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.

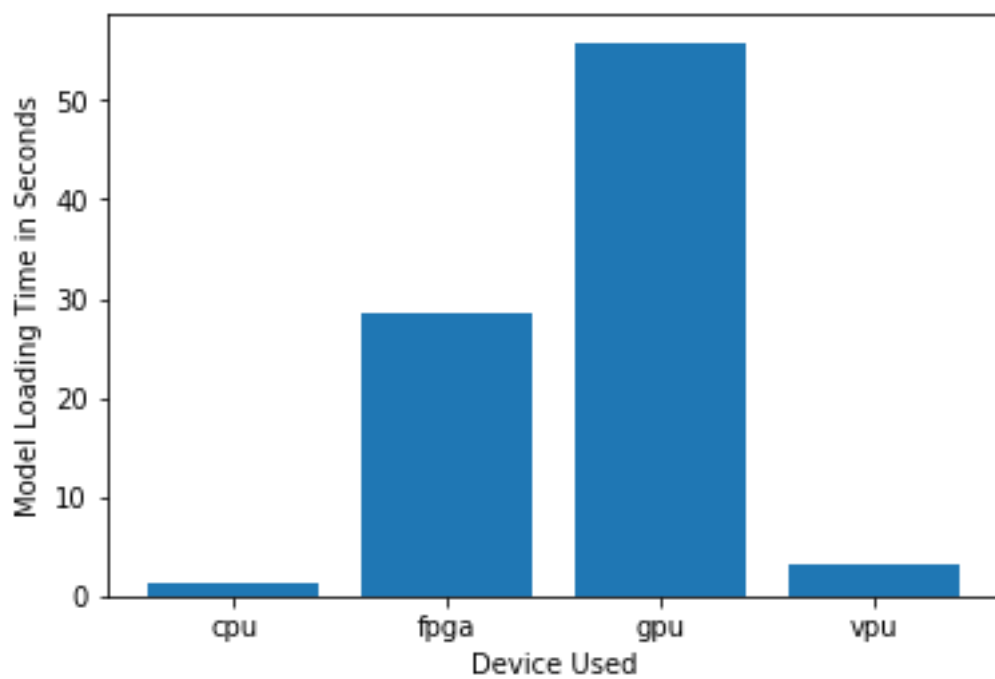| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
| --- |
| *FPGA* |

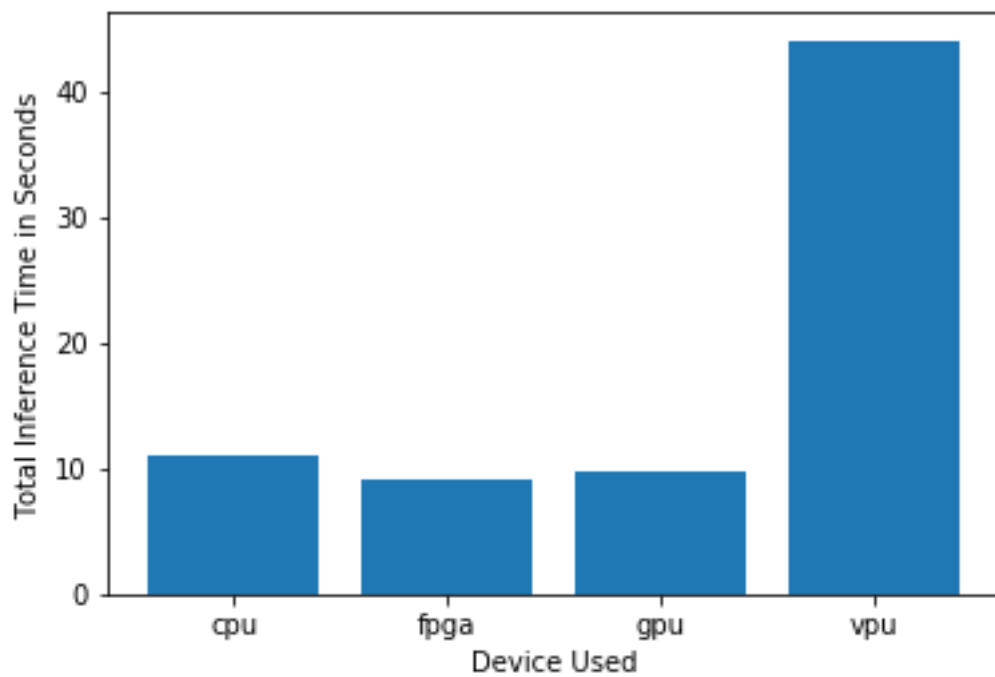| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The company is undergoing expansion and in the last year they made 2 million dollars in revenue.	*The proposed hardware meets the client's budget.*
The client wants a solution that is reprogrammable.	*The proposed hardware is reprogrammable and can be used for both scenarios the client mentioned.*
The client wants a solution that would last for at least 5-10 years.	*The proposed hardware has a longer lifespan when compared to other alternatives.*

