

Determining if Your Computer Can Run ArcGIS Pro

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Introduction

Trent students can obtain a free copy of ArcGIS Pro to use on their own computer via Trent University's [MaDGIC \(Maps, Data & Government Information Centre\)](#), but students must have a computer that will support this Windows-only software. Here we focus on helping you determine if your computer can run ArcGIS Pro, by having you answer some questions about your system that will determine your options.

The need for installing and running ArcGIS Pro on your own computer varies by course type:

- **It is required for web-based GIS courses**, as we use ArcGIS Pro as the primary software in the course and students are typically unable to visit Trent University Symons campus to access public computers (but note this option is available if you live close).
- **It is optional for in-person GIS courses**, as the course will have in-person workshops in a computer lab where students have access to a Windows 10 computer with ArcGIS Pro.

Before we get started, ESRI maintains a useful webpage on this topic:

Run ArcGIS Pro on a Mac. <https://pro.arcgis.com/en/pro-app/latest/get-started/run-pro-on-a-mac.htm>

Can My Computer Run ArcGIS Pro?

Question 1: What Operating System are You Using?

- Windows (any version) → [Visit Section A: Windows Computers](#)
- Mac OS X / MacOS (any version) → [Visit Section B: Apple Computers](#)
- ChromeOS

ArcGIS Pro is Windows-only and won't run natively on a Chromebook.

While it is possible to run Windows virtually in some operating systems, **this is not recommended on a Chromebook**. Chromebooks generally lack the system requirements needed to work with virtualization well. And Chromebook hardware is typically difficult to impossible to upgrade.

>>> Options Summary: ChromeOS

1. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
2. If taking an in-person GIS course, use an in-house Trent University public computer.

iv. Other Operating Systems

For users of other operating systems, we can't provide much support.

- **Linux users:** This article may help. **How To Run Windows 11 and macOS Virtual Machines in Linux.** <https://www.tomshardware.com/how-to/run-windows-11-and-mac-os-virtual-machines-in-linux>
- **Tablets and smartphones** cannot run ArcGIS Pro.

>>> Options Summary: Other Operating Systems

1. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
2. If taking an in-person GIS course, use an in-house Trent University public computer.

Section A: Windows Computers

Question 2: What version of Windows is your computer running?

a) Windows 8.1 or earlier

ArcGIS Pro requires at least Windows 10, so as is a Windows 8.1 or earlier computer cannot run ArcGIS Pro.

A computer running Windows 8.1 or earlier is too old (≥ 8 years) to be worth upgrading to have it run Windows 10 (even if possible). Microsoft stopped supporting Windows 8.1 in January 2023.

>>> Options Summary: Windows 8.1 and Earlier

1. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
2. If taking an in-person GIS course, use an in-house Trent University public computer.

b) Windows 10 or 11

If your computer is running Windows 10 or 11, it meets ArcGIS Pro's operating system requirements.

Next you should confirm that your computer meets ArcGIS Pro's hardware requirements (<https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-system-requirements.htm>), as described in the following table.

Computer Component	ArcGIS Pro Requirements	How to Check in Windows 10/11
Processor/ CPU	Minimum 2 cores; 10 is optimal. Hyperthreading/multithreading required.	Start > Settings > System > About , look for Device specifications > Processor .
Storage	Minimum 32 GB of free space; SSD (solid state drive) recommended (standard on most modern computers). Remember to include that your storage should have at least 15-20% free space.	Start > Settings > System > Storage . "Local Storage" will list both the size of your internal C: disk and the amount used. It will also list any other disks.
RAM	Minimum 8 GB of RAM; 32 GB or more is recommended.	Start > Settings > System > About , look for Device specifications > Installed RAM .
Graphics Memory	Recommended: 4 GB or more. Notebook computers with less will benefit from more RAM.	Start > Settings > System > Display . Under Multiple Displays select Advanced Display Settings . Under "Display Information" the graphics card vendor and model will be listed.

If your computer does not meet one or more of these requirements you may be able to upgrade your computer. Refer to your computer's documentation, available from your computer manufacturer's support website. Some upgrades are complex and may best be completed at an authorized computer repair centre. In any upgrade decision consider the cost to upgrade versus purchasing new, and the age of your current computer (computers more than 3-4 years old may not be worth upgrading).

