TZWorks® Microsoft Office Backstage (bs) Parser Users Guide

Abstract

bs is a standalone, command-line tool that parses the Microsoft Office 2016 Backstage artifacts. The Backstage artifact include entries of files and folders with their last modified timestamp. The results are displayed in a CSV type format where one record is displayed per line. This tool has binary versions that run in Windows, Linux and OS-X.

www.tzworks.net

Contact Info: info@tzworks.net

*Document applies to v0.10 of **bs***

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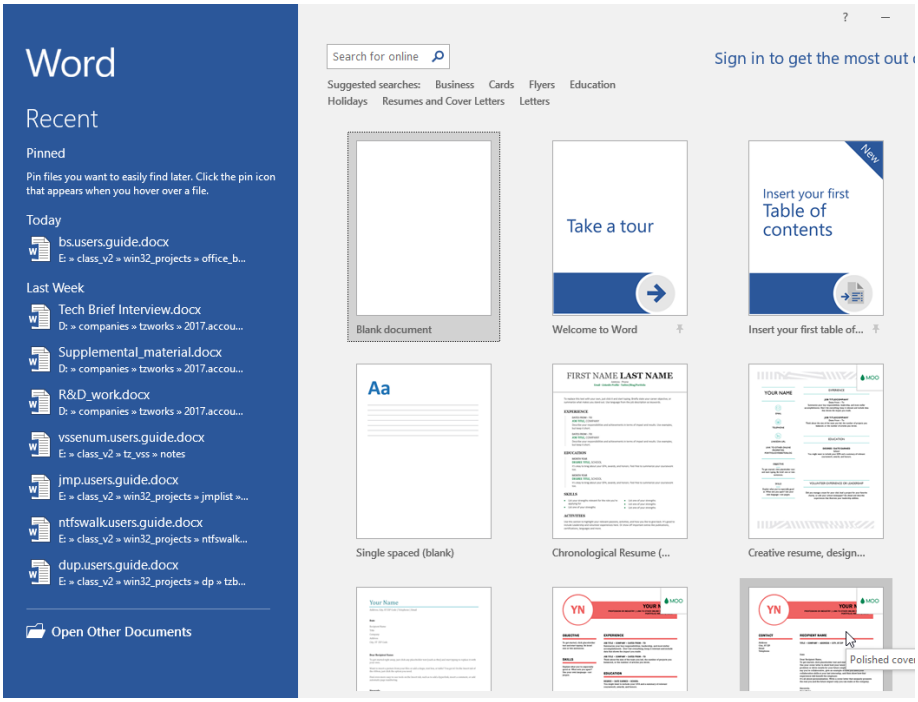
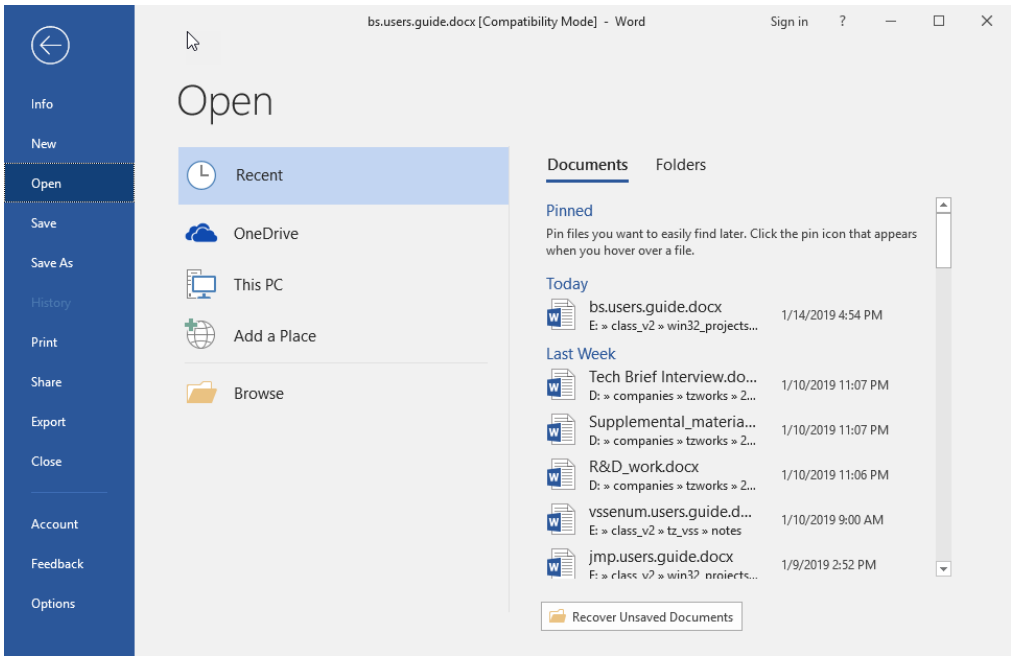
Webpage: http://www.tzworks.net/prototype_page.php?proto_id=44
Contact Information: info@tzworks.net

