

Choose the Right Hardware

Scenario 1: Manufacturing

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)
FPGA

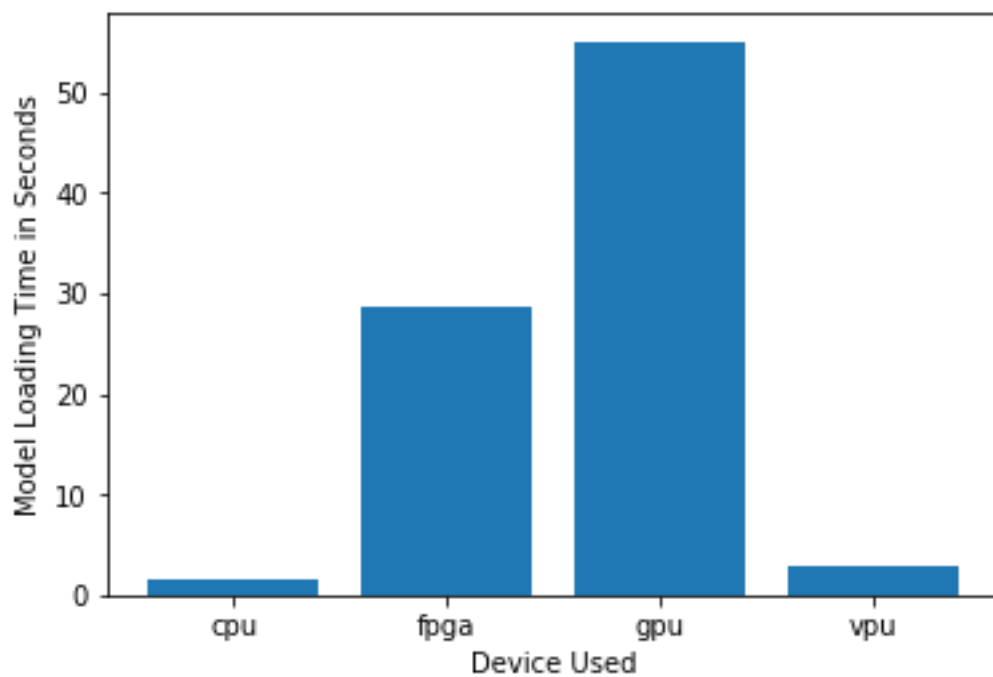
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
To be able to detect chip flaws - the system needs to be flexible and reprogrammed easily as new designs are added regularly.	FPGAs can be reprogrammed as and when there are design changes.
Looking for a hardware which would last for 5-10 years.	FPGAs last for around 10 years at least.

Queue Monitoring Requirements

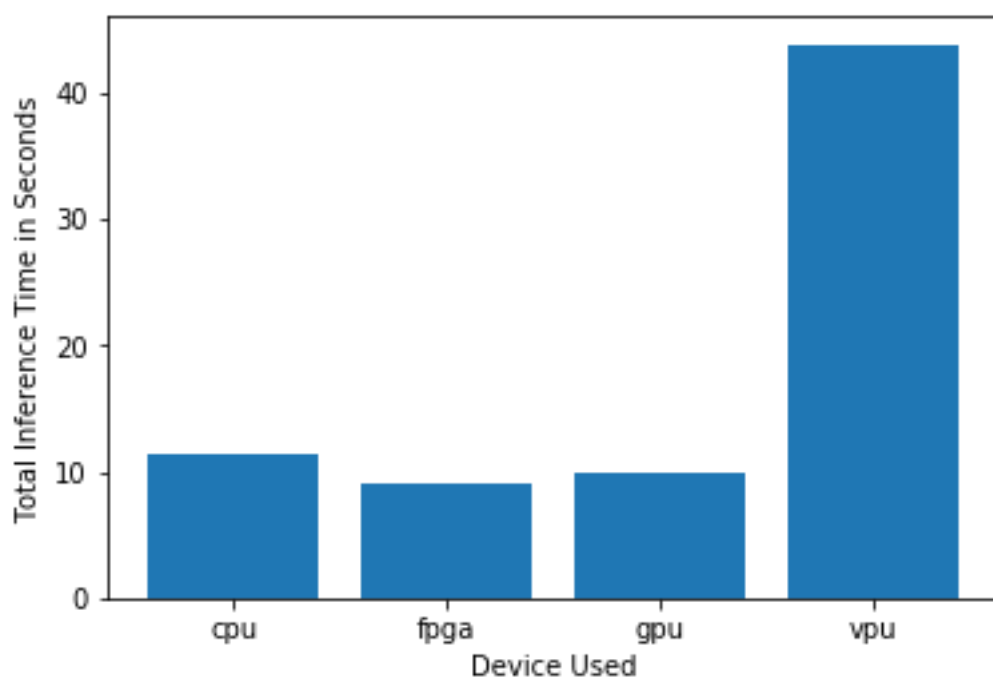
Maximum number of people in the queue	5
Model precision chosen (FP32, FP16, or Int8)	FP16

