

# 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

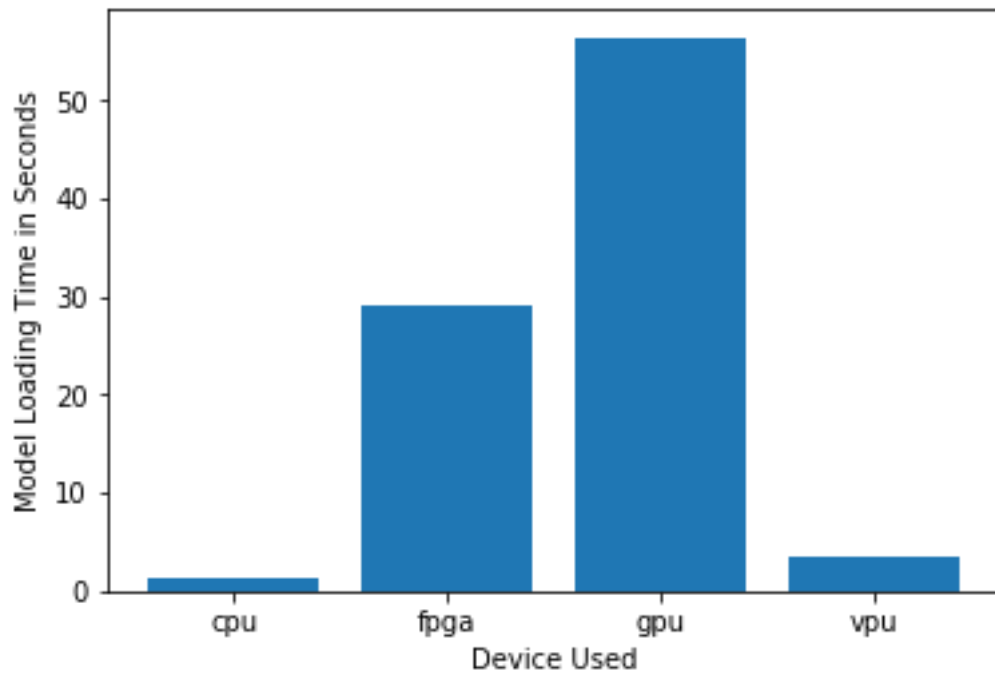
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client requires a flexible system that can be reprogrammed and optimized quickly.	FPGAs are reprogrammable devices that provide high performance.
The client would like the system to last for at least 5-10 years.	FPGAs are durable devices that can run continuously for long periods of time without drop in performance.

#### Queue Monitoring Requirements

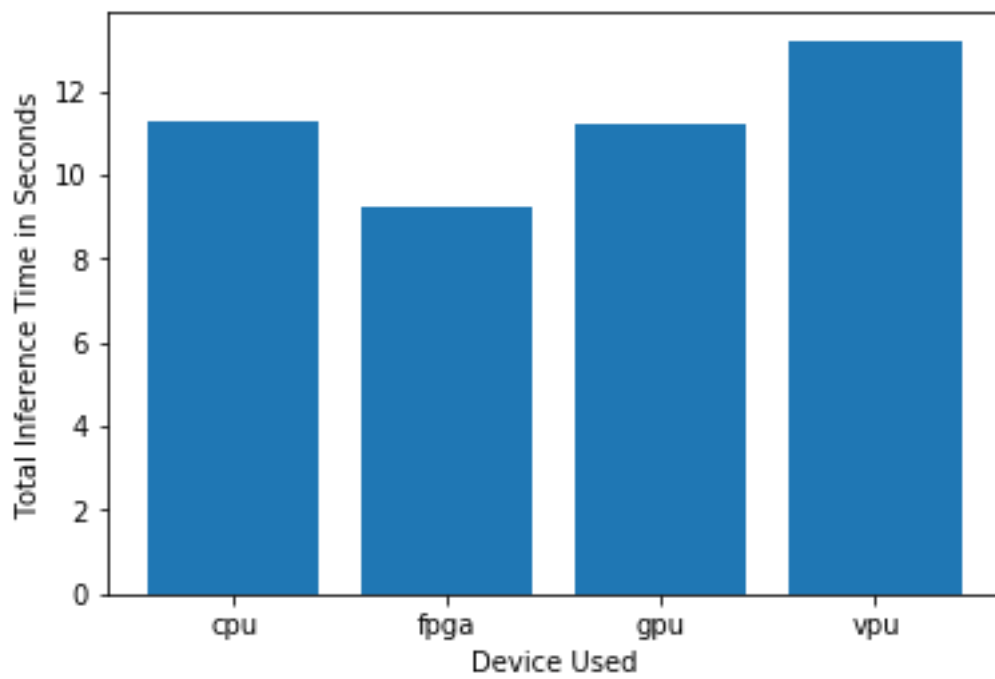
Maximum number of people in the queue	3
Model precision chosen (FP32, FP16, or Int8)	FP32 for CPU and FP16 for the rest

