

CyberPatriot Scoring Engine v3

Introduction to the CyberPatriot Scoring Engine

The CyberPatriot Scoring Engine is a tool designed to assist educators in preparing students in their learning of necessary computer skills to complete highly challenging computer tasks. These learned skills can be applied during CyberPatriot competitions and will be useful in real world work environments.

The CyberPatriot Scoring Engine is composed of the Scoring Engine process, the Coach Configuration Tool and the Score Report.

The Scoring Engine Process

The Scoring Engine process starts up when a new configuration is saved and upon logging into the system. The Scoring Engine process runs in the background and utilizes native Windows methods for checking system configuration changes.

The Coach Configuration Tool

Teachers can use the Coach Configuration Tool to set various computer settings for scoring for example, Local Policy settings, user accounts and group control, Windows Updates, Firewall configurations and more.

These customized settings are saved into a configuration file. The purpose of these settings is not to actually change the

computer settings via the Scoring Engine; instead, the Scoring Engine monitors the student's activities and awards points when the student successfully configures a setting in the actual computer system to match the settings specified by the instructor.

Coach Configuration Tool items:

[Local Policy](#)

[Account Policies](#)

[Installed Programs](#)

[Local Users and Groups](#)

[Shares](#)

[Windows Updates](#)

[Scheduled Tasks](#)

[Firewall](#)

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Each tab includes various items that an instructor can set to Scoring. Each scoring item will be monitored by the Scoring Engine and when the user sets a computer setting to exactly match a scoring item, the Scoring Engine awards points.

The Score Report

Students can monitor their progress by viewing the Score Report. The report will update at regular intervals. When the Scoring Engine detects that a computer setting has been set to match the exact settings specified in the Coach Configuration Tool, it will display the entry under Items Found showing the location, the category and the setting. In addition, the Score Report shows the last score check, the current score (number found/total items checked) and a completion percentage.

Scoring Engine v3.00 was produced in conjunction with the U.S. Air Force Association and the National Science Foundation by the following students from Texas A&M University Corpus Christi (in alphabetical order): Ibrahim Akdemir, Timothy Darst, Fransico Elizalde, Nick Guerra, Brad Hannah, Jeff Hayslett, Raul Martinez, Dustin McManus, Narendra Reddy, Frank Saney, and Alex Uresti.

The File Menu items

Save

The Save menu item saves the current settings (does not prompt for file name or directory).

Save As

The Save As menu item allows the user to specify a name and directory to save the Scoring Engine's current configuration.

Load Saved Configuration

The Load Saved Configuration menu item allows the user to specify a directory and open a Scoring Engine configuration file.

Clear Configuration

The Clear Configuration menu item will reset all settings the user has set in all tabs.

Match System Settings

The Match System Settings menu item will change all settings in the program to match the configuration on the current operating system. It will clear any Scoring checkboxes.

About Scoring Engine

The About Scoring Engine displays associations and developer information.

Release to Students

The Release to Students menu item will bring the current computer or virtual

machine into a state that is ready for CyberPatriot students to practice on. The current configuration will be saved and the Coach Configuration Tool and its associated desktop shortcut will be deleted to ensure that students cannot use this tool for guidance in configuring the operating system. This action cannot be undone, so it should only be chosen if all settings are ready to be saved and no more changes need to be made to the Scoring Engine.

Exit

Exit will close the Coach Configuration Tool. This will not terminate the Scoring Engine background process.

Click the checkbox on the top left (under the File menu) to automatically save the current configuration on exit.

Scoring Engine Install/Uninstall

1. Installing Scoring Engine

To install the Scoring Engine:

- a. If a previous Scoring Engine version is installed, please uninstall the previous version before continuing.
- b. Double click CyberPatriot Scoring Engine 3.0 icon to start the InstallShield Wizard.
- c. Click Next to continue the installation.
- d. Click Install and if prompted by the User Access Control, click Yes to allow changes to the computer.
- e. Click Finish to complete the Scoring Engine install and close the InstallShield Wizard.

