Proj 12: Kernel Debugging with Livekd on Windows 10 (20 pts.)

What You Need

A Windows 10 machine, real or virtual. Unfortunately, this process seems to fail on most machines. It worked on my 32-bit Windows 10 virtual machine, but not on the 64-bit real lab machines.

Purpose

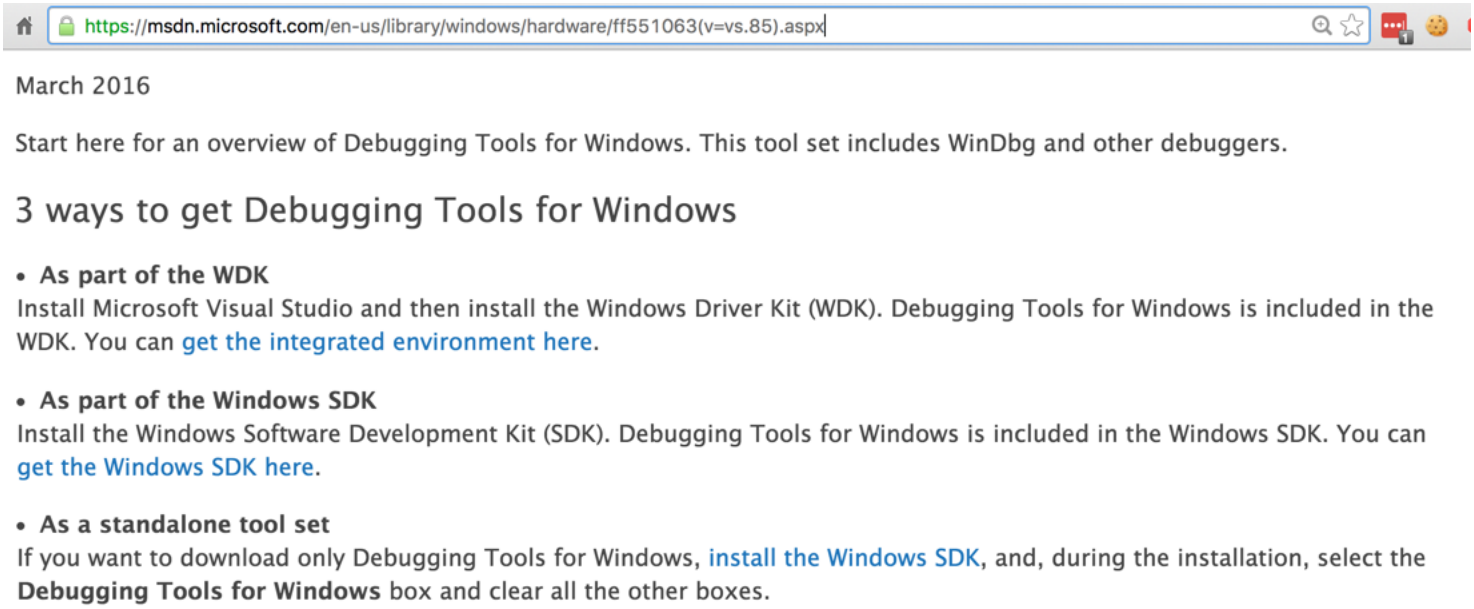
To debug the Windows kernel. To get full functionality, you need to use two machines and a network connection, but the Sysinternals Livekd utility makes it possible to get a lot of kernel debugging functionality with a single PC, which is very convenient!