Here is a brief review of some of the possible PC hardware upgrades.

- **RAM:** If your computer lacks sufficient RAM, it should be upgradable. RAM is sold by many 3rd party vendors and tends to be inexpensive. Read your computer's documentation to learn:
 - the maximum RAM your computer can support,
 - the specifications of the RAM your computer uses, and
 - how to add or replace RAM in your computer.
- **Storage:** If you are short on disk space, you should be able to upgrade the internal storage (C:) to increase storage space, and possibly also upgrade storage speed. You'll be using storage to store the application and to store GIS data:
 - ArcGIS Pro software must be installed on **C: drive**. If your C: drive lacks sufficient space (accounting for keeping 15-20% of drive storage free) you may be able to replace the drive with a larger, faster drive.
 - GIS data can be stored anywhere, on the internal boot drive or an internal or external disk.

Recommended drive types include:

- **NVMe M.2 SSD** (solid state drive): the fastest drive type but may be incompatible with some computers. Example: Samsung 970 EVO Plus.
- **SATA SSD (could be 2.5" or M.2 form factor)**: not as fast, but compatible with vast majority of computers. Example: Crucial MX500
- **External SSD**: these drives connect via a port on your computer. This has limited benefit, helping with data storage but not with the ArcGIS Pro application. Example: the Samsung T7

Avoid older HDD (hard disk drive) types (have spinning platters) as they are slow.

- **Processor:** This critical computer component is not generally upgradeable. For computers where a CPU upgrade is possible, use of an authorized computer repair centre is recommended.
- **Graphics Memory:** If your computer does not meet ArcGIS's graphics memory requirements, it may be possible to upgrade. For computers that support a replacement, this may involve the purchase of a video card that is compatible with your computer.

>>> Options Summary: Computers Running Windows 11/10

1. If your computer meets all these hardware requirements, you can obtain and install ArcGIS Pro as described in the companion document.
2. If it does not, you may be able to complete upgrades to meet ArcGIS Pro's requirements.
3. **If you are unable/unwilling to upgrade your computer to meet ArcGIS Pro hardware requirements, then your current computer will not support ArcGIS Pro, and you can:**
 - a. Find another computer or purchase a new computer that can run ArcGIS Pro, or
 - b. If taking an in-person GIS course, use an in-house Trent University public computer.

Section B. Apple Computers

It is possible to run Windows on a Mac, but its availability and alternatives depends on the Mac hardware, age, and operating system. There are two methods available to run Windows on a Mac:

- **Via Boot Camp:** splitting the Mac internal storage into two parts, installing Windows on one partition (while the MacOS remains on the other), and deciding what operating system to use on computer startup (requires reboot to change operating systems), or
- **Via virtualization:** software is used to create a virtual disk image of Windows 11, saved as a file on Mac storage. Virtualization software then opens the virtual disk, presenting Windows 11 in its application window on the Mac. Windows 11 runs within that window.

First, we need to determine your computer type.

Question 3: What type of Apple computer do you have?

As of October 2023, Apple sells only ARM-based Macs, but continues to support some Intel Mac models. Select **Apple > About This Mac > More Info** and look for the description of your Mac computer.

- a) **Apple Silicon (M1/M2/M3, also called ARM) Mac** → [Visit Section B1: Apple Silicon Macs](#)
- b) **Intel-based Mac 2018 and newer** with a core i5, i7, or i9 processor and running MacOS Big Sur 11.6.7 or higher → [Visit Section B2: Intel Macs 2018 and Newer](#)
- c) **Intel-based Mac older than 2018** with a core i3 processor **OR** running MacOS Catalina 10.15 or older:

These older Macs are not capable of running a useable Windows environment or ArcGIS Pro. Mac processor upgrades are not generally possible.

>>> Options Summary: Intel Macs older than 2018

1. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
2. If taking an in-person GIS course, use an in-house Trent University public computer.

Section B1: Apple Silicon Macs

Apple Silicon Macs (running M1, M2, or M3 processor families) can run Windows 11 Pro written to work on ARM processors using the virtualization software Parallels. Boot Camp will not work with Apple Silicon Macs, nor will other virtualization software (as of the time this was written).

