FRED Login: **teacher** FRED PW: **teacher1** BitCurator Admin PW: **bcadmin** 

## Born-digital Processing: Disk Imaging Workflow

## Setting Up

1. **Turn on** the F.R.E.D. computer and monitors. Underneath the desk set on top of the Dell computer tower is an input switcher. **Press 1 to select the FRED**. (2 is the Dell computer.)



- 2. If the media is a CD/DVD, place the disk in the CD/DVD reader in the FRED.
- 3. Every other type of media will need to be plugged into the FRED through a write blocker. Locate the portable Tableau Forensic USB Bridge write blocker located in a fanny pack sized bag with an orange tag and labeled Digital Intelligence. Usually it's next to the FRED on top of the toolbox.





1

4. Connect the power and USB cords to the **write blocker**. Plug in the power cord to a power socket underneath the table and **plug in the USB cord to one of the 3 USB ports to the right of the power button** on the FRED.

5. Plug the media **directly into the portable write blocker** and **DO NOT** turn it on yet. The setup will look like this:



- 6. Log into the FRED using the **teacher** account. If the FRED hasn't been turned on in a while, **update the date and time**. You can do this by searching "Date and time" in the search box next to the start menu.
- In the BitCurator Shared Folder on the Windows Desktop, create the following folder structure: (Note: You can copy the example directory ualr-mscollection#\_diskimage\_000 and rename the folders accordingly.)
  - a. ualr-ms-*collection*#\_diskimage\_001
    - i. ualr-ms-collection#\_diskimage\_001\_SIP
      - 1. Documentation
        - a. Primary Reports
        - b. Secondary Reports
        - c. Carrier Photos
    - ii. ualr-ms-collection#\_diskimage\_001\_AIP
      - 1. Original Files
    - iii. ualr-ms-collection#\_diskimage\_001\_DIP
- 8. Copy the **media carrier photographs** taken during the **Pre-Disk Imaging Workflow** into the **Carrier Photos** folder.

## **Checking for Viruses**

9. On the write blocker, press the power button to turn it on. In Windows, open File Explorer and look through the navigation panel. Under "This PC" locate the external drive plugged in through the write blocker. Right-click the drive and select "Scan with Windows Defender..."



- a. If the result finds 0 viruses, you can move forward with the remaining steps in the disk imaging workflow.
- b. If the result finds a virus (or more), do NOT move forward with the workflow.
  - i. **Immediately safely eject the device**. Contact the CAHC's Director of Digital Projects and Initiatives for next steps.
  - ii. On a computer with Internet access, Google the detected virus to help determine next steps.

NOTE: If Windows and/or Windows Defender **cannot recognize the device** (it doesn't show up in the Windows OS at all), then wait to scan for viruses until you have booted BitCurator. You can use the **ClamTk** antivirus software available in **BitCurator's Additional Tools** folder on the Desktop to scan for viruses. Select **Scan a Directory**, locate the external hard drive and Scan.



### **Getting Started**

- 10. **Before doing anything else**, properly eject and **TURN OFF** the write blocker (device name T8R2).
- 11. On the Windows desktop, click on the **Oracle VM Virtualbox** icon. **Start** the BitCurator virtual machine, version 2.2.8.



- 12. It can take a few minutes for BitCurator to fully boot up, during which a number of windows **will display and disappear**. When BitCurator is fully booted, **turn on** the **portable Tableau write blocker**.
- 13. Two **popup windows** will display at the top of the screen. You can **x out** of both of these.



14. To check that BitCurator can "see" the attached external device, open the **Home** folder on the Desktop. In the **Navigation Menu**, you should see the external device listed.



For in-depth descriptions of the BitCurator tools and helpful additional information, check out the BitCurator Wiki: <u>https://confluence.educopia.org/display/BC/BitCurator+Environment</u>

# Building a Submission Information Package (SIP)

#### Creating a Disk Image File

- 15. In the **Imaging and Recovery** folder on the Desktop, select the **Guymager** application to create a disk image.
- 16. You will be prompted to enter the administrator password, which is bcadmin.



17. *Right click* on the appropriate drive which is usually at the top of the list and select **Acquire Image**.