#### Test Results

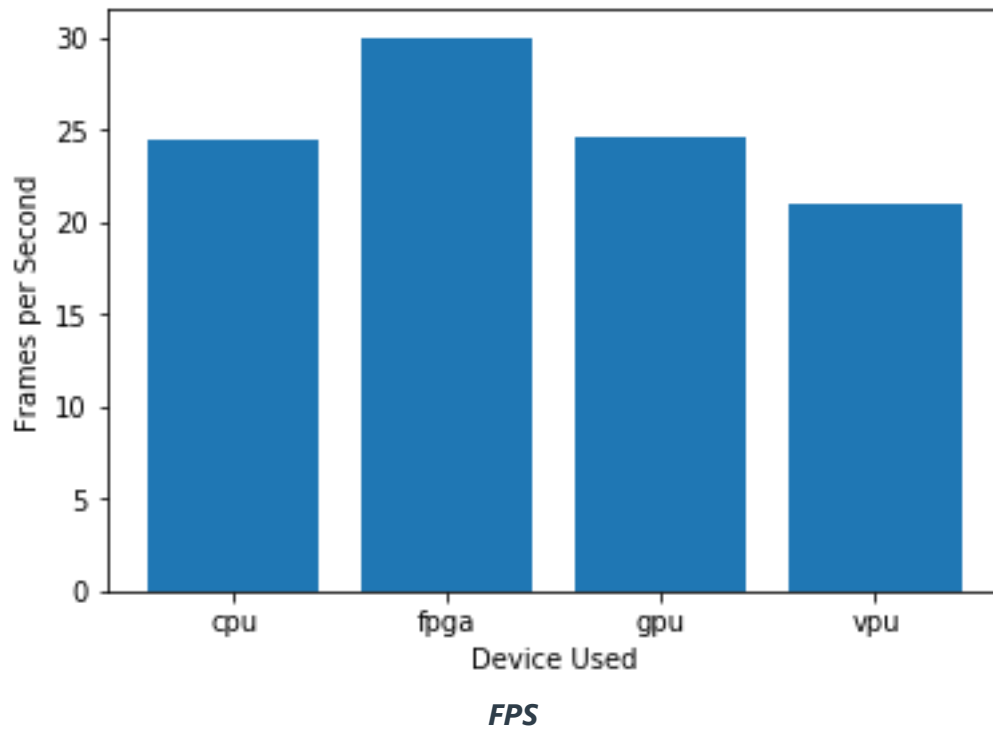
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



***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

*For the above scenario, FPGAs are the most suitable hardware based on the client's requirements. Firstly, the client has enough budget to invest in a FPGA. Secondly, the client needs a flexible system that has the capability to be reprogrammed and at the same time have a long lifespan. FPGAs satisfy both these requirements.*

