

Choose the Right Hardware

Proposal Template

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?
The factory has a vision camera installed at every belt. Each camera records video at 30-35 FPS (Frames Per Second) and this video stream can be used to monitor the number of people in the factory line. Mr. Vishwas would like the image processing task to be completed five times per second.	This description has cleared that latency is a major corner, and FPGA has the ability to handle this speed once it get programmed as it can run many sections on parallel and the ability not to go off-chip for performing inference, also FPGA doesn't send the output back to CPU using the PCIe bus making the inference a lot faster.
The second issue Mr. Vishwas has encountered is that a significant percentage of the semiconductor chips being packaged for shipping have flaws. These are not detected until the chips are used by clients. If these flaws could be detected prior to packaging, this would save money and improve the company's reputation.	To solve this problem edge system, need to be very powerful and to deliver very high performance. FPGA would be a perfect on this situation as it can reprogrammed as fit to the scenario.
<i>The system would need to be able to run inference on the video stream very quickly. Additionally, because there are multiple chip designs—and new designs are created regularly—the system would also need to be flexible so that it can be reprogrammed and optimized</i>	<i>FPGA has the best inference time, and can be modified many times without any problem or damage</i>

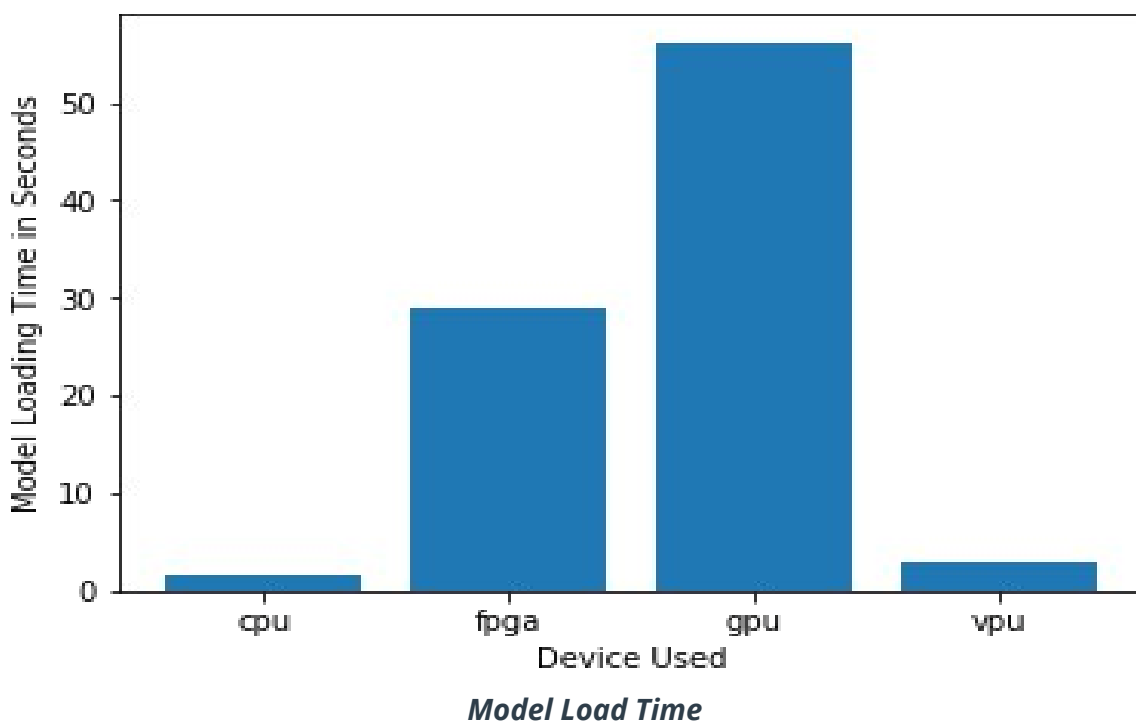
<i>to quickly detect flaws in different chip designs</i>	
While Naomi Semiconductors has plenty of revenue to install a quality system, this is still a significant investment and they would ideally like it to last for at least 5-10 years	FPGA is the best for this description as it has a very long-time span time could go for 10 years