Queue Monitoring Requirements

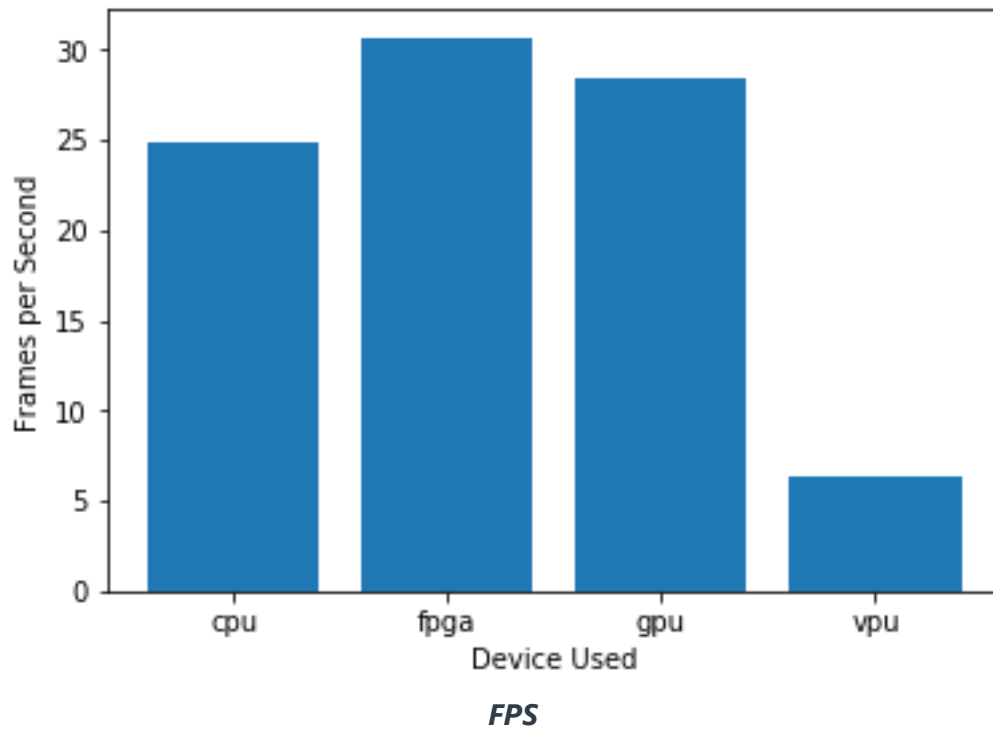| Maximum number of people in the queue	*5*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

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).

UDACITY

Model Load Time

Inference Time

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
The client's requirements center mainly around durability and flexibility while maintaining optimum efficiency. Our proposed hardware solution, FPGA meets these requirements. It outperforms other alternatives on inference time (lowest inference time) and number of frames per second (highest FPS). *Downside is that it has the highest model load time but this is not a deal breaker as loading the model is a one-time event.*

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.