## 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)

IGPU

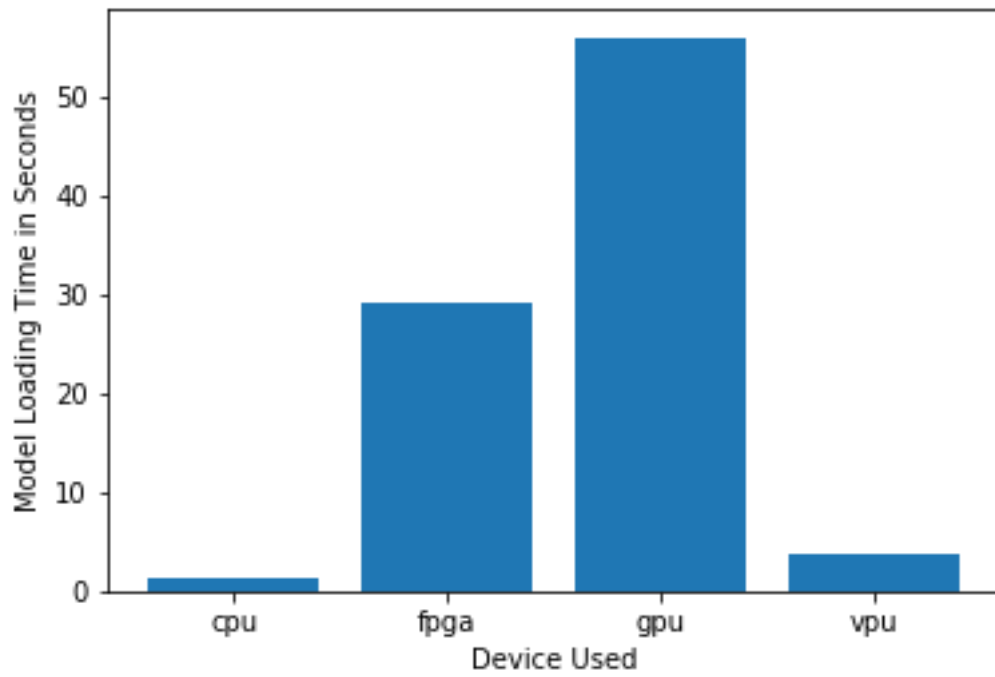
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client does not have much money to invest in additional hardware	The client already possesses an Intel i7 core processor that has an IGPU. Hence no extra expenditure is required.
The client would like to save as much as possible on electricity.	Since this a computer vision application GPUs are more power efficient than CPUs for handling images.

## Queue Monitoring Requirements

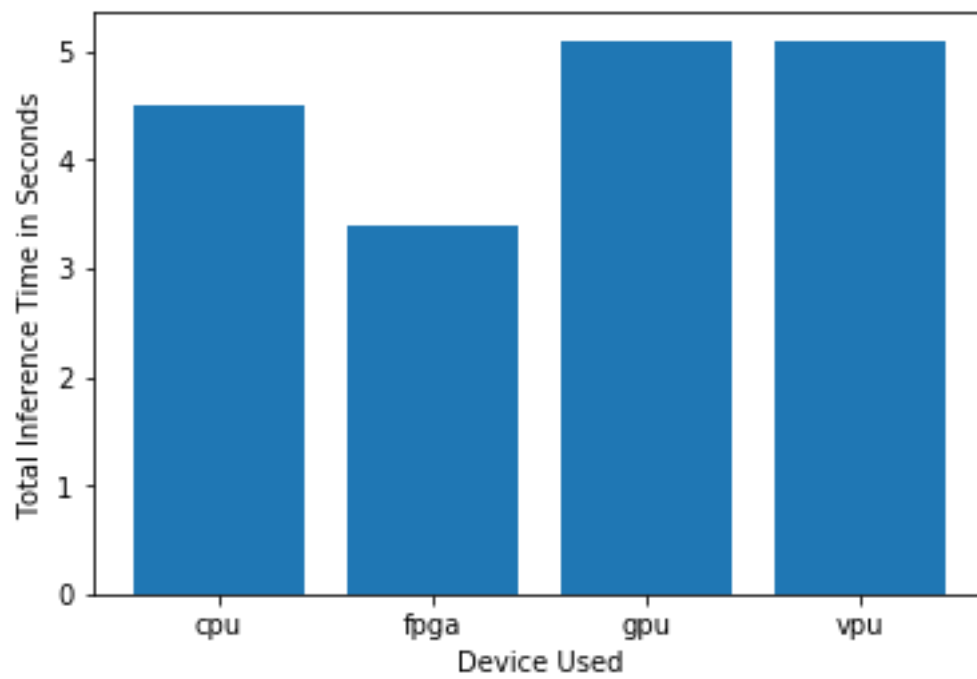
Maximum number of people in the queue	2
Model precision chosen (FP32, FP16, or Int8)	FP32