In February 2023 Microsoft authorized Parallels Desktop for using ARM versions of Windows 11 on Mac with Apple Silicon <https://www.parallels.com/windows-11-arm-apple-m-series/>. And with the latest release of Parallels 19 in August 2023, enhancements have been made that specifically address ArcGIS Pro (<https://www.parallels.com/blogs/parallels-desktop-19/>).

However, a word of warning:

The current version of Microsoft Windows 11 Pro for ARM processors is still in development and has limitations. It has been shown to run ArcGIS Pro, but there may be unpredictable bugs and crashes resulting from unexpected issues. Keep this in mind as you decide your way forward. For more information see Windows Arc-based PCs FAQ from Microsoft at <https://support.microsoft.com/en-us/windows/windows-arm-based-pcs-faq-477f51df-2e3b-f68f-31b0-06f5e4f8ebb5>.

Your Apple Silicon Mac requires the following to properly run Windows 11 via Parallels:

- **RAM:** Minimum 8 GB; ≥16 GB recommended.
- **Storage:** Minimum 17 GB free for virtualization software and Windows 11 virtual disk; 100 GB free on an internal SSD drive is recommended to allow for a larger Windows disk.
*Remember to keep a minimum 15-20% of any storage disk free/unused.

Setting up Windows on ARM Mac requires the following software:

- **Parallels Desktop software** version 17 or later (current version 19 recommended, cost \$130 Cdn; coupons/sales may be available), &
- **Microsoft Windows 11 Pro for ARM processors** (avoid the Intel version). If you own a valid unused Windows 11 Pro licence it may be useable in activating an ARM version. See **Purchasing the Windows 11 Operating System**.

The following reference may be helpful, from a user who have used ArcGIS Pro virtually on a Mac:

Testing ArcGIS Pro on M1 Pro Mac with Parallels Standard to see if Pro would be worth it. 2023-10.

Reddit. https://www.reddit.com/r/gis/comments/1750t68/testing_arcgis_pro_on_m1_pro_mac_with_parallels/

Options Summary: Apple Silicon Macs

1. If your Silicon Mac has sufficient RAM and storage space, you can purchase Parallels Desktop and Windows 11 Pro for ARM processors and run Windows and ArcGIS Pro virtually. Note there might be issues with running Windows ARM, which is still in development.
2. If you lack RAM or internal storage (which is typically not upgradable), or are unwilling to purchase the software, your Mac won't support running Windows & ArcGIS Pro. You can:
 - a. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
 - b. If taking an in-person GIS course, use an in-house Trent University public computer.

Section B2: Intel Macs 2018 and Newer

Students with Intel-based Apple computers approximately 2018 and newer (running MacOS Big Sur 11.6.7 and later), with core i5, i7, or i9 processors, have two choices for running Windows 10 on their Mac:

- **Boot Camp** (choose to start up your computer in Mac or Windows), or
- **Virtualization** (run Windows 10/11 virtually in a window in MacOS).

Determining the best option requires knowing more about your Mac.

Question 4: How much RAM memory & disk space does your Mac have?

Use the following table to determine what of the next sections fits your case:

Computer RAM	Free Disk Space on Internal Boot Drive *be sure to account of keeping at least 15-20% of your disk free of data	
	< 100 GB free	≥ 100 GB free
≤ 4 GB	Visit Section B2d: Neither Boot Camp nor Virtualization Possible	Visit Section B2b: Boot Camp
> 4 GB	Visit Section B2c: Virtualization	Visit Section B2a: Boot Camp & Virtualization Possible

Section B2a: Boot Camp & Virtualization Possible

Your computer has the resources to run either Boot Camp or Virtualization. This table briefly describes the advantages and disadvantages of each.

Factor	Advantage Goes To...
Performance	Boot Camp , because the computer is managing one operating system at a time, and the operating system has direct access to computer hardware. Also, virtualization goes through a type of data translation that slows its performance somewhat.
Cost	Tie or edge to Boot Camp: Boot Camp software is free. Some good virtualization software is free and others cost. In both cases a valid Windows 10/11 license still must be available or purchased. See Purchasing the Windows 11 Operating System .