Test Results

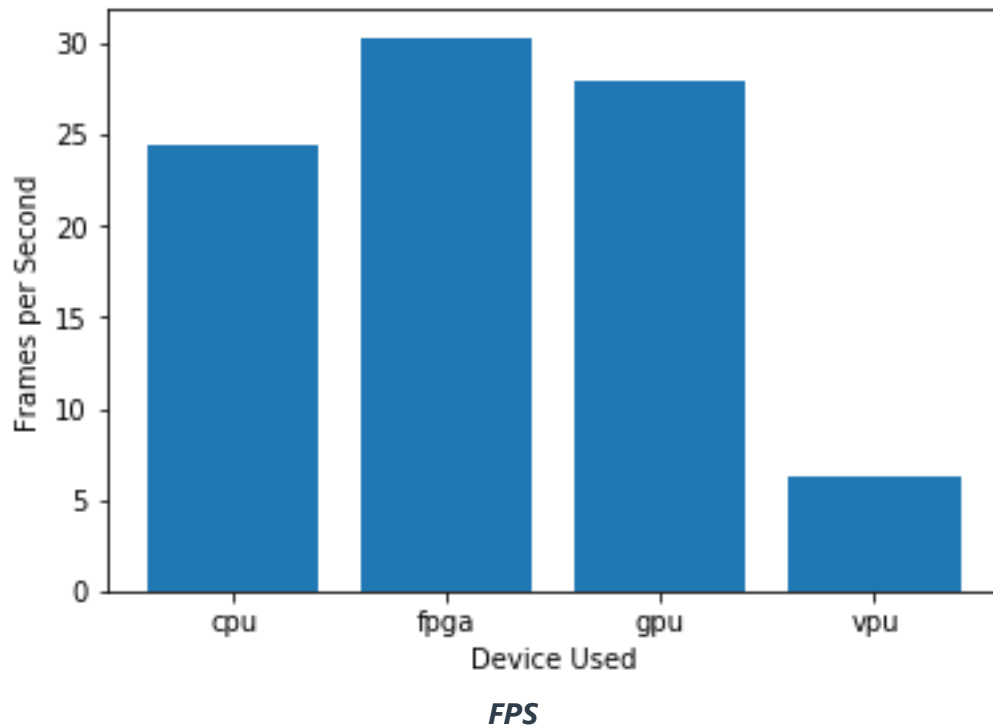
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation

Client has requested 30-35 FPS (Frames Per Second) to monitor the number of people in the factory line. Also, low inference time so that video can stream quickly to help with production. As you can see in above performance plots, FPGA meets both the requirements with highest FPS and lowest inference time among all the devices.

Scenario 2: Retail

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario?
(CPU / IGPU / VPU / FPGA)

CPU

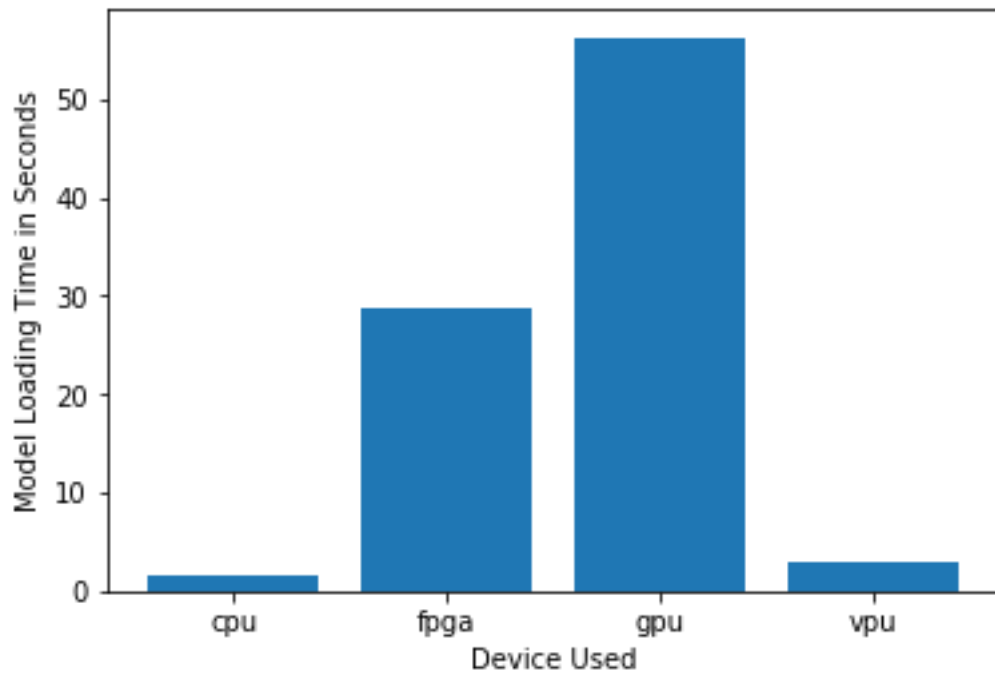
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
No budget for extra hardware	Since the client already has Intel i7 core processor, it can be used.
Save much as possible on his electric bill – implies low power requirement.	Not adding any extra hardware will automatically save power.