## Test Results

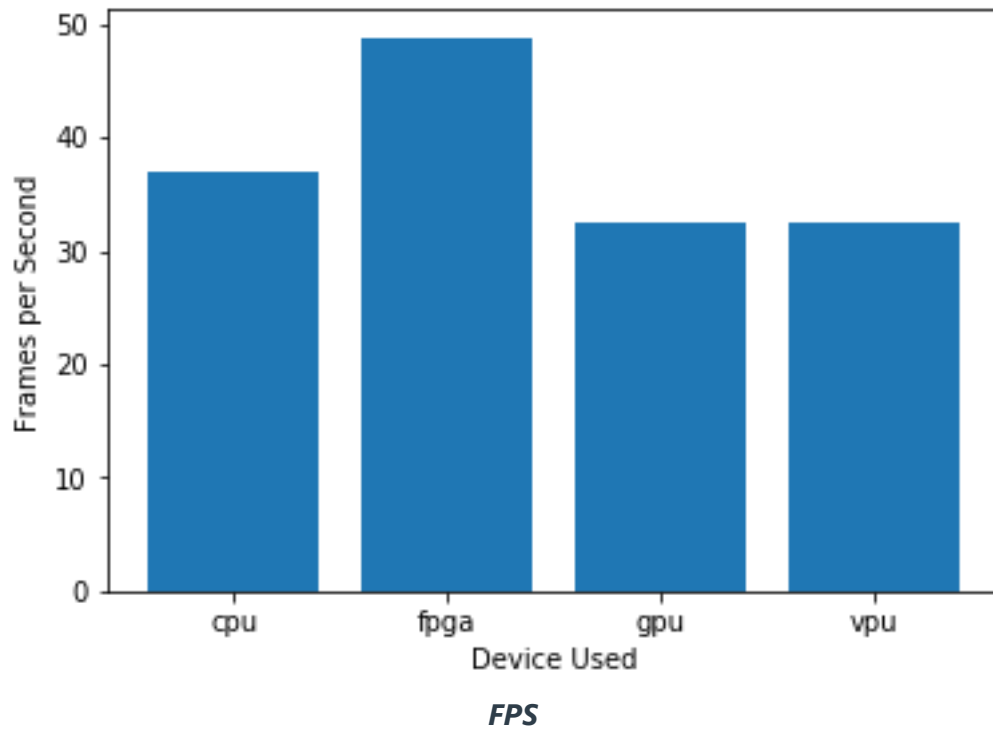
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



***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

*The client does not have the budget to invest in new hardware, but he already possesses a modern Intel i7 core processor that would have an IGPU. The IGPU would be more power efficient than the CPU for handling the processing of the image for detection and since the client would like to save as much as possible on electricity, IGPU would be my recommendation for this scenario.*