Installing Debugging Tools for Windows

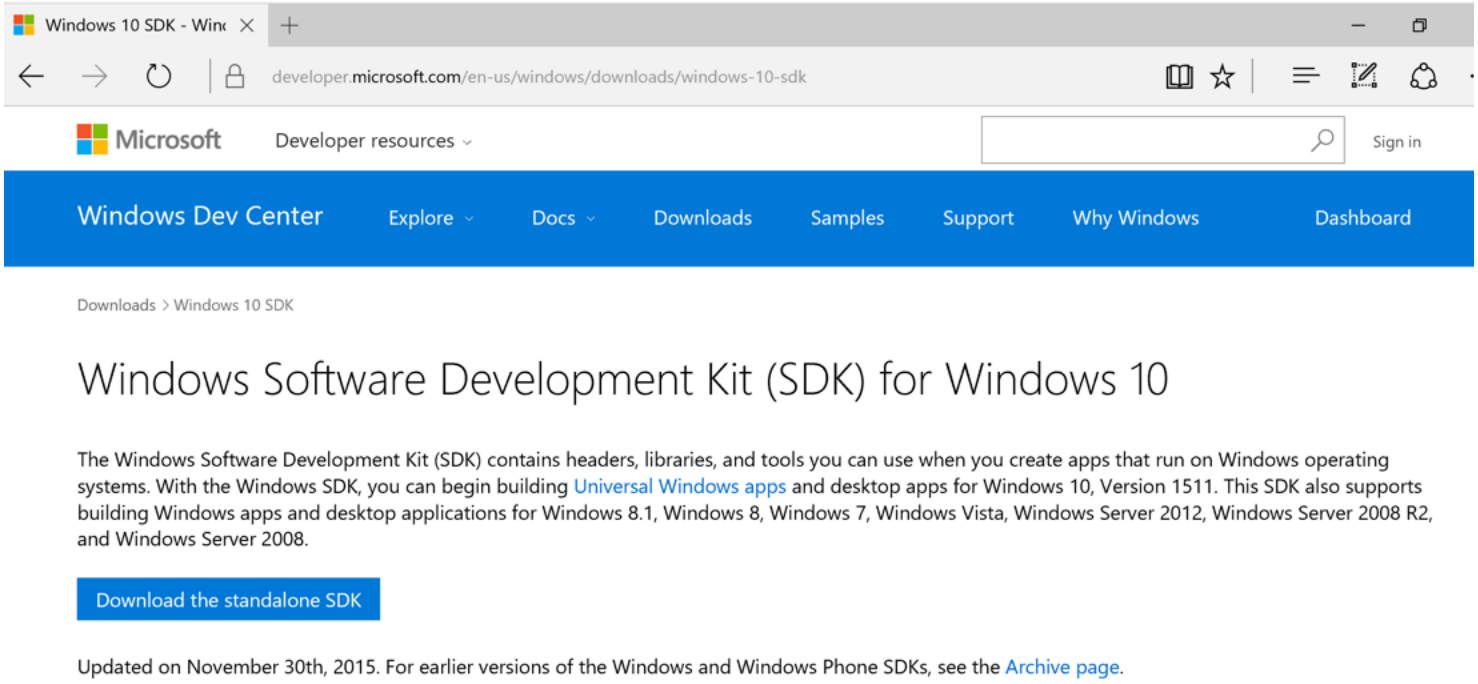
Use Edge on Windows 10, and go to :

https://msdn.microsoft.com/en-us/library/windows/hardware/ff551063(v=vs.85).aspx

In the "As a standalone tool set" section, click "**install the Windows SDK**", as shown below:

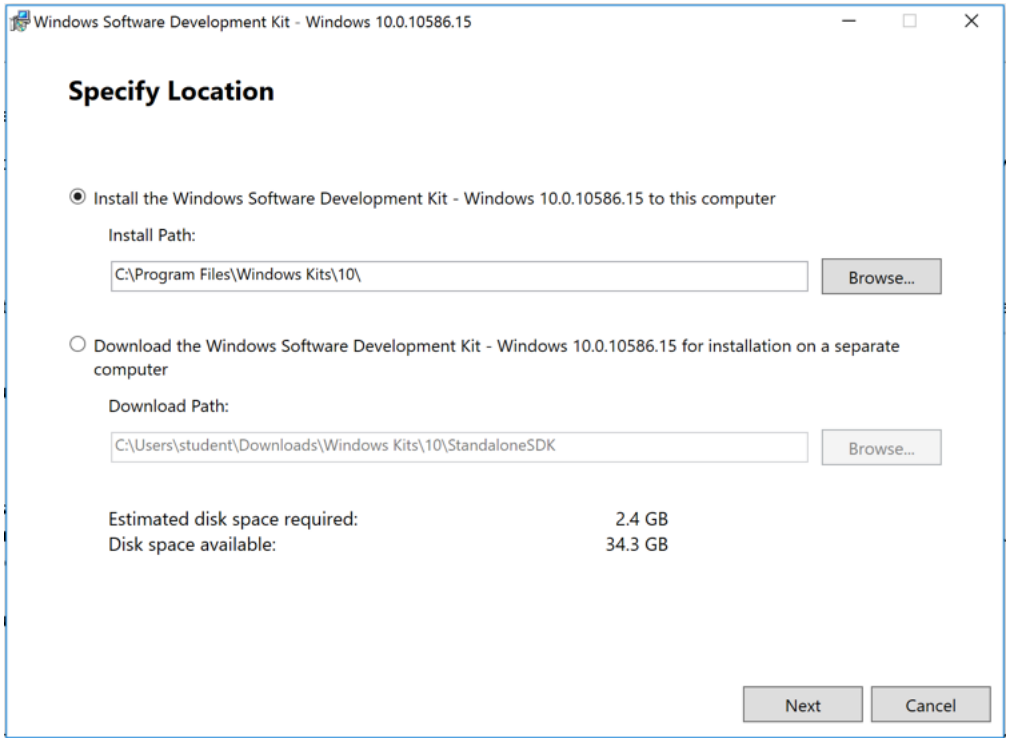


On the next page, click the "**Download the standalone SDK**" button, as shown below:



When you see a message saying "sdksetup.exe has finished downloading", click the **Run** button.