Queue Monitoring Requirements

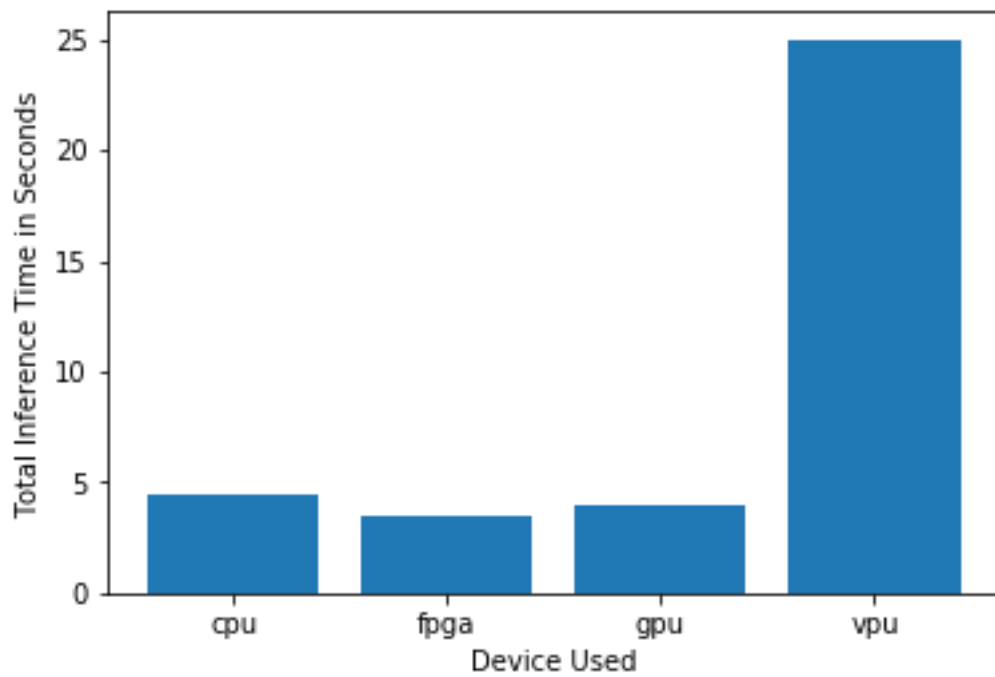
Maximum number of people in the queue	4
Model precision chosen (FP32, FP16, or Int8)	FP32