Once the installation is complete, two new icons will be added to the user's Desktop: the Coach Configuration Tool and the Score Report.

Double click the Coach Configuration Tool to start configuring settings that the Scoring Engine will monitor.

Double click the Score Report to see the user's performance.

2. Uninstalling Scoring Engine

To uninstall the Scoring Engine:

- a. Open the Control Panel by clicking Start -> Control Panel.
- b. Click the Uninstall a program (sublink of Programs).
- c. Locate and click the CyberPatriot Scoring Engine entry in the installed

programs list.

d. Click Uninstall then click Yes to acknowledge the uninstall prompt.

e. Click OK to acknowledge the reboot requirement after uninstallation is complete.

f. If prompted click yes in the User Account Control to make changes to the computer.

g. Reboot the computer.

Technical Notes

Computer System Changes

In some instances, if changes to the computer system are made while the Coach Configuration Tool is running, for example, adding a new user or adding a share, or other modifications not already configured to be monitored, the Coach Configuration Tool must be restarted for it to see the new changes made.

Update VMWare Tools

When running the Coach Configuration Tool in Microsoft Windows 10 as a VMWare guest, users may experience poor performance when moving the window around the screen. For best performance install the latest version of VMWare Tools on the guest virtual machine.

Changes in CyberPatriot Scoring Engine v3

GUI Changes

The first noticeable changes are in the Coach Configuration Tool. The graphical user interface (GUI) has been redesigned for enhanced visual appeal and ease of use, additional tabs have been added to increase functionality, and more menu features have been added to greatly extend what can be done with the tool.

The new GUI is now resizable and relies more on the use of dynamically populated list views rather than dropdown boxes in order to display more information to the user. This feature is noticeable in the Installed Programs, Startup, Shares, Scheduled Tasks List View, and Services tabs in version 3 of the program. An alternative view exists for scheduled tasks called Scheduled Task Tree View, which corresponds more closely to the layout of the Microsoft Task Scheduler. Both Scheduled Task views work with the same data, though in alternate layouts and changes in one will be reflected in the other. In addition to these changes, the Users tab has been completely redesigned to show current users on the system and provides a more intuitive display for the configuration of each user. Another noteworthy change for the GUI is that all “Not Scoring” checkboxes have been changed to “Scoring” checkboxes, which is easier for users to logically understand.

New Features

Version 3 also introduces several new tabs that extend the functionality of the program. Inbound Firewall Rules and Outbound Firewall Rules correspond closely to the Windows Firewall with Advanced Security, and provide a granular

approach to scoring on firewall settings. For Windows server operating systems, a Roles tab is now provided, and for all other Windows Operating Systems, a Features tab has been added. In addition to these, a Summary tab has been added for the Coach's benefit that shows all currently scoring items and the configuration settings for each one convenient list view. Any item in this listing can be removed by unchecking the Scoring checkbox. Also, the entire list can be exported to an HTML page for the coach to print or import into a Microsoft Excel workbook.

The most incredible new features of version 3 are provided as File menu options. New options for "Save as" and "Load Saved Configuration" allow for coaches to manage multiple configuration files, each with settings defined by the coach. These saved configuration files can be imported to new virtual machines that run the same operating system under which the files were saved. The tool also has an optional automatic save feature to provide a more streamlined user experience. Even better, the tool now features a "Match System Settings" menu option, which will change all the settings in the GUI to match with the current settings on the operating system. This feature allows coaches to see exactly how a virtual machine is configured before modifying settings to score on.

Added Operating System Support

In addition to these visual changes, behind the scenes the Coach Configuration Tool has been redesigned to work more dynamically and in a more modular fashion, so that it will be more extensible for future releases. Along with these changes came support for the newer operating systems, including Windows 8, Windows 8.1, Windows 10, and Server 2012 (in addition to the previous support for Windows 7, Server 2008, and Server 2008 R2).