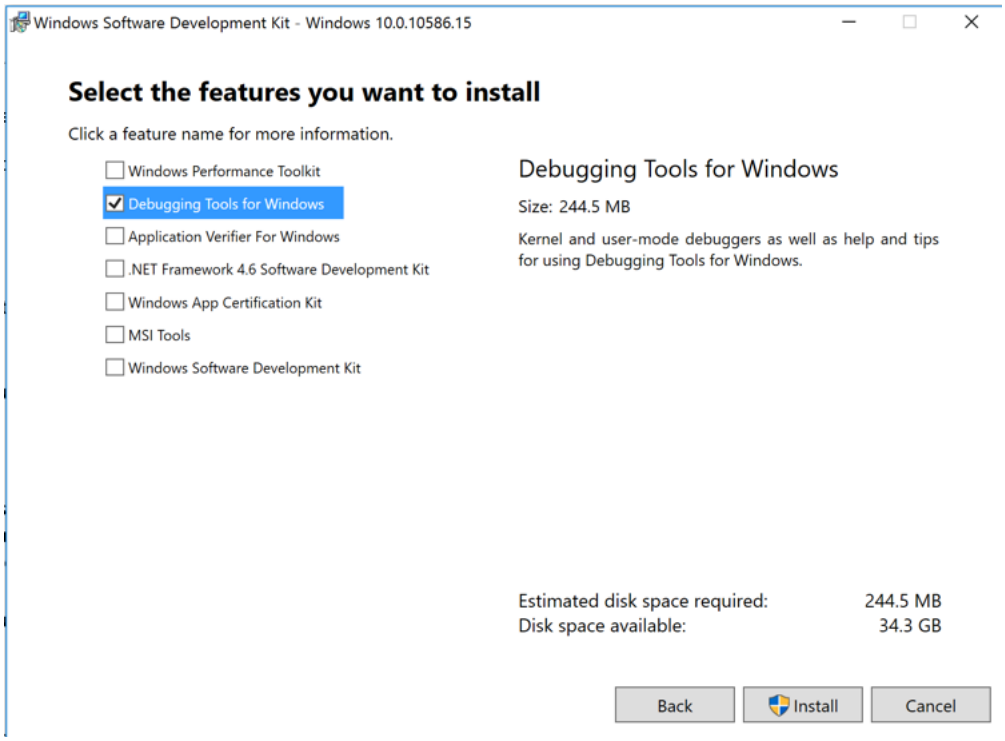
At the "Specify Location" screen, accept the default options and click **Next**, as shown below:



At the "Windows Kits Privacy" screen, accept the default options and click **Next**.

At the "License Agreement" screen, click **Accept**.

At the "Select the features you want to install" screen, check the "**Debugging Tools for Windows**" box and clear all the other boxes, as shown below:



When you see the "Welcome to the Windows Software Development Kit" message, click **Close**.

Setting Up Local Kernel-Mode Debugging

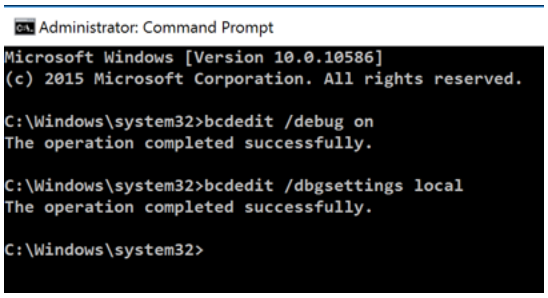
At the bottom left of the sceen, click twice in the Cortana search bar and type **CMD**.

When "**Command Prompt**" appears, right-click it, and click "**Run as Administrator**".

If a User Account Control box pops up, click **Yes**.

In the Administrator Command Prompt window, execute these commands:

```
bcdedit /debug on
bcdedit /dbgsettings local
```



Click **Start**, **Power**, **Restart**.

