Running out of RAM and Disk Resources for Windows Embedded Updates

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Providing answers on the Windows Embedded forums helps to foster community conversations and discover answers that one would otherwise not run into. Most of the answers I provide are based on some past experience. Sometimes, the answer is not so straight forward. For example there is this forum post about memory limitations for Windows Updates:

https://social.msdn.microsoft.com/Forums/en-US/842faed1-c449-46a2-b55a-ad0deea461aa/updated-ds-runs-out-of-memory-while-installing-on-client?forum=quebeccomponentsforum

Running out of space for the Windows Updates was something I ran into from time to time, thus the simple solution was to just recommend increasing the storage space. I found this solution by checking the disk space as updates were being processed, and I noticed that space was being used up as the installation kept going. When WES7 or WE8S installs the updates, each CAB update file is extracted and expanded taking up more and more space until the files are processed and the temp files are removed. Disk space wasn't the answer in this case.

As with all posts, the original poster provides a little more information on the problem and/or others jump in with their experiences. The fact that RAM would also be an issue was not something I experienced before. As fate or karma would have it, a week after the post, I was working on a project that runs into the same issue. First, I thought it was disk space, and increased the disk size. Everything was installing just fine until I hit the same error:

Windows setup failed to install packages or apply component settings while offline servicing the image not enough memory available to complete the operation

