

SAR ESSENTIALS OPENCL RUNTIME SELECTION

October 2025

© 2025 NV5 Geospatial Solutions, Inc. All rights reserved.

This information is not subject to the controls of the International Traffic in Arms Regulations (ITAR)
or the Export Administration Regulations (EAR).

INTRODUCTION

SAR Essentials requires an OpenCL platform and device (“runtime”) installation on your system before it can run. The OpenCL runtime selection determines whether computations are executed on the Central Processing Unit (CPU) or on the Graphics Processing Unit (GPU).

This document explains how to manually configure an OpenCL runtime for SAR Essentials running on Windows systems. Although SAR Essentials automatically determines an appropriate runtime for its operations, you can optionally choose one yourself if multiple platforms and devices are available. For example, you may want to exploit a specific GPU component on your system to provide the best performance for SAR Essentials.

In most cases, you do not need to explicitly choose an appropriate OpenCL runtime because SAR Essentials automatically chooses one based on the default logic described in the next section. Thus, this document is primarily intended for advanced users who are willing to work with environment variables.

DEFAULT BEHAVIOR

SAR Essentials follows the default logic described here to select an appropriate OpenCL runtime:

1. It checks for the availability of one or more installed and compatible OpenCL runtimes.
2. If no runtimes are detected, it issues an error message saying that SAR Essentials cannot be installed. Please refer to the *SAR_Essentials_OpenCL_Installation.pdf* document for additional information about OpenCL configurations.
3. When only one operational OpenCL runtime is detected, SAR Essentials uses that one. If it is a GPU-only runtime, SAR Essentials issues a warning message suggesting that you also install a CPU-only runtime. These are typically easier to configure and are less prone to driver and update errors.
4. When more than one operational OpenCL runtime is detected, SAR Essentials gives priority to CPU-only runtimes.

CUSTOM CONFIGURATION

Follow the steps in this section to explicitly define a preferred OpenCL runtime for SAR Essentials. You must use Windows environment variables to override the default behavior described in the last section.

1. Start a Windows command prompt by typing **cmd** in the Search window.
2. Change to this directory:

```
C:\Program Files\SARMAP SA\SAR Essentials\bin
```

3. Run the **sarxinfo** application:

```
sarxinfo
```

4. Identify the platform and device you would like to use from the report that **sarxinfo** generates. See the red text in the following example:

```
-----
OpenCL platforms:
-----
```

```
Nr. of platforms . : 2
Platform 0 . . . : Intel(R) OpenCL
Available devices: 2 (1 GPUs, 1 CPUs, 0 accelerators)
Device 0 . . . : Intel(R) HD Graphics 4600 (def)
Device type . : GPU
Device version : OpenCL 1.2
Driver version : 20.19.15.4835
FP64 support . : no [!] FP64 required
SPIR support . : yes
Global mem size: 1629 MB
Local mem size : 64 KB
Max mem object : 407 MB
Address bits . : 64
Compute units . : 20
Global cache . : 256 KB
Max clock freq : 1300 MHz
Max workgroup . : 512
Image support . : yes
Context check . : passed
Device ready . : no
Device 1 . . . : Intel(R) Core(TM) i7-4810MQ CPU @ 2.80GHz
Device type . : CPU
Device version : OpenCL 1.2 (Build 10094)
Driver version : 5.2.0.10094
FP64 support . : yes
SPIR support . : yes
Global mem size: 16288 MB
Local mem size : 32 KB
Max mem object : 4072 MB
Address bits . : 64
Compute units . : 8
Global cache . : 256 KB
Max clock freq : 2800 MHz
Max workgroup . : 8192
Image support . : yes
Context check . : passed
Device ready . : yes

Platform 1 . . . : AMD Accelerated Parallel Processing
Available devices: 2 (1 GPUs, 1 CPUs, 0 accelerators)
Device 0 . . . : Capeverde (def)
Device type . : GPU
Device version : OpenCL 1.2 AMD-APP (2348.3)
Driver version : 2348.3
FP64 support . : yes
```

