

Gaps in Secure Development and Improvements in Secure Development –
In Practice –
Artefact Configuration Manual

MSc Project Report
Programme Name MSCCYBETOP

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MSc Project Submission Sheet
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Programme: MSCCYBETOP **Year:** 2021.....

Module: MSc Research Project/Internship

Supervisor: Dr Imran Khan

Submission Due Date:

Project Title: ... Gaps in Secure Development and Improvements in Secure Development – In Practice – Artefact Configuration Manual

Word Count: **Page Count:**

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Gaps in Secure Development and Improvements in Secure Development – In Practice – Artefact Configuration Manual

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Overview

This document describes the outline and the usage of the Security Toolbox CLI that was developed as part of internship. This d

1 Introduction

This configuration manual outlines the usage of the Security Toolbox command line interface (CLI) tool. This manual accompanies the report which outlines the research and the reasons for the tool usage. This was generated as part of the internship and addressed security issues identified during the SDLC of software products being built. The Security Toolbox is used to address security vulnerability in ASP .Net Web Applications. 7 severe security items are addressed in automated manner that can be used as part of CI/CD pipeline or as a standalone tool. The CLI is compatible with all ASP.Net Web Applications.

It is recommended that tool is used in CI/CD environment to allow for the security issues to be addressed as part of the build process and deployment process which is embedded into the SDLC. The tool can be used in standalone manner however this may result in the fixes only being deployed to a local test environment as opposed an official test or UAT environment.

2 Usage with screenshots

The application has two main usage scenarios: CI/CD or standalone. This guide will illustrate the standalone use for brevity.

The CLI tool has a default or override use case. These will be illustrated below with the addition of the help features and possible overrides that can be used.

2.1 Default

Default usage of the application will just run in the directory the CLI tool is placed in. A screenshot below figure 1 shows default use case. The output is displayed to the console. In this instance, it will give a list of what the tool is doing, the outputs applied and what updates will be applied. As the application is enhanced more updates will be applied. This informs the user of the actions of tools and where they occurred this will also appear in the logs of the CI/CD tool too.