Factor	Advantage Goes To...
Computer Disk Use	Virtualization , because the file containing the Windows operating system can be placed on any disk (including an external disk) and does not require partitioning of the internal hard drive like Boot Camp.
Functionality	Virtualization , because MacOS and Windows run side-by-side in real time, while Boot Camp requires one to restart the computer to switch operating systems. Virtualization even allows one to copy data between the operating systems.

The following reference may help you further in deciding between Boot Camp and Virtualization:

How to install Windows on Mac. Cliff Joseph, MacWorld. <https://www.macworld.co.uk/how-to/install-windows-mac-3497251/>

Visit the appropriate section for further details on each option:

- [Section B2b: Boot Camp](#)
- [Section B2c: Virtualization.](#)

Section B2b: Boot Camp Only

Boot Camp: Choose to run Mac or Windows when booting your Mac.

With Boot Camp you divide your internal drive (from which your Mac starts up) into 2 partitions and install Windows on its own partition. Then, when you start your computer, you choose whether to start in Windows 10/11 or MacOS; this means to change operating systems you must restart the computer. Apple provides a free utility called Boot Camp to help with the setup and installation.

Boot Camp's requirements (<https://support.apple.com/en-ca/HT201468>) include:

- A newer Intel-based Mac computer. Boot Camp does not work on Apple silicon Macs.
- Minimum 64 GB space on our internal startup drive; ≥128 GB is strongly recommended. Boot Camp partitions this disk and sets up Windows on one of the partitions, making that space unavailable for MacOS. Remember to also keep at least 15-20% of any disk free.
- Minimum 4 GB of RAM; 16 GB or more is preferred (to run ArcGIS Pro on top of Windows).
- Video card with 256 MB of RAM or higher recommended

The basic Boot Camp setup process includes:

- Download and use the free Boot Camp Assistant to create a Windows partition on your Mac disk.
- Format the Windows (BOOTCAMP) partition.
- Install Windows. This requires a valid Windows 10/11 license; see **Purchasing the Windows 11 Operating System.**
- Use Boot Camp in Windows to complete the install (sets up your Mac hardware in Windows).
- Install ArcGIS Pro, as described in the companion document.

To use Windows on a Mac with Boot Camp you must start up in Windows.

Additional helpful references on Boot Camp:

- **Boot Camp Support.** Apple. <https://support.apple.com/en-ca/boot-camp>
- **How to install Windows 10 on your Mac using Boot Camp.** Cale Hunt, iMore. <https://www.imore.com/how-install-windows-your-mac-boot-camp>

Section B2c: Virtualization Only

Virtualization: Run Windows in a virtual environment.

With virtualization software creates a virtual disk image of Windows 10/11, saved as a file on the Mac storage. When you run the virtualization application it opens the virtual disk, presenting Windows in the application window on the Mac. Windows runs normally within that window.

Virtualization requirements are higher because it is running MacOS and Windows simultaneously. The following is based on Parallels' requirements (<https://www.parallels.com/ca/products/desktop/resources/>):

- Intel Core i5, i7, i9 or Xeon processor
- ≥ 16 GB of RAM (≥ 8 GB for each operating system)
- About 1 GB for the Parallels application, with the start-up drive an SSD type
- At least 100 GB disk space (on any disk connected to the Mac) for the virtual machine file

The virtual machine file that contains the Windows operating system can be stored on any storage device, but it is probably best stored on the start-up drive in its default location.

There are different virtualization applications available, with three main contenders:

- **Parallels**. Must be purchased. Provides good performance. <https://www.parallels.com/ca/>
- **VMWare Fusion Player**. Free for educational purposes to download, install, and use (requires VMWare account setup). Decent performance. <https://www.vmware.com/ca/products/fusion.html>
- **VirtualBox**. This free, open-source software may not offer quite as many options and performance as the first two but has always been free. <https://www.virtualbox.org>

This reference may help with choosing: **Best virtual machine software for Mac 2023**:

<https://www.macworld.com/article/668848/best-virtual-machine-software-for-mac.html>

Once you have chosen your virtualization software, the basic process of set up includes:

- Download and install the virtualization software (a Mac application).
- Open and use the virtualization software to set up a Windows virtual machine file on your disk of choice (choose your fastest). This requires a valid Windows 10/11 license; see **Purchasing the Windows 11 Operating System**.
- Install ArcGIS Pro within Windows.