Getting LiveKD

On your Windows 10 machine, in Edge, go to

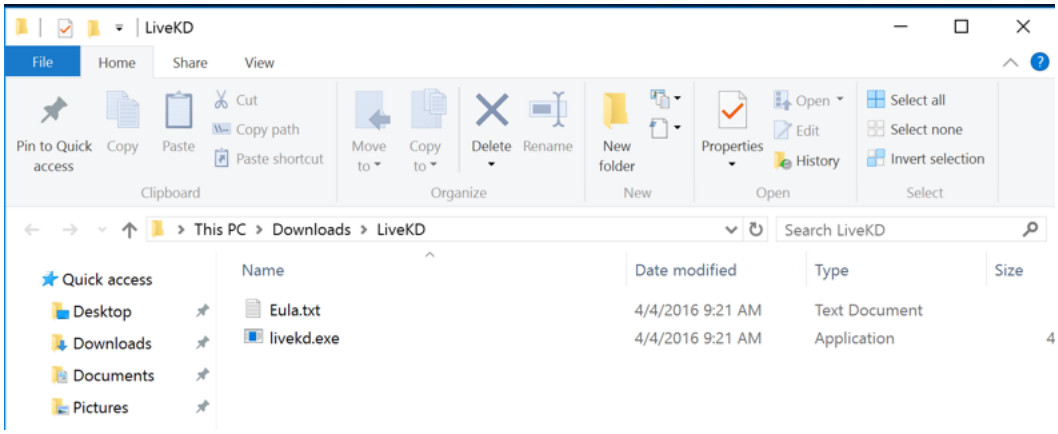
https://technet.microsoft.com/en-us/sysinternals/bb897415.aspx

Click the "**Download LiveKd**" link.

Click "**Open Folder**".

Right-click **LiveKD.zip** and click "**Extract All...**", .

A LiveKd window opens, showing two files, as shown below.



Click **Start**. Click "**File Explorer**".

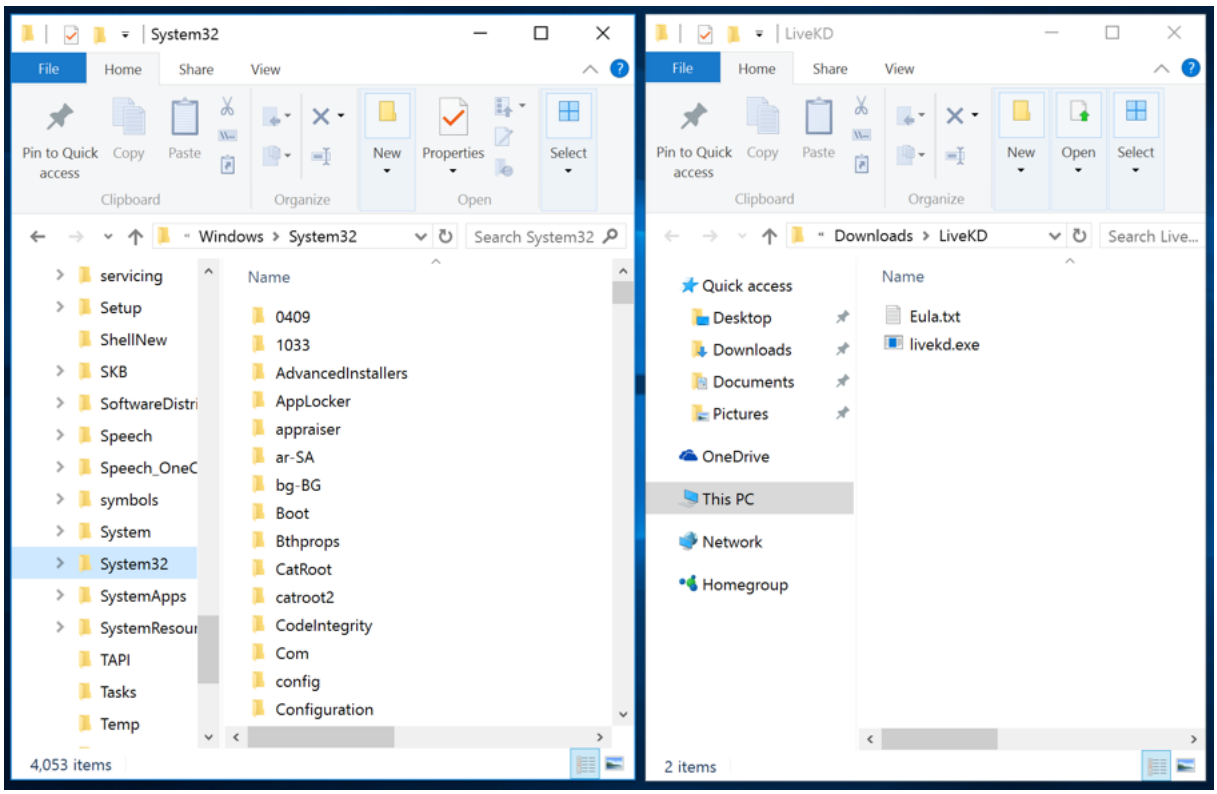
In the left pane, double-click "**This PC**".