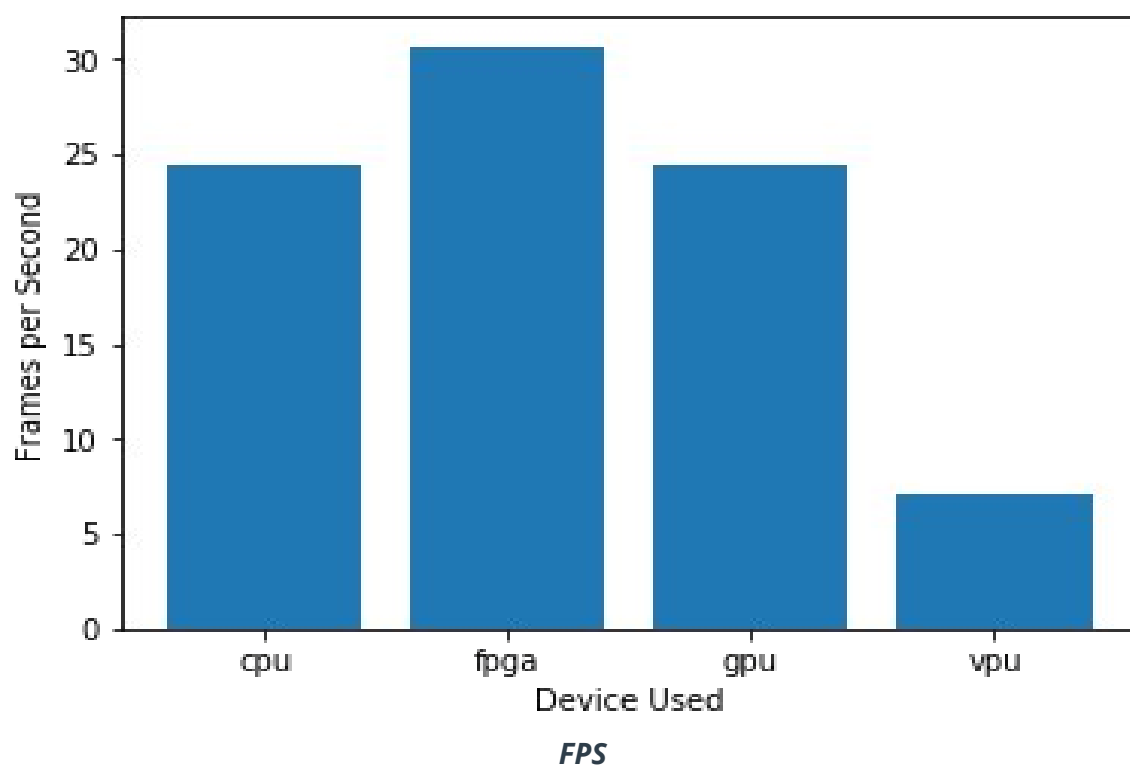
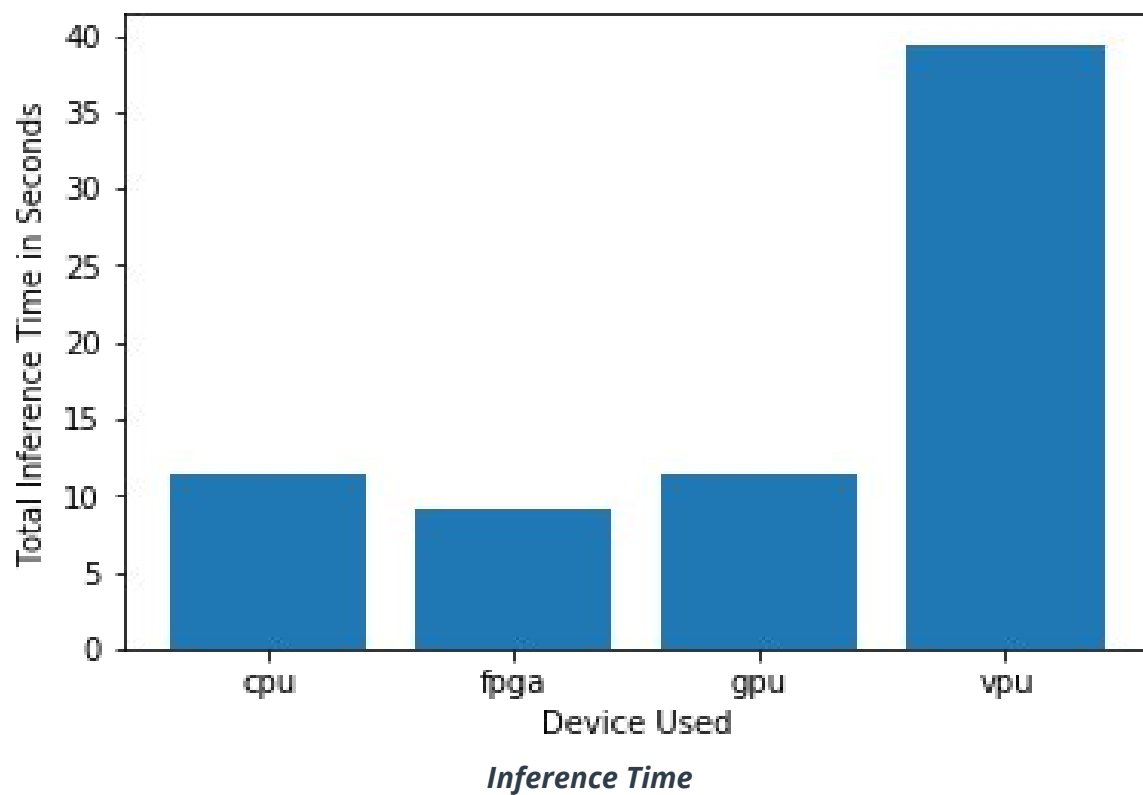
Queue Monitoring Requirements

