ROS setup for Windows PC
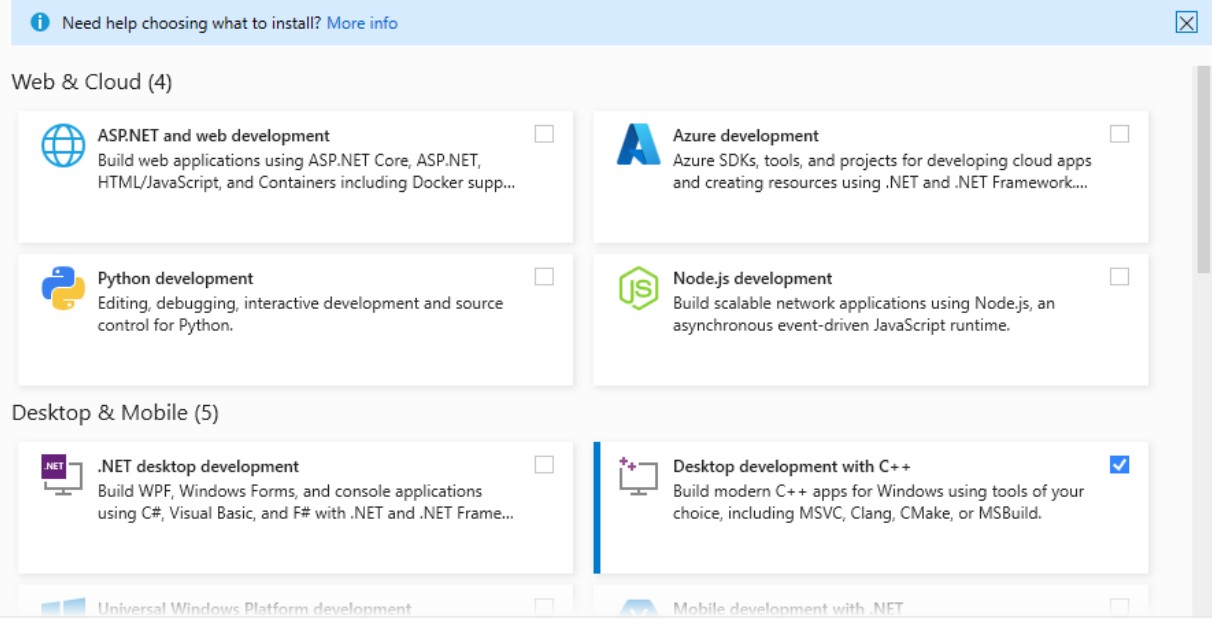
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Follow the procedure outlined on this website: ROS on Windows installation

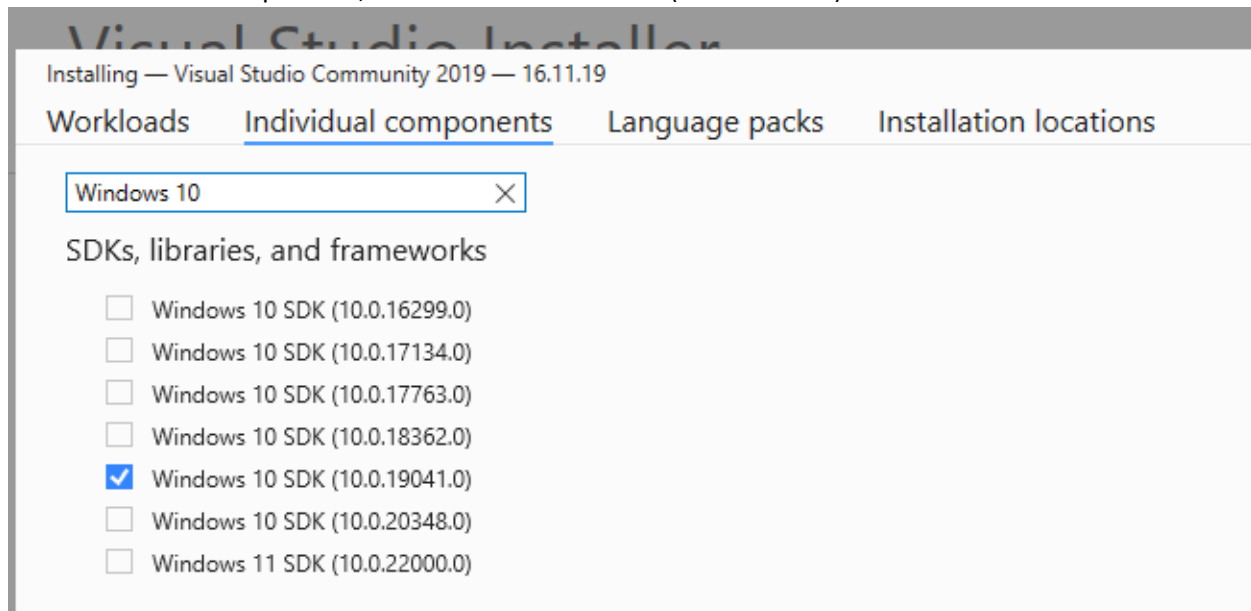1. Install Visual Studio Community 2019 (version 16.11).
   a. Include "Desktop development with C++" workload.