## 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

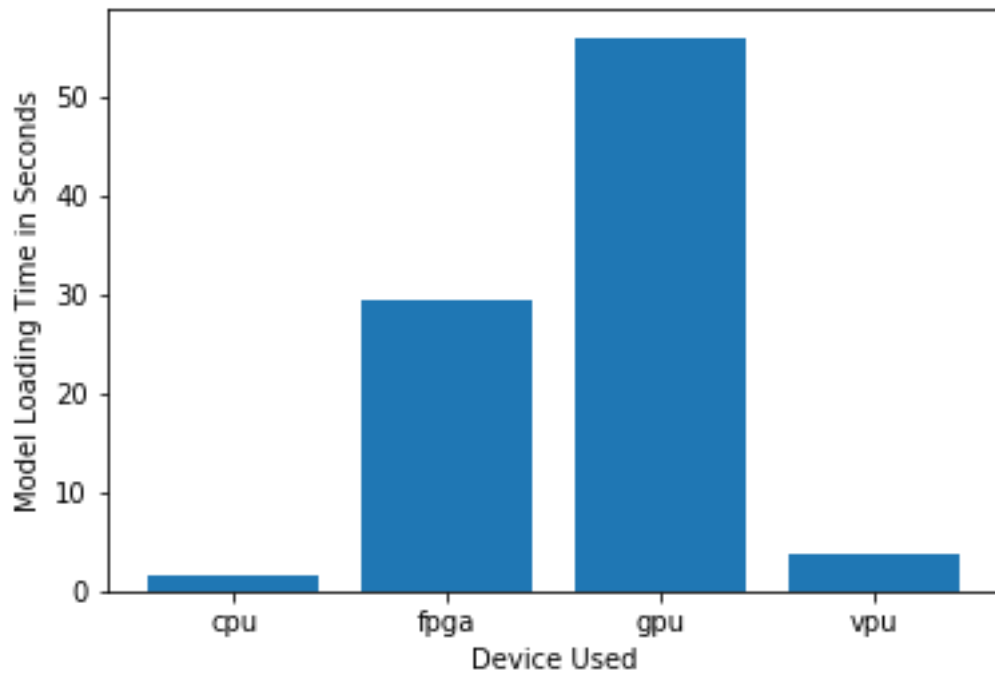
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client has a budget of only 300\$ per machine and would like to save as much as possible on hardware.	VPUs are cheap devices that would fit in their price range
The client would like to save as much as possible on power requirements.	VPUs are low power devices that require ~1W to run inference.

## Queue Monitoring Requirements

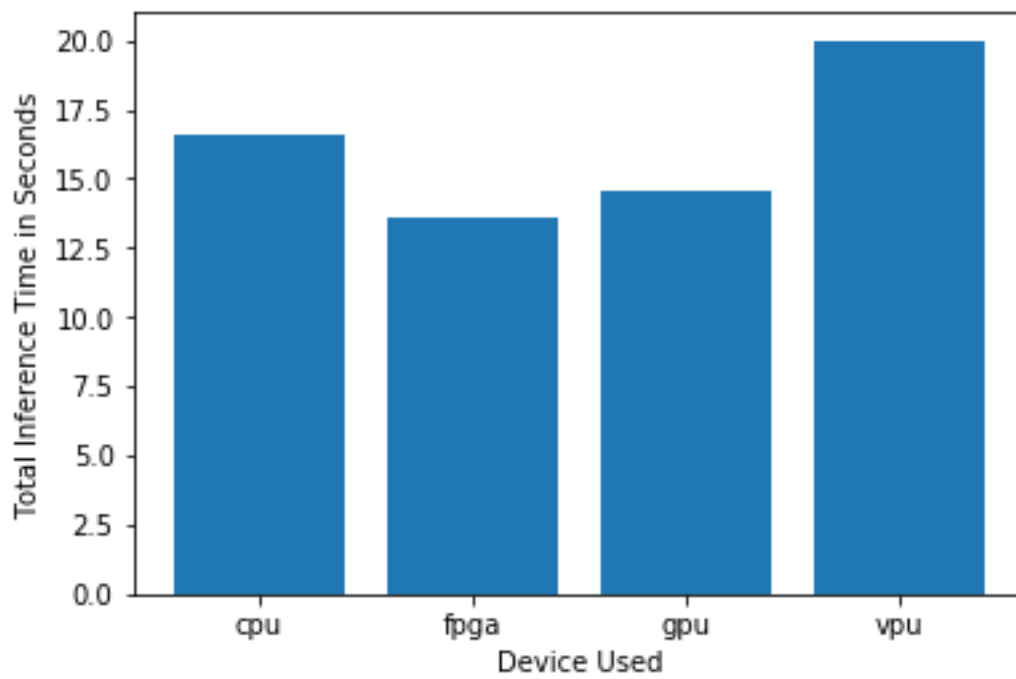
Maximum number of people in the queue	5
Model precision chosen (FP32, FP16, or Int8)	FP16