Maximum number of people in the queue	2
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).





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

*As shown in the inference time graph FPGAs takes the least time to perform inference. The client needs inference to run fast and he has the padget to use FPGAs. So **FPGA** is the best choice*

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

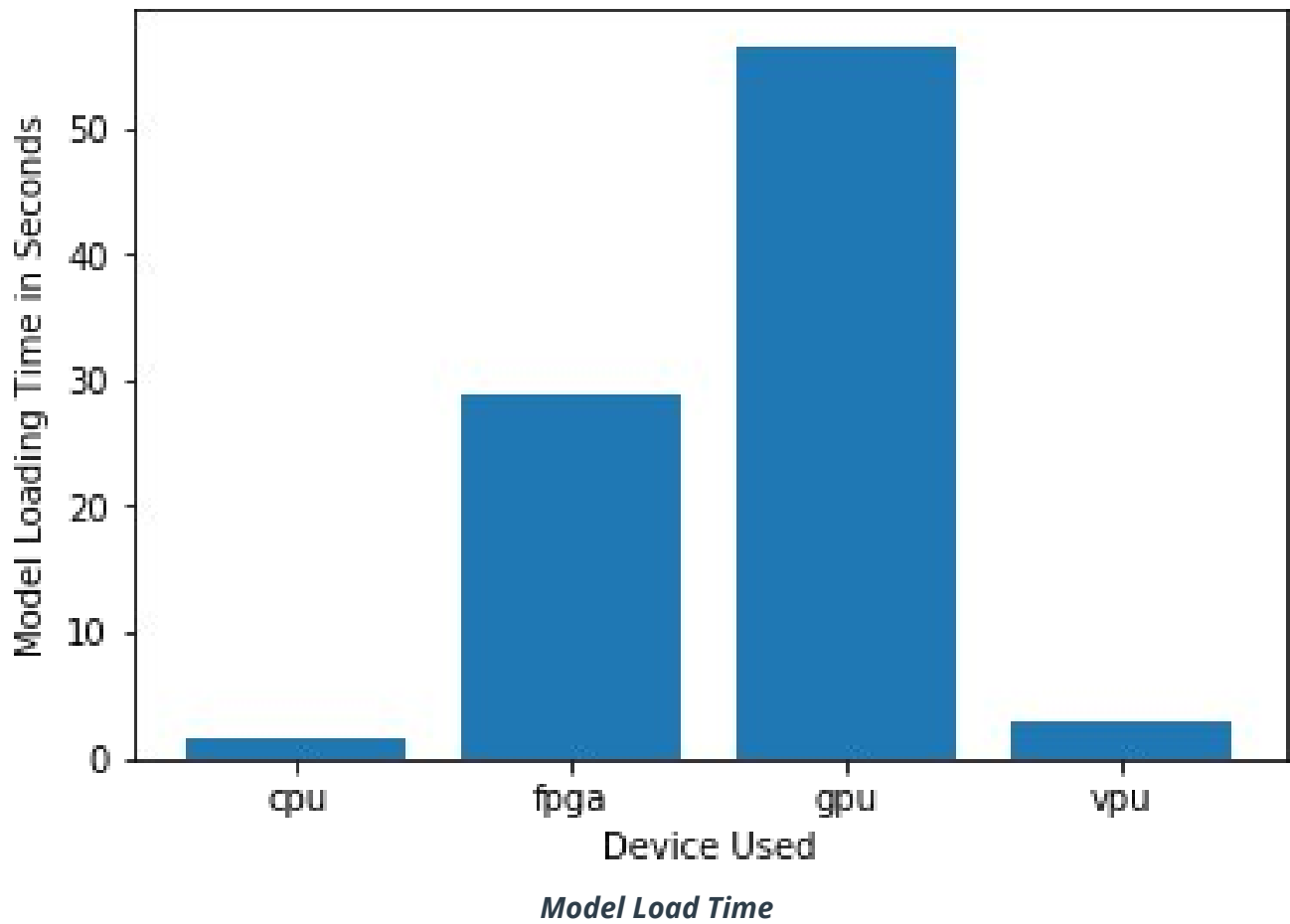
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Most of the store's checkout counters already have a modern computer, each of which has an Intel i7 core processor. Currently these processors are only used to carry out some minimal tasks that are not computationally expensive.	The client already has a lot of high-end CPUs which can get the job done without additional cost
Mr. Lin does not have much money to invest in additional hardware	<i>Existing CPUs can get the job done</i>
and, would like to save as much as possible on his electric bill.	<i>CPUs can meet the manager expectations and reduce total cost, and electricity cost</i>