Serial	Linux	Model		itate	Size	Hidden	Bad	Progress
nr.	device				-	areas	sectors	Trogress
000ECC020008C0B4	/dev/sdb	WD_Eleme nts_25A2	Acquire image		1.078	unknown		
VBb793eb3c-af58643d	/dev/sda	VBOX_HARDDISK	Cione Gevice		274.9GB	unknown		
	/dev/foop0	gnome-logs_100.snap	Abort		978.9kB	unknown		
	/dev/loop1	gnome-system-monitor_14	Info		2.3MB	unknown		
	/dev/foop10	gnome-characters_539.snap	🔿 idle		282.6kB	unknown		
	/dev/loop11	gnome-logs_81.snap	🔿 Idle		978.9k8	unknown		
	/dev/foop12	core_9066.snap	() Idle		98.5MB	unknown		
Size Sector size Image file Info file Current speed Started Hash calculation Source verification Image verification Overall speed (all across	1,000 512	0,170,586,112 bytes (931GiB /	1.00TB)					

18. A new window will appear. For **File format**, select **Expert Witness Format**. (*Note: the file extension for Expert Witness Format is .E01, not Exx.*)

	Acquire image of /dev/sdb	4					
w image (file extensio	on .dd or .xxx)	☑ Split image files					
ess Format, sub-form	at Guymager (file extension .Exx)	Split size 2047 PiB 🔻					
umber ualr-ms-							
collection#_							
itact name Elise Tanner							
Collection Name disk image file creation							
000ECC020008C0B4							
у	r/ualr-ms-0001_diskimage_001/ua	alr-ms-0001_diskimage_001_SIP/					
e (without extension)	ualr-ms-collection#_diskimage_0	01					
Info filename (without extension) ualr-ms-collection#_diskimage_001							
/ verification							
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erify image after acquisition (takes twice as long)							
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19. Under **Split size**, change the denomination to **PiB**.

- 20. Fill in appropriate metadata fields.
  - a. Batch number = **ualr-ms-**
  - b. Item number = collection#\_
  - c. Contact name = your full name
  - d. Description = brief description
- 21. Click the ellipses next to Image directory. Browse to the package SIP folder via media > sf\_BitCurator\_Shared\_Folder > ualr-ms-collection#\_diskimage\_001\_SIP. Choose the SIP folder.

Select destination directory 😣							
Look in:	/media/sf_BitCuratorms_001_dis	kimage_001	- 0	0 🔗 🗉 🗉			
Computer	Name Ualr-ms_001_diskimage_001_AIP Ualr-ms_001_diskimage_001_DIP Ualr-ms_001_diskimage_001_SIP	▼ Size	Type Folder Folder Folder	Date Modified 9/22/2:13 AM 9/16/20 3:07 PM 9/22/2:13 AM			
Directory:	ualr-ms_001_diskimage_001_SIP			<u><u></u>Choose</u>			
Files of type:	Directories			- 🗶 Cancel			

- 22. In Image filename type ualr-ms-collection#\_diskimage\_001
- 23. Under Hash Calculation, check MD-5, SHA-1, SHA-256, Verify Image after acquisition, and then click Start.
- 24. When complete, close Guymager and *EJECT THE ATTACHED DISK and turn off the write blocker.* (NOTE: At this point in the workflow, you can image multiple media/devices before moving on to Creating Documentation.)

### Creating Documentation

- 25. On the Desktop in the Forensics and Reporting folder, select Bulk Extractor Viewer.
- 26. In Bulk Extractor Viewer, under the Tools dropdown menu, select Run Bulk
  - Extractor. 😕 💿 Run bulk\_extractor v Device O Directory of Files -/Bag Test/bcdemo\_diskimage.E01 Use Banner File Use Alert List File Use Stop List File Use Find Regex Text File Use Find Regex Text Use Random Sampling uning Parameters Use Context Window Size Use Page Size Use Margin Size Use Block Size Use Number of Threads Use Ma um Recursion Depth Use Wait Time rallelizing | Use start processing at offset Use process range offset o1-o2 Use add offset to reported feature offs ebugging Options Start on Page Number Use Debug Mode Number Erase Output Directory Manage Queue... Import... Submit Run Cancel
- 27. For Scan, click the Image File option.
- 28. For Image File, browse via [Desktop > Shared Folders and Media > sf\_BitCurator\_Shared\_Folder > ualr-ms-collection#\_diskimage\_001\_SIP] and select the disk image file (file extension .E01). Click OK.