One of the big requests for WES 7 was to get access Windows Updates directly into the build tool. Going through MyOEM website to get Windows XP Embedded updates was a pain. Microsoft created Windows Embedded Developer Update (WEDU) to update the distributions share (and catalog for WE8S) with the latest security updates and hot fixes. Install the latest updates when the OS installs was a perfect solution, since some customers don't want their devices connected to the Internet. Unfortunately over time, the number of updates has increased. It is not uncommon to include 300+ updates into a configuration file.
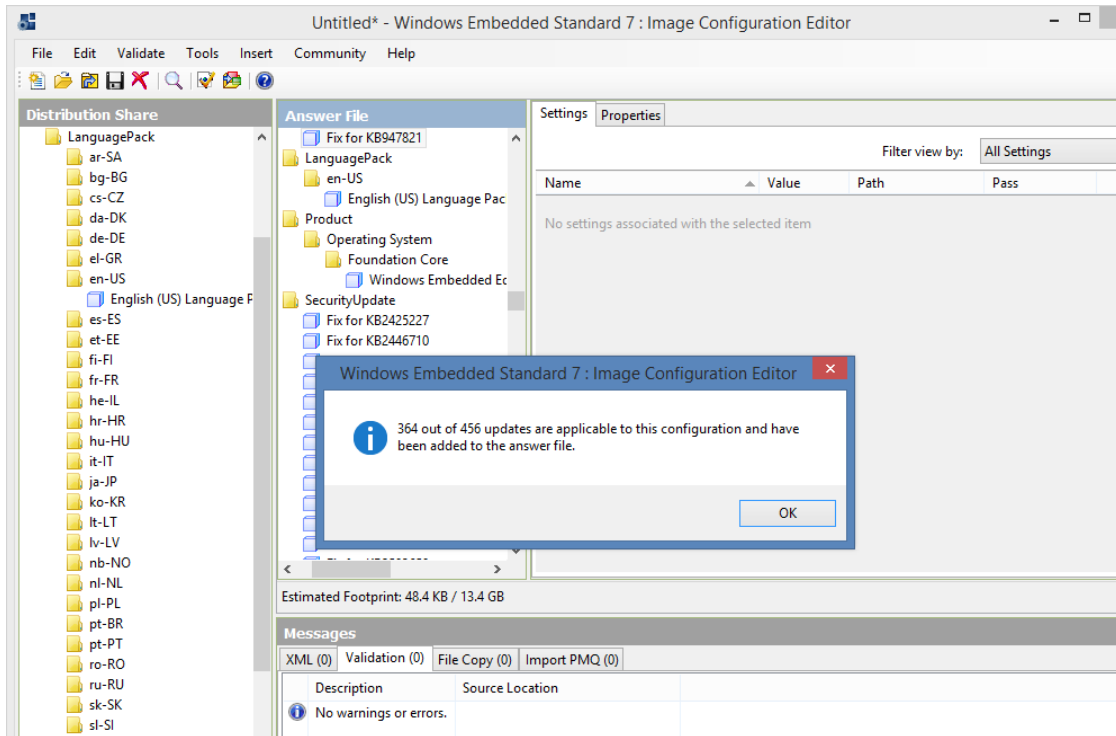
With the project I was working on, I decided to track disk space and memory. Since the updates were not installing all at once, I decided to break them into smaller groups by using DISM and configuration sets. The image with no updates was about 3GB in size. Applying the first set of updates double the size. The picture below shows 6 GB used space.
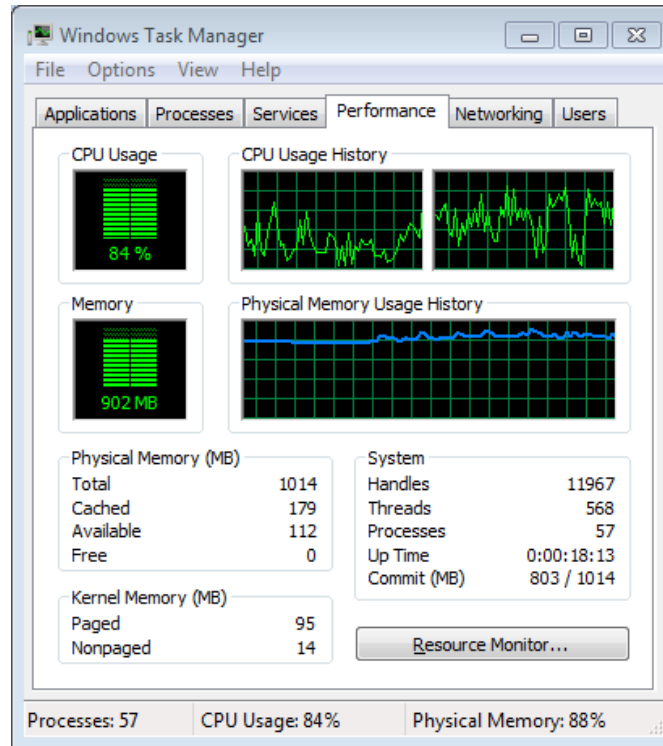
2
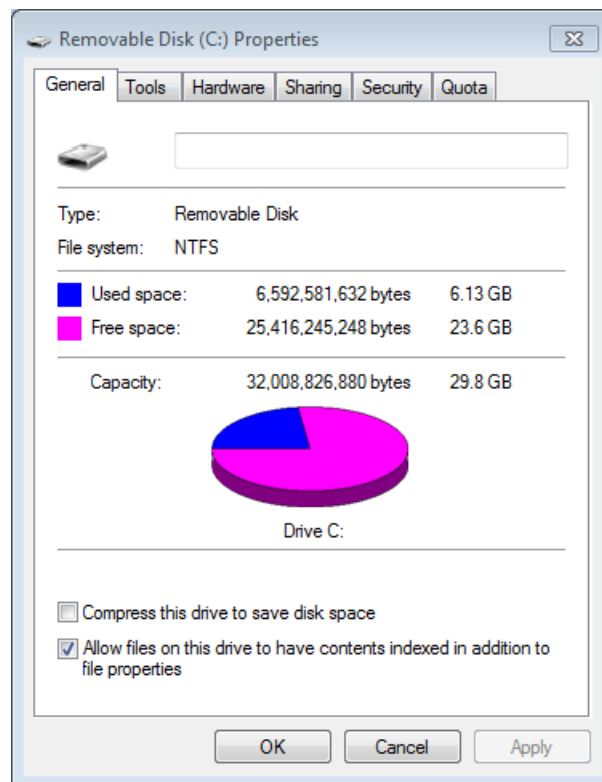
As I applied the next set of updates, I watched the disk space go from 6GB to 8GB, and then all the way up to 10GB.
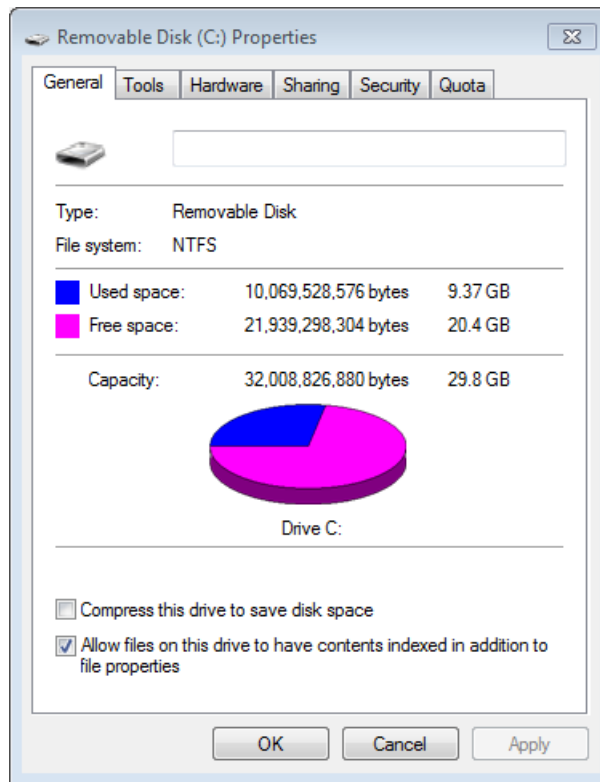
Disk space was not only an issue. Tracking the RAM, the amount of memory used started at 500MB.