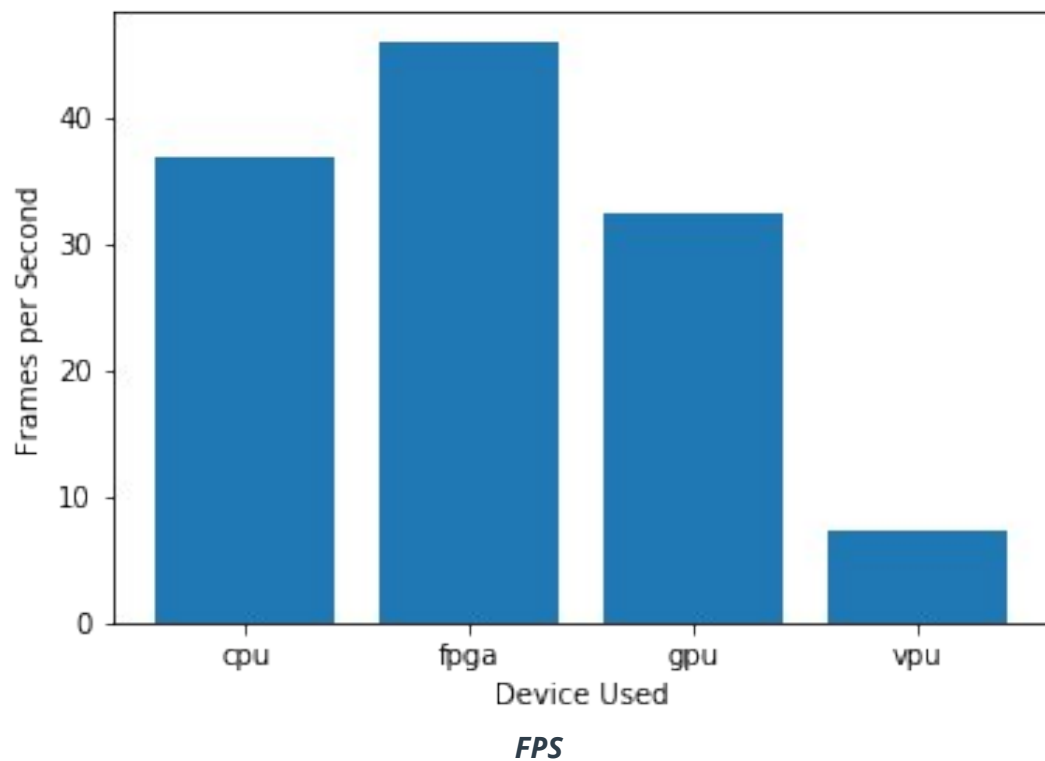