   b. In the Individual Components, select "Windows 10 SDK (10.0.19041.0)".

2. Install Windows Package Manager

a. In the Start Menu, find the "x64 Native Tools Command Prompt for VS 2019" item.
b. Right Click, select More then "Run as Administrator"
c. Copy the following command line:

```
@"%SystemRoot%\System32\WindowsPowerShell\v1.0\powershell.exe" -N
oProfile -InputFormat None -ExecutionPolicy Bypass -Command "iex
((New-Object System.Net.WebClient).DownloadString('https://chocol
atey.org/install.ps1'))" && SET "PATH=%PATH%;%ALLUSERSPROFILE%\ch
ocolatey\bin"
```

d. Paste it into the command window.
e. Approve any prompts
f. Once it has completed, close the command prompt to complete the install.

3. Install Git:
a. Reopen the Visual Studio Command Window as described above.
b. Note that you might need to run the following command first if you are not able to install git as described in the next step:
```
choco feature enable -n useFipsCompliantChecksums
```
c. Please install Git using the command here, even if you have it installed as an application.

```
choco upgrade git -y
```

d. Close the command window
e. After Git installed, open another Visual Studio command window and ensure Git is now available by typing the following in the Visual Studio command window.

```
git --version
```

f. Close and Reopen the Visual Studio Command Window as described above.