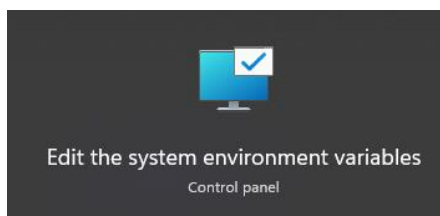
```

SPIR support . : yes
Global mem size: 2048 MB
Local mem size : 32 KB
Max mem object : 1344 MB
Address bits . : 64
Compute units  : 10
Global cache . : 16 KB
Max clock freq : 775 MHz
Max workgroup  : 256
Image support  : yes
Context check  : passed
Device ready . : yes
Device 1 . . . : Intel(R) Core(TM) i7-4810MQ CPU @ 2.80GHz
Device type . . : CPU
Device version : OpenCL 1.2 AMD-APP (2348.3)
Driver version : 2348.3 (sse2,avx)
FP64 support . : yes
SPIR support . : yes
Global mem size: 16288 MB
Local mem size : 32 KB
Max mem object : 4072 MB
Address bits . : 64
Compute units  : 8
Global cache . : 32 KB
Max clock freq : 2794 MHz
Max workgroup  : 1024
Image support  : yes
Context check  : passed
Device ready . : yes

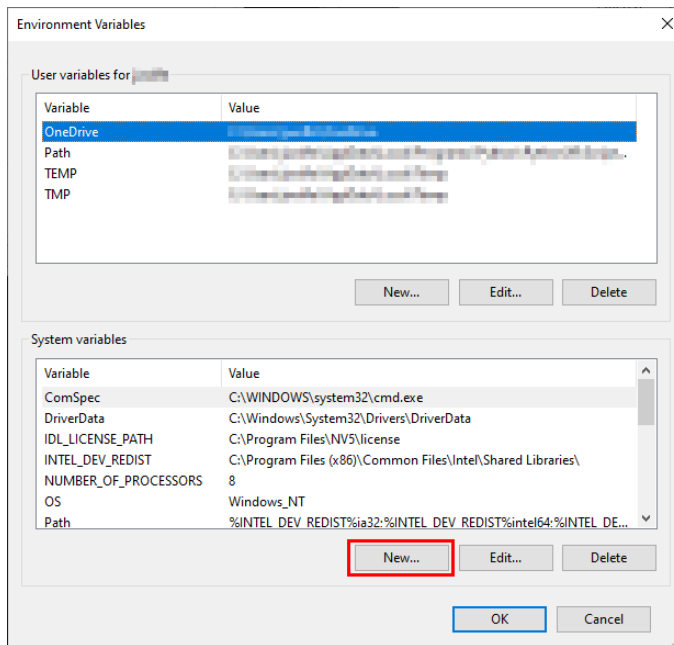
```

[OK] This machine seems to be SAR Essentials-compatible

5. In the Windows search bar, type **environment** and start the **Edit the system environment variables** application.



6. In the *Systems Properties* dialog, click the **Environment Variables** button. The *Environment Variables* dialog appears.
7. Click the **New** button in the *System variables* section.



The New System Variable dialog appears.

8. Enter the following information:

Variable name: **SAR ESSENTIALS_OPENCL_PLATFORMID**

Variable value: Enter the desired **Platform** number from the sarxinfo report.

9. Click **OK**.

10. Click the **New** button again and enter this information in the New System Variable dialog:

Variable name: **SAR ESSENTIALS_OPENCL_DEVICEID**

Variable value: Enter the desired **Device** number from the sarxinfo report.

In the example report above, the first variable value (platform ID) would be 1 and the second variable value (device ID) would be 0 if you wanted to use the second AMD GPU configuration:

```
Platform 1 . . . : AMD Accelerated Parallel Processing
Available devices: 2 (1 GPUs, 1 CPUs, 0 accelerators)
Device 0 . . . : Capeverde (def)
Device type . : GPU
Device version : OpenCL 1.2 AMD-APP (2348.3)
.
.
.
Device ready . : yes
```

11. Click **OK** to dismiss the New System Variable dialog, the Environment Variables dialog, and the System Properties dialog. The process is complete.

Note: As these environment variables will have priority over the default behavior, please pay attention to the correct values and double-check that the selected platform/device is compatible with SAR Essentials. You can do this by verifying that the `device ready` line is set to `yes` in the `sarxinfo` report (see step 10 above).