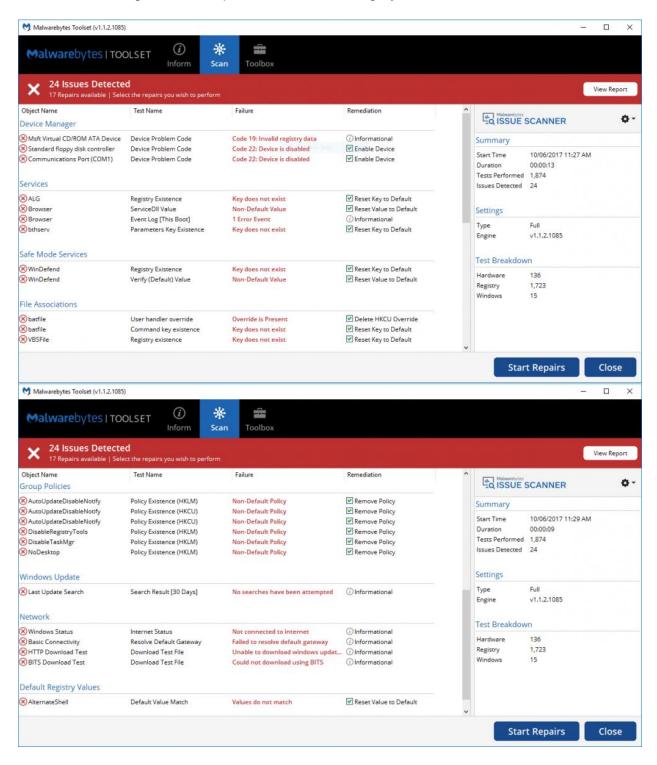
Default Registry Values Issue Scanner

We check that several critical OS components are set to their correct default values. If they are missing or incorrect, we offer to restore them. We currently check the following:

- Winlogon UserInit
- Winlogon Shell (x86)
- Winlogon Shell (x64)
- SafeBoot AlternateShell
- Session Manager BootExecute
- Session Manager BootShell
- SubSystems Kmode
- SubSystems Windows

Windows Issue Scanners

Windows Issue Scanners detect problems with core components of Windows. Most will report back Informational content instead of offering an automated repair operation so you can make an informed decision on next steps or to draw focus to an area of the OS that is malfunctioning. Below are examples of a device with several registry and Windows OS issues.



Windows Update Issue Scanner

We check that Windows Update has performed a search for updates in the last 30 days and that there are no outstanding Windows Update Installation Errors over the last 60 days.

Winsock Issue Scanner

We make a guick API call to verify the x86 and x64 Winsock Stock is functional.

WMI Issue Scanner

We perform a namespace connection and query to ensure WMI is functioning properly.

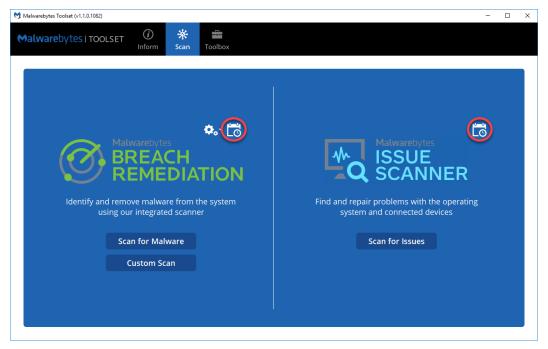
Windows Installer Issue Scanner

We perform a test install and uninstall of a special x86 and x64 MSI package that installs a test Service. This is done to check the integrity of the entire Windows Installer framework and process. We accomplish this be doing the following:

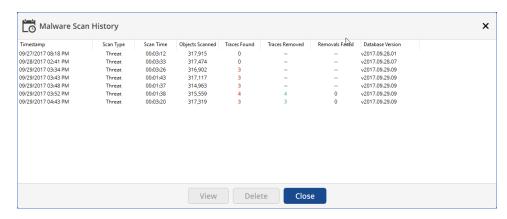
- x86 Install
 - Create Temporary File
 - Extract Installer
 - Check for Existing Install Check Install Code, Product Code, Registry Key, App Location, and App Folder
 - o Install x86 Installer
 - o Verify Installation Check Installer Log, Registry Key existence, and Service existence
- x86 Uninstall
 - Create Temporary File
 - Check for Existing Install Check Install Code, Product Code, Registry Key, App Location, and App Folder
 - o Uninstall x86 Installer
 - Verify Uninstallation Check Uinstaller Log, Registry Key non-existence, and Service non-existence
 - Delete Temporary File
- x64 Install
 - Create Temporary File
 - Extract Installer
 - Check for Existing Install Check Install Code, Product Code, Registry Key, App Location, and App Folder
 - o Install x64 Installer
 - o Verify Installation Check Installer Log, Registry Key existence, and Service existence
- x64 Uninstall
 - Create Temporary File
 - Check for Existing Install Check Install Code, Product Code, Registry Key, App Location, and App Folder
 - Uninstall x64 Installer
 - Verify Uninstallation Check Uinstaller Log, Registry Key non-existence, and Service non-existence
 - Delete Temporary File

Scan History

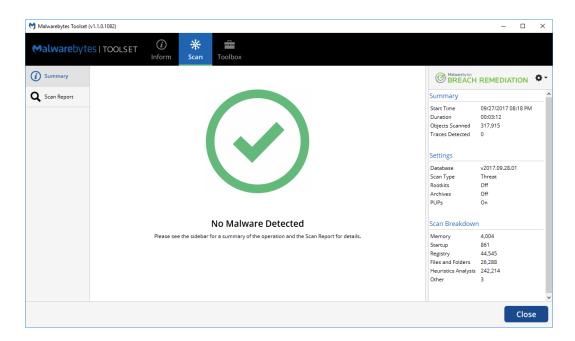
Malware scans and issue scans both generate history logs, allowing inspection of the results of each scan that has been executed. Please note the location of the calendar icons on the Scan screen shown below.



Clicking either calendar icon displays a history of the scans of the type selected which have been executed. A Malware Scan History Log is shown below.

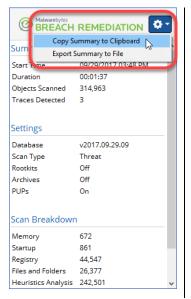


Selecting the first entry on this page causes the results of this scan to be displayed, as shown below.



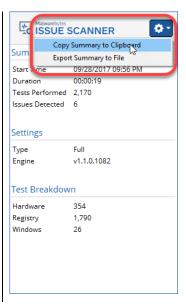
Scan status is shown in the center of the screen with a sidebar that provides selected summary information. Malware scan status may indicate remediated threats (cleaned), warnings (threats detected but not cleaned), or malware-free scans. Issue scan status may indicate system issues that are present, system issues that were repaired by *Malwarebytes Toolset*, or issue-free scans.

Each issue scan that is executed generates a log file. You may need this log file for troubleshooting purposes, or just for your records. Here's how to get that log. After running an Issue Scan, look for the Detail window associated with the scan, as shown here.



The selector in the upper right corner of each status screen allows you to copy a summary of the selected scan to your clipboard, or to a text file.

Samples of each scan type are included at end of this guide.



Scan History Log Files

By default, the Malwarebytes Toolset saves Scan History Log Files in c:\ProgramData\Malwarebytes\Malwarebytes
Toolset\Logs. Since we store these files in a unique location on the PC itself, you can utilize this capability to transplant or share
Scan History from on Windows PC to another. This is great for instances where you need someone else to see what the Toolset
found, removes, and/or repaired. Keep mind that these files are compressed and encrypted so they can only be viewed in full by
the Malwarebytes Tooslet.