Test Results

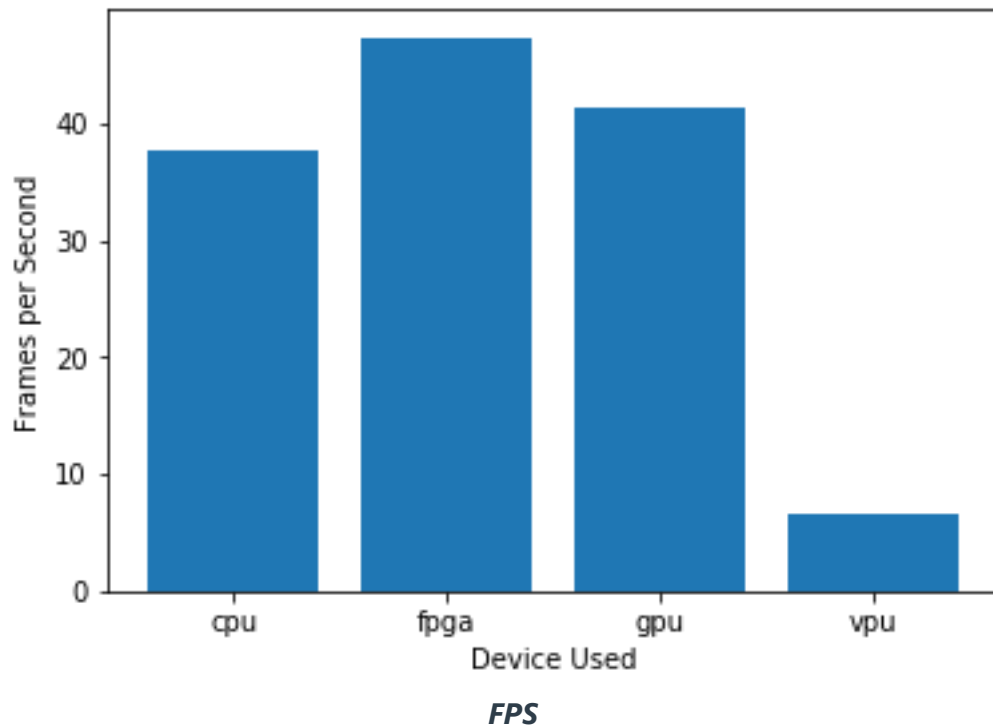
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation

Even though FPGA provides the best inference time and FPS among all devices, CPU performs good enough according to the client requirements. Since the client already has Intel i7 CPU, it can be utilized to perform the given task without investing on extra hardware.

Scenario 3: Transportation

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario?
(CPU / IGPU / VPU / FPGA)

VPU

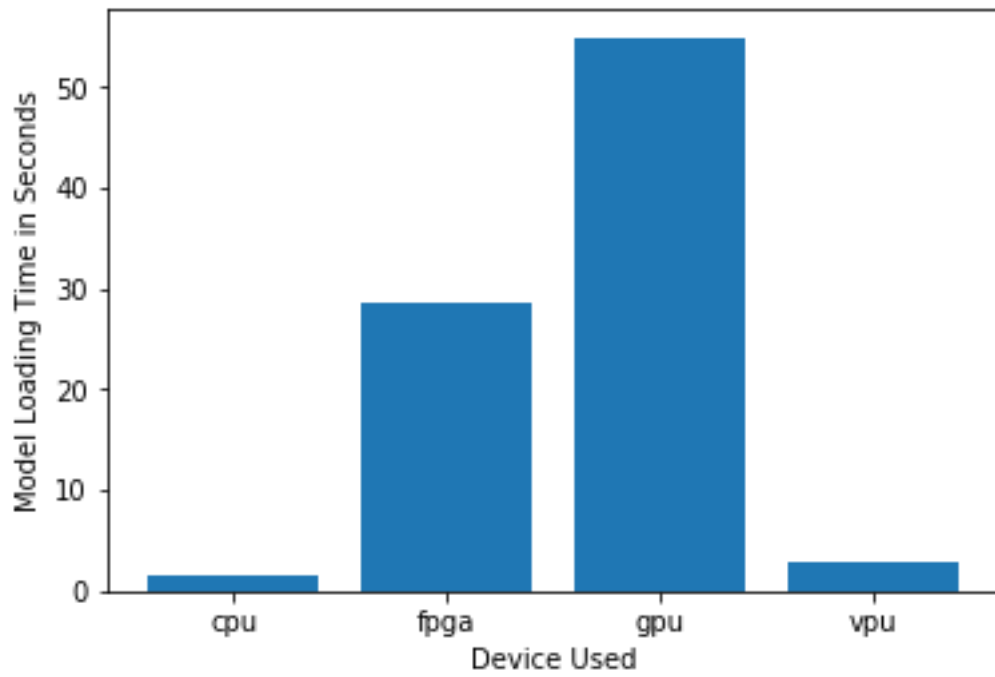
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Maximum of \$300 per machine and existing CPU cannot be used.	VPU is around \$100.
Save power	VPU is a low power device.