1 Introduction

With the newer versions of Microsoft (MS) Office programs, when you first start Office you will be presented with the Backstage view. From this view, you can create a new document (using a pre-created template) or open an existing file. One can also see the most recently used files listed on the left side of the view.



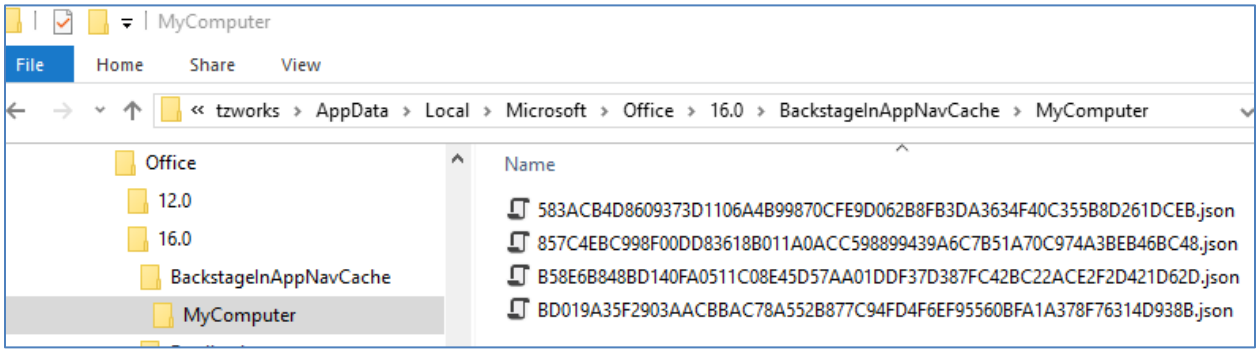
If you are currently viewing or editing a file, and you want to go back to the Backstage view, one just selects the ***File*** tab.



In order for MS Office to render the history data, it makes use of some persistent information stored on the computer. For MS Office 2016, this file history data is contained in a new set of files located in the *MyComputer* folder or other folders that designate remote shares.

C:\Users\<acct>\AppData\Local\Microsoft\Office\16.0\BackstageInAppNavCache\[MyComputer or other remote dir]

The files residing in this directory can be either delimited text or json formatted text. These files have long names that consist of a 64-character string. The string is actually a representation of a 32-byte hexadecimal hash which results from the computation of certain contents of the artifact file that relate to a primary directory. This, in turn, allows unique names files to be generated. Below is an example of a few of the JSON type files on one of our test computers.

