

# Clear Ballot Group Product Advisory Notice

## 20-01



Regarding an issue with the use of encrypted ballot definition files (BDFs) in ClearVote 2.0

March 9, 2020

This document describes directions for merging election results from ClearCast into ClearCount in ClearVote 2.0.

### Background

When merging election results from ClearCast into ClearCount, an “error” occurs if the encrypted BDF option has been selected in ClearDesign.

The first USB drive merges successfully, but merging subsequent USB drives from the same election that were scanned on the same day results in a message similar to the following:

*ERROR: Merge into <ElectionName> failed: The image files have been changed after having been already merged (must perform DeleteBox function and re-merge): Box(es) None*

Tabulated results for all USB drives are successfully merged, but images may be missing from the merged data.

### Technical Cause

An extraneous file is being copied along with all the ballot images to the CountServer from the USB drive when BDF encryption is enabled. The file does not need to be copied to this location in order to merge results. This file has a naming convention based on the election name (extracted from the BDFx file name) and the date of the election, therefore the file name will be identical for all ClearCast units that are used to run the same election on the same day.

ClearCount validates the files that are being merged to detect whether a file has the same name but different contents as a previously existing file, which can be a sign



that the data has been tampered with. The second time (and each subsequent time) this extraneous file is copied to the CountServer, it fails this validation process, which leads to the above error. The CountServer also at this point stops processing additional images.

## Resolution

There are two possible workarounds to resolve this. Choose the option that works best for your jurisdiction's requirements.

### Option 1: Do not use the encrypted BDF option.

Do not select the "Encrypt BDF On Export" option in ClearDesign. The file that causes an "error" is only copied when an encrypted BDF is in use.

If you have already printed your ballots and previously selected the "Encrypt BDF On Export" option, you can re-export the BDF after de-selecting the "Encrypt BDF On Export" option and use the resulting BDF file in your ClearCast units. This does not require any change to the ballots or to the election setup in ClearCount.

When exporting an unencrypted Ballot Definition File (BDF) from ClearDesign, security is maintained through proper chain of custody of elections equipment (including the removable media). BDF encryption is designed to provide an additional security control.

Additionally, whether the Ballot Definition File is encrypted on export or not, the integrity of BDF exported from ClearDesign and election results merged from ClearCast is assured through the use of hash-based message authentication code (HMAC), which enables ClearCount to determine that the incoming results have not been altered, whether through incidental file corruption or malicious tampering. The HMAC additionally authenticates the results, as it uses strong cryptography to calculate a hash of all the exported files which is tied to the election password.



## Option 2: Rename the BDFx file

The file that causes the error is not processed by ClearCount after it is copied to the CountServer. However, the file may cause problems when it is copied prior to the ballot images being copied, because the merge process has been interrupted.

To ensure that all ClearCast results and images are imported into ClearCount, change the file name of the BDFx to something that begins with a letter at the end of the alphabet, such as *z\_<ElectionName>.bdfx*.

If you have already printed your ballots or exported the BDFx file, you can rename the existing BDF and copy the renamed file to the USB drives in your ClearCast units. This does not require any changes to the ballots or to the election setup in ClearDesign or ClearCount.

If you have already created the USB media for ClearCast with the existing BDFx file, and the file name is earlier in alphabetical order than the anticipated image file names, take care to delete the old BDF file and replace it with the renamed one. Image files are named based on the counter group abbreviation (for example, “ED” for Election Day ballots), so the naming requirement depends on the counter group settings for the election.

This workaround can be used with encrypted ballot definition files. The process described above will still occur on almost all USB drives that are being merged into ClearCount; however, it can be safely ignored. Verify that results and images have been imported successfully by checking the Card Inventory report and ensuring that there are images present for each box that has been merged.

## Additional Information and Next Steps

Clear Ballot has conducted a thorough review to determine the root cause of this occurrence in our software and have taken steps to ensure it is not present in future



releases of ClearVote. We are also investigating the feasibility of a de minimis change to ClearVote 2.0.

If you have any questions or concerns, please email [support@clearballot.com](mailto:support@clearballot.com).