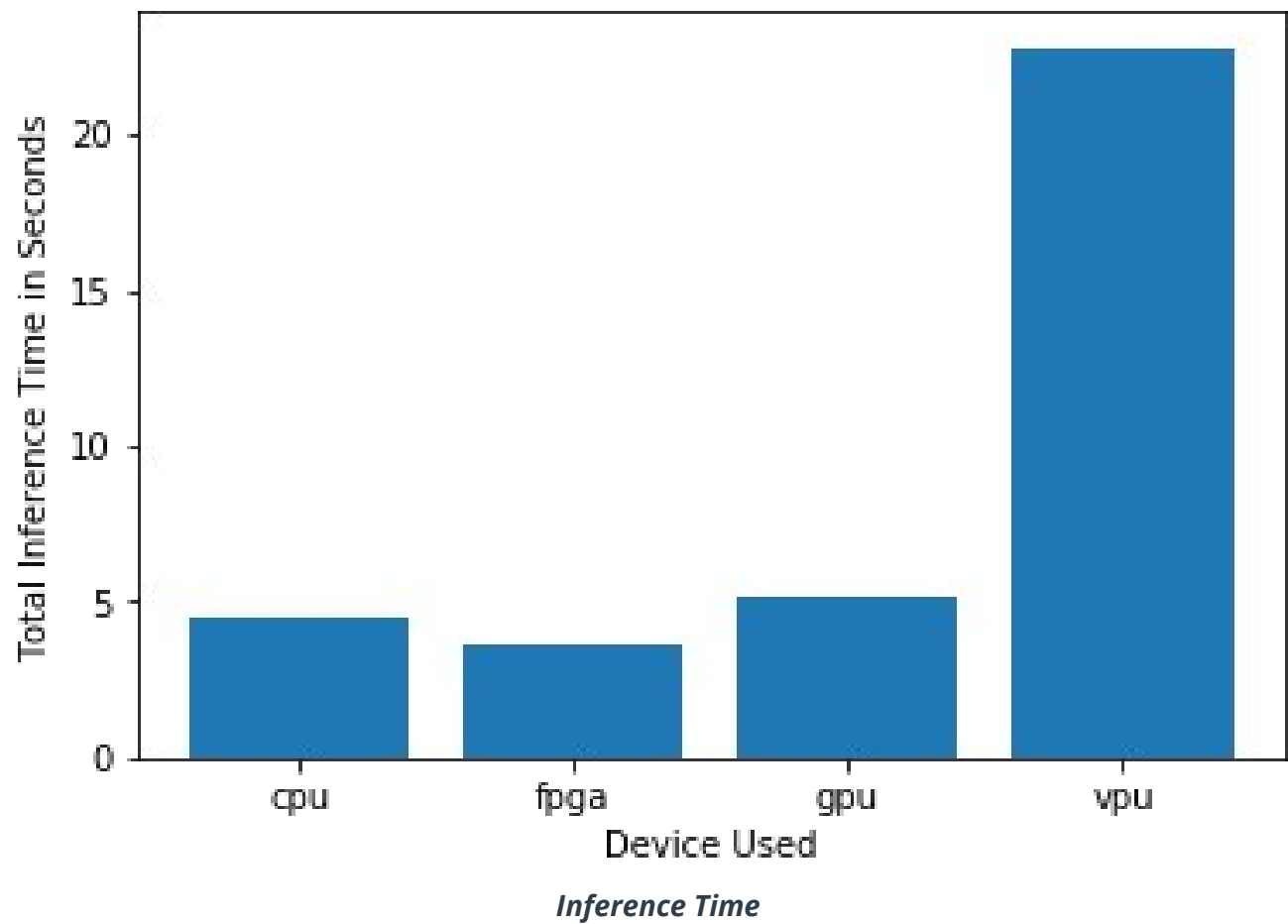
Queue Monitoring Requirements