	Image File to Extract Features From	8
New Folde	er Delete File Rename File	
/he	ome/bcadmin/Desktop/Shared Folders and Media/sf_BitCurator_Shared_Folder/ualr-ms_001_diskimage_001/ualr-ms_001_diskimage_001_SIP	
Folders ./ Documenta	Al ualr-ms_001_diskimage_001.E01	
Selection: /h	home/bcadmin/Desktop/Shared Folders and Media/sf_BitCurator_Shared_Folder/ualr-ms_001_diskimage_001/ualr-ms_001_diskimage_001_SIP	U
ualr-ms_00	01_diskimage_001.E01	
Filter:		
Image Files	(.raw.img.dd.000.001001.vmdk.E01.aff/dev)	
	😮 Cancel 🖉 🖌	к

- 29. For **Output Feature Directory**, browse to that same **SIP folder** and **select the Documentation folder.**
- 30. For the remainder of the options (including **Scanners**), keep the default settings. Lastly, click **Submit Run**.
- 31. When **Bulk Extractor** indicates **Progress** as **Done**, close the Bulk Extractor Viewer. Go back to the **Forensics and Reporting** on the Desktop, and select **BitCurator Reporting Tool**.



32. Select the Run All tab. In Image File, browse via [Desktop > Shared Folders and Media > sf\_BitCurator\_Shared\_Folder > ualr-ms-collection#\_diskimage\_001\_SIP] and select the disk image file (.E01). Click Open.



- 33. In **Bulk Extractor Feature Directory**, browse to and select the **Documentation** folder in the **SIP** folder. Click Open.
- 34. In **Output Directory**, browse to and open the **Documentation** folder. In the empty output directory for **Name** type "**Reports**" and **CLICK SAVE**. (Note: **DO NOT** click the **Create Folder** button.)



35. Back in BitCurator Reports, click **Run**. Scroll to the bottom of the **Command Line Output** window. It will read **Success** when finished. Close BitCurator Reports.

For in-depth descriptions of the BitCurator tools and helpful additional information, check out the BitCurator Wiki: <u>https://confluence.educopia.org/display/BC/BitCurator+Environment</u>

Building the Archival Information Package (AIP)

36. Navigate to your **disk image file** and *right click*. Select **Scripts** and then **Disk Image Mount**.



37. With the disk image mounted, you can now extract the actual files. Locate the mounted disk on the desktop and copy ALL of its contents into the Original Files folder in the AIP folder.

	ualr-ms-0001_diskimage_00	1_AIP Original Files → O	۹. ۲	
Ø	Recent	Name	Size	Modified
û	Home			
	Desktop			
<				
Ø	Recent	Name	Size	Modified
ŵ	Home	Class Presentation		7:18 AM
	Desktop	CIS	4 items	7:28 AM
۵	Documents			
∻	Downloads	Photos		22 Sep
99	Music	System Volume Information		7:40 AM
ø	Pictures			

- 38. Once copied, unmount the disk image by *right-clicking* the **mounted disk** on the desktop and selecting **Unmount**. You will again be prompted to input the admin password: **bcadmin**.
- 39. At this point in the workflow, you will choose one of two routes:
  - a. You will keep the disk image E01 file.
    - i. Move the **Documentation** folder and the **.E01** file from the **SIP folder** into the **AIP folder** with the extracted files.
  - b. You will **NOT keep the disk image** E01 file. It will be up to the supervising archivist as to which route to take.
    - i. Move only the **Documentation** folder from the **SIP** folder into the **AIP** folder with the extracted files. **Delete the .E01 disk image file**.

- 40. Save open files and close all applications running in BitCurator.
- 41. Once everything is copied into the appropriate folders, **close BitCurator** (select the **Power Off Machine** option when prompted) and **the Virtual Machine**.

#### Building a Dissemination Information Package (DIP) TBD

## Capturing Technical Metadata

- 42. Now that the AIP package has been assembled, **technical metadata** for the files can be created. On the Windows 10 desktop, locate the **Medialnfo** shortcut and start the program.
- 43. In MediaInfo, drag the Original Files folder from the AIP folder into MediaInfo.



44. Once you've opened the **Original Files** folder directory in MediaInfo, go to the **View** drop-down menu to explore the different formats/schema in which the information can be displayed. The **Tree** view is particularly easy to parse.