In the left pane, expand "**Local Disk (C:)**".

In the left pane, expand **Windows**.

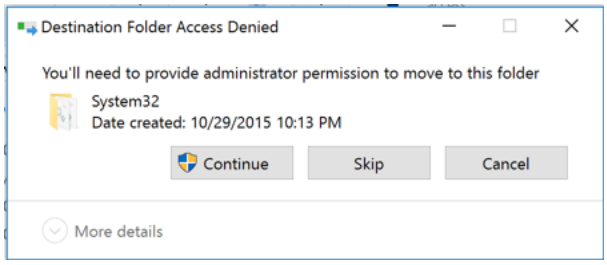
In the left pane, scroll down to find **System32** and click it.

Resize both File Exporer windows so you can see them both at once, as shown below.



Drag **livekd.exe** onto the **System32** folder in the left pane of the other File Explorer window and drop it there.

A "Destination Folder Access Denied" box should pop up, as shown below. Check to make sure the destination folder is **Sytem32**. Then click **Continue**.



Using LiveKd

At the bottom left of the sceen, click twice in the Cortana search bar and type **CMD**.

When "**Command Prompt**" appears, right-click it, and click "**Run as Administrator**".

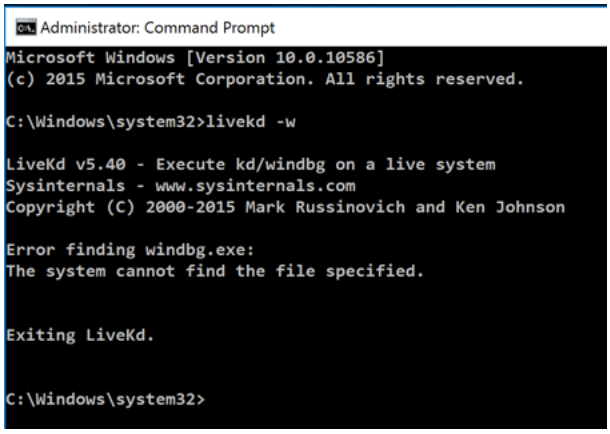
If a User Account Control box pops up, click **Yes**.

In the Administrator Command Prompt window, execute this command:

```
livekd -w
```

A "SYSINTERNALS SOFTWARE LICENSE TERMS" box pops up. Click the **Agree** button.

If you see "Error finding windbg.exe", as shown below, fix that with the Troublehooting advice in the box below.

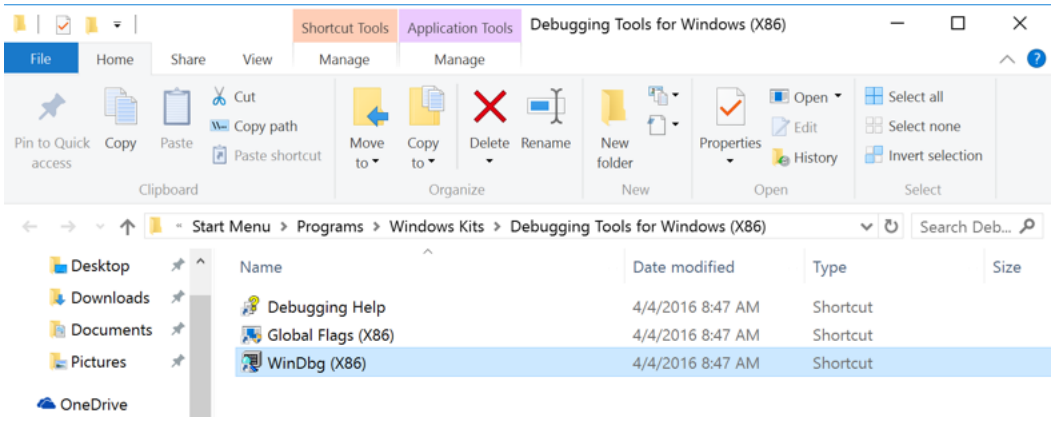


Troubleshooting

The "Error finding windbg.exe" occurs because the Windows installer fails to add the correct directory to the PATH environment variable.

