**Document Intent:**

This document is provided to discussing the overall Imaging / Cloning process. This is not meant to be a step by step guide that walks someone through the entire process. It is meant to be an informational process and procedural document. This document should be used to refresh your memory when you go to pull an image or do image maintenance. Just as an Image is a living component of our infrastructure so is this document… I’m writing it mainly from memory and it can be added to.

Key: **Pro Tips** = Things I do to make the Image easier to manage.

**The Build Procedures:**  
Most of my knowledge comes from imaging older OS’s. There is a new Windows 10 process that Alex had to learn, because we had issues with the Windows store and UIU. Please refer to the: Audit Mode: Windows 10 – Step by Step Guide.doc (Originally provided by UIU) for any Windows 10 builds.

* Install OS (If Win10 – Take a chance or follow the Audit Mode: Windows 10 – Step by Step Guide.doc.  
  **Pro Tips:**
  + Find smallest drive possible during this, its easier to deploy small image to larger drive and expand than vice-versa.
  + Do not Activate Windows on the Image, if I remember right there is only so many times Windows can be Sys Prepped and activated on images, believe count is 5.
* If using SHB for install, modify any security settings (SHB) first, might not be able to remote in or even open Internet Explorer if you don’t do these first: See *Security Mods to DISA SHB Win2012 and Win10.docx in the FAQ#: 10002.***Pro Tip:** You might still want to go over the settings even if its not SHB, some of the settings in the document are also tweaks, or turning on things that might not be on by default: Example RDP.
* Fully Update OS, if on MII don’t forget to set Proxy.
* Customize the build and perform any tweaks:
  + Copy C:\Utils folder over.
  + Enable PowerShell Execution Policy.
  + Perform Reg tweaks during this.
  + Setup Image Version for info on the image by using: C:\Utils\Scripts\RegistrySettings\ImageVersion.
* If doing so, do any tweaks for user profiles or logons or Public settings: C:\Users\Public   
  **Pro Tip:** 1st time logon profiles get built from: C:\Users\Default. There is also a way to modify some user profile settings from Regedit.
* Install most common software, leaving off anything that has a single machine / user type license. Example: Don’t install MatLab, since it is a per machine license. MS Office is ok to install, it is a VLK.   
  **Pro Tip:** Use Chocolatey script to install most free software.
* Best Practice: Determine a hostname (15 CHR$) and dedicate a static IP on your network to the Image, unless using DHCP on network.   
  **Pro Tips:**
  + Be descriptive with the hostname. Example: Win10SHBImage.
  + I normally dedicate a range of IPs in my network for Images.   
    Example DPL: 10.209.8.240 – 253.
* Do one last set up of updates to OS and all software if needed.
* Cleanup:
  + Manually cleanup any installers, downloads, items on the desktop, or temp files if they will not be part of the image.
  + Start – Run – Disk Cleanup
* Shutdown System and get ready for Imaging
* **Additional Expert Pro Tips:** 
  + Keeping a document on the desktop: Keep an information bulleted document on the default Admin desktop with the Image Version and what was done. Example: MM.DD.YY-VERSION# - Updated JAVA. Fixed User profile desktop shortcuts. Added new software: Firefox. Ran Windows Updates. (Could have a script to list all the updates and past them into document.)
  + Never add or leave a system on a Domain and clone it. Always remove it from the Domain First. This can be scripted or done with 3rd party software after the fact.
  + There is a Run Once section in the Registry that you can kick off scripts to do things after an Image boots up for the first time.

**Initial Imaging Procedures:**

If doing an image that is only required on one type of hardware or a single image dedicated to a single Project, this initial Imaging step might be your first and last step. Read on to the other sections for overall processes for common images across all hardware using UIU.