MediaArea.net/MediaInfo - 50 files	- 🗆 ×
🎉 File 🙀 View 📉 Options 🧑 Debug 🚺 Help 👹 Language	
Resic Basic	4-1e_Allora_UnderDiscussion_Master\25 A
Sheet	
Iree	1Folder/296927_2006-84-1e_Allora_Und
Text	
HTML	
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MPEG-7	- Te_Midia_DiddeDiacdaaloit_maateriza
PBCore 1.2	1 Folder/296927_2006-84-1e_Allora_Und
PBCore 2.0	
EBUCore 1.5	4-1e_Allora_UnderDiscussion_Master\29
EBUCore 1.6	Folder/296927 2006-84-1e Allora Und
EBUCore 1.8 (acq. metadata: parameter then segment)	
EBUCore 1.8 (acq. metadata: segment then parameter)	
EBUCore 1.8 (acq. metadata: parameter then segment, json)	the diam linderDiscussion Masterios
EBUCore 1.8 (acq. metadata: segment then parameter, json)	4-Te_Allora_OnderDiscussion_Master2s
FIMS 1.1 (beta)	Folder/296927_2006-84-1e_Allora_Und
FIMS 1.2 (beta)	
reVTMD	
Custom	
¥9 Your system	
C:\Users\Archives\Desktop\BitCurator Shared Folder\296927_20	06-84-1e_Allora_UnderDiscussion_Master\29
✓ General	
- Complete name: C:\Users\Archives\Desktop\BitCurator Sh	hared Folder/296927_2006-84-1e_Allora_Und V

45. The next step is to **export this technical information** into a readable file format. Go to the **File** drop-down menu and select **Export**.



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46. Select the Text tab and then click on the ... button



47. Browse to and select the **ualr-ms-***collection***#\_diskimage\_***001\_***AIP\_Documentation** folder.



- 48. Before selecting the Save button, in the Filename address bar, name the text file as: ualr-ms-collection number\_diskimage\_001\_mediainfo. Click Save to return to the Export window. Then click OK to run the export process.
- 49. Next, **create HTML** and **XML** files by clicking each tab and then OK. They will save in the **same location** with the same file name as the text file.
- 50. Lastly, once all three (Text, HTML, and XML) files are created, move copies of these files into the *Documentation > Primary Reports* folders in **AIP** folder.
- 51. Lastly, use this technical data to fill out the metadata spreadsheet.

## Arranging and Describing

52. Open the **template\_metadata\_diskimage-2020.xlsx** spreadsheet file located on the Windows Desktop in the **BitCurator Shared Folder** and save it as **ualr-ms***collection#* diskimage 001.



53. To begin arrangement, move the **.info file** into the **Documentation** folder. Next, open the **Documentation** folder. Delete reports and sub-folders devoid of any information. (*Note: The simplest way to do this is to change to the Details view in the finder window so that the file size is visible. This way you don't have to open each folder to see if it's empty. Delete all files and folders that indicate 0 KB.)* 

Documenta	ation					
Share	View					
eview pane tails pane	Extra Media E List	large icons E Large icons um icons E Carellines	Group by ∴ Add colum Sort by Size all colum Gurrent view	ns • V File numns to fit	check boxes name extensions len items i Show/bide	selected tems
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r Shared Fold	der	Primary Reports	9/16/2020 3:08 PM	Filefolder		
1 Sharea Fore		Reports	10/9/2020 1:55 PM	Filefolder		
ots		Secondary Reports	9/16/2020 3:08 PM	File folder		
		unzip_carved	10/9/2020 1:39 PM	File folder		
		winpe_carved	10/9/2020 1:38 PM	File folder	$\frown$	
		aes_keys.txt	10/9/2020 1:35 PM	Text Document	0 КВ	
ts		alerts.txt	10/9/2020 1:35 PM	Text Document	0 КВ	
		ccn.txt	10/9/2020 1:39 PM	Text Document	2 KB	
		ccn_histogram.txt	10/9/2020 1:41 PM	Text Document	1 KB	
105		ccn_track2.txt	10/9/2020 1:35 PM	Text Document	0 KB	
ds		ccn_track2_histogram.txt	10/9/2020 1:41 PM	Text Document	0 КВ	
		domain.txt	10/9/2020 1:41 PM	Text Document	4,031 KB	
		domain_histogram.txt	10/9/2020 1:41 PM	Text Document	15 KB	

- 54. Following the recommendations of the **Disk Imaging Metadata Spreadsheet Instructions** document, open each of the remaining reports created by **Bulk Extractor** and **MediaInfo** to **find and record** the information in the spreadsheet.
- 55. As you fill in the spreadsheet, place the **reports that you use** to fill out the spreadsheet into **the Primary Reports** folder. **All other reports** can be moved into the **Secondary Reports** folder. (Note: Do not keep sub-folders. Remove the files from each sub-folder and then delete it when empty.
- 56. Once the spreadsheet is complete, **save** and review your work.