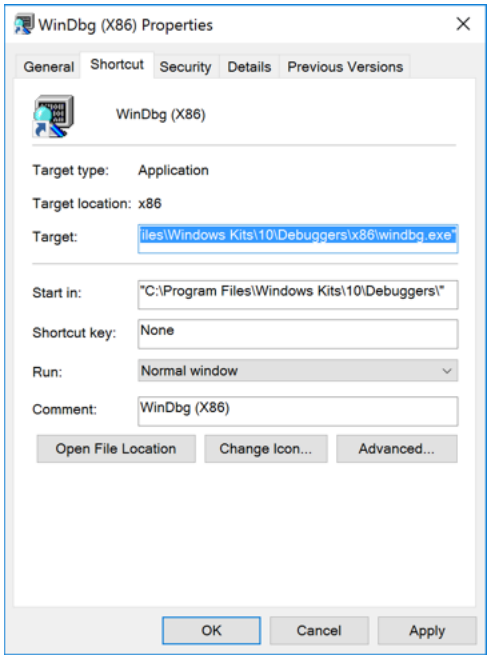
To find the correct path, at the bottom left of the sceen, click twice in the Cortana search bar and type **windbg**.

When **WinDbg** appears, right-click it, and click "**Open file location**". A window opens showing a shortcut to WinDbg, as shown below.



Right-click **WinDbg** and click **Properties**.

Click in the Target box, then right-click and click "**Select All**", as shown below.

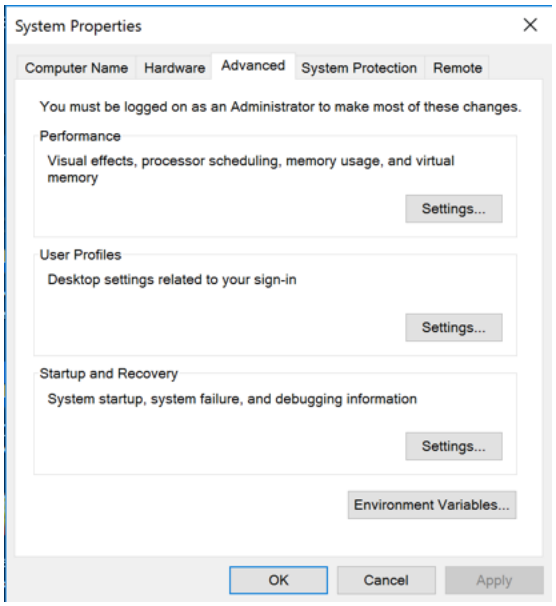


Right-click the highlighted path and click **Copy**.

In a File Explorer window, right-click "**This PC**" and click **Properties**.

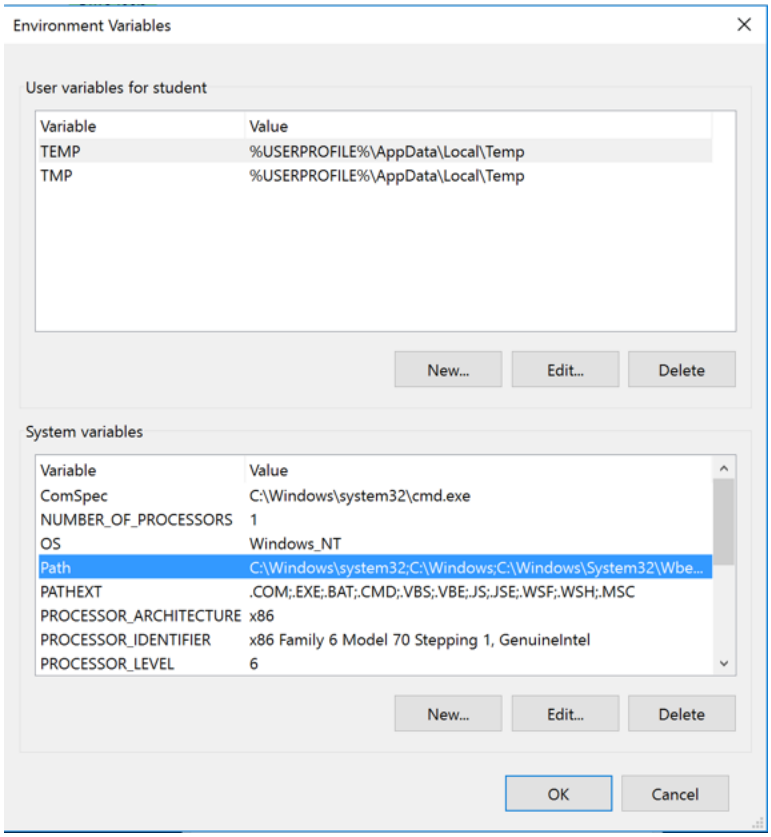
A System box opens. In the left pane, click "**Advanced system settings**".