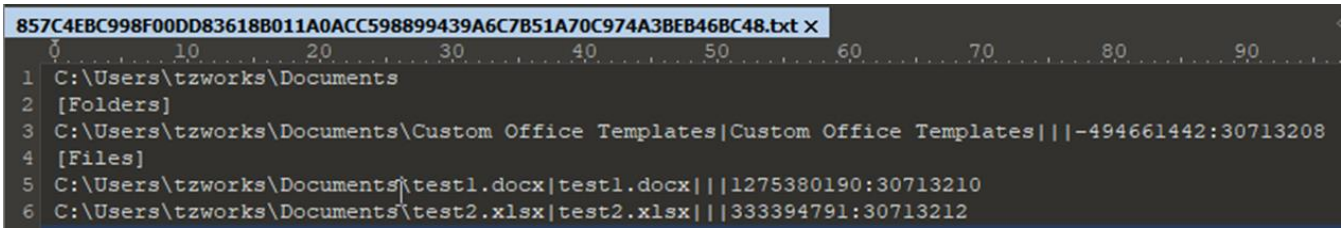


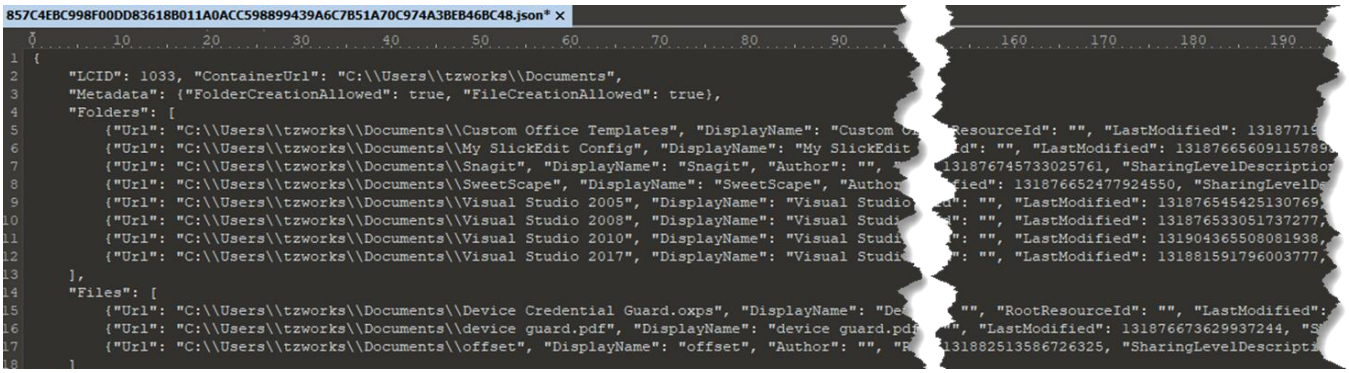
When parsing the data in backstage files, of interest to the analyst is the data that contains references to file and folder paths (both local and remote), each timestamped with the last modified time. So, while the records identify files and folders used in the past, it doesn't necessarily mean they still exist on

the system. Therefore, this data can be good in identifying user activity in conjunction with certain files even after these same files may have been deleted or moved elsewhere.

2 Internals of the Artifact File

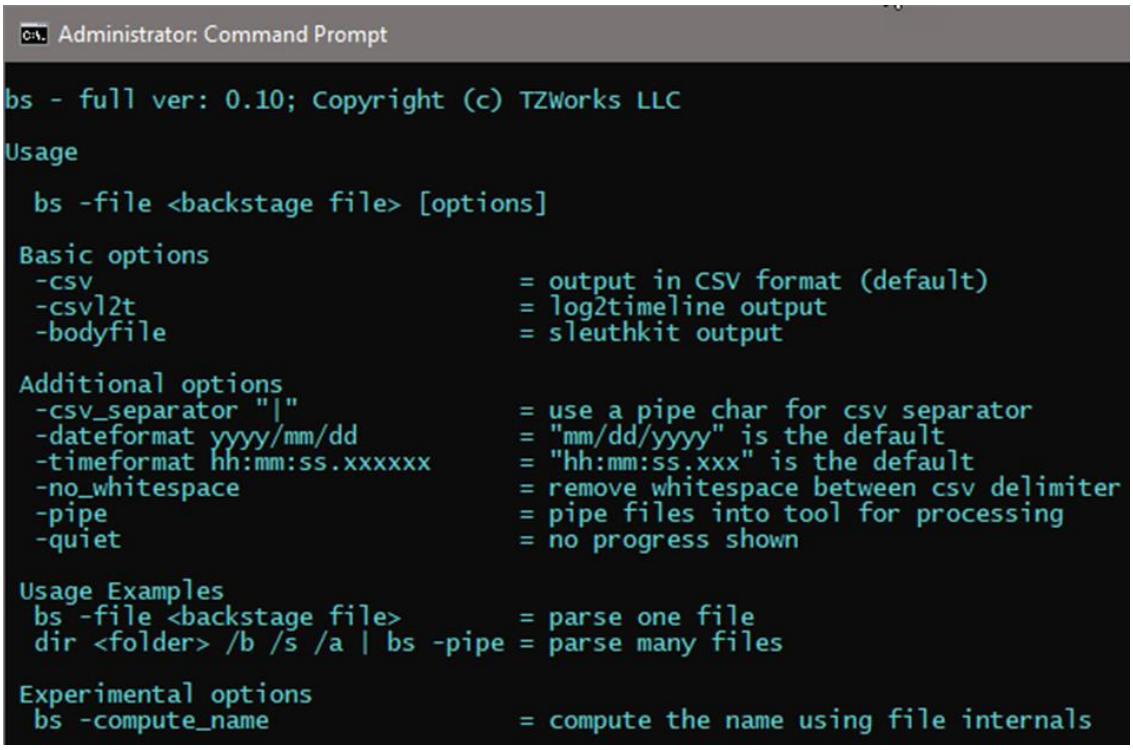
As mention earlier, the Backstage artifact data consists of text data. The older format has records where each field is delimited by the pipe character. The newer format has records that use the JSON (JavaScript Object Notation). The interesting fields that are populated for most records are the: *Url (folder)*, *Displayname (file)*, and *LastModified* timestamp. There are other fields, but they are not populated as often or not at all depending on your configuration, and include: *Author*, *ResourceID,* and a few others. Below are samples of the two formats encountered; the first screenshot shows records delimited by a pipe character and the second one is JSON. For the second one, we took the liberty of formatting the JSON output so it could be shown in this document; typically, the Backstage artifact renders JSON data without any CRLFs, and consequently, would look like a single very long line.