Faster Scoring Engine process

In the Scoring Engine Component of version 3, the methods of scoring check the system configuration using native Windows methods. These changes have yielded faster update times for the CyberPatriot Score Report when scoring on a small number of items. To make things easier, the Scoring Engine component starts up automatically when a new configuration is saved, and it also starts up whenever a user logs into the system, so a coach never has to worry about this background process because it should always run whenever it is applicable to do so.

Local Policy

Administrators can access the computer's Local Policy via:

Click Start and type secpol.msc -> click the secpol application to open it.

Click the Local Policies and double click Audit Policy, Security Options or User Rights Assignment to modify these settings.

Audit Policy

An administrator can access the Audit Policy settings under Security Settings\Local Policies\Audit Policy.

When defining these policy settings, an administrator can specify to audit success, failures or no auditing.

Select the Scoring checkbox to determine whether the administrator has properly enabled or disabled the Success or Failure settings.

Security Options

An administrator can access the Security Options settings under Security Settings\Local Policies\Security Options.

When defining these policy settings, an administrator can enable or disable certain items or specify timing thresholds.

Select the Scoring checkbox to determine whether the administrator has properly set the Enabled or Disabled settings, or specified a timing threshold.

User Rights Assignment

An administrator can access the User Rights Assignment under Security Settings/Local Policies/User Rights Assignment

An administrator can assign various rights to groups or individual users.

To have the Scoring Engine check the users assigned to a specific right, click the drop down menu, select a group or user and click add. The specified user will be appended to the list under Added Users.

Check the Scoring box to enable scoring on individual user rights.

To score on these items, the computer's User Rights Assignments must exactly match those set on this tool.

Account Policies

Administrators can access the computer's Account Policies via:

Click Start and type secpol.msc -> click secpol to open it.

Double click Account Policies and click Password Policy or Account Lockout Policy to modify the settings.

Password Policy

An administrator can specify various timing thresholds or set password settings to Enabled or Disabled.

To score on these items, specify a range of values to check for or select Disabled or Enabled to check if these have been set.

Enforce password history - specify a range of passwords remembered

Maximum password age - specify a range of number of days before password must be changed.

Minimum password age - specify a range of number of days before password can be changed.

Password must meet complexity requirements - Set to enabled or disabled.

Store passwords using reversible encryption - Set to enabled or disabled.

Click the box next to Scoring to have the Scoring Engine monitor whether the settings have been set accordingly

Account Lockout Policy

An administrator can set various settings for the following items:

Account lockout duration - Specify the number of minutes the account will be locked out.

Account lockout threshold - Specify the number of invalid logon attempts.

Reset account lockout counter after - Specify the number of minutes the counter will reset at.

Select the Scoring box to have the Scoring Engine monitor whether the user has set these items accordingly.

Installed Programs

Administrators can access the computer's Installed Programs via:

Click Start -> Control Panel -> Uninstall a Program (link under Programs)

Local Users and Groups

Administrators can access the computer's Local Users and Groups settings via:

Click Start -> type lusrmgr.msc -> click lusrmgr to open it.

Users

The list of users under the Username heading are the users the Scoring Engine has detected upon startup.

In the New Username box, enter a new username to score on. This will not actually add a new user to the system.

Clicking on the Remove User box underneath the name will remove the username from the User tab, it will not actually remove the user from the system.

Under the Password heading, type the current password for that particular user and select Scoring on Password Change, the Scoring Engine will score when it detects the password has changed.

Select to score on the following items individually by clicking the Scoring box next to the item: User cannot change password, Password never expires and Account is disabled.

In order to score, the users listed in the computer's Local Users must exactly match the list of users under the Username box.

Groups

The Group tab contains a list of the current computer's groups. An administrator can assign each user or group to various groups.