UDACITY

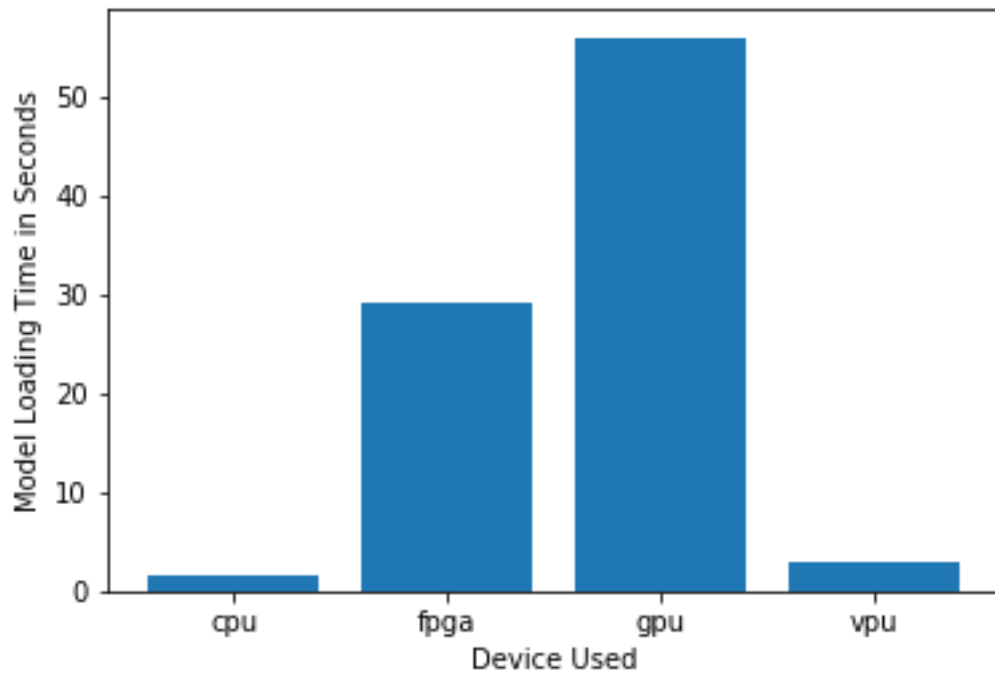| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *CPU+IGPU* |

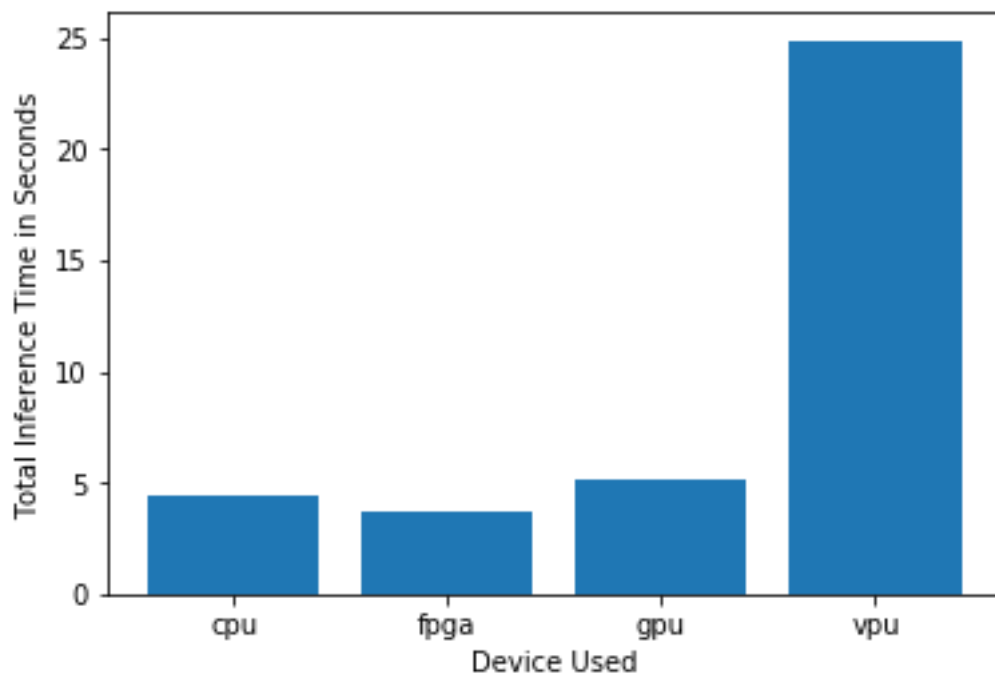| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client already has modern computers with Intel i7 core processors which are not fully utilized.	*The computers come with our proposed hardware and their under-utilization means they can be leveraged for inference.*
The client does not plan to invest in additional hardware.	*Since the computers already have Intel i7 core processors, we can use our proposed hardware solution without incurring additional hardware related costs.*
Most customers spend 30-50 mins in the store during a single visit. Out of this, they have an average wait time of 230 seconds at the checkout counters. On the weekends, the wait time can increase substantially. The average time spent is 40 mins at the store and 350-400 seconds at the checkout line.	*Inference time is not critical and our proposed hardware should suffice in this scenario.*