3 How to Use *bs*

The screen shot below shows all the options available for this tool.



The most basic option is to parse an individual file. One does this by using the ***-file <argument>*** option. This takes the artifact path/file as an argument. The tool can sense, based on the file contents, whether the data is pipe delimited text or JSON formatted text so no extra parameters are required to be passed in by the user to process either the older or newer formatted files. Once the tool determines the format, the data is parsed into individual records. Below is an example of the parsed data in a report format.

```
License #1d38e7cc14a3070 is authenticated for business use and registered to TZWorks LLC
run time: 01/15/2019 02:55:37 [UTC]; Host: DESKTOP-M8BOQQP; MachineInfo: Windows;10.0.workstation;10.0.1;64
"cmdline: bs64 -file e:\testcase\BackstageInAppNavCache\json.format\win10\857C4EBC998F00DD83618B011A0ACC598899439A6C7B51A70C974A3BEB46BC48.j

LastModify UTC (entry)  | type   | DisplayName                | Url                                                  | Author | Resourc
11/26/2018 15:28:29.938 | Folder | Custom Office Templates    | C:\Users\tzworks\Documents\Custom Office Templates    |        |
11/26/2018 00:26:49.115 | Folder | My SlickEdit Config        | C:\Users\tzworks\Documents\My SlickEdit Config        |        |
11/26/2018 02:56:13.302 | Folder | Snagit                     | C:\Users\tzworks\Documents\Snagit                     |        |
11/26/2018 00:20:47.792 | Folder | SweetScape                 | C:\Users\tzworks\Documents\SweetScape                 |        |
11/25/2018 21:22:22.513 | Folder | Visual Studio 2005         | C:\Users\tzworks\Documents\Visual Studio 2005         |        |
11/25/2018 21:01:45.173 | Folder | Visual Studio 2008         | C:\Users\tzworks\Documents\Visual Studio 2008         |        |
12/28/2018 02:09:10.808 | Folder | Visual Studio 2010         | C:\Users\tzworks\Documents\Visual Studio 2010         |        |
12/01/2018 17:32:59.600 | Folder | Visual Studio 2017         | C:\Users\tzworks\Documents\Visual Studio 2017         |        |
11/26/2018 00:52:12.312 | File   | Device Credential Guard.oxps | C:\Users\tzworks\Documents\Device Credential Guard.oxps |        |
11/26/2018 00:56:02.993 | File   | device guard.pdf           | C:\Users\tzworks\Documents\device guard.pdf           |        |
12/02/2018 19:09:18.672 | File   | offset                     | C:\Users\tzworks\Documents\offset                     |        |
```

Shown above is the default output, which uses a CSV variant that separates fields with pipe delimiters. One can specify other delimiters as well, by using the ***-csv_separator <delimiter arg>***. The delimiter argument can either be one of 3 characters: *comma*, *pipe* or *tab*. One can also output the parsed data in

the common *Log2Timeline* format (***-csvl2t***), if desiring to merge this artifact data with other artifacts to create a timeline of activities.