4. Binary Package Installation
a. ROS Last Known Good (LKG) Build Installation: Open the Visual Studio Command Prompt as Administrator as described above and then paste in these commands, but note that you might need to run this again first:
```
choco feature enable -n useFipsCompliantChecksums
```

```
mkdir c:\opt\chocolatey

set ChocolateyInstall=c:\opt\chocolatey

choco source add -n=ros-win -s="https://aka.ms/ros/public" --priority=1

choco upgrade ros-noetic-desktop_full -y --execution-timeout=0
```
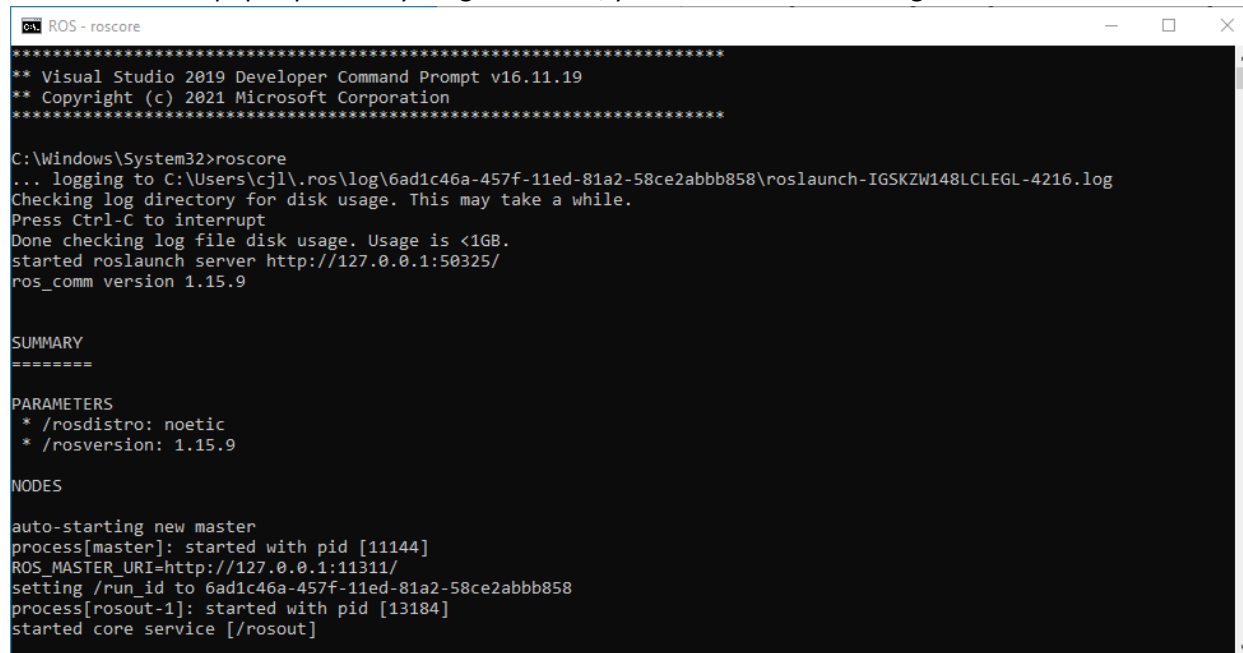
b. At this point, you will need to reboot your computer

5. Create a ROS Command Window shortcut
a. Create an Administrative command line shortcut for Visual Studio by right-clicking in a Windows Explorer folder and selecting New > Shortcut
b. In the shortcut path, copy the highlighted command line:

```
C:\Windows\System32\cmd.exe /k "C:\Program Files (x86)\Microsoft Visual Studi
o\2019\Community\Common7\Tools\VsDevCmd.bat" -arch=amd64 -host_arch=amd64&& s
et ChocolateyInstall=c:\opt\chocolatey&& c:\opt\ros\noetic\x64\setup.bat
```

    c. Name the shortcut "ROS"

    d. Set that shortcut as Administrator by …
- i. Right Click on the shortcut and choose "Properties".
- ii. Select the Shortcut Tab if not already selected.
- iii. Press the Advanced button
- iv. Check the button "Run as Administrator".
- v. Press OK on the Advanced properties dialog.
- vi. Press OK on the "ROS Properties" shortcut dialog.

    e. Test by clicking on the shortcut, using your admin privileges to proceed, and then typing "roscore" at the command line. You might get a Firewall warning, but just click cancel in the window that pops up. If everything is in order, you should see something like this:

6. [OPTIONAL] Install new Windows Terminal and set up for ROS
    a. Install the new Windows Terminal from GitHub by using this link to download the installation file and then running it
    b. To set up the new terminal for ROS:
- i. Find the new "Terminal" program on the start menu, right click and select 'More → Run as Administrator.' Note that this step caused some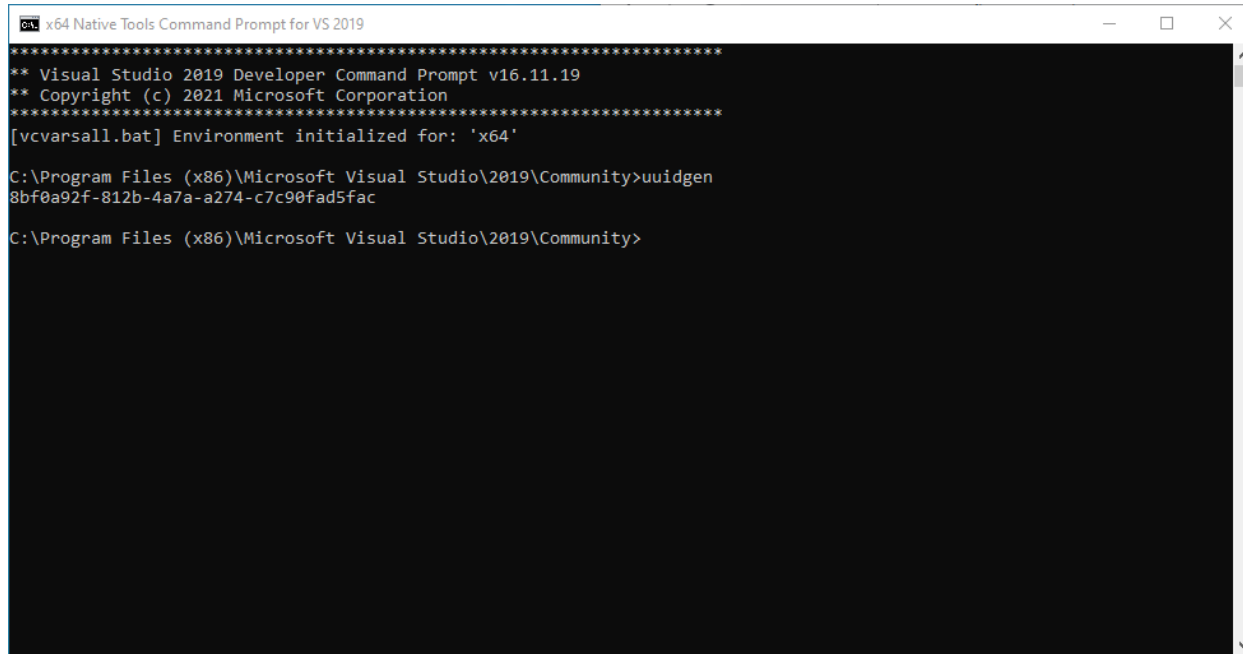 problems in one case, but you can still run ROS even if you are not running the terminal as an administrator. If you can, though, you should for cybersecurity best practices, but it doesn't have to be a complete deal-breaker if you cannot run the terminal as an administrator.
- ii. Select settings from the drop down arrow next to the Add Tab (+) Button.
- iii. Click on the "Open JSON file" button at the bottom left
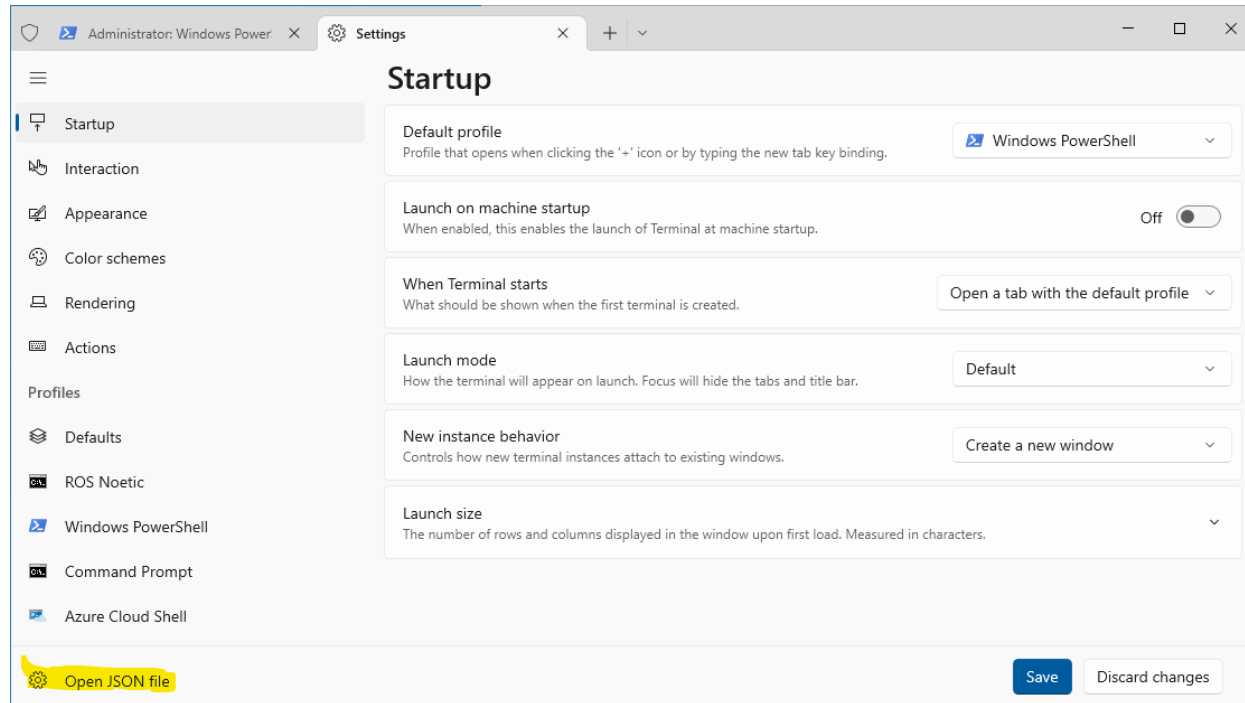
c. This will open the settings.json file in Visual Studio, where you can modify the settings to add a new profile for ROS