Queue Monitoring Requirements

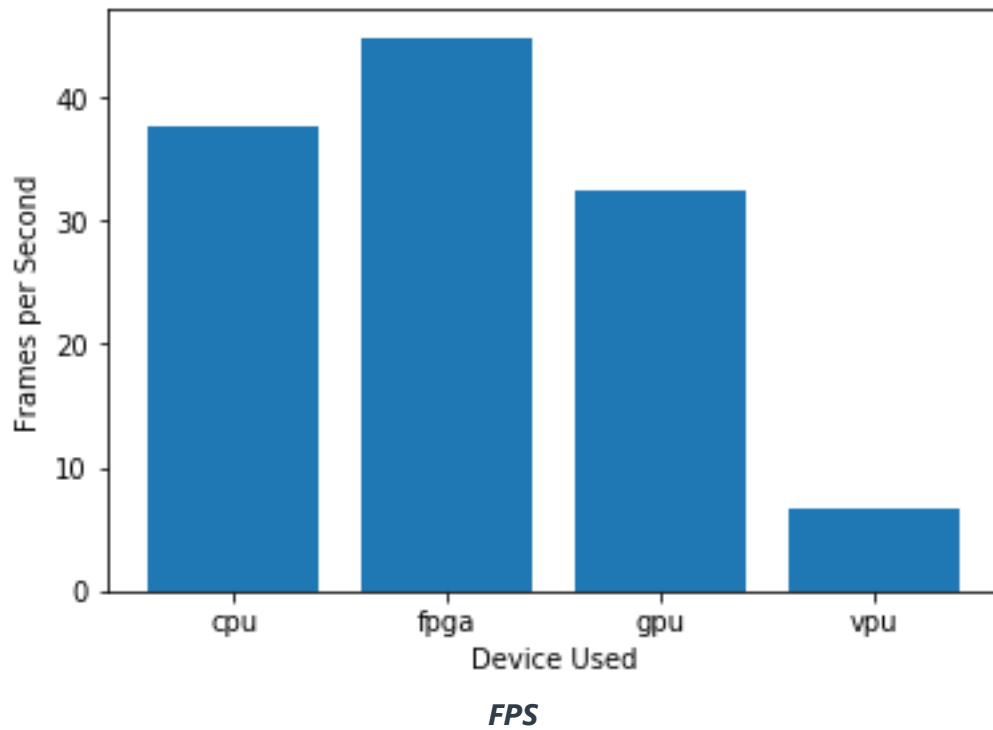| Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP32*

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).

UDACITY

Model Load Time

Inference Time

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
The client's requirement is mainly to avoid incurring extra hardware related and electricity costs while achieving optimum performance. Our proposed solution (CPU + IGPU) meets these requirements as its number of Frames Per Second, model load time, and inference time fall into acceptable ranges and does not incur extra hardware related and electricity costs.