The screenshot shows a Microsoft Visual Studio Debug Console window. The title bar says "Microsoft Visual Studio Debug Console". The main area displays the output of the "Security Tool Box" CLI tool. The output includes a large graphic of the words "SECURITY TOOL BOX" in a stylized font, followed by a detailed line-art illustration of the same text. Below the graphic, the console output shows the tool's execution process, including searching for files, applying security updates to a web.config file, and saving the updated file. The output ends with a message about automatically closing the console when debugging stops.

```
Microsoft Visual Studio Debug Console
SECURITY TOOL BOX
SECURITY TOOL BOX

SECURITY TOOL BOX

No arguments specified, defaults will be used recursive search and backup
for overrides please call with param help
-----Searcher Kicked Off -----
Search beginning on root path C:\Dropbox\College\_NCIRL\Masters\Report\test
Search Finished on root path C:\Dropbox\College\_NCIRL\Masters\Report\test
-----Searcher Finished -----
-----RESULTS-----
FileName:web.config DirectoryName:C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1
FileName:Web.config DirectoryName:C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test
-----END RESULTS-----
-----Updater Kicked Off -----
Applying Updates for File: C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\web.config
File C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\web.config is invalid XML, skipping security updates
Applying Updates for File: C:\Dropbox\College\_NCIRL\Masters\Report\test\test\tes1\test\Web.config
Back up of file C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config has been created to C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config.bak
Iterating through security updates
Applying update: X-Frame-Options
Applying update: Cache-Control
Applying update: Pragma
Applying update: Expire
Applying update: X-Content-Type-Options
Applying update: Content-Security-Policy
Applying update: X-XSS-Protection
Saving Updated file C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config
-----Updater Finished -----
Updates Applied
Security Tool Box Exiting

C:\Users\Nassir\source\repos\Masters\SecurityToolBox\bin\Debug\netcoreapp3.1\SecurityToolBox.exe (process 25776) exited
d with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

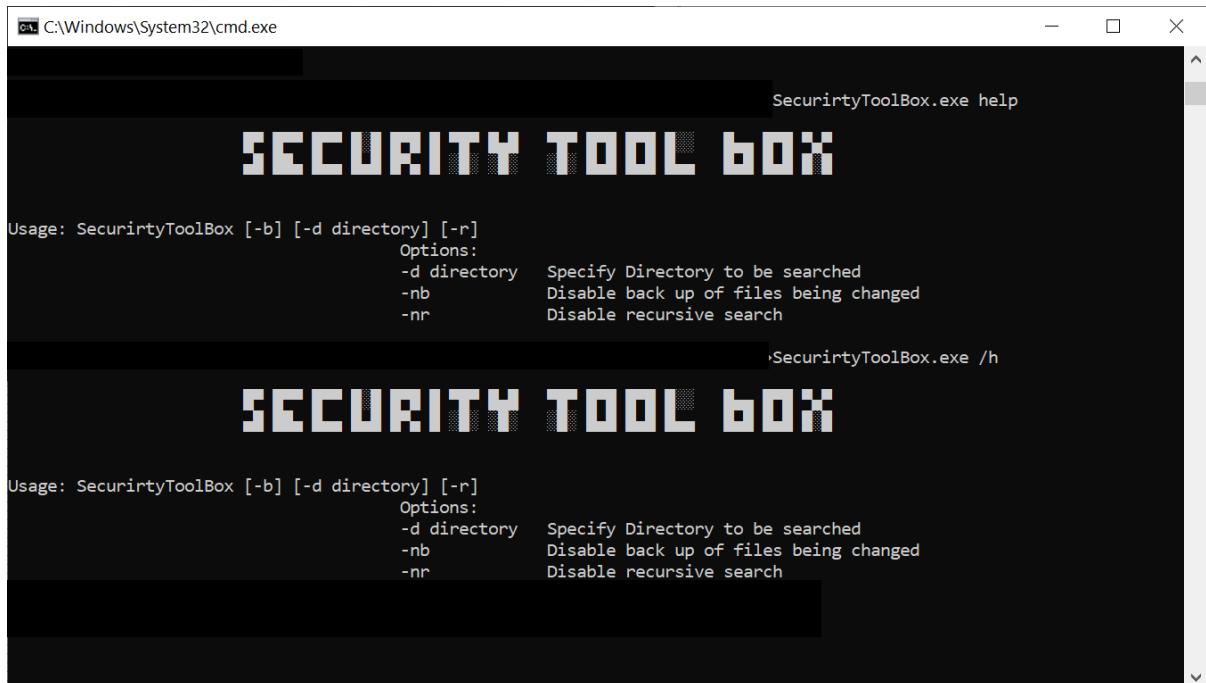
Figure 1: Default usage

2.2 Help

If the CLI tool is run with the parameters "-h", "/h", "help", the list of parameters that can be passed into the CLI tool will be displayed with a brief description. This will give the latest set of overrides available for the application.

Figure 2 illustrates the overrides and their uses.

e.g.: “SecurityToolBox.exe -h” “SecurityToolBox.exe /h” “SecurityToolBox.exe help”.



The screenshot shows a Windows Command Prompt window titled 'C:\Windows\System32\cmd.exe'. The title bar also displays 'SecurityToolBox.exe help'. The window contains two identical outputs of the tool's help command. The top output is preceded by the command 'SecurityToolBox.exe /h' and the bottom output is preceded by 'SecurityToolBox.exe help'. Both outputs show the usage command 'Usage: SecurityToolBox [-b] [-d directory] [-r]' followed by a table of options:

Options:	
-d directory	Specify Directory to be searched
-nb	Disable back up of files being changed
-nr	Disable recursive search

Figure 2: Help

2.3 Override

The tool supports a directory override where to search for configurations files. The ability to disable back up of configuration files when tool is run. The final override is the ability to disable recursive search if not required.

2.4 Path

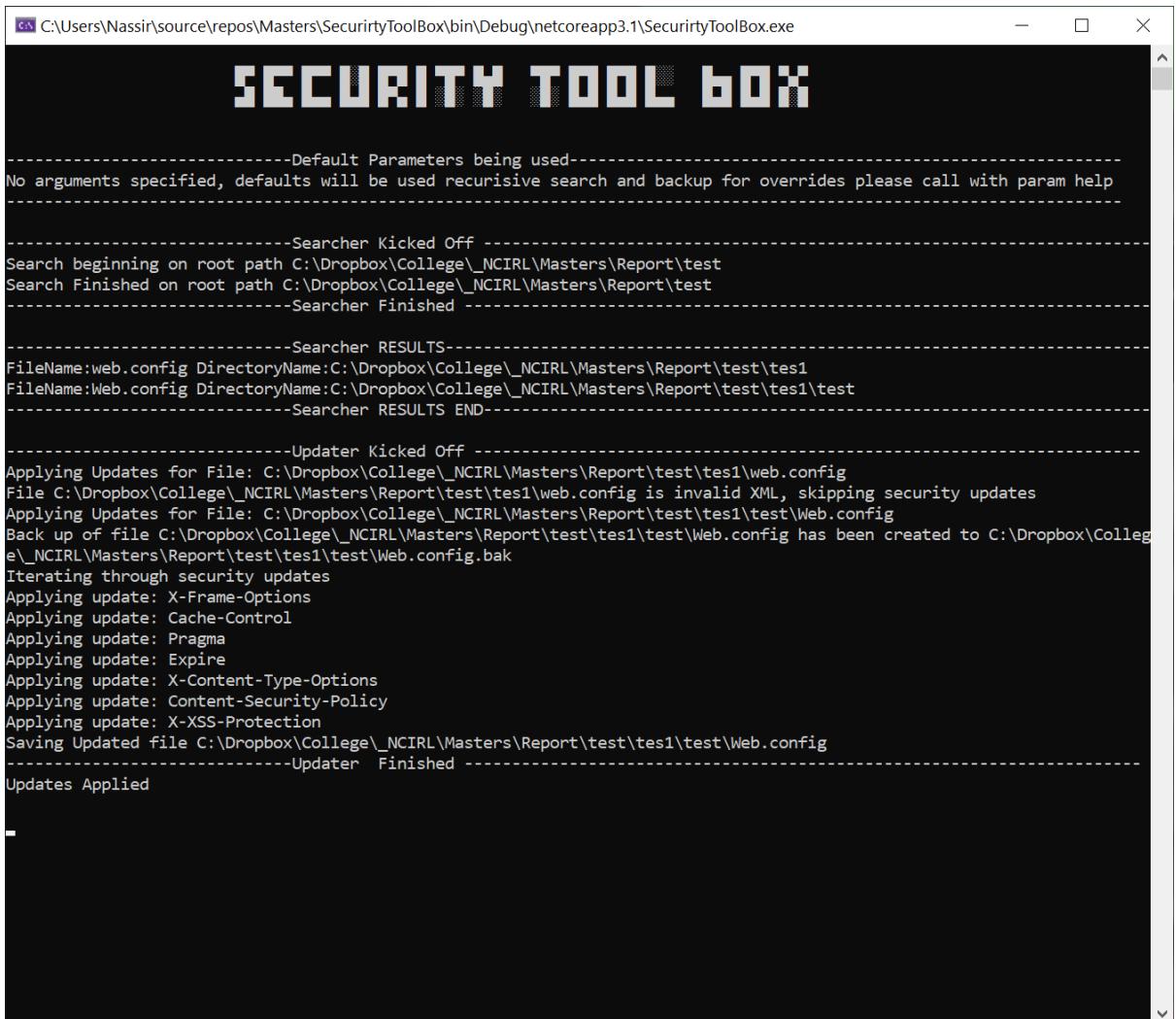
The reason for path override is that it allows for an instance where the configuration files may be in a remote directory or not in the directory of the CI/CD build tool and this needs to specify explicitly. This allows for the tool to search any path as required by the build tool.

2.5 Disable of back of files being changed

While back up files can be useful in testing or investigation scenarios, they may provide confusion to developers and may end up going into production due to error. This option allows for the updates to occur with only details being logged as opposed a backup of the changed file(s) existing on the build server.

2.6 Disable recursive search

This option stops the time consuming process of recursively searching directories for configuration files and will search the root directory. This may suit specific use cases where configuration file will only be in the root directory.