d. In the list array in the "profiles" object (starting at line 35 for me), add a new block for ROS by pasting in the following:

```
"profiles" :

    {

        list:

        [

            ...

            {

                "commandline" : "C:\\Windows\\System32\\cmd.exe /k \"C:\\Prog
ram Files (x86)\\Microsoft Visual Studio\\2019\\Community\\Common7\\Tools\\Vs
DevCmd.bat\" -arch=amd64 -host_arch=amd64 && set ChocolateyInstall=c:\\opt\\c
hocolatey&& c:\\opt\\ros\\noetic\\x64\\setup.bat",

                "guid" : "{xxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxxxx}",

                "icon" : "ms-appx:///ProfileIcons/{0caa0dad-35be-5f56-a8ff-af
ceeeaa6101}.png",

                "name" : "ROS Noetic",

                "startingDirectory" : "c:\\ws"

        },
```

e. From a Visual Studio command window, use the command uuidgen to generate a globally unique identifier (aka universally unique identifier).
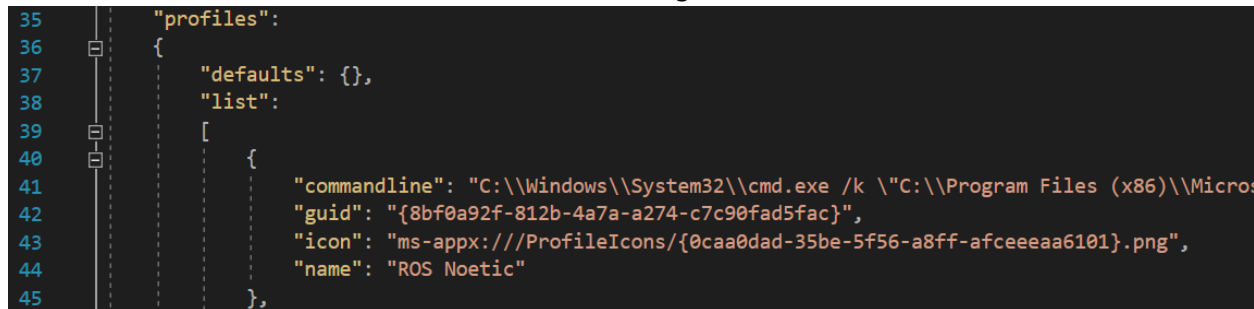
```
x64 Native Tools Command Prompt for VS 2019                                    —    □    X
**********************************************************************
** Visual Studio 2019 Developer Command Prompt v16.11.19
** Copyright (c) 2021 Microsoft Corporation
**********************************************************************
[vcvarsall.bat] Environment initialized for: 'x64'

C:\Program Files (x86)\Microsoft Visual Studio\2019\Community>uuidgen
8bf0a92f-812b-4a7a-a274-c7c90fad5fac

C:\Program Files (x86)\Microsoft Visual Studio\2019\Community>
```
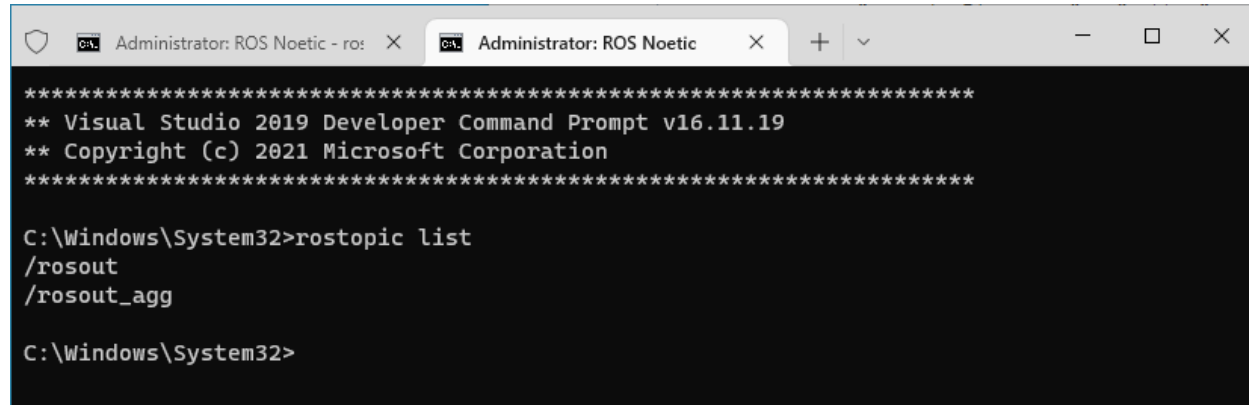
f. Copy the guid (select the text, then right click to copy)

g. Replace xxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxxxxx in the json file with the guid text copied above. Your Visual Studio window should look something like this:

```
35          "profiles":
36      ⊟   {
37              "defaults": {},
38              "list":
39      ⊟      [
40      ⊟          {
41                      "commandline": "C:\\Windows\\System32\\cmd.exe /k \"C:\\Program Files (x86)\\Micros
42                      "guid": "{8bf0a92f-812b-4a7a-a274-c7c90fad5fac}",
43                      "icon": "ms-appx:///ProfileIcons/{0caa0dad-35be-5f56-a8ff-afceeeaa6101}.png",
44                      "name": "ROS Noetic"
45                  },
```

h. Make sure to save the json file in Visual Studio

i. Back in the Settings tab of Terminal, select the new ROS Noetic profile and slide the switch for "Run this profile as administrator" to on:

j. To launch a ROS terminal, use the dropdown arrow next to the tabs at the top and select ROS Noetic.

7. Using your new ROS setup

   a. When launching the new Windows terminal, please remember to Run as Administrator, by right clicking on the Windows Terminal and Select *Run as Administrator*.

   b. Alternatively, Ctrl+Shift+clicking on the terminal icon in either the start menu or task bar is a handy shortcut to run as administrator.

   c. Once Terminal launches, open a ROS Noetic tab

   d. Type roscore to start a ROS core

e. Open another ROS Noetic tab in terminal for doing your actual ROS work. A simple way to check if your ROS is set up and functioning properly is the command rostopic list, which should show you a list of topics like this:

```
*******************************************************************
** Visual Studio 2019 Developer Command Prompt v16.11.19
** Copyright (c) 2021 Microsoft Corporation
*******************************************************************

C:\Windows\System32>rostopic list
/rosout
/rosout_agg

C:\Windows\System32>
```