Maximum number of people in the queue	2 - 5
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).





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

*CPU has lower inference time than GPU and VPU which is good for this application. CPU has also a good FPS. So **CPU** would be recommended for this project.*

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

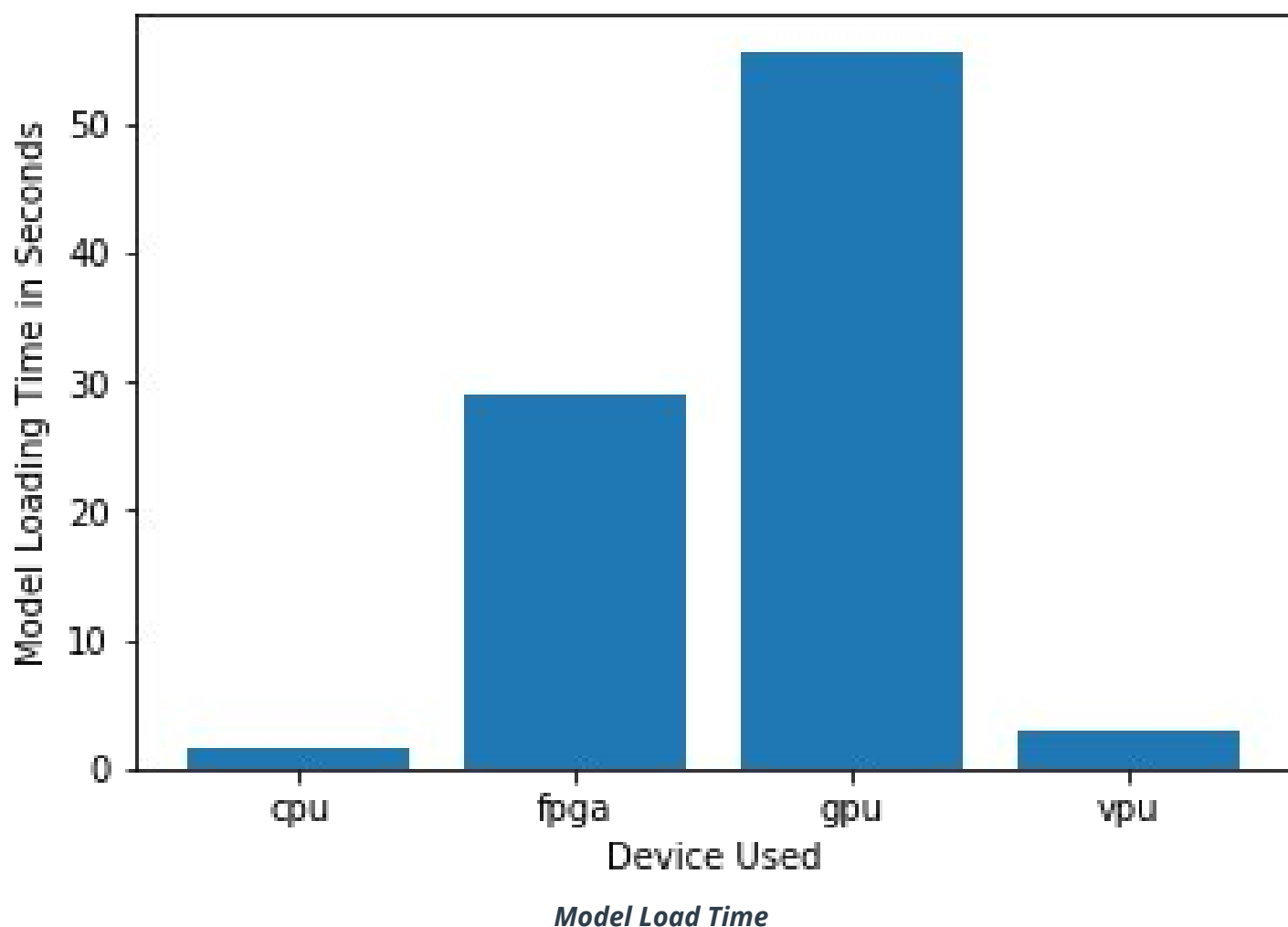
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The CPUs in these machines are currently being used to process and view CCTV footage for security purposes and no significant additional processing power is available to run inference	<i>A VPU is good as it get plugged to USB and run inference without using much power or CPU</i>
Leah's budget allows for a maximum of \$300 per machine	<i>VPU's are the chipset devices to run inference</i>
she would like to save as much as possible both on hardware and future power requirements	<i>VPU's or NCS 2 don't use a lot of power as they are pugged as USB extension</i>