```
C:\Users\Nassir\source\repos\Masters\SecurityToolBox\bin\Debug\netcoreapp3.1\SecurityToolBox.exe
-----Default Parameters being used-----
No arguments specified, defaults will be used recursive search and backup for overrides please call with param help
-----
-----Searcher Kicked Off -----
Search beginning on root path C:\Dropbox\College\_NCIRL\Masters\Report\test
Search Finished on root path C:\Dropbox\College\_NCIRL\Masters\Report\test
-----Searcher Finished -----
-----Searcher RESULTS-----
FileName:web.config DirectoryName:C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1
FileName:Web.config DirectoryName:C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test
-----Searcher RESULTS END-----
-----Updater Kicked Off -----
Applying Updates for File: C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\web.config
File C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\web.config is invalid XML, skipping security updates
Applying Updates for File: C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config
Back up of file C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config has been created to C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config.bak
Iterating through security updates
Applying update: X-Frame-Options
Applying update: Cache-Control
Applying update: Pragma
Applying update: Expire
Applying update: X-Content-Type-Options
Applying update: Content-Security-Policy
Applying update: X-XSS-Protection
Saving Updated file C:\Dropbox\College\_NCIRL\Masters\Report\test\tes1\test\Web.config
-----Updater Finished -----
Updates Applied
```