Section B2d: Cannot Run Boot Camp or Virtualization

One of either disk space or RAM would have to be upgraded to run Boot Camp or Virtualization, and unfortunately these are challenging to upgrade on most Mac computers:

- The internal hard disk may be replaceable with a larger disk (SSD recommended if compatible). Hiring an authorized Apple service agent is strongly recommended.
- RAM can be upgraded on a few Mac models, including iMac 27" any year, iMac 21.5" from 2015 & 2016, all Mac Pro models, and Mac Mini 2018 (Apple service agent recommended).

>>> Options Summary: Newer Intel Mac with Limited Resources

1. Upgrading either your internal drive (for Boot Camp) or RAM (for Virtualization) may allow you to set up Windows on your Mac computer. See the sections **B2b: Boot Camp** and **B2c: Virtualization** for details.
2. **If you do not or cannot upgrade, your computer as is cannot run Windows. You can:**
 - a. Find another accessible computer or purchase a new computer (see **Purchasing a New Computer Recommendations** for some tips) that can run ArcGIS Pro, or
 - b. If taking an in-person GIS course, use an in-house Trent University public computer.

References: Running Windows on a Mac

Joseph, Cliff. 2023-11-01. **How to Install Windows on a Mac**. MacWorld.

<https://www.macworld.com/article/670954/how-to-install-windows-on-mac.html>

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<https://www.computerworld.com/article/1611644/yes-you-can-officially-run-windows-on-apple-silicon-macs.html>

Mann, Tobias. 2024-01-22. **Wanna Run Windows on an M-series Mac? Fine, buy a license, but no baremetal**. The Register. https://www.theregister.com/2024/01/22/microsoft_so_you_want_to/

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Purchasing the Windows 11 Operating System

Depending on your situation you may need to purchase a copy of Windows Operating System:

- If your current computer is running Windows 10 or 11 you don't need to purchase a Windows license.
- If purchasing a new Windows computer, ensure it comes with Windows 11 (Pro recommended). Windows 10 support ends in October 2025, so avoid purchasing Windows 10.
- If you want to run Windows 11/10 on your Mac, and you don't already have available a valid licenced copy of Windows 11/10 that is unused, you will need to purchase a legitimate copy.

Windows 10 and 11 both come in several different editions. For Trent GIS courses **Windows Home** is sufficient, although you might want Windows Pro for other reasons.

- Microsoft provides a comparison of Windows 11 Pro vs. Home: <https://www.microsoft.com/en-us/windows/compare-windows-11-home-vs-pro-versions>
- Wikipedia provides a table comparing the different "editions" of Windows 10: https://en.wikipedia.org/wiki/Windows_10_editions.

Windows 11 is available:

- On Microsoft's Canada Education web-based store (educational discounts available for some products) at <https://www.microsoft.com/en-ca/store/b/student>
- On Microsoft's Canada (non-education) web-based store at <https://www.microsoft.com/en-ca/>
- From several third-party resellers (prices vary, but sales do happen).

Purchasing a New Computer Recommendations

Here are some recommendations on buying a new computer if you are in the market.

- Get as fast a processor as you can afford (within your overall budget). This component cannot be upgraded, and the faster your processor, the longer your computer will function with reasonable performance.
- Get a minimum 16 GB RAM. This will ensure your computer will function well and longer. Getting a computer that can hold ≥ 32 GB of RAM will extend the life of your computer, as you can upgrade this later.
- Ensure your internal storage is an M.2 NVMe SSD (Solid State Drive), recommend 500 GB minimum.
- Purchase this or last year's model. Avoid buying models older than 1 year. Older models are cheap for a reason!
- You will pay more for a laptop (versus a desktop) and get poorer computer performance, so be certain you need the portability before buying.

Questions? Contact a GIS course instructor or Robert Loney (rloney@trentu.ca).