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.

U D A C I T Y

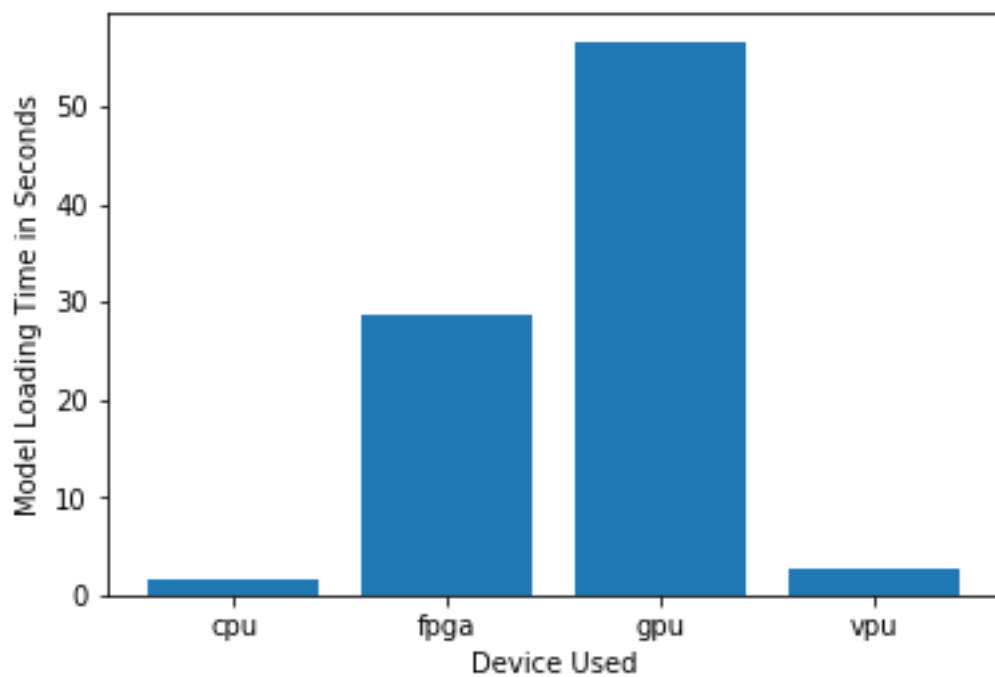| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *VPU* |

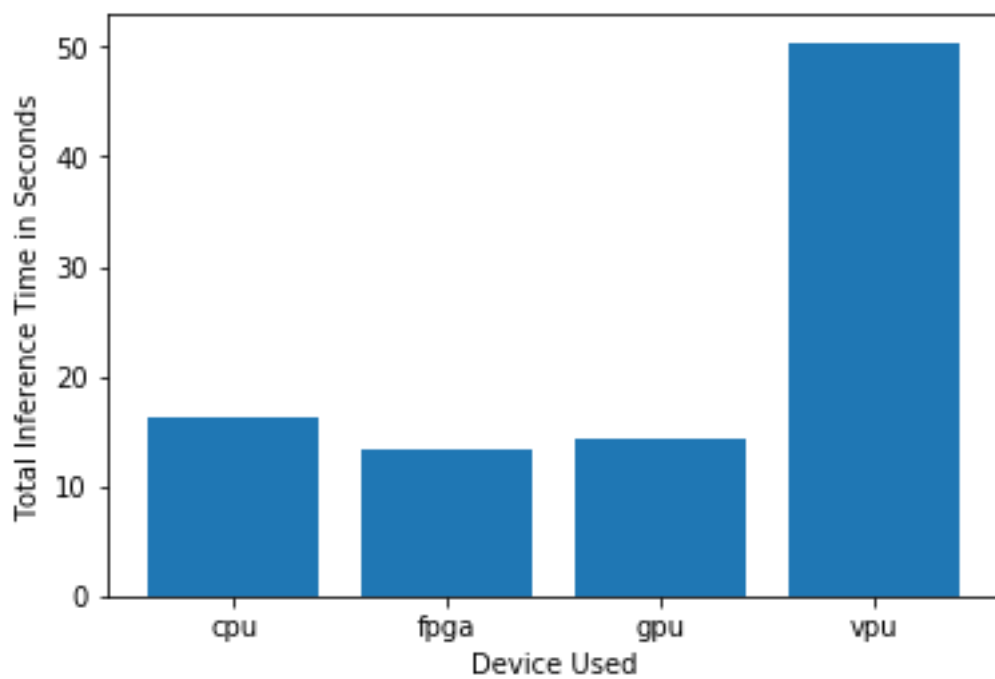| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client's budget is $300 per machine.	*The cost of the proposed hardware falls comfortably in this range.*
The client would like to save as much as possible both on hardware and future power requirements.	*The proposed hardware has low power consumption.*
The CPUs in the client's 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.	*The proposed hardware can run inference without utilizing the CPU.*