If desiring to parse many files contained in a folder, one can use the ***-pipe*** option to process an entire folder and child subfolders in one session. Since the tool can sense between the different artifact internal formats, one can mix and match older and newer formatted files during this process. An example on how to use the ***-pipe*** option is shown in the command-line menu output subtitled "Usage Examples" that is shown above.

The last option worth mentioning is an experimental option that computes the name of the artifact file by using certain contents of the Backstage file. One invokes this via the ***-compute_name*** switch. This can be used with either the ***-file <arg>*** option or the ***-pipe*** option. This is useful to see if the contents (or the name) of the file have changed either via corruption or if done intentionally.

4 Available Options

Option	Description
-file	Specifies which Backstage file to act on. The format is: ***-file <backstage file to parse>***
-csv	Outputs the data fields delimited by commas. Since filenames can have commas, to ensure the fields are uniquely separated, any commas in the filenames get converted to spaces.
-csvl2t	Outputs the data fields in accordance with the log2timeline format.
-bodyfile	Outputs the data fields in accordance with the 'body-file' version3 specified in the SleuthKit. The date/timestamp outputted to the body-file is in terms of UTC. So if using the body-file in conjunction with the mactime.pl utility, one needs to set the environment variable TZ=UTC.
-pipe	Used to pipe files into the tool via STDIN (standard input). Each file passed in is parsed in sequence.
-filter	Filters data passed in via STDIN via the -pipe option. The syntax is *-filter <"*.ext | *partialname* | ...">*. The wildcard character '*' is restricted to either before the name or after the name.
-no_whitespace	Used in conjunction with *-csv* option to remove any whitespace between the field value and the CSV separator.
-csv_separator	Used in conjunction with the *-csv* option to change the CSV separator from the default comma to something else. Syntax is *-csv_separator "|"* to change the CSV separator to the pipe character. To use the tab as a separator, one can use the *-csv_separator "tab"* OR *-csv_separator "\t"* options.
-dateformat	Output the date using the specified format. Default behavior is *-dateformat "mm/dd/yyyy"*. This allows more flexibility for a desired format. For example, one can use this to show year first, via *"yyyy/mm/dd"* or day first, via

	"dd/mm/yyyy", or only show 2 digit years, via the *"mm/dd/yy"*. The restriction with this option is the forward slash (/) symbol needs to separate month, day and year and the month is in digit (1-12) form versus abbreviated name form.
-timeformat	Output the time using the specified format. Default behavior is ***-timeformat "hh:mm:ss.xxx"*** One can adjust the format to microseconds, via ***"hh:mm:ss.xxxxxx"*** or nanoseconds, via ***"hh:mm:ss.xxxxxxxxx"***, or no fractional seconds, via ***"hh:mm:ss"***. The restrictions with this option is a colon (:) symbol needs to separate hours, minutes and seconds, a period (.) symbol needs to separate the seconds and fractional seconds, and the repeating symbol 'x' is used to represent number of fractional seconds.
-quiet	Show no progress during the parsing operation.
-compute_name	Computes the name of the Backstage file by looking at the file internals

5 Authentication and the License File

This tool has authentication built into the binary. There are two authentication mechanisms: (a) the digital certificate embedded into the binary and (b) the runtime authentication. For the first method, only the Windows and Mac OS-X (if available) versions have been signed by an X-509 digital code signing certificate, which is validated by Windows (or OS-X) during operation. If the binary has been tampered with, the digital certificate will be invalidated.

For the second (runtime authentication) method, the authentication does two things: (a) validates that the tool has a valid license and (b) validates the tool's binary has not been corrupted. The license needs to be in the same directory of the tool for it to authenticate. Furthermore any modification to the license, either to its name or contents, will invalidate the license. The runtime binary validation hashes the executable that is running and fails the authentication if it detects any modifications.

6 References

1. G-C Partners Daily Blog #510, 18 Oct 2018. Office 2016 Backstage Artifacts.
2. https://blogs.technet.microsoft.com/office2010/2009/07/15/microsoft-office-backstage-part-1-backstory/
3. https://blogs.technet.microsoft.com/office2010/2009/08/11/microsoft-office-backstage-part-3-the-info-tab/