## 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).

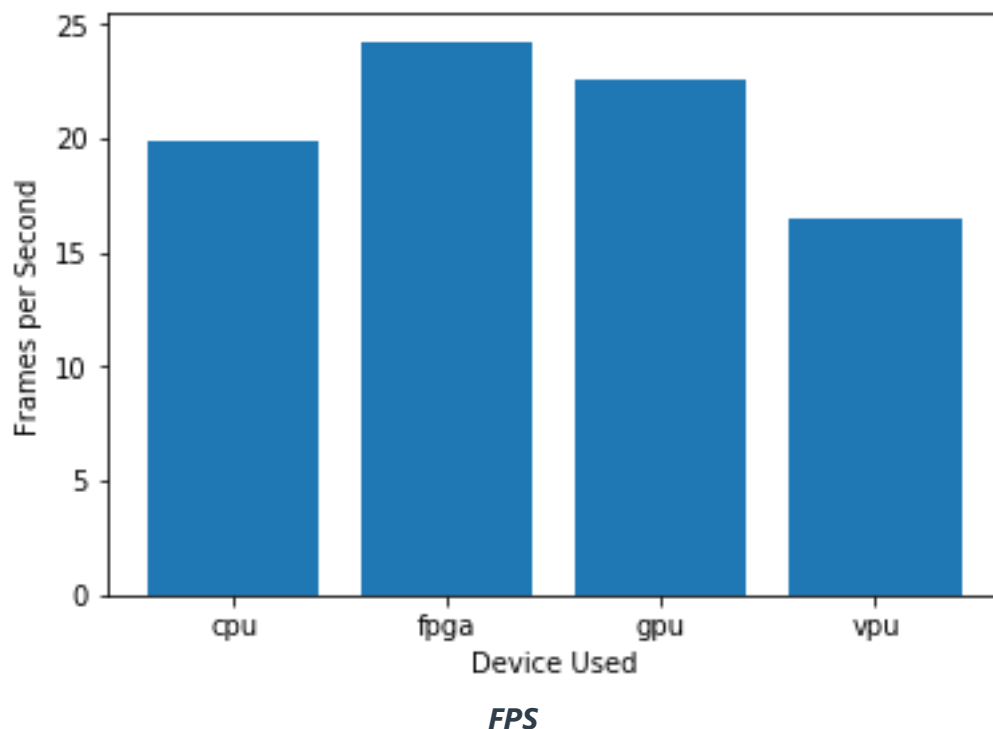


***Model Load Time***



***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

*In this scenario the client's machines are already working at nearly full capacity; hence he needs to invest in new hardware. But, he has a low budget of only 300\$, so the ideal device would be a VPU that could help offload some of the image processing tasks from the CPU. Also, the client would like to save as much as possible on power requirements and VPUs are low power devices, hence it would be the most appropriate hardware for this scenario.*