Queue Monitoring Requirements

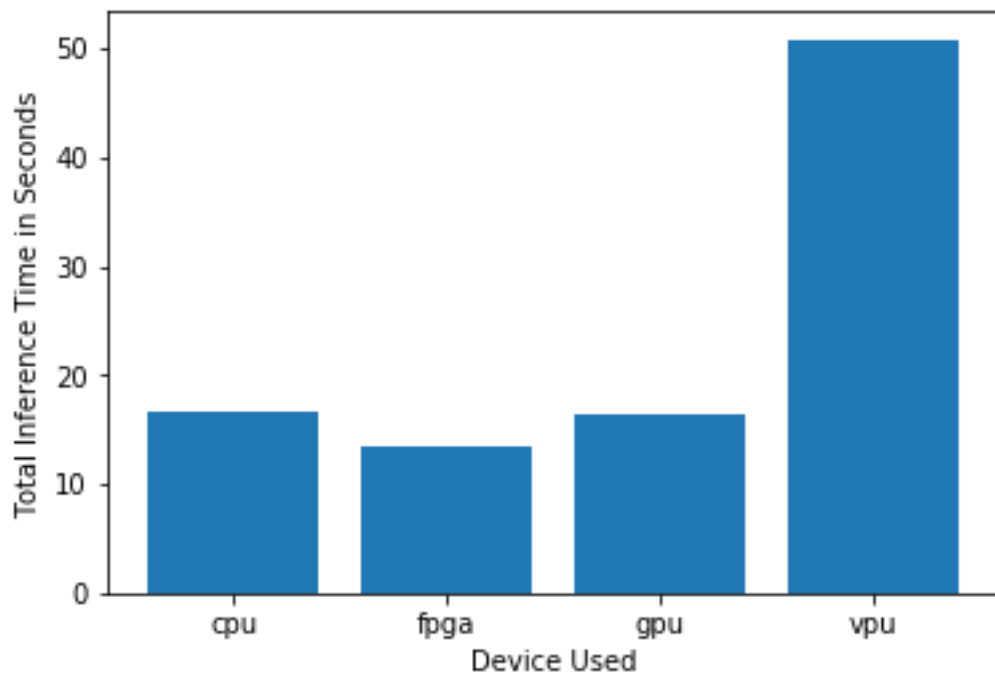
Maximum number of people in the queue	7
Model precision chosen (FP32, FP16, or Int8)	FP16

Test Results

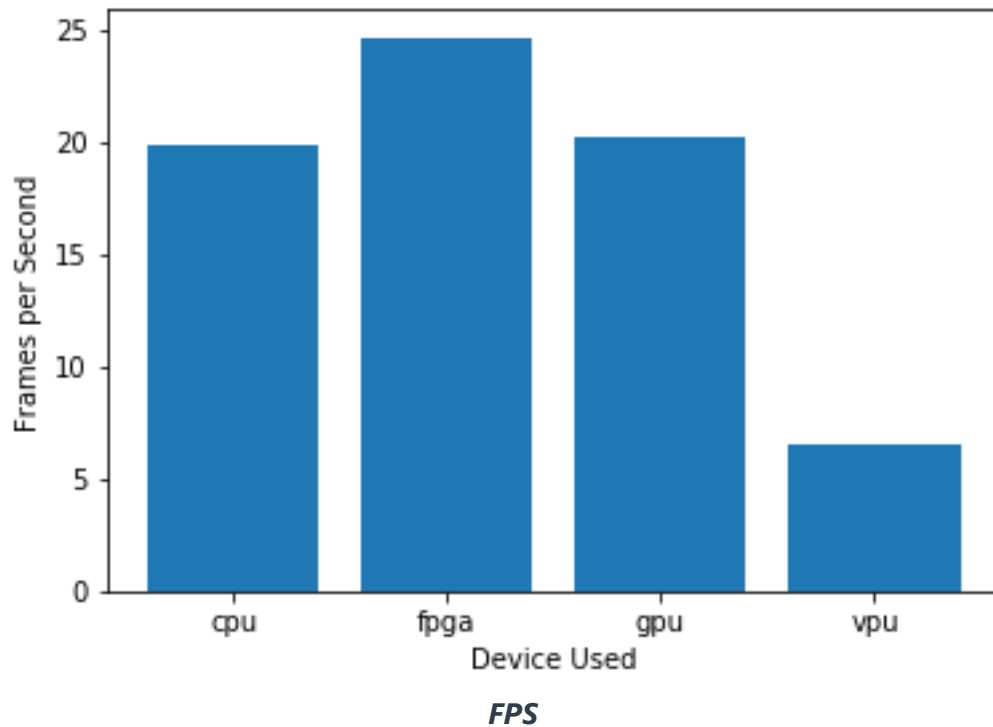
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation

If they could use the existing CPU, it would have been a better option. Since, they cannot use their CPU, next best option is VPU according to the budget and power requirements. Also, loading time of VPU is next best CPU which will help with managing 7 different cameras.