To add a user or group to score on, choose a user or group from the dropdown list under the Users heading and click the Add button to append them to the Added Users list.

To remove a user or group from the Added Users, select the user and click the Remove button.

Select the Scoring checkbox to have the Scoring Engine score on the specified list of users and groups.

Startup

Administrators can add items to the computer's Startup configuration via:

Click Start and search for msconfig -> Click the Startup tab in the System Configuration utility.

In addition, Users can add items to the Startup folder:

Click Start -> All Programs -> right click Startup and select Open

Shares

Administrators can view the computer's Shares via:

Open Windows Explorer -> Type \\localhost\ -> press Enter

Alternatively, using the command (cmd) window:

Click Start -> type cmd -> click cmd to open the command window -> type net share.

Windows Updates

Administrators can view or modify the computer's settings for Windows Updates via:

Click Start -> type update -> click Windows Update

Scheduled Tasks

Administrators can view or modify the computer's Scheduled Tasks via:

Click Start -> type scheduled tasks -> click the Scheduled Tasks application

Scheduled Tasks Tree View

The Tree View tab shows a dual pane window listing the scheduled tasks.

Use the drop down arrows to navigate to a desired setting then click on an entry to bring up its details in the right-side pane.

In the right-side pane, click the Scoring checkbox next to an item to score on.

Scoring is performed by removing the selected item from the computer's Scheduled Tasks.

Scheduled Tasks Grid View

The Grid View tab shows a list of the tasks detected by the Scoring Engine.

To score on an item, select the Scoring checkbox next to the desired entry.

Scoring is performed by removing the selected item from the computer's Scheduled Tasks.

Firewall

Administrators can view and modify computer's Firewall settings via:

Click Start -> type Firewall -> click the Windows Firewall with Advanced Security application.

Firewall Profiles

The Firewall Profiles tab shows a list of default profiles detected by the Scoring Engine: Domain Profile, Private Profile and the Public Profile.

Each profile will have a list of items that can be modified such as the Firewall State, Inbound Connections, Outbound Connections, etc. Select the desired setting for each individual item such as Block or Allow, etc. and click the Scoring checkbox to score on the specified item.

Points will be scored when the student configures the settings matching the specified criteria.

Inbound Firewall Rules

The Inbound Firewall Rules tab contains a list of services and applications that can be filtered by the firewall.

For each item, the user can specify a Protocol, Local and Remote Ports, Local and Remote IP Addresses, as well as assigning it to one or more profiles.

For each item, specify whether the item is enabled or disabled.

Then select the Action to Allow or Block the connection.

Select the checkbox next to a desired line item to score.

To successfully score, the user must set the Windows Firewall settings to exactly match all items specified in the Inbound Firewall rules tab

Outbound Firewall Rules

The Outbound Firewall Rules tab contains a list of services and applications that can be filtered by the firewall.

For each item, the user can specify a Protocol, Local and Remote Ports, Local and Remote IP Addresses, as well as assigning it to one or more profiles.

For each item, specify whether the item is enabled or disabled.

Then select the Action to Allow or Block the connection.

Select the checkbox next to a desired line item to score.

To successfully score, the user must set the Windows Firewall settings to exactly match all items specified in the Outbound Firewall rules tab.

Services

An administrator can view and modify the computer's Windows Services via:

Click Start -> type Services -> click the Services application

Other

In the Other Tab, Coaches can configure settings for the host file, Remote Desktop and can specify files to be removed.

Features

An administrator can view and modify the computer's Windows Features via:

Click Start -> type Features -> click Turn Windows Features on or off to open it

Summary

Summary of scoring items

The Summary tab contains a listing of all currently scoring items.

You can also remove items from scoring by deselecting the Scoring checkbox. Click refresh to update the list.

The list can be exported to an HTML file by clicking the Export Summary button on the top right, then save the file to a location of your choosing.

The HTML file can then be opened in an Excel spreadsheet where it will automatically format and populate the cells.