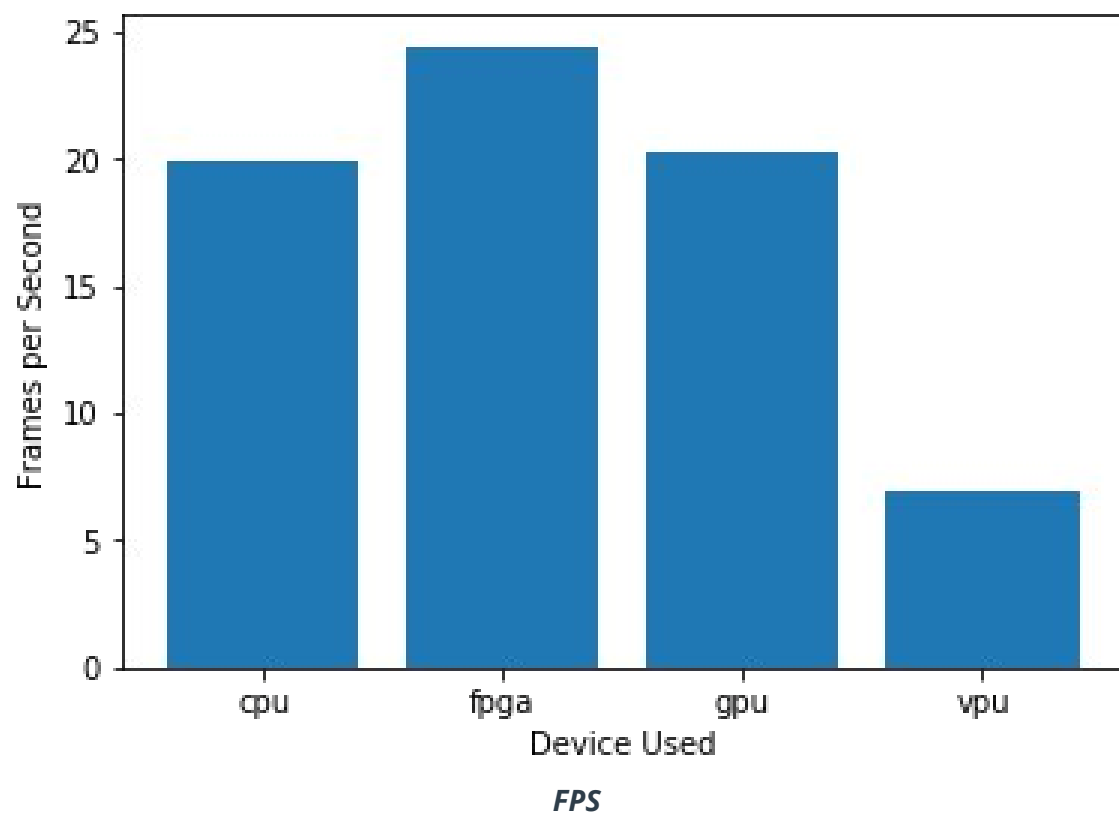
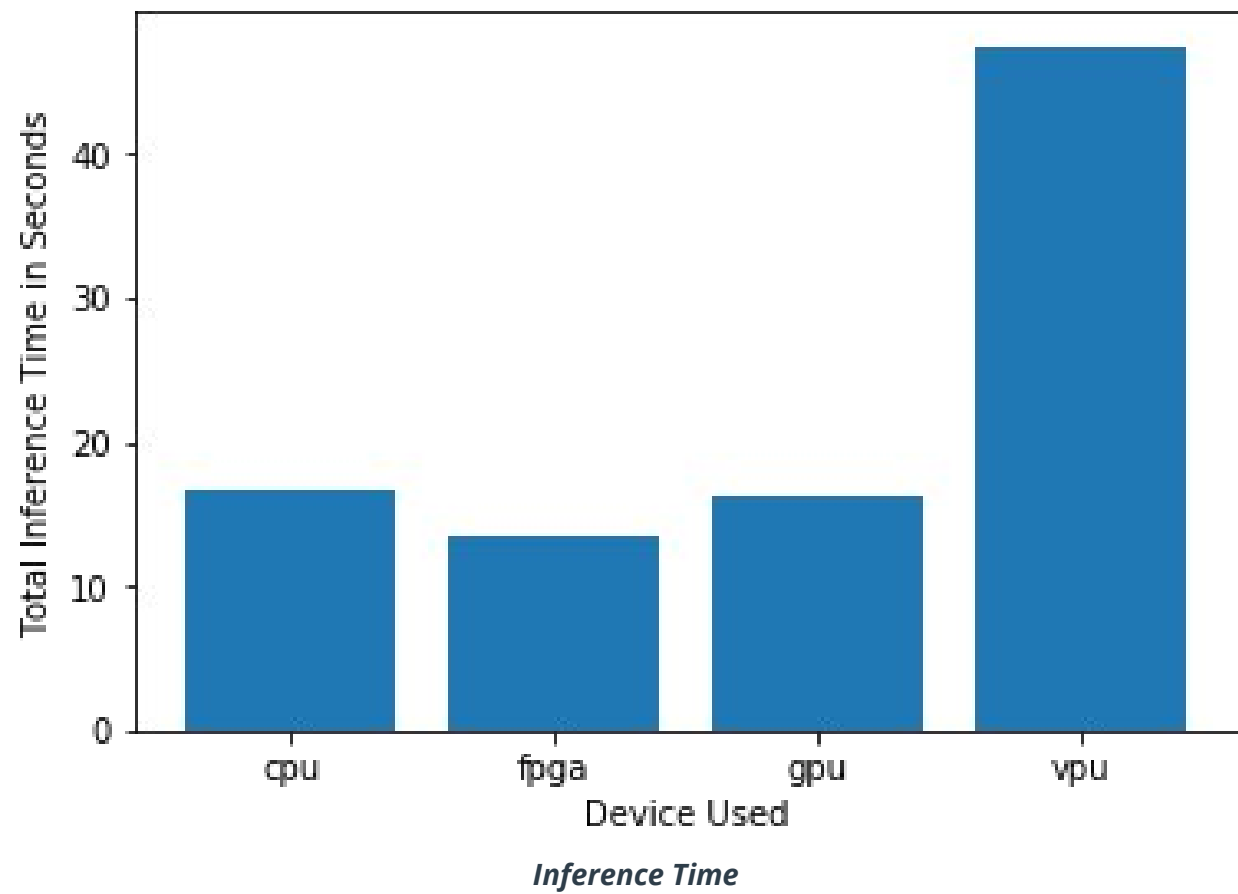
Queue Monitoring Requirements

Maximum number of people in the queue	7 - 15
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).





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

VPU has a very high inference time and low FPS. A CPU or GPU would perform better if the budget and power scenario ignored. As the client order limited budget VPU would be the best.