Queue Monitoring Requirements

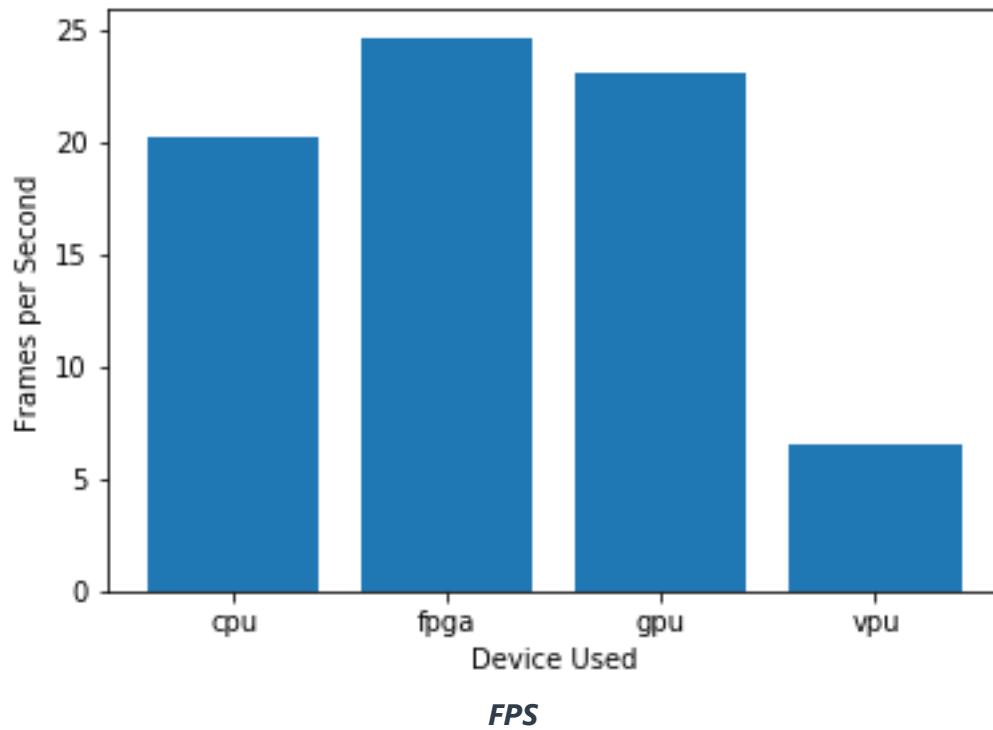| Maximum number of people in the queue	*7-8*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

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).

U U D A C I T Y

Model Load Time

Inference Time

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
The client's main requirements center around saving as much as possible on both hardware (budget of $300 per machine) and future power requirements while maintaining optimum operational efficiency. *Our proposed VPU hardware meets these requirements but there are a few downsides:* *While it has a low model load time which is great, it has the highest inference time and the lowest number of Frames Per Second (FPS).* *However since the client's primary requirements are low power and cost efficiency, the VPU is the best choice.*