A "System Properties" box opens, as shown below. On the **Advanced** tab, click the "**Environment Variables**" button.



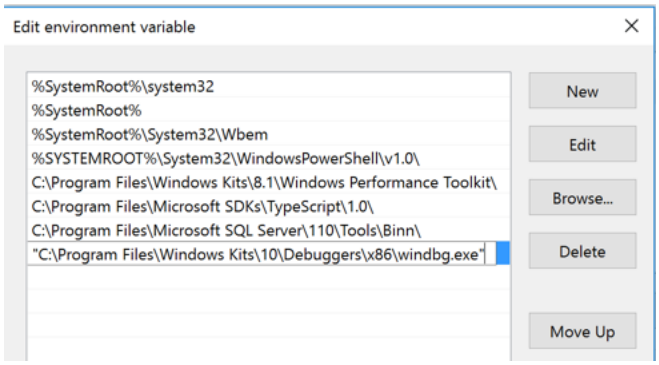
An "Environment Variables" box opens. In the lower portion of this box, click **Path**, as shown below.

In the lower right of this window, click the **Edit...** button.



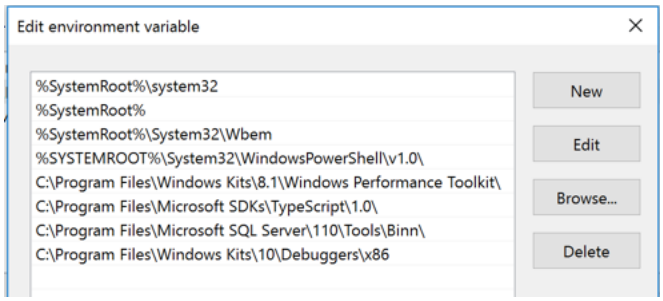
An "Edit environment variable" box opens. Click the **New** button to open a new entry at the bottom of the list.

Right-click in the new entry's box and click **Paste**. The path to windbg appears, as shown below.



Click in the new entry and use the keyboard to carefully remove the quotes and the **/windbg.exe**, as shown below.

When the path is correct, click the **OK** button.



In the "Environment Variables" box, click the **OK** button.

In the "System Properties" box, click the **OK** button.

Click **Start**, **Power**, **Restart**.

In the Administrator Command Prompt window, execute this command:

```
livekd -w
```

Using Livekd

When Livekd starts, it asks you whether to set the _NT_SYMBOL_PATH automatically, as shown below.

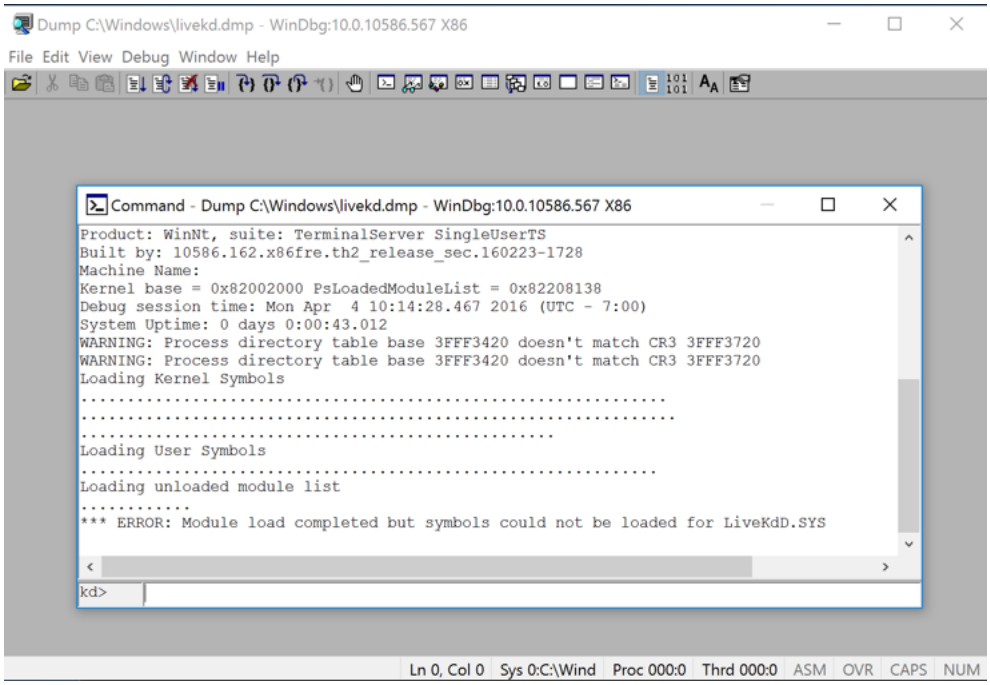
Type **y** and press **Enter**.

```
C:\Windows\system32>livekd -w

LiveKd v5.40 - Execute kd/windbg on a live system
Sysinternals - www.sysinternals.com
Copyright (C) 2000-2015 Mark Russinovich and Ken Johnson


Symbols are not configured. Would you like LiveKd to set the _NT_SYMBOL_PATH
directory to reference the Microsoft symbol server so that symbols can be
obtained automatically? (y/n) _
```

Livekd asks "Enter the folder to which symbols download". Press **Enter** to accept the default option.