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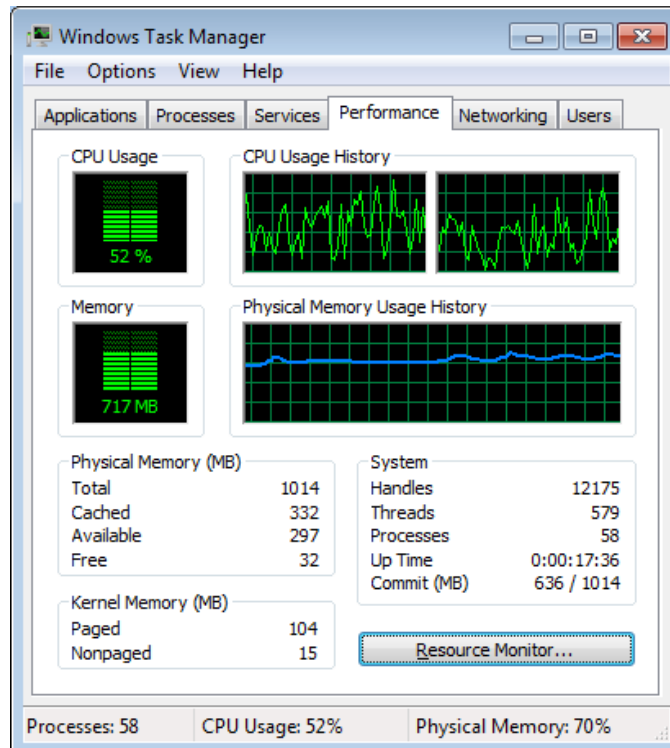
As the updates were being process, the amount of RAM usage increased. One configuration set was still too big, and an out-of-memory error popped up, and the update failed.

By breaking down the updates and apply them to the installed target image, the final image size was 8GB. Your image size will vary. The next step would be to use Disk Cleanup to clean out the c:\Windows\winsxs directory.

IoT/Embedded systems are designed to have limited RAM and disk space. The WES7 and WE8S end-of-life cycle is quite a few years from now and more updates are going to be made available. The resource issue is not going to go away. It would be nice if Microsoft came out with SP2 distribution shares. We would then re-start with zero updates and grown from there. With the focus on Windows 10, money and resources are probably not available to go back to WES 7. Here are the options to work around the issue:

1. Create small configuration sets that are made up of the updates and hot fixes, and then apply them to a target image using DISM.
2. Use Windows Update to download and install the updates.
3. Use Disk Cleanup to clean out the c:\Windows\winsxs directory.

Note: *Disk Cleanup utility will NOT run on boot drives that are identified as removable. Comercial CF cards purchased at the store are the biggest culprits since they ae identified as removable. Industry grade CF cards ID as fixed are available from a few companies: WinSystems, Trancend, and Dolphin. If CF card is going to be the boot media, industrial grade CF cards are recommended for booting Windows.*