* Pick an Imaging solution and try to stick with it: We currently use Clonezilla.  
  **Pro Tip:** Keep original Clonezilla version you pull the image with. Sometimes when restoring with a newer version it will mention that the image is old and must be restored with older version.
* Boot from Imaging Software.
* Select an Image Repo ensure it’s not the drive you are cloning.
* Select Drive to Clone.
* Proceed with pulling the Master Image.
* Use a naming convention for Image Names:
  + Ours is: Master-Hardware Installed On-Hard Drive Size-OS-Project (If One)-Date.  
    Example: Master-DellPrec4800-120GB-Win10SHB-2019-02-14-img (Project omitted because we use this for entire Site)
  + **Pro Tip:** Using the above naming convention tells what the original hardware was, because without UIU you might not have a successful restore, along with HD size, OS, and you might have an issue that came up after a certain date that you have to fix.
* **Pro Tip:** Always keep the original unmodified Image, preferably in Image format (HD’s take up space) … if something happens you can always restore from original build without having to completely rebuild. Recommend using the above naming convention with Orig-Master…

**UIU Imaging Procedures:**

UIU stands for Universal Imaging Utility: <https://www.bigbangllc.com>. It allows you to take an image and restore it on any hardware with minimal issues. It is only for Desktop OS’s and not meant for Server OS’s. Example: Win10 compared to Server 2012. The UIU Image should never be re-imaged and used in production. If so, their technical support will provide no assistance. That is why we will keep a Master Image where that Image gets updated in stages:

* Perform Imaging in multiple stages / Multiple Copies of Image.
  + Going forward you will only make changes to your 2nd (Maybe 3rd) copy of your Master Image, because your first step will always be pushing an image from the latest Master to a hard drive. (See below Pro-Tip on next page)
* Run the UIU Software.
* Occasionally update the UIU Driver Database. If Maintenance runs out you can no longer get the updates, but software will continue to function.
* Perform any fixes the UIU software recommends.
* Once you run UIU, it will Sys Prep the system in the background. That counts as 1 of 5 Sys Preps. That’s another reason you never want to reimage from a UIU build.
* Initial use of the software will ask you to fill in the Sys Prep info, afterwards it will remember those settings
* Once the system shuts down, do not power back on.
* Provide an Image Name:   
  A slightly different Naming Convention is used on UIU Images because hardware doesn’t matter:
  + UIU-Hard Drive Size-OS-Project-Date  
    Example: UIU-256GB-Win10-BH-2019-02-19-img
  + Looking at the above naming convention: I know it hardware independent (UIU)-Drive size I can restore to-OS-Maybe BH specific software is installed-Date created.
* Pull the Image.

**Pro Tips:** Things will go wrong. Keep multiple versions of the Image:  
1. Keep an original image that **never gets** touched.  
2. Keep the current image you are working on.  
3. Keep the image version right before the current.  
4. Keep a UIU Image.

**Image Maintenance:**

Time permitting, Images should be kept up to date and maintained. Possibly on a Monthly timeframe. There should be a single POC on the team that maintains the Image and passes the latest copy around to the team.

* Push Latest Master to a new drive.  
  **Pro Tip:** 1st time will be from the Orig-Master
* Boot Up drive and check network connectivity.  
  **Pro Tip:** If you have network issues, someone on the network has taken your IP, because the Image isn’t consistently on the network.
* Update the Master Image completely using all the mentioned steps in this document: Win Updates, Software Updates, New Software, Tweaks / Fixes to last version of Image.
* If doing the Pro-Tip – Keeping a document on the desktop, put what was done into that document. It will help when something goes wrong on an Image version.
* Update the Image Version using the: C:\Utils\Scripts\RegistrySettings\ImageVersion
* Shutdown and pull another Master Image.  
  Pro Tip: Keep old Master until you know you have no major issues with new Image
* Push the new Master to another drive for UIU.
* Go through the process and pull the new UIU Image.
* Test UIU Image

**Number one Hint Pro Tips:**   
Understanding the multiple Images:

* Have an Original don’t touch unless emergency Master Image.
* Think of all other Masters as rotating images so you always have a last known good… incase update makes newer one unbootable.
* Only keep 2 non-original Masters so as not to get confused. Label them good.
* You should maybe do the same with UIU image. Make sure you have a good working one before you delete the old one.