Windbg launches, as shown below.

There's an error loading the symbols, which may be related to the constantly-changing nature of Windows 10.



If you wish to change the font, click **View**, **Font**.

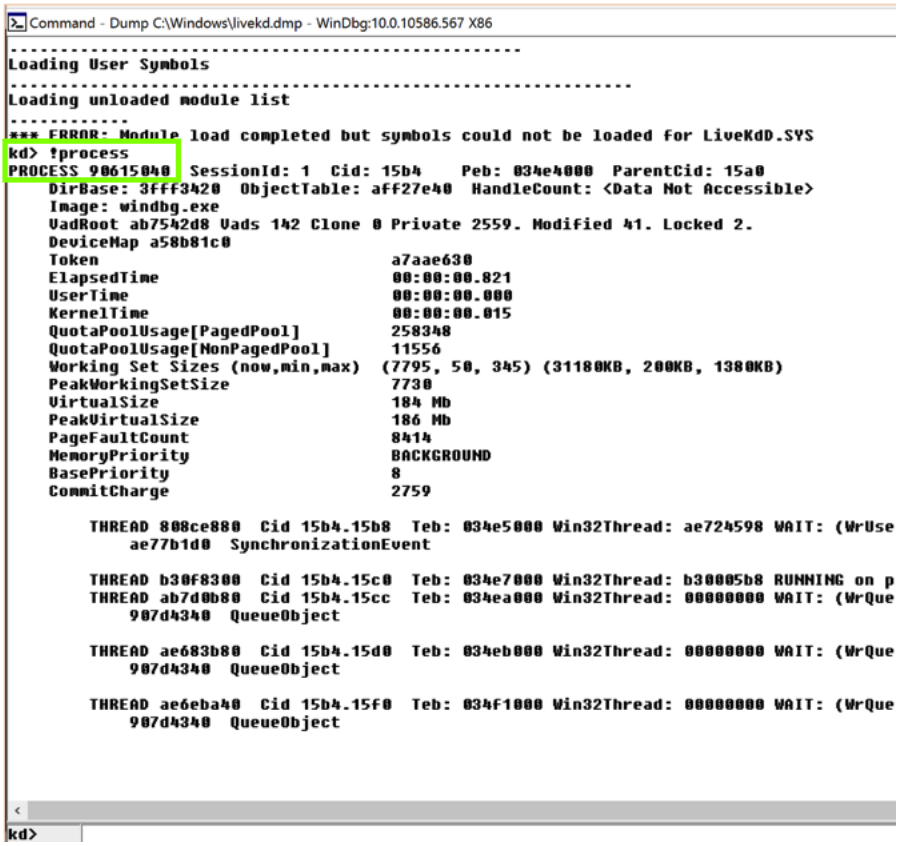
Make the "Command" window larger, as shown below.

This is a strange combination of a GUI and command-line, like the other debuggers we've used. Commands are typed into the box at the bottom and the results appear in the large top pane.

At the bottom of the Command window, in the command bar, execute this command:

```
!process
```

You should see the "**kd> !process**" command, and its output, showing a **PROCESS** number, as shown below.



Saving the Screen Image

Make sure you can see the "**kd> !process**" command and a **PROCESS** number.

On your keyboard, press the PrntScrn key.

Open Paint and paste in the image.

YOU MUST SUBMIT WHOLE-DESKTOP IMAGES TO GET FULL CREDIT.

Save the image with a filename of "**Proj 12 from YOUR NAME**".

Turning in Your Project

Email the images to: **cnit.126sam@gmail.com** with a subject line of **Proj 12 From Your Name**, replacing Your Name with your own first and last name. Send a Cc to yourself.

Sources

Setting Up Local Kernel Debugging of a Single Computer Manually

Getting Started with WinDbg (Kernel-Mode)

Windows 7 x64 Local and Live Kernel Debugging

Posted: 4-4-16 by Sam Bowne
Win Server 2008 information added 12:22 pm 4-4-16
Win Server 2008 information